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# A Systems Approach to Defining Environmental Regulatory Institutions

It is unlikely that any new regulatory regime will involve the establishment of a completely new regulatory institution. Instead, regulatory responsibility is more often apportioned to an existing institution, or several institutions within a portfolio that most closely match the subject matter of the regulatory regime in question. This article therefore offers guidance less for those involved in the initial policy design phase, and more for those engaged in implementation and operational policy, as well as those with review and reform agendas. In emphasising these policy and policy-like elements, the article takes as its lead the argument made by the New Zealand Productivity Commission and the New Zealand government that the traditional emphasis of review and reform efforts on regulatory design has acted to the detriment of implementation and better regulatory practice.

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In 2014 the Productivity Commission released a comprehensive and cross-cutting report, *Regulatory Institutions and Practices* (New Zealand Productivity Commission, 2014). The report outlined a number of policy choices for governments, regulatory institutions, and regulatory practitioners and managers in terms of how they approach their work. Notably, it suggested moving beyond responding to various crises towards a strategic (and system-wide) development of regulatory capacity and capability. In 2015 the *Government Response to the New Zealand Productivity Commission Report on Regulatory Institutions and Practices* reinforced that:

> there is a need for the different agencies involved in designing and administering regulation, and monitoring how effectively [it] is functioning, to lift their game. The system as a whole also needs to work more coherently, to secure real improvements in regulatory outcomes. (New Zealand Government, 2015, p.1)

The utility of the Productivity Commission report is enhanced by the fact that it is not commodity- or legislation-specific. The term commodity in this article refers to the way it is used in Australian environmental regulatory terminology, and relates to the physical subject matter covered by regulation; conversely, in the US and UK the term used is media, with the traditional environmental media being air, water, waste and pollution. Instead of having this sort of focus, the report covers a range of matters through the themes of improving regulatory institutions and practices and better regulatory management. The sub-themes considered under these two headings are outlined in Table 1. Those matters of particular relevance to this article appear in italics.

This article considers the policy and implementation issues raised by the report and the government's response to it in application to environmental regulation and the various environmental regulatory agencies, as well as their functions and roles. It does so in an attempt to provide practical guidance to policy makers on how the structure of regulatory institutions – as collections of regulatory practices – affects implementation. In other words, the nature of the institution as a collection of systems and practices has ongoing impacts on the effectiveness with which the institution achieves its outcomes.

While the focus of the article is on environmental institutions, many of the issues associated with regulatory design, implementation and review are transferable and are worthy of consideration by regulatory institutions in other regulatory fields.

For the purposes of this article, regulatory institutions are defined as the governmental bodies, including agencies, bureaus and departments, tasked with implementation of legislation containing regulatory provisions (which incorporate a range of functions, from setting, monitoring and enforcing standards to providing guidance to the regulated community). The definition covers all regulatory institutions, operating at local, regional, central/federal and international levels. This definition does not include industry bodies (even ones established by government).

Equally, regulatory practices are taken to be those activities and processes undertaken by a regulatory institution to implement and give effect to legislation with regulatory provisions. Necessarily, this includes the management and governance of regulatory officers engaged in their daily work. In referring to regulatory systems, this article uses the definition provided by Manch, where:

> Reference to the 'regulatory environment' means the environment in which our regulatory systems operate. Reference to 'regulatory systems' means the end-to-end approach of government intending to influence or compel specific behaviour. (Manch, 2014, p.18)

Regulatory systems are therefore the collection of regulatory practices undertaken to give effect to legislation with regulatory provisions.

**Table 1: Regulatory Institutions and Practices report: recommendations and areas of focus**

| Improving regulatory institutions and practices | Better regulatory management |
|---|---|
| • *regulatory practice*<br>• *regulatory culture and leadership*<br>• *workforce capability*<br>• effective consultation and engagement<br>• regulation and the Treaty of Waitangi<br>• *role clarity*<br>• *regulatory independence and institutional form*<br>• *governance, decision rights and discretion*<br>• decision review<br>• approaches to funding regulators<br>• monitoring and oversight | • *system-wide regulatory review*<br>• information to understand and manage the system<br>• *strengthening institutions* |

