

## Article

# Environmental Regulation of Agriculture in Federal Systems of Government: The Case of Australia

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**Abstract:** The regulation of environmental impacts from agriculture can take place at various scales. In some nations, with federal systems of government, the multiscale nature of regulatory interventions can be confusing for farmers, not to mention costly and time-consuming to navigate. Regulatory overlap contributes to inefficiency and wastage in governance efforts, reduced trust in government action and can preclude positive environmental outcomes across the landscape. In this article, we explore how Australia's national-level law has been applied to agricultural land use. We canvas the concepts of regulatory complexity and ambiguity, and argue for a more integrated and flexible policy mix that rewards positive behaviour and stewardship of natural capital. This model would provide financial and other personal gains for those who can demonstrate objectives are being met. Further empirical research on fine-tuning that policy mix, again across scale, is warranted.

**Keywords:** federal environmental regulation; agricultural impacts; national environmental law; environmental federalism



**Citation:** Hamman, E.; Deane, F.; Kennedy, A.; Huggins, A.; Nay, Z. Environmental Regulation of Agriculture in Federal Systems of Government: The Case of Australia. *Agronomy* **2021**, *11*, 1478. <https://doi.org/10.3390/agronomy11081478>

Academic Editor: Thomas Bournaris

Received: 25 June 2021

Accepted: 23 July 2021

Published: 25 July 2021

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## 1. Introduction

Agricultural land use has been described as a 'leading human influence on the global environment' [1]. It accounts for roughly one-third of all global greenhouse gas emissions [2] and has been a major contributor to water pollution [3], wetland depletion [4] and global biodiversity loss [5]. Across the vast landmasses of countries such as the United States (US), Canada and Australia, agriculture has increasingly found itself 'at centre stage in a variety of policy debates', ranging from environmental impacts to sustainable food production to trade-related disputes [6]. Yet, in the US, as with many other nations, there has been a general reluctance to regulate the environmental impacts of agriculture [7]. The tendency has been to treat such impacts as a 'subset of farm business planning' [8]. Similarly, in Australia, there has been a reluctance to regulate, though the impacts of agriculture have recently become a focus of the national regulatory regime [9].

In this paper, we explore the role of regulation within the national policy architecture of federal governments [10]. We examine the case of Australia's national environmental law—the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)—to highlight the difficulties in regulating agricultural impacts at the federal scale, particularly where state governments are responsible for allocating property rights and making the vast majority of land-use decisions (e.g., mining and gas tenures, national parks and reserves, major public infrastructure, etc.). We take a broad view of agriculture in this paper, including 'tillage, drainage, intercropping, rotation, grazing and extensive usage of pesticides and fertilisers' [11]. We include large, medium and small-scale farms in our definition, as well as conglomerates, cooperatives and global agri-businesses. The various scales and activities of farming enterprises are important, as we seek to distinguish through our analysis between agriculture and other forms of regulated land use—mining, urban development, public infrastructure, etc.—as well as large- and small-scale agricultural activities across the landscape. In addition, we include both land 'owners' and 'occupiers'

in our analysis, consistent with most definitions in Australian property legislation, and use the terms ‘landholders’ and ‘farmers’ interchangeably.

Although there has been some legal and regulatory scholarship on the topic of federal environmental regulation in the US [12,13], there are still gaps in the broader literature analysing environmental regulation at scale. Notably, there is a lack of specific studies on the role of federal governments in regulating the impacts of agriculture in circumstances where state governments (constitutionally) control property rights and land-use planning. This paper aims to partly address that gap by examining how Australia has attempted to control agricultural impacts through its national environmental legislation. Based on a survey of the literature (both published and grey) and an analysis of Australia’s legislation and case law, we conclude that national regulatory measures, if they are to be utilised, need to be more tailored for agriculture. Moreover, as is consistent with the weight of environmental policy literature, regulation should be mixed with other policy levers such as education, markets and financial incentives [14,15]. To date, integration between national regulation and other (national and state) policy instruments is not evident from the EPBC Act approach in Australia. Accordingly, improved coordination between federal, state and local levels of government will likely be necessary to help avoid regulatory duplication and ongoing industry confusion [16].

Finally, we highlight at various points throughout this paper that the livelihoods and unique cultures of farming communities must be front and centre in regulatory debates. Regulation is essentially about behavioural change [17], and there are considerable questions of justice at stake such that regulation ought to be applied in a way that is responsive, risk-based and proportionate to the threats that agriculture poses [18,19]. In Australia, the debate over agricultural regulation remains highly polarised. But as Martin makes clear, ‘a simplistic appreciation of the issues as being merely about “red tape” or the putative rights of [Australian] farmers, is unlikely to serve the farm sector or the country well’ [20]. In this regard, improved coordination between public and private actors is likely to be necessary [21], as well as adopting strategies that direct farmers to engage in planning towards the achievement of public goals, not necessarily through coercive control, but by offering a degree of flexibility and choice [22].

## **2. Regulating Agricultural Impacts on the Environment**

### *2.1. Regulation as a Policy Choice*

Regulation is ‘the ex-ante bureaucratic legalisation of prescriptive rules and the monitoring and enforcement of these rules by social, business and political actors on other social, business and political actors’ [23]. It is any rule endorsed by governments where ‘there is an expectation of compliance’ [24]. On its own, regulation is often insufficient to address ‘wicked’ environmental problems such as non-point-source pollution from agricultural activities. Yet, in conjunction with other policy levers, regulation can be useful in long term sustainable land management [25]. In an agricultural setting, regulatory instruments have tended to be paired with other market-based mechanisms such as tradable permits [15], and regulatory scholars have long argued for a move away from ‘command and control’ centralised regulation towards more ‘information-based’ and flexible policy control strategies [7].

Command and control regulation, historically the most common form of regulation, is based on the theory of deterrence, and typically emphasises ‘a coercive, formal and adversarial style of enforcement and the sanctioning of rule-breaking behavior’ [26]. It is often centralised and prescriptive [12] and includes criminal sanctions for non-compliant behaviour, such as financial penalties or, in some rare cases, imprisonment. Other ‘softer’ forms of regulation are also available and are routinely deployed in other industries, including ‘self-regulation’—a process where organised groups regulate the behaviour of their own members [14], and ‘co-regulation’, where legal frameworks combine public and private instruments to strengthen standalone capabilities towards a shared goal [27].

## 2.2. Regulating Agricultural Activities

One of the foremost challenges in regulating agriculture is that most impacts are diffuse in nature, and any ‘abatement practices are often unobservable’ [28]. The literature is indeed dense on the multifarious challenges that governments (federal or otherwise) face in controlling diffuse impacts, especially on aquatic systems [29–31]. Indeed, controlling nitrogen and phosphorous run-off in the extensive catchment of Australia’s Great Barrier Reef has been and continues to be an enormous challenge [32]. In this regard, undertaking pollution control with a single regulatory instrument is rarely recommended [28].

Moreover, as Ruhl points out, farming in many nations, such as the US, Canada and Australia, is a ‘deeply rooted cultural institution with many noble qualities and important economic and social benefits’ [6]. Another key challenge, therefore, is to devise an environmentally sound but socially responsible mix [33], or as Pretty describes it [34]:

*[to] find ways to integrate such policy tools into effective packages that will increase the supply of desired environmental and social goods whilst ensuring farmers’ livelihoods remain sustainable.*

Concomitant with these problems is the challenge of regulating different scales of farming enterprises. The introduction (or change) of regulatory rules often cannot be absorbed quickly enough by smaller farms, resulting in excessive paperwork, record-keeping and considerable costs to their operations [16]. For example, each time a threatened species is added or amended to wildlife legislation, typically, only those enterprises of a sizeable scale have the capacity to adjust, whereas it may be more difficult for individuals and small landholders [16]. As we argue in the next section of the paper, these practical challenges of regulating diffuse non-point source pollution, and the different sizes and capabilities of farming enterprises are exacerbated by the complexities of federalist systems of government.

