

BIOSECURITY SYSTEMS OF HAWAI'I: AN EVALUATION AND RECOMMENDATIONS FOR REFORM

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Executive Summary

Purpose of the Report

This report was prepared in response to the request from the Hawai'i Conservation Alliance for an examination of Hawaii's biosecurity systems, comparing them to an "ideal", and identifying priority improvements.

An Ideal Biosecurity System

Biosecurity is a term increasingly used internationally to encompass prevention, containment and control of alien species to protect economic, social and ecological values.

An effective biosecurity system should:

- Comprised an integrated package of approaches to preventing, eradicating, containing or controlling alien species so that their impacts on societal values are reduced to an acceptable level or eliminated.
- Be designed to allow issues to be targeted in the most cost-effective way.

Overall Effectiveness of Hawaii's Biosecurity System

Many of the elements of a system are in place, being run by professional and dedicated people. But not all elements are there, and the processes necessary to turn them into an integrated system are lacking. Agencies are impeded in their work by inadequate powers, resources and public support.

As a result, the system is failing to deliver what Hawai'i needs.

Serious pests are entering Hawai'i, and moving between islands.

Even where their presence is recognised at an early stage, they are not being effectively tackled before they spread. Money is being wasted on inefficient or ineffective programs, and not being provided for important and potentially cost-effective programs. No-one has the job of looking at the costs of alternative strategies for the whole of society, so decisions are being based on narrow agency or sectoral interests.

Hawai'i is, therefore, paying a far higher price overall than necessary for the privilege (or obligation) of trading with a world that contains millions of organisms that are unable to move to Hawai'i without human help. A few examples of this are provided, including:

- Little fire ants have arrived, but have not been contained, despite the feasibility and low cost of achieving containment. They have the potential to devastate Hawaii's coffee industry.

- Delays in responding to *Salvinia* cost Hawai'i around \$2 million for removal and containment.
- Much of the effort to control coqui frog and *Miconia* will be wasted in the medium to long term, when no comprehensive, strategic program is in place.
- The ability for the people of Hawai'i to enjoy their relaxed, outdoor lifestyle would be greatly reduced by the introduction of West Nile Virus or malaria. Those diseases would also severely affect the tourist industry. Basic quarantine systems that could keep them out are absent, despite the low cost of prevention in comparison to the ongoing costs of health management when they arrive.

That said, major progress has been made in recent years, and there is a strong base to build from. Hawai'i can be proud of what it has done, but the journey has only begun and there is still a high risk that much of what has been gained could be lost.

Conclusions

The report contains a large number of detailed recommendations. These can be summarised within the following broad conclusions.

- **Hawai'i does not need to radically change the direction of its current reform initiatives.** Most agencies are beginning to move tentatively away from an ad hoc approach to biosecurity towards a more strategic treatment of the work as part of core functions, and from a narrow agency perspective to a wider, more cooperative approach. **But the pace of change must accelerate if serious economic and social costs are to be avoided.**
- Progress so far has been driven by individuals at lower levels in the agencies. **Leadership is now needed at the highest levels in agencies and the legislature.** The process of and results of reforms must be embedded in organisational structures and procedures, not continue to rely on individual efforts. Biosecurity must become a core government program, with stable funding.
- Hawai'i must gain recognition within the federal systems as a State that not only has different circumstances, and which therefore needs to be treated differently, but also as a State that is active within the limits of its mandate. **Federal pre-emption presents its challenges, but these can be overcome with a concerted effort.**
- **The HISC and CGAPS must be actively built into effective coordinating mechanisms.** Hawai'i cannot afford to continue wasting resources on ineffective systems, and effective systems can only be built through collective action by all State and federal agencies.
- **Actions must be based on assessments of the relative costs and benefits of different approaches to individual pests and pathways.** The current focus on prioritising actions within existing individual agency resources is improving agency effectiveness but not optimising effectiveness for Hawai'i.
- **Decisions must be made promptly and efficiently.** Non-decisions and delayed decisions are serious obstacles that must be tackled urgently.
- **Improved methods must be developed or borrowed, and used consistently.**
- Hawai'i cannot wait until it has a strongly supportive public, but in the long run that will be essential. Maui shows that building community support is both feasible and valuable. **There needs to be an active, coordinated strategy for building community and sector awareness and involvement.**

Report Background

Purpose and Basis for the Report

This report was prepared in response to the request from the HCA for an examination of Hawaii's biosecurity systems, comparing them to an "ideal", and identifying priority improvements.

My biosecurity policy experience comes largely from over a decade of work within the Convention on Biological Diversity, in New Zealand, and with the Galapagos biosecurity system (SICGAL).

The report is based on the information provided in interviews with agency professionals, with limited direct observation of the systems. It is not so much an outsider's view of what should be implemented, as an outsider's compilation of the views of about 30 professional biosecurity experts within Hawai'i about what should happen, filtered and expressed through my conceptual understanding of biosecurity. I take full responsibility, however, for the conclusions and recommendations contained in this report, which cannot be attributed to any of the many experts who provided input to the project.

The report has been pared down to core findings and recommendations, given that the target audience is managers and politicians rather than technical experts. Further details of the evidence and reasoning behind these findings can be provided on request.

An Ideal Biosecurity System

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- Be designed to allow issues to be targeted in the most cost-effective way.

Appendix 1 sets out my views of what would be the elements of an "ideal" biosecurity system.

Appendix 2 addresses in more detail the issue of cost-effective targeting.

Overseas Comparisons

The New Zealand and Galapagos experiences are very relevant to the Hawai'i situation.

The Galapagos is, like Hawai'i, an isolated island archipelago that is part of a larger, continental, country. Ecuadorean law and practice has recognised that the Galapagos must be treated differently to the mainland, with the result that the Galapagos has been able to build a functioning system despite the fact that this is effectively lacking on the mainland.

