

Strategic Review of the Australian Plague Locust Commission (APLC)

Part A – Background, Discussion and Recommendations

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Executive Summary

This report presents the findings and recommendations arising from a strategic review of the Australian Plague Locust Commission (APLC). These are discussed according to 6 broad strategic areas that came out of stakeholder consultation and associated analysis of issues raised. A more detailed discussion against the review terms of reference is also provided in part B of the report.

APLC is a strong organisation staffed by very competent and dedicated people who have a good record of achievement and who are internationally recognised in their field. APLC is particularly valued for maintenance of technical expertise and provision of advice. Overall, stakeholders considered that the APLC should continue to exist but did not seem to be fully meeting stakeholder expectations. There needs to be improvements made to the business model, better communications & marketing, improvements to surveillance and forecasting, a focus on maintaining technical expertise, improved understanding & confidence in control operations and a revitalised strategic science program.

A number of times during consultation it was evident that different stakeholders had quite different perspectives on the same issue. This is best illustrated by the events of 2010, including what gave rise to the 2010 plague and what APLC did about it or could have done about it. A detailed analysis of the 2010 plague is provided in the report. At the start of this plague cycle locusts were established over very wide areas at variable densities, but mostly densities were too low to commence control operations. APLC strategic control operations did remove some areas of very dense nymphs, thus reducing subsequent interstate migrations. However regarding the question of what level of operations could have prevented the plague, the probable answer is that it is not feasible to prevent a plague under these circumstances and that mitigation of impacts is the only feasible strategy.

Mandate, Policy and Area of Operations

The overall mission of the APLC is seen by stakeholders to be appropriate and the relative responsibilities of agencies are also about right. However the wording of the APLC charter currently provides too great an emphasis on control operations compared with the other APLC roles. There should be more emphasis on the APLC roles in monitoring, surveillance, forecasting and technical expertise, with control aspects being very strategic in nature. Agencies will continue to heavily rely on APLC for technical advice and intelligence given the infrequent nature of major locust outbreaks and the associated difficulty in maintaining expertise.

There may be value in linking the MoU to the new intergovernmental agreement on biosecurity and improving the profile of APLC within Australia's biosecurity system. It should also be recognised that there is significant expertise within APLC unrelated to locusts, such as aerial and remote area operations. This could be better utilised by the broader Australian biosecurity community at appropriate times.

The current, published boundaries for APLC's defined area of operations no longer reflect the primary scope of its operations (including monitoring and control), which creates confusion and unrealistic expectations on the part of stakeholders. It is proposed that APLC operations should be primarily based on defined criteria rather than published boundaries.

The current APLC guideline that control operations are conducted where there is “the potential to inflict significant damage to agricultural industries in more than one member State” prompted significant discussion. While it was agreed that this should continue largely unchanged, it was agreed that potential significant impact on the community should be added to the criteria.

Governance

There was an almost universal concern expressed during consultation that the committee of Commissioners is not working as effectively as it could. Establishment of a two level committee structure similar to that which exists for the other cost shared pest response programs is proposed. A high level committee representing each of the funders, as well as the Commonwealth environmental agency, would meet at least once per year to make strategic decisions on issues such as funding, key governance matters and strategic plans. A lower level, more technically based committee would be maintained to support the Director, APLC on more routine operational matters.

A number of unresolved governance issues that require the attention of the new committees are also discussed. These include the legal status of APLC as an operating entity, decision making rights, legal authority of APLC staff in various states, the status of its Commissioners in respect of occupational health and safety (OH&S) liabilities, APLC’s future involvement in low level aerial operations, and the longer term future of chemical control operations.

Communications

Probably the biggest current issue that needs to be addressed by APLC and member organisations is the need for a much better understanding between member and non-member organisations of the purpose, functions, capacity, performance and limitations of APLC. There needs to be much more open, transparent and active communications generally. APLC needs to take on an approach of pushing information out to its stakeholders and not rely on them seeking the information themselves. The revised communications strategy, which includes a revised website, should be aimed at improving stakeholder understanding of locust management in areas such as the roles of agencies, major locust control decision criteria, the science of locust control and performance of the locust monitoring & management system.

Resourcing and Budget

Generally the overall level of resourcing of APLC is adequate. In fact in recent years APLC has been underspent against budget, largely because of limited demand for control operations and delays in re-filling vacant positions. Recommendations and suggestions contained within this review will require some additional, but not excessive, investment. There are also significant issues around how to better deal with demand fluctuations and how to best manage the reserve fund, which will have a balance in the order of \$3.5 million at the end of 2011-12.

It is not feasible or practical to significantly increase staffing levels to maintain a standing army. The most likely way that capacity can be improved for APLC operations is through forming better partnerships with the States and LHPAs. A number of suggestions are made to facilitate a more flexible partnership approach,

which will also enable better utilisation of staff during quiet times, provide job enrichment and improve staff retention.

A detailed review of the current cost sharing formula is not recommended at this time.

Science

The Research Review Committee has been inactive for some time, with priorities determined internally and the research program results have not been communicated well to stakeholders. Development of science priorities requires deeper consideration and a somewhat different process is needed that will require more dedicated leadership. Use of an external facilitator and an internal science leader is suggested.

The focus of the science program should continue to be in the three broad areas of control agents, environmental stewardship and population ecology. Also suggested is redevelopment of the supporting information systems, more in-depth cost benefit analyses and documentation of “grey” literature and key unpublished research results.

Operations

There were strong views from State investors that multi-jurisdictional planning during the last major plague in 2010 was not effective. The process needs to be tightened when there are major plague events, more in line with other national emergency responses. A suggested process is outlined.

The current criteria for commencing a control campaign are considered appropriate, including the requirement for a minimum of 10km² of high-density infestation before commencing operations. However it is suggested that the wording in the operations manual be amended to reflect the degree of flexibility that is currently practiced. There should also be an emphasis on intervention early in the locust season based on monitoring information and where such control is feasible.

A common perception that APLC is increasingly risk averse reflects APLC’s need to manage risks such as environmental protection, expanding agricultural areas where aerial spraying cannot be used and increasing numbers of farms using organic production methods. These are all legitimate risks that need to be managed responsibly and no change is suggested apart from better communication.

It is suggested that the APLC Director should develop a formal workforce plan that addresses a number of internal staffing issues discussed in the report, including new skills & roles, succession planning and staff retention.

Finally, some of the recommendations and suggestions contained in this review represent a significant change in approach compared with current practices, will require culture change and may take some time to implement. Change will not happen automatically and will require careful management and strong leadership from the Director of APLC and his senior staff.

List of Recommendations

Mandate, Policy and Area of Operations

Recommendation 1. The mandate of the APLC should remain largely unchanged, but the wording of the memorandum of understanding (particularly the charter) should be modified to reflect the Commission's broader intelligence gathering role, its strategic monitoring & control functions and the provision of technical advice to stakeholders. These documents should also be reviewed to ensure consistency with the intent of the Intergovernmental Agreement on Biosecurity.

Recommendation 2. The APLC should implement its control operations based on defined criteria rather than geographic boundaries, with the primary focus being on early intervention to minimise the build-up of populations that may impact on agriculture and/or the community across more than one State.

Governance

Recommendation 3. The governance of APLC should be strengthened through establishment of a two level committee structure as follows:

- (a) a "National Plague Locust Management Committee" (the Commissioners) composed of representatives who have authority to make decisions on behalf of their agencies and who could form better linkages into the national biosecurity system, and
- (b) a lower level, more technically based committee ("Consultative Committee on Plague Locusts"), similar to the existing committee, would be maintained to support the APLC Director on more routine operational issues.

Recommendation 4. The governance of APLC needs to be resolved, particularly with respect to:

- clarifying its legal status as an operating entity,
- decision making rights and responsibilities of the investors,
- regulatory authority of APLC staff under state legislation,
- the liability status of its Commissioners in relation to OH&S and the future implementation of low level aerial operations.

Recommendation 5. The APLC should continue to place a high level of priority on planning and research & development that addresses environmental concerns associated with aerial application of insecticides.

Communications

Recommendation 6. The APLC should develop and implement a revised communications strategy, including a revised website, aimed at improving stakeholder understanding of locust management in areas such as the roles of agencies, major locust control decision criteria, the science of locust control and performance of the locust monitoring & management system.

Resourcing and Budget

Recommendation 7. The principles used in formulating the APLC budget, including the accumulation and use of the reserve fund, should be reviewed in the light of structural and procedural changes suggested in this review.

Science

Recommendation 8. A revitalised review, planning and leadership process should be applied to the APLC science program, with a strategic focus on the three key areas of control agents, environmental stewardship and population ecology.

Recommendation 9. The APLC should make a strategic investment in updating its key information systems, particularly those that support monitoring and forecasting and, where practicable, capture and document important corporate knowledge and unpublished research results.