Source: New Zealand Productivity Commission, 2014, pp.vi-viii

### The regulatory experiment

Bailey and Kavanagh (2014) highlight that designing and implementing regulation is extremely difficult. They consider it to be 'fraught with complexity, severe knowledge gaps, unintended consequences, speculation about the efficacy of different regulatory arrangements, and a regulatory environment which is in a state of constant change' (p.15). Mumford (2011) states that 'the reality [is] that for the most part regulatory regimes are experiments ... [and] we do not know in advance precisely how it will work in practice' (p.36). This argument speaks to the connections between the regulatory development process (design: the making of laws, rules, ordinances and other instruments) and the practices that comprise operationalisation (implementation of those instruments), which is also variously called regulatory delivery (OECD, 2014a), regulatory administration (Australian National Audit Office, 2014), regulatory implementation, regulatory activity or regulatory practice (New Zealand Productivity Commission, 2014; New Zealand Government, 2015).

Unfortunately, there is a sense that the regulatory experiment is being conducted in a less than scientific manner. Mumford goes on to state: '[i]n complex decision-making contexts we often revert to heuristics, or "rules of thumb"' (2011, p.41). What is required, perhaps, is greater study, with a focus on what is already in place and what might be expected to eventuate. In determining better rules of thumb for the regulatory experiment, Mumford states, '[i]n an experimental frame the two that we might emphasise are "thinking ahead" and "thinking along the way"' (ibid.). This suggests an approach that can be taken not only in the design stage of regulation, as already stated, but also in the review stage (including performance auditing, reform and continuous improvement).

### The inclusion of systems, practices and institutions in regulatory reform

Bailey and Kavanagh have noted that '[m]uch of the focus of regulatory management in New Zealand, and in other

parts of the world, has focused at the front end, on the quality of regulation-making' (Bailey and Kavanagh, 2014, p.16). There is an acknowledgment, in the work of the New Zealand Productivity Commission and the government response, that the emphasis of efforts directed to the analysis and reform of regulation have, in the past, been centred on the policy associated with creating or amending a regulatory regime and its reflection in statute, possibly extending to secondary regulation. In response, the Productivity Commission undertook to 'develop guidance for improving the design of new regulatory regimes and recommend system-wide improvement to the operation of existing regimes' (ibid., p.10). The Productivity Commission report and the government response, therefore, mark a shift towards a consideration not only of the process of developing regulatory instruments, but also of the systems, institutions and practices engaged in giving subsequent effect to those instruments.

### The state of regulatory institutions and systems

The use of unexamined heuristic thinking in regulatory systems, as described by Mumford, has created a significant number of challenges and problems. These problems are core issues that affect the entirety of any number of regulatory systems. In fact, the issues arise within the systems themselves, and therefore a systemic approach is needed to address them.

The first is the failure on the part of institutions to apply basic understandings to the management and practice of administered regulation. On this Bailey and Kavanagh observe:

> Although there have been improvements in regulatory management systems, departments still do not, in general, systematically apply basic good management principles and practices to the regulatory regimes that they administer. (Ibid., p.13)

The second issue is a failure in forming the requisite agency-wide culture within an institution (ibid., p.14). The reason this is so important in terms of regulatory practice is the interconnectedness of the various regulatory roles. 'The critical elements of the regulatory system are self-reinforcing and display a level of interdependency' (ibid., p.12). The organisational culture in an institution in this context is a systematic support that maintains effectiveness across the interlinked regulatory areas.

The third issue is the inability of regulatory institutions to develop and progress. '[I]t appears that institutional constraints within our regulatory system have rendered it virtually incapable of gradual evolution and incremental change' (ibid., p.15). It is the form of the institutions themselves, as embodiments of entrenched unconscious heuristic processes, that forms part of the problem and inhibits efforts to overcome those problems.

> There have been difficulties in adapting police and customs bodies (and even the courts) to environmental roles, though these bodies have continued to be tasked with certain aspects.

### Resolving systemic regulatory issues

Bailey and Kavanagh noted that the strengthening of regulatory systems should include:

- defining the overall objective of the system and bringing focus and attention to it;
- strategic prioritisation of effort across the system;
- specifying and allocating tasks for improving the system; and
- promoting continuous improvement in regulatory design and practice. (ibid., p.15)

In accord with this, and noting the resistance of heuristic regulatory institutional forms to reform, this article undertakes an initial analysis of environmental regulatory agency forms as institutionalised systems. While limited in this respect, such an analysis could serve as an example for other institutional systemic analyses.

