Misfits of science and creatures of habitus:

Ecological expert witnesses across water resource management fields

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Thesis abstract

This thesis applies Bourdieusian field-theory to investigate the way scientific knowledge is converted into evidence to inform decision making across four key fields central to the development and enforcement of water resource management law in New Zealand: the New Zealand Environment Court, the Environmental Protection Authority, regional councils plan hearings, and ministerially appointed science and technology advisory groups. The New Zealand publicly funded science system now exhibits most of the characteristics of a "neoliberal science regime" (Lave, 2012), a regime constituted by an extensive and influential science "consultocracy" (Hodge and Bowman, 2006) a marketplace of expertise which encompasses the seven Crown Research Institutes, hybrid scientific research institutes and significant aspects of the university sector. This regime has structurally entrenched a series of contradictions across New Zealand's publicly funded science system which have a decisive influence on 1.) scientific habitus across institutional settings, 2.) the production of 'public good' environmental expert knowledge claims, and 3.) the way that ecological expertise is converted into evidence to inform decisions on RMA law and policy.

While the autonomy of New Zealand's publicly funded science system has been greatly diminished, the New Zealand Environment Court has developed a set of procedures and rules that are designed to reconstruct the idealised or 'pure' autonomous scientific community inside the juridical field. Some of these procedures and rules, most significantly those that relate to the still developing practice of expert-conferencing, have been replicated within regional authority plan hearings and science and technology advisory groups.

These procedures function relatively effectively inside the Environment Court. Within quasi-juridical fields like the EPA, councils and STAGs however, politics and power have a significant influence in the process of converting scientific knowledge into evidence to inform actions and judgements, as well as the evidentiary burden that is placed on ecological and biophysical evidence versus other forms of expertise. The neoliberal regime favours agents with the greatest economic capital to engage experts, primarily industry and local and regional authorities. Aside from a small number of highly active 'misfit' individuals, university-based experts are not major players in the Environment Court, which points towards the powerful authority assigned to expert-knowledge claims produced outside academia. Within this context, mātauranga Māori increasingly represents a corrective to the technocratic, ecological modernisation project embodied in the New Zealand RMA. Ecological misfits see mātauranga Māori as the most powerful articulation of 'public good' environmental values in Aotearoa today. However, the most vocal champions of mātauranga Māori tend to argue around the contradictions produced by the neoliberal science regime, rather than challenging them directly, arguably blunting its transformative potential.

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List of abbreviations

ADS	Alternative Dispute Resolution
CCMAU	Crown Company and Monitoring Advisory Unit
CRI	Crown Research Institute
DAF	Department of Internal Affairs
DSIR	Department of Scientific and Industrial Research
EDS	Environmental Defence Society
EnvC	New Zealand Environment Court
FRST	Foundation for Research, Science and Technology
GWRC	Greater Wellington Regional Council
HBRC	Hawke's Bay Regional Council
HRC	Horizons Regional Council
IWRM	Integrated Water Resource Management
MBI	Ministry for Primary Industries
MBIE	Ministry for Business, Innovation and Employment
MfE	Ministry for the Environment
MM	Mātauranga Māori
MoRST	Ministry for Research, Science and Technology
NIWA	National Institute for Water and Atmospheric Research
NPM	New Public Management Theory
NPS-FM	National Policy Statement - Freshwater Management
NZAS	New Zealand Association of Scientists
OECD	Organisation for Economic Cooperation and Development
OCFC	Office of the Chief Freshwater Commissioner
RNZ	Radio New Zealand
RSNZ	Royal Society of New Zealand
R&D	Research and Development
SSIF	Strategic Science Investment Fund
VM	Vision Mātauranga Fund

Chapter One: Introduction

We collectively experience a world both created by and understood through technological rationality and science, but seemingly unable to mitigate any risk that would require a significant disruption to production or consumption. More than thirty years ago, Ulrich Beck (1992) defined reflexive modernity as the recursive turning of modernity back on itself: the attempt to understand and address the problems generated by neoliberal modernity - such as climate change, freshwater degradation, nuclear catastrophe, domestic and international terrorism, post-truth, the decline of democratic structures and habitus - with the techniques of neoliberal modernity. These techniques take the form of quantitative cost-benefit and risk-benefit analysis, environmental impact assessments, economic forecasts, opinion polling, economic and financial modelling, the proliferation of science and technical advisory bodies and science consultancy industries, integrative and participatory resource management ideologies and processes, performance and accountability metrics, surveillance, attempted censorship and information control, to name a few examples. Today these techniques are primarily carried out by an assemblage of public and private science providers connected with multiple government and public sector authorities that comprises a system Mirowski defines as the "neoliberal regime of science" (2018).

Risk society has created the conditions in which neoliberal science regimes can thrive. The neoliberal science regime "reconfigures both the institutions and the nature of knowledge so as to better conform to market imperatives" (Mirowski, 2018, p. 172), the core principle of which is that "the market is the ultimate information processor" (p. 173). The result is a paradoxical situation in which we are mostly aware that science is commodified and politicised, while increasingly dependent on science for reliable, impartial and non-politicised knowledge. In such conditions, the authority of science is continually called into question.

These contradictions culminate dramatically in New Zealand with respect to intensive dairy farming and the degradation of freshwater ecosystems. 'Dirty dairying' is regarded by most New Zealanders as one of the most important political issues, and one that involves a complex range of competing interests and values. Increasing public awareness of the externalisation of the environmental costs of primary production is highlighted repeatedly in surveys which show that freshwater is considered the most important environmental issue for 80% of New Zealanders, and freshwater was a significant national election issue in 2017 (Statistics New Zealand 2018; Rood 2019). This awareness gave the current Labour government the strongest possible public mandate to mitigate and reverse freshwater degradation. However, progress remains superficial and performative, and economic interests continue to trump science-informed mitigation measures (Joy and Canning, 2020; Koolen-Burke and Peart, 2022).

The "crisis of expertise" (Eyal, 2019) has generated vast bodies of scholarship internationally, but the political economy of the science-law and science-policy nexuses has only received intermittent attention from sociologists in Aotearoa. Within this nexus, the scientific expert witness is a key player. Inside the framework established by the Resource Management Act (1991), the scientific expert witness is a key mediating agent between science providers and legal and policy fields. Scientific expert witnesses are drawn both from the neoliberal science regime, (which is comprised of Crown Research Institutes, tertiary institutions and hybrid research organisations), as well as the environmental "consultocracy" (Hodge and Bowman, 2006) (comprised by the largest, transnational environmental consultancy firms such as Boffa Miskell and WPS). The neoliberal science regime and the environmental consultocracy are structurally coupled and are the most powerful providers of expertise within Aotearoa's science-policy and science-law nexuses.

The legal literature on expert witnessing in environmental adjudication tends to be descriptive (Forret, 1998; Warnock, 2014; Warnock and Pedersen, 2017), and critical political economic approaches are comparatively rare (Monod de Froideville, 2022; Koolen-Bourke

and Peart, 2022). While there is a body of literature examining the use of expert witnesses in New Zealand's criminal and family court systems (see Katz, 2018; Henderson, 2013) the conduct and activities of expert witnesses across resource management fields remain mostly obscure to the public and have attracted comparatively scant attention from social science researchers. Within the legal scholarship and juridical commentary produced by the New Zealand Environment Court, "expert witnessing" is almost never used as a verb. In a written interview response from one Environment Court Commissioner, the term 'expert witnessing' was flanked with scare quotes to indicate that it is the interviewer's phrase, not the Court's (*Interviews*, Oct 2022 - March 2023). Rather, legal scholarship and juridical commentary speaks of 'the expert witness', which points to the way that expert witnessing is legally conceptualised as a set of rules that define and delimit a *role*, rather than a *practice* that has generated its own strategies, dispositions, political economy and culture. A central objective of this thesis is to explain expert witnessing as both a role and a practice and in doing so, to shed light on the 'game within the game' of expert witnessing for water governance law and policy. This leads to the central question of this thesis: Have the practices of expert-witnessing generated their own specific form of culture and politics? And if so, what are the implications for the contribution of science to the legal resolution of water resource management conflicts?

The Aotearoa science reforms, the beginning of which is usually traced back to the dissolution of the centralised Department for Industrial and Scientific Research (DSIR) in the early 1990s, have pushed publicly funded science providers in an explicitly commercial direction (Gailbraith, 1998, 2009; McGuinness *et al.*, 2009; Davenport and Bibby, 2007; Leitch *et al.*, 2014; Robinson, 2015). The Aotearoa science reforms involved a continual rollback of public funding; the exclusion of scientists from science-related policymaking and science funding structures; the rapid growth of a 'knowledge economy' involving the marketisation and privatisation of different forms of expertise; the narrowing of research agendas to focus on the needs of commercial actors and the decline of 'public-good' science (Davenport and Bibby, 2007; Leitch *et al.*, 2014; Hendy, 2015). Unlike neoliberal science regimes operating in

societies like America however (Lave, *et al*., 2010; Mirowski, 2011; Mirowski, 2018), the neoliberal science regime in Aotearoa is distinguished by extremely low-levels of private sector research funding, producing a highly commercially-orientated science system that is still predominantly reliant on public funding, with very limited autonomy from central government (Leitch *et al*., 2014; OECD, 2021, 2020; MBIE, 2022). Over the same period, the RMA regime has necessitated the growth of an industry of experts, which are drawn both from the heavily commercialised publicly funded science sector as well as the environmental consultocracy. Seeking to reassemble the set of practices and relations that constitute expert witnessing within the context of the application of neoliberal principles across the public sector raises an important subquestion to the central research objective, namely: To what degree do some forms of expert witnessing function as a structural component of Aotearoa's neoliberal science regime by recasting science as a form of expertise and a source of evidence in both environmental adjudication and policy formation that favours the economic over the ecological?

The expert witness is retained by a client to provide evidence on their behalf in multiple forms of environmental litigation and policy formation: from Environment Court consent and plan appeals, regional council policy plan and resource consent applications and EPA directed boards of inquiry. In order to dis-embed experts from their institutional setting and separate client objectives from expert evidence, the Environment Court has developed a series of rules and procedures to incentivise and discipline experts towards impartiality. The most powerful disciplinary mechanism is the Environment Court's application of the *Code of Conduct for Expert Witnesses* (EnvC *Practice Note*, 2023, s.9), which instructs experts to demonstrate impartiality both in the presentation of written and oral evidence, and through processes designed to enhance good faith expert deliberation, most significantly the developing practice of expert conferencing. The rules and procedures outlined in the Court's *Practice Note* (2023, ss7-10) bear similarity to Habermas' (1984) notion of the "ideal speech situation", but one specifically tailored for the adjudication of contested scientific and technical knowledge claims. While these rules and procedures can operate quite

effectively within the relatively autonomous juridical setting of the Environment Court, they become much less effective when replicated in more heterogeneous, quasi-juridical and non-juridical resource management fields, such as regional council resource consent and plan hearings, EPA boards of inquiry and science and technology advisory groups, where power, politics and self-interest continue to dominate.

Due to the absence of existing domestic research to draw on, much of the information and the most important insights in this thesis are derived from 'insider knowledge': semi-structured interviews conducted with a pool of ecologists and conservation scientists with substantial experience acting as expert-witnesses across multiple fields. These experts are primarily housed within tertiary institutions, Crown Research Institutes and smaller, green-focused consultancies. Interviews reveal that many of these experts have little faith that the *Code of Conduct for Expert Witnesses* (EnvC *Practice Note*, 2023, s.9 - hereafter *The Code*) itself guarantees the impartiality of expert-witness evidence. A recurring theme is that expert witnessing is more like a 'game' or an 'art' in which experts can 'perform' objectivity to decision makers who already share similar dispositions characteristic of agents within the environmental consultocracy and neoliberal science regimes. Participants describe the unspoken rules and conventions of expert-witnessing and the epistemic and discursive strategies that are used to both interpret a client brief and then tailor the presentation of information in a way that can meet the objectives of their client while maintaining a simulacra of impartiality and 'objectivity'. The *Code's* insistence on a traditionally empirico-positivist separation of facts and values, combined with juridically constructed disciplinary boundaries, combines to greatly disadvantage integrated, multidisciplinary forms of ecological expertise compared to other knowledge claims, especially privileging economic knowledge claims. The structural coupling observable between the neoliberal science regime, the environmental consultocracy and environmental governance authorities has marginalised academic ecologists, who, aside from a small group of highly active 'misfit' individuals, are not major players in these processes. As such, experts working in the interests of the agricultural sector have been able to have a very significant and

disproportionate influence on sustainability policy and resource management litigation and legislation in Aotearoa.

Within the RMA context, the neoliberal science regime has produced an institutional configuration and culture that is somewhat unique to Aotearoa's system of state-funded science and regionally devolved resource governance. Scientists within CRIs talk of a 'culture of silence' which involves a range of both formal and informal rules preventing them from speaking publicly about issues which might expose their institution to public criticism (*Interviews*, October 2022 - March 2023; Hendy, 2016). Within regional councils, technical staff articulate what could be called an anti-political disposition: an aversion to the 'messiness' of politics, which is connected with an idealised vision of "pure science" (Peilke, 2012) or "neutral science" (Ozawa, 2005): objective scientific knowledge cleansed of any 'external' political considerations (*Interviews*, October 2022 - March 2023). As such, many scientific researchers and technical staff within regional councils and CRIs perceive their role as fundamentally apolitical, and the artifice of politics is seen as a hindrance to environmental policymaking, rather than an intrinsic part of it. Politics is a fly in the ointment of policy, a problem that stands between prescription and practice, one which can be overcome by rational, evidence-based and deliberative decision-making. As explained in the final chapter, Sir Peter Gluckman - probably the closest New Zealand has come to producing a theoretician of the ethos of science - has repeatedly championed a vision of scientific authority that rests on its assumed value-neutrality and separation (and superiority) to politics. But because 'pure science' is based on informed disagreement and logical argumentation, this type of approach is inherently vulnerable to the kind of problematisation and complexification that can be tactically employed to undermine its authority in policy and legislative spheres.

These strategies are facilitated and structured into regional and national-level environmental legislative and planning processes by the RMA regime. The RMA was originally intended to provide for a devolved, democratic and evidence-driven decision

making and policy formation to both enhance public participation and a sense of ownership over natural resources, and to "promote the sustainable management of natural and physical resources" (Palmer, 2013: 14). Four decades later and it has become something close to common-sense that the RMA has failed to realise anything resembling sustainable development (Joy, 2015; Joy and Canning, 2021; Joy, 2022; Koolen Burke and Peart, 2022). The declining state of freshwater quality has been documented for over forty years and successive governments have failed to respond with an effective policy framework. From an ecological perspective, the most persistent criticism of the RMA is that it has failed to protect biophysical bottom-lines, and that it has failed to respond to "greater demands from the public for higher standards and more certain sustainability" (Oram, 2007: 12). More fundamentally, there is a growing acceptance that the normative concepts at the very heart of the RMA (which, during its history have fluctuated between superficial notions of sustainable development and ecological modernisation) are deeply compromised (Kawharu, 2000; Jackson and Dixon, 2007; Nicolas, 2018, Clapcott *et al.*, 2018, Kaiser and Saunders, 2022). This has opened a space in which both academics, legal agents and policy makers are increasingly receptive to alternative value-frameworks, most significantly mātauranga Māori which could provide a corrective to the productivist, colonial ethos that has dominated both science provision and resource management law and policy in New Zealand for much of its history (Kawharu, 2000; Muru-Lanning, 2012; Clapcott *et al.*, 2018). In some instances it appears the symbolic capital of mātauranga Māori represents a challenge to economic capital, most notably in the formalisation of Te Mana o Te Wai and the extension of legal personhood to the Whanganui River. The juridical, scientific and political recognition of mātauranga Māori is in its very early stages, and whether or not it represents a counter-hegemonic force, or whether it will be co-opted into the existing neoliberal science regime is unclear. The ambiguities in the way mātauranga Māori is defined and used by scientists, policymakers and juridical agents reflects the complex politics of hegemony that are pulling Mātauranga Māori in different (and sometimes contradictory) directions simultaneously.

The prioritisation of economic matters over environmental outcomes has been a recurring criticism of the planning, policy-formation and resource consent processes enshrined in the RMA (Jackson and Dixon, 2007; Wheen, 2013; Koolen-Bourke and Peart, 2022). Authorities publicly valorise 'evidence-driven' and 'science-driven' policy, but in practice, economic concerns consistently trump matters of long-term ecological sustainability and scientifically defined biophysical limits. A recent Environmental Defence Society (EDS) research project summarises the current situation: [1]

> We found that current regulatory direction ensures economic matters are prioritised over environmental ones and can prevent good science-driven outcomes … the current focus on costs unreasonably elevates the evidentiary burden to justify environmental reforms, creating systemic inertia against change (Koolen-Bourke and Peart, 2022, p. 13).

Koolen-Bourke and Peart starkly conclude that "given that most of the environmental issues we face today require an urgent response, this broader finding is deeply troubling" (2022, p. 13). However, while the EDS provided a badly-needed and impressively comprehensive insight into the systems and policy structures that shape the science/policy interface (using the development of the National Policy Statement - Freshwater Management 2020 as a case study), it does not delve into the minutiae of expert-witnessing across fields, or make explicit connections between the political economy of expertise and the neoliberal science regime in which it is embedded. The practice of expert-witnessing, including its internal culture and politics (*nomos)* and experts' own 'sense of the game' remains a largely unexplored territory for sociologists. *The thesis does not claim to provide an 'objective' account of 'the field of expert witnessing', rather, it is concerned with how interconnected water resource management fields produce ecological misfits, those who are attuned to recognise a 'game within a game', and struggle against it.* The thesis aims to make the experiences of these misfits visible

[1] The Environmental Defence Society is a New Zealand-based environmental NGO that specialises in sustainability policy and litigation and is funded by a combination of private and public sources.

and accessible to sociological inquiry and by necessity relies heavily on the accounts of the misfits themselves.

The thesis structure is as follows. Chapter Two outlines the theoretical framework that informs the study - Bourdieusian field theory. As well as elaborating Bourdieu's tripartite concepts of habitus, capital and field as they relate to the scientific and juridical fields, Bourdieu's (marginal) position in STS is briefly contextualised, with a focus on the two major figures most relevant to Bourdieu's own approach - Robert Merton and Thomas Kuhn. Chapter Three seeks to operationalise Bourdieu's field-theoretic by way of a viable research methodology tailored to the institutional configuration of science and resource management law and policy in Aotearoa. Chapter Four provides a Bourdieusian-influenced history of the development and structure of the New Zealand system of state-funded science and resource management legislation, situating mātauranga Māori within this history. This chapter also conceptualises the Environment Court as a 'field of fields' and describes how the Court's rules and procedures regarding expert witnessing and expert conferencing have been displaced and partially replicated throughout key RMA decision making arenas. Chapter Five turns towards an interview-driven analysis of expert witnessing both as a judicially constructed ideal speech situation and as contextually embedded practice with reference to three key water resource management conflicts: Horizons Regional Council's One Plan, the aborted Ruataniwha dam scheme in Hawkes Bay, and the development of the National Policy Statement on Freshwater (2020). The final and concluding chapter is concerned with possibilities for agency and resistance, making use of Bourdieu's underdeveloped concept of the 'misfit' to understand the disruptive struggles of ecological expert witnesses and the increasing symbolic capital of mātauranga Māori.

Chapter Two: Theoretical framework

2.1 Introduction

The purpose of this chapter is to outline Bourdieu's tripartite theory of field, habitus and capital, and to explain its relevance both to the study of scientific practice, and its relevance to the conversion of scientific knowledge into evidence used to inform resource management decisions within key juridical fields. Before explaining Bourdiusian field-theory it is necessary to historically contextualise Bourdieu within the development of STS, with an emphasis on the work of the two theorists who arguably influenced the concept of the scientific field most strongly, Merton and Kuhn. This chapter lays the theoretical groundwork for the methodological operationalisation of field-theory in Chapter Three and informs the historical narrative of the field-external forces that drove the de-autonomisation of Aotearoa's publicly funded science system in Chapter Four. The ideas covered in this chapter also provide the conceptual framework for interpreting the interview data and providing a more 'internalist' account of ecological expert witnessing across juridical fields in Chapter Five.

Four key arguments emerge from this chapter: Bourdieusian field theory is a useful framework for understanding: 1.) the structural configuration of scientific research across public institutions; 2.) the forms of habitus that this configuration has produced; 3.) the various strategies and practices that individual scientists enact within this configuration and 4.) what happens to ecology when it is converted into 'evidence' to inform freshwater water policy and law within judicial and quasi-judicial fields.

It is widely recognised that field-theory has been, until very recently, largely ignored within STS. Quoting Lave:

> "For its part, the STS world is profoundly ambivalent about Bourdieu. His classic 1975 article on the structure of scientific fields is included in the major STS anthologies, but

> his later critiques of STS researchers for taking positions that he considered too strongly constructivist alienated many who might have made use of his powerful analytic framework" (2012, p. 10)

Given the prominence of his ideas in other areas of sociological inquiry - consumption practices, cultural distinction, education and inequality - Bourdieu's absence within STS is striking. Part of the explanation for his absence is evident in the historical trajectory of STS theory, which has long moved away from structuralist and functionalist accounts in favour of ANT-inspired, micro-sociological and ontological approaches that tend to emphasise contingency, plurality and change, with a focus on the agency of individual scientists and other agents within wider assemblages (see Hess, 2013; Fuller, 1999). Researchers who see field-theory as a structuralist, political-economic alternative to the more dominant agentic approaches within STS must therefore expend much effort justifying their use of Bourdieu, attempting to 'build bridges' between STS and field theory with the aim of making Bourdieuian structuralism palatable to mainstream STS (Albert and Kleinman, 2011; Baker, 2017; Camic, 2011; Gauchat and Andrews, 2018; Hess, 2013; Jeon, 2019; Kate-Lostuvali, 2016; Nelson 2014; Eyal, 2013; Lave, 2012).

Another reason for Bourdieu's absence is his long-standing antagonism with one of the most influential voices in STS: Bruno Latour. This antagonism is usually traced to Bourdieu's final publication prior to his death, *Science of Science and Reflexivity*, in which he dismisses aspects of nascent Actor Network-Theory as a theoretical trend (2004: 26-31). In his many subsequent publications, writings and interviews, Latour has singled-out Bourdieu for critique seemingly more than any other thinker (perhaps, aside from Kant), positioning Bourdieu as emblematic of the arrogance of 'old-fashioned' social science and its universalistic categories and assumptions. But increasingly, scholars are recognising that this antagonism has been detrimental to the development of STS and are simply getting on with field-theoretic approaches to scientific practice (Crossley, 2004; Nelson, 2014; Lave, 2012; Gorski, 2013; Camic, 2013). For many of these scholars, particularly Lave (2012), field theory provides a means to understand both the internal and external determinants of

scientific practice: the nitty-gritty of field specific practice *as well as* the wider political economy of science in the context of neoliberalism.

While Bourdieu's absence within STS is contextualised, the following chapter does not attempt to build any 'bridges' between STS and field theory or 'reconcile' Bourdieu with STS. This is ground already covered elsewhere. Instead, it focuses on three core bodies of theory relevant to the analysis and discussion of the publicly funded science system and the way this system provides scientific knowledge to the related judicial and quasi-judicial fields central to resource governance in Aotearoa. The thesis as a whole seeks to demonstrate the relevance of field-theory empirically, and the purpose of the following sections is to lay the conceptual foundation for the empirical discussion in Chapters Four and Five. The chapter begins with a discussion of the Mertonian ethos of science, shifts to the Kuhnian inspired 'turn to practice', before turning to an elaboration of Bourdieu's theoretical *oeuvre* as it relates to science and law.

2.1 Mertonian functionalism

By the early 1970s, STS was characterised by the dominance of structural functionalism, of which Robert Merton was a leading figure. Merton conceptualised science as a semi-autonomous field in which research is structured through norms and an institutional "reward system" that grants prestige and resources to scientists according to the quality of their work (Merton, 1973). Merton's definition of the ethos of science is a moral consensus reproduced and transmitted through institutionalised practice. He quotes Bayet's remark that "this scientific ethos does not have its theoreticians, but it has its artisans. It does not express its ideals, but serves them: it is implicated in the very existence of science" (Beyet, as cited in Merton, 1973: 39).

Loosely defined, norms are specific to a social group, context or situation. The term norm is typically used in two ways: either as a pattern of behaviour, or as behaviour that is deemed desirable (Anderson *et al.*, 2010). Merton distinguished between technical and moral norms.

Technical norms refer to the methodological principles which guide and order scientific discovery, such as logical coherence, empirical validity and repeatability. Technical norms "guide the extension of certified knowledge", which is "the institutional goal of science" (Merton, 1973, p. 117). Moral norms also provide a methodology, but a different kind, "The mores of science possess a methodological rationale but they are binding, not because they are procedurally efficient, but because they are believed right and good. They are moral, not technical prescriptions" (Merton, 1973, p. 118). These are norms that govern scientists' relations to themselves, to the institution they reside in, and to the wider public.

Harriet Zuckermann, a student of Merton, conceptualised Merton's norms into "four sets of institutional imperatives": communism, universalism, disinterestedness, and organised scepticism (often referred to under the acronym CUDOS) (Zuckerman, 1977, p. 7). CUDOS are the non-codified "guiding principles" of scientific work: scientists must relinquish ownership of their research findings through publication (communism); truth-claims must be evaluated according to pre-established impersonal criteria that can be reproduced universally (universalism); personal interest or bias must be excluded from scientific method (disinterestedness); and critique is both welcomed and essential (organised scepticism) (Zuckermann, 1977). These norms are "expressed in the form of prescriptions, proscriptions, preferences and permissions" and legitimised institutionally, through rewards and sanctions, forming what Merton describes as a "scientific conscience" (1973: 38).