Operations

Recommendation 10. In the event of a major locust plague, or where such a plague appears imminent, coordinated management, combat planning and integrated operational procedures should be implemented between APLC and all affected jurisdictions, more in line with other national biosecurity emergency response arrangements.

Recommendation 11. The current general approach by APLC to conducting control operations is supported, but a more cooperative approach with state and other agencies should be adopted to increase flexibility & operational capacity, including a national approach to training, joint training & operations, provision of technical advice and reciprocal service delivery.

Recommendation 12. The APLC Director should develop a workforce plan that addresses issues discussed in this report, including new skills & roles, job enrichment, succession planning and staff retention.

1. Introduction

The Australian Plague Locust Commission (APLC) is an organisation established within the Commonwealth Department of Agriculture Fisheries and Forestry (DAFF) through a Memorandum of Understanding (MoU) between the Commonwealth, New South Wales (NSW), Victorian, South Australian and Queensland governments for the control of plague locusts. The Charter of the APLC is provided in attachment 4.

This report presents the findings and recommendations arising from a strategic review of the APLC. The review was conducted according to the terms of reference listed in attachment 1.

Primary sources of information for the review were written documentation of the operations of the APLC and other reports of relevance, as well as interviews and meetings with staff and stakeholders. Key documents referred to are listed in attachment 2. Individuals and organisation consulted are listed in Attachment 3.

The conclusions and recommendations contained in this report are those of the reviewer and do not represent Australian government policy.

2. Background

2.1 Reason for and conduct of the review

Within the spirit of the APLC MoU, periodic reviews have been conducted of APLC activities, with the most recent being conducted in 2005. Following the very large outbreak of plague locusts that affected a number of States in 2010, some member States suggested that the next scheduled review should be more broad ranging, including a strategic examination of the role and functions of the APLC to guide future operations. Following several rounds of discussion between APLC Commissioners and their agency executives, the terms of reference in attachment 1 for a strategic review of APLC were finalised. These are quite detailed and are organised within 5 main areas:

- APLC mandate, charter & responsibilities
- Area of Operations
- Governance and resourcing
- Legislative and duty-of-care obligations
- Operational effectiveness

Consultation was conducted with key stakeholders using the framework within the terms of reference and the results of these discussions is reported in attachment 8 and a detailed analysis of the issues raised is discussed in section 6.

Following further discussion with the Commissioners, the main discussion section (3) is organised according to the primary strategic issues that arose from the analysis, namely:

- Mandate, Policy and Area of Operations
- Governance
- Communications
- Resourcing and Budget
- Science
- Operations

2.2 National policy context

There has been significant work conducted in recent years to improve the national biosecurity system. The key document arising from this reform is the Intergovernmental Agreement on Biosecurity (IGAB), which is an agreement between the Commonwealth, State and Territory governments (with the exception of Tasmania). The IGAB defines biosecurity as *the management of risks to the economy, the environment, and the community, of pests and diseases entering, emerging, establishing or spreading.*

This agreement identifies the roles and responsibilities of governments and outlines the priority areas for collaboration to minimise the impact of pests and disease on Australia's economy, environment and the community.

The IGAB has as its objectives (in summary):

1. Reducing the likelihood of significant exotic pests and diseases from entering, becoming established or spreading in Australia.
2. Preparedness for effective responses and management of exotic and emerging pests and diseases that enter, establish or spread in Australia.
3. Ensuring that, where appropriate, significant pests and diseases already in Australia are contained, suppressed or otherwise managed.

The objectives and functions of APLC clearly address IGAB objective 3.

The IGAB also incorporates a number of principles that should underpin the national biosecurity system. Particularly relevant to this review are:

- Biosecurity is a shared-responsibility between all governments, industry, natural resource managers, custodians or users, and the community.
- Activity is undertaken and investment is allocated according to a cost- effective, science-based and risk-management approach, prioritising the allocation of resources to the areas of greatest return.
- Relevant parties contribute to the cost of biosecurity activities.
- Governments, industry, and other relevant parties are involved in decision-making, according to their roles, responsibilities and contributions.

2.3 History of the APLC

The APLC was established in 1976 following a decision of the Australian Agricultural Council of Ministers and a subsequent exchange of letters between the Commonwealth and the States of New South Wales, Queensland, Victoria and South Australia. As an interesting aside, “Australian” in the name of APLC refers to the name of the locust, not the nature of the organisation, which does not have Australia wide responsibilities.

The primary purpose of establishing a dedicated locust control organisation was to overcome difficulties in organising national control of plague locusts. These natural pests can migrate over long distances and pose a threat to agricultural industries across multiple States. The impetus for the decision was the major infestation of 1973-74 which extended into all of the above States and involved several locust species.

The APLC has conducted a program of monitoring, forecasting, research and control since commencing operations in 1976. It was originally only responsible for control of the Australian plague locust, but in 1986 it was agreed that the commission should also manage two other species, the spur-throated locust and the migratory locust, in specific areas.

Funding for the APLC appears to be based on historical expenditure and agreements made at the time of commencement of the APLC. Prior to formation of the Commission, NSW was the State with by far the greatest routine expenditure on locusts. When the APLC was formed, the Commonwealth agreed to pay 50 percent and NSW, Victoria and South Australia had agreed to split their shares 35%, 10% and 5% respectively. Queensland subsequently saw advantages in becoming a member and offered 2.5%. Consequently the NSW share was reduced to 32.5%. In each case except NSW the contributions come from consolidated revenue. NSW's share is drawn from landowner contributions to Livestock Health and Pest Authority rates.

A Memorandum of Understanding (MoU) was signed in 2002 to formalise the agreed roles, responsibilities and accountabilities of the APLC and to incorporate changes agreed during the intervening years.

A Director manages the operations of the APLC and receives guidance from six Commissioners representing the contributing State and Commonwealth agencies. Key performance indicators are provided in section 4.6.

2.4 Current Memorandum of Understanding

The wording of the current MoU is reproduced in attachment 4. It has been unchanged since 2002.

The MoU covers a range of issues including: the overall purpose of the APLC; the roles & responsibilities of the member agencies, Director and Commissioners' roles; operation of the Committee of Commissioners; financial and reporting arrangements.

The specific roles of the APLC are set out under the APLC Charter within the MoU and are reproduced below:

Purpose

The purpose of the APLC is to control locust populations in those situations where they have the potential to inflict significant damage to agricultural industries in more than one member state.

Roles

1. Implement a preventive control strategy to minimise economic loss to agricultural industries caused by the Australian plague locust, spur-throated locust and migratory locust, with priority given to Australian plague locust.
2. Minimise risk of locust control to the natural environment, human health and markets for Australian produce.
3. Develop improved locust management practices through a targeted research program.
4. Provide a monitoring and forecasting system for operations conducted by APLC and member states.
5. Promote and facilitate adoption of best practice in locust control by member states.
6. Participate in cooperative national and international programs for development of APLC expertise.
7. Continually review APLC operations to ensure they keep pace with the expectations of industry, community and government.

The geographic areas within which APLC operates regarding each of the three pest species are defined through maps attached to the MoU. These are reproduced in attachment 5.

The boundaries were originally agreed upon by the Commissioners on the basis of where each species of locust is most likely to pose an interstate threat. They were described by using administrative districts and roads that existed in the 1970s. Recent changes and amalgamations of local government and biosecurity administration areas in Queensland and NSW have resulted in the current APLC boundary passing through districts.

2.5 Current work areas

APLC currently has its work organised against five functional areas:

Monitoring and forecasting.

The APLC monitors the population status of the three pest locust species using a range of information sources, including surveys undertaken by APLC field officers based at Longreach, Broken Hill and Narromine, light trap information and reports from the public and state agriculture authorities. This information is brought together with other information such as meteorological data through a geographic information system based decision support system that also includes a locust population model. This is used to produce short-term forecasts of likely locust development and possible population changes, which are summarised in the Locust Bulletin which is produced monthly.

Control.

The APLC field staff based at Longreach, Broken Hill and Narromine also conduct strategic control operations against substantial targets of locust bands and swarms (generally a minimum of 10 km² of infestations). However swarm control has been restricted in recent years owing to unresolved occupational health and safety (OH&S) concerns associated with low level flying. The main control agents used are fenitrothion, fipronil and GreenGuard. The latter is a naturally occurring soil fungus, *Metarhizium*, which is specific to locusts and grasshoppers, and has been developed as an environmentally friendly control for locusts.

Research.

APLC undertakes applied and targeted research on issues such as the cost and efficacy of control agents, the potential environmental and trade impacts of its control programs, population ecology to support monitoring and forecasting of locust populations, and locust control decision-making. There is considerable leveraging of funds through external funding providers and use of external research providers.