The Galapagos biosecurity system was largely designed to protect the natural ecosystems on which its tourism industry is based, and to protect human health. Like Hawai'i, the Galapagos imports most of its food, and agriculture is not a large economic sector.

In contrast, New Zealand (like Australia and Chile) has built a world-class biosecurity system largely to protect its domestic agriculture. The agriculture, horticulture, forestry and other primary production sectors have pushed for tough rules and enforcement, and experience no conflict between this position and their support for free trade arrangements. That system coincidentally protects human health, biodiversity and other public values.

In both New Zealand and the Galapagos, there is strong public support for biosecurity. In the Galapagos, this support has been built from almost zero base in less than a decade, in parallel with the creation of the system.

Overall Effectiveness of Hawaii's Biosecurity System

One of the people interviewed, when asked what improvements they would make to the biosecurity system, replied after some thought "We don't have a biosecurity system to improve". That judgement is both accurate and unduly harsh. Many of the elements of a system are in place, being run by professional and dedicated people. But not all elements are there, and the processes necessary to turn them into an integrated system are lacking. Agencies are impeded in their work by inadequate powers, resources and public support. As a result, the system is failing to deliver what Hawai'i needs.

Serious pests are entering Hawai'i, and moving between islands. In recent years over 100 new naturalisations have been recorded each year by the Bishop Museum. These figures are far less than the real rate of introduction, given the low level of systematic surveillance and the lack of surveys for such groups of organisms as soil insects, fungi, etc. One expert estimates that there is now one new species established every 3-4 days.

Even where the presence of a new arrival is recognised at an early stage, they are not being effectively contained before they spread. Without comprehensive containment and eradication scenarios money is being wasted on inefficient or ineffective programs, and not being provided for important and potentially cost-effective programs.

Hawai'i is, therefore, paying a far higher price than necessary for the privilege (or obligation) of trading with a world that contains millions of organisms that are unable to move to Hawai'i without human help.

Nevertheless, major progress in biosecurity has been made in recent years, and there is a strong base on which to build. The Invasive Species Committees (ISCs) are an example of new initiatives that are tackling major gaps in the system with enthusiasm and professionalism. The amount of resource devoted to this area has increased, and awareness at public, agency and political levels has also grown. Improved techniques have been introduced, for example the Hawai'i Department of Agriculture (HDOA) species risk assessment/targeting systems have increased interception rates.

There is clear evidence that most agencies are beginning to move tentatively away from an ad hoc approach to biosecurity towards a more strategic treatment of the work as part of core functions. There has also been a movement away from a narrow agency perspective to a wider, more cooperative inter-agency approach. Creating and maintaining a strategic interagency biosecurity approach, and adjusting internal agency programs to deal with wider public value sets will be difficult, and will require strong support between agencies and from the broader conservation community. In particular, HDOA is a key agency, and needs to embrace,

implement and demonstrate its recently acquired role as a broad biosecurity agency that serves interests other than agriculture (notably biodiversity).

Many of the gains in the past few years have shown that individuals can make a difference – journalists who promote the issue, politicians who take actions, agency staff who step outside their narrow responsibilities and take a broader view. But there have also been too many examples of keen individuals being ground down by the systems they are working in, or of initiatives faltering when the leaders move elsewhere. Hawai'i must actively nurture and support its leaders, who will continue to be the source of innovation and major direction changes. But it must also ensure that new initiatives are subsequently embedded in law and policy, and given core funding, allowing their continued implementation as leadership focus moves to new frontiers.

In summary, Hawai'i can be proud of what it has done, but the journey has only begun and there is still a high risk that much of what has been gained could be lost.

Little Fire Ant

LFA is in Hawai'i. Its arrival was tracked, its location is known, it is still not widely distributed, but it is not being contained and there are no eradication plans. Hawai'i has and continues to build a multi-million dollar coffee industry. When fire ants invaded coffee plantations in the Galapagos, the industry collapsed because no-one was prepared to harvest infested plants. There is no reason to believe that the industry in Hawai'i can survive the invasion of LFA if action is not taken now.

Erythrina (Wiliwili) Gall Wasp (EGW)

This wasp probably originated in Africa, and spread gradually across the Pacific to Hawai'i. On arrival, it spread very rapidly, and is in the process of killing most introduced and native Erythrina species. All populations in Hawai'i are infected with EGW. No action was taken prior to its arrival, despite several years warning. Only one action is now being implemented – biological control. Yet many professionals believe that the important native wiliwili community will be severely damaged over most of its range before successful biocontrol is found and used. The option of eliminating introduced Erythrina species and allowing the natural dormancy period of the native species to interrupt the wasp breeding cycle has been posed by scientists privately, but is not being examined by anyone with authority to make a decision on the best method to maintain the native species.

Salvinia

Salvinia provides a good lesson in the cost of delaying action. Proposals for eradication were canvassed by scientists when it was only occupying one small lake. Eradication at that stage would have been easy and cheap. But no action was taken until it had been spread to other areas, by which time the cost of removal had escalated to \$2m.

Coqui Frogs and Miconia

These are major problems on some islands, and either not present or subject to successful control/eradication programs on others. Millions of dollars are being invested in control, but there is no inter-island quarantine to prevent reinvasion and spread, meaning that the investment is not being spent in a way that will deliver maximum bangs for bucks. Current control programs do not have long term funding and authorities, and as a result some programs have already been prematurely stopped, with the consequent waste of much of the previous investment.