> "The entire structure of technical and moral norms implements the final objective. The technical norm of empirical evidence, adequate and reliable, is a prerequisite for sustained true prediction; the technical norm of logical consistency, a prerequisite for systematic and valid prediction. The mores of science possess a methodologic rationale but they are binding, not only because they are procedurally efficient, but because they are believed right and good. They are moral as well as technical prescriptions" (1973: 32).

Merton's analysis of the social organisation of science led him and his colleagues to investigate the ways in which "the social system of science works in accordance with, and often also in contradiction to, the ethos of science" (Hess, 2001: 179). Ideally a Mertonian reward-system will function in such a way as to bestow credit in proportion to a scientist's contribution to the advancement of knowledge, and how much credit is received will reflect the epistemic and cultural status of the knowledge that is produced (Hess, 2001). Merton observed that the rewards of science - prestige, fame, and the many material benefits including salary, research funding, laboratory space, access to the 'best' postgraduate students - are mostly apportioned by scientists themselves (Strevens, 2006). This reward-system is deemed to be functional to the degree that it encourages scientists to produce knowledge that has a social value: the more significant the contribution, the more rewards are bestowed; the more rewards are bestowed, the more credibility and fame a scientist has. For example, Pasteur's status is an outcome of the social value of penicillin; Darwin's status is an outcome of the social value of evolutionary biology.

But Merton was aware that as an individual scientist's prestige grows so does their power, which can lead to an unbalancing of the reward-system in favour of those who have already attained status, what he termed "cumulative inequality" (Merton, 1949, cited in Strevens, 2006: 48). Merton defined the 'Matthew effect' drawing inspiration from the Gospel of Matthew, "For unto everyone that hath shall be given, and he shall have abundance: but from him that hath not shall be taken away even that which he hath" (Merton, 1949, cited in Strevens, 2006 p. 31). The "Matthew effect" describes instances "that for equally good scientific work, renowned scientists tend to get more credit than unknown scientists" (Merton, cited in Strevens, 2006: 48). This can sometimes be the case when scientists come into conflict with one and other, or scientists at the top of the institutional hierarchy are able to skew the distribution of rewards and resources in their own favour (such as the apportionment of more credit to senior authors in instances of co-authorship) thus violating the norm of universalism (Strevens, 2006). But the scientific reward system remains functional to the degree that instances of unfairness and inequality are minimised by

fine-tweaking the distribution of labour and rewards, and overall, contribution to society continues to determine credit.

The Mertonian ethos of science provided a way to describe the scientific enterprise as driven simultaneously by morality and self-interest, both of which are kept in check by the institutionalised reproduction of incentives and disincentives. A normative system is the set of all norms associated with a particular social system combined with members' collective understanding of the importance and applicability of these norms, which remains very close to both the ethnomethodological (Lynch, 2000) and Bourdieusian conceptualisation of how rules influence practice (2012, p. 22-30). An individual scientist's 'normative orientation' is similar to Bourdieu's 'disposition', it is her particular pattern of conformity or resistance to the norms of a system, as the individual understands them (Anderson e*t al.*, 2010: 1). To achieve the "goal of science… the extension of certified knowledge" (Toren, 1984: 1666), it is necessary for scientists as a whole to abide by this system. While deviations will occur, as in all institutions, generally scientists will uphold these conventions and gross deviations, such as faking evidence or plagiarism, are uncommon. A functionalist analysis can give shape and coherence to a normative system, but because the 'system' encompasses both non codified and contextual conventions as well as individual 'orientations', Mertonians typically take the position that the system itself is never "fully knowable" (Anderson *et al*., 2010: 16).

Although Merton was certainly more attuned to inequality than Parsons, leftist critiques of Merton broadly followed already established critiques of Parsonian functionalism. Marxist or conflict-theory inspired sociologists questioned functionalism's failure to attend to conflict, the inability to account for institutional and social change and, most significantly, the blindness to the influence of individual actors (see Toren, 1983 for an overview of these debates). Both the optimism in self-regulatory systems and the focus on order and equilibrium led to a widely-shared perspective that functionalism housed an implicitly conservative bias.

While Parsonian social theory has been widely accused of conservatism, a number of authors have argued that the characterisation makes less sense in relation to Merton (Knorr Cetina, 1991, 2001; Hess, 2013). For example, Hess makes a persuasive case that the values underlying Merton's social theory are closer to left social liberalism (Hess, 2001: 179). The "tension" that Hess identifies in Merton's thinking runs parallel with a "tension" in liberalism itself:

> "[Merton] studies distributive issues such as patterns in allocation of credit, but also sought to explain how apparently unfair outcomes, such as the apportionment of more credit to senior authors in cases of multiple discovery, were often necessary for the institution to maintain functional stability" (2013: 180).

In attempting to conceptualise the problem of inequality, Merton introduced the idea of manifest and latent functions to the functionalist vocabulary, with manifest functions referring to the intended outcomes of a system, while latent functions are unintended, possibly undesirable outcomes (Merton, 1972). While Merton was concerned with the effect that cumulative inequality may have on science itself, his solutions focused on tweaking the internal constraints to individual advancement, while factors 'external' to the field such as class, gender, ethnicity, or the political economy of science itself, remain mostly untouched. A functional system of science for Merton meant one with strong norms and a reward system geared towards maximising merit-based inequality. As Hess explains:

> "Merton supported students who wanted to do work on gender and inequality in science, but his support for universalism in science led him to criticise African-American scholars who argued only they could do good African-American scholarship. He found such views to lead to solipsism, and he compared them to the equal and opposite view that only outsiders such as Gunnar Myrdral could understand a social controversy like American race relations" (2013: 180).

2.2 Kuhn and The Structure of Scientific Revolutions

The obvious intellectual affinity between Merton's study of science and the dominant functionalist paradigm in American social science partly explains the enormous influence that the ethos of science had and continues to have on American sociologists. The disposition of thinking about institutions as normative systems, or the impulse to look to norms, values and the 'agency' of individuals to explain patterns of behaviour seems to be a recurring disposition within U.S. social science generally, and arguably, continues to be a point of contrast in relation to Anglo and continental approaches in STS (see Nelson 2014; Hess, 2013; Swartz, 2019). This might also at least partly explain why the most significant challenge to the ethos of science came from outside the sphere of American sociology. Kuhn's *The Structure of Scientific Revolutions* had an immeasurable impact on the sociology of science, and is "a permanent part of the repertoire of historians and philosophers in the study of science" (Hacking, quoted by Stix, 2012). Whereas Merton was (somewhat unfairly) criticised for reproducing an idealised and semi-heroic vision of scientists as moral agents, Kuhn presents an entirely unromantic picture where the most scientists are closer to cogs in a giant, impersonal machine he defined variously as a 'paradigm' or a 'disciplinary matrix'. According to Kuhn, science does not gradually inch towards truth through a stable process of accumulation, but instead lurches forward in violent revolutionary convulsions following long periods of what he termed "normal science".[2]

[2] Some of the historical exemplars Kuhn uses to explain paradigm shift in his writings are; the transition from Ptolemaic to Copernican cosmology, the transition from Aristotelian mechanics to classical mechanics, the acceptance of Lavoisier's theory of chemical reactions in place of phlogiston theory, the replacement of the Great Chain of Being with Darwinian evolution, Germ Theory overtaking miasma theory, and the transition from Newtonian mechanics to Einstein's general theory of relativity. Some contemporary examples of paradigm shift in the natural sciences include the acceptance of plate tectonics as an explanation for geological change, the acceptance of the existence of quarks and the standard model of particle physics, the supersession of deterministic predictability with the concept of non-linear dynamic systems as promoted by chaos theory, and the increasing understanding of the nitrogen cycle and resulting paradigm shift within soil science and resource management. In Kuhn's view, paradigms are distinctive of the natural sciences, whereas social science are characterised by a "tradition of claims, counterclaims, and debates over fundamentals" which do not meet the criteria of a paradigm by his definition (Kuhn, 2000, p. 77). Nevertheless, many social scientists have applied Kuhn's concept of paradigms to social science, perhaps the most famous of which is Galbraith's seminal study of the Keynesian revolution in macroeconomics (Dunn and Pressman, 2005). In the later part of the 1990s, 'paradigm shift' emerged as popular buzzword referring to almost any type of cultural or

In opposition to the teleological image implicit in functionalist accounts, Kuhn favours what has been termed an "evolutionary" view of scientific progress (Wray, 2011).[3] As Wray explains, the evolutionary development of an organism is no more than an adaptation that allows the organism to continue surviving within the particular constraints of its environment. There is no teleological or qualitative aspect to evolution: the organism is not developing towards a 'better' or perfect organism, it is simply developing characteristics that may or may not allow it to adapt to whatever constraints produce the need for adaptation. Darwin famously identified a number of species that he termed "living fossils", such as the Australian platypus and the lungfish, which belong to an ancient genetic lineage and display a physiology remarkably similar to their fossilised ancestors (Shear and Werth, 2014). He theorised that these organisms are "anomalous" in the sense that their habitats have remained comparatively or uncommonly stable for millennia: "[These] living fossils … have endured to the present day, from having inhabited a confined area, and from having thus been exposed to less severe competition" (Darwin, 1859, quoted in Shear and Werth, 2014, p. 434). [4] Similarly, science develops by allowing new theories to emerge in response to puzzles and problems, and advancement is gauged by how successful a theory is in solving these puzzles, not in terms of advancement towards the 'perfect' theory, or abstract truth. As Wray (2011) explains, environmental constraints do not lead to a 'perfect' organism, but they do lead to a proliferation of different types of adaptations and different types of organisms, at least temporarily.

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institutional change, and the increasing commodification of the term by the marketing industry led to a widely shared view that the word has been overused to the point of becoming meaningless, and is now hopelessly divorced from Kuhn's original concept.

[3] This is not a characterisation imposed by interpreters of Kuhn. In *Structure*, Kuhn compares his theory to that of Darwin's: scientific progress is like evolution in that its development cannot be understood with reference to any end-goal (2000, p. 173). And in the later part of his career Kuhn was still describing himself as a "post-Darwinist Kantian" (e.g. Horgan, 2012, para 10).

[4] Today biologists know that these species have evolved significantly (Shear and Werth, 2014), but the analogy is still useful in understanding Kuhn's definition of paradigms. But this does perhaps point to the major limitations of the evolutionary/biological analogy for scientific change: organisms do not resist adaptation. Kuhn demonstrates the similarity between scientific change as mirroring social change, yet also claimed that paradigms were unique to the physical sciences.

This is perhaps as a far as a naturalistic analogy can take us, however. Natural selection dictates that organisms that do not adapt successfully will eventually become extinct. While a revolutionary paradigm is driven by a need to solve puzzles that cannot be solved by the dominant paradigm, Kuhn recognised there are different cultural, political, economic and institutional factors that may prevent or delay the scientific acceptance of a revolutionary paradigm. Karl Popper's (2002) theory of falsification was based on the argument that a reproducible anomaly could be enough to destabilise a paradigm.[5] Popper echoed Merton's moral vision of scientific work when he posited that scientists would actively seek out, or at least welcome revolutionary paradigms, "not because they add to positive knowledge of the truth of theories, but because they add to the negative knowledge that the relevant theories are false" (2002, p. 281). Kuhn rejected both of these arguments.[6] He argued that progress in normal science is only possible through the inculcation and institutionalisation of the dominant paradigm (what Bourdieu would call a 'scientific habitus'). This means that under conditions of normal science an array of non-voluntary techniques, measurements, methods, assumptions and even world-views are shared by the majority of the relevant scientific group.

In his earlier writing Kuhn termed this constellation of shared beliefs a "paradigm", later he tried to redefine it as a "disciplinary matrix". It is a concept with many clear parallels both with Bourdieu's idea of habitus, and also with Wittgenstein's idea of a "language-game":

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[5] Karl Popper's theory of falsification holds that science develops through trial and error, it is driven by conjectures and refutations ('new ideas') towards a realist concept of truth. Kuhn rejects the idea that science is a search for truth (Fetzer 1993, p. 160) and the claim of theory-truth correspondence (Kuhn 2000, p. 95), as science does not evolve towards the truth, but *from* the truth (Meynell, 1975, p. 80). Kuhn's evolutionary depiction of science is "driven from behind, not pulled from ahead" (Kuhn, 2000, p. 96). For Popper, scientific progress is driven by problems, and scientists' motivations for problem solving are moral. But Kuhn argues that problem-solving only opens the potential for paradigm shift during those rare and contingent periods of scientific crisis: the accumulation of anomalies in itself does not guarantee a scientific revolution. While Popper's theory of falsification is relevant to describing aspects of a scientific crisis, it does not describe the mundane practice of normal science.

[6] While the role attributed to falsification by Popper is similar to the one that Kuhn assigns to anomalies, Kuhn doubts that falsifying experiences exist for a number of reasons. Kuhn argued that Popper's idea of falsification replicated the same flawed assumptions as the concept of verification: "both assume the existence of absolute standards of evidence that transcend the paradigm. A new paradigm may solve puzzles better than the old one does, and it may yield more practical applications. But you cannot simply describe the other science as false" (quoted in Horgan, 2012 para 12).

the shared and structured ways of speaking, thinking and interacting, which make sense only within the context of a broader "form of life". Differing language-games with differing rules may exist within the same scientific paradigm, but it is the dominant paradigm which constitutes the particular 'form of life' and provides these language-games their respective sense and coherence. Language-games have sense only in relation to other language-games within the broader system of language-games (the paradigm) to which they belong. By Wittgenstein's account, whatever persuasiveness or power a language-game might have is primarily derived from the rules of intelligibility which are embedded in the social context in which they are situated (Wittgenstein, 2009, p. 18-23; 225-237). Rationality or truth becomes part of an activity where "It is the language-game that manifests a rational behaviour and not the person herself" (Schwed, 2009: 6). Thus, from a Kuhnian point of view, it makes much less sense to talk about the 'agency' of individual scientists in relation to a paradigm. A scientist cannot choose to commit themselves to a paradigm: a paradigm is inculcated through scientific training, performed through scientific work, and represents the "educational initiation that prepares and licenses the student for professional practice" (Kuhn, 2000: 318-319), in other words, the non-voluntary dispositions of an employable scientist. Kuhn had identified this 'tension' between the desire for innovation (and individual recognition) and the requirement for conservativeness in one of his very first essays on the theory of science, "The Essential Tension" (1977). This clear-eyed, unromantic focus on the conservativeness and problem-oriented nature of scientific work revolutionised the study of science, and destabilised both the moral, normative view of Mertonian functionalism, as well as the detached, rational, self-falsifying image popularised by Popper.

So for Kuhn, the norms that structure science are not moral rules derived from social values, but rather the methodological standards enshrined by the dominant paradigm, such as logical coherence, scope, replicability, accuracy, methodological legitimacy, verifiability of evidence. And the way paradigms influence scientific work is not straightforwardly universal, the importance given to different aspects of a paradigm may differ according to

institutional context, policy and legislative context, cultural context as well as different types of scientific specialisation. For example, a chemist and a physicist might operate with different definitions of what a helium atom is, but these taxonomic or conceptual differences still exist within the same dominant paradigm. For Barnes and Dolby (1970: 23): "The groups of scientists showing the greatest degree of consensus are Kuhn's paradigm sharing communities. The cohesion, commitment and solidarity within these stem from technical norms of paradigms, not from an overall scientific ethos."

The vast majority of scientists will never formally or publicly question a paradigm. They solve problems whose solutions reinforce and extend the scope of the paradigm rather than challenging it. There are always anomalies that a dominant paradigm cannot account for, and scientists are more likely to ignore these anomalies rather than challenge the paradigm itself, what Kuhn terms "mopping up" (2000, p. 25). Cognitive consensus during periods of normal science suppresses innovation, "Under normal conditions, the research scientist is not an innovator but a solver of puzzles" (Kuhn, 2000, p. 39). When enough anomalies have accumulated, this may result in a state of crisis which forces some scientists to push against the boundaries of normal science and engage in "extraordinary research", meaning new theories, new experiments, new procedures (Kuhn, 2000, p. 92). For Kuhn, this state of crisis represents a decisive moment in the history of science wherein, given an absence of significant political, cultural or institutional barriers, the possibility of a paradigm shift opens up. It is a period characterised by "the proliferation of competing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals" (Kuhn, 2000, p. 145).

By 'recourse to philosophy' Kuhn is referring to 'the blurring of the boundaries' of a paradigm. Because a paradigm is defined by agreement on fundamentals, a paradigmatic crisis destabilises a discipline at its very foundations, and as scientists begin to express increasingly open dissent the field itself begins to look like something quite different. Dissident scholars work to position anomalies as the defining subject matter of their

discipline, isolating and magnifying anomalies and pushing the rules of normal science to generate speculative theories (Kuhn, 1977: 81). New journals emerge and special issues are published, conferences and books are framed around the emerging paradigm, and the new paradigm begins to attract the attention of the field's more eminent academics. If successful, a single revolutionary theory or body of evidence may open the road to a new paradigm, such as the publication of Darwin's *Origin of the Species*, or Marie Tharp's discovery of the Mid-Atlantic Ridge in 1953, which eventually vindicated the controversial theory of plate tectonics. If unsuccessful, the new theories can be abandoned relatively easily, and some revolutionary scholars may instead turn to philosophical analysis, becoming meta-theoreticians outside or on the very margins of their discipline. If the new paradigm fails to stabilise, some of the new ideas may be assimilated into the dominant paradigm, or else insoluble puzzles are isolated and left for future scholars to solve. Kuhn's criteria for a successful paradigm shift is that the new paradigm must retain and expand the puzzle solving power of the preceding paradigm, while also providing a guide for the predicted future problems within a field.

Crucially, Kuhn demonstrates the way that a paradigm shift is both "a destructive, as well as a creative act" (Horgan, 2012, paragraph 7). The breakdown of a dominant paradigm may be experienced on a deeply personal level by individuals whose education and careers have unfolded within it, and a paradigm shift can threaten or destabilise ontological security in various ways. Competing paradigms may have methodological, conceptual, observational or taxonomic disparities that render them "incommensurable", meaning scientists habituated to the dominant paradigm may not completely understand the emerging paradigm, or may be unsure of what criteria to employ when evaluating its comparative merit. Like the choice between competing political ideologies, that between competing paradigms proves to be a choice between fundamentally incompatible forms of life, "the normal-scientific tradition that emerges from a scientific revolution is not only incompatible but often actually incommensurable with that which has gone before" (Kuhn, 2000, p. 104). Kuhn's striking statement that "Unlike art, science destroys its past" is often

put in juxtaposition with Newton's famous aphorism, "If I have seen farther, it is by standing on the shoulders of giants" (Toren, 1983: 1668). Perhaps Kuhn's most radical insight is that science does not move towards anything, rather, it moves away from its own past.

When the dust of a scientific revolution has settled, people, problems and information that were central to a dominant paradigm may become obsolete or unscientific. Conversely, problems, people and information that were previously thought unimportant or irrelevant may become central to the new tradition. Kuhn drew on Gestalt psychology and Wittgenstein's famous duck-rabbit image to show how a paradigm shift could mean seeing the same information in a completely different way (Kuhn, 2000, p. 111-121).[7] It is not surprising then that so many interpreters of Kuhn have emphasised the way that paradigm shift mirrors the process of generational, cultural and political change, such as Max Planck, who argued that "a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it" (1950, p. 33). As Wittgenstein would say, this is an agreement "not in opinions, but rather in form of life" (2008, p. 241). Although paradigm shift is a political and subjective process which will often involve a defence of entrenched interests and deep division within a field, Kuhn argues that once the new paradigm is established, this history of this conflict and contingency is largely erased from the training that habituates students into the new paradigm. The new paradigm invalidates and replaces the preceding one, so while chemistry or physics students may be introduced to

[7] For example, it is well-known that the information that would form the basis of germ theory was apparent to microscopists as early as the late seventeenth century. As Wootton argues (2006, p 110) "An intellectual revolution that should have taken place failed to occur". There are complex paradigmatic and political/cultural explanations for this historical lag between the observance of bacteria and the emergence of bacteriology as a discipline. For example, doctors operated by the doctrine of Hippocrates, believing disease was caused by an imbalance of the "humours", which could be caused or exacerbated by miasma (bad air) and were largely resistant to new information that would destabilise their status or practice (Wootoon, 2006, p. 195-221). The idea that tiny organisms could cause fatal disease among humans also contradicted the doctrine of the great chain of being, the hierarchical structure of all matter and life derived by mediaeval Christianity. As late as the 1840s, doctors like Ignaz Semmelweis and John Snow were arguing for the link between bacteria and disease, but were largely ignored (Wootton, 2006, p. 195-221). Although the existence of bacteria was evident to doctors and scientists, this information would remain suspended in a pre-paradigmatic state until the very late enlightenment period.

the ideas of Lasovier, Newton or Aristotle as the founding figures of their field, the history of scientific revolutions is mostly irrelevant to their training, and is largely relegated to 'specialist' disciplines such as the philosophy and sociology of science.

2.3 The turn to practice

Today Kuhn is ranked among the giants of philosophy, a figure who irreversibly changed the way we all think about science, and, like Marx or Foucault, a thinker whose influence has grown much larger than the content of his original writings. It's not difficult to see why the arguments in *Structure* were seductive to social scientists: he complicates any claim to the semi-autonomous position of the physical sciences, and topples the pedestal that allowed science to position itself as above politics or society. Kuhn brought science down into the profane world of politics and self-interest that we all inhabit, and destabilised the myths that scientists and philosophers of science told about themselves since the very beginning of the Enlightenment. More than this, by introducing conflict, politics, culture and history into the study of science, Kuhn made scientific practice interesting to social scientists, and also to a popular audience. [8] But as Horgan explains, most interpreters of Kuhn have tended to avoid the more radical extension of his conclusions:

> "[*Structure*] fomented the now trite idea that personalities and politics play a large role in science. [But] the book's most profound argument was less obvious: scientists can never truly understand "the real world" or even each other" (2012, para 5).

This idea that scientists inhabit 'different words' was perhaps the most controversial part of *Structure*, and was the point latched on both by critics who were disturbed by the seemingly

[8] Referring to the adoption of Kuhn as a guiding-light for British opponents of Merton, Ben-David (1978: 205-207) remarks: "They [British Kuhnians] did so not because Kuhn's model was more congruent with observations (that they did not try to check) but because it dealt with scientific communities as defined by their members intellectual and scientific concerns, which for everyone except professional sociologists was a much more interesting point of view than an analysis of the norms and reward system of science … Sociology becomes interesting only if it can show that actually there is no consensus in science and that decisions about what is at any moment accepted as scientific 'truth' are arrived at through a process of conflict of interests, power struggle and negotiations, as in many other fields of behaviour."

irrational and relativist characterisation of scientific progress (such as Popper), as well as a few that felt that Kuhn did not take this relativism far enough (such as Paul Feyerabend). To note that scholarly interpretations of Kuhn are 'diverse' would be unhelpfully clichéd. But it is useful, as Read (2013: 34) has done, to think of Kuhn's influence in STS as comparable to Wittgenstein's influence in philosophy: both Kuhn and Wittgenstein direct us away from any philosophically abstract explanation of practice and instead towards the material conditions of practice (Read, 2013: 34).

While it took decades for the social sciences to absorb and respond to *Structure*, its publication greatly accelerated the critique of Mertonian functionalism, and gave scholars a new theory to position themselves against pre-Kuhnian approaches. Here a key work was Mulkay's (1976) "Norms and Ideology in Science", in which he argued that Mertonian norms fail to even describe scientists own understanding of scientific work:

> "In recent years, there has been much criticism of this kind of functional analysis of science. One reason for such criticism is that detailed study by historians and sociologists has shown that in practice scientists deviate from some at least of these putative norms with a frequency which is remarkable if we presume that the latter are firmly institutionalised" (1976: 639).

Mulkay's central argument was that Merton had mistaken norms for ideology, and had confused the moralisations put forward by individual scientists for a scientific morality. When Mertonians followed behaviour they found that norms were often in coexistence with counter norms. Merton himself acknowledged the existence of counter-norms in his original essay, and later emphasised the workings of sociological ambivalence, which results when people are subjected to two or more normative systems. Counter-norms are not necessarily a threat to a functional normative system and in some respects are an inevitable byproduct of these systems, as Ziman has noted, if there were not counter-norms then there would be no need for a social system to assert preference for actions aligned with original norms. But

Mulkay argued that neither norms nor counter-norms represent a normative structure of science, rather:

> [Mertonian norms] are better conceived as vocabularies of justification, which are used to evaluate, justify and describe the professional actions of scientists, but which are not institutionalised within the scientific community in such a way that general conformity is maintained (1976: 653).

Mulkay had looked to Kuhn for a non-moral basis to ground his analysis of scientific practice, noting that "Kuhn does not explicitly state that scientific theories operate as norms, but such a conception is implicit in his scheme" (quoted by Toren, 1983: 1668). Kuhn had tried to explain that he had introduced the concept of paradigms as an alternative to norms, and while any community of practice will obviously involve shared technical and behavioural norms, this community cannot be reduced to any normative structure and a normative structure is not a sufficient basis to understand practice.[9] In other words, paradigms are much bigger than norms, but how exactly norms influence practice, and how they work within a paradigm is something that should be investigated empirically, rather than theorised in advance.