Environmental management.

This program aims to manage and minimise impacts on the environment resulting from locust monitoring and control operations, including the risks involved with pesticide use. A determination has been made by the Department of Sustainability, Environment, Water, Population and Communities under the *Environment Protection and Biodiversity Conservation Act 1999* that the Environment Minister's approval is not required at the commencement of each locust control campaign, provided there are no substantial changes in the way in which locust control is undertaken. There is an ongoing requirement to continually assess control actions and to implement continuous improvement in its locust control activities.

Communications and engagement.

A wide range of communication and engagement activities are undertaken to provide information, advice and support to stakeholder agencies, landholders and the general community. These include the Locust Bulletin, the APLC website, engagement with stakeholders and other promotional & awareness tools.

Budget.

The annual budget of APLC is approximately \$4.8 million. However in years with minimal control activity, the organisation is normally underspent against budget. It has been agreed with investors that unspent funds are retained in a reserve held by DAFF to allow for significant seasonal variation in locust control activity.

2.6 2010 Operations

Given that the experiences of stakeholders during the major plague of 2010 was a major reason for the conduct of this review, details of APLC control operations during that year are included, based on information provided by APLC.

Three distinct control campaigns were undertaken by APLC during the 2010 calendar year. These were:

1 At Tibooburra (NSW) in March 2010 (treating areas in NSW and Queensland)

Conducted 13-26 March 2010;
204,403 ha (2044 km²) treated over 73 targets; [1,698 km² NSW + 346 km² Queensland]
10 APLC staff engaged

2 Mildura (Vic) in October-November 2010 (treating areas in NSW and Vic)

Conducted 24 Oct - 11 November 2010;
41,734 ha (417 km²) treated over 65 targets; [246 km² NSW + 171 km² Vic]
9 APLC staff engaged.

3 Deniliquin (NSW) in November 2010 (treating areas in NSW).

Conducted 6-18 November 2010;
37,888 ha (379 km²) treated over 37 targets; [All NSW]
4 APLC staff engaged

A detailed discussion of what led to this plague is presented in section 3. The high density nymphal bands present in southwest Queensland (west of Quilpie & north of Thargomindah) in January 2010 could not be treated due to heavy widespread rain in that region at that time. APLC advises that had they been able to implement some control at that time, this would have reduced population size and extent later in that season, but would not have completely eliminated the widespread infestation evident during the period April-November 2010.

Time available for effective & efficient control of locusts in March 2010 in northwest NSW was limited by rain, life cycle stage and the inter-relationship between these factors. Northwest NSW received over 30 mm of rainfall across the entire region during the week 1 - 8 March 2010. Bands only began to form in the later nymphal stages due to the effects of rain; hence bands were only present for last 2 weeks of the nymphal phase before fledging commenced.

The 205,000 hectares treated in March 2010 represented the only area of high-density infestation (>50 per metre²) at that time. All bands visible across that region during that period were treated. Aerial surveillance well beyond the treated area did not reveal any wider, high density infestation. APLC staff undertook extensive aerial surveillance of southwest Queensland, Central and Western NSW and eastern South Australia as part of defining the March 2010 control campaign area.

There was some delay in treatment of infestation within National Park areas due to a late change in the operational policy of NSW Parks. However, those areas which had originally been mapped with high density infestation were all treated, even if the infestation had started to disperse with maturity. The same applied to areas outside

of the National Park. There was one target area (<6,000 ha) which was not treated as the landholder would not grant permission for treatment (APLC policy is that treatment only proceeds with informed consent of the landholder).

Areas outside of the treated areas were carrying a locust population, but at medium to lower density (<30 per metre²). The area infested at this level was millions of hectares, therefore containing tens of billions of locusts.

This very widespread medium to lower density population across very large areas was the real source of the 2010-11 problem, and it was not possible to do anything to effectively mitigate this, short of undertaking horizon-to-horizon blanket spraying across millions of hectares.

Part of the Determination ("dispensation"), which has been provided to APLC under the Environmental Protection and Biodiversity Control Act (see section 5.4) is that they only treat high density infestations in order to limit the areas which are subjected to application of non-specific insecticides. Treating areas with lower than high density band or swarm populations would put APLC in breach of that Determination and would work against their environmental duty of care.

The lower density infestations not treated (both outside and within the control campaign area) aggregated once these locusts had fledged and matured. Under other circumstances, APLC may have mounted a subsequent swarm control campaign (although this would have had limited impact upon the overall population). However, since 2008 APLC has been unable to undertake swarm control (which requires the low level use of helicopters) until issues of risk management raised by NSW have been addressed to their satisfaction.

The first post-winter generation in 2010 (hatching from the eggs laid in April & May) started in some areas of central west NSW in September, with the larger populations in southern NSW, eastern South Australia and NW Victoria appearing in October-November, hence the recommencement of APLC operations in October 2010.

2.7 Previous Review

The APLC has been the subject of periodic reviews in line with requirements of the MoU, the most recent being conducted in 2005 by Dr Kevin Sheridan. Many of the issues identified in this review were again highlighted in the current review. Hence the executive summary and recommendations of the Sheridan review are reproduced under attachment 7. Comments are included against each recommendation regarding whether the issue identified remains significant.

3. Strategic Discussion

A detailed discussion of the issues raised through consultation against the terms of reference is provided in section 6. Given the lengthy list of ToRs, there is a great deal of detail provided, including a range of suggestions regarding improvements to the operation of APLC. However there were 6 broad strategic areas that came out of this analysis, namely:

- Mandate, Policy and Area of Operations
- Governance
- Communications
- Resourcing and Budget
- Science
- Operations

In this section I discuss the issues raised against each of these strategic areas.

In a review of this nature, inevitably problems or areas requiring improvement will be highlighted, with less attention given to the positive qualities and achievements of an organisation. When read by staff members, this can be a somewhat negative experience. Hence, upfront it needs to be said that APLC is a strong organisation staffed by very competent and dedicated people who have a good record of achievement and who are internationally recognised in their field. In the words of the DAFF hierarchy, the APLC is a “terrific institution” that does a “fabulous job”.

Overall, stakeholders considered that the APLC should continue to exist. However APLC did not seem to be fully meeting stakeholder expectations and jurisdictions queried the extent to which they were receiving value for money. My view is that this is more perception rather than reality, caused primarily by poor communication between organisations. Nevertheless there needs to be improvements to the business model, better communications & marketing, improvements to surveillance and forecasting, a focus on maintaining technical expertise, improved understanding & confidence in control operations and a revitalised strategic science program.

A number of times during consultation it was evident that different stakeholders had quite different perspectives on the same issue. This is best illustrated by the events of 2010, including what gave rise to the 2010 plague and what APLC did about it or could have done about it.

Some of the questions asked were:

- if a primary purpose of APLC is to prevent locusts moving interstate, why did Victoria and South Australia experience such large outbreaks in 2010?
- why didn't APLC conduct operations in the channel country of Queensland in the spring of 2009 and autumn of 2010 to prevent these populations moving south?
- given the above, is APLC a good investment?

I will discuss this up front as it is front of mind for a number of stakeholders. This should be read in conjunction with the information provided in section 2.6. While some of this information may seem highly technical for a strategic discussion, I do not consider it possible for the expectations of investors to be addressed without a basic understanding of these technical aspects.

What happened in 2010 is typical of large plagues that have happened every 10 to 20 years in eastern Australia (there have been 8 major plagues in eastern Australia since the 1930's). Similar patterns to that in 2010 were seen in 1973-74 and 1999-2000.

A typical cycle starts when there are large populations present in central west and northwest NSW (or central Queensland or northern South Australia) that fledge (final moult from nymph to the winged adult) in spring. Adult locusts spread to many areas, including southwest Queensland. The start of summer rainfall in late November kicks off summer generation bands of nymphs during December/January. Following fledging of this generation, adults then breed and lay eggs in February, often with some southward migration into far northwest NSW and far north South Australia. The third generation fledges in late March and moves south to produce a plague. During a plague cycle, breeding also continues across a wide area in autumn.

In 2009 there were swarms that moved north from areas of NSW during November. This arose following very warm conditions in August and the population in central west NSW fledging in October. APLC forecast in late December that if rain were to occur in February there would be a plague. Swarms appeared in the Jackson-Nacowlah area of southwest Queensland in late November and the APLC forecaster contends that a large proportion of these were from NSW which gave rise to the subsequent channel country populations (surveys in that area in early November found no evidence of locusts).

Large hopper bands were present in the channel country in January 2010. APLC advises that these could not be treated due to heavy widespread rain in that region at that time. At the same time populations continued to develop in other parts of NSW, including the Riverina, far west, far southwest and central west. The adults from the January bands in southwest Queensland subsequently flew south and west and laid eggs in February in far northwest NSW and far northern South Australia. By March there were hopper bands over very wide areas of NSW and South Australia, and there were already populations in northwest Victoria.