## 2.3. Regulating Agricultural Impacts in Federal Systems

In federal systems of government, where state, local and federal governments are constitutionally distinct, the interaction between different scales of law can result in ongoing legal and political battles. Several studies in environmental federalism have explored the complexities of this ‘multiscale regulation’, examining topics such as agricultural impacts on wetlands and migratory birds [35] and pesticide use on farms [36–38]. In some cases, a leadership role has been assumed by the federal government, with significant areas still left to be managed by state or local regulatory agencies [36]. In other instances, gaps in national legislation have emerged due to narrow interpretations of regulatory requirements [39], or, as we argue below, confusion as to how regulatory obligations at the national and sub-national scales are to be applied.

It is perhaps unsurprising, therefore, that in countries such as the US, a strong case has been put against centralised regulatory control [12]. Yet in the European Union (EU), multiscale systems have arguably led to the harmonisation of environmental regulation [40,41], for example, through the EU Nitrates Directive, which plays a central role in combatting diffuse source pollution from agricultural practices [42]. In some cases, the political system itself has had to adapt, for example, towards a concept known as ‘dynamic federalism’ [43]. In Australia’s case, although state and federal governments have agreed to consistency in their approach [44], much more needs to be done to fully realise it in practice [16]. The discussion in the next section further unpacks some of these challenges highlighting the design deficiencies in Australia’s national-level approach.

## 3. National Environmental Regulation in Australia

### 3.1. The EPBC Act: Overview and Context

Australia is a vast continent comprised mainly of privately held estates (freehold and leasehold) subject to various legislative instruments that seek to prioritise the protection, and in some rare cases, restoration, of degraded landscapes [45]. Presently, all levels of government (local, state and national) have regulatory frameworks in place which provide

for environmental protection and planning, including local government planning instruments and state-based legislation to protect native vegetation and threatened species and to control pollution and invasive species. These instruments place obligations on private landholders with respect to on-farm environmental management, including establishing permitting and licensing systems to limit certain activities (e.g., vegetation clearing) and the imposition of criminal penalties for violations [46].

The EPBC Act is Australia's main environmental law on the national scale [47]. It is by no means the only law that regulates agriculture in Australia, with various other state and local level frameworks controlling the use of fertilisers on farms (Chapter 4A in [48]), biosecurity and invasive species [49] and clearing of native vegetation [50,51]. The main focus of the EPBC Act is on protecting 'matters of national environmental significance' (MNES) which include, but are not limited to, World Heritage sites (such as Tasmanian Wilderness, the Great Barrier Reef, Uluru and Kakadu), internationally important (Ramsar) wetlands (of which there are 66 in Australia) and the habitats of migratory species and nationally listed ecological communities.

The regulatory engine room of the EPBC Act is a 'referral and assessment' process. Referrals of 'actions' are made to the Australian Environment Minister if the proponent considers that there is likely to be a 'significant impact' on one or more MNES [52]. It is a criminal offence to carry out any activity without first (self) referring the matter for consideration. Significant impact guidelines produced by the Australian Government are used as tools during the process [52]. After referral, Australia's Minister for the Environment decides: (1) whether or not an action will have, or is likely to have, a significant impact on an MNES, and (2) if the action is determined to have such an impact (or likely impact), then what kind of assessment and approval (if any) will be required. In this way, MNES operate as "triggers" for referral and assessment to the national government. The current list of MNES includes (Pt 3 Div 1 in [47]):

- World Heritage sites;
- National Heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Listed threatened species or endangered ecological communities (plant and animal species listed as threatened under the Act);
- Listed migratory species (e.g., migratory birds and their habitat);
- Nuclear actions (e.g., related to uranium mining/storage/transportation, etc.);
- The Commonwealth Marine Environment;
- The Great Barrier Reef Marine Park (as a separate consideration from its World Heritage and Natural Heritage listing); and
- Underground water resources (i.e., groundwater) where the activities are related to large coal mining or coal seam gas (CSG) developments.

Notably, this list does not explicitly include impacts from climate change or vegetation clearing through such inclusions have been suggested [53–55]. As noted above, except where clearing impacts on MNES, the regulation of vegetation clearing is largely within the ambit of state and local legal regimes. State governments utilise satellite technology to monitor and enforce compliance (for example, to show where clearing permits have not been obtained) [56,57].

Since its passage in 1999, the focus of the EPBC Act has been on Australia's resource extraction industry, especially coal mining, as well as associated infrastructure, such as port development, pipeline and rail construction [58]. Evidence of this 'preoccupation' with large-scale development is also reflected in the agricultural industry's under-engagement with the Act. In comparison to other sectors in Australia's economy, the number of referrals under the EPBC Act received from the agricultural sector is low, representing less than three per cent of all referrals received since 2000 [9]. In part, this may be attributed to the high proportion of smaller-scale practices in the agricultural sector (e.g., pockets of clearing, fence construction, fire breaks). These small-scale projects may less frequently

(or less conspicuously) trigger the operation of the EPBC Act than larger-scale and more visible projects such as mining or major infrastructure development.

From the 60 proposals deemed to be ‘controlled action’ decisions in the agricultural sector since 1999, approximately half (34) have been assessed on preliminary documentation from the proponent, 7 through EIS or Public Environment Reports, 5 through an accredited process, 1 on referral information and 0 by public inquiry [9]. Only 10 proposed actions have not been approved across all sectors since 2000, 2 of which were agricultural projects [9]. Although further qualitative empirical work is necessary, factors which may contribute to low referral rates by the agricultural sector include: (1) landholders self-assessing that their actions are a ‘continuing use’ (see below) or will not have a significant impact on an MNES, (2) landholders being unaware that they need to refer an action or (3) landholders choosing to avoid referring an action [58].

### 3.2. Problems with the Current Regulatory Approach

By most accounts, Australia’s environmental law frameworks have failed to protect biodiversity across the nation [59]. Despite local, state and national laws all targeting agriculture to varying (and often conflicting) extents, Australia still finds itself in a biodiversity crisis. The most recent State of the Environment report—produced on a five-yearly cycle by the Australian Government—showcases a downward national trend in native plant species, wetlands, coral reefs, small mammals, reptiles, amphibians and shorebirds [59]. The biggest drivers of decline are feral pests and invasive species, the broad-scale removal of woody vegetation (largely for cattle grazing) and climate change [60]. Australia’s Great Barrier Reef—a World Heritage site and nationally listed Marine Park—has continued to suffer from diffuse impacts of land clearing, as well as pesticide and nutrient loading within the catchment. The EPBC Act has had little, if any, behavioural impact on controlling these activities [32]. In the following sub-sections, we summarise some of the main ‘design’ problems with the Act.

#### 3.2.1. A One-Sized-Fits-All Approach

Regulatory scholars typically underscore the importance of regulators adapting their strategies and level of intervention according to the culture, conduct and context of the regulated community [61–63]. The likelihood of positive compliance outcomes is significantly enhanced by regulatory requirements that are clear, accessible and comprehensible [64]. Moreover, regulatory overlap, duplication or conflicting rules can make complying with regulatory requirements onerous, confusing and costly for regulated entities, undermining their economic, social and normative motivations for compliance [64].

Contemporary thinking on regulatory practice argues that policymakers should be attuned to an industry’s ‘cognitive frameworks’ and ‘attitudinal settings.’ [61,65]. After all, regulation is fundamentally concerned with behavioural change [17,66]. Baldwin and Black refer to this deeper understanding of regulatory environments as ‘really responsive risk-based regulation’ [65]. They merge theories of ‘risk based’ and ‘responsive regulation’ by establishing what they call a ‘risk-based approach to responsive regulation’ [65]. Of the five factors they suggest regulators should be responsive to, one in particular stands out in the context of Australian agriculture—the need to be responsive to a ‘regulated firms’ behavior, attitude, and culture’ [32,66]. As Baldwin and Black argue, drawing on the earlier work of Oliver [61,67]:

*The behavior, attitudes, and cultures of regulatory actors are considerations that require responsiveness because the motivational postures, conceptions of interests, and cognitive frameworks of regulated firms (and regulators) heavily influence the regulatory relationship and the regulator’s capacity to influence or regulate behaviour.*

Braithwaite and others have underscored the need to understand regulated entities in terms of appreciating their ‘motivational postures’ [68,69]—that is, a population’s stance towards regulatory authority. Bartel and Barclay have conducted important empirical work in Australian communities in this regard [66]. However, our understanding of



the behaviours, attitudes and cultures of Australian farmers (especially as it relates to biodiversity conservation and environmental regulation) is still underdeveloped. This lack of understanding coupled with the one-size-fits-all referral and assessment approach of the EPBC Act is likely to have contributed to regulatory failure. As Martin, Kennedy and Williams have noted [70–72]:

*... farmers adopt a broad range of agricultural activities across Australia in terms of scale and intensity. Each different type of activity poses varying risks to biodiversity and the major critique of the existing literature on EPBC and environmental regulation of the agriculture sector has been that a 'one-size fits all' and strict regulatory regime (based on referral, assessment and approval) has not been overly effective.*

Arguably, the EPBC Act's one-size-fits-all approach does not adequately account for the unique differences in culture, resourcing and established practice across the various locations and industries captured by the legislation (e.g., agriculture, ports, mining, residential development, defence, tourism, etc.). In a US context, similar arguments have also been made, with Adler commenting: 'all too often, federal environmental law embodies a "one-size-fits-all" approach that, in practice, is "one-size-fits-nobody"' [12]. For this reason, the subsidiarity principle, that authority should be delegated to the 'level of government closest to the problem', is often deemed appropriate for environmental regulation [10].