The Productivity Commission report as part of better regulatory management suggested a system-wide regulatory review (New Zealand Productivity Commission, p.374). Bailey and Kavanagh further suggest that:

> A systems approach to regulatory management would see monitoring and review of regimes not as the end of a process – or worse, forgotten about entirely – but as a fundamental part of enhancing the quality and impact of the regulatory system. (Bailey and Kavanagh, 2014, p.16)

### Environmental regulatory practice

Administering environmental regulation is a complex and difficult process (Pink and White, 2015; Emison and Morris, 2012). Legal frameworks offer multiple litigation and sanction options that can be negotiated or imposed, leading to punitive or restorative outcomes, with the possibility, and increasing likelihood, that a mix of all approaches may be necessary (Baldwin, Cave and Lodge, 2013; Freiberg, 2010; Sparrow, 2008). There are diverse kinds of regulated entities. Some are large multinational corporations, others are medium enterprises, and some (perhaps even the majority) are small businesses. A small part of the regulated community comprises organised career criminals engaged in networks which have ties to other forms of organised crime, and, potentially, terrorist organisations (Wyatt, 2013; UNODC, 2010).

Environmental regulation, like most forms of regulation, must also deal

with a number of political pressures from governments of the day and their particular platforms. Industry groups are opposed to bureaucratic clutter because of the compliance costs incurred (Productivity Commission, 2012, 2013). Meanwhile, environmental advocates push for tighter controls or, increasingly, blanket bans on certain commercial activities as a result of their concerns for environmental effects, especially from new and emerging technologies. Cianchi (2015) notes that such environmental activists are becoming increasingly radicalised. In short, the provision of environmental regulatory delivery occurs in a highly contested space, especially so when sanctions or responses are levied as well as administered by regulators (Pink and Marshall, 2015).

Regulatory implementation, which is intended to minimise harm, involves practices that by contrast constrain, limit and circumscribe.

#### Environmental regulatory institutions as collections of practices

The government bodies that exist to administer environmental regulation and respond to environmental crime tend to fall into three groups. These are the police, customs agencies and environmental regulatory agencies (Pink, forthcoming 2016).[1] There have been difficulties in adapting police and customs bodies (and even the courts) to environmental roles, though these bodies have continued to be tasked with certain aspects. To ensure full coverage of environmental regulatory requirements, the greater part of the regulatory role is given to environmental regulatory agencies which have distinctive and recognisable characteristics. These agencies fall into three broad types. For the purposes of this article, these are the environmental protection agency, the environmental commodity agency and the hybrid environmental agency. In summary:

- *environmental protection agencies* are dedicated regulators undertaking activities closely aligned with the traditional four main media: air, water, pollution and waste;
- *environmental commodity agencies* are commodity (media)-oriented bodies undertaking activities aligned with the specific matter, subject or geographic location[2] (and associated commodities, sectors and industries) they have been established to administer and regulate;
- *hybrid environmental agencies* are government bodies that to varying degrees combine policy, programmatic and regulatory activities and responsibilities.

#### Policy, programmatic and regulatory activities and responsibilities

This article draws distinctions between the three main types of governmental activity: policy, programmatic and regulatory. This will be explored further in the discussion of the different environmental regulatory agencies.

The policy role involves supporting the government of the day in policy development and determining the best way to put that policy into effect. The two options are through programmes or by regulatory delivery, whichever is most likely to succeed.

Programmatic approaches, in broad terms, are undertaken to maximise benefit, while regulatory approaches are intended to minimise 'harm and nuisance' (Baldwin, Cave and Lodge, 2013, p.106). There are arguments that maximising one thing is the same as minimising the other, and in some instances this may be the case, though it seems an approach that lacks nuance. Either way, there is a notable difference in the way the two tendencies are implemented in government practice. Programmatic practices ultimately rely on the fiscal power of the state: the power to fund and provide. Regulatory practices rely on the physical power of the state: the power to deny; that is, to deny freedom of action through banning the action or, in serious cases, incarcerating the actor.

Programmatic efforts, looking to maximise benefit, involve practices that are fostering, facilitative and motivating, with financial support as a core component, often in the form of 'contracts, grants, loans, subsidies or incentives' (ibid., p.106). Alternatively, programmatic practices include the establishment of marketplaces in which beneficiaries can trade, or use the power of exhortation or the power to convene, both to persuade behavioural change without direct financial support.