Some control of the spring 2009 population was conducted around Coonamble. However conditions were very wet and APLC staff advise that additional operations would have been severely limited by this.

In the autumn of 2010 APLC sprayed 200,000 ha in northwest NSW (around Tibooburra) and southwest Queensland. This was the only significant area of high density infestation known at that time. Surveys in April in areas north of Tibooburra identified significant concentrations of adults, but no swarms. APLC was not able to undertake swarm control during winter, which requires the use of helicopters, owing to unresolved OH&S risk management issues.

It is difficult to judge the effectiveness of this operation in terms of reducing subsequent populations in other States, given the very large and widespread infestations evident at that time. Where there are lower density populations spread across large parts of NSW and Queensland, it becomes unrealistic to conduct meaningful control from both cost and environmental perspectives.

Nevertheless, APLC has supplied a case study (attachment 6), which attempts to quantify the benefits of the Tibooburra campaign. Despite the assumptions in this case study and the margin for error these introduce, it shows a positive benefit in

terms of reducing the size of the infestation and control costs in South Australia. However from South Australia and Victorian perspectives, they still faced enormous populations of locusts.

A question here is, if there is a major plague, is it worth doing anything? As one APLC staff member put it somewhat crudely but effectively, when comparing “shitloads versus shitloads plus 40%, it is hard to tell the difference”. APLC strategic control in the Tibooburra area did remove an area of very dense nymphs and did reduce subsequent interstate migrations. However locusts were already established over a very wide area at variable densities. What level of operations could have prevented the plague, or is this possible at all? There were swarms from the Riverina to far north South Australia at the start of April. The probable answer is that it is not feasible to prevent a plague under these circumstances and that mitigation of impacts is the only feasible strategy.

Bullen (1975) summed up this situation very well: *“Every member of the public knows that they eat vegetation and that their destructive powers are fabulous, so that locust swarms understandably engender a certain degree of public hysteria.”*

“This usually occurs at a point in a locust plague when populations are already so large that they are uncontrollable even by the largest and most efficient control organisations. Action is taken, usually at great public expense and almost always ineffectively, but it performs a useful public relations exercise.”

“...a more rational and much cheaper form of locust control is the suppression of the early stages of population increase rather than the very expensive and almost certainly ineffective policy of control action taken at or near plague peaks.”

The cost benefit study conducted by ABARES in relation to the 2010-11 program estimated a benefit cost ratio for APLC operations of around 50:1. The problem here is that this study is really about a different issue. The ABARES study measured the benefit of conducting control operations once the plague was established. The issue raised by Victoria and South Australia is whether the plague could have been prevented in the first place.

It is beyond the scope of this review to determine how effective plague prevention can be early in a season and this should be the subject of ongoing R&D. However operationally, early intervention is very difficult to do. When locusts are widespread at low density there is little that can be done apart from close monitoring. In fact widespread blanket spraying would place APLC in breach of the Determination that has been provided under the *Environmental Protection and Biodiversity Conservation Act 1999* (see section 5.4). It is suggest that the best strategy at this stage is to improve the quality and efficiency of monitoring and forecasting so that control operations can be mounted as early as is practical.

Given the above analysis, it is clear that APLC and stakeholders do not have a common understanding of what is potentially achievable and how much is within the capability of APLC. The recommendations contained within the following sections should address this and a range of other issues.

3.1 Mandate, Policy and Area of Operations

The overall mission of the APLC is seen by stakeholders to be appropriate and the relative responsibilities of agencies are also about right. This is a good example of the concept of shared responsibility in operation. However the wording of the APLC charter currently provides too great an emphasis on control operations compared with the other APLC roles. There was a common view amongst investors that APLC should be primarily an intelligence unit, with control operations being very strategic in nature.

These views are strongly supported, especially given the limitations to the scope of control operations that can be conducted by APLC now and possibly greater limitations in the future if environmental and other considerations further limit aerial application of pesticides. Other agencies will continue to heavily rely on APLC for technical advice and intelligence given the infrequent nature of major locust outbreaks and the associated difficulty in maintaining expertise.

The wording of the current MoU needs some tightening to reflect this more strategic focus. Specifically, there should be more emphasis on the APLC roles in monitoring, surveillance, forecasting and maintenance of technical expertise, with control aspects being very strategic in nature.

The wording of the purpose statement for APLC could be redrafted along the lines of:

The purpose of the APLC is to provide strategic intelligence regarding plague locusts and to undertake strategic control of locust populations where they pose a significant threat to Australian agriculture and/or communities, primarily where the impact may extend across more than one member State.

In addition, there may be value in linking the MoU to the new intergovernmental agreement on biosecurity (IGAB), which seeks to strengthen the collaborative approach between the Commonwealth and State and Territory governments to address Australia's broad range of biosecurity issues.

Recommendation 1. The mandate of the APLC should remain largely unchanged, but the wording of the memorandum of understanding (particularly the charter) should be modified to reflect the Commission's broader intelligence gathering role, its strategic monitoring & control functions and the provision of technical advice to stakeholders. These documents should also be reviewed to ensure consistency with the intent of the Intergovernmental Agreement on Biosecurity.

There were some views expressed during consultation that all control operations could be conducted at the State level. I do not support this idea fully, owing for the need for APLC to be involved in operations to maintain expertise and the need to maintain a capacity to respond quickly, especially to cross border issues. However I support more flexibility in terms of service provision (discussed later) and it is suggested that APLC operations need to be very strategically focused with an emphasis on early intervention, given its limited capacity. There were also views that APLC could take over all operations from the States, but this is considered unrealistic, as it would require a significant expansion of APLC and an associated reduction in overall efficiency due to the seasonal and cyclical nature of activity.

Another broader issue that deserves some further consideration is whether APLC should be limited to locust control or whether its role could be expanded to include other pests. I do not consider that APLC currently has significant reserve capacity to undertake management of another major pest. However this option could remain open under very limited circumstances. It is not considered that the MoU needs to be modified to reflect this option – it could be agreed by the parties at the time.

However it should also be recognised that there is significant expertise within APLC unrelated to locusts, such as aerial and remote area operations. This represents a significant investment by the States and Commonwealth and could be better utilised by the broader Australian biosecurity community at appropriate times. Development of better linkages into the biosecurity system is therefore encouraged and practical suggestions are made in a number of places in section 6.

In the area of maintenance of technical expertise and provision of advice, APLC is generally considered to be excellent and its advice is highly valued. An area where APLC does not currently have significant expertise is on-ground spraying operations. While it is not suggested that APLC commence on-ground control operations, it would be worthwhile for the organisation to be able to provide advice, especially for States like Victoria where infestations are infrequent, on-ground control is the primary method used and many staff need to be brought up to speed quickly. A suggestion regarding how this may be achieved is provided in section 6.

The current, published boundaries for APLC's defined area of operations no longer reflect its primary areas of operation. The boundaries were described many years ago, primarily based on the boundaries of the main agricultural areas, which have since expanded further west. In addition, APLC often does not have the resources to treat all locust bands within the defined areas.

This creates confusion and unrealistic expectations on the part of stakeholders regarding what APLC will and won't do in terms of operations. It has created a perception that APLC is pulling back from its responsibilities.

Having published boundaries at all also creates unintended expectations, that is, if there are locusts within the APLC boundaries, then APLC will treat them. However the reality is much more complex in terms of who will conduct treatments. APLC already uses a range of criteria to determine whether control operations will be undertaken (see section 5.2).

I propose that APLC operations should be primarily based on defined criteria rather than published boundaries. Although some APLC staff would prefer to retain published boundaries, most stakeholders supported the alternative proposal. An analysis of the advantages and disadvantages of the new approach is provided in section 6.

The criteria for determining whether control operations will be undertaken could include:

- Locust populations that are large enough and dense enough to warrant control operations.
- The population poses a threat or potential threat to agriculture or the community in more than one State.
- Locust populations early in the season that may contribute significantly to plague development should receive highest priority.
- Aerial control is feasible.

- Environmental or other considerations do not preclude broad acre treatments.
- APLC has the resources available to undertake operations.
- Where there are multiple potential control targets, priority will be given to operations that will have the biggest impact in terms of preventing further build up of locust populations over time.

To assist in communications, indicative maps could still be published as a guide to the areas where APLC operations are likely to take place.

Recommendation 2. *The APLC should implement its control operations based on defined criteria rather than geographic boundaries, with the primary focus being on early intervention to minimise the build-up of populations that may impact on agriculture and/or the community across more than one State.*

As is currently the case, the Director, APLC should have the ultimate decision-making responsibility. However good communication with stakeholders will be essential when there are decisions to not treat significant locust populations. This has been an issue in the past when there have been varying views regarding whether an operation should have been mounted.