Other industries captured by the Act, for instance, mining and development, may be more likely to have access to third-party expertise in the form of consultants, expert legal advice, planners, etc. Moreover, many major developments are likely to be 'greenfield' projects that require, at the state level, a full environmental impact assessment, often taking 12–18 months to complete. Accordingly, there may be a gap between those sectors capable of complying with the Act and those that lack the technical or financial capacity to comply. In other words, agriculture seems fundamentally different from other EPBC Act-regulated industries. For agriculture (and perhaps also with mining and other sectors), there is also the susceptibility to trade fluctuations and climatic uncertainty (droughts, floods, etc.), as well as a host of other social and economic factors (for example, a lack of seasonal farmworkers due to border closures from COVID-19). Accordingly, Australian farmers have had to manage 'significant risk and variability' in their day-to-day operations [73], suggesting that an inflexible, centralised regulatory model is unlikely to be fit for purpose.

As the literature demonstrates, understanding the behavioural dimensions of farmers, including their 'relationships of power' with trusted intermediaries (e.g., peak bodies), as well as their vernacular [46], is important for improving environmental outcomes. It is particularly important for the informed design of regulatory strategies (be it self-regulation, co-regulation or command and control), which can help to shape the optimal 'policy mix' employed by governments [14]. A deeper understanding of industry culture, broader risks and behaviour can therefore help to inform all aspects of policy design as well as strategies of application and implementation (e.g., regulatory compliance). For example, as Parker and Nielson point out, it is vital to appreciate the 'characteristics and capacities' of the industry being targeted as well as their 'economic, social and normative motives' for change [64]. Bartel and Barclay have published similar results, utilising theoretical models of motivational posturing and responsive regulation [63,66,74].

Concomitant with a likely failure to understand and respond to industry culture (and sub-culture, for that matter) is the potential 'under-consideration' of specific place-based factors in both the design and implementation of federal regulatory instruments [45]. In the context of vegetation clearing laws—a particular flashpoint for agri-environmental conflict in several Australian states—research has revealed that while cultural differences between the regulated and regulators can itself trigger resistance, it is often deeper notions such as ignorance of place and a lack of respect for local knowledge that underpins regulatory failure [46]. For example, Bartel has found that farmer resistance to native vegetation laws in New South Wales had fomented because of the 'blanket' nature of the state-wide protections that did not account for the specific local, social and environmental conditions of farming—including the heterogeneity of different environments; the production values of the land

and the capacity of alternative measures such as revegetation to achieve environmental aims [46,75]. In some instances, such as in New South Wales, state legislation has addressed this shortcoming through new regulatory models [76].

A potential failure to properly focus the EPBC Act towards agriculture (at least in capturing the potential impacts of agricultural land use) has meant that it has not had the intended positive environmental consequences that underpinned its original introduction. Despite this, it is nevertheless clear that strict regulation, even if well-targeted to the culture of the industry, is unlikely, on its own, to facilitate improved farm management practices across Australia [77,78]. Suffice it to say, environmental regulation is a 'politically unpopular' choice in land use policy [79], and accordingly, a more nuanced, collaborative and incentive-driven approach may be desirable at the national level. Such an approach may help to secure, first, better conservation outcomes for Australia's unique biodiversity and, second, a higher degree of trust in administrative decision-making from the agricultural sector. As Adler has argued in the US context, this may require a higher degree of regulatory decentralisation in order to 'allow for a closer fit between policies and local preferences' [12].

### 3.2.2. Regulatory Complexity and Ambiguity

There is often a need for simplicity in regulatory design [80], something which is lacking in the case of the EPBC Act [16]. By most accounts, the EPBC Act is a complex and cumbersome regime with a referral and assessment regime that is challenging to understand and comply with, especially given the range of activities undertaken in Australia's agriculture sector [81,82]. Needless to say, regulatory requirements that are ambiguous or uncertain make it more challenging for farmers to meet regulatory requirements. As Parker and Nielsen note, one of the key factors influencing compliance with regulatory regimes is the target group's knowledge of the rules, which can be undermined where rules are complex, inaccessible or incomprehensible [64]. Two particular challenges for Australian farmers in this regard seem to include: (1) determining what actions constitute a 'significant impact' on an MNES in terms of their proposed agricultural operations; and (2) whether a 'continuing use exemption' may apply in their individual circumstances [16]. Each of these will now be discussed in turn.

#### Assessing 'Significant Impacts'

The referral process under the EPBC Act requires landholders to make predictions as to whether the impact of their activities upon MNES, including, for example, threatened species or ecological communities, is, or is likely to be, 'significant'. The nature of terms such as 'significant impact', makes it difficult to quantify the impact of individual proposed actions. There are likely many focal points for this uncertainty, including: (1) what is 'likely'?; and (2) what is 'significant'? Departmental guidance confirms that 'likely' impacts do not need to exceed a probability of 50% of occurring as a result of the action, but that it is sufficient that the impact is a real or not remote possibility [52]. Australian courts have expanded the interpretation of the '(likely) significant impacts' under the EPBC Act to include 'indirect impacts' [47,83] (s 527E in Ref. [47]). This concept was applied in the *Minister for the Environment v Queensland Conservation Council Inc* ('Nathan Dams case') [84], in which the Federal Court held that the requirement to assess 'all adverse impacts' could include the consequences of the action that could be reasonably contemplated by the proponent, whether or not those consequences are within the proponent's control [84]. Although 'impact' is now defined in s527E of the Act to include both direct and indirect 'consequences' of an action, an exhaustive definition has not been provided by the courts, and historically has been assessed in each case by the Minister [85]. The upshot of this has been uncertainty in understanding thresholds for triggering obligations under the Act.

Despite the expanded scope of '(likely) significant impact' under the EPBC Act to include indirect impacts, 'cumulative impacts' across a landscape generally have not been properly accounted for. Cumulative impacts, or cumulative effects, as they are sometimes

known, may be described as ‘the results of actions that are individually minor but collectively significant when added to other past, present, and reasonably foreseeable future actions’ [86]. One of the main critiques of the EPBC Act is, therefore, its preoccupation with project-level assessment and approval, as opposed to the broader governance of regional plans and interaction with state and local policies. Whilst there is the option for strategic environmental assessment (SEA) under the Act and bioregional planning, such measures have often not been utilised [16,87], with some notable exceptions: for example, the recent SEA for the Great Barrier Reef [88]. By focusing on assessing projects (mostly major projects) in such a fragmented manner, the EPBC Act may neglect the broader bioregional (and state-controlled) landscape in which the project is being undertaken, not to mention the broader time period in which the impacts of multiple projects interact with one each other [9]. This may have resulted, as increasingly reported in the literature, in the phenomenon of ‘death by a thousand cuts’ [89].