Here the question of what exactly Kuhn meant by paradigms, how his view changed during his lifetime, and how faithfully the model has been interpreted and applied by social scientists over the decades could potentially lead down a dizzying rabbit-hole. Highly influential STS scholar Steven Fuller (1999) has been almost wholly dismissive, arguing that Kuhn reified one particularly brief moment in the history of science (scientific revolutions)

[9] In a preface for a collection of essays also entitled *The Essential Tension* (1977), Kuhn explains why he conceived of paradigms as encompassing but not reducible to norms/rules: "The term paradigm … entered into *The Structure of Scientific Revolution*s because I, the book's historian-author, could not, when examining the membership of a scientific community, retrieve enough shared rules to account for the group's unproblematic conduct of research. Shared examples of successful practice could, I next concluded, provide what the group lacked in rules. Those examples were its paradigms, and as such essential to its continued research. Unfortunately, having gotten that far, I allowed the term's application to expand, embracing all shared groups commitments, all components of what I now wish to call a 'disciplinary matrix'. Inevitably, the result was confusion, and it obscures the original reasons for introducing the special term. But those reasons still stand. Shared examples can serve cognitive functions commonly attributed to shared rules".

and used that as the basis of a general model of science. In doing so, Fuller argues, Kuhn uncritically reproduces a Cold War version of the traditionalist mythology of science, an "elitist myth" of "visionary geniuses", heroically shifting paradigms through revolutionary struggles, a model which has little to no relevance in a globalised, democratised, technocratic world (Fuller, 1999, quoted in Rothstein, 2001). Here, arguably, Kuhn's elitist focus foreshadows Bourdieu's (2000) elitist focus on revolutionary 'misfit 'geniuses' like Pascal and Beethoven in *Pascalian Meditations*. Without ignoring these kinds of arguments, and without ignoring the socio-political context of Kuhn's writings, any prolonged evaluation of the 'accuracy' of Kuhn's model is beyond the focus of this thesis. In avoiding endless reinterpretation it is again useful to look to Read's Wittgenstinian reading of Kuhn for guidance. Read rejects the idea that Kuhn has a 'model of science', rather, he provided a "simple schematic" comprised of a systemic but flexible terminology to aid historical investigation (2013, p. 84).

Read's point is that the value of the concept of paradigms is primarily methodological and heuristic. For Read, paradigms have a value and purpose similar to Bourdieu's 'fields': a way to conceptualise practice in opposition to the overly 'internalist' accounts of Merton and Popper. Kuhn is, as Wittgenstein would say, is "drawing a boundary around a concept" (cited in Kitching, 2008: 109). Kuhn was much less interested in finding a universal model of science than he was in grounding the philosophy of science in history and practice, 'jumping over the boundary' of Popperian empiricism and Mertonian functionalism, and during his lifetime, again like Bourdieu, he repeatedly urged his students and interpreters to avoid dogmatism or any overly rigid application of his ideas.[10]

[10] Here again it is useful to consider Kuhn's paradigm alongside Wittgenstein's language-game. A language game is a specific set of discursive practices tied to a specific set of purposes, which are structured around an internally coherent set of rules. Although these activities are rule-governed, and these rules are more-or-less unique to each game, Wittgenstein argues language-games do not derive their legitimacy and internal coherence from these rules, but rather from the 'form of life' that sustains them. In this sense rules only exist as a 'second-best' method of formally codifying the ways of thinking and behaving that we already share. What gives definite normative content to a rule is how we all use it in actual practice: "the point is that we all make the *same* use of it" (1974: 183). For Wittgenstein, therefore, rule-following requires 'consensus of action' or 'agreement in forms of life'. This requirement emphasises Wittgenstein's contextualist point about intelligibility: what we do and say acquires significance only against a background or context provided by a practical way of doing things. This is not to imply that the way we apply normative rules is unconscious;

As Bourdieu puts it, (2004: 18), *Structure* "shook up some essential things in the academic order, in particular the cognitive structures of those who dominated the academic and scientific order … the Capitoline triad - Parsons, Merton and Lazarsfeld (who never got over it) - to assign itself the monopoly of the legitimate view of social science (with the sociology of science as its false closure and reflexive crown.)"[11]

2.4 Bourdieu and STS

The history of the emergence of both SSK and STS could be simplified as an attempt to reconcile the influence of social factors on the production of scientific knowledge with the idea that science is (or should be) the objective pursuit of truth (Kale-Lostauvli, 2016: 274). Mertonians theorised science as a rule-governed, unitary institution where external and internal factors may have some influence, but did not compromise the functionality of the system itself. Kuhn's account of scientific paradigms broke down the boundary between social factors and scientific knowledge, undermined the idea of linear, rational scientific progress and laid the foundations for a new sociology of science grounded in the researcher's own observation and interpretations of practice. The two major sociological 'schools' born from the turn to practise - ethnomethodology and the STRONG Programme -

following a rule entails a practical consciousness, as opposed to cognising them in a detached and theoretical manner. Some theorists have perceived a parallel between Wittgenstein's comments on 'interpreting' a rule and Gidden's theory of tacit knowledge – the mental repository of rules, norms and conventions that we know have a determining influence on our behaviour, but would have difficulty in verbalising: "know--how" as opposed to the "know--why" (see Pleasants, 1997). The type of knowledge at play here seems closer to Bourdieu's *le sens practique*, "the sense of the game", the kind of prereflective correspondence between our dispositions (inherited from our social position) and the logic of a particular social field. As Bourdieu emphasises, *le sens practique* entails creation and innovation – within limits – and is an *active* relation. To be successful in a social field requires "not just knowledge of the rules, but a constant awareness of and responsiveness to the play at hand: it requires improvisation, flexibility and above all an analysis of the strengths and weaknesses of one's team--mates and adversaries" (Hillier and Rooksby, 2005: 20).

[11] In *Science of Science* Bourdieu is generally an admirer of Kuhn and very briefly reinterprets paradigm shift within a field theory framework (2004: 14-18, 80). He is however critical of Kuhn's failure to conceptualise the relative autonomy of science, as well as the irrationalist or relativist interpretation of paradigm shift via 'revolutionary science'. Explaining the context into which *Structure* was born, Bourdieu adopts a characteristically reflexive position: "… the central theme of his work, namely the tension between establishment and subversion, was in tune with the 'revolutionary' mood of the day, Kuhn, who was in no way revolutionary, was adopted, somewhat in spite of himself, as a prophet by the students of the University of Columbia and integrated into the 'counterculture' which rejected 'scientific rationality' and proclaimed the supremacy of imagination over reason. (2004: 17)

had major conceptual and methodological differences. But both schools rejected philosophical foundations for scientific truth as well as the functionalist prioritisation of norms over practice. Both ethnomethodology and the STRONG programme sought, in different ways, to construct an explicitly sociological account of science informed by empirical observation of different types of scientific work in different institutional settings (Barnes, 2009, Bloor, 1976; Lynch, 2000, Mulkay, 1979).

Although Bourdieu and Latour started publishing on the sociology of science around the same time (Bourdieu, 1975, 1976; Latour and Fabbri, 1977), today, Latour's influence within STS is vastly greater. Over the past two decades, scholars have questioned and contextualised Bourdieu's absence within STS (e.g. Nelson, 2014; Tucker, 2007; Albert and Klienman, 2011), and a number of compelling articles on the value of Bourdieusian field-theory value the study of science have been published (e.g. Kale-Lostauvali, 2016; Schinkel, 2007; Albert and Kleinmann, 2011; Jeon, 2019; Sismondo, 2011, Hess, 2011; Lave, 2012; Albert and Kleinman, 2011,). But while it seems that some scholars are increasingly ready to reconsider Bourdieu's relevance to the sociological understanding of science, applications of Bourdieu's thinking to real-world scientific conflict, change or practice remain relatively rare. For Nelson (2014) and Tucker (2007) the Bourdieu-Latour conflict has significance far greater than the average academic turf war; it has been constitutive of STS as a field, to the point that it is sometimes difficult to separate Bourdieu's theory of science from Latour's critique of Bourdieu, and the type of outmoded structural-functionalism that Latour has repeatedly argued Bourdieu represents.

The next section outlines Bourdieusian field theory as it relates to science and law, which is primarily derived from "The Specificity of the Scientific Field" (1975); "The Forms of Capital" (1986); *Outline of a Theory of Practice* (1997), "The Force of Law: Towards a Sociology of the Juridical Field" (1987); "The Peculiar History of Scientific Reason" (1991) Bourdieu and Waquant's (1992) *Invitation to a Reflexive Sociology*, and his last publication before his death, *The Science of Science and Reflexivity* (2004), alongside a wealth of secondary literature.

2.5 Habitus, field, capital

Similar to his account of agency in other social contexts, Bourdieu argues that scientific achievement is the result of interplay between scientists and the structure of the field in which they are working. This interaction is conceptualised with three interrelated concepts:

1. *Habitus*: a set of dispositions that incline actors to act and react in specific ways;
2. *Field*: arenas of activity within which actors engage and compete with each other to achieve their objectives;
3. *Capital*: the range of resources, linked to and often directly derived from an actor's habitus, that can be applied in given fields.

Actor's enter a field with different degrees of cultural, economic, social and symbolic capital, and they deploy this capital according to their understanding of what is valued within a field. Each field represents a relatively distinct social space – occupational, institutional, political, cultural – and is governed by more or less structured norms, values, rules and interests. For Bourdieu, it is the habitus that provides the capital that will influence success or failure within a given field, although capital is also accumulated within a field (Sismondo, 2011). Social capital is very simply the measure of the value of relations an actor has with others, which can range from the British 'old-boy clubs' designed to differentiate and advantage members over those from excluded groups to the extensive familial networks among poor migrants which serve to provide a measure of financial security (Bourdieu, 1986). Cultural capital is a more complex form of capital, and is broadly related to an individual's social position. Cultural capital may cover an individual's cultural tastes, their way of speaking, their education, the social and practical competencies, as well as socio-psychological factors such as ambition, self-esteem and perceptions of others (Bourdieu, 1986). Cultural capital is thus closely related to a person's social status, and often forms the basis of the pre-reflective understanding of the logic or nomos of a

particular field. Unlike social and economic capital, cultural capital takes years to acquire and is a foundational element to our sense of self (Hillier and Rooskby, 2004). Symbolic capital refers to those forms of capital that are accorded the highest social prestige and legitimation, and hence which may be the most powerful in accruing status and advantage (Sismondo, 2011). These four forms of capital interact together to determine a person's position within any given field, and actors' interplay within a field usually has a self-interested or competitive aspect. Although Bourdieu does define fields in disciplinary terms, a field is much broader than disciplines, rather, "[fields] are a space of engagement, or a structure of relationships that bounds the practices relevant to [an agent]" (Sismondo, 2011: 84).

Bourdieu (1986) maintains that symbolic, cultural and social capital are extended forms of economic capital. Although economic capital is foundational to all forms of capital, Bourdieu has been criticised for neglecting to fully theorise economic capital or extend it beyond Marx's notion of capital as a relationship of class exploitation (Desan, 2013). In *Distinction*, Bourdieu defines economic capital loosely as "actually usable resources and powers" (1986: 111); the wealth, physical resources and productive means that can be institutionalised as property rights and converted into the other forms of capital. While this definition is simplistic, it will suffice for the purposes of this study, in which economic capital refers to the monetary resources an agent can use to engage scientific and legal expertise. 'Meta-capital' refers to any form of capital that is powerful enough to influence the relative value of other forms of capital and the exchange rates between them, and is often an expression of the interests of power-blocs within the field of power (Bourdieu & Wacquant, 1992, p. 112). The state is the primary mechanism for universalising meta-capital through legislation, policy, funding structures and the reform of public institutions:

> The constitution of the state goes hand in hand with the constitution of the field of power, understood as the space of play in which holders of various forms of capital struggle in particular for power over the state, that is, over the state's capital over the different species of capital and over their reproduction (Bourdieu et al, 1994, p. 3).

While Bourdieu does not use the phrase 'neoliberal metacapital', here it is used to refer to the ideological components of the public sector reforms that produced Aotearoa's current science regime: public choice theory, agency theory, new public management theory. While these theories are not discursively hegemonic in the way they were when they were first introduced, we are living in a world that is in-part created by them. Neoliberal metacapital is the assemblage of ideologies applied to the public sector, operationalised by the state, and influences the value of different forms of capital within the state apparatuses, inflected in different ways via the *nomos* of each particular field and its degree of relative autonomy.

Finally, habitus is the set of dispositions that incline actors to act and think a certain way. Habitus has constitutive power: it governs what is an acceptable move within a given field while also influencing the actor's own dispositions. Bourdieu writes, although habitus pre-exists the field, it is the field that imbues habitus with "sense and value" (Bourdieu, 1992: 452). So it is possible to talk about both the habitus or *nomos* of a particular field, as well as the habitus of individuals within a field. As a "matrix of dispositions", habitus can include empirical tendencies, preferences, tastes, emotions; a kind of world view or cosmology held by actors; skills, education and practical skills; social competencies as well as the formal and informal norms and rules that influence behaviour and determine status (Howe and Langdon, 2002: 215). Habitus is therefore a socially constructed, socially learned and institutionally-bound set of characteristics that are partially common to a group of people and are closely related to shared material and institutional circumstances (e.g. rural small-farmers, urban manufacturers, humanities lecturers etc.). It is not just the way an actor thinks and behaves, but also the entire cultural and professional repertoire we bring to a given activity or environment: "a way of walking, a tilt of the head, facial expressions, ways of sitting and using implements, always associated with a tone of voice, a style of speech and … a certain subjective experience" (Bourdieu, 1997, p. 85). As Wacquant puts it, habitus is "the way society becomes deposited in persons in the form of lasting dispositions, or trained capacities and structured propensities to think, feel and act in determinant ways,

which then guide them" (Wacquant, 2005: 316). Bourdieu emphasises that habitus has a systemic character without ever being fully determined, and is durable while still remaining fluid and transposable (2004, p. 45). Crucially however, except in exceptional circumstances, our relationship to habitus is usually partially prereflective – it is primarily a practical, rather than a theoretical mastery, as Bourdieu phrases it, *le sens practique*: a sense of the game.

In contrast to *le sens pratique* - practical knowledge - is reflexive knowledge, a higher form of knowledge in which represents a "development of this practical sense away from automatic or habituated practice to a more aware and evaluative relation to oneself and one's contexts" (Schirato & Webb, 2002, p. 255). Reflexivity and agency can be taught, learned or developed in a dialectic fashion through the interplay of habitus and field. While habitus is durable it is not static or eternal, and the extent of misfit between habitus and field may produce varying degrees of negotiation, improvisation, adjustment, and perhaps subversion. While reflexivity is not the privilege of scientists or academics and can emerge in any field and in multiple ways, following from Bourdieu's fragmentary comments of misfits (discussed below), it is more likely to emerge in fields with a degree of relative autonomy and in conditions that produce a contradiction between habitus and *illusio,* either through a temporary crisis, or a fundamental shift in the objective conditions of a field (Bourdieu, 2000, p. 121-125; 2005; p 47).

2.6 Scientific capital and the scientific field

There is a vast amount of research that has developed and reformulated notions of capital - both within and outside a Bourdieusian framework. From emotional capital (Reay, 2000) and linguistic capital (e.g., Stanton-Salazar & Dornbusch, 1995), through to social-psychological notions of identity capital (e.g., Côté, 2002), economics-based conceptualisations of human capital (Becker, 1993), to Putnam's (1995, 2000) redefinition of

social capital as the 'cement' for political unity and social cohesion. [12] But it is only recently that scholars have paid sustained attention to scientific capital (for example Lave, 2012; Archer *et al.*, 2015; and Jeon 2019).

Bourdieu framed his theory of capital, field and habitus around empirical data derived from the humanities. In his final text, *Science as Science*, he does provide a brief definition of scientific capital:

> Scientific capital is a set of properties which are the product of acts of knowledge and recognition performed by agents engaged in the scientific field and therefore endowed with the specific categories of perception that enable them to make the pertinent distinctions, in accordance with the principle of pertinence that is constitutive of the nomos of the field […] Scientific capital functions as a symbolic capital of recognition that is primarily, sometimes exclusively, valid within the limits of the field (although it can be converted into other kinds of capital, economic capital in particular) (Bourdieu, 2004: 55).

Bourdieu thus defines scientific capital as primarily social and symbolic capital that is able to be applied within and from within a field, which may be embodied by particularly high-profile scientists, or particularly high-profile forms of scientific discourse, method or expertise. In relation to the scientific field itself, Bourdieu writes that:

> … the field is a site of two kinds of scientific capital: a capital of strictly scientific authority, and a capital of power over the scientific world which can be accumulated through channels that are not purely scientific (2004, p. 57)

To say that science is a field is to say that it is "a system of objective relations … and a locus of competitive struggle in which the issue at state is the monopoly on scientific authority … in the sense of a particular agent's capacity to speak and act legitimately in scientific

[12] For Swartz (2006: 89) the popularity of Putnam's reformation (some might say appropriation) of social capital is probably at least partially responsible for Bourdieu's comparative absence in American political science and political society.

matters'' (Bourdieu, 1975, p. 19). These "objective relations'' include relations between “isolated scientists, teams or laboratories, defined by the volume and structure of the specific capital they possess” (Bourdieu, 2004: 33). Agents must acquire a level of competence prior to entering the field (scientific capital and a sense of the game), as well as a commitment to participating in a field and an investment in its ‘stakes’, what Bourdieu terms *illusio*, or the belief that the game itself is worth playing. In this way Bourdieu constructs an alternative to the Mertonian vision of science as a self-contained system in which the internalisation of norms allows science to progress according to its own logic. But this does not mean that the scientific field is simply an arena of individual competition, but rather a field of struggles where agents compete to attain monopoly of scientific authority, which is principally and but not exclusively related to peer recognition, and bounded by a shared *nomos*. As Kale-Lostuvali explains (2016: 280), “In the place of Merton's concept of "organised scepticism” as one of the norms governing scientific practice Bourdieu proposes a mechanism inherent in the definition of the field: the struggle for scientific authority.”

So while it is possible to map the concept of fields onto different disciplines, a Bourdieusian field is not defined in disciplinary terms, but rather by its *nomos*, the specific structure of relationships and the set of constraints on agency that govern the legitimate moves an actor may make. Fields are a space of 'objective relations between positions' which are "structured in a hierarchical ordering and are occupied by agents possessed of different amounts of field-specific capital" (Camic, 2011: 277). When actors commit to a field they also commit to *illusio,* a practical acknowledgement of its stakes which is implicit in the playing of the game. Fields operate according to an identifiable *nomos* which are the principles of "vision and division" or "fundamental laws" of experience that govern practices and experiences within the field (Bourdieu, 1979, p. 23). Like Wittgenstein’s language-game, the *nomos* structuring one field can be incommensurable to those structuring another. In this way it becomes less meaningful to talk of a general or universal 'scientific field’, instead the researcher must study and describe the *nomos* of scientific practice in different institutional

and practical settings (universities, industry science, consultant science, regional and local government science, science deployed in legislative and policy planning processes, Crown Research Institutes, or special research units such as the Cawthron Institute and the Institute for Governance and Policy Studies at Victoria University).

In explaining the 'relative autonomy' of science, Bourdieu insists that the sociologist must conceptualise science "in its two fold relation." He writes:

> … science must be examined in its two-fold relation, on the one hand to the social cosmos in which it is embedded – the external reading – and on the other to the social microcosm constituted by the scientific universe, a relatively autonomous world endowed with its own rules of functioning which must be described and analysed in themselves – the internal reading (quoted in Camic, 2013, p. 187).

For Bourdieu, "social cosmos" refers to the "general economic and social conditions'' that are external to a field, including, "economic crises, technological change, political revolutions, or the demands of a given group" (Camic, 2013, p.189). The 'social microcosm' is the scientific field itself, the space of hierarchically structured objective relations in which actors compete for scientific authority. When Bourdieu says that researchers must understand science 'in its two fold relation', he his referring to an analysis that can account for both the internal structure and *nomos* of the field, the subtle shift in practices and habitus displayed by actors as they move across different institutional and practical contexts, as well as the external factors from the political, economic and field of power influence the structure of the field, such as the political economy of the academic publishing cycle, research funding systems and broader political, policy and economic forms of meta-capital that determine what types of scientific knowledge is authoritative, and to what extent.[13]

[13] For Bourdieu any analysis that is too strictly focused on either internal or external factors is guilty of sociological reductionism, which his concepts of field, habitus and capital are designed to prevent (Bourdieu, 2004, p. 4-9). Both 'externalist' and 'internalist' approaches are reductive in the sense of explaining social relations in terms of interactions between empirically perceivable elements, such as between interest groups in policy networks, between universities and the state or among actors within an institution. As Bourdieu argued in "The Peculiar History of Scientific Reason" an*d Science of Science*, Mertonian sociology is 'internalist' in the

Although Bourdieu emphasises that science must be understood in this two fold-relation, much of his writings on science (as well as literary and artistic fields) are focused on the internal dynamics of fields. This is because he held the scientific field to be "relatively autonomous with respect to the encompassing social [cosmos]" (Bourdieu, 2004: 45). This relative autonomy is not a given, but a result of the historical development of science as a discipline. Bourdieu emphasises that the degree of autonomy of any disciplinary field is "a historical conquest, endlessly having to be undertaken anew", but "easily forgotten in the case of the natural sciences, because their autonomy is inscribed both in the objectivity of the structures of the field, and also in scientists' minds, in the form of theories and methods" (2004: 47). The degree of relative autonomy of a professional, disciplinary or aesthetic field is in proportion to the costs of entry: the stricter the costs of entry, the more autonomous the field, and the more "the system of forces that are constitutive of its structure is … independent of the forces exerted on the field", and the more the field "has the 'freedom' it needs to develop its own necessity, its own logic, its own nomos" (Bourdieu, 2004: 47). This autonomy is only relative however since, "A field's autonomy is illustrated by the way it generates its own values and markers of achievement, but the relative nature of this autonomy means these values are not alone in shaping the field; economic and political power also play a role, albeit in a form specific to each field" (Maton, 2005, p. 70).

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sense that norms substitute for the detailed logic of scientific practice, whereas some aspects of the STRONG program were overly 'externalist' by 'directly relating' the socio-political interests of scientists to the production and validation of scientific knowledge. This 'short-circuit effect', as Bourdieu calls it, results from sociologists' search for the cause of scientists' actions and beliefs primarily outside of the scientific field in which they are embedded. As a consequence, Bourdieu says Barnes overlooked the field specific logic of scientific practice, and by "exorciz[ing] the idea of the autonomy of scientific field", the strong program attempts to reduce scientific discourse to the class interests of its producers (2004: 47). Conversely, while Bourdieu (2004: 20-21) praises Collins for "reminding us that a fact is a collective construct", he identifies an internalist limitation in interactionist approaches which "…seeks the principles of agents' actions in the interactions between them and ignores the structures (or objective relationships) and the dispositions (generally correlated with the position occupied within these structures) that are the real principles of actions, and among other things, of the interactions themselves (which may be a mediation between structure and actions)."

The *nomos* of the scientific field thus involves both internal and external competition: a relatively autonomous, closed and inward competition characterised by the partially-performative 'disinterested objectivity' of pure science, wherein scientists compete for peer recognition and scientific authority, as well as an external, outward and more 'open' form of competition where actors try to gain economic and political advantage in ways that are strategic and political - drawing on whatever capital they possess - rather than purely scientific (generating funding, or gaining administrative power, or public recognition through non-academic fields.) At the same time, the scientific field is subject to field-external influences, and, like all fields, is influenced by the meta-capital generated by the field of power. The concept of relative autonomy allows Bourdieu to combine the political and scientific dimensions of scientific practice while preserving the analytical boundary-line of the field. He rejects any individualist notions of disinterestedness while leaving room for agency, albeit a heavily contextual and bound form of agency. All scientific activity is also a 'move' within the field: "Because all scientific practices are directed towards the acquisition of scientific authority … what is generally called "interest" in a particular scientific activity … is always two-sided (Bourdieu, 1975: 23). [14] Every scientific endeavour is also an attempt to increase capital, where "what is at stake is in fact the power to impose the definition of science" (1975: 23). There are a range of strategies that actors can adopt to increase their capital, but for Bourdieu agency is bound by habitus, capital and field and a product of the type and quantity of capital possessed by an agent, their ability to mobilise this capital, their hierarchical position and the nomos of the field they inhabit. For example:

> "Depending on the position they occupy within the structure of the field … the 'new entrants' may find themselves orientated either towards the 'risk-free' investments of succession strategies … or towards subversion strategies, infinitely more costly and more hazardous

[14] And vice-versa, as Kale-Lostuvali explains, "Individual scientists are of course interested in accumulating capital, but a relatively autonomous field with its own *nomos* orients agents to the scientific capital specific to that field and supports an "interest in disinterestedness" (2016: 280).

> investments which will not bring them profits … unless they can achieve a complete redefinition of the principles legitimating domination" (Bourdieu, 1975: 30).

In terms of policy debates around the role and purpose of science in relation to sustainability, the notion of autonomy thereby has a double significance. First, Bourdieu (1993: 164) argues that the relative autonomy of science means that science itself is a mediating force which, "like a prism", refracts external influences according to its own logic (p. 164). Through this 'refraction', external pressures can be transformed and may take on specific forms of discourse. Second, this process of 'refraction' is shaped by the internal hierarchy and objective relations within the field. Against any 'reductive' internalist or externalist approach, internal and external influences are entangled in a somewhat dialectical relationship, and however these wider pressures are played out within a field depends both on the degree of autonomy from other fields and as well as the field's internal structure, with the "refraction coefficient" serving as a measure of a field's "degree of autonomy" (Bourdieu, 1992). For Bourdieu (1973, p. 63) this "dialectic of internality and externality", that is, of "the internalisation of externality and of the externalisation of internality" that characterises all social life.