Regulatory implementation, which is intended to minimise harm, involves practices that by contrast constrain, limit and circumscribe. In short, they regulate. Instead of incentives, regulatory practices contain penalties as a core component. Such penalties include incarceration, fines, suspensions, seizure, confiscation, cancellations, restitution, and either mandatory or prohibitive orders (ibid., pp.249-51). Regulation may also be indirect, by requiring delegated regulators (such as local government) to act, which involves devolution of practice but not responsibility.

It is worth noting that the regulatory and the programmatic are options for achieving outcomes. They can exist simultaneously in terms of achieving a broad policy goal. However, in circumstances where a policy develops without a clear consideration of the factors informing the choice of option, the two can find themselves operating in competition. At worst they can hinder the effectiveness of one another (New Zealand Productivity Commission, 2014).

#### Environmental protection agencies

The Environmental Protection Agency is a dedicated regulator created by statute (Emison and Morris, 2012; Mintz, 2012). Its remit tends to be to administer laws relating to the traditional environmental commodities or media: water, air, pollution

and waste (United States Environmental Protection Agency, nd). It does not necessarily have a policy or programmatic branch, though it can undertake extensive encouraging and advising of activities to help ensure regulated entities comply with the relevant environmental regulatory regimes. (See, for example, the Victoria Environment Protection Authority in Australia.)[3]

In addition to this, environmental protection agencies can adopt the 'expert model of regulation' (Sparrow, 2012) and develop responses to environmental issues outside the remit prescribed by their legislation. When this occurs, agencies are obviously unable to fall back on their authority and powers under law. This means they have to find alternative courses of action for resolving environmental impacts, including negotiation, conciliation, encouragement and persuasion (Baldwin, Cave and Lodge, 2013; Sparrow, 2012).

### *Characteristics of environmental protection agencies*

The core task of the environmental protection agency remains regulatory work. Staff within environmental protection agencies see themselves, and are purposively trained, as regulators.[4] Particular training and authorisation attaches to their role the use of coercive powers, which environmental protection agency officers are expected to exercise routinely and appropriately. The use of powers is covered by standard operating procedures, and the levying of sanctions is conducted by reference to a mapped schedule of non-compliance responses.[5] While environmental protection agencies predominantly establish frameworks[6] for their officers to operate within, individual officers have high degrees of autonomy, especially those appointed as authorised officers[7] under legislation. Legislation frequently apportions decision-making power and discretion to authorised officers in relation to addressing suspected or potential breaches of environmental legislation. While circumstances can require timely, on-the-spot action, the result can create a tension between the needs of the moment and the overall necessity to achieve a consistent, proportionate, repeatable, measurable approach to regulatory delivery across the agency.

### Environmental commodity agencies

The environmental commodity agency is a body that focuses on one specific matter, media or subject (including geographic locale) and can be expected to administer it through both programmatic and regulatory operations. Such an agency can distribute and manage grants, undertake secretariat roles for industry or other interest group bodies, ensure the continued operation of marketplaces, and intervene when breaches of the regulatory aspects of the regime are detected. (See, for example, the Australian Pesticides and Veterinary Medicines Authority.)[8]

### *Characteristics of environmental commodity agencies*

Environmental commodity agencies usually have a statutory basis for their existence or serve a statutory office holder.[9] They are highly variable in their institution and practices. This is a direct result of being designed and activated to address a specific issue; they are, in other words, customised to their purpose. They might be predominantly judicial or executive as well as policy, programmatic and regulatory, in varying proportions dependent on the determined needs of the commodity or geographic location.

What unites these types of agencies into a single typology and distinguishes them from both environmental protection agencies and hybrid environmental agencies is the degree of focus. While an environmental commodity agency can look to all intents and purposes the same, the fact that it is highly focused on a type of regulated thing or a contained geographic location lends it a slightly different status. It is usually a very small agency with a highly independent culture, distinct from the departmental public administration culture, which can be viewed at arm's length, even where there are reporting and service provisions between the agency and an umbrella institution.