### Construing ‘Continuing Use’

Another aspect of the Act that has created confusion for the agricultural sector is the exemption provisions for farmers, notably the ‘continuing use’ provision under Section 43B [16]. The continuing use provision was introduced to clarify that authorisations provided prior to the commencement of the *EPBC Act* would continue after its introduction. Importantly, ‘continuing use’ agricultural developments are exempt from further consideration under the *EPBC Act*, regardless of the presence of, or likely impacts upon, MNES (s 43B in [47]). As with the referral process under the *EPBC Act*, it is the individual proponent’s responsibility to determine whether or not their project constitutes a ‘continuing use’. Continuing uses include actions concerning land, sea or seabed that were occurring before the commencement of the Act (16 July 2000) [90]. However, it does not include an enlargement, expansion or intensification of use, a change in location or any change in the nature of the activities that would *significantly impact* the land, sea or seabed [9,47] (s 43B in Ref. [47]). The precise meaning of the terms ‘intensification’, ‘expansion’ and ‘enlargement’ is unclear, giving rise to further uncertainty about which activities are captured by the exemption [16]. In the case of *Huon Aquaculture Group Limited vs. Minister for the Environment* [91], the Federal Court found (in relation to marine harvesting in Tasmania) that any significant expansion of an action that was previously within the jurisdiction of the ‘continuing use’ provision will no longer be exempted from the operation of the *EPBC Act*. Put differently, once continuity was broken, however temporarily, section 43B could no longer be relied upon. An expansion of a continuing action will be subject to the ‘likely significant impact’ threshold and an approval must be obtained for the action to lawfully proceed.

It is evident that the continuing use provision is a significant point of concern for farmers due to the lack of transparency associated with the provision’s meaning and intention [92]. This uncertainty makes it difficult for farmers to confidently predict the line between legitimate continuing use of their farming actions and (new) referable action. It is increasingly acknowledged that uncertainty has undermined the *EPBC Act’s* effectiveness as a policy instrument [16,53,58,92]. These findings are supported by other claims, which have suggested that farmers either do not know about or do not understand their obligations under national environmental law, even though the EPBC Act has been in existence for over 2 decades [9]. This seems to suggest that the obligations of the EPBC Act have been poorly communicated to the wider agricultural sector in Australia despite the Australian Government previously having invested in outreach services for farmers [9].

### 3.2.3. Duplication in the Australian Federal System

Regulatory complexity and uncertainty are compounded by the overlap between national, state and local environmental rules [16,93]. Although planned agricultural activities may impact MNES (and thus require national referral and assessment), they still often require state and even local-level assessment and approval, raising legitimate concerns about duplication and inefficiency in the process. A distinguishing feature of Australia’s



political system, as highlighted in the introduction, is the constitutionally entrenched position of the states in policy areas where they hold concurrent powers with the federal government. As national economic integration has deepened, the federal government has assumed increasing power (as in the USA, see the case of centralisation [12]) over land use and governance systems. Despite this, it often remains reliant on the willingness of the states to engage in negotiations and co-implementation of its policies at a regional scale [85,94].

Under the Australian federal system, states have primary responsibility for managing land use and a mandate to create laws and policies on matters not simply within the narrow ambit of MNES, but for all living and non-living resources within their jurisdiction (water, minerals, forestry, biodiversity, etc.). In the state of Queensland, for example, there is an explicit power in the (state) constitution to legislate for land allocation and management (ss 30, 40 in [95]). Consequently, the EPBC Act has often been perceived as operating as a kind of national ‘safety net’ for actions that are also being assessed (and approved) under state-based legislative processes.

Viewed another way, however, differing legislative foci at the state and federal levels can exacerbate the regulatory complexity and uncertainty discussed in the preceding sub-sections. For example, threatened ecological communities (i.e., protected woodlands, grasslands, shrublands, forests, wetlands, marine, ground springs and cave communities) are one of the most likely triggers for farmers under the EPBC Act. Second to threatened ecological communities is the trigger associated with threatened species (birds, frogs, mammals and endangered flora in particular). However, in relation to MNES, there appear to be different methodologies for determining the listing of threatened species at the state and federal levels, and as noted above, differing capacities amongst farming enterprises to respond to regulatory amendments. In the 2017–2018 financial year, the Australian Government considered the status of 89 species to be added to the endangered species list under the EPBC Act. Of these, 68 aligned with state and territory decisions, while the remaining 21 were classified differently at the federal level [96]. Whilst some of this may be remedied through a new Common Assessment Method to species listings [97], a lack of certainty about the description and requirements associated with the EPBC Act triggers may compound the complexity of complying with regulatory requirements.

Finally, perhaps one of the most pertinent examples of regulatory overlap facing the agricultural sector are the rules relating to vegetation clearing. Such rules can potentially exist at the state, federal and even local levels. Farmers are therefore expected to understand and respond to each level of regulatory control and risk breaching the law if the appropriate permits are not obtained in advance. In the Australian state of Queensland, for instance, the Court of Appeal decision in *Fairmont Group Pty Ltd. vs. Moreton Bay Regional Council* [2019] QCA 81 confirmed that local and state regulatory controls must be complied with when undertaking vegetation clearing, despite the fact that the clearing may relate to the same area of vegetation. An application to appeal the decision to Australia’s High Court was refused in late 2019, reportedly leaving farmers in a state of further frustration about the differing scales of rules applying to their actions [98].

#### 4. Reflections on Improving Regulatory Design

The enormity of the policy challenges facing federal nations such as Australia should not be underestimated. Resolving these challenges requires a renewed focus on qualitative, empirical and transdisciplinary research approaches. Recognising that enormity, and acknowledging the limits of our doctrinal desktop approach, we offer here only a few reflections on the potential research and policy trajectories that may be needed. Our focus in this paper was limited to analysis of the relevant provisions and policies that have contributed to complications under the regime. We did not undertake qualitative empirical research for our conclusions (interviews, etc.), although that would seem the next logical step for future research to examine the depth and breadth of incongruence between federal, state and local actors.

In any event, it seems clear that regulating agricultural impacts at scale is a notoriously challenging task. It seems all the more challenging in the case of federal systems of government such as Australia, where there is conflict and overlap between the political agendas (and jurisdictional legitimacy) of local, state and federal lawyers of government. That said, it is well known that there is a valuable body of theoretical work on regulation more generally that can be called upon to help improve environmental law. As Jones notes, there is a diverse range of approaches to regulatory design [99], though perhaps these need to be more targeted in the case of federal regulatory structures. The weight of academic attention has tended to focus on ‘good principles’ to help inform policy design, perhaps the foremost of which is the ‘desirability of preferring complementary instrument mixes over single instrument approaches’ [18]. Others have put forward their own views about how best to regulate environmental impacts, including in the context of agriculture. Ruhl’s three principles for controlling agricultural impacts, for instance, are that regulatory interventions must [7]:

- (1) Relate to farms the way farms relate to the landscape—that is, as numerous, disperse and diverse operations having cumulative effects over large geographic scales.
- (2) Take full advantage of market incentives and adaptive management techniques as means of keeping farms and their regulatory burdens flexible and responsive to rapidly changing social and economic conditions—that is, it must avoid relying exclusively on command-and-control regimes that have dominated modern federal environmental law.
- (3) Relate to farms the way farms relate to the relevant decision-making bodies—that is, local and state governing bodies must be sufficiently empowered to form arms-length cooperative relationships with federal regulatory authorities.

Ruhl’s third factor is perhaps the one we are most concerned with in our paper, and further empirical research is needed to understand exactly where those cooperative relationships (and regulatory ambits) need to be addressed. Lessons may be learnt (and comparative research questions derived) from similar political structures that regulate agricultural activities in the USA and Canada. As with the USA, Australian states and territories have considerable constitutional powers, know-how and expertise, which should (in theory, at least) allow them to accomplish far more than federal regulators can achieve on their own regarding biodiversity protection [100]. Yet a circumstance of ‘uncooperative federalism’ has seemingly emerged, with powerful states such as Texas and California suing the federal government on the basis of their (mis)handling of public resources and broader implementation of national environmental policy [101]. A particular flashpoint for USA federal–state relations has been wetland regulation, with “dredge and fill” or §404 permits typically required prior to construction activity impacting wetland environments [102]. In addition to national regulatory controls exercised by the USA Army Corps of Engineers, individual states may have their own duplicative requirements, for example, in Florida, which can exacerbate state–federal political relations [102]. Ultimately, the ‘jurisdictional mismatch’ in environmental law in the USA, as with Australia, lacks a cohesive rationale to succeed [103]. As Adler remarks, ‘environmental protections would be more successful [in places such as the USA] if responsibility was divided between the federal and state governments in a more justifiable manner.’ [103].