Bourdieu argues that it is the relative autonomy of science means it is "the historical site where trans-historical truths are produced" (Bourdieu, 2004: 69). This notion of 'trans-historical truths' is perhaps the most contentious aspect of Bourdieu's application of field theory to science in relation to the philosophy of scientific knowledge. According to Bourdieu "the more or less total closure" of the scientific field is the basis of its relative autonomy and is a specific structural characteristic of the physical sciences: "The struggle for scientific capital, a particular form of social capital … owes its specificity to the fact that the producers tend to have no possible clients other than their competitors" (Bourdieu, 1975: 23). Obviously scientists do have 'clients' other than their fellow scientists, but capital accumulation is principally based in peer recognition, meaning a more or less 'closed' system for the generation of scientific authority. Moreover players in a scientific field have

"an immense collective stock of equipment for theoretical construction and empirical verification or falsification which all participants in the competition are required to master" (2004, 69). This closed system involves "specific laws of dialogue and argument", and the power of *illusio* "govern[s] the confrontation of the scientist with the external world [and] with other scientists" (Bourdieu, 2004: 84). Because the history of scientific knowledge is not a component of the collective stock of knowledge that participants are required to master (and awareness of this history could potentially disrupt *illusio*), "the particular conditions of emergence [of scientific facts] are obliterated and facts are universalised (Bourdieu, 2004 as cited in Kale-Lostuvali, 2016, p. 281). In this way, the transhistorical objectivity of scientific knowledge is itself a product of the field's relative autonomy, and the stronger the conditions that support this autonomy, the more capable it is of producing transhistorical truth.

The notion of relative autonomy and 'transhistorical truth' have been widely critiqued, mostly from a philosophy of science perspective (for example, Mialet, 2003; Sismondo, 2011; Camic, 2006; Gieryn, 2006; Lundburg, 2011). Kim (2009) provides an insightful summary and defence against some of these criticisms. Primarily critics argue that Bourdieu's field theory of science "ultimately degenerates into the 'idealist view' of science propagated mainly by Merton and Habermas", and that "even if Bourdieu is right in arguing that his field theory of science is quite distinct from that of Merton, he is not able to offer any empirical evidence to support the validity of his own field theory" (Kim, 2009: 58). While there is always a "tension" between internal and external pressures (Bourdieu, 2004: 47), generally Bourdieu seemed to favour a kind of "relational realism" (Schinkel, 2007: 722) where the structure of the scientific field means that 'external factors' are never powerful enough to alter the fundamental structure of the field, or influence the core methods and principles of science. In short, critics argue that Bourdieu replicates the Mertonian vision of science as a self-regulating enterprise producing universal truth though institutional rationality, and, like Merton, he assumes rationality, rather than demonstrating it empirically (Kim, 2009: 58-59). Some critics have gone as far as accusing Bourdieu of

superficially altering Mertonian vocabulary by replacing ‘recognition' for symbolic capital (Mialet, 2003) [15] Lundburg (2011, paragraph 4) echoes such criticisms when he argues that, "What Bourdieu fails to notice is that he indeed moves outside of history when he takes the notions of rationality and scientific reason to have forever fixed extensions, based on which one might then evaluate the progress or decline of science and philosophy objectively. Contrary to his own self-understanding, Bourdieu’s naturalistic enterprise thus has a supernatural foundation.”

While the question of the rationality or 'truth' of science is beyond the scope of this thesis, it is worth acknowledging that these criticisms have elements of validity. Bourdieu applied his field theory to the study of science; it did not emerge from ethnographic observation in the same way as his works on aesthetic, academic and artistic fields. And in his very final series of lectures delivered at the Collège de France in 2000, he did invite philosophical criticism by claiming his theoretical model could reconcile "the question that I raised at the beginning, that of the relationship between truth and history" (Bourdieu 2004, 78). Rather than attempting to defend Bourdieu here (as Kim, 2009 has already persuasively done), it would be more productive to draw a boundary around the issue of relativity and truth. Bourdieu attempted to outline his sociological account of science at the very end of his career, and did not have an opportunity to respond to the weight of criticism directed against him. It is also true that Bourdieu focuses much more on internal field dynamics, and how exactly the external 'social cosmos’ influences scientific knowledge is arguably an underdeveloped part of his account of scientific fields and social fields generally.[16] His rather bold claim to have ‘solved' the problem of relativity, where he argued that the field's

[15] Bourdieu responds to these critics in Science of Science (2004: 11), arguing that field theory leads to a fundamentally a different vision of the scientific world compared to Merton: “Structural functionalism sees the scientific world as a 'community’ which ‘developed' for itself just and legitimate regulatory institutions where there are no struggles - or at least, no struggles over what is at stake in the struggles.”

[16] For example June Jeon develops and applies Bourdieu's notion of scientific capital to understand how the field-specific practices of scientists are intertwined with "a meso-level institutional matrix” and “macro-level patterns of stratification within science” (2019: 160), which serve to “institutionalise [post-doctoral researchers] to be opportunistic”, among other findings (164). While Jeon advocates for the usefulness of Bourdieusian field-theory to STS, she does note that the scientific habitus is limited by Bourdieu’s lack of ethnographic data, his failure to articulate a clear distinction between the physical and social sciences or general scholastic habitus and scientific habitus (Jeon, 2019: 161).

relative autonomy "is for me the Archimedean point on which one can stand to give a scientific account of scientific reason, to rescue scientific reason from relativistic reduction and explain how science can constantly progress towards more rationality" (2004: 54), is just one component of a comprehensive theory of practice. And it is worth questioning whether science really needs to be 'rescued' from relativity, and how much relevance this question has in relation to the post-truth world we are collectively experiencing. Because the kind of 'confirmation bias' involved in the rejection of unequivocal scientific consensus - such as flat-earth theory, climate-change denial and anti-vaccination movements - is arguably closer to a superficial, bad-faith version of social constructionism that it is to 'relativism' per se (see Lewandowsky, 2020). But for most of his career Bourdieu is interested in the way scientific knowledge is able to present itself as transhistorical, universal and rational, and devotes comparatively little attention to the philosophical validity of universal scientific rationality. Whether or not science is 'relatively autonomous', and whether or not science is capable of producing trans-historical truth is secondary to the way that the structure of the field allows truths to be presented as transhistorical, and for science to be culturally understood as autonomous, trustworthy and unfolding according to its own logic. Autonomy is not particularly important in itself, but rather, it is important insofar as scientists are free enough from the workings of the field of power to produce public good science. Given Bourdieu consistently opposed any dogmatic or rigid application of his theories, and specifically invited his students to creatively engage with and adapt his theory of society to the realities of practice, the question of the relative autonomy of science and its capacity to produce truth is something that needs to be investigated contextually and empirically, rather than theoretically or philosophically. Again, the value of field theory to sociologists is primarily methodological, rather than just theoretical, and evaluating field-theory's relevance as a method to understand the practice of ecological science within juridical and quasi-juridical spheres is exactly what this thesis attempts to do.

Increasingly, researchers who wish to use field-theory to understand dynamics between differentiated fields without losing sight of 'society as a whole' have sought to address

Bourdieu's under-theorisation of the spaces between and connections between fields (e.g. Lave, 2013; Eyal, 2013; Schmitz *et al.*, 2018). For both Lave (2013) and Schmitz *et al.* (2018) the solution is to focus on the struggles over the legitimacy of different forms of capital within and between fields by emphasising *both* the autonomous and heteronomous poles of fields. At the autonomous pole, agents are able accumulate sufficient symbolic capital to shape a field according to their interests. At the heteronomous pole, agents are far more vulnerable to the authority of field-external pressures, such as the state, the market, as well as dominant forces within the field. The balance between autonomy and heteronomy is never settled, and the struggle for autonomy, or dominance, is a key feature of capital conflicts (Lave, 2013 pp 110-115). As Lave explains, "Because the preeminent forms of capital in a field effectively define its power structure, debates over truth are also attempts to establish authority" (2013: 111). Schmitz *et al.* (2018) make an important and compelling case for the reintroduction of the Marxian-Hegelian notion of totality into field-theory by reorientating towards Bourdieu's difficult and often neglected concept of the 'field of power'. Bourdieu conceptualised the field of power as actualising itself as a form of "meta-capital": the forces which determine the relative value of specific forms of capital in relation to the "totality of social fields" - aka "society as a whole" (2018: 56-57). By Bourdieu's definition, meta-capital is "capital with the unique characteristic of having power over capital as a whole" (Bourdieu, 2012, as quoted in Schmitz *et al*. (2018, p. 63). Lave (2012) provides an innovative template for analysing scientific capital conflicts within the broader context of neoliberal science regimes as defined by Mirowski (2011).

Although researchers have been prone to use field theory to analyse discrete social spheres in isolation from the field of power, the field-theoretic "does not posit hermetically closed spheres of the social in an axiomatic fashion, but on the contrary considers relatively differentiated segments of society as the results of historical processes" (Schmitz et al., 2018 p. 52). Bourdieu's intention was never to conceptualise fields as anything comparable to Lyotardian 'islands of language', but rather to show how fields are embedded within and shaped by broader cultural, economic and political forces. A field is autonomous to the

extent that it is able to either deflect, reflect or refract external influences according to its own internal logic, and this autonomy is never absolute, it is always historically won, relative, contingent and influenced both by connected and overlapping fields as well as the totality of social fields, the field of power, or "society as a whole" (Bourdieu, 1983, pp 320-323).

2.7 The juridical field and juridical reasoning

Bourdieu's central argument in "The Force of Law" (1987) is that the legal field, like the scientific field, is characterised by "its own incomplete but quite settled [relative] autonomy" (Terdiman, 1987: 806). As with any relatively autonomous social field, autonomy does not mean the juridical field has somehow developed independently of the field of power, or that the juridical field does not act in close relation to the exercise of power in other social fields (Terdiman, 1987: 807). Rather, it means that the practices within legal fields are heavily structured by tradition, education, daily practice and professional usage, that these practices are deeply habituated and relatively unique to the juridical field, and the reproduction or development of these practices unfolds in relation to a juridical *nomos*, the "fundamental law of the field" that is relatively closed to outsiders (Bourdieu, 1987: 833). For Bourdieu, the *nomos* of the legal field is to convert collective and individual problems into the language of the law, with the means of evaluating of the chances of success for any given strategy itself reliant on legal expertise, expertise which is "defined by [legal professionals'] monopoly of the tools necessary for legal construction" (1987: 835) Like the scientific field, the juridical field is shaped by its internal struggles for status and capital, the meta-capital of economic, political fields and the field of power and the "internal logic of juridical functioning" which formalises the range of possibly "legal" solutions to the social problems that come before it (1987, p. 816). Quoting Bourdieu:

> "The functioning of the juridical field tends to impose the effect of closure, visible in the tendency of judicial institutions to produce truly specific traditions, in categories of perception and judgement which can never be completely translated into those of the nonprofessional. Juridical institutions produce their own problems and their own solutions according to a hermetic logic unavailable to laypeople" (1987: 834).

The ability to reproduce this "hermetic logic", which is the cumulated product of juridical-specific capitals, *illusio*, *libido*, *nomos*, *doxa* and habitus, is the basis of the field's relative autonomy, and also demarcates its boundaries (and connections) in relation to other fields. These boundaries are the result of long-term historical struggles and developments which result in what Bourdieu refers to interchangeably as "differentiation" and "autonomisation", in which field-external logics and rationales are successively either eliminated or refracted in the production of specific forms of juridical capital (Schmitz *et al*., 2017: 52). The autonomy of legal reasoning is based on its closure from all other fields, its "capacity to manufacture its own conditions of existence, which has been described as law's amazing trick, the trick by "which the law rebuilds itself in mid-air without ever touching down" (Fish 1993, quoted by van Kriken, 2004, p. 1). As Schmitz *et al.* explain, "…inasmuch as being 'auto-nomos' is the result of a historical process, this inevitably leads to the acknowledgment of the fact that 'autonomy' – i.e. the formation of a distinct *nomos*, as well as the establishment of the other field characteristics – has to be regarded as a variable [which involves] varying degrees of both autonomy and heteronomy" (2017: 52). As with the autonomy of the scientific and disciplinary fields that Bourdieu analyses in texts like *Homo Academicus* and *Science of Science*, the juridical field also exhibits degrees of heteronomy in relation to external influences such as political power, economic interests and cultural values.

As van Kriken notes, the basis of the legal field's special claim to a privileged form of highly-rational juridical reasoning is its "institutional position within the reason of state" (2004, p. 2). Like the scientific field, the legal field produces its own form of rationality which has a high degree of influence on subordinate judicial and quasi-juridical fields. And

like the scientific field the juridical field is capable of producing something like trans-historical truth (such as fundamental human rights) but it is more often concerned with establishing facts which are the basis of judgements related to the resolution of localised disputes, obligations and duties, conflicts over property and resources, and the enforcement of judgements through the legitimised violence of state power (van Kriken, 2004). In reaching judgements, the legal field is highly dependent on other relatively autonomous knowledge producing fields, particularly science. Quoting van Kriken (2004, p. 2):

> "Law's relationship to other fields of knowledge is then organised around either (1) the *displacement* of alternative sources of explanatory authority, or (2) the *appropriation* of the knowledge produced by those other fields in order to enhance that privileged position, while surrendering the minimum degree of cognitive or normative authority to those other modes of knowledge production."

Because the establishing of facts that are the basis of judgements are based on a closed body of doctrine, the juridical field does establish its own form of meta-autonomy from the normative forms of 'good judgement' that exist in other relatively autonomous knowledge producing fields (van Kriken, 2004, p. 9). This is especially so for technical and scientific expertise, whereby courts will set down a series of rules that dictate how different forms of expertise are converted into facts and evidence. This involves the universal enforcement of a set of rules for neutrality, objectivity and impartiality on scientific expert witnesses:

> "Thus, one of the functions of the specialised juridical labour of formalising and systematising ethical representations and practices is to contribute to binding lay people to the fundamental principle of the jurists' professional ideology - belief in the neutrality and autonomy of the law and of jurists themselves" (1987: 844).

In this way, Bourdieu argues, the juridical field converts all forms of social conflict (including the scientific conflict of opposing expert witnesses) into legal conflicts between

'parties', a “juridically regulated debate between professionals acting by proxy,” (1987: 831), and this “transformation of irreconcilable conflicts of personal interest into rule-bound exchanges of rational arguments between equal individuals is *constitutive of the very existence of a specialised body independent of the social groups in conflict”* (1987: 831 - emphasis added).

The only truly juridical field that is relevant to this study is the New Zealand Environment Court (hereafter EnvC). While much of Bourdieu's concept of the legal field and legal reasoning this is highly relevant to the operation of Aotearoa's common law system, the 'hermetic logic' of the EnvC - as a specialised institutional product (and the juridical embodiment) of the Resource Management Act (1991) - is characterised by a number of elements that are distinct from the French civil code, which was the basis of Bourdieu's "The Force of Law" (1987). On the broadest level, the French civil code emphasises the importance of written law and the authority of judges in interpreting and applying that law. The English common-law system, by contrast, is based on judicial precedents in which decisions made by judges are used as precedents to guide future legal decisions (Merryman, 1985). Tracing the two systems back to their "originatory conceptions", Joireman notes that “…civil systems begin with the idea of the state as supreme and the role of individual in obedience to it … [whereas] common law systems have developed with the idea of the protection of individual rights from the state as a primary goal” (Jorieman, 2001: 573).

Common-law systems are conventionally associated with adversarial systems of justice, which involves an evidentiary contest between conflicting parties which is neutrally arbitrated by a judge (Merryman, 1985). Within common law systems, the parties legal counsel are responsible for gathering evidence, questioning witnesses, and arguing their case before the judge or jury. Civil law systems are more commonly associated with an inquisitorial system, in which the judge assumes a more active role of investigator by gathering evidence and questioning witnesses (Barker, 2002). These differences mean subtle

contrasts between the habitus of legal professionals and witnesses (Chayes, 1975, Jorieman, 2001, Barker, 2002). For example, within an inquisitorial system lawyers act more as advisors to their clients rather than as key actors in a trial and it is the judge who is responsible for uncovering the facts (Jorieman, 2001). Under common law, facts theoretically emerges from agents' adherence to established legal procedures, which judges must arbitrate in a neutral fashion (Jorieman, 2001). Bourdieu notes that French civil court judges are trained to approach legal problems in a deductive manner with a strong emphasis on logical reasoning and textual interpretation, starting from general codified legal principles and interpreting and applying this codified set of rules to specific cases (2001: 176). While judges in common law systems are expected to follow precedents established by higher courts, they also have the authority to interpret and apply the law in new ways, which can create new precedents (Barker, 2002). Some scholars argue that the flexibility of common law and the enhanced role of the judiciary in the shaping law are significant advantages over civil law systems, as it allows for greater adaptability and greater innovation and creativity in legal thinking (e.g. Merillat, 1966; Chayes, 1975; Fombad, 1998).

As Bourdieu repeatedly stresses, the history of a field is inscribed on the positions and stances within the field itself: “the history of a field, like the history of a society, is contained within that field, and the field is itself a product of that history” (The Field of Cultural Production, 1993: 2). As will be explained in Chapter Four, the flexibility of the common law system, combined with the emphasis on sustainable development and participatory decision making enshrined in the New Zealand Resource Management Act (RMA), is the basis of the New Zealand Environment Court’s capacity to develop a series of ‘homegrown’ mechanisms and procedures for environmental litigation and adjudication that rely heavily on scientific and technical expertise, allowing it to operate as a specialised juridical 'field of fields' that has significant influence on related quasi-juridical RMA fields that also rely heavily on scientific expert witnesses in reaching judgments and decisions.

2.8 The Misfit

The most influential critics of Bourdieu tend to portray habitus as a mechanistic kind of functionalism that depicts individuals as unwittingly reproducing the wider structures of which they form a part, downplaying agency and neglecting strategies of resistance (Jenkins, 1992; Latour, 1996; 2005; Freidmann, 2006). For Latour, Bourdieu epitomises what he disparagingly labels "classic sociology" (1996: 194) or "the sociology of the social" (2005: 11), defined as "Sociology [that claims] to know more than the 'actors', it sees right through them to the social structure or the destiny of which they are the patients" (1996: 199). Here Latour takes elements of the established poststructuralist critique of 'critical theory' (with 'critical theory' variously standing for everything from Durkhiemian functionalism to the Frankfurt School to conflict theory to cultural studies [see Callinicos, 1989]), and specifically targets Bourdieu. For Latour, Bourdieu's moral vision of sociology as vocation, as well as concepts like *doxa* and *illusio,* have an air of arrogance, where the sociologist develops a "meta-language" that can reveal the social reality which agents themselves are unable to perceive, empowering the sociologist while disempowering the subjects of sociological analysis (Latour, 1996: 19).

The tone and impact of the endless Latour/Bourdieu beef is best understood within the material and cultural context of the French intellectual scene. Considering the hyper-competitive nature of the French intellectual field, the primacy of stylistic differentiation, the cultural importance of the 'heroic intellectual' and the strange mode of celebrity culture this involves (Kauppi, 1997; Hage, 2013), it is not at all surprising that Latour was compelled to position ANT against Bourdieusain social theory, and partially build his own symbolic capital on criticism of Bourdieu. In Kuhnian terms, Bourdieu represented the established paradigm, whereas Latour, Callon *et al*. were the (self-proclaimed) revolutionary upstarts. As Fuller has argued, this pattern more-or-less describes the discursive construction of the history of STS, where each 'new' approach seeks to invalidate and replace what came before, and then retroactively presents itself as "an

evolving response to theoretical and methodological issues surrounding the nature of science" (Fuller, 2000: 5), obscuring the historical and material conditions in which the struggle for distinction unfolds. Interestingly, Bourdieu comments on exactly this "logic of supersession, of outflanking" in a footnote at the beginning of *Science of Science*, noting that, "…sociology suffers greatly from the fact that the pursuit of distinction at any price … encourages an artificial emphasis on differences and prevents or delays the initial accumulation in a common paradigm - everything endlessly starts from zero - and the establishment of strong, stable models" (2005: 8). Bourdieu goes on to reflect that,

> It has appeared to me retrospectively that I was somewhat unfair to Merton in my early writings on the sociology of science - no doubt under the effect of the position I then occupied, that of a newcomer in an international field dominated by Merton and structural functionalism … I think I was wrong to lump together with Parsons, Lazarsfeld the Merton who reintroduced Durkheim … A remark in passing: when one is young - this is elementary in the sociology of science - other things being equal, one has less capital, and also less competence, and so, almost by definition, one is inclined to put oneself forward in opposition to the established figures, to look critically at their work. But this critique can in part be an effect of ignorance (2004: 12-13).

As Nelson shrewdly observes, "one can understand the Bourdieu-Latour relationship by way of a parallel relationship between the then younger and up-and-coming Bourdieu with the older and established Robert Merton" (2014: 32). Referencing Weber's sociology of religion, Schinkel makes much the same point when he notes that "What is at stake in such a struggle between a consecrated scientific star such as Bourdieu ('priest') after his succession to the throne of the French scientific field (the chair of sociology at the Collège de France, which he occupied since 1980) and a new vanguard headed by Latour ('prophet'), would be scientific capital as symbolic capital" (2007: 721-722).

Without getting lost in an endless attempt to 'defend' Bourdieu from the dominant voices in STS, it is sufficient to say that the characterisation of Bourdieu as an apolitical reproduction

theorist are usually based on incomplete readings which fail to account for the synthetic and iterative character of Bourdieu's social theory (see McNay, 1999: 101-131; Adkins, 2003; Swartz, 2003; Emirbayer and Schneiderhan, 2013; Schmitz *et al.* 2018). While much of Bourdieu's corpus is concerned with how material inequality is reproduced in open societies, towards the end of his life, Bourdieu had become a public activist, a role that seemed to contradict his earlier aversion to the kind of overtly political intellectualism of other 'superstar' French intellectuals, such as Jean-Paul Sartre (Swartz, 2003: 797).[17] For Swartz (2003) changes in French academic, institutional and political fields - particularly the attack against welfare state provision - convinced Bourdieu to adopt a more explicitly political stance against neoliberalism towards the end of his career, giving him far more public visibility. From the mid-90s onwards, Bourdieu became increasingly aware that "the internal and external worlds have become fused … [and] this changes the institutional focus of his intellectual politics" (Swartz, 2003: 808-809).

Although undoubtedly an underdeveloped aspect of the field-theoretic, Bourdieu's work does contain an account of change within fields, one that is integrated into his overall theory of practice. Bourdieu, like Marx and Wittgenstein, holds that meaning is manifest in human beings' practical interaction with the world, the *use* they make of it. Our day-to-day interaction with 'things' (people, institutions, knowledge, 'nature') is not something we theoretically cognize, rather we *use* them within the domain of our day-to-day practical activity. Precisely because habitus is based on this practical interrelation, it cannot be

[17] While Bourdieu's research was always concerned with politics, power and human suffering, his aversion to 'politicised sociology' is related to the importance he places on relative autonomy, and defending the autonomy of intellectual fields from outside economic, political and religious forces was an enduring concern throughout his career. In *The Craft* (1991), Bourdieu emphasises that there should be a clear distinction between sociology as a science and politics as a field of conflict, and wedding any theory too closely to any political programme (like Sartre associated existentialism with Soviet communism and then later with Maoism), or adopting any intellectually subservient role for the current political leadership, necessarily reduces this autonomy. Again, this view of autonomy is partially grounded in the French context, where traditionally some intellectual services, such as teaching, were considered part of the civil service, which freed them from market demands and clientelism, and ensured, in theory, that 'sectional interests' did not prevail over the general interest (Siegrist, 2004). Swartz (2003: 797) summarises Bourdieu's Weberian-influenced vision for sociology as a science: "Sociology was a scientific craft that constructed a distinct type of knowledge that was empirical (although not positivist) and critical (although not intellectualist). And the sociologist was called to exercise this craft, not embrace some prophetic leadership role for society."

understood as something static and immutable. Rather than strictly determining practices, it operates as a limiting framework within which a great number of practices can be produced, and it is precisely this inventive flexibility that allows an individual to cope with the various positions and roles that movement within and between different social fields entails. Quoting Bourdieu: "The habitus, like every 'art of inventing' is what makes it possible to produce an infinite number of practices that are relatively unpredictable, even if they are limited in their diversity" (1990: 63). The refusal to lose sight of the real determining power of wider political and economic structures is the key attraction for scholars who seek to understand the neoliberalisation of science as it applies to resource use conflicts (Lave, 2012). His social theory yields a nuanced and original conceptualisation of individuals' own practical and reflexive relationship with social structures, a relationship that involves a complex mix of both agency and constraint.

As described above, it is in explaining the relation between habitus, capital and field that Bourdieu most frequently invokes his analogy of the 'game'. Every agent will act according to her position within the field and type of capital available to them, and those who are most successful are typically those whose habitus aligns most closely with the circumstances of the field. In some cases, a conflict or discrepancy between dispositions and position creates innovations from what Bourdieu terms "misfits" (2005: 47), people who are able to challenge the existing structures and, in rare cases, transform them. More likely however, "dispositions and position are mutually adjusted" (2005: 47), or, if the discrepancy is wide, such people will simply 'lose', or else find themselves blocked entry into the field altogether. Social fields are thus arenas of struggle and competition over specific resources which generates agency at the same time it limits it. As Hillier and Rooksby explain, occasionally there may be an exceptional newcomer who has the ability to participate effectively in a field, however.