West Nile Virus and Malaria

These are two serious human diseases that are not yet in Hawai'i. There is no reason to believe that they will not arrive, given that some basic quarantine defences (e.g. spraying of aircraft interiors, effective quarantine for containers of Christmas trees, prohibition on water in used tyres and similar imports) are absent, and an effective early response system is also lacking. When they arrive, the effect on the population and the economy will be severe – lost tourism income, increased health costs, reduced productivity, control costs, effects on lifestyle, etc. I could find no evidence that a proper cost-benefit analysis of prevention versus response, comparing the likely costs of various options, had been undertaken and an informed decision on the approach that should be taken made by those who should be responsible.

Not much nature left

Like most isolated island systems, Hawai'i has high levels of endemism and stunning examples of what evolution can generate – silverswords, showy snails, fascinating birds. But it also has an unenviable international reputation for its levels of extinctions – e.g. it has a bird extinction rate even higher than New Zealand's embarrassing figure. But what is left is far from safe, and largely invisible to the public. Extinctions are continuing, and many remaining populations and ecosystems could suddenly collapse if new alien species arrive – West Nile Virus could destroy many of the remaining bird populations for example.

Few of Hawaii's citizens can interact with terrestrial native species on a daily basis. To reach natural areas requires a long journey into the hills, or an excursion into the ocean. There are few accessible lowland remnants on most islands. And even journeys to the sea may soon cease to be a chance to see native species - 23% of all species present in Pearl Harbour are introduced, and there are no controls to prevent their spread to other parts of the islands.

Key Findings and Recommendations

THE BASIC PROCESSES – PREVENTION, CONTAINMENT, CONTROL

Border Control

The legislature has recognised the need for improved border control, and provided significant new funds to HDOA. But if HDOA and other agencies continue to be crippled by inadequate laws and regulations, the benefits that HDOA can deliver with those resources will be significantly reduced.

A common call from those I spoke to was for a clear recognition within the federal system that Hawai'i is different, and that the federal rules must reflect that. To achieve this will require the State authorities to demonstrate that they are doing what they can within their mandates, a strong presence in Washington D.C., and work with the managers of federal agencies on the mainland so that they understand Hawai'i's situation. Federal pre-emption is a significant issue, but there are solutions available, and Hawai'i's agencies and politicians need to make use of opportunities (such as the current review of some federal quarantine rules) to reduce the effect of pre-emption. This should be a very high priority for the agencies, particularly HDOA. **It may be useful for HISC to develop a strategy for addressing federal pre-emption issues, to be collectively implemented by the relevant agencies and the legislature.**

The rules that border control agencies are enforcing are inadequate, reflecting the past rather than current needs. There are also inexplicable limitations on control activities, such as the rule against opening first class mail. **There is a need for a progressive review of all rules, beginning with those that are the most problematic, in order to allow effective border control operations that address all relevant interests (agriculture, environment, health, etc).**

Inter-Island Quarantine

Hawai'i comprises an archipelago of islands that are naturally isolated to at least some extent (in terms of both marine and terrestrial environments). There is no effective inter-island quarantine system in place to prevent the movement of native and introduced species between islands. With increased movements and faster/higher volume vehicles such as the super-ferry, this situation is becoming worse rather than better.

There seems to be a fatalistic view among many of those I interviewed that pests will move anyway, so inter-island quarantine is a waste of scarce resources. But others believe that there are ways to make it affordable.

Even if an inter-island quarantine system cannot prevent eventual transfers, it can slow the spread of organisms. This will reduce the impacts on residents, increase the ability to take effective control measures before significant impacts occur, and reduce the costs of eradications (by reducing the number of times that this is necessary).

There is an urgent need to develop cost-effective inter-island quarantine processes, even if they only address some risks to some extent. Very clear “black and white” rules will help to make enforcement cheaper, and public education will reduce the rate of movements of risk goods and organisms. Some simple actions, such as barge cleaning, would have major benefits.

HDOA has the legal powers needed to control most inter-island movements, but does not see this as a priority in comparison to preventing inter-state movements. That is an appropriate judgement for HDOA to make in relation to the use of its current resources. But it is an inappropriate approach if viewed from a wider perspective, because it will result in increased overall costs for the State. (See Appendix 2 for a broader discussion on this issue). There appears to have been no wider consideration of the issue, to compare the costs of action against inaction and place proposals in front of the legislature. HISC is the agency with the mandate to do this. **HISC should urgently undertake an assessment and provide a report and (if appropriate) budget bid to the legislature setting out the relative costs and benefits of the status quo or various levels of inter-island controls.**

Port and Airport Design

In New Zealand ports and airports cannot accept international traffic unless they have been approved by the quarantine agency. Approval is only provided if the agency is “satisfied that there are available, and capable of operating to approved standards, all arrangements, facilities (other than office and parking facilities), and systems” that are reasonably required for the quarantine service to operate effectively. In contrast, in Hawai'i the port and airport authorities appear to dictate the conditions in which quarantine will operate, in a way that is detrimental to the effectiveness of the service. **It is vital that this problem with Hawaii's system be corrected, either through legislation or agreements.**

It is also noticeable that while quarantine issues are very visible to passengers arriving at New Zealand airports, they are almost invisible in Hawai'i, except in relation to the risk of taking organisms to the mainland. **More publicity about the importance of quarantine and the risks of non-compliance is needed.**

Detection and Rapid Response

Prevention systems will never be 100%. The next most cost-effective response to alien species problems is early detection followed by either eradication or containment.

Detection can be done through either systematic surveillance or by encouraging the public to report unusual findings. A mix of both approaches will be more effective than either on its own.

Hawai'i has little systematic surveillance, and the cost-effectiveness of increasing surveillance should be examined by HISC. Public awareness of nature is generally low, but this does not rule out the use of public reporting, and the “report a pest” work has had some success.