Similar challenges relating to strained state and federal regulatory relationships may also be seen in Canada, albeit with some notable differences attributable to variances in ‘institutional configurations’ and ‘intra-institutional relations’ [104]. Canada’s shared jurisdiction over matters relating to the environment, created through sections 91 and 92 of the Canadian Constitution, ‘has historically shaped and continues to shape environmental law and policy’ across the nation [105]. In more recent years, there has been a trend towards more localised regulation of environmental matters [105], which in theory could help fill the gaps of ‘inaction’ left by state and federal regulators [106]. As we noted in the case of *Fairmont* above, local regulations in Australia seem less about gap-filling and more about

reducing duplication in regulatory effort. Further research and investigation are warranted into exactly where that duplication needs to be removed.

In relation to Ruhl's point (2) above, the Australian Government is certainly not without forward-thinking agri-environmental strategies within its policy repertoire. Australia's *National Strategy for Nature* recognises, at the highest level, the need for improved accounting for nature on farms through the key concept of natural capital [107]. Similarly, there are government-backed land stewardship programs for the agriculture sector [108], and an emissions reduction fund pays farmers to manage their carbon emissions [109]. Yet, the reality is that these non-regulatory measures are not to be well-integrated within the existing regulatory approach of both federal and state governments [16]. As a recent review of the Act noted, the national government tends to rely too heavily on detailed prescriptive processes and provides few exemptions, incentives or defences for farmers undertaking revegetation exercises, constructing wetlands (e.g., ponded pastures) and other stewardship, restoration and sustainability-focused activities [16].

If national environmental regulation is to achieve its aims, policymakers ought to give further thought as to how regulatory interventions can best supplement non-regulatory measures for behaviour change across scale. This may require a degree of legislative integration between instruments. The regulation of sugarcane in the state of Queensland is a good example of this. The provisions in Chapter 4A of the *Environmental Protection Act 1994* (Qld) were introduced to combat water pollution from farming and other activities impacting the Great Barrier Reef. The legislation provides a defence to criminal prosecution where farmers can demonstrate adherence to voluntary industry-led (accredited) programs. Such programs are supported by financial and other incentives to encourage positive behavioural change at the farm level. In a similar way, the EPBC Act's approach to the oversight of agricultural activities may need to better integrate with land stewardship programs and other 'co-regulatory' measures where farmers trust and accept the legitimacy of the oversight bodies (national or regional industry groups), as opposed to centralised national control.

With a suite of innovative methods now available for evaluating agricultural impacts [110], it is still theoretically possible to design a regulatory system at the farm (or perhaps landscape) scale that is more fit for purpose than the blunt instrument the EPBC Act has arguably become. Whilst the multiscale nature of environmental governance will continue to be a challenge (especially given states are responsible for land use in Australia, whilst the Commonwealth has international responsibility), suitable frameworks have been developed which can help to disaggregate broad supranational policy objectives for biodiversity conservation by scaling them down to the regional or local level [111]. Accordingly, there should be no temptation to seek a 'one-size-fits-all' approach to land use regulation that combines vastly different industries (and impacts) such as mining and major infrastructure with farm-based activities. Policymakers, therefore, ought to recognise that agriculture is a 'geographically dispersed and highly variable industry', the upshot of which 'will greatly complicate any effort to regulate and monitor farming practices as we do for most other industries' [33].

Another recent example of a smarter regulatory intervention is the United Kingdom's Agriculture Bill which includes 'wide-ranging provisions' to enable financial support (or rewards) for agri-environmental schemes that conserve or restore sensitive habitat and landscapes, promote animal welfare and manage green space for open access [112]. The Bill addresses calls for greater consideration of landscapes and scale in regulating agricultural impacts by introducing 'incentives for cross-boundary collaboration' in the provision of ecosystem services that need to be managed at catchment or wider spatial scales. Such measures are largely non-existent in the EPBC Act, although a recent review of the Act has suggested increased investment in similar natural capital and payment for ecosystem services-type endeavours [16]. Such measures could be incorporated into the regulatory approach, and indeed it may be necessary to consider changes to other legal regimes, such as taxation law and/or corporations legislation (both of which are under the ambit of

the federal government in Australia) in order to promote sustainable farm management through financial incentives [7,113].

Finally, a point about regulatory implementation (as opposed to design). The literature highlights that risk-based frameworks ensure that regulatory compliance efforts are targeted to the areas that will have the greatest impact on regulatory objectives [61,114]. Risk-based regulation should focus on ‘detecting undesirable or non-compliant behaviour, responding to that behaviour by developing tools and strategies, enforcing those tools and strategies on the ground, and assessing their success or failure, and modifying them accordingly’ [61]. Arguably, the different assessment methods available under the EPBC Act, which involve varying degrees of complexity, incorporate some elements of a risk-based framework [9,115]. However, a 2020 report produced by the Australian Auditor-General found that the Australian Government lacks appropriate strategies to manage its compliance intelligence under the EPBC Act, thereby restricting its capacity to conduct appropriate compliance risk assessments relating to all forms of regulated development, including agriculture [81]. As a consequence, referrals, assessments and approvals under the Act seem not to be appropriately tailored for individual projects [81]. Although the Audit report related more broadly to departmental performance under the Act and did not specifically focus on agriculture, the findings have relevance to the governance of agricultural impacts due to the absence of tailored risk-based strategies for the sector. As a more specific review into agriculture under the Act found, this lack of specificity in focus may result in perceived inequitable attention paid to small-scale and low-impact agricultural projects and, conversely, insufficient attention towards more significant and long-term threats to MNES [9]. For example, an assessment of the EPBC Act in 2017 indicated that high volumes of land clearing for agriculture were occurring without any referral or approval under the Act at all [81]. Such activities are difficult to police at the national scale as states currently run the most comprehensive land use compliance programs using satellite data [57].

In the end, with agricultural development intensifying and the demand for land increasing, interactions between the agriculture sector and biodiversity conservation legislation are only likely to increase [9]. Generalised regulatory approaches overlook the potential for such interactions to have positive impacts on both environmental and farming objectives. By tailoring regulatory objectives, and thereby reducing financial and time demands, the agricultural industry may be able to invest further in strategic vegetation management [9], which in turn may have benefits for biodiversity. For example, vegetation management accounts for approximately 65% (122 m tonnes CO<sub>2</sub>e) of contracted abatement, which generally involves crediting carbon storage from vegetation regrowth by removing stock by fencing or preventing land clearing [9,116]. The protection of biodiversity could, by extension, benefit the agricultural sector by stimulating natural capital investment into the market. Research from Australia’s peak scientific body has found that ‘markets that support carbon sequestration could benefit farmers and rural communities (particularly in New South Wales and Queensland), increasing farm incomes by more than 30%, and national income by up to 3% above existing trends’ [117]. This reinforces the desirability of adopting an appropriate mix of policy tools that are tailored to the particular context and culture of the agricultural sector.

## 5. Conclusions

This article has explored some of the challenges that Australia has experienced in the federal regulation of environmental impacts from the agricultural sector. It has argued that the EPBC Act adopts a one-size-fits-all approach to assessment and approval of environmental impacts, which may be suitable for mining and other public infrastructure, yet is not tailored to the conduct and context of agricultural land use. Moreover, the regulatory regime created by the EPBC Act is complex and uncertain, detracting from a proponents’ capacity to fulfil the broad responsibility placed upon them to refer actions under the Act [16,46]. Importantly, the duplication between national, state and local

environmental laws may result in overlaps and inconsistencies, which seem to undermine both administrative efficiency and, ultimately, environmental outcomes.

To respond to some of these challenges, a more tailored, cooperative and appropriately scaled policy approach is arguably required. One line of work that we have canvassed includes an improved understanding of the motivations and capacities of agricultural stakeholders, including a better grasp on how different sectors (sugarcane, grazing, rice, cotton, etc.) are likely to respond to regulatory and/or non-regulatory interventions at different scales (national, state and local). In the same vein, we have argued for consideration of a more integrated and flexible policy mix (at the national level) that rewards positive behaviour and stewardship of natural capital (water, soil, biodiversity, etc.) with financial and other personal gains to be realised by those who can demonstrate objectives are being met. Further research on fine-tuning that policy mix, again across scale, is likely also required.