A significant issue for some stakeholders is the current APLC guideline that control operations are conducted where there is “the potential to inflict significant damage to agricultural industries in more than one member State”. Locusts can move considerable distances within one State and it may be difficult to judge the potential interstate impacts of subsequent generations. While APLC practices flexibility in this area, there were views that the current criterion is too inflexible.

However it should also be recognised that the primary basis for the Commonwealth 50 percent investment in APLC centres around the multi-state criterion. This policy position was confirmed during a more recent discussion with the committee of Commissioners, but it was agreed that potential significant impact on the community should be added to the criteria (as reflected in the suggested purpose statement and recommendation 2). It is also important that APLC remains mindful of the need to exercise flexibility in this area.

Reflecting the earlier discussion on the important technical advice role of APLC, irrespective of whether an infestation is likely to impact on more than one State, APLC should continue to have a role in providing technical and operational advice to the affected State(s).

A number of other comments and recommendations made within this review will also need to be taken into account when redrafting the MoU.

3.2 Governance

There was an almost universal concern expressed during consultation that the committee of Commissioners is not working as effectively as it could and needs revitalising. Apparently this has not always been the case and it should also be noted that there have been a number of recent membership changes. Problems identified included:

- State Commissioners have been acting in a generally passive manner and not taking an active role in debating or contributing to issues. There is a perception that the Commissioners tend to “rubber stamp” papers presented at meetings.
- Some commissioners are at too low a level within their organisations to be able to represent the organisation effectively and to make commitments. Note that it was recognised that the Commissioners are appointed by the funding members to represent their own jurisdiction’s interests; hence arrangements and views will inevitably vary between member agencies.
- There was uncertainty whether the focus of the Commissioners should be more at a management level, or technical.
- Some Commissioners do not have a sufficient understanding of locust management from a technical perspective.
- There has been no fully involved strategic planning exercise since 2001.

Given the above, establishment of a two level committee structure similar to that which exists for the other cost sharing arrangements was discussed with stakeholders. With these arrangements there is a National Management Group (NMG) that considers higher level policy and financial issues, and most importantly makes financial commitments on behalf of funding parties; and a Consultative Committee (CC) whose role is to reach a consensus on the technical aspects of the response and to advise the NMG on relevant issues.

There was some attraction to this proposal amongst stakeholders, although problems with the normal NMG process were also identified, for example the routine nature of the majority of APLC business and the fact that not all States are funders. A more recent meeting of Commissioners discussed a modification to the NMG/CC model. The following is proposed.

- A high level committee representing each of the funders, as well as the Commonwealth environmental agency, would meet at least once per year to make strategic decisions on issues such as funding, key governance matters such as workplace health and safety and strategic plans. It may also meet more regularly during major plagues. The committee may be called something like “the National Plague Locust Management Committee”. In effect, these representatives will be the new “Commissioners”. Officers at the SES level would provide the required level of authority and it would be helpful if they were also able to form better linkages into the national biosecurity system. As with other national committees, decision making would be by consensus where possible, but there may be rare times when a formal vote is required.
- A lower level, more technically based committee (“Consultative Committee on Plague Locusts”), similar to the existing committee would be maintained to support the Director, APLC. Its role would be to assist in strategic and operational planning, budgeting, promotion of best practice, facilitating cooperation between agencies, and provision of strategic oversight of operations, including the evaluation and review process. Funding parties

would need to review their representation to ensure they have the right type of representative. Although members will be expected to gain a working knowledge of locusts and associated management principles, they should be acting primarily at a strategic level. Sub-committees may be established as appropriate, particularly when highly technical or operational issues need to be resolved.

There is also a need for the APLC to be more visible as part of Australia's biosecurity system and the above arrangements should improve this situation. I also suggest that a report should be supplied at least annually to National Biosecurity Committee (NBC) and to Standing Committee.

Recommendation 3. *The governance of APLC should be strengthened through establishment of a two level committee structure as follows:*

- (c) a "National Plague Locust Management Committee" (the Commissioners) composed of representatives who have authority to make decisions on behalf of their agencies and who could form better linkages into the national biosecurity system, and*
- (d) a lower level, more technically based committee ("Consultative Committee on Plague Locusts"), similar to the existing committee, would be maintained to support the APLC Director on more routine operational issues.*

Regarding involvement of non-funding stakeholders, these currently do not attend Committee meetings, apart from a representative of the NSW Livestock Health and Pest Authority (LHPA). The LHPA has been allowed to attend with observer status as the NSW funding contribution to APLC comes from that source. Given the shared responsibility principle – from the IGAB, one principle states "Governments, industry, and other relevant parties are involved in decision- making, according to their roles, responsibilities and contributions" - some consideration should be given to inviting an observer from a more representative national industry organisation such as the National Farmers' Federation. This would improve the visibility of APLC nationally and may facilitate better "buy-in" from key stakeholders. However I suggest that inviting multiple observers would not be advisable from a committee process perspective.

There are a number of unresolved governance issues that require the attention of the new committees.

Legal Status

There is some uncertainty regarding the legal status of APLC and in particular the Commissioners. Administratively, the Commission is part of DAFF and its staff are DAFF employees. However DAFF has also received independent legal advice that the APLC is an administrative arrangement that is not a legal entity in its own right but that it is similar in form to an unincorporated association. As such the office bearers (the Commissioners) may be found liable in negligence for the activities conducted by the association, irrespective of the office bearer's own individual contribution. This legal advice recommended that the employment contracts of Commissioners be reviewed to ensure that appropriate indemnities are included. The advice does not discuss the legal responsibilities of DAFF as the employer.

At the risk of moving outside of my area of legal expertise, I consider that further legal advice on this matter should be sought for the following reasons:

- Apart from stating “The Strategic Plan will be developed by the Director in consultation with the staff, Commissioners and other stakeholders, and finally determined by the Commissioners”, the wording of the role of Commissioners under the MoU does not indicate that they have any real decision making authority. Their role would appear to be mainly facilitation and advisory.
- In part, the role of the Director is to “manage all APLC operations and other activities”.
- APLC staff are DAFF employees and as such, it is presumed that DAFF would carry primary responsibility for their conditions of employment and day-to-day management.
- The contention that APLC is similar to an unincorporated association would seem at odds with the reality that it is essentially a Division of DAFF, which is a legal entity in its own right.
- It is understood that the intent of the Commission is to provide for joint funding and operations for a national locust monitoring and response program. It is not meant to be a separate legal entity.
- Irrespective of the legal status of the APLC, under Section 19 of the *Work Health and Safety Act 2011* a distinction is made between the duty of care afforded to the direct employer (S19(1)) and the duty of care for other persons as a result of work carried out as part of the conduct of a business or undertaking (S19(2)). The latter would appear to apply to APLC Commissioners who exert influence over APLC operations, albeit indirectly. While this would appear to afford responsibility on both the employers and the Commissioners, the more specific requirements set out under S19(3) would appear to apply more directly to the employer.

Hence it is suggested that further legal advice be sought that seeks to clarify the legal status of the APLC, and more importantly, the relative legal responsibilities of the Commissioners and DAFF as the employer. The advice could also consider whether any changes need to be made to the current administrative arrangements.

In many ways, the differences between the APLC MoU and other cost sharing Deeds are quite subtle in terms of their intent, the specific administrative arrangements, and in particular the roles of the associated advisory committees. Subject to the outcomes of the above legal advice, there may be some need to examine the other Deeds for the same reason, or at least to ensure that members of committees fully understand their legal responsibilities.

Decision making rights

A secondary issue raised by some stakeholders was the question of to who is the APLC is responsible. Although the APLC website states “The APLC director is accountable for all APLC activities to the Commissioners.....”, under section 10 of the MoU it is clear that the Director and staff are directly responsible to the Commonwealth department to which they belong. It is difficult to argue that ultimate accountability would lie anywhere but with the employing organisation.

However, under the MoU the Commission has an obligation to its funding partners to carry out its role and to provide appropriate reports. Clearly, funding partners can exert ultimate influence by withdrawing funding if the APLC is not meeting its obligations under the MoU. I consider that sufficient checks and balances are in place to ensure effective management and this will be further strengthened with the changes suggested in relation to the committee structure. No further action is suggested on this matter, apart from clarifying the situation in published literature.

Research Review Committee

A major issue identified by virtually all stakeholders was the inactivity of the Research Review Committee (RRC). I also gained the impression that, even when operating, the RRC process was not particularly effective. This is not acceptable considering the level of priority afforded to the APLC research program and the need for it to have a strong strategic focus.