The Bishop Museum by State mandate and funding provides a central depository for specimens and regular reporting of what species are naturalised. This is the logical institution to provide rapid diagnosis of new incursions. **It is important that the capacity of the Museum to perform this service is strengthened.**

Given the problems related to legal authority and agency responsibilities, it is desirable to have contingency plans for how new incursions will be responded to. At present there are only two – for Brown Tree Snake (BTS) and red imported fire ant (RIFA). **There needs to be work, perhaps led by HDOA, to develop some generic response plans that cover matters such as**

who reports of a new incursion are to be sent to, who makes decisions on the level of response, when eradication will be undertaken immediately, etc.

There needs to be a clear decision-making process that will ensure that there are no unreasonable delays between incursion detection and a decision on response (or a decision to not respond). This is currently lacking. For example two alien gecko species were detected, a control method is available, but after two months there has still been no decision on what the response will be. Because costs, impacts and the risks of establishment escalate rapidly after a pest first arrives, such delays must be treated as unacceptable.

Containment

As highlighted in the case of LFA (see box above), it is vital to be able to prevent a potentially dangerous organism continuing to spread from its initial entry point. Containment may be a temporary measure while eradication is planned, or a long term response to the organism.

Hawaii's agencies recognise the need for containment activities, but lack the powers to achieve this effectively. In particular, they require increased powers to enter private land and undertake the actions necessary to prevent the organism spreading, and powers to share the costs of such actions equitably across society (e.g. by paying compensation and levying exacerbators to cover the costs of actions). **Actions to provide powers to contain pests should be urgently devised and implemented.**

Make Better Use of the Powers that are Available Now

The above sections propose reforms to a number of legal powers and processes. But there are many legal powers that are under-utilised. **Existing legal powers need to be used more actively.** Actions that could be taken now include:

- Putting more species on the noxious plant lists
- Enforcing the rules related to the labelling of incoming goods
- Enforcing other restrictions

Agencies seem to be impeded by a fear of litigation. **It is vital that the signal is sent that the agencies cannot be bullied by threats where they have a strong legal case, and that support for strong actions is built through the public awareness programs.**

INSTITUTIONS, SYSTEMS AND FUNDING

Overlaps and Gaps between Institutions

There has been a history of responding to problems by creating new agencies, rather than by reforming existing agencies. The creation of the Invasive Species Committees (ISCs) is a perfect example of this –control of established species such as *Miconia* could have been undertaken by agencies such as HDOA and DLNR, but instead of investigating and addressing the reasons for their lack of attention to the problems, new institutions were formed to fill the gap. While this has produced some valuable short term gains, it has also contributed to serious overall system problems:

- There are significant overlaps of responsibilities between agencies, resulting in inefficiencies, competition for resources, etc
- Accountabilities are unclear.
- Agencies have functions that are not backed up by the necessary legal powers, which are often held by another agency.
- There are conflicting functions within individual agencies.

Unlike New Zealand, which has a single biosecurity border control system that acts on behalf of all government interests (national and local, economic, biodiversity and health), Hawai'i has a number of agencies with very specific jurisdictions. This has created a number of serious problems that need to be addressed:

- There are gaps in controls that mean that some pathways cannot be controlled by any agency. One example of this is the lack of any agency with the power to control military movements within the State.
- Federal agencies operate within their specific jurisdictions, which are not designed to protect the State. Federal pre-emption means that other agencies cannot compensate for resulting inadequate controls.
- Agencies vary in their capacity to undertake the work effectively. Homeland Security, for example, have state-of-the-art detection equipment and data management systems, while at least parts of HDOA are limited to visual inspection and very basic data management systems.

In New Zealand, the state sector reforms in New Zealand in the late 1980s (that produced the Department of Conservation) and the biosecurity reforms over the last few years, both aimed to remove conflicting functions, and create agencies that were able to provide an integrated, efficient, national approach to key work areas. For example production forestry and environmental forestry were separated, as was national park management and land development. The new agencies had broad, comprehensive roles – heritage conservation, biosecurity, etc.

It is unlikely to be practical to move towards a one-agency system in the foreseeable future. But steps can be taken to reduce the worst effects of the current fragmented arrangements. In particular there should be more contracting between agencies to make optimal use of resources, and greater sharing of information and expertise.

And while it is clearly impossible to achieve wholesale institutional reform affecting federal agencies, it would not be impossible to have some degree of institutional reform at the state level. **HISC should examine the potential for rationalising the responsibilities of agencies, reducing the overlaps and gaps in responsibilities, and preferably, reducing the number of agencies.**

Where this is not possible, and conflicts cannot be removed, they must at least be openly recognised, with decisions made transparently so that any perverse effects on agency functions can be avoided.

A particular issue that needs to be addressed is the ISCs. The existence of these as separate entities, reliant for funding on grants from existing agencies, is not viable in the long term. **The ISCs must undertake an exercise in the near future to determine what agency they should be attached to in the medium term, and what their long term role should be.** Or if they are

to remain independent, they need secure dedicated funding. Options for their role include control on the ground, best practice development and dissemination, and leadership of groups of volunteers and landowners. A focused role is essential.

Internal Structures and Functioning of Institutions

The problems created by the number of institutions are exacerbated by poor structures and operations within agencies.

Agencies seem to be divided into small divisions, with responsibilities that are functionally defined (e.g. plants, animals, freshwater, chemical and mechanical control, quarantine). This encourages silo approaches that are not conducive to good biosecurity outcomes, and inefficiencies. **All the agencies I examined would benefit from careful reforms of their structures.**

What was also clear in every agency I examined was that it was individuals not systems that were driving the response to biosecurity needs. This is appropriate in relation to leading edge/innovation activities. But in Hawai'i it is also the case for core activities. That approach is undesirable for several reasons:

- There is a strong risk of instability in programs due to staff changes.
- Working against or outside systems is stressful. Eventually the individuals who are driving progress will lose their enthusiasm because they don't have the necessary authority for their work, and both the work they have been doing and their own future in the organisation will be put at risk.
- Good innovations don't get bedded into the system, because there is nowhere for them to go. So there is a risk of reinventing the wheel and other causes of inefficiency.