In the end, any regulatory or policy reform in this space should also seek to recognise the unique relationship that Australian landholders have with the environment. This includes accounting for their varying capacities to engage with the legal system as well as understanding the ‘vernacular’ knowledge and local perspectives of agricultural communities [118,119]. The Australian example presented in this paper may have broader relevance to international discourses about designing effective regulatory solutions to governing environmental risk across the landscape.

**Author Contributions:** Conceptualization, E.H., F.D., A.K., A.H. and Z.N.; methodology, E.H., F.D., A.K., A.H. and Z.N.; writing—original draft preparation, E.H., F.D., A.K., A.H. and Z.N.; writing—review and editing, E.H. All authors have read and agreed to the published version of the manuscript.

**Funding:** This paper was informed, in part, by research funded by the National Farmer’s Federation.

**Acknowledgments:** We acknowledge the comments from three anonymous reviewers as well as the earlier contributions of Stephanie Jowett, Lauren Kassulke and Andrew Simpson in this research. We would also like to acknowledge the helpful discussions we had with representatives from AgForce, the Rice Growers’ Association of Australia and the National Farmers Federation.

**Conflicts of Interest:** Evan Hamman is a Senior Lecturer in Law at Queensland University of Technology, Brisbane, Australia. He has also worked, from time to time, as an Australian Government contractor, including during the period in which this article was being finalised for publication. The views in this article reflect the authors’ own independent research and do not in any way represent the views of the Australian Government.

## References

- Adelman, D.A.; Barton, J.H. Environmental Regulation for Agriculture: Towards a Framework to Promote Sustainable Intensive Agriculture. *Stanf. Environ. Law J.* **2002**, *21*, 3–43.
- Vermeulen, S.J.; Campbell, B.M.; Ingram, J.S.I. Climate Change and Food Systems. *Annu. Rev. Environ. Resour.* **2012**, *37*, 195–222. [[CrossRef](#)]
- Moss, B. Water Pollution by Agriculture. *Philos. Trans. R. Soc. B Biol. Sci.* **2008**, *363*, 659–666. [[CrossRef](#)]
- Ramsar Convention on Wetlands. *Global Wetland Outlook: State of the World’s Wetlands and Their Services to People*; Ramsar Convention Secretariat: Gland, Switzerland, 2018.
- Norris, K. Agriculture and Biodiversity Conservation: Opportunity Knocks. *Conserv. Lett.* **2008**, *1*, 2–11. [[CrossRef](#)]
- Torres, G. Wetlands and Agriculture: Environmental Regulation and the Limits of Private Property. *Univ. Kans. Law Rev.* **1985**, *34*, 539–576.
- Ruhl, J.B. Farms, Their Environmental Harms, and Environmental Law. *Ecol. Law Q.* **2000**, *27*, 263–349.
- Torres, G. Theoretical Problems with the Environmental Regulation of Agriculture. *Va. Environ. Law J.* **1989**, *8*, 191–214.
- Craik, W. *Review of Interactions between the EPBC Act and the Agriculture Sector*; Report; Department of the Environment and Energy: Washington, DC, USA, 2018.
- Cosens, B.A.; Ruhl, J.B.; Soininen, N.; Gunderson, L. Designing Law to Enable Adaptive Governance of Modern Wicked Problems. *Vanderbilt Law Rev.* **2020**, *73*, 1687–1732.
- McLaughlin, A.; Mineau, P. The Impact of Agricultural Practices on Biodiversity. *Agric. Ecosyst. Environ.* **1995**, *55*, 201–212. [[CrossRef](#)]
- Adler, J.H. Fable of Federal Environmental Regulation: Reconsidering the Federal Role in Environmental Protection. *Case West. Reserve Law Rev.* **2004**, *55*, 93–113.



13. Esty, D.C. Revitalizing Environmental Federalism. *Mich. Law Rev.* **1996**, *95*, 570–653. [\[CrossRef\]](#)
14. Gunningham, N.; Sinclair, D. Regulatory Pluralism: Designing Policy Mixes for Environmental Protection. *Law Policy* **1999**, *21*, 49–76. [\[CrossRef\]](#)
15. Howlett, M.; Vince, J.; del Río González, P. Policy Integration and Multi-level Governance: Dealing with the Vertical Dimension of Policy Mix Designs. *Multidiscip. Stud. Politics Gov.* **2017**, *5*, 69–78. [\[CrossRef\]](#)
16. Graeme, S. *Independent Review of the EPBC Act: Interim Report*; Commonwealth Government of Australia: Canberra, Australia, 2020.
17. Martin, P.; Hine, D.W. Using Behavioural Science to Improve Australia’s Environmental Regulation. *Rangel. J.* **2018**, *39*, 551–561. [\[CrossRef\]](#)
18. Gunningham, N.; Grabosky, P.; Sinclair, D. *Smart Regulation: Designing Environmental Policy*; Oxford University Press: New York, NY, USA, 1998.
19. Roach, M. Can “Risk-Based” Regulation Help Increase Public Confidence in the Environment Protection Authority (EPA)? An Evaluation of New South Wales Environmental Licensing Reforms. *Environ. Plan. Law J.* **2015**, *32*, 346–360.
20. Martin, P. A Future-Focused View of the Regulation of Rural Technology. *Agronomy* **2021**, *11*, 1153. [\[CrossRef\]](#)
21. Eijlander, P. Possibilities and Constraints in the Use of Self-Regulation and Co-Regulation in Legislative Policy: Experience in the Netherlands—Lessons to Be Learned for the EU? *Eur. J. Comp. Law* **2005**, *9*, 1–8.
22. Coglianese, C.; Lazer, D. Management Based Regulation: Prescribing Private Management to Achieve Public Goals. *Law Soc. Rev.* **2003**, *37*, 691–730. [\[CrossRef\]](#)
23. Levi-Faur, D. (Ed.) *Handbook on the Politics of Regulation*; Edward Elgar: Cheltenham, UK, 2011.
24. *Australian Government Guide to Regulatory Impact Analysis*; Department of the Prime Minister and Cabinet: Canberra, Australia, 2020.
25. Bryan, B.A.; Kandulu, J.M. Designing a Policy Mix and Sequence for Mitigating Agricultural Non-point Source Pollution in a Water Supply Catchment. *Water Resour. Manag.* **2011**, *25*, 875–892. [\[CrossRef\]](#)
26. Gunningham, N. Enforcing Environmental Regulation. *J. Environ. Law* **2011**, *23*, 169–201. [\[CrossRef\]](#)
27. Ugarte, S.; Swinkels, V. *Policy Instruments and Co-regulation for the Sustainability of Value Chains*; The American Society of Mechanical Engineers: New York, NY, USA, 2015.
28. Weersink, A.; Livernois, J.; Shogren, J.F.; Shortle, J.S. Economic Instruments and Environmental Policy in Agriculture. *Can. Public Policy/Anal. De Polit.* **1998**, *24*, 309–327. [\[CrossRef\]](#)
29. Ryther, J.H.; Dunstan, W.M. Nitrogen, Phosphorus, and Eutrophication in the Coastal Marine Environment. *Science* **1971**, *171*, 1008–1013. [\[CrossRef\]](#)
30. Sharpley, A.; Wang, X. Managing Agricultural Phosphorus for Water Quality: Lessons from the USA and China. *J. Environ. Sci.* **2014**, *26*, 1770–1782. [\[CrossRef\]](#) [\[PubMed\]](#)
31. Sobota, D.J.; Compton, J.E.; Harrison, J.A. Reactive Nitrogen Inputs to US Lands and Waterways: How Certain Are We about Sources and Fluxes? *Front. Ecol. Environ.* **2013**, *11*, 82–90. [\[CrossRef\]](#)
32. Hamman, E.; Deane, F. The Control of Nutrient Run-Off from Agricultural Areas: Insights into Governance from Australia’s Sugarcane Industry and the Great Barrier Reef. *Transnatl. Environ. Law* **2018**, *7*, 451–468. [\[CrossRef\]](#)
33. Ruhl, J.B. Three Questions for Agriculture about the Environment. *J. Land Use Environ. Law* **2002**, *17*, 395–408.
34. Pretty, J.; Brett, C.; Gee, D.; Hine, R.; Mason, C.; Morison, J.; Rayment, M.; Van Der Bijl, G.; Dobbs, T. Policy Challenges and Priorities for Internalizing the Externalities of Modern Agriculture. *J. Environ. Plan. Manag.* **2001**, *44*, 263–283. [\[CrossRef\]](#)
35. Adler, J.H. The Ducks Stop Here? The Environmental Challenge to Federalism. *Supreme Court. Econ. Rev.* **2001**, *9*, 205–241. [\[CrossRef\]](#)
36. Grossman, M.R. Environmental Federalism in Agriculture: The Case of Pesticide Regulation in the United States. In *Environmental Policy with Political and Economic Integration: The European Union and the United States*; Braden, J.B., Folmer, H., Ulen, T.S., Eds.; Edward Elgar: Cheltenham, UK, 1996; pp. 274–304.
37. Hornstein, D.T. Lessons from Federal Pesticide Regulation on the Paradigms and Politics of Environmental Law Reform. *Yale J. Regul.* **1993**, *10*, 369–446.
38. Rae, A. Federalism in the Regulation of Chemical Pollutants in Australia. *Prometheus* **2003**, *21*, 247–264. [\[CrossRef\]](#)
39. Theis, J.G. Wetlands Loss and Agriculture: The Failed Federal Regulation of Farming Activities Under Section 404 of the Clean Water Act. *Pace Environ. Law Rev.* **1991**, *9*, 1–54.
40. Oates, W.E. On Environmental Federalism. *Virginia Law Review* **1997**, *83*, 1321–1329. [\[CrossRef\]](#)
41. Levi-Faur, D. Regulatory Networks and Regulatory Agencification: Towards a Single European Regulatory Space. *J. Eur. Public Policy* **2011**, *18*, 810–829. [\[CrossRef\]](#)
42. van Grinsven, H.J.M.; ten Berge, H.F.M.; Dalgaard, T.; Fraters, B.; Durand, P.; Hart, A.; Hofman, G.; Jacobsen, B.H.; Lalor, S.T.J.; Lesschen, J.P.; et al. Management, Regulation and Environmental Impacts of Nitrogen Fertilization in Northwestern Europe Under the Nitrates Directive: A Benchmark Study. *Biogeosciences* **2012**, *9*, 5143–5160. [\[CrossRef\]](#)
43. Hudson, B. Dynamic Forest Federalism. *Wash. Lee Law Rev.* **2014**, *71*, 1643–1714.
44. Department of Agriculture, Water and the Environment. *Intergovernmental Agreement on the Environment*; Australian Government: Brisbane, Australia, 1992. Available online: <https://www.environment.gov.au/about-us/esd/publications/intergovernmental-agreement> (accessed on 10 May 2021).
45. Bartel, R.; Graham, N. Property and Place Attachment: A Legal Geographical Analysis of Biodiversity Law Reform in New South Wales: Property and Place Attachment. *Geogr. Res.* **2016**, *54*, 267–284. [\[CrossRef\]](#)