> "More often, insight and a sense of the game – a habitus – develop with experience. Players learn from experience about what is possible and what is not; about how to work

> effectively within existing practices in the field and about how the rules may be modified. Players' activities are constructed, therefore, both by the external limits of rules and regulations, and also by their internalisations and placing of limits on what they think they can do or what they want to do in the circumstances" (2005, p. 23).

So habitus cannot be correctly understood as entailing any kind of blind reproduction of practices, but neither, as McNay argues, does it allow for the conceptual "fetishization of the indeterminacy of social structure" (1999: 105).[18] Bourdieu describes the habitus as "durable but not eternal" (Bourdieu, 1992: 33), and emphasises that because habitus is a product of historical struggles, it can also be changed by struggle. The potential for a shift in habitus exists in "new experiences, new education, new training, or any situation in which a previously unconscious aspect of the habitus is rendered at least partially explicit" (Bourdieu, 2005: 45). At the same time he urges the necessity of recognising "an inevitable priority of originary experiences and consequently a *relative closure* of the system of dispositions that constitute habitus" (Bourdieu, 1992: 133). Given the historical and systemic nature of these dispositions, we should not be surprised that the characteristics inherited from a habitus may persist long after the objective structures that produced them have ceased to exist. This is an argument best understood in parallel with Marx's famous second paragraph from the *Brumaire*: "People make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past" (Marx, 1978: 236).

Significantly, Bourdieu writes about "times of crisis" in which "the routine adjustment of subjective and objective structures is brutally disrupted [and] constitute a class of

[18] This "fetishisation of the indeterminacy of social structure" usually leads to a fetishisation of agency, which is particularly apparent in ANT and ANT-oriented ontological approaches. Agency, when abstracted from social structure, enables theorists to invent and 'play' with pseudo-philosophical problems, revelling in the "bewitchment of our understanding by the resources of our language" (Wittgenstien, 2009, p. 52). An especially egregious example is Annemarie Mol's "I Eat and Apple" (2008), in which she argues that an apple, in the process of digestion, is enacting agency. Quoting Mol (2008, p. 30), "Take: *I eat an apple*. Is the agency in the *I* or in *the apple*? I eat, for sure, but without apples before long there would be no ''I'' left. And it is even more complicated. For how to separate us out to begin with, the apple and me? One moment this may be possible: here is the apple, there am I. But a little later (bite, chew, swallow) I have become (made out of) apple; while the apple is (a part of) me. *Transubstantiation*. What about that for a model to think with?"

circumstances when . . . 'rational choice' may take over, at least among those agents who are in a position to be rational" (Bourdieu, 1992: 131). These crises may entail radical changes within a field, or a dramatic shift between fields. Similarly, Bourdieu addresses the effects of increased transit from field to field characteristic of rapidly changing societies, such as the reflexive, ultra-mobile late modern societies described by Beck and Giddens. [19] He argues that in all cases in which habitus encounters situations different from its construction a "dialectical confrontation" takes place between habitus on one hand, and objective social structures on the other:

> In this confrontation, habitus operates as a structuring structure able to selectively perceive and to transform the objective structure according to its own structure, while, at the same time, being restructured, transformed in its makeup by the pressure of the objective structure. This means that in rapidly changing societies, habitus changes constantly, continuously, but within the limits inherent in its originatory structure, that is within certain bounds of continuity (2005: 46-47).

For Bourdieu, although the destabilisation of habitus, reflexivity, agency and critical consciousness are all potential effects of a movement across fields, in most cases any transformation will be partial, uneven, and probably temporary (he cites the example of French students from bourgeois families who made radical conversions to left-politics in 1968, and were later among the progenitors of neoliberalism) (2005: 47). The point is that any significant, widespread or long-lasting transformation of habitus does not arise from a change of mind alone, but from a shift within or between fields which then destabilises the prevailing interplay between habitus, capital and field.

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[19] Louis McNay (1999) provides a nuanced account of this process as it relates to gender identity. She argues that the 'detraditionalisation' of gender can be usefully analysed around the transposition of the feminine habitus into "traditionally non female fields of action" (1999: 107), particularly women's entry into the workforce (that is into a field previously structured around masculinity). McNay's central argument is that a Bourduian analysis of social change allows the conceptualisation of the uneven transformations of gender: the undoing of certain rules, norms and habits of gender and the simultaneous strengthening of other traditional modes of behaviour.

As will be explored in more depth in Chapters Five and Six, in Bourdieusian terms, this is a situation that can be conceptualised as a conflict between subjective dispositions (the habitus) and objective structures (the field) – as Aitkins (2003: 26) phrases it, a "discord between the previously routine adjustment of subjective and objective structures: a dissonance between the feel for the game and the game itself". Such gaps are certainly perilous spaces for agents to inhabit, but they also entail conditions where innovation, creativity and reflexivity might arise; where rules can be transgressed, and, in the most exceptional cases, broken and remade.

2.9 Conclusion

If Steven Fuller is at least partially correct in his account of Actor Network Theory as a strategic response to the neoliberalisation of French universities and the shift to "the Mode 2 conception of policy and client-driven "post disciplinary" research" (2000, p. 9), then perhaps Bourdieu's primary sin in relation to STS was remaining a committed, structuralist sociologist up until the day of his untimely death, at which point structuralist sociology was already about a decade out of fashion. In contrast to dominant approaches within STS, field-theory provides a framework for "reassembling the structural" (Lave, 2015). Field theory is well-suited to 1.) explain the historical de-autonomisation of Aotearoa's publicly funded science system, 2.) describe the patterns of domination, subordination and resistance within this system, and; 3.) understand the way science is deployed and converted through the practice of expert-witnessing within key judicial and quasi-juridical fields, without losing sight of 'society as a whole' or the effects of the field of power on these fields. In short, field theory provides a framework to understand the structural connection between Aotearoa's neoliberal science regime and the political economy of water resource governance.

The following chapter seeks to operationalise Bourdieu's social theory by way of a viable research methodology that is tailored to Aotearoa's publicly funded science system and the RMA water resource governance framework.

Chapter Three: Methodology

3.1 Introduction

This chapter outlines the various details and factors that shaped the methodological approach to understanding expert-witnessing for environmental decision-making in multiple fields. The chapter structure is as follows. In the first section (3.2) I briefly reflect on my own pathway to this topic. Secondly (3.3), I recap the problem scope of this research. In section 3.4 I state my central research objectives and question. In the following section (3.5) I identify the methodological significance of potential conceptual limitations in Bourdieu's oeuvre discussed in Chapter Two. Lastly (3.6) I outline the primary data sources and means of analysis.

3.2 Research pathway

The development of this research topic initially followed an inquiry-based method of investigation, which, defined very simply, means allowing the problem-scope and theoretical framework to emerge through sustained inquiry of a topic (Taguchi *et al.*, 2017). Initially, this thesis was focused on the role of scientific expertise and knowledge in establishing regulatory frameworks for intensive agriculture, with a view to using the socio-political history of the Overseer™ software as a case-study. [20] The prolonged expert disagreement surrounding Overseer's™ suitability as a regulatory device provided a potential window into what happens to scientific authority when it collides with the intensity of human interest.

[20] Overseer™ is agricultural nutrient modelling software or on-farm 'decision support tool' that estimates nitrogen leaching, phosphorus run-off and generates nutrient budgets for farms. It also models the amount of methane, nitrous oxide and carbon dioxide generated on-farm and the amount of carbon sequestered in trees. The Overseer software has been in development since 1981 and is jointly owned by the Ministry for Primary Industries, the Fertiliser Association of NZ, and AgResearch Ltd. There has been significant expert and non-expert debate regarding whether Overseer is reliable or precise enough to be used as a regulatory tool, with a Science Advisory Panel concluding in 2018 that they "did not have confidence in Overseer's™ estimates of nitrogen lost from farms across the full range of New Zealand's climate, topographies, and land-uses" (Ministry for the Environment, Ministry for Primary Industries, 2018). The software is still in development today, and continues to be used in a variety of ways by regulators, auditors and farmers.

However, much of the controversy surrounding Overseer's™ use as a regulatory and nutrient auditing device is related to the perceived precision of its modelling, which generates a very specific set of research questions related to the efficacy of modelling-based decision support systems for agriculture. Rather than maintaining a singular focus on Overseer™, the study instead turned towards a wider investigation of the role of expertise in different water resource use conflicts, including the Horizons Regional Council's One Plan, The Ruataniwha dam scheme and the National Policy Statement for Freshwater Management (2020). These water use conflicts all involve contested scientific knowledge claims and occur across different institutional settings: the New Zealand Environment Court (EnvC) the Environmental Protection Authority (EPA), regional councils and ministerially appointed scientific and technical advisory groups (STAGS). By focusing on the role of the expert witness, it is possible to trace the way science is deployed in legal and policy spheres key to RMA decision making.

Although the pathway into the topic of expert-witnessing followed an inquiry based method of investigation, once a Bourdieusian field-theoretic approach had been decided upon, the study shifted from inquiry-based approach towards a more theoretically-driven and deductive approach in which Bourdieu's concepts were used to both order and understand the types of primary data available, and to interpret the large volume of academic and grey literature on the Aotearoa science-policy and science-law nexuses. In sum, it was decided that a study that aimed to assemble and describe practices across different forms of expert-witnessing in different types of water resource management conflicts would provide for a more robust operationalisation of field-theory, and therefore would be more likely to lead to more generalisable findings regarding the political economy of freshwater governance.

In the early phases of research, mātauranga Māori was marginal to the limited focus of the study. Closer to the end of the main interviewing phase, the process of repealing the NZ

RMA was (seemingly) advanced, Te Mana o Te Wai had been formalised and it became clearer that mātauranga Māori was emerging as a potentially powerful transformational force within the scientific and juridical fields with great importance to ecology and law. Although mātauranga Māori became one of the most interesting aspects of the topic, a major reorientation of the study was impossible at this point, and rather than sideline the issue, the meaning and significance of mātauranga Māori became a recurring theme in the final phase of interviews with mostly Pākehā participants. The limitations this poses for the thesis findings are acknowledged in s3.5.1 below.

The next section outlines the central research questions and objectives that have emerged from a Bourdieusian-informed analysis of the Aotearoa science/policy interface.

3.3 Research question and objectives

The central questions of this thesis are: Have the practices of expert-witnessing generated their own specific form of culture and politics? And if so, what are the implications for the contribution of science to the legal resolution of resource management conflicts?

1. The primary objective of this research is to understand the practice of expert-witnessing in the context of water resource management conflict within juridical and policy fields.
2. The second objective is to understand whether ecological knowledge is qualitatively transformed when converted into expert witness testimony that provides evidence to answer legal and policy questions.
3. The third objective of this research is to investigate whether particular knowledge-claims made by experts are prioritised in different evidentiary contexts, and to describe how this occurs in relation to both the construction and presentation of evidence, and the judgments that are made on this evidence.

4. The fourth objective is to evaluate the value of a Bourdieusian theoretical approach for understanding the practice of expert-witnessing within the context of the broader political economy of expertise centred on water resource management conflict in Aotearoa New Zealand. Seeking to reassemble the set of practices and relations that constitute expert-witnessing within the context of neoliberalism raises an important subquestion to this fourth and final objective, namely;
5. To what degree does expert-witnessing function as a structural component of Aotearoa's neoliberal science regime by recasting science as a form of expertise and a source of evidence that favours the economic over the ecological?

3.4 Operationalising Field, Capital and Habitus

Chapter Two makes the argument that Bourdieu's social theory appears well-suited for understanding the publicly-funded science system in Aotearoa, as well as the way that experts are mobilised on behalf of stakeholders in resource management conflicts through the legalistic agonism enshrined in the environmental litigation, resource consent and policy-formation framework of the New Zealand Resource Management Act. In attempting to extend and modify Bourdieu's ideas to understand an area not analysed by Bourdieu himself (or any Aotearoa based social scientists that I am aware of), it is worthwhile beginning with the meta-theoretical and meta-methodological principles that guided Bourdieu's own work. Swartz helpfully identifies six orienting principles of Bourdieu's sociology:

> (1) focus on multiple forms of power and domination, particularly cultural and symbolic ones, (2) challenge received views of the social world, (3) employ relational analysis, (4) connect micro and macro levels of analysis, (5) adopt a self-critical, reflexive posture in sociological work, and (6) include an intellectual activist orientation for a public sociology (Swartz, 2013: 19).

In the absence of any sociological research on expert-witnessing in New Zealand, I had to look overseas for guidance on how to operationalise Bourdieu's ideas. Here I am heavily indebted to Rebecca Lave's highly novel application of Bourdieu to political ecology (2012), and the methodological principles set forth by Shmitz *et al.* (2017). Lave uses Bourdieu to explain the rise of Dave Rosgen - a private consultant with relatively little formal scientific training - to the very top of the stream restoration field in the United States. Using Bourdieu, Lave argues that neoliberalisation has assigned scientific claims developed outside of academia a new and powerful legitimacy in public decision making authorities, which has occurred concurrent with academic scientists' diminished capital within policymaking fields (2012, 2012b). While Lave uses field-theory to conceptualise competing expert-knowledge claims and the complex and diverse assemblage of agents and public institutions within the 'stream restoration field', her focus on the conflicting capital assigned to university and private sector knowledge claims surrounding "The Rosgen Wars" perhaps gives her study a more defined and specific set of parameters that my own.

On first glance field/capital/habitus seem eminently suited to describing the practice of expert-witnessing, a practice which occurs within juridical and quasi-juridical settings and is structured according to a complex but clear set of rules and regulations that produces highly patterned types of behaviour and interactions. At the most general level, a field is a bounded, structured social space in which agents compete with one and other by deploying field appropriate capital, the deployment of which is derived from an agent's habitus, a set of subjective dispositions generated both by formal training and experience within a field that produces a 'sense of the game'. Fields are agonistic spaces wherein agents struggle to define and maintain boundaries, control the conditions of entry, and, most crucially, to define and deploy the types of knowledge and capital that are valued within it.

The practice of expert witnessing is structured by a set of formal rules and, assumedly, a more informal and tacit field-logic. By necessity, it also involves elements of both competitive struggle and enforced deliberation as experts articulate competing

knowledge-claims and lawyers acting on behalf of stakeholders interrogate these knowledge-claims using both adversarial and inquisitorial processes, processes which are themselves informed by the knowledge-claims of experts retained opposing parties. For the individual expert-witness, the objective, at its most basic level, is to reconstruct and perform their own disciplinary capital according to the *nomos* of the judicial field, converting their scientific capital into juridically recognised symbolic capital.

In operationalising the field concept, it is crucial to recognise that Bourdieu maintains an analytical distinction between the positions that constitute the field and the agents' themselves (Bourdieu and Wacquant, 1992: 107). Quoting Lave, "The relationship between the objective structure of the field (the hierarchical and structured relation between positions) and its subjective structure (the habitus that agents within the field acquire through participation in it and the dispositions they bring to it) is critical to understanding a field" (2012a: 23). In the same way that Bourdieu argues for conceptualising a field in a way that captures both the internal nomos of the field as well as the 'external' forces that influence the structure of the field (1988, 2000, 2005), he also argues that the objective structure of the field and the subjective dispositions of agents must be analysed together, "as two translations in the same sentence" (Bourdieu 1996: 121, as quoted in Lave 2012a: 23). In attending to both the objective structure of a field as well as subjective habitus, Bourdieu hopes to avoid reductionist accounts of practice, which he defines as,

> "[Any] analysis which tries to isolate a purely 'political' dimension in struggles for domination of [the] field, [which] would be as radically wrong as the (more frequent) opposite course of only attending to the to the 'pure' purely intellectual determinations involved in [field-specific] controversies" (1975: 21).

How to apply these methodological and analytical guidelines to expert-witnessing for environmental litigation and policy making? How to integrate the subjective and objective dimensions of social practice by way of method? Firstly, a field or fields must be specified, and here a number of difficult questions emerge. Is expert-witnessing a field in-itself,

comparable to Lave's "stream restoration field"? Or is it a legal space where many different fields of expertise - hydrology, ecology, financial modelling, soil-science, fluvial geomorphology, law, planning (to name just a few) - are displaced and appropriated within the juridical and policy/bureaucratic field (all of which are nested within the political field, the economic field and the field of power)? How are overlapping or connected fields conceptualised? How are the boundaries between fields to be understood, and what exists in the spaces between fields?

While Bourdieu's analysis of judicial, scientific, academic and disciplinary fields provide many useful insights, none of these analyses fits perfectly on the practice of expert-witnessing. Aside from his analysis of the field of power, the state and the political field, Bourdieu favoured relatively autonomous and bounded professional and cultural fields, most of which are quite different from the process of expert-witnessing, in which expert-knowledge that is produced within a disciplinary/ institutional field is reconstructed, performed and then evaluated by agents across both juridical and quasi-juridical legal and policy fields. The task of describing a field of positions, which involves identifying the relevant players and their positions, requires a fairly extensive knowledge of a field, as well as an understanding of the field's historical development (Gorki, 2013: 7). An attempt to conceptualise the multiplicity of fields from which expert-witnesses are drawn, while staying true to Bourdieu's methodological precepts, would make the project frighteningly big.

In reflecting on how to best apply the concept of fields to expert-witnessing its useful to return to the point made in Chapter 2: Bourdieu's sociology is fundamentally anti-positivist. While fields are not just theoretical constructs, neither are they straightforwardly empirically verifiable entities (like a network by Latour's definition, for example). Bourdieu developed his social theory from the careful empirical observation of multiple forms of practice in specific domains, but his concepts do not designate specific empirical phenomena. While we can use fields as a sociological tool to understand social practice, it is

important to remember that fields are a sociological tool, not a grand theory that reveals the basic structure of society (society is not just a collection of fields). As Eyal explains, terms like 'scientific field' or 'economic field' do not denote the "essence" of science or an "entity" called the economy, "but rather a structure of relations itself determined by the total set of relations between fields as well as by the struggles in the field over the value of various forms of capital" (2013: 160). Swartz puts it more didactically:

> "[Bourdieu's] concepts are not intended to be reflections of empirical reality. Rather, his concepts try to convey a certain way of approaching the study of the social world; they are orientating tools for research. He thinks of his concepts as agendas of questions for research, rather than ready-made answers … On the other hand, his concepts are not purely theoretical constructs either … They attempt to assemble in diverse ways a variety of relevant empirical materials for sociological investigation [which] developed out of a research orientation and stem from efforts to understand certain empirical phenomena" (2013: 20).

Whether or not expert-witnessing constitutes a field in strictly Bourdieusian terms is therefore something to answer through empirical investigation, rather than theoretical foreknowledge. Relatedly, whether or not expert-witnessing constitutes a field that is powerful enough to produce its own habitus or exert an influence on the expert's preexisting habitus becomes an important component of the central research question. Such an approach fits with Bourdieu's much-repeated methodological precept that theorising and empirical investigation must go hand-in-hand (Bourdieu, 1968).

But it is possible to make a preliminary designation to guide data identification and collection: the practice of expert-witnessing for environmental policymaking is primarily shaped by four separate but interconnected fields which are; *the policy field*, *the juridical field*, the *environmental consultancy field* and the *publicly-funded science field*. The publicly funded science and private environmental consultancy fields feed expertise into the juridical and policy fields, and this expertise is then nominally the basis of legal judgements and policy

decisions on freshwater governance. Aggregating expert-witnessing across four preliminary field designations allowed the identification of knowledgeable informants who would share insights into the practice of expert-witnessing and provides initial clues on how to begin the task of constructing expert-witnessing as "a bundle of relations" (Eyal, 2013: 158), and then potentially either a Bourdieusian field or an interconnected matrix of fields. Key actors in the policy field are those who generate and make decisions on environmental policy: Central and local government policy analysts and advisers, advisors and elected representatives. Key agents in the judicial field include legal counsel, Environmental Court commissioners and Environment Court judges. Key agents in the publicly-funded science field are CRI and university experts, predominantly but not exclusively from the physical sciences, who have acted as expert-witnesses for either resource consent applications, regional plan submissions or Environmental Court cases and appeals. Key agents within the environmental consultancy field are science-consultants and science-managers who also act as expert witnesses across policy and legal fields.

Swartz's (2013: 30) advice is that "constructing a field [should] lead the researcher as far as the effects of a field can be discerned." However, given the size of the publicly funded science field and the environmental consultancy field and the numerous forms of expertise relevant to water governance, an attempt to explain *every* form of expert evidence across *all* of these fields would make this project unviable for a lone PhD student. To maintain viability and focus, I have chosen to primarily focus on ecological expertise from the university sector, CRI sector, and small to medium size green consultancies. In order to give insight into the juridical field and policy field, alongside ecologist expert witnesses it is also necessary to interview EnvC commissioners and independent commissioners who sit on panels that hear regional council consent and plan hearings, as well as EPA boards of inquiry. While this limited focus is necessary to maintain viability, it does introduce constraints to the study. Experts retained by large industry bodies like DairyNZ and Fonterra, and experts employed by the largest, global consultancy firms like Boffa-Miskell and WPS, are not directly interviewed. However, the perspectives of university ecologists

and small/medium consultant-ecologists do shed some light on how these firms and organisations operate.

In identifying connections between these fields, I follow Schmitz's *et al's*., advice:

> "Homologies cannot a priori be claimed to exist between positions in different fields; they must instead be seen as dynamic relations, subject to the permanent conflict surrounding the capital exchange rates and heteronomous influences between fields in the field of power and thus must be treated as empirical questions … A perspective on fields which adequately considers effects of heteronomy *requires a definition of habitus that is not restricted to one single field*. An agent's internal alignment within their own field – but also any preconditions for further practice – cannot be derived solely from that field alone" (2017, p. 59-60 - emphasis added).

This is an approach that is quite similar to that already adopted by Lave (2012), in which she situates agents within the stream restoration field on an axis of autonomy to heteronomy. At the most autonomous pole of this axis, agents have the greatest degree of autonomy from field-external influences, and usually wield sufficient symbolic capital to determine or at least heavily influence internal field conditions. Moving towards the heterogenous pole of the axis, agents are far more subject to field-external influences, such as economic and political pressure, as well as the influence of the field of power. Here it should be noted that agents include individuals as well as public institutions and businesses. Quoting Lave: "Such an analytical framework can also be important politically, in exposing relations of power and domination in which [experts] play a role" (2012: 123). As both Lave (2012) and Schmitz *et al*. (2017) maintain, capital conversions between fields are a useful way to identify structural homologies between fields, and in the context of this topic, the main capital conversion focused on is the conversion of scientific ecological knowledge claims into judicially recognised symbolic capital. Moreover, looking at scientific expert-witnessing across a range of relatively autonomous (the EnvC and EPA) and relatively heterogeneous (regional councils and STAGs) resource governance

authorities will potentially provide a deeper insight into ecological habitus across both the publicly funded science field, and some insight into ecological habitus within small and medium-sized environmental consultancies.

The grounds on which ecological expert-witnesses base their assertions of expertise are very diverse, and often defined in opposition to conflicting expert-evidence. There are all claims to symbolic authority, and thus assertions of capital. While Bourdieu's concepts of scientific and symbolic capital are very useful in revealing the legitimacy accorded to competing knowledge-claims, they are not very helpful in determining the 'truth-content' of these knowledge-claims. Lave identifies this problem in her own work, and she notes that "Bourdieu was far more interested in the structure and organisation of particular fields, rather than the knowledge-claims that are made within fields" (2012, p. 124), and further, "Bourdieu expends a great deal of effort describing dueling claims to authority and status in different fields, but he never goes into much detail about what allows a particular set of claims and capital to win" (2012: 110). In order to "move past the framework of claim versus counterclaim" (2012: 24), Lave draws on both social and natural science, and urges political ecologists to adopt a transdisciplinary approach and develop the "the ecological knowledge to assess the truth claims at the heart of the ecological services paradigm and a deep political-economic engagement to understand why they matter" (2012: 124).

Lave's transdisciplinary advice is a reflection of her overarching theoretical ambition, which is to "bridge political ecology and science and technology studies" (2012a: 122). This is an approach supported by Chiapello & Fairclough's influential definition of transdisciplinarity as a "dialogue between two disciplines or frameworks [which] may lead to a development of both through a process of each internally appropriating the logic of the other as a resource for its own development" (2002: 176). But transdisciplinarity is not just a stance, it is something that develops over many years of experience and accumulated knowledge of respective fields. Lave's argument in favour of transdisciplinarity could be interpreted more straightforwardly: as a call for social scientists to understand the physical science they are writing about. But just as importantly, it is a call to make research findings accessible and

translatable across disciplinary and epistemic boundaries, to avoid producing research that is only relevant to and read by members of your own academic tribe. In other words, to reject scholasticism.