A suggested process for revitalising the RRC process is provided in section 3.5.

Access Rights

APLC rights of entry onto land for routine monitoring purposes is in place in Queensland and NSW, but not currently for South Australia or Victoria. The latter has not been in place for some time. Staff were covered during the 2010 plague as a result of an emergency declaration, but this was only in effect during the period of the emergency. Staff are not currently covered in South Australia owing to a recent change to legislation, but it is understood that this is being addressed.

Further detail on the issue in Victoria is provided in section 6. Biosecurity Victoria advise that APLC staff will have to operate under the same rules and policies as Victoria's Authorised Officers, which according to APLC may not be practical in all situations. Essentially the issue needs to be resolved between the parties as a matter of priority.

There was a particular issue in Victoria during 2010 over the APLC insistence on individual landowner permissions needing to be obtained before undertaking aerial spraying, despite legal coverage as part of the emergency declaration in that State which obviated this need. Considering that the APLC approach is followed in all other States, and that there may be particular circumstances relating to individual farms that make aerial spraying contraindicated, it is considered reasonable for APLC to insist on this risk management practice.

Occupational Health and Safety

New OH&S legislation, which has enhanced the personal liability for officers and managers, has also brought changes to APLC operations, for example the need to better manage staff fatigue. This has reduced the number of control campaigns that APLC can conduct in any one year, but is reasonable and defensible.

The one issue of ongoing concern is the ability of APLC to conduct low level, helicopter flying, which is required to be able to effectively identify adult swarms for control operations. This is particularly an issue in NSW where higher standards have been applied since a number of accidents occurred in 2004-05. In fact, NSW DPI or the LHPAs no longer conduct low-level helicopter work. It is the reason that no APLC aerial operations were conducted during the winter of 2010.

In Queensland, low-level helicopter operations continue to be conducted, but training and procedures are being upgraded in the light of new OH&S legislation and a departmental review of helicopter use. Adult swarm control is not conducted in South Australia.

APLC has conducted a risk assessment for low-level helicopter work, which with risk mitigation measures, has been assessed as medium risk. This is currently before the Commissioners for endorsement, but there remain issues that need to be resolved between APLC and NSW. Part of this appears to be differing attitudes to risk based on previous experience, but there is also a fundamental questioning of

whether low-level helicopter operations are required at all. Based on technical explanations and evidence provided by APLC, I am comfortable that low level flying is generally the most effective way to identify adult swarms.

This issue can only be resolved through consultation & negotiation between agencies and further discussion at the Commissioner Committee level is a priority.

Capacity

It is apparent that APLC has less capacity to conduct the number of spraying operations than it has conducted in previous times. This has arisen out of the need to manage risks such as OH&S, staff fatigue etc. Hence in some years the need for conduct of spraying operations may exceed APLC's capacity to respond, where this was not the case previously. There is no way to avoid this reality and more flexible arrangements for conduct of operations will be required. In section 3.4 I discuss mechanisms for conducting operations in a more cooperative and flexible manner that will help address the capacity issue.

Recommendation 4. The governance of APLC needs to be resolved, particularly with respect to:

- *clarifying its legal status as an operating entity,*
- *decision making rights and responsibilities of the investors,*
- *regulatory authority of APLC staff under state legislation,*
- *the liability status of its Commissioners in relation to OH&S and the future implementation of low level aerial operations.*

Environmental Concerns

A major issue for APLC may be the future of aerial control per se. A cessation of this control method would necessitate major changes to APLC itself given its current reliance on this control method. It is likely that if this occurred, the role of APLC would revert entirely to R&D, technical support, monitoring and forecasting. Concerns about potential environmental damage caused by aerial spraying operations appear to be well recognised by APLC and there is significant ongoing work in this area. To further address this issue, APLC should include scenario planning within its strategic planning processes. It is difficult to predict how this will play out in the future, with a worst-case scenario being that no aerial spraying using insecticides will be permitted.

Virtually all stakeholders recognised this area as a key priority for ongoing R&D. There are also increasing social duty of care issues that need to be addressed, such as the increasing practice of organic farming and less tolerance from the public for the use of chemicals generally.

APLC will need to continue conducting R&D in this area and adapt its operational approach as community attitudes change and R&D brings new techniques. Whether the current reliance on aerial control operations can continue in the long term is impossible to say. However current evidence is that it is the most efficient control method available and the environmental harm caused is generally limited and transient. The new committees will need to keep a close eye on this issue.

Recommendation 5. The APLC should continue to place a high level of priority on planning and research & development that addresses environmental concerns associated with aerial application of insecticides.

Governance Tools and Planning

Regarding other governance processes used during “normal business” periods, there was some debate and comment about the need for operational plans and annual reports (not produced in recent years). The Director has advised that annual reports were largely being ignored by investors and as an alternative APLC has been producing a twice yearly report to Commissioners of achievements against key performance indicators (provided in section 5.6). One suggestion from stakeholders was that APLC should produce a business plan, including a strategic risk profile. It is suggested that the new committees should decide upon the appropriate governance tools to be used.

3.3 Communications

Probably the biggest current issue that needs to be addressed by APLC and member organisations is the need for a much better understanding between member and non-member organisations of the purpose, functions, capacity, performance and limitations of APLC. It is apparent that APLC has made a significant effort in this area in recent years, but lack of understanding and unrealistic expectations remain as significant issues.

In short, there needs to be much more open, transparent and active communications generally. APLC needs to take on an approach of pushing information out to its stakeholders and not rely on them seeking the information themselves. Overall there needs to be better reporting to stakeholders regarding APLC activities, not only of routine activities but also areas such as APLC involvement in overseas conferences and control operations.

Member organisations also need to play their own part in addressing this issue. For example, it was at times evident during consultation that, while a State commissioner might have a good understanding of an issue, the same issue was not well understood within his or her own organisation. All members should also be playing their part in engaging industry and keeping them informed on locust issues in general.

The role of APLC also gets confused in the media and with landowners. While the locust management objectives of APLC are clearly defined, distinct from those of State agencies and published on the APLC website, many stakeholders, particularly non-investor stakeholders do not have a good understanding of the relative roles. At the landowner level, this understanding is particularly poor. A number of agencies were only vaguely aware of the existence of APLC and had no real understanding of its role.

This lack of understanding is not surprising given the complexity of locust management arrangements, with at least 3, sometimes 4, levels having responsibilities for locust control – APLC, State government, local government / pest authority and landowners. The infrequent nature of locust plagues in many areas means that locust control and management arrangements will never be front of mind. This is always likely to be an issue given the complex national arrangements. However messaging through communications exercises and agency websites need to be mindful of this issue.

A related issue is the APLC website. The current site was revamped quite recently, and contains some very good information. However many stakeholders are seeking a greater level of detail, for example the criteria for commencement of operations as contained within the operations manual. Another request from stakeholders was for better, integrated mapping and that the maps should be interactive if possible. It is suggested that a professional web design person be engaged to review the overall website design.

There is also more scope for publishing of locust population dynamics, operational procedures and the underlying theory. For example the information explaining the 2010 plague provided at the beginning of this section was not readily available in published material and was compiled primarily through interrogating APLC staff. This is a very complex area and inclusion of easy to understand explanations would help with managing expectations.

Other issues that present communication challenges include:

- The criteria for commencing control operations, are not well understood and are seen as a “bit of a black box”. They are not published on the APLC website, so again the lack of understanding is not surprising.
- While there was no disagreement that the first priority for control operations is nymphal bands rather than adult swarms, it is often the adult swarms that are most visible to the public and a decision to not treat them can be difficult to explain.

While communication with the public can be improved and DAFF Communications people are attempting to improve the profile of APLC externally on an ongoing basis, heavy investment in this area is not warranted given the infrequent nature of major locust events. In general terms, the relative locust management roles of APLC and other agencies should be as clearly communicated as possible to stakeholders and landowners using routine communication channels such as agency websites and extension material, with a more intense focus in the lead-up to and during major locust outbreaks.

Finally, there was a call from stakeholders that results of research need to be better communicated, with better access to published results, especially environmental studies done on chemical controls. Published work and reports are listed on the APLC website and there are some good summaries of some of the main areas of research, but perhaps there needs to be a mechanism to push key results out to stakeholders. An annual summary report is an obvious answer, but there may be more innovative mechanisms that APLC can explore.

Recommendation 6. *The APLC should develop and implement a revised communications strategy, including a revised website, aimed at improving stakeholder understanding of locust management in areas such as the roles of agencies, major locust control decision criteria, the science of locust control and performance of the locust monitoring and management system.*

3.4 Resourcing and Budget

Generally the overall level of resourcing of APLC was not questioned, although there were some comments about the need to improve efficiency. In fact over the last few years APLC has been underspent against budget, largely because of reduced demand for control operations and delays in re-filling some vacant positions.