46. Bartel, R. Vernacular Knowledge and Environmental Law: Cause and Cure for Regulatory Failure. *Local Environ.* **2014**, *19*, 891–914. [CrossRef]
47. Environment Protection and Biodiversity Conservation Act 1999 (Cth).
48. Environmental Protection Act 1994 (Qld).
49. Biosecurity Act 2014 (Qld).
50. Vegetation Management Act 1999 (Qld).
51. Planning Act 2016 (Qld).
52. Department of Agriculture. *Water and the Environment. Significant Impact Guidelines 1.1—Matters of National Environmental Significance*; Australian Government: Canberra, Australia, 2013.
53. Hawke, A. *Report of the Independent Review of the Environment Protection and Biodiversity Act 1999*; Commonwealth Government of Australia: Canberra, Australia, 2009.
54. Macintosh, A. The Greenhouse Trigger: Where Did It Go and What of Its Future? In *Climate Law in Australia*; Bonyhady, T., Christoff, P., Eds.; Federation Press: Annandale, Australia, 2007.
55. McGrath, C. Submission to the Independent Review into the Operation of the Environment Protection and Biodiversity Conservation Act 1999. Submission, 2008.
56. Martin, P.; Hamman, E.; Leuzinger Coutinho, G.; Diegues Leuzinger, M. Biodiversity Intelligence from Satellites. In *Achieving Biodiversity Protection in Megadiverse Countries: A Comparative Assessment of Australia and Brazil*; Martin, P., Diegues Leuzinger, M., Teles da Silva, S., Leuzinger Coutinho, G., Eds.; Routledge: Milton, UK, 2020; pp. 148–167.
57. Hamman, E. The Use of Satellites in Environmental Regulation: Applications and Implications for Biodiversity Conservation. *Aust. Environ. Rev.* **2019**, *34*, 88–92.
58. Macintosh, A. Why the Environment Protection and Biodiversity Conservation Act's Referral, Assessment and Approval Process Is Failing to Achieve its Environmental Objectives. *Environ. Plan. Law J.* **2014**, *21*, 288.
59. *Australia State of the Environment Report*; Australian Government Department of Environment and Energy: Canberra, Australia, 2016.
60. Filho, W.L. Handling the Impacts of Climate Change on Biodiversity. In *Handbook of Climate Change and Biodiversity*; Filho, W.L., Jelena Barbir, J., Preziosi, R., Eds.; Springer International Publishing: Cham, Switzerland, 2019; pp. 403–408.
61. Baldwin, R.; Black, J. Really Responsive Regulation. *Mod. Law Rev.* **2008**, *71*, 59–94. [CrossRef]
62. Braithwaite, J. The Essence of Responsive Regulation. *Univ. Br. Columbia Law Rev.* **2011**, *44*, 475–520.
63. Ayres, I.; Braithwaite, J. *Responsive Regulation: Transcending the Deregulation Debate*; Oxford University Press: New York, NY, USA, 1992.
64. Parker, C.; Nielsen, V.L. Compliance: 14 Questions. In *Regulatory Theory: Foundations and Applications*; Drahos, P., Ed.; ANU Press: Acton, Australia, 2017; pp. 217–232.
65. Black, J.; Baldwin, H. Really Responsive Risk-Based Regulation. *Law Policy* **2010**, *32*, 181–213. [CrossRef]
66. Bartel, R.; Barclay, E. Motivational Postures and Compliance with Environmental Law in Australian Agriculture. *J. Rural Stud.* **2011**, *27*, 153–170. [CrossRef]
67. Oliver, C. Strategic Responses to Institutional Processes. *Acad. Manag. Rev.* **1991**, *16*, 145–179. [CrossRef]
68. Braithwaite, V. Games of Engagement: Postures within the Regulatory Community. *Law Policy* **1995**, *17*, 225–255. [CrossRef]
69. Murphy, K. Turning Defiance into Compliance with Procedural Justice: Understanding Reactions to Regulatory Encounters through Motivational Posturing. *Regul. Gov.* **2016**, *10*, 93–109. [CrossRef]
70. Martin, P.; Kennedy, A.; Williams, J. Effective Law for Rural Environmental Governance: Meta-Governance Reform and Farm Stewardship. In *New Directions for Law in Australia*, 1st ed.; Levy, R., O'Brien, M., Rice, S., Ridge, P., Thornton, M., Eds.; ANU Press: Acton, Australia, 2017; pp. 263–271.
71. Australian Bureau of Statistics, 1301.0 Year Book Australia 2009–10 2010. Available online: <https://www.abs.gov.au/AUSSTATS/abs@nsf/Lookup/1301.0main%20features12009-10> (accessed on 5 March 2021).
72. Department of the Environment. *Australia's Fifth National Report to the Convention on Biological Diversity*; Report; Australian Government: Canberra, Australia, 2014.
73. Department of Agriculture, Water and the Environment. *ABARES Insights: Snapshot of Australian Agriculture 2020*; Report; Australian Government: Canberra, Australia, 2020.
74. Braithwaite, J. *Restorative Justice and Responsive Regulation*; Oxford University Press: Cary, NC, USA, 2002.
75. Simmons, B.A.; Wilson, K.A.; Dean, A. Landholder Typologies Illuminate Pathways for Social Change in a Deforestation Hotspot. *J. Environ. Manag.* **2020**, *254*, 109777. [CrossRef] [PubMed]
76. *Biodiversity Conservation Act 2016* (NSW).
77. Gunningham, G. Incentives to Improve Farm Management: EMS, Supply-chains and Civil Society. *J. Environ. Manag.* **2007**, *82*, 302–310. [CrossRef] [PubMed]
78. Reside, A.; Cosgrove, A.J.; Pointon, R.; Trezise, J.; Watson, J.E.M.; Maron, M. How to Send a Finch Extinct. *Environ. Sci. Policy* **2019**, *94*, 163–173. [CrossRef]
79. Cary, J.; Roberts, A. The Limitations of Environmental Management Systems in Australian Agriculture. *J. Environ. Manag.* **2011**, *92*, 878–885. [CrossRef]
80. Davis, S.J. *Regulatory Complexity and Policy Uncertainty: Headwinds of Our Own Making*; Becker Friedman Institute for Research in Economics Working Paper No. 2723980; University of Chicago: Chicago, IL, USA, 2017. [CrossRef]