The variability of form and the degree of independence can be influenced by the agencies' revenue streams, which can originate with government, across jurisdictions, via industry registration payments, or any other number of mechanisms (see, for example, the Australian Fisheries Management Authority).[10] Whatever revenue stream is directed towards the agency is usually isolated from general government revenue. Monies are therefore protected, which can lead to greater certainty in terms of the continued operation of the agency, though many agencies remain susceptible to agendas focusing on small government, and legislation repeal.

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The potential issue of chief concern for environmental commodity agencies emerges from the relationship between them and their regulated communities (Baldwin, Cave and Lodge, 2013). Such agencies can often have their counterparts in peak industry bodies with which they have long-standing interactions. Such interactions are a necessity where interests align and a collaborative and cooperative approach is needed to address matters relating to an aspect of the commodity. The relationship can, however, become strained where interests do not align. Alternatively, such agencies may find themselves adopting industry interests as their own in a process of regulatory

capture (ibid., pp.107-8). Where industry also provides the resource base for the agency, through licensing and registration fees, an expectation can develop that the environmental commodity agency exists for the sole purpose of advancing the needs of the industry, thereby compounding the issue. There are obvious knock-on effects arising from this combination of factors that have consequences for effective regulatory delivery.

In an attempt to address these issues, some agencies establish separate teams dedicated to responsive regulatory delivery, while the majority of the agency carries out programmatic work and some preventive compliance encouragement. While this appears to solve the issue by keeping a clear distinction between an agency's support of industry and its regulation of the same, there can be subsequent cultural issues that arise from such a division, notably in terms of silos or stovepipes (McMahon, 2006).[11] This sort of consequence is particularly evident in hybrid environmental agencies.

**Hybrid environmental agencies**

Hybrid environmental agencies are government departments, offices or bureaus that form a part of the public service providing support to the executive branch of government. They can be headed by a minister or secretary, or a political appointment of one type or another. They are, like any other public service body, tasked with giving effect to the policies of the government of the day. This is as opposed to explicitly implementing the law, which is much more the task of an environmental protection agency. (See, for example, the Australian Department of the Environment.)[12]

**Characteristics of hybrid environmental agencies**

It is worth noting that the hybrid environmental agency is not the same as a regulatory agency. Regulatory delivery is only one of three roles hybrid environmental agencies perform. As discussed previously, these roles are policy, programmatic and regulatory. Regulatory delivery is often the last role such an agency is given, and it is not one that always sits well within a hybrid agency. This can occur where an environmental protection agency operates inside a larger hybrid environmental agency, or where the environmental protection capability is integrated within the latter without formal organisational recognition of the role. This occurs because organisational distinctions tend to replicate the formalism of having a separate environmental protection agency. Additionally, the organisational lines operate in concert with cultural distinctions.

Either way, the inclusion of regulatory roles within a programmatic and policy agency can be one of the key causes of challenges to these agencies achieving effective regulatory delivery (OECD, 2014a, 2014b; New Zealand Productivity Commission, 2014). Additionally, Mumford highlights that '[t]he performance of regulators themselves is influenced by a range of incentives and underlying capabilities' (Mumford, 2011, pp.36-7).

While hybrid environmental agencies perform three broad types of role, policy, programmatic and regulatory, each role has a different focus and intent. The distinction between roles and their implications for relationships is a core problem for hybrid environmental agencies, and leads to distinctions in agency cultures. The result can be silos within the organisation and communication issues outside the organisation. From time to time, governance arrangements can emerge that do not adequately address the particularities of each approach, leading to the inefficient and ineffective distribution of resources, the inappropriate setting of outcomes and misaligned measurements of success (New Zealand Productivity Commission, 2014, ch.10).

In terms of implementation, the characteristics of institutions make certain organisational challenges more likely to eventuate according to type.

**Practical guidance**

The use a systems approach as a diagnostic frame which considers all of the agencies working within a regulatory regime has a number of benefits. It provides practical guidance to policy makers, resource allocators and regulatory practitioners; it reinforces the need for institutional review and reform; and it points to further areas that might benefit from systematic review and research.

In terms of implementation, the characteristics of institutions make certain organisational challenges more likely to eventuate according to type. For example, regulatory capture is a greater issue in environmental commodity agencies, and silos can develop very clearly in hybrid environmental agencies. Equally, environmental protection agencies can develop weakness in policy areas that affect the overall regulatory regime. Alternatively, environmental protection agencies can find themselves in conflict with their programmatic and policy portfolio partners.