Recommendations and suggestions contained within this review, if accepted will require some additional, but not excessive, investment. Given the currently healthy budget position of the APLC this is considered manageable.

There are some associated issues that require consideration:

Management of the Reserve Funds

Currently the reserve fund, made up of accumulated annual budget surpluses, is managed within the DAFF accounts. The balance at the start of 2011-12 was \$2.4 million, but is anticipated to rise to around \$3.6 million at the end of 2011-12. No interest is earned. Some investors would prefer to see APLC maintain a separate bank account on which interest would be earned, but this is not feasible within the current status, structure and financial management arrangements within DAFF. The Commonwealth recognises both Commonwealth and state contributions as revenue, and is able to carry forward unspent revenue. This has been managed under an agreement between the DAFF Chief Finance Officer and the Australian National Audit Office. It is suggested that the new Committees reconsider the appropriate quantum for the Reserve fund, as well as review the drawdown arrangements.

How to deal with demand fluctuations.

According to APLC, the majority (~80%) of its expenditure is on activities other than control operations. Given that it is not a large organisation, its capacity to ramp up and conduct large-scale control operations during years such as 2010 is limited. This has become even more difficult in recent years since managing staff fatigue has become more important and staff retention has become more difficult. In fact APLC was underspent in 2010, primarily because they had not been able to fill some field positions.

It is not feasible or practical to significantly increase staffing levels to maintain a standing army. However a better mechanism is needed for ramping up operations during times of high demand. There are limited mechanisms to achieve this, given the specialised expertise required to operate aerial locust control operations. Private providers are unlikely to maintain this sort of expertise given the infrequent demand.

The most likely way that capacity can be improved for APLC operations is through forming better partnerships with the States and LHPAs. The jurisdictions have asked for a better relationship, including joint training exercises, joint operations and jurisdictions conducting operations on behalf of APLC. These strategies may not entirely solve this issue as the States will often also be involved in locust operations at the same time as APLC, but this will not always be the case. How this new, more flexible partnership approach may be put into effect will be a worthwhile task for the revitalised Committee of Commissioners.

“Just in Time” training packages should also be developed. There are many highly experienced field staff in jurisdictions who do not have locust control experience, but who have other related skills and could be brought up to speed very quickly with appropriate training.

Utilisation of staff during quiet times.

Although perhaps overplayed to an extent in some of the comments (staff have ongoing commitments in terms of training, monitoring etc), it seems that there are times when field staff quite simply get bored. A number of suggestions were made that would improve the relationships between organisations and provide job enrichment. These are provided in detail in section 6.3.4, but include joint training exercises, specialist roles and short-term placements or exchange programs with other workgroups.

Again, working up the feasibility and detailed arrangements to make this happen should be a task for the committee.

Staff retention

Staff leave organisations for many reasons, but the two issues highlighted during consultation were job enrichment and employment conditions. Implementation of some or all of the above suggestions should help address the job enrichment issue. Regarding conditions of employment, a detailed examination of this issue is beyond the scope of this review. However issues around pay level and permanency of employment were raised by a number of staff, so this does warrant further consideration by APLC.

I will make some general comments. The practice of employing new staff initially on a one year contract, although raised as a problem, is supported as it gives APLC the opportunity to assess the suitability of these people for ongoing employment – a much more reliable method than a straight interview type process for operational roles.

Regarding salary, the starting level of a new field officer is around \$50k per annum, which is about the same for similar roles in Queensland, Victoria and NSW. As a generalisation, salary levels tend to be higher in the Commonwealth for equivalent positions. The comment was also made that the level of the Director is lower than appropriate within DAFF. This directly affects the salary levels of subordinate staff. Hence if DAFF were to review salary levels, it is suggested that the positions of all APLC staff be considered as a group.

Cost Sharing Formula

Another issue raised during consultation was whether the current cost sharing formula should be reviewed. As outlined in section 2.3, the current funding proportions were originally established on a fairly arbitrary basis. Current cost sharing arrangements under the emergency animal disease response agreement and the emergency plant pest response deed use gross value of production of susceptible species as the basis for jurisdictional shares, with the commonwealth bearing 50% of the total costs. Pests and diseases are also categorised based on industry versus public benefit and this determines the proportion of costs borne by industry versus government.

A principle contained within the IGAB is that “Risk creators and beneficiaries contribute to the cost of risk management measures in proportion to the risks created and/or benefits gained (subject to the efficiency of doing so)”. On this basis it could be argued that industry should also contribute to funding the APLC as a major beneficiary. However it should also be recognised that landowners remain responsible for on-ground control costs on their properties, so do contribute in this way.

Following consideration of this issue I concluded that a beneficiary analysis would be too difficult, as the primary objective for locust control operations is to reduce the impact from locusts migrating to other States, hence it would be very difficult to measure. Other APLC roles, for example R&D would be equally difficult to determine objectively. Given the number of national programs currently under constant scrutiny, it is currently not a good climate in which to negotiate a new agreement.

Further, my feeling based on experience, is that the current proportions are not too far from the mark in any case.

Given the above issues, a clearer process for development & approval of budgets is suggested, an obvious role for the Committee of Commissioners.

Recommendation 7. *The principles used in formulating the APLC budget, including the accumulation and use of the reserve fund, should be reviewed in the light of structural and procedural changes suggested in this review.*

3.5 Science

The research program is currently not well communicated to stakeholders, with the outcome that many have the perception that research conducted by the APLC is in the doldrums, is too narrowly focused, or not well targeted. This is in fact not the case, with significant, worthwhile research being conducted and very good buy-in from external research providers. There is also very good leveraging of funds through external funding providers. However it is also reasonable that stakeholders would have this view, given that the Research Review Committee has been inactive for some time with priorities determined internally and the research program results have not been communicated well to stakeholders.

An important point to make here is that the program should not be just research focused. There is significant research and science conducted elsewhere that is relevant to supporting the operations of APLC. A significant role of the program is to investigate, document and communicate appropriate science knowledge that supports locust monitoring and control. Hence the program should be referred to as a science program, rather than R&D.

Development of science priorities requires deeper consideration than is currently the case and the new committees will need to consider a somewhat different process. The current Research Review Committee has not been working, largely owing to members having insufficient time to contribute. A process along the following lines is suggested:

- In the absence of an existing person from amongst the funders who has the time and commitment to coordinate the process, I suggest engagement of an independent, part-time, paid person to play a coordinating role. This person would need to have appropriate scientific credentials, as well as being experienced in consultation.
- A detailed planning process involving stakeholders would be run periodically (every two to three years) to review research and science priorities. The RRC would produce a strategic science plan following this process. The strategic science plan would be approved by the National Plague Locust

Management Committee and communicated to major non-member stakeholders.

- A detailed science and research plan that addresses the strategic priorities would be developed and updated annually by APLC, in consultation with the member agencies through the RRC (note that one of the current APLC research staff has updated the strategic research priorities document, but it has not been signed off and remains a draft).
- An annual process would be run, primarily between the RRC and researchers to review progress with existing projects and develop proposals for new projects.
- The annual APLC report would include science highlights.

A related issue is the fact that there are a number of people within APLC involved in R&D, as well as a number of external providers, yet there is no science leader to provide mentoring and leadership (most head office staff report to the Director). For example some researchers do not have formal scientific qualifications and oversight of experimental design is required to avoid wasted effort. It is suggested that a science leader as a part-time role be appointed from within the existing staff complement.

In terms of Science Priorities, the focus should continue to be in the three broad areas of control agents, environmental stewardship and population ecology.

Control Agents

A longer term threat to APLC aerial control operations is the availability of chemicals into the future. Increasing scrutiny of the environmental effects of chemicals, more stringent registration requirements and reduced R&D by chemical companies mean that the future use of at least some of the current chemicals may be limited. For this reason, ongoing research by APLC into new and alternative treatment methods is critical. Some specific areas highlighted during consultation were:

- Better chemical use techniques, especially in high risk areas.
- Alternative “softer” and more targeted chemicals.
- Application techniques to minimise spray drift and maximise effectiveness.
- Alternative control methods, including plowing of egg beds, use of locust parasites, new biopesticides.

Environmental Stewardship

As well as the need to investigate new control techniques, there is an ongoing need to quantify the risks associated with use of chemicals to support ecological risk assessments. APLC is doing some good work in this area in conjunction with external collaborators and this needs to continue. Ongoing communication of the outcomes of this work is essential to demonstrate APLC’s efforts in environmental stewardship and in identifying priority areas for future R&D.

Population Ecology

Given the high priority and value placed by stakeholders on forecasting and intelligence gathering regarding current and future locust plagues, this is an obvious focus area. Areas for research include:

- Detailed investigation of a range of aspects of locust ecology to improve the underlying biological parameters that drive the forecasting model, including diapause, reproductive output and the impact of natural pathogens / parasites.