While I have attempted to approach this topic in the 'spirit' of transdisciplinarity, this is not a transdisciplinary study. A central goal of this research is to apply a field-theoretic to the practice of expert-witnessing in order to make this practice visible and accessible to Aotearoa-based social scientists. However, while I have attempted, as far as possible, to understand the disciplinary and epistemic context from which particular ecological knowledge-claims are derived, much of the qualitative commentary on the truth-content of specific examples of expert-evidence comes by way of interview participants cross referenced with the supervision team. Given my own lack of any training in either legal studies or freshwater ecology, this is unavoidable. Without jettisoning truth, the primary focus here is necessarily the processes by which expert knowledge-claims are reconstructed and performed in such a way that maximises the legitimacy of the expert and their evidence, but combined with an analysis of the field-specific conditions that allow certain types of knowledge-claims to be prioritised over others. While I cannot claim to be enacting transdisciplinarity in the way Lave avers, it is an important guide to forming both the methodological approach and the key objectives of this thesis. Moreover, transdisciplinarity can be a useful normative yardstick or analytic tool, especially in regard to elements of expert-witnessing that have apparently transdisciplinary objectives (most notably the increasing importance of expert-conferencing/expert-caucusing, which seeks to enforce cooperation and deliberation between experts) and the conversion/'judgement' of ecological knowledge claims, which are often integrated and holistic and therefore usually multidisciplinary in nature.

A final major consideration in applying a field-theoretic to expert-witnessing is the problem of the 'relative autonomy' that Bourdieu assigns to both the scientific and juridical fields discussed in Chapter Two. Given that expert-witnessing encompasses a range of

interconnected but (seemingly) relatively autonomous fields and disconnected but relatively autonomous disciplines, it is necessary to give some forethought to how autonomy will be conceptualised.

As will be explained in Chapters Four and Five, maintaining a set of formal boundaries between policy, scientific and judicial settings is central to Aotearoa's science/policy interface. While Bourdieu provides many insights on the 'conversion' between different forms of capital (and how capital is transformed or "transmuted" in the process of conversion), what exactly happens to relatively autonomous field-specific capital when transferred and reconstructed within another field is not entirely clear. To preemptively address this blindspot, I look to Gil Eyal's influential "Spaces Between Fields" (2012: 162) in which he argues that a field's boundary does not simply separate what's inside and outside the field,

> … but is also a zone of essential connections and transactions between them. On the one hand, the volume of the boundary is where struggles take place to apportion actors and practices this way and that; on the other hand, it is also where networks provide for a seamless connection between fields.

To understand how field boundaries function, Eyal calls for a "productive interchange" between Bourdieusian field-theory and Callon's notion of translation (2012: 181). For Eyal, such an interchange would lead to a reassessment of the 'relative autonomy' that Bourdieu assigns to the scientific and juridical field, which has been much critiqued from within actor-network theory (e.g. Mialet, 2003). As argued in Chapter 2, such a 'reassessment' is completely congruent with Bourdieu's own writings, in which he is clear that relations between fields are historically contingent, and there are "no transhistoric laws of the relations between fields'' (Bourdieu and Waquant, 1992: 109). Fields can gain and then lose their autonomy, (as has been the case with Aotearoa's publicly-funded science system) and the consequences of a loss of autonomy must be investigated according to the mediating

effects of the structures and dynamics of specific social fields, alongside the forces that impinge on fields from the outside. Here it's worth returning to a key point made in Chapter Two: although Bourdieu's early essay *The Specificity of the Scientific Field* has interpreted by many as a non-empirical and idealistic description of the scientific field, there is a strong counterargument that it should instead be interpreted as a field-theoretic explanation as the only way that science can function as science genuinely orientated towards the public good. Thus, the notion of 'relative autonomy' remains a highly relevant, and a useful normative guide to illuminating the field-specific as well as the broader social and political consequences of a loss or erosion of autonomy.

It is also worth considering whether the 'problem' of spaces between fields has been overstated by theoreticians. As Schmitz *et al.* (2007) have powerfully argued and Lave (2012) has demonstrated, Bourdieusian field theory provides a useful framework for ordering and interpreting the way fields are interconnected within the wider context of society at large, but given the complex interconnectedness of multiple RMA decision making spaces, it is very difficult to determine where any one field begins and ends. Whether or not it is worthwhile conceptualising an overarching RMA field, within which the EnvC, the EPA, regional councils and STAGs are subfields, or, alternatively, whether these arenas are better conceptualised as fields in their own right, is arguably not a particularly useful (or interesting) question to anyone other than theoreticians. The EnvC is the only truly juridical field analysed in this study, and it operates a 'field of fields' influencing both quasi and non-juridical field inside an overarching RMA field (the heterogeneous point of which are highly vulnerable to the operations of the field of power), which is much larger and more complex than the four key arenas (the EnvC, the EPA, regional councils and STAGs focused on within this research.

Field theory was chosen as a framework to investigate this topic because the field concept is flexible enough to apply across multiple arenas, identifying similarities without obscuring differences. Arguably, any attempt to strictly delineate fields from one and other serves to

obscure this complex interconnectedness (and their interconnectedness with the field of power), which, as Schmitz *et al.* (2017) emphasise, was never Bourdieu's intention. Field theory is a theoretical tool that aids the construction of empirically-driven "perspicacious presentations" (Wittgenstein, PI, p. 122), a type of understanding that aims at 'drawing connections' by identifying patterns of behaviour, agency and ideology. To again paraphrase Wittgenstien, rather than trying to untangle fields, we should try to understand their entanglement. If patterns of behaviour, agency and ideology are described without resorting to the 'short circuit' fallacy, it would seem field theory has demonstrated its usefulness. The continual analysis and reanalysis of the tools used to describe and understand behaviour across fields is secondary to the perspicacity of the presentation itself, which can stand on its own (as it does in Lave's [2012] work on The Rosgen Wars in the U.S.)

To summarise, Bourdieusian field-theory, combined with insights from key secondary literature, appears to be the most appropriate methodological framework to understand and illuminate the practice of expert witnessing within the particular science-policy configuration currently dominant in Aotearoa. This section has shown how I intend to operationalise the core Bourdieusian concepts in relation to expert-witnessing for water resource governance, I now turn to the major sources of data and the methods for organising and analysing this data.

3.5 Data identification and analysis

Following Lave's interview-led research design (2013a, 2013b, 2013c) the major primary source of data for this study are in-depth, semi-structured interviews with knowledgeable informants.[21] The second primary data source is an assemblage of relevant legal material

[21] Lave's work on The Rosgen Wars is extensively researched and combines qualitative and quantitative approaches. While Lave uses a range of instruments (participant observation, mail surveys and structured interviews), her principal instrument is in-depth, semi-structured interviews with stream restoration experts and practitioners: federal and state environmental agency staff, academics, consultants and nonprofit staff (Lave 2012a: 127-133). In order to gain an insight into Rosgen's courses, Lave uses participant observation (by enrolling in two of Rosgen's short-courses) and two mail-surveys (which she sends to students enrolled in the

including Environment Court and Supreme Court case law, expert-witnesses' statements of evidence, statutes, judgements and specialised legal commentary. The major source of secondary data is the range of grey literature produced by government and NGOs relating to the science/policy nexus, the professional practice of expert-witnessing, the operational and funding structures of publicly-funded science producing organisations, and the various types of literature surrounding the RMA's implementation, development and many amendments. Data organisation and analysis has been shaped by both the scope of the topic and the materials available. While Lave uses participant observation (enrolling in and observing Rosgen's short courses) the strict rules of confidentiality that govern expert conferencing meant that participant observation was not viable for this project.

The sections below outline the rationale for participant identification, interview technique, ethics and participant confidentiality and the organisation and analysis of legal documents and policy literature.

3.5.1 Identifying interview participants

In identifying interview participants, I attempted to approach 'key agents' who could provide insight into the four preliminary field designations outlined in 3.4 above: the policy field, the juridical field, the publicly-funded science field and the environmental consultancy field. Bourdieu's concept of symbolic capital provided a guide to identifying key agents within the judicial field, which he defines as the power available to an individual based on their status, honour, prestige and recognition within a given field (Bourdieu, 1972). While Bourdieu stresses that symbolic capital is a property of individuals, it is derived from that individual's position within a field. Thus, snowball sampling was the logical sampling method for both the juridical field, in which interviewees were asked to provide referrals to particularly knowledgeable participants (participants identified through

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short-courses she attends). To aid in mapping the position of private and public sector agencies in the stream restoration field, Lave also sends standardised interview questions to stream restoration agency staff. However, in-depth semi-structured interviews are the primary instrument used to operationalise the concepts of habitus, capital and field.

chain-referral tended to be in positions of authority or possess communally-recognised symbolic capital that enabled them to speak with authority on relevant topics.) Key agents within the juridical field are EnvC commissioners, independent commissioners and freshwater commissioners. Rather than approaching key agents within the policy field, I instead focus on experts with extensive experience within policy fields, particularly regional councils and STAGs.

To identify key agents within the 'publicly-funded science field, I sought experts who have acted as expert-witnesses on behalf of submitters or appellants on issues relevant to water-resource management, with an attempt to represent the major organisations and institutions that comprise the publicly-funded science system outlined in Chapter Three: Crown Research Institutes, universities and research institutes and NGOs that are formally independent but receive significant government funding. Snowball sampling from this initial pool of ecological experts led to the identification of agents in small and medium sized environmental consultancies (which, as a whole, tend to have a greener focus compared to the largest firms). All ecologists interviewed for this study have extensive experience acting as expert-witnesses, meaning they have established a level of credibility as an 'effective' or a 'reliable' expert-witness, they have performed the "accumulated labour" that produces symbolic capital (Bourdieu, 1986: 183). The least experienced expert-witness interview participant has acted as an expert-witness on six separate cases, whereas the most experienced has acted as an expert-witness on more than thirty separate hearings and cases across the range of water governance bodies outlined above.

A major limitation of this study is the absence of Māori scientists and juridical agents within the interview pool, which was an unfortunate outcome of the research timeline. While a number of ecological expert witness participants have professional links with iwi and whakapapa to Māori cultural backgrounds, I do not have any participants who can speak authoritatively on mātauranga Māori. While ecological experts were willing to share their perspectives on the value of mātauranga Māori in relation to water resource governance, the

single EnvC official specialising in mātauranga Māori did not respond to my interview requests, and EnvC officials declined to respond to my questions regarding how mātauranga Māori aligns with the EnvC's Code of Conduct. As such, the commentary on mātauranga Māori is limited and informed through academic and policy literature and comments from ecological expert witnesses who work with Māori. Rather than sidelining the issue, I have tried to restrict the commentary on mātauranga Māori to understanding where conflict is concentrated, and hypothesising future possibilities and constraints within a field undergoing transformation. However the absence of Māori voices is a major limitation of the study and emphasises the need for a more focused research project - either led or in co-authorship with Māori scientists - that more explicitly connects mātauranga Māori with the existing neoliberal science regime.

3.5.2 Interview technique

Twenty in-depth, semi-structured interviews involving sixteen participants were conducted in two rounds between October 2022 and March 2023, with ongoing personal communication with key informants up to the point of final drafting. Interviews covered matters such as scientific uncertainty and standard setting, contested expert knowledge-claims, evidentiary burden, the politicisation of expertise and how science might be transformed when converted within juridical settings and used as evidence to inform legal judgments and policy decisions. Snowball sampling was used to generate new interview participants, with each participant asked to nominate potential informants at the close of the interview.

All interviews were voice-recorded and were between one and two hours in length. Face-to-face verbal interview was the preferred interview setting, however, most of the twenty interviews were conducted remotely using either zoom or microsoft teams. Because the sixteen interview participants represent a range of institutional and disciplinary backgrounds, each interview required an individually tailored interview guide consisting of a list of primary questions. These primary questions served as opening questions to initiate

discussion, and secondary questions were used as prompts to encourage the informant to expand on issues already discussed, or to nudge a participant towards a topic of interest.

Interview questions were ordered with a view to building rapport with individual participants, and hence differed according to the participant. But generally interview questions followed a pyramid structure: starting with more basic descriptive questions, building towards questions aimed at eliciting experiences and opinions, and ending with more 'difficult' abstract or structural considerations (Dunn, 2021: 154-155). This approach was aimed at eliciting information that encompassed the subjective/personal/experiential and objective/institutional/structural dimensions of practice. In conversing with participants I sought to position myself as an enthusiastic learner rather than an "all-knowing researcher" (Bissell, 2018, as cited in Mansvelt and Burg, 2021: 393), and this positioning (along with being honest), generally afforded generosity and patience from informants. Although each interview required its own interview guide and developed according to its own dynamic, at the close of each interview every participant was asked the same question: "What do you think should be done to improve the contribution of expert-witnesses for water resource management decision-making?" When requested, I provided the participant a list of primary interview questions by email before conducting interviews, and informants' responses to primary questions were used as prompts for a wider conversation.

3.5.3 Ethics and participant confidentiality

Prior to conducting interviews an ethics screening questionnaire and low risk notification were completed through Massey University Human Ethics Committee. Massey University ethics procedures seek to ensure research participants' privacy and confidentiality are respected, that the chance of harm to participants and the researcher is minimised, that participants are well informed about the research project and their right not to participate, and that the research is conducted in a culturally and socially sensitive manner. When requesting an interview, participants were sent an individually tailored participant information sheet that outlined the scope of the study and participants' rights. While

ecologists themselves were generally happy to be interviewed without a list of pre-prepared questions, EnvC commissioners and independent commissioners were more cautious and usually requested a structured interview template prior to the interview. Following interviews, participants were then provided with a targeted transcription of their interview, and after they had assessed and amended their transcript, informed consent was requested via email.

Because of the relatively small pool of experts who act as expert-witnesses for water resource management, and to encourage frank and open discussion, all interview participants are de-identified and every effort has been made to maintain participant confidentiality. Given the small pool of professionals directly involved, participants were orally informed prior to recording that anonymity cannot be guaranteed. In order to protect confidentiality, participant's institutions and roles are not identified, and they are instead situated within generalised field designations. Nevertheless, given that many of the issues related to the efficacy of Aotearoa's science/policy interface and the privileging of economic evidence over ecological evidence have already been played out in public and semi-public arenas, it is possible that some participants can be identified by their interview comments. To allow for participant agency, I submitted the sections of transcriptions that I intended to quote or paraphrase from to each participant by email for review and, when required, amendment or alteration. To afford participants knowledge and control over how their interview material will be used, I offered to circulate a draft copy of my discussion chapter to participants on request. The only interview participant that is directly named is Dr Mike Joy. Given that he had already talked publicly and published on most of the matters covered in interviews, maintaining anonymity would have been impossible, and Dr Joy granted permission to be identified.

To avoid identifying participants, interviewees are cited according to their general discipline, institutional setting and the date of interview. For example, (Ecologist: university, Dec 2022; Conservation scientist: consultancy, March 2023). Although different

types of ecologists and conservation scientists were interviewed, no further information is provided to protect confidentiality. Environment Court commissioners are shortened to 'EnvCC', for example, (EnvCC, Dec 2022). Independent and Freshwater Commissioners are cited as (Independent commissioner, Oct, 2022; Freshwater commissioner, Feb 2023). Interviews with Professor Joy are cited as (Joy, personal communication, date of interview).

3.5.4 Legal material

The second source of primary data for this project is relevant legal commentary, expert-witness statements of evidence, juridical rulings and case-law surrounding the Horizons Regional Council One Plan, the Ruataniwha dam project, and the National Policy Statement for Freshwater Management (2020). These three examples were given special attention because they draw in a wide range of experts, involved expert disagreement and stakeholder conflict, and it covers the full scope of water resource governance: from plan formation and implementation at the regional level through to the EnvC and Supreme Court appeals process and EPA directed boards of inquiry, through to ministerially appointed STAGs. It was necessary to analyse relevant case-law, legal commentary and expert-evidence in order to identify how science is deployed in freshwater decision making at the regional level, and its role in council and court hearings. A news scan using the Newztext database was undertaken to assist contextualising expert conflict in each of these cases. This helped to identify issues which had not been evident when focusing on Overseer's development and implementation, such as evidentiary issues that arise from the implementation of freshwater regulatory policy, and how issues at the science-policy interface manifest in practice.

Methodologically, the decision to investigate a range of water management conflicts and relevant EnvC and High Court case-law was informed by Mansvelt and Berg's (2021: 390-395) criteria for "trustworthy" qualitative research (a term they prefer to ‘rigour’ and encompasses credibility, transferability, dependability and confirmability). While statements of expert-evidence are usually available using a general search engine, it was

necessary to use the LexusNexus platform to conduct keyword searches of case law and specialised legal commentary. This expanded to include keyword searches for Environmental Court case-law that related to the status of particular forms of expert-evidence and the role of expert-evidence within RMA planning processes. The Zotero reference management programme was used to store, organise and annotate all legal, academic and grey material.

To understand expert-witnessing as professional practice, I made use of the range of materials produced and made available by the Resource Management Lawyers Association (RMLA), which includes webinars, professional practice and Expert-Witness Code of Conduct guidelines, relevant case-law, the RMLA member directory and the RMLA Resource Management Journal. Publicly available information from the *Making Good Decisions Programme,* which accredits and trains councillors, community board members, and independent commissioners, was also exceptionally useful.

3.5.5 Policy literature

To gain an understanding of the historical context for the current science-policy configuration, it was necessary to engage with relevant historical reports, discussion papers and documents generated by the Department for Science, Innovation and Research (DSIR), the Ministry for Science, Research and Technology (MoRST), the Foundation for Research Science and Technology (FRST), the Crown Company Monitoring Advisory Unit (CCMAU), material produced by bodies that represent scientists, such as The Royal Society Te Apārangi, the New Zealand Association of Scientists (NZAS), and the Public Services Association (PSA), along with a deep-dive into the Aotearoa based academic science/policy literature. Numerous government reports and policy analyses produced since the establishment of Ministry for Business, Innovation and Employment (MBIE) in 2012 were also relevant, including a number of reports from the Parliamentary Commissioner for the Environment, the Office of the Chief Freshwater Commissioner and key government

agencies such as the Ministry for the Environment, Department of Conservation, the Ministry of Business, Innovation and Employment and the EnvC.

Here I also drew on a number of relevant government and NGO studies, including more recent policy analyses produced or commissioned by the MBIE and research produced by the Environmental Defence Authority (EDS). This material laid the groundwork for understanding the issues and concerns regarding how the current publicly-funded science system provides a major knowledge base for RMA decision-making. Literature on traditional ecological knowledge and policy formation was also examined, and more specifically the relationship between mātauranga Māori and both science and sustainability objectives. This is a topic of increasing international importance, driven by a perceived need to rectify biases in current approaches and to deepen the knowledge base on which policy is formed (Clapcott *et al.*, 2018). A specific matter of concern is the way that mātauranga Māori has become a force which potentially introduces new forms of expertise and knowledge that sit outside the conventional science-policy nexus. Late in the project it became necessary to conduct a review of EnvC and Supreme Court case law as it relates to the integration of mātauranga Māori into freshwater law and policy, which is written into the section 3.7.3 of the following chapter.

3.5.6 Data analysis

Following Fairclough (1999, 2001, 2013) critical discourse analysis is used as a broad interpretative framework, which he defines as "both a normative and an explanatory critique … that does not simply describe existing realities but seeks to explain them, for instance by showing them to be effects of structures or mechanisms or forces that the analyst postulates and whose reality s/he seeks to test out" (2013: 9). Fairclough sees discourse as a form of social practice that involves a dialectic between discourse and the institutions and social structures which frame it, a concept that has many parallels with Bourdieusian field theory (Fairclough [1999] originally defined CDA with reference to

Bourdieu's concept of the field). Critical discourse analysis is therefore a useful framework for interpreting not only speech and text, but also the broader social and institutional context that enables and constrains particular types of discourse and agency.

All data for this project was stored, organised, thematised and annotated using the Zotero reference management programme. In the absence of any Bourdieusian coding template that I am aware of, coding became an iterative process involving the slow, gradual accumulation of data into documentary banks that served to organise data in groups according to attributes, with this data incrementally re-coded according to theoretical concepts (Glazer, 1965). This coding process loosely follows Glazer and Strauss' method of constant comparison, in which broadly descriptive data is progressively recoded and reinterpreted with reference to elements of field-theory, producing an iterative dialogue between theoretical concepts and empirical material (Cope and Kurtz, 2016).

Coding and thematisation of data followed a broadly deductive process in which data was first organised according to the four broad field designations mentioned above. Data within these four preliminary categories was incrementally disaggregated into subcategories, for example data within the 'judicial field' category was organised according to its relevance to either the One Plan, the Ruataniwha dam scheme or the NPS-FM (2020), and these categories were further disaggregated into analytical themes such as 'contested evidence', 'evidentiary burden', 'status of evidence', 'ecology vs economics', 'hearing decisions', 'mātauranga Māori', 'decision appeals' and 'environment court judgements'. Relevant expert witness evidence was disaggregated according to the submitter, the submission context, and the disciplinary and institutional background of the expert. Targeted interview transcripts were also entered into Zotero for coding and thematisation. Data from across all subcategories were coded according to its relevance to key Bourdieusian concepts: *doxa*, *illusio,* misrecognition, reflexivity, habitus, field, forms of capital, agency, neoliberal metacapital and the field of power.

3.6. Conclusion

This chapter has explained how field-theory can be operationalised for the study of the practice of expert-witnessing in relation to water management conflict in the Aotearoa-New Zealand context, covering the major theoretical and methodological issues involved and the means of collecting and analysing the most useful available data. The next chapter shifts to a Bourdieusian-influenced history of how the publicly funded science field now functions in relation to the key RMA decision making spaces that are the focus of Chapter Five. The bulk of the chapter is focused on describing the historic de-autonomisation of publicly funded science to the point it now resembles a neoliberal science regime (Mirowski, 2011; Lave, 2014), but it also includes a brief history of the EnvC, the Resource Management Act and the increasing symbolic capital of mātauranga Māori throughout these spaces. Chapter Four is a macro-level analysis of the field-external forces which has transformed the provision of ecological expertise in freshwater governance across universities and CRIs. This macro-level analysis provides context for the micro-level, practice-based, interview-driven discussion in Chapter Five and the final discussion on 'misfits' in Chapter 6.

Chapter Four: The New Zealand science/policy nexus in context

4.1 Introduction

This chapter provides a critical, Bourdieusian-influenced history of the New Zealand publicly funded science system and the policy and legislative framework for water resource management, with special emphasis on the development of the interconnected but distinct fields central to this study: CRIs, universities, the New Zealand Environment Court (EnvC), regional councils and STAGs. As Bourdieu repeatedly emphasised throughout his work, the history of a social field is "inscribed" in the *nomos*, *illusio* and 'rules of the game' that characterise the field(s) in question (2010, p. 32). For Bourdieu, "the history of a field … is nothing other than the history of its struggles i.e. of the strategies of those who seek to conserve and transform it" (2002, p. 40). The history of a field is inscribed on the positions and stances within the field itself: "the history of a field, like the history of a society, is contained within that field, and the field is itself a product of that history" (2002: 2). In order to understand how a field is objectively structured, how agents are positioned (agents referring to both individual and collective actors), and the limitations and possibilities for agency within and across fields, it is necessary to describe these field's historical development.

More specifically, this historical context is necessary in order to account for, 1.) the structural configuration of scientific practice across public institutions; 2.) the types of professional and institutional habitus that this configuration has produced; and 3.) the strategies and practices that individual scientists enact within this configuration when mobilised in water resource management conflicts involving contested knowledge claims in both juridical and quasi-juridical spheres. Against critics that have misleadingly characterised Bourdieu as an "ahistorical reproduction theorist" in the past (Moore, 1980 p. 541; Mialet, 2003) , I follow the more recent interpretations of researchers such as Gorski (2013), Swartz (2011, 2013), Eyal (2013), Schmitz *et al.* (2018) and Stienmetz (2011) who view

habitus, field and capital as each representing "a form of incorporated history" (Stienmetz, 2011 p. 51). The historical narrative charted here forms the basis of the Bourdieusian analysis of scientific practice across these fields in Chapter Five.

The history charted below is a history of the imposition and elevation of neoliberal metacapital - specifically the principles of new public management theory, agency theory public choice theory, supply side economics, monetarism, and entrepreneurship - to the status of *nomos*, the "official principle of vision and division" (Bourdieu, 1996 p. 22) of Aotearoa's publicly funded science system. This history is unavoidably also a history of successive economic crises that have transformed Aotearoa culture and society - economic crises which extended into almost every area of social space and radically transformed, not only the publicly funded science sector, but the very definition of science, universities, knowledge and truth. The dominant effect of the successive policy and legislative responses to these crises has been the historic de-autominisation of Aotearoa's publicly funded science providers. Although this de-autonomisation occurred at a different pace and tempo across differentiated and distinct fields (influenced both by the contingent functioning of each particular field and the extent and degree of resistance from agents within them) the fundamental causes and effects are fairly uniform. In order to compensate for greatly diminished central government funding, science providers have been directed to pursue market-like behaviours and form close relationships with industry, researchers and academics are increasingly unable to define their own research agendas and are restricted to applied research and research commercialisation, and "national science policy has seen a strong swing towards demand-side policies … [in] which 'science' and 'research' have been subsumed within an economic discourse", an environment wherein "researchers appear disempowered as the policy agency becomes the 'driver' of innovation in a demand-driven scenario" (Leitch e*t al.,* 2014: 2). Parallel to this "fundamental redefinition" of science (Leitch *et al.,* 2014, p 7), the normative principle of scientific autonomy has been supplanted and replaced by the notion of corporate or commercial autonomy. The New Zealand science reforms have produced dysfunctional funding and institutional structure which disciplines

researchers, limits scientific endeavour and compromises the core values of science (Galbreath, 1999; NZAS, 2004; Edmendes, 2005; Leitch *et al.*, 2014; Robinson, 2015; Hendy, 2016; Galbreath, 2021). Despite protracted attempts by successive governments to refine and stabilise the science system, collectively, these attempts have not shifted the system beyond the basic organisational model established in the early 1990s (MBIE, 2022).