Core biosecurity approaches need to be built into agency systems and structures.

That said there is still a need to have individuals driving innovation at the edges. **There is a need to actively track and mentor future leaders.**

There is also a need to ensure that scarce resources are well targeted. HDOA have commenced work in this area, as part of planning for the deployment of new resources.

Prioritising/operational design work within HDOA needs to be completed, and its implementation supported by all agencies.

Training in all aspects of biosecurity is an area that needs particular attention. There is a need to ensure that the relatively small number of people working in the biosecurity area, are able to operate effectively, using best management practices. Many agencies appeared to have not formalised training program. Training is needed in management and policy as well as operational responsibilities. Again, resources should be shared.

Coordination

Given the agency proliferation problem, and the cross-sectoral nature of biosecurity, coordination and cooperation between agencies is essential. Hawai'i has in recent years achieved this for some issues – Brown Tree Snake (BTS) and West Nile Virus (WNV) for example. **It is**

important that lessons from those successful experiments are studied and used in other areas.

HISC itself is, of course, an experiment in coordination, as was CGAPS. Both experiments have been successful, but both are in need of refinement to deal with issues identified since they were established.

HISC should focus on its core role as a sector leadership group – identifying outcomes and broad approaches, monitoring progress, and communicating with the legislature. Because its meetings are open to the public, HISC cannot be expected to act as a forum for resolving inter-agency disputes. It is vital that HISC is effective in keeping an eye on the way the jigsaw fits together, to ensure that the efforts of multiple agencies do provide an effective collective response to the issue.

CGAPS can undertake that role to a limited extent, but is handicapped by the fact that senior managers do not attend. **CGAPS needs to decide whether to continue to work as an information sharing forum for technical staff, or become a decision-making/dispute resolution forum to increase the efficiency of agency efforts.** If it is to have the latter role, composition will have to change, as will modus operandi.

Assuming CGAPS remains as it is, **there is a clear need for a forum in which senior managers from the main agencies can meet, resolve differences, and agree on joint initiatives.** The recent biosecurity workshop convened by HCA shows the clear need for greater communication and collective work at a senior level, including with managers of federal agencies who are not based within the State.

At the County level, there is also a need to refine coordination in relation to project work.

The development of joint facilities and sharing of technical capacity has been under-utilised. A role for HISC should be to facilitate improvements in this area. There is a need to formalise multi-agency servicing roles (e.g. Bishop Museum for diagnostics and collections) and ensure that these are properly resourced.

But as well as mechanisms, there is a need for some changes in attitudes. I frequently heard comments that suggested territorial approaches were being taken in circumstances in which cooperation would be more appropriate, that expressed a sense of being under attack or misunderstood, or that expressed a lack of respect for other organisations or other parts of their own organisation. These problems can only be overcome by having improved “mapping” of contributions so that everyone can appreciate the importance of the other agencies, by increased interactions between staff in different agencies, and by leadership within all agencies to overcome the competitive and defensive responses that are always the easiest.

There is a particular issue with the military, because of the high turn-over of senior staff. That needs to be actively tackled, given their key landowner/coastal user roles, and their immunity from some regulatory rules.

Decision-Making Processes

The biocontrol release approval process seems to be a good example of key problems with many decision-making processes in Hawai'i:

- The wide range of interests affected by the decision is reflected not in the decision-making criteria, but rather by adding additional decision-makers to the process. Where a rule change is required, there are seven different decision-making parties involved. For a simple permit approval, four. The roles of these different decision-makers are not defined, so they are effectively all making the same decision. This is obviously inefficient and will introduce unnecessary delays.
- There are no clear decision-making criteria that these many decision-makers are to follow.
- The process does not appear to follow a logical order – ensure the application has the necessary information, ascertain public views, review against the criteria, and make a decision. For example the public hearings occur after two decision-makers (including the Governor who is presumably not involved as a technical arbitrator) have had the opportunity to decline the application. If the hearing process is meaningful, then one can only conclude that it is producing information that would be relevant to those decisions.
- The distinction between technical and political decisions is not clear.
- The process for undertaking technical checks on applications poor. It is reliant on voluntary contributors who are not necessarily available.
- There are no appeal processes in the event of an unfair decision, and because there are no criteria, no easy way to recognise an unfair decision anyway.

There is an urgent need to review and improve key decision-making processes.

Funding

The funding system for biosecurity in Hawai'i needs reform, particularly to address the following issues:

- Almost all funding is in short-term grants, and there is little core funding for long-term basic programs. Biosecurity is a long-term business, and areas such as pest control and quarantine must have secure funding if they are to be successful.
- The funding systems encourage a competitive relationship between providers, rather than a strategic approach.
- The sources of funding are too narrow. In particular, there needs to be increased cost-recovery and sharing of costs across the community.
- There is a need for assessments of the true costs of pests, so that the most cost-effective response actions can be chosen. Too often attempts to save money or prioritise are in fact resulting in increased costs to society.
- There are significant inefficiencies in the way money is administered, due to fragmentation of funding processes and reporting.

BUILDING AND IMPROVING THE SYSTEMS

Best Practice Development and Dissemination

The capacity to manage alien species is rapidly increasing internationally, as a result of research by management programs and technique development work. Hawai'i needs to improve its capacity to both benefit from international experience and contribute to improvement of management practices.