- Population dynamics and modelling of locust populations.
- Better forecasting methodology and software.
- Implications for leaving areas untreated when locusts are too widely spread for cost effective control.
- Climate change impact.
- Remote sensing.

A note of caution is required in this area. While the current forecasting and intelligence reports provided by APLC are highly valued, stakeholders are seeking higher quality, more up-to-date and more objective, scientifically robust forecasts. The forecasting system is seen to currently rely too much on the experience of APLC senior staff. While ongoing investment in forecasting technology is supported, investors need to understand that the population dynamics of locusts across the Australian landscape are very complex. Hence there are significant limitations on the ability of tools such as computer models to accurately predict the future size and extent of populations. . These will most likely continue to be tools to support decision-making by experienced people applying an additional level of experience-based judgment, rather than be the primary forecasting method.

Recommendation 8. *A revitalised review, planning and leadership process should be applied to the APLC science program, with a strategic focus on the three key areas of control agents, environmental stewardship and population ecology.*

A number of other issues in the science area also require some attention:

- Some of the information systems used within APLC, particularly those used for forecasting are, by the admission of APLC staff, “old and tired” and should be rebuilt.
- I consider that a more in-depth cost benefit analysis of different aspects of locust control may be of value. For example, longitudinal cost benefit studies to gain a better appreciation of the value & effectiveness of preventative control actions.
- Within APLC there is a great deal of grey literature / unwritten wisdom (knowledge gained from experience) that has never been documented. This is a difficult area that all organisations suffer from to a more or less extent. Nevertheless, efforts should be made to document key areas where possible.
- There are also significant unpublished research results within APLC, particularly work done by researchers who have now left the organisation. Again, this is a difficult area, but at least there should be documentation of the outcomes of research within APLC procedures & manuals where operational procedures are based on that research.

Recommendation 9. *The APLC should make a strategic investment in updating its key information systems, particularly those that support monitoring and forecasting and, where practicable, capture and document important corporate knowledge and unpublished research results.*

3.6 Operations

Planning and coordination

There were strong views from State investors that multi-jurisdictional planning during the last major plague in 2010 was not effective and that the multi-jurisdictional forum was more about information sharing than a planning forum. Significantly, each agency, including APLC, had their own plans but there was no over-arching national plan.

The process needs to be tightened considerably when there are major plague events, more in line with other national emergency responses. The following process is suggested:

- The Commonwealth would take a greater leadership role in relation to the overall national program, including initiating and chairing Consultative Committee meetings.
- An overall national response plan would be produced. This would be a higher-level strategic document focusing on objectives and broad strategies for the national program.
- Jurisdictional and agency response plans would refer to the national plan. Preferably a standard format would be used, similar to that used in other national responses.
- Consultative Committee meetings would be scheduled by the Commonwealth on a regular basis with a focus on addressing strategic control issues, cross border issues etc. It is suggested that recommendations from recent reviews of Consultative Committees be incorporated into Committee processes. For example, it is important for Consultative Committee to meet face to face early in a response to ensure that all parties gain a good appreciation of the issues at hand.
- The National Plague Locust Management Committee would be convened by agreement.

A specific issue to consider is when such a formal response starts; given that relatively routine locust control operations happen most, if not all, years. It is suggested that this should occur by consensus and that the trigger for discussing the commencement of a formal national response would be when there is a “major plague” according to the APLC classification system – “500,000 hectares or more of agricultural land affected by invasion of dense bands/swarms”; or such a situation is forecast based on monitoring information. Where the situation is unclear but there are significant warning signs, it is suggested that this warrants a face to face meeting to fully consider the situation.

Recommendation 10. *In the event of a major locust plague, or where such a plague appears imminent, coordinated management, combat planning and integrated operational procedures should be implemented between APLC and all affected jurisdictions, more in line with other national biosecurity emergency response arrangements.*

Criteria for operations

The criteria for commencing a control campaign are well documented within the APLC Operations Manual (see section 5.2) and the criteria seem appropriate. The only element that was seriously questioned during consultation was the requirement for a minimum of 10km² of high-density infestation. This is in line with the focus suggested earlier for APLC activities, that is, large, strategic infestations. APLC also advised that there are technical reasons for the current approach (including start-up

costs), but agreed that some flexibility should be retained. There may be good strategic control reasons for treating a smaller area and APLC advise that smaller areas are treated at times. Hence it is suggested that the wording in the operations manual be amended to reflect this degree of flexibility.

As discussed earlier, there should also be an emphasis on intervention early in the locust season based on monitoring information and where such control is feasible.

Some stakeholders also had an overall impression that APLC did not conduct enough operations during 2010. The basis for control operations conducted that year is explained in section 2.6 and appears to be reasonable under the circumstances.

There were a number of comments that APLC is increasingly risk averse and that this has affected the scope of its operations. These observations reflect APLC's need to manage risks such as environmental protection, expanding agricultural areas where aerial spraying cannot be used and increasing numbers of farms using organic production methods. These are all legitimate risks that need to be managed responsibly and I found no evidence that the APLC approach should be changed, apart from better communication with stakeholders regarding these aspects of their operations.

Monitoring

Regarding monitoring of locust populations, the general view was that this is a critical role for APLC and that if anything, it should be strengthened and broadened in geographic scope. There was also strong support for broadening the use of other contributors to provide data into the monitoring system, for example landowners and others who are "out and about" and may make useful observations. Investigation of remote sensing was also suggested.

Broadening of the contributors into the monitoring system is supported as a general principle but APLC staff advise that they already utilise external contributors over a very wide area. The main associated issue relates to data integrity and risks such as over-estimating locust prevalence. While there are many people out there who can provide useful information and make the whole system more accurate and efficient, data quality will be variable. Continued on-ground monitoring operations by APLC field staff is considered necessary to ensure adequate coverage and to validate external data.

Use of external data also requires careful management in terms of data integrity & relevance and there are ongoing challenges in maintaining enthusiasm, especially when locusts haven't been an issue for a while. Better information systems will be required as outlined in section 6.5 to manage the data, as the current system does not flag the source of the data.

Cooperation across agencies, including training

There is a strong desire on the part of funding parties to work more effectively in partnership with APLC and as discussed previously this should improve the surge capacity of APLC.

The perception of the States is that APLC has withdrawn from its role in assisting the States in training or participating in joint training exercises. According to APLC there has been no conscious decision in this regard. Given that a primary role valued by

fundlers is maintenance of expertise regarding locusts and locust control, it is considered that its role in training should be revitalised.

A number of ideas to make improvements in this area are provided in section 6.

Recommendation 11. *The current general approach by APLC to conducting control operations is supported, but a more cooperative approach with state and other agencies should be adopted to increase flexibility & operational capacity, including a national approach to training, joint training & operations, provision of technical advice and reciprocal service delivery.*

Internal Staffing

Staff succession planning was seen as a significant issue within APLC, given the age of some very experienced staff. This issue may be overplayed to an extent considering that there are some good, younger staff within the organisation and that the issue has been recognised by management. However it is recommended that the Director continue to take this issue into account within his planning for the organisation. The earlier suggestion about capturing grey literature will also help in this regard. The APLC Director should develop a formal workforce plan that addresses issues discussed in this report, including new skills & roles, succession planning and staff retention.

In terms of the mix of skills within APLC, I consider that the current most significant current deficiency is the lack of a population modeller. This capability will be essential given the need to redevelop the forecasting toolset and further develop population models.

Another role that should be considered is one or more specialist extension officers to enhance the technical advisory role of APLC that is so valued by stakeholders. Part of this role would be to gain experience in on-ground control methodology where APLC does not have significant expertise. Depending on budget, existing positions may need to be redefined to accommodate this change.

Having spent some time in the APLC Canberra office and witnessing a healthy level of camaraderie amongst staff, I was a little surprised that poor internal communications was raised by APLC staff as a significant issue. This appears to have arisen from a lack of formal group meetings and discussion forums, so it is suggested that these be re-instituted. Recognition of new roles within the organisation, such as the suggested research coordinator should also help this situation.

Recommendation 12. *The APLC Director should develop a workforce plan that addresses issues discussed in this report, including new skills & roles, job enrichment, succession planning and staff retention.*

Change management

Finally, APLC is seen by a number of stakeholders to be insular and resistant to change. My view is that this is only partly true, but perception is reality. Some of the recommendations and suggestions contained in this review represent a significant change in approach compared with current practices, will require culture change and may take some time to implement. Most importantly the organisation needs to become more outwardly focused and be responsive to client needs. Change will not happen automatically and will require careful management and strong leadership from the Director of APLC and his senior staff.