The first part of this chapter (ss 4.2-4.6) is focused predominantly on science providers, whereas the second part (beginning at s 4.7) is focused predominantly on the legal and policy framework in which ecological expertise is deployed. Section 4.2 covers the establishment of the Department for Scientific Research (DSIR) in 1926, and its development and growth over sixty years to become New Zealand's primary producer of scientific knowledge. The third section (4.3) details the DSIR's dissolution and development into the current commercial, competitive model for Crown Research Institutes, universities and the small number of semi-independent hybrid research organisations such as the Cawthron Institute. Section 4.4 provides a history and evaluation of the protected and ongoing attempt by central government to stabilise the commercial model for Crown Research Institutes and universities between the late 1990s to the present day. Section five (4.5) critically discusses the significance of mātauranga Māori, both to science funding and scientific research, as well as a potential corrective to the productivist, utilitarian and commercial *nomos* that has dominated both environmental policymaking and public science funding in New Zealand for most of its history. Section 4.6 focused specifically on the consequences of the incursion of neoliberal metacapital into universities and the normalisation of academic capitalism. Section 4.7 shifts to a focus on policy and law, beginning with a critical evaluation of the New Zealand Resource Management Act (1991) as the broad legislative framework within which scientific expertise is mobilised in water resource management conflicts. Sections 4.8 to 4.8.3 outline the role and influence of the New Zealand EnvC as a 'field of fields' which exerts influence over the evidentiary rules and practices for establishing 'reliable' expert testimony and advice commonly used across RMA water governance authorities.

4.2 DSIR: Expansion (1926-1973)

The history of government-funded science in New Zealand conventionally begins with the establishment of the Department of Scientific and Industrial Research (DSIR) in 1926 (Galbreath, 1999; Palmer, 1994). Prior to the DSIR, state-funded science was primarily conducted by the New Zealand Geological Society (NZGS), which was set up by the government in 1865 to identify mineral assets, and the New Zealand Institute (NZI), founded in 1867, which aimed to bring together various fragmented research and philosophical societies that had emerged during the early decades of colonisation (Galbreath, 1998, cited in McGuinness et al., 2009: 13). While the NZI and the NZGS expanded under the directorship of George Hector (Galbreath, 1998: 5-20), they did not represent a deliberate government policy of creating a central scientific establishment, and "these institutions did not professionalise science in New Zealand to any large degree, and there remained for many years a lack of state-funded scientific investigation" (McGuinness et al, 2009: 14). Scientific research carried out during this period was almost entirely in primary industries such as agriculture and funded sporadically by a combination of government grants, assistance from Britain and support from the NZI (McGuinness *et al*., 2009 p. 14). As Galbreath (1998, p. 13) explains:

> "The role of government leaned more toward providing support and practical advice for prospectors and farmers through special purpose administrative departments than towards maintaining separate scientific institutions … [Politicians] were more interested in practical solutions to immediate problems than in advancing scientific understanding in the hope of future benefit."

The most powerful catalyst for the founding of the DSIR came from the imperial centre, as Britain put increasing pressure on the dominions to form their own scientific institutions (Galbreath, 1998). In February 1926, Sir Frank Heath, head of the British DSIR, toured NZ

and Australia and produced reports "carefully written for local conditions but recommending, in essence, his own British system of organisation of scientific and industrial research" (Galbreath, 1998: 18). The New Zealand DSIR closely followed the model proposed by Heath: a central scientific authority to administer and coordinate research carried out in existing institutes such as the NZI and the Cawthron institute, or in new research associations formed in cooperation with industry (Galbreath, 1998). The dominant focus of Heath's NZ report was primary industry, and while he did "give some consideration to secondary industries", he concluded that, "the primary industries and those which directly support their needs must be given first priority" (Galbreath, 1998: 18). Heath stressed the importance of associations between research organisations and industry, and research and education, supporting moves to establish an agricultural college (which in 1964 became Massey University), and recommended the establishment of specialised research institutes under the umbrella of the DSIR to service particular branches of agriculture, with "the first and most urgent need being dairy" (Heath, as quoted in Galbreath, 1998, p. 19). Like the British model, the DSIR was expected to facilitate cooperation between industry and science, with provision for the DSIR to match private funding (Galbreath, 1998).

The British model of the DSIR provided a degree of autonomy for scientists very different from existing practice New Zealand, "where, since the 1890s, scientists had been attached to administrative departments [such as the Department of Agriculture] to provide 'useful' scientific services and practical advice" (Galbreath, 1998: 19). In Britain, the 'Haldane Principle' - the principle that research funding should be decided by autonomous research councils and free from political or administrative pressures - was already enshrined in government policy (Galbreath, 1998, p. 19-20). Theoretically the Haldane Principle was meant to ensure a centralised administrative and funding system did not impede on the autonomy of scientific research, and that scientists, rather than government ministers, should be in charge of evaluating the quality of likely research endeavours through processes of peer review. While ministers decide the overall size of the funding for science

and research and its distribution between the research councils, they should not decide which individual projects should be funded (Pells, 2019). Although the DSIR was never envisaged as a national research organisation, but rather an institution that supported, organised and evaluated research conducted externally, it now had a virtual monopoly on scientific provision. McGuinness et al (2009: 20) describes this as a "paradigm shift in organisation" but Galbreath emphasises another shift "which is perhaps so obvious as to have gone unremarked: DSIR and its research became managed and controlled not by administrators but by scientists" (2017: 169).

The early NZ DSIR was charged with providing "permanent services to the government" which today we would understand as 'public good' science (such as food safety, geological mapping and meteorology), as well as "research investigations" which included cooperatively funded research programmes with institutes and industry (Galbreath, 1998: 23). Although Heath's model assumed that commercial science would be funded largely by industry and conducted by external research institutes, the distinction between public good and commercial science was blurred from the very early years of the DSIR. Quoting Galbreath (1998: 24): "Some of the work done in the 'permanent scientific services' could certainly be classified as research in aid of industry, and the pragmatic Marsden did not hesitate to make use of the scientific services to provide support for new research investigations." Much of the funding for the fledgling DSIR came from Britain through the Empire Marketing Fund, which benefited primary industries in New Zealand, as well as aligning New Zealand research with the economic needs of the imperial centre. Early research investigations sponsored by the DSIR on the biological control of weeds, soil science, animal nutrition, plant breeding, seed science and dairy research were all funded through the Empire Marketing Board (Galbreath, 1998).

Contrary to Heath's model, after the election of a Labour government in the mid-1930s that had a broader view of the remit of the state, the DSIR had started to conduct its own research, establishing the Plant Research Station in 1936. By 1939 the DSIR had established

eight internal research divisions, five research associations (dairy, leather, coal, wheat and wool) and a research station, extending its own range and leading to direct competition with the Department of Agriculture and the privately endowed Cawthron Institute (Davenport and Bibby, 2007: 182). The budget of each department was set separately, and while there was some effort to coordinate research investigations (mostly between the DSIR and the Department of Agriculture), each department had a degree of operational autonomy (Galbreath, 1998: 248). World War Two provided the impetus for the further expansion and centralisation of science in New Zealand, and while the DSIR was still small, it made significant contributions.[22] While notable scientific achievements were made during this period, the wartime research programmes "placed immense strain on the physical-science infrastructure, and the consequences of the previous, almost exclusive focus on primary industries became evident at this point" (McGuinness *et al.*, 2009: 18).

The growth of the DSIR from science facilitator to the national scientific provider continued in the decades following WW2, and growing conflict with other research organisations and government departments prompted the establishment of the National Research Advisory Committee (NRAC) in the 1960s. The NRAC was set up to develop national science strategies and to foster better coordination across the DSIR departments and between the DSIR and other scientific organisations (Galbreath, 1998: 246). While the NRAC was ineffective - each DSIR department retaining a degree of autonomy and continuing to expand to undertake wider research as well as service roles - it did signify a political desire to implement a more coherent productivist agenda (Palmer, 1994, McGuinness et al, 2009, Galbreath, 1998). Research agendas and priorities were still determined largely by individual researchers and DSIR department heads. The DSIR received the majority of science funding, but research was also funded by individual government departments, such

[22] For example, research undertaken by the Plant Chemistry Laboratories improved the drying of fruits for service rations, grasslands scientists examined the best grasses to use for runway strips, a physical testing laboratory was set-up to engineer gun-sights, as well as the cooperation with Britain in its radar and programme and ionospheric research. Ernest Rutherford's scientific capital in Britain allowed him to arrange for loan of equipment to assist in research being undertaken in New Zealand, and he encouraged the recruitment of graduates from New Zealand to the UK to join research teams concerned with radio research (Galbreath, 1998: 72-74).

as the Ministry of Agriculture and Fisheries, the Ministry of Forestry and the Meteorological Office (Palmer, 1994). A social science research fund committee distributed grants, primarily to the universities, for research in sociology, psychology, anthropology and education (Palmer, 1994). From the early 1970s onwards there was an increasing drive towards planned industrial management, and the DSIR first formed a Science and Industrial liaison unit, and then a full Industrial Processing Unit to promote its services available to industry, auguring the commercial model that was to be established in the early 1990s (Galbreath, 1998: 247).

4.3 DSIR: Dissolution (1973-1993)

DSIR's development during the decades between 1924 and 1970 had "extended its form and function well beyond what was envisaged when it was first established" (Galbreath, 1998: 245). The global oil shock and Britain's entry into the European Common Market in 1973 signaled the end of this long period of expansion, and the beginnings of the historic shift towards the commercial model of state-funded science. [23] From the mid- 1970s New

[23] New Zealand social scientists have generally argued that the global economic crisis of 1973 was a key factor in the dissolution of colonial economic arrangements and the collapse of New Zealand's pastoral economy. For example, Richard LeHeron argues that New Zealand was one of the last major contributors to the imperial food commodity chain, at which point Britain's entry into the European Economic Community in 1973 cast New Zealand adrift and caused a profound economic and cultural crisis. The failure of the Muldoon National government's interventionist attempts to stabilise the agricultural and wider national economy created the context for both the advocacy and adoption of radical neoliberal reforms post-1984 (LeHeron, 1993). What is omitted from this chapter is the cultural and social consequences of this period of crisis, the "sense of betrayal and cultural collapse" (Campbell, 2022: 122).

Authors such as Kelsey (2001) framed this early period of neoliberal reform as "The New Zealand Experiment" as a way to emphasise the previously marginal position of economic theories that had suddenly become hegemonic. But the word "experiment" evokes agency, choice, and an openness to falsification. None of these accurately reflects the situation in New Zealand at this time (as Kelsey recognises), and as detailed below, arguments against Agency Theory and Public Choice Theory were largely placed outside the boundaries of legitimate debate. For poststructuralist geographers like LeHeron, New Zealand was the victim of a series of political and global economic crises, and reacted in such a way that greatly reduced the agency of the state. For Gramscian-influenced sociologists like Poata-Smith (1997), the New Zealand government was struggling to contain a crisis of legitimacy/hegemony on multiple fronts. In the account of academics like Kelsey, LeHeron and Boston, a very small number of elite actors within government and Treasury reacted to and attempted to contain a crisis by the rapid, universal and doctrinaire application of a very limited range of economic theory, actively working to delegitimise alternative viewpoints and reinforcing Margret Thatcher's terrifying slogan, "there is no alternative". A Treasury policy paper from 1987 directly echoes Thatcher: "It is

Zealand's economic situation deteriorated rapidly, with high inflation, low economic growth, rising unemployment, very low productivity growth, substantial fiscal deficits, and rising international indebtedness (Boston, 1989: 134). From 1976 Muldoon's National government imposed a 'freeze', and then a 'sinking lid' policy across all government departments, including the DSIR (Galbreath, 1998, p. 249). The Lange Labour government elected in 1984 continued this policy while also applying the 'user-pays' principle and reducing the DSIR's funding by 25% per year, both as a cost-recovery measure, as well as way to encourage a customer-contractor approach to research (Galbreath, 1998, p. 249).

But this was only the beginning of a much more radical reform programme that involved virtually every aspect of the public sector and public administration - from state controlled industry and agriculture to housing health, education and science - and would transform New Zealand "from one of the most-regulated, to one of the least-regulated countries in the world" (Carter and Bollinger, 1997: 778, Boston, 1987). The speed and breadth of this reform programme was in part enabled by the "highly-centralised, unitary institutional structure of the NZ state" (Roper, 2018, p. 17). Johnathon Boston (1993) identified a number of core influences in the so-called 'rogernomics' reform programme: 1.) macroeconomic stabilisation, 2.) a questioning of public ownership, 3.) the re-evaluation of traditional social obligations, 4.) an ideological shift to the right, and 5.) a focus on greater bureaucratic and executive accountability (1987: 129).[24] Public choice theory, agency theory and monetarism

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sometimes suggested that there is some wider society which is greater than the sum of the people in it and social benefits are felt by this society even though none of the people may comprehend the gain ... We would have some difficulty in deriving policy from an imaginary construct of that type" (Treasury (1987, cited in Wood, 1991). The "NZ experiment" is the binary opposite of an "experiment" in Popperian terms, but it does reflect a number of the characteristics of Kuhn's revolutionary paradigm shift as described in Chapter Two.

[24] 'Rogernomics' is a portmanteau of "Roger" and "economics" (an analogy with "Reaganomics"), which was coined by journalists working for the New Zealand Listener in 1985 to describe the neoliberal policies of Labour finance minister Roger Douglas. Like the phrase "The New Zealand Experiment", the term is misleading, incorrectly inferring Roger Douglas was the progenitor of a new type of economic system tailored for the New Zealand situation. As Jonathan Boston has persuasively argued, in regard to economic policy and public sector reform, there is very little to differentiate 'Rogernomics' from Thatcherite economic liberalism. For Boston, the major differences were rhetorical and ideological: "In contrast to the Thatcher Government, however, the Lange Government has not fully embraced liberal principles; nor has it wholeheartedly endorsed the neo-conservative critique of social democracy. Perhaps the major difference lies in Labour's continuing commitment to a positive as well as a negative concept of liberty … Without this concern for social justice it

were key economic theories constituting the conceptual framework for these reforms; a transfer of business and management theories from the private to the public sector in what was broadly termed the "new managerialism" (Boston, 1987; Carter and Bollinger, 1997; Galbreath, 1999; Kelsey, 1995, 2005).

State subsidies and import tariffs that protected local industry were removed, and many state-owned services - including telecommunications, forestry, financial broking and insurance firms and the national airline - were fully privatised (Kelsey, 1995). Other state services, including power generation and distribution, the postal service, rail system and coal industry were restructured into another model imported from the United Kingdom, the 'State Owned Enterprise', a corporation in which the state is the sole shareholder and is mandated to function as an economically viable entity, paying a yearly dividend to the government (Boston, 1987: 145; Carter and Bollinger, 1997).

An overarching aim of these public sector reforms was increasing efficiency and avoiding "bureaucratic capture": the capture of ministers by their departmental advisors or the dominance of professional and sectoral interests in policy making (Boston, 1987). This was to be achieved primarily by separating policy formation from administration and service delivery (Carter and Bollinger, 1997, p. 778). Accordingly, government ministries were substantially reduced and restricted to a policy-making role, while administrative responsibility was devolved to state agencies with the aim of increasing efficiency and accountability in service delivery. As Carter and Bollinger explain (1997: 779):

> "Service providers, acting as agents to the policy-makers, are excluded from direct participation in decision-making, thus reducing their capacity to influence policy in their own interests. The converse of this devolution, which had received much less attention, had been a substantial centralisation of state political power."

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would be questionable whether Labour could any longer be regarded as a social-democratic party" (Boston, 1987: 150).

The devolution of service delivery and centralisation of policy formation power is key to understanding how these reforms reconfigured the relationship between the state and science. These principles were applied with unprecedented uniformity across the public sector, an approach that has been praised by economists as “an extensive and intellectually coherent approach to public sector reform” (Lodge and Gill, 2011: 239), and criticised by social scientists as the “rapid and highly doctrinal" application of a "radical political economy” (Campbell, 2022, p. 120). During this period the operations of publicly funded scientists were subject to an "exhaustive series of reviews and reports'' (Galbreath, 1998, p. 251), the most significant of which were the Beattie report (Beattie *et al.*, 1986) and the Arbuckle report (Arbuckle *et al.*, 1988). The Beattie report aimed to demonstrate the positive net benefit of R&D investment in relation to both the private and public sector, recommending a doubling of 1986 public expenditure by 1996, with the overarching aim of creating "a knowledge, rather than labour based economy” (Beattie, 1986). While Beattie *et al.* accepted the principle of user-pays, they cautioned that market philosophy should not be applied wholesale to science, concluding that “a significant part of the country’s wider research and development has to be recognised by the government as public good and be supported by public funds” (Beattie *et al.*, 1986).

The Beattie report was “largely ignored by the government” (Edmeades, 2004: 86), who responded by forming the Science and Technology Advisory Committee (STAC). STAC’s report, entitled Science and Technology Review: A New Deal (Arbuckle et al. 1988) was framed much more explicitly within the discourse of public choice and agency theory, bluntly stating that “the guiding principle [in designing the new system] is that the role of the government should be minimal” (Arbuckle, 1988: 47). The authors of New Deal argued that a reason for the cold reception of the Beattie report was its reliance on “simplistic notions of market failure” (Arbuckle et al, 1988: 87). Chief among STAC’s recommendations was the adoption of contestability as the governing principle for R&D funding, the commercialisation of scientific institutes, and the institutional and statutory separation of the policy, purchase and operational arms of scientific research (Arbuckle, 1988). STAC

suggested three categories of research worthy of state funding: ‘public good research’ (research with social value but no market value), ‘pre-commercial applied research’ (research with the potential for future economic benefits) and ‘strategic research’ (research supported for strategic reasons) (Galbraith, 1998: 253).

This was a period of intense and personal crisis for New Zealand scientists as their professional field was being fundamentally transformed and previously solid relationships, institutions and hierarchies were being liquified. Galbreath quotes the distinguished physicist Marcus Oliphant, who observed that the series of reviews and reports preceding the first phase of these reforms entailed a “mutually incomprehensible dialogue” between “scientists who do not understand economics and economists who do not understand science” (1998: 250). In the language of the new managerialism, DSIR scientists were categorised along with other public sector employees as “vested interest groups” who sought to “capture” policymaking to increase their own funding and influence (Galbreath, 1998: 250). Scientists had long considered their work as 'public good', and as a fundamental contributor to economic growth, a view directly contradicted by the New Zealand Treasury, who maintained that publicly funded research has no direct influence on economic growth. This was made clear in a memorandum, dated 12 December 1984 to the Minister of Finance from the Secretary to the Treasury:

> "Calls for increased government assistance for R&D are frequently based on fallacious arguments regarding the relationship of levels of R&D to economic growth. It is frequently claimed that increased levels for R&D effort will lead to increased innovation and economic growth. In fact, there is no simple connection between R&D and economic growth" (Easton and Bollard, 1986 quoted in Cartner and Bollinger, 1997: 788).

The DSIR was characterised as an organisation filled with “lazy and unresponsive scientists” managed by “tyrannical and conservative science directors” (Winsley, 2003, quoted in Davenport and Bibby, 2007: 183). The Royal Society and the NZAS were suddenly

charged with quantifying the connection between science funding and economic growth, a relationship which had previously been generally accepted as implicitly causal (Cartner and Bollinger, 1997: 789). In some senses, Treasury was accurate in the view that there is "no simple connection between R&D investment and economic growth", pointing both to the complexity and difficulty of quantifying and rationalising this relationship in orthodox economic terms, and the lack of New Zealand based case-studies (Cartner and Bollinger, 1997; Davenport and Bibby, 2007). Attempts by scientists to translate the social value of science into economic terms were largely ignored. Galbreath (1998, p. 250-251) cites a 1967 paper by Dick, Toynbee and Vignaux which conservatively estimated a 20% per annum return on R&D investment, a rate "well above that normally required for government investment in public projects." Throughout the 1980s, this was the *only* New Zealand-based assessment of the economic value of R&D investment, and "was largely disregarded by economists" (McGuinness *et al.,* 2009: 21). Treasury maintained the ideological position that "it is better for markets than governments to decide research and development are likely to yield the highest returns" (Galbreath, 1998: 251), with some economists advocating for an extremely limited definition of 'public good' which would restrict government funding to "public good research aimed at goals outside the market framework - such as the protection of rare native species" (New Zealand Treasury, quoted in Galbreath, 1998: 252).

Ultimately, the government did not entirely accept the Treasury's view, accepting STAC's slightly broader definition of public good science. For Cartner and Bollinger (1997: 789), the problem of quantifying the relationship between science investment and economic growth was not 'resolved', rather; "they have been effectively rendered marginal, at least in the current political climate." Despite the absence of a clear understanding of the connection between science investment and economic development, the science reform model "was based on the view that the relationship between science funding and economic development is positive and can be managed for optimal efficiency, cost and economic return" (Cartner and Bollinger, 1997, p. 791). Quoting Galbreath (1998, p. 253), "When the restructuring of science finally proceeded after five years of review, argument and

recommendation, it followed the general pattern of reform throughout the public sector, but with a somewhat wider list of public good science that could be funded." The three categories outlined by STAC were combined and statutorily defined as "Public Good Science Outputs' ' (Foundation for Research, Science and Technology Act, 1990, cited in Galbreath, 1998: 289).

The structural reconfiguration of the New Zealand science system closely followed STAC's recommendations, propelled by three new pieces of legislation introduced by the Fourth Labour government: The State Owned Enterprise Act (1986), The State Sector Act (1988) and The Public Finance Act (1989), and the Crown Research Institutes Act (1992) (McGuinness et al, 2009: 22). In 1990, the Ministry for Research, Science and Technology (MoRST) and the Foundation for Research, Science and Technology (FRST) were established, and the following year, the DSIR was dissolved along with the research division of the Ministry of Agriculture and Fisheries, the Forest Research Institute of the Ministry of Forestry, and the research section of the Meteorological Service. These were reconstituted into 10 Crown Research Institutes, most of which were based on the old DSIR departments, with a few producing new associations (like the new Pastoral Agriculture Research Institute which combined the DSIR's Grassland's Division with the Ministry of Agriculture's research unit.) The major discipline-based divisions of the DSIR, like Chemistry and Physical Sciences, were disaggregated between numerous CRIs (Galbreath, 1998: 262). The ten CRIs were statutorily enshrined as Crown Owned Entities charged with performing research "of benefit to New Zealand" and to maintain "financial viability" (Ministerial Science Task Group, 1991, cited in Davenport and Bibby, 2014: 183). Since 1979 the DSIR had maintained a small Social Science Research Unit based in Christchurch, which was reconstituted as the smallest of the CRIs, the Institute for Social Research and Development (Galbreath, 1998: 265). The Institute for Social Research and Development struggled to meet the requirement of short-term commercial viability, and it was subsequently disestablished in 1995. The nine remaining CRIs were each based on a productive sector or grouping of natural resources,

giving each CRI a distinct focus as well as a clear user-base, while maintaining the DSIR's previous strong agricultural and environmental research focus.

The science reforms produced what was referred to at the time as "the tri-institutional framework" (McGuinness et al, 2009) or, more disparagingly, "the commercial model" (Edmeades, 2004): the institutional and statutory separation of policymaking, funding and science provision. MoRST was the ministry responsible for generating science policy and advising the Minister for Science and technology, and FRST would implement policy and oversee the distribution of funds between the 9 remaining CRIs. Funding previously allocated to the DSIR and the Ministry of Agriculture in the form of yearly block grants was consolidated into a single contestable pool, the Public Good Science Fund (PGSF), with CRIs now competitively 'bidding' for a share of the PGFS, which was to be allocated by FRST in a manner consistent with the "specified science output classes" set by MoRST (FRST, 1992, cited in Edmeades, 2004: 86). Funding applications could be made by any agency or individual (including private citizens, commercial organisations and universities), with the selection of successful applications based on perceived merit and relevance to priority outcomes (Davenport and Bibby, 2007: 185). In line with the principles of contract and agency theory, if a CRI was successful in its application, it would enter a contractual relationship with FRST to deliver a specified output. The Crown Research Institutes Act (1992) enacted STAC's recommendation that CRIs should be commercial organisations owned by and answerable to the government. The Act also established the principles on which CRIs must operate, which include;

> Every Crown Research shall, in fulfilling its purpose, operate in a financially responsible manner so that it maintains financial viability.
>
> A Crown Research Institute is financially viable if: (a) regardless of whether or not it is required to pay dividends to the Crown, the activities of the Crown Research Institute generate, on the basis of accepted accounting principles, an adequate rate of return on

> the shareholders' funds; and (b) The Crown Research Institute is operating as a successful going concern.

Section 5 of the CRI Act also instructs CRIs to "undertake research for the benefit of New Zealand", and to "promote and facilitate the application of (i) the results of research and (ii) technological developments." CRIs were established as the providers of public good research in New Zealand, run by a board of directors appointed by the government (MoRST and CCMAU, as cited in McGuinness, 2009: 23). In order to meet the criteria outlined in Section 5 of the CRI Act, CRIs are also companies under the Public Finance Act 1989 and the Companies Act 1993, "expected to have a medium to long-term focus, and balance government funding with commercial investment" (McGuinness, 2009: 23). As a number of science commentators have noted (e.g. Edmeades, 2004; Galbreath, 1998; 2017; Robinson, 2015; Davenport and Bibby, 2007), the purpose of the CRIs was not substantially different from the purpose of the DSIR, except, unlike the DSIR, CRIs must act as semi-commercial entities, statutorily required to "provide an adequate rate of return on shareholder funds."