81. Department of Agriculture, Water and the Environment. *Referrals, Assessments and Approvals of Controlled Actions under the Environment Protection and Biodiversity Conservation Act 1999*; Report; Commonwealth of Australia: Canberra, Australia, 2020.
82. Reside, A. Could the EPBC Act be Fit for Purpose and Prevent Biodiversity Decline? *Ecol. Soc. Aust. Bull.* **2019**, *49*, 1–2.
83. McGrath, C. Key Concepts of the Environment Protection and Biodiversity Conservation Act 1999 (Cth). *Environ. Plan. Law J.* **2005**, *22*, 20–39.
84. Minister for the Environment v Queensland Conservation Council Inc (2004) 139 FCR 24, 38–39 (Black CJ, Ryan and Finn JJ).
85. Godden, L.; Peel, J. The Environment Protection and Biodiversity Conservation Act 1999 (Cth): Dark Sides of Virtue. *Melb. Univ. Law Rev.* **2007**, *31*, 106–145.
86. Hegmann, G.; Cocklin, C.; Creasey, R.; Dupuis, S.; Kennedy, A.; Kingsley, L.; Ross, W.; Spaling, H.; Stalker, D. *Cumulative Effects Assessment Practitioners Guide*; AXYS Environmental Consulting Ltd. and CEA Working Group for the Canadian; Environmental Assessment Agency: Hull, QC, Canada, 1999.
87. Marsden, S. Strategic Environmental Assessment in Australian Land Use Planning. *Environ. Plan. Law J.* **2013**, *30*, 422–433.
88. Department of State Development, Tourism and Innovation. *Great Barrier Reef Strategic Assessment*; Report; Queensland Government, 2019. Available online: <http://www.statedevelopment.qld.gov.au/regions/regional-priorities/gbr-strategic-assessment.html> (accessed on 5 March 2021).
89. Dales, J.T. Death by a Thousand Cuts: Incorporating Cumulative Effects in Australia’s Environment Protection and Biodiversity Conservation Act. *Wash. Int. Law J.* **2020**, *20*, 149–178.
90. Department of Agriculture, Water and the Environment. *Agricultural Actions Exempt from Approval Under National Environmental Law*; Report; Australian Government: Melbourne, Australia, 2020.
91. Huon Aquaculture Group Limited v Minister for the Environment [2018] FCA 101.
92. Productivity Commission. *Industries, Land Use and Water Quality in the Great Barrier Reef Catchment: Research Report*; Report; Australian Government: Melbourne, Australia, 2003.
93. Morrison, T.H. Evolving Polycentric Governance of the Great Barrier Reef. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, E3013–E3021. [CrossRef]
94. Crawford, J. The Constitution and the Environment. *Syd. Law Rev.* **1991**, *13*, 11–30.
95. Constitution Act 1867 (Qld).
96. Australian Government, (then) Department of Environment and Energy. *Annual Report 2017-18*; Report; Australian Government: Brisbane, Australia, 2018.
97. Australian Government, Department of Agriculture, Water and the Environment. Common Assessment Method. Available online: <https://www.environment.gov.au/biodiversity/threatened/cam> (accessed on 10 May 2021).
98. Solomons, M. High Court Boosts Queensland Councils’ Power to Limit Land Clearing. The Sydney Morning Herald 2019. Available online: <https://www.smh.com.au/environment/conservation/high-court-boosts-queensland-councils-power-to-limit-land-clearing-20190912-p52qoz.html> (accessed on 10 May 2021).
99. Jones, J. Regulatory Design for Scientific Uncertainty: Acknowledging the Diversity of Approaches in Environmental Regulation and Public Administration. *J. Environ. Law* **2007**, *19*, 347–365. [CrossRef]
100. Fischman, R.L.; Meretsky, V.J.; Drews, W.; Stephani, K.; Teson, J. State Imperiled Species Legislation. *Environ. Law* **2018**, *48*, 81–124.
101. Lin, A.C. Uncooperative Environmental Federalism: State Suits Against the Federal Government in an Age of Political Polarization. *Georg. Wash. Law Rev.* **2020**, *88*, 101–161.
102. Polson, M.; Ewell, C.; Meindl, C.F. Florida’s Efforts to Assume Section 404 Permitting. *Wetl. Ecol. Manag.* **2021**, *29*, 169–180. [CrossRef]
103. Adler, J.H. Jurisdictional Mismatch in Environmental Federalism. *N. Y. Univ. Environ. Law J.* **2005**, *14*, 130–178. [CrossRef]
104. Huque, A.S.; Watton, N. Federalism and the Implementation of Environmental Policy: Changing Trends in Canada and the United States. *Public Organ. Rev.* **2010**, *10*, 71–88. [CrossRef]
105. Scott, D.N. The Environment, Federalism, and the Charter. In *The Oxford Handbook of the Canadian Constitution*; Oliver, P., Macklem, P., Des Rosiers, N., Eds.; Oxford University Press: New York, NY, USA, 2017.
106. Fox, S. Localizing Environmental Federalism. *Univ. Calif. Davis Law Rev.* **2020**, *54*, 133–194.
107. *Australia’s Strategy for Nature 2019-2030*; Commonwealth of Australia: Canberra, Australia, 2019.
108. Department of Agriculture, Water and the Environment. *Agriculture Stewardship Package*. Australian Government, 2021. Available online: <https://www.agriculture.gov.au/ag-farm-food/natural-resources/landcare/sustaining-future-australian-farming> (accessed on 11 May 2021).
109. Australian Government, Clean Energy Regulator. Emissions Reduction Fund. Available online: <http://www.cleanenergyregulator.gov.au/ERF> (accessed on 10 May 2021).
110. Van der, W.; Hayo, M.G.; Petit, J. Evaluation of the Environmental Impact of Agriculture at the Farm Level: A Comparison and Analysis of 12 Indicator-Based Methods. *Agric. Ecosyst. Environ.* **2002**, *93*, 131–145. [CrossRef]
111. Nuissl, H.; Hasse, D.; Lanzendorf, M.; Wittmer, H. Environmental Impact Assessment of Urban Land Use Transitions—A Context-Sensitive Approach. *Land Use Policy* **2009**, *26*, 414–424. [CrossRef]
112. Rodgers, C. Delivering a Better Natural Environment? The Agriculture Bill and Future Agri-Environment Policy. *Environ. Law Rev.* **2019**, *21*, 38–48. [CrossRef]

- 
113. Gumley, W. Investment Markets and Sustainable Agriculture: A Case for Ecological Tax Reform. *Revenue Law J.* **2004**, *14*, 200–222.
  114. Hampton, P. *Reducing Administrative Burdens: Effective Inspection and Enforcement*; HM Treasury Report; HM Treasury: Norwich, Australia, 2005.
  115. Australian Government Department of Environment and Energy. *Compliance Policy*; Report; Australian Government Department of Environment and Energy: Canberra, Australia, 2019.
  116. Climate Change Authority. *Review of the Emissions Reduction Fund*; Report; Australian Government: Canberra, Australia, December 2017.
  117. Commonwealth Scientific and Industrial Research Organisation Australian. *National Outlook 2015*; Report; CSIRO: Canberra, Australia, 2015.
  118. Graham, N.; Bartel, R. Farmscapes: Property, Ecological Restoration and the Reconciliation of Human and Nature in Australian Agriculture. *Griffith Law Rev.* **2017**, *26*, 221–247. [[CrossRef](#)]
  119. Productivity Commission. *Regulation of Australian Agriculture*; Productivity Commission Inquiry Report; Australian Government: Canberra, Australia, 2016.