There is some good work being done by agencies, but in general I did not find a strong improvement culture in most organisations, and there was poor communication of best practice within and between agencies.

There appears to be a relatively low investment in improvement of techniques, particularly as a result of not implementing “research by management” approaches. The capacity to undertake focused research also needs to be increased, particularly in relation to detection and eradication/control. Increase in infrastructure for biocontrol research was identified as a high priority by a biocontrol workshop at the Hawai'i Conservation Alliance Conference this year.

Every country in the world is affected by limited technology for alien species control. Some work areas are particularly badly affected – control of marine species for example. But Hawai'i has greater problems than many other countries due to the stronger limitations on the use of some methods. For example:

- the process for registering new toxins and baits is very long and difficult, and the resulting permission tends to be so specific that future innovation is impossible.
- There are limitations on some methods (e.g. shooting from helicopters) that are far more stringent than in countries like New Zealand.

HISC should review the R&D capacity across the agencies, identify ways to increase capacity and effectiveness, and review priorities.

The ability to accept some (reversible) collateral damage has been important in New Zealand's response to alien species. For example, for offshore island rat eradication operations, some loss of native species is accepted, provided the population can be protected and the longer term benefits for that population (or others) warrants the losses. Hawaii's agencies appear to be unwilling to make logical cost-benefit analyses of the optimal level of collateral damage, and as a result rule out some methods that would reduce the overall impacts of alien species.

There is a need to improve best practice documentation and dissemination. **CGAPS should establish responsibilities for the development of standard operating procedures and their dissemination across the system.**

Public Awareness and Public Involvement

A major difference between Hawai'i and New Zealand is that in Hawai'i most people do not have a sense of what their natural heritage is, what has been lost, and what the threats are. Most people I spoke to outside the agencies did not know what plants in Honolulu were native, for example. This lack of connection to nature and their heritage is a major impediment to having public support for biosecurity. How can you worry about alien species if you don't even know what is native? As a result of this, there does not appear to be a strong environmental movement focused on natural heritage issues to help bring biosecurity issues forward.

NGOs and State agencies (particularly DLNR) must develop a coordinated program to improve public appreciation of Hawaii's natural heritage.

I was also intrigued by the apparent lack of pressure from economic sectors for progress in biosecurity. In New Zealand, the systems have been built largely in response to the needs of these sectors (agriculture, forestry, horticulture, etc), despite the fact that they are also

disadvantaged by the limitations on organism movements. **There is an urgent need to increase the understanding in key economic sectors (tourism, agriculture, etc) of the current and potential costs of alien species.**

In New Zealand, there has been a shift from environmental groups being focused on campaigning against government programs (e.g. to prevent indigenous forestry and damming of rivers) to a focus on active involvement in conservation management work. There are now large numbers of community restoration programs in place (perhaps 3000 or more nationally), and these are resulting in a broadening of understanding of heritage values and the implications of alien species. People involved in projects are able to see for themselves the effect of rats, stoats and other pests, and appreciate the effort required to control them. And their sense of ownership of the heritage they are working to protect is extremely strong.

During my visit, a number of people said that “Maui was different” in terms of awareness and involvement of the public. A number of possible reasons for this were cited. They all shared a common element – that actions by a small number of people had produced both an increase in awareness, and a sense that the public could act to change things they didn’t like. **HCA should study the Maui situation in more detail and draw lessons on how to empower communities to prevent and solve alien species problems.**

Hawaii’s agencies have very limited capacity to undertake professional public awareness work. **A program to maximise the benefits of scarce public awareness resources is needed.** That should:

- Develop an overall public awareness strategy that each agency contributes to, ensuring that the efforts collectively add up to a clear, strong message.
- Identify key target groups, rather than focus on the “general public”.
- In the short term focus on helping people become involved, or on removing active opposition, rather than on more general messages.
- Actively learn from the work done so far, perhaps by setting aside time at CGAPS to focus on this issue.

Showing success

Monitoring and reporting are expensive processes. They therefore need to be minimised. But at the same time, it is vital that we:

- Identify effective mechanisms, and share best practice
- Constantly improve our operations
- Satisfy those providing the resources that they are being effectively used and are delivering desirable outcomes
- Generate public support by showing the benefit the public gains from our work.

I observed considerable activity in relation to monitoring and reporting. But I was left with the impression that:

- The reporting was designed to satisfy funders, who were focused on whether activities had happened rather than whether those activities had delivered real value.
- The reporting processes were unnecessarily expensive.
- The monitoring wasn’t connecting to active learning and improvement processes.

CGAPS needs to develop a general approach to monitoring and reporting, and progressively tackle problems in this area.

Regional cooperation

Hawai'i is part of the USA, but also part of the Pacific region. It is important that better links are established with biosecurity experts and agencies within the Pacific basin.

There is huge, largely untapped potential for cooperation with other countries.

Hawai'i needs to find ways to participate in SPREP-led processes, and should also actively seek technical cooperation in areas such as hull fouling, pest control research, etc.

Import Substitution

One of the reasons Hawai'i has a high incursion rate is that it has very high rates of movement of high risk goods, such as fresh fruit, flowers and vegetables. Eighty percent of food is imported, and at any point in time Hawai'i has only 11 days food in the islands. Many food items are not produced on the island at all, despite Hawai'i having a suitable climate and soils. Increasing self sufficiency would not only reduce biosecurity risks, but also reduce supply and price risks and strengthen the local economy.

There is a need for an urgent review by HDOA of imports that could be phased out in association with a local substitution program. Some of the relevant high risk items I was told about were horticultural plants for on-growing, Christmas trees, and flowers and foliage.

Harness counties

Only one county – Maui – is active in this area. **The Maui County initiatives should be encouraged, and the model exported to other counties.**

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Appendix 1: An Ideal Biosecurity System

ELEMENTS OF AN IDEAL BIOSECURITY SYSTEM For Biodiversity Protection Purposes

The following is a compilation from New Zealand experience and the CBD alien species work of the main elements that will collectively provide a system for managing alien species (biosecurity) risks.

An external border

- Clear definition of the border. The border should ideally be placed so that natural spread of unwanted species from the neighbouring state or from ocean-going shipping is unlikely (e.g. for an island that would mean a border out of sight of land, so that birds and insects are not tempted to leave a vessel and fly to land).
- Enforcement of the border, so that any movement of people or goods is controlled.

Internal borders (where applicable)

- Where the country contains natural barriers to species movement, and associated evolutionarily isolated ecosystems, borders to allow control of the movement of people or goods should be established. This is likely to include controlling movement of aquatic species between catchments, movement of species between islands, movement across mountain ranges or other harsh ecosystems (e.g. deserts), and movement across the lowlands between isolated peaks.
- Where the country contains natural barriers to the movement of people, goods or alien species, these should be utilised to provide control on the movement of existing pests (see containment element below).

Controls on the deliberate importation of organisms

- No species or subspecies that is not already present in the country should be able to be imported unless it has been subject to an assessment, and that assessment has shown that it is highly unlikely to have unacceptable impacts on biodiversity, and that any impacts that might be acceptable are justified by the benefits that importation would generate.
- Where the species or subspecies is already present, and creating unacceptable or unjustifiable impacts, further importations should be prohibited.
- Where the species or subspecies is already present, and is creating impacts that are acceptable (given the benefits generated), further importations should be controlled to ensure that new genetic material would not increase the adverse effects of the species (using the same criteria for decisions as for new organisms)

Controls on the importation of risk goods (i.e. those goods which could carry organisms, including passengers and their baggage)

- No risk goods should be able to be imported unless there is an import health standard setting out measures to ensure that the risk good will not pose an unacceptable risk of carrying an organism.

- The risk good should be certified as meeting the standard before it leaves the country of origin.
- There should be an inspection regime to ensure that the risk good does comply with the requirements of the import health standard
- There should be strong penalties on those who have certified a risk good (or in the case of a passenger made a declaration) that is found on inspection to be in breach of the standard.

Testing the border and compensating for holes

- No quarantine system can be 100% effective. The system should be periodically tested to determine its efficacy for various types of risk.
- For each of the weaknesses detected, a decision should be taken as to whether to seek to plug the hole by improving the quarantine system, or to respond to the risk by using surveillance and eradication to deal with the species post-border before they cause damage or become ineradicable.

Targeted surveillance

- There should be a targeted surveillance system to cover the species that are most likely to get through the holes in the border system.
- There should be a targeted surveillance system to cover species that are a particular risk and which might conceivably get through the system. “Particular risk” includes species that would be highly damaging, or that would be likely to have become ineradicable before they were detected by less targeted surveillance.
- The standard to which the targeted surveillance system should operate would be to detect the species before it becomes difficult to eradicate or causes significant impacts.

General surveillance and diagnostic services

- There should be a system to allow members of the public to report possible new incursions. This should include information on how to preserve samples, easily accessible places to report findings and deliver samples (e.g. a telephone hotline with inspectors able to respond by visiting the person who reported, and/or places in villages and towns to hand in samples), diagnostic services to immediately identify whether this is a new incursion, and feedback to those who report.
- There should be a baseline data base established of known native organisms and alien species, with distributional information, that is kept constantly updated as information comes in from surveillance and other activities (e.g. native species surveys).
- There should be diagnostic services available (potentially by contracting taxonomists in other countries and using imaging technology) to allow potential new incursions to be rapidly identified.
- There should be a program of non-targeted surveillance designed to identify new incursions and to fill the baseline data base. This would be designed to survey samples of all the major ecosystem types, and all places that are likely to be subject to new incursions (e.g. next to ports, native habitats next to urban centres).

Eradication of new incursions

- Where a species is found that is considered to be new to the country and has not been authorised, it should be automatically subject to eradication if this is feasible (see the Piero Genovesi paper) and would cost less than a set amount (with that amount established taking

into account the average long term direct financial costs of allowing a species to continue invading, so that the standard would be that eradication is a more cost-effective approach than long term control).

- Where the cost is above the set amount, there should be a cost-benefit analysis to determine an affordable cost for that species. If the cost is less than the affordable cost, then eradication should proceed.
- If the cost is above the affordable cost, there should be an assessment to determine whether the impacts the species would have are unacceptable, and if so, if that level of impact justifies paying the additional cost.
- Where the unauthorised entry was the result of illegal activities, then those responsible should be required to pay for eradication, regardless of the cost.
- The one exception to the above would be where a species has been accidentally introduced, and it has benefits that might warrant its retention. In that case, it could be assessed as if it was a proposed deliberate importation, and if it met the tests it could be retained. This option should not apply to illegal introductions.
- The same system should apply to new incursions across identified internal borders.

National containment

- Where eradication is deemed to be infeasible or unaffordable, the feasibility and effectiveness of national containment should be assessed. The aim of containment would be to prevent spread throughout the country, and in particular to prevent spread into sensitive habitats. This would be done by controls on movement of the species or risk goods, the establishment of internal borders, and the use of eradication programs outside the current range (or range reduction activities).

Species imported into or held in containment

- Except in exceptional circumstances where containment can be enforced, deliberate importations should be decided on the assumption that the species will eventually reach all suitable habitats. So conditional importations should be used rarely or never.
- Some facilities (e.g. zoos and botanic gardens) could be subject to licensing to allow them to continue to hold animals and plants which would otherwise not be permitted. This would only occur where containment could be enforced and the species held would not pose an unacceptable risk if it escaped (taking into account the ability to eradicate after escape).
- For a species which appeared unlikely to survive escape into the wild (e.g. hothouse plants in a temperate country, cagebirds that would be unlikely to survive predation), importation or continued use could be allowed, subject to the ability to reassess the species if new information suggested that survival was possible.
- For species which are held in captivity as pets, aquarium species, cagebirds, etc, containment could be considered for licensed holders, where enforcement appeared feasible, or for the holding of neutered animals. In general, this should be limited to species already present, where eradication would be unreasonable given the level of risk posed and benefit derived. Transition to lower risk species should be required where appropriate.

Control

- Control should be used in areas where the species is present and cannot be eradicated, at the level that is justified to reduce the impacts on the site, or on sites that could be infected by spread from the site.

- There needs to be capacity to establish coordinated control plans to ensure that control actions on different land tenures or by different agencies are synergistic.

Existing pests that have no societal benefits

- These would be treated in the same way as new incursions.

Existing species that have societal benefits and are not naturalised

- There should be an assessment to determine whether it would be possible to prevent impacts by responding to the species after naturalisation first occurred (e.g. by eradication).
- If it appears that eradication would not be possible after naturalisation, and the species would not meet the tests for a deliberate importation, there should be an immediate eradication program.
- If it appears that it would be possible to delay action until naturalisation occurred, but that the species would not meet the tests for deliberate importation, then there should be an immediate prohibition on further breeding/propagation, and deliberate or negligent spread of the species. The rate at which eradication was initiated would be determined by the need to balance effective management of the threat with minimisation of the costs on current holders.
- Species could be assessed under the deliberate importation rules, and approved for use.
- Species could be approved for commercial or sector use where there would be significant costs for removal, and the costs of ensuring that it does not naturalise or cause unacceptable impacts would be borne by those wishing to continue use the species. The criteria would be essentially the same as for deliberate importations, but with the ability to also consider the costs of removal.

Existing species that have societal benefits and are naturalised

- Species could be approved for commercial or sector use where there would be significant costs for ceasing that use, and the costs of ensuring that it does not cause unacceptable impacts would be borne by those wishing to continue use the species. The criteria would be essentially the same as for deliberate importations, but with the ability to also consider the costs of changing to other species.

Governance

- One or more agencies should have clear accountability for the elements of the system.
- Those agencies should have the capacity to undertake their work effectively.
- There should be a single decision-maker or decision-making body to assign accountability and make the high level decisions about how to operate each of the elements.
- There should be provision for appropriate input by the public and stakeholders to decisions, including the ability to challenge decisions where they are ultra vires or do not appear to be a reasonable application of discretion.

Legislation

- The legislation should provide clear decision-making criteria for each of the elements.
- The legislation should provide adequate legal powers to allow implementation of each element.

Funding

- Funding should be adequate to ensure that risks are not unreasonably transferred to future generations.
- Where it is possible to identify them, the transaction costs are not excessive, and doing so would not create perverse incentives, those who increase the risk of import or spread of an unauthorised species should pay the costs of risk management.

Natural spread from neighbours

- There should be assessment of the potential for natural spread from neighbouring countries of species that are either alien in that country, or are spreading as a result of human induced changes in either country which means that the spread is “unnatural”. Actions could then be taken in the source country to reduce the risk, or at the entry point (in the same way as for species from other incursion sources).

Export of pests

- A country should comply with any import health standards or other controls imposed by other countries.
- Where a species of known or potential invasiveness is being deliberately exported, there should be prior informed consent from the importing country.
- Where a country has an alien species that can potentially infect a neighbouring country, they should take reasonable measures to prevent spread, or allow the at risk country to take reasonable measures to protect themselves.

Public and Scientific Understanding

- There should be a program in place to ensure that the public have a sound understanding of the risks posed by alien species, the actions they can take to reduce that risk, and the reasons for the measures in place.
- There should be a program of scientific and technical research to improve capacity over time.

Appendix 2: Cost-Effective Targeting of Pests

Invasive organisms, by their very existence, impose costs on society. Even if we do not have any biosecurity system, we still pay – through lost production, health care costs, disposal and replacement of dead amenity plantings, erosion, etc.

Instead of paying these costs, we can choose to spend money on prevention of impacts – on quarantine, eradication or control of organisms. But we cannot choose to pay nothing at all in response to the organism.

This reality means that *we cannot prioritise which invasive species we will respond to*. If one agency “prioritises” and chooses not to, for example, do border control work to prevent the organism reaching Hawai‘i, they are simply transferring the costs of response to another party.

Instead, we must consider each species and devise the most cost-effective response for society as a whole, and then share the costs equitably across interested parties.

Take coqui frog, for example. Where the frog is not yet present, there are two reasonable choices available:

- carrying out quarantine/containment work to prevent or delay the frog’s arrival, and then early detection and eradication work if that fails; and
- choosing to allow the frog to arrive, and leaving landowners to carry out controls to minimise the impacts on their values.

If the first option is chosen, then it may still be appropriate to transfer those costs to the landowners who benefit. In New Zealand that would be done by creating a pest management strategy and requiring “beneficiaries” to pay. It may also be appropriate to require those who might spread the frog (e.g. nurseries, shipping companies) to contribute as “exacerbators”. So the choice of strategy and the distribution of costs can (and should) be decoupled.

In choosing a particular response, the following will be relevant factors:

- what strategy has the lowest overall cost
- what strategy avoids unacceptable impacts (e.g. extinction of species)
- what are the risks of failure of different strategies
- are there unacceptable methods required for the strategies (e.g. killing of charismatic animals).