The new commercial model for science transformed the relative autonomy of public sector scientists by excluding them from the policy process and forcing them to compete for funding in contestable pools designed to simulate market conditions, removing the near total monopoly on research provision and funding allocation that the DSIR had sustained for more than forty years. The reforms established an unprecedented degree of central government control over state-funded research, with researchers now "dependent on a funding system which offers them very little autonomy in setting research agendas and controlling budgets, and alternative opportunities for public good research are limited" (1997: 797). While the government produced many reports advocating for different degrees of the application of market principles to science funding, as Edmeades argues, "there was no formal analysis and discussion as to whether the commercial model was appropriate to science … it was simply assumed that the only alternative to the public service model was the commercial model" (2004: 87).

Many commentators have identified the erosion of scientific autonomy as a significant and undesirable consequence of the New Zealand science reforms (e.g. Edmeades, 2009; Robinson, 2015; Galbreath, 1998, 2017; Hendy, 2016; Cartner and Bollinger, 1997). As Galbreath puts it, it was a shift from "scientists on top" to "scientists on tap" (2017; 169). Significantly, managers were hired who copied the methods of businesses and this, combined with the loss of traditional institutional allegiance, changes in employment conditions, and the challenge to traditional disciplinary identities meant significant discontent for many researchers and research managers (Halliwell and Smith, 2007: 378).

But the history of the DSIR sketched above shows that state-funded scientific research in New Zealand, from very early colonial-era science, has been overwhelmingly productivist, utilitarian and focused on primary industry (there are exceptions, such as DSIR's wartime and postwar research in nuclear science and radar technology). So DSIR researchers never possessed autonomy in the sense they were free to pursue curiosity-driven 'blue-sky' research, but they did have relative autonomy in Bourdieusian terms, and this relative autonomy included both technical autonomy, based on complex theoretical and methodological knowledge, and relative socio-economic autonomy, based on the previous system of bloc funding that afforded the DSIR significant agency in setting its own priorities and apportioning funding across its own departments and independent research institutes. More specifically, the New Zealand science reforms removed the relative socio-economic autonomy of science which had been institutionalised within the DSIR. The removal of relative socio-economic autonomy has flow-on effects for technical and disciplinary autonomy. Quoting Cartner and Bollinger, "… the previous New Zealand science system gave a large degree of autonomy to both universities and government science agencies. The new system is much more restrictive: the content of publicly funded research is closely defined within the priorities framework; and the conduct of research is subject to much greater government control" (1997: 790).

4.4 Stabilising the neoliberal regime

In their critical account of the New Zealand science reforms, Cartner and Bollinger emphasise the "remarkable" absence of effective resistance from scientists and their representatives (1998: 96). They write:

> Accepting that the science reforms in New Zealand are as radical as they appear (and we do not think this is contentious), the success with which they have been implemented is remarkable. 'Success' here is meant in the sense that the reforms are in effect, they have raised very limited controversy; they have been implemented with at least the acquiescence, if not always the full cooperation of the scientists and science agencies involved, and funding as been guaranteed for the next five years" (1998: 798).

Although the New Zealand Association of Scientists, the Royal Society, and the Public Service Association lobbied hard against redundancies and funding reductions, their concerns tended to be framed as "reflecting the immediate self-interest of a disaffected group" in official deliberations (Cartner and Bollinger, 1998: 785). The government's 'sinking lid' policy that had begun in 1976, the annual decimation of government R&D expenditure beginning in 1984, and the absence of clear alternatives to the market philosophy emanating from Treasury (along with the looming possibility of further funding and resource cuts) had a powerful disciplinary effect, placing scientists in a "double-bind situation, balancing a desire and need for continuing increased public funding against possible threats, perceived or real, to their scientific activity, autonomy and integrity" (Cartner and Bollinger, 1998: 785).

As we will see, this "double-bind situation" is now an objective component of the publicly funded science field in NZ, and has become an observable component of the habitus of

many high profile ecologists working across RMA spaces. The impact of the 25% per annum reduction in public funding for the DSIR that began in 1984 was exacerbated by the rampant inflation that the New Zealand economy was suffering during this period, with New Zealand's gross expenditure on R&D as a percentage of GDP falling from 1.4% in 1981 to 0.91% by 1989 (Palmer, 1994, as cited in Davenport and Bibby, 2007: 183). Therefore much of the lobbying of the NZAS and Royal Society during the early years of reform was focused on securing their share of public funding, which they were able to do only after significant budgetary depreciations (Cartner and Bollinger, 1997: 795). As noted above, the neoliberalisation of New Zealand's public sector is unique chiefly because of the speed, vigour and uniformity of its application. Within such an environment, where short-term cost reduction is the primary goal and there are no alternatives, it is not at all surprising that Cartner and Bollinger reported "an essentially expedient and pragmatic approach among all involved, including scientists, many of whom have faced considerable disruption and insecurity, and who must work within the prescribed framework" (1997: 796). Moreover, the accountability measures established for CRIs functioned "not only to enhance efficiency and value for money, but [are] also [designed] to demonstrate this to be the case" (Cartner and Bollinger, 1997: 797).

Nevertheless, a number of commentators reported a brief period of optimism following the reform period. Despite the immense disruption for individual scientists and greatly reduced resources compared with the old DSIR operating budget, it was said that "New Zealand science appears to have a sense of direction and certainty" (Davenport and Winsley, 1996; cited in Cartner and Bollinger, 1997: 798). Former Minister for Research, Science and Technology, Margret Austin commented that the policy/provider split and the administration of contestable funding by FRST meant "a stronger strategic direction to the Crown's investment in science and technology" (Austin, 1999: 361). McGuinness cites Palmer's (1992) claim that "there was a real sense that consistent government disregard of the science sector was coming to a close" (McGuinness, 2009: 23). However, as Cartner and Bollinger (1997: 798) point out, within the new system CRIs have a clear interest in

demonstrating success, and the new model did not “accommodate continuing debate as to whether the direction, criteria for certainty, and foundations are sound.” The privileging of short-term economic objectives meant that concerns regarding the quality and conduct of scientific research were rendered marginal.

In 1993, universities were allowed to compete with CRIs for access to the Public Good Science Fund (PGSF). New funding pools were established to fund areas not covered by the PGSF, including The Marsden Fund (1994), the Technology New Zealand Fund (1997) and the New Economy Research Fund (2000). Since 1992, CRIs had some form of “non-specific outcome” funding, although the scale of this funding was very small, averaging 5-10 per cent of CRI income up to 2011 (MBIE, 2016: 8). FRST's view was that contestable funding represented “natural justice” by granting all parties equal access to funding resources and therefore, in theory, avoiding 'bureaucratic capture' (FRST, 2005: 4, cited in Davenport and Bibby, 2007: 184) Reliance on contestable funding caused numerous difficulties for CRIs throughout the 90s and early 2000s, in particular a lack of financial stability consequent of the shifting priorities of MoRST, which could change year-to-year and "leave researchers without financial resources before projects had reached completion" (McGuinness, 2009: 24). FRST’s attempt to implement the annual science policy instructions formulated by MoRST imposed a "political time-scale on [scientific research]”, which “caused major uncertainty about the criteria applicable to funding proposals each year and possibly led to the submission of risk-averse ‘safe-science’ proposals to maximise chances of continued funding” (Davenport and Bibby, 2007: 184). Large, semi-independent research organisations that had relied on DSIR block grants, such as the Cawthron institute, struggled to survive during this period.

An unstable funding environment meant that CRIs had to work quickly to diversify income sources (Davenport et al, 2002), with some CRIs creating overseas subsidiaries (CCMAU, 2005, cited in Davenport and Bibby, 2007: 185). A few CRIs reduced dependency on government funding (in particular AgResearch and Plant & Food Research, which continue

to be the largest and most commercially connected of the 9 CRIs) somewhat ironically led CCMAU to question whether some institutes might develop beyond the remit of government science policy (CCMAU, 2005; in cited in Davenport and Bibby, 2007: 185). CCMAU was primarily concerned that offshore commercial research agreements would have an adverse effect on CRI's relationship with local industry, and the potential that New Zealand taxpayers were subsidising research and intellectual property for commercial enterprises overseas which may compete with domestic industry (CCMAU, 2005, cited in Davenport and Bibby 2014: 186).

Scientists were concerned that while the new system had reduced costs, it had not enhanced the institutional conditions necessary for quality research. In October 2006, more than 700 scientists signed an open letter to the Minister of Science, Research and Technology, "expressing concern that New Zealand's research capability is being jeopardised by current research structures and funding strategies" (Scoop, 28 October 2006). Among a range of concerns related to science funding, the signatories noted a "drift of the CRIs towards science consultancies" (The Open Letter Group of Scientists, 2006, quoted in Davenport and Bibby, 2007: 186). Some observers argued that increasing commercial activity, particularly offshore commercial activity, may conflict with Section 5 of the CRI Act, which instructs CRIs to both undertake research for the benefit of New Zealand, and to facilitate the application, results and developments of research (Davenport and Bibby, 2007: 186). Edmeades argued that the application of contestability and contract theory to publicly funded research had produced a series of conflicts of interest that were damaging the integrity of science itself,

> Particularly in respect to a.) the independence and objectivity of science (profit motive v the national interest), b.) accountability (public v private good), c.) measurement (financial v non-financial performance) and as a consequence, d.) human resources (service to science or to a company?) (2004: 89).

While the contestable process for funding has been replicated globally, few countries applied contestability to science funding as vigorously as New Zealand, with Anderson noting that by 2006 the New Zealand science system had the highest level of contestability in the OECD (Anderson, 2006). By the mid-2000s, MoRST and FRST had begun the protracted task of attempting to reconcile the principles of contestable funding with CRI's need for long-term financial stability. The Outcome Based Investment (OBI) initiative launched in 2004 was the first such attempt, under which a CRIs would agree on specific research outcomes to deliver over a twelve-year period (McGuinness *et al.*, 2009: 24). Rather than enhancing stability, MoRST's own assessment found that the OBI increased competitiveness, disincentivized collaboration and potentially "locked out" researchers for a longer period of time compared to the existing funding system (McGuinness, 2009: 24-25). The OBI was cancelled after one year and was replaced in 2006 with the Stable Funding Environment (SFE) initiative. Under the SFE, a portion of contestable funds was separated into a pool of negotiated funding. Researchers were asked to negotiate a research timeline and output with FRST, which would provide ongoing funding for an agreed period of time. The SFE also involved the creation of 'research platforms' (also called 'research hubs' and 'research units'): areas of priority research specified by MoRST which were allocated a set amount of funding for a seven to ten year period (McGuinness, 2009: 30).

In 2008 the media was reporting on "growing resentment among the country's scientists" (NZ Herald, 19 March 2008). The Royal Society had released a "Science Manifesto" which revealed deeply felt dissatisfaction, in particular with "the excessive weight of competition between would-be colleagues, excessive and distracting compliance costs that compromise the productivity of research [which] reduces the effectiveness of scientific research, demoralises scientists, and restricts the appeal of science to coming graduates of students" (Royal Society, 2008: 3-4). Much of this resentment was directed at FRST, which the New Zealand Association of Scientists maligned as "… an empire unto itself, administering a fragmented, complicated, changeable and jargon-ridden bureaucracy" (NZAS, 2008: 2). In 2009, a MoRST review of the SFE found that while research platforms had provided an

increased level of direction and stability for specific projects, the combination of contestable and negotiated funding had failed to achieve the goal of stability for CRIs (McGuinness, 2009: 30). For Davenport and Bibby, “contestability was being framed as the opposite of stability and that ‘too much’ contest ability is not a good thing” (2007: 188).

By 2010, the CRI Taskforce established by the new centre-right government led by John Key could bluntly state that "competition had achieved all it could for CRIs” (CRI Taskforce Report, 2010). Although the taskforce acknowledged that contestable funding “drives dynamism and creativity”, it recommended that a significant portion of CRI funding be allocated directly and on a long-term basis (MBIE, 2016: 5). The high level of contestable funding was said to render CRIs vulnerable as businesses, creating uncertainty and undermining their ability to act strategically (MBIE, 2016: 8). The taskforce also recommended disestablishing the tri-institutional framework and combining funding, policy and governance functions into a single government entity. In response to the Taskforce’s recommendations, the Government introduced core funding in July 2011. The amount of core funding granted to each CRI in 2011 was based on historic contractual commitments, largely from existing contestable funds (MBIE, 2016: 9). Approximately 67 per cent of Ministry funding directly received by CRIs in 2010/11 was converted to core funding. CRI core funding totalled $202m across all CRIs, equating to around 33 per cent of CRIs’ total revenue in 2011, but with a high degree of variability across CRIs (MBIE, 2016: 10). MBIE argued that core funding would allow CRIs a measure of autonomy which would better "enable them to respond, align and manage their research activities.” However, this new measure of partial financial autonomy had nothing to do with scientific autonomy, but rather "This is consistent with them being autonomous companies subject to the Companies Act 1993” (MBIE, 2016: 11).

CRI core funding was implemented alongside changes to CRI’s performance expectations with the aim of increasing partnership between publicly employed scientists, both with each other and with the private sector, and a more systematic measurement of scientific

performance to ensure that funding is meeting its objectives (MBIE, 2016). In 2011 the FRST was merged with MoRST to form the new "business-facing" Ministry for Science and Innovation (MSI), which took over the policy and investment functions of both agencies. In July 2016, MSI was again subsumed with The Department of Building and Housing, The Department of Labour and The Ministry of Economic Development to form a new 'super-ministry', the Ministry for Business, Employment and Innovation (MBIE).

Commentators noted the striking absence of the words 'research', 'technology' and 'science' from the new Ministry's official title (Leitch *et al.*, 2014, p. 18). A joint press release from Economic Development Minister Steven Joyce and State Services Minister Jonathan Coleman was notable for the complete absence of the word science (Coleman *et al.*, 2012). Similarly, the Prime Minister's announcement speech made it clear that the primary role of the MBIE would be to help build "a more competitive and productive economy" and that combining agencies will "enable businesses to better engage with government" (Key, 2012: 8). Joyce *et al*. emphasised the cost-recovery benefits of the new Ministry, claiming that "In the medium term, we expect the new ministry to deliver savings through the consolidation of corporate services of about $5 million to $6 million a year, and of policy capability of about $2 million to $5 million a year (2012, p. 1). In their analysis of New Zealand science-policy discourse, Leitch *et al.* (2012, p. 5) found that between 1992 and 1999, the discourse of New Zealand science policy "fluctuated between an emphasis on 'excellence'- whereby science is measured against international benchmarks - to an emphasis on 'relevance' - whereby science is measured by its ability to generate practical outcomes". The discourse emanating from the newly-founded MBIE led Leitch *et al.* to question whether established definitions of 'science' were being fundamentally transformed through "structural changes that have blurred the boundaries between business and public science organisations" (2014: 19).

The Key National Government did increase science funding through the Strategic Science Investment Fund (SSIF), established in 2016, investing $410.5 million over four years in

science and innovation through the Innovative New Zealand package, and the SSIF – worth nearly $250 million per year (MBIE, 2016: 7). Between 2015/16 and 2019/20, the SSIF has invested $1,488 million, with 97 percent allocated to CRIs in the years 2016/17 to 2018/19. This proportion dropped to 91 per cent in 2019/20 when other platforms, including independent research organisation (IRO) capability funding, were transferred into the SSIF mechanism and $17 million was allocated to universities.

The Future Pathways Green Paper, a major review of the science funding system committed by MBIE, found that despite funding increases, contractualism and contestability still causes financial precarity for CRIs, as well as "unproductive competition across all organisations in the research system" (MBIE, 2022: 2). MBIE notes that despite the recommendations of the 2010 CRI Taskforce, "research institutions in New Zealand have largely remained within the same operational form and design as established in the early 1990s" (MBIE: 2022: 2). The Greenpaper's description and critique of the current funding system closely resemble the findings of the 2010 Taskforce, including:

- A fragmented system that encourages unproductive competition and a lack of integration between CRIs, universities and other research bodies.
- A proliferation of competing governance strategies and priorities which struggle to connect directly with funding.
- Weak connectivity between researchers, organisations and the public.
- Weak system responsiveness to Māori (MBIE, 2022: 18).

As Welch has noted, neoliberalisation is not only a strategy of "lean production" but also "lean reproduction", meaning diminished or eliminating the provision of the services and resources that undergird public and private productive capacities (Welch, 2015, p. 54-65). In comparison to other OECD countries, New Zealand still under-invests in industry related research, with gross domestic spending on R&D only increasing from 2.085% of GDP in 2000 to 2.691% of GDP in 2020 (OECD, 2020). New Zealand has always ranked poorly in the OECD's R&D expenditure rankings, and today sits at 17th place (OECD, 2021). This

under-investment is exacerbated by low-levels of private sector R&D investment, which has not changed significantly as a result of reforms (OECD, 2021, 2020). It has been argued that low private sector R&D expenditure is a reflection of New Zealand's industrial structure, which lacks a domestic manufacturing base, is economically dominated by primary industry producing agricultural commodities for export, and numerically dominated by small and medium-size enterprises (Davenport and Bibby, 2007: 183). The OECD, for its part, argues that "industry composition explains only a small part of the shortfall from the OECD average" (OECD, 2017, p 117). However, there is a circular, zombie-like pattern to the OECD's discourse on such matters. From the OECD's perspective, limited innovation, low investment in new technologies, and the low private sector contribution to R&D is both a cause *and* effect of the decline in manufacturing (OECD, 2017). Such accounts render the NZ government's own responsibility for "stripping away support from the stagnating productive sector" through unilateral trade and investment liberalisation and inflation-targeted monetary policy (Kelsey, 2015, p. 59) outside the realms of legitimate policy discourse. On this interweaving cause and effect, Kelsey notes, "embedded neoliberalism requires broad coherence across the regulatory domain" (2005, p. 140).

Bourdieu's attention to the totality within which field-specific dynamics unfold, his notion of meta-capital, contextualises this set of higher level instruments that regulate the state's ability to regulate; the "meta regulation" that allows pro-market governance to become normalised and largely invisible within routine policymaking across public institutions (Morgan, 1999). Without losing sight of this totality, two abiding themes are evident in the OECD's commentary on NZ private sector R&D: publicly employed scientists need to partner up more effectively, both with each other and with the private sector, and the agencies of central government need to more systematically measure scientific performance to ensure that funding is meeting its objectives (OECD, 2015, 2017, 2010, 2021). As detailed above, these have been among the central objectives of the science reforms that have now been ongoing for more than two decades, objectives that have yet to be met. While business-based R&D spending in New Zealand remains among the lowest among small,

advanced economies (OECD, 2022: 53), within New Zealand, the low level of industry contribution to science funding is rarely discussed openly in science-policy realms.

As a Bourdieusian-influenced analysis of the prevailing logic of neoliberal metacapital would anticipate, nor have the science reforms substantially increased collaboration. The New Zealand Productivity Commission notes that knowledge transfer and research collaboration from Crown Research Institutes and universities remains weak, and there are minimal financial incentives for university researchers to engage in applied research (NZ Productivity Commission, 2021). The OECD argues that New Zealand's science funding mechanisms still do not provide sufficient incentives for knowledge transfer, noting that only two out of seven Crown Research Institutes - AgResearch and GNS Science - have substantial industry funding shares, which are focused on land-based industries and geothermal technologies (OECD, 2022: 57).

While the OECD has generally been enthusiastic in its support of the reforms that created the CRI system (and the wider reforms to NZ's public sector), it has repeatedly criticised the government's lack of long-term monitoring and evaluation. For example, a 2008 report dryly notes that while New Zealand governments have shown determination in adopting "international best practices", "this appears to have been done to the detriment of some pragmatism in ensuring efficacious implementation" (OECD Reviews of Innovation Policy: New Zealand 2007). In its 2017 'Public Governance Reviews: New Zealand', it observes that while New Zealand had made significant progress in "modernising its public sector through a range of reforms", there had been limited evaluation of the long-term impact of these changes (2017, p. 4). The OECD also noted that "New Zealand's focus on short-term performance targets and on reducing costs in the public sector could have unintended negative consequences", such as the erosion of public trust in government institutions and the underinvestment in key areas of public service provision (2017, p 15). The report emphasised the importance of taking a more strategic and long-term approach to public

sector reform, with a greater focus on "promoting social and economic well-being" (2017, p. 16).

Jack and Diane Sommer headed-up a series of anonymised surveys of New Zealand scientists and technologists in 1996, 2000 and again in 2008 which are "remarkable for the consistency in responses over time" (Sommer, 2010, p ii). In both the 1996 and 2000 surveys, Sommer *et al.* reported "stunning levels of dissatisfaction with New Zealand's science and technology reforms" (see 2010, p 1-5 for an overview and comparison of the findings of the three surveys). These surveys reveal longstanding and increasing concerns over issues such as "interruptions to research funding" and "bureaucratic accountability" (2008, p 5). The survey found that interruptions to funding are "particularly acute among agricultural and soil, physical and biological scientists", with CRI scientists twice as likely to cite interruptions as university scientists (2010, p. 13). Concerns regarding the funding stability had intensified between 1996 and 2010 (17.5% and 24.2% and respectively) (2010, p. 14). Sixty one percent of respondents either disagreed or empathetically disagreed with the proposition that government science strategy is "open and inclusive of a large segment of New Zealand scientists" (2010, p. 23).

The surveys also suggest that scientists have a general and increasingly skeptical attitude towards the government's role in setting science agendas, with 68.5% of university scientists disagreeing that governments should set broad research agendas, and 37.3% of CRI scientists disagreeing (the level of disagreement in both sectors increasing since 1996) (2008, p 5). Seventy percent of respondents in both the 1996 and 2008 surveys disagreed with the statement "The management mechanisms now in place are appropriate for the effective enhancement of research" (Sommers, 2010, p 15). Only 26.7% of CRI scientists said they would recommend science as a career, compared to 43.8% of university scientists (2008, p. 33). A summary judgement as to whether New Zealand science is "headed in the right direction" received a majority negative response of 53.5% from CRI scientists, compared

with 30.9 % for university scientists. Overall, dissatisfaction remained highest among CRI scientists (Sommer, 2010, p. 20).

In addition, a 2014 NZAS survey of 384 scientists, half of whom work in CRIs, found that 40% of scientists feel "gagged" by management policy and the fear of losing funding (NZAS, 2014). Then President of the NZAS, Dr Nicola Gaston, commented that industry often forbids scientists from disclosing the results of their research, especially if that research is commercially funded and produces results undesirable to the funder (Gaston, 2014, as quoted in Saprong, 2022, p. 2). Hendy (2016) has argued that this 'gagging' is a consequence of the reliance many CRIs have on industry funding, citing Fonterra's 2014 botulism scare, during which scientists within AgResearch were barred from speaking to the media, despite high levels of justified public concern (2016, pp 11-35). Hendy argues that not only can these funding agreements skew research, but they can see scientists locked up in confidentiality clauses that prevent them from talking about their work publicly (2016, pp 59-80). In 2020, the New Zealand Association of Scientists called for a review and renewal of the entire CRI system, arguing that CRIs are "overly business-orientated at the cost of some of the driving motivations for their existence" (NZAS, as quoted in Koolen-Bourke and Peart, 2012, p. 126). The New Zealand Public Service Association has made similar criticisms, calling for amendments to the Crown Research Institutes Act to ensure that scientists employed in CRIs have similar rights of academic freedom as those enshrined in the Education and Training Act (Interviews with CRI and university scientists undertaken for this study strongly support Gaston and Hendy, and suggest this 'gagging' effect also arises from institutional culture, the attitudes and perceived interests of management bureaucracy, professional networks and 'behind the scenes pressure' enacted by industry heads and politicians on both CRI and university managers.

The tensions and contradictions that are now a structural component of NZ's science system have disrupted the relation between many working scientists' disciplinary habitus (still mostly formed within universities) and the institutional positions and broader funding and

policy fields they must now work within. This misalignment between scientific dispositions and institutional positions has introduced an inevitable misfit or gap between habitus and field which has led to the various negotiations, improvisations and compromises that working scientists are forced into, as well as an observably enhanced reflexivity displayed by many rank and file scientists in relation to the shifting *nomos* of their field.

4.5 Mātauranga Māori vs. western science

While the history of New Zealand science has predominantly been told from the standpoint of the history of 'western science', science did not arrive in New Zealand with the first western explorers and scientific observers. In 1868, the Governor of New Zealand, George Bowen, commented that "it might be said that every colonist in a new and unexplored country is, unconsciously, more or less a scientific observer" (Bowen, 1868, cited in McGuinness, 2009 et al: 3). Governor Bowen was of course referring to the idealised 'pioneering spirit' of Pākehā settlers, but Māori had already developed a rich, interlocked and transmissible body of knowledge generated over approximately six centuries of continuous occupation prior to first contact with Europeans.

Belich suggests that Māori would have developed an oral cartography of New Zealand, including prime hunting and cultivation areas, as well as the location of valuable raw materials and minerals "…from Far North to Deep South within a century or so [after first settlement]" (1996: 64). During the early phases of European colonisation, Pākehā relied heavily on mātauranga Māori for local knowledge, food, resources and safety, and Māori were quick to recognise the benefits of literacy, technology and trade (Belich, 1996; Salmond, 1997). At this time, the Māori knowledge-system encompassed, among other things, an extensive understanding of New Zealand's flora and fauna; sophisticated navigational systems