*Policy implications*

When developing implementation policy, or conducting reviews of effectiveness in the regulatory space, it is important to have regard to the systemic characteristics of regulatory institutions which pose foreseeable risks to regulatory outcomes. These risks, having been identified, can be mitigated or circumvented through proper policy planning. When reviews are undertaken, an effort can be made to determine the extent to which risk mitigation measures have managed to overcome the challenges that are present in regulatory institutions.

On the rare occasions when there is the scope to design a new regulatory institution, policy developers may have

the opportunity to construct a model for regulatory delivery that overcomes the structural obstacles evident in past institutional forms. Additionally, it may be found that portfolios can be established or redesigned along systemic lines, dividing internal areas by function and making clearer delineations between programmatic and regulatory approaches.

The New Zealand Productivity Commission report and the government response to it highlight the importance of practices and institutions in the regulatory field. In accepting these findings, it seems counterproductive not to consider such practices and institutions when developing policy aimed at achieving regulatory success.

### Next steps

The study conducted here can be taken further in a number of ways. This can be done as a research undertaking, but also as an organisational exercise as part of reform processes to achieve continuous improvement. We recommend: more detailed mapping of regulatory practices and the interdependencies between them; and review of regulatory institutions as systems within a regulatory regime system as a whole.

### Conclusion

The emergence of regulatory practice within traditional policy and programmatic environmental agencies raises particular issues, and recasts the relationships within the network of agencies that work together to achieve better regulatory outcomes. The balancing of roles can pose serious challenges to the achievement of environmental protection and other desired outcomes. Equally, awareness of the differences in roles can potentially generate solutions to a range of challenges.

It is worth acknowledging that different agency types and approaches exist for a purpose. A simplistic approach to environmental protection is very unlikely to succeed. Rather, a diverse and complex set of supports and interventions is required to manage it effectively, many of which are external to the agency, however it is designed.

Having acknowledged the important differences in institutional roles and functions, the task then becomes one of more completely understanding the differences, and then ensuring appropriate resources are leveraged and directed in an appropriate way to achieve the desired effects (Bailey and Kavanagh, 2014).

Environmental protection agencies, environmental commodity agencies and hybrid environmental agencies are collections of practices and capabilities. Each agency type can be assisted by policy, programmatic and regulatory approaches, which can supplement or undermine one another. The challenge lies in finding the right balance.

Given the challenges, and fortunately for regulators, the *Regulatory Institutions and Practices* report and the corresponding government response provide a great deal of information and guidance. More importantly, this information has been practically oriented and synthesised, such that the regulatory, compliance and enforcement community can draw upon these documents to advance agency-specific requirements around regulatory capability and capacity.

1 It should be noted that the three core agencies are even more prominent when the environmental crime is situated within the context of transnational environmental crime. See, for example, Baldwin et al., 2015; Bisschop, 2015; Wyatt, 2013.
2 Examples of a geospatial location would be within a marine protected area or relating to something like Australia's Great Barrier Reef.
3 See www.epa.vic.gov.au.
4 The issue of strong identification with agency mission and individual practitioner/professional role sets environmental protection agency staff apart from staff in environmental commodity agencies and hybrid environmental agencies. For more detailed explanation and analysis, see Emison and Morris, 2012. See also McMahon, 2006 on the value of a regulatory agency's mission statement generally.
5 See Pink and Marshall, 2015 on sanction mapping.
6 Such frameworks cover activities such as case management systems, sanctions mapping, standard operating procedures, assurance reviews and governance and oversight.
7 For examples of the powers of authorised officers at the federal and state level in Australia, see section 406 of the Environment Protection and Biodiversity Conservation Act 1999 and section 55 of the Environment Protection Act 1970.
8 See www.apvma.gov.au.
9 The Office of the Gene Technology Regulator in Australia provides one such example, with the regulator as an independent statutory office holder responsible for administering the Gene Technology Act 2000 and corresponding state and territory laws. The regulator is appointed by the governor-general only with the agreement of the majority of all jurisdictions. See http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/about-regulator-1.
10 With funding either being cost recovery or on a fee-for-service basis. For more information see www.afma.gov.au.
11 American literature uses the term stovepipe; Australians are more familiar with the term silo.
12 See www.environment.gov.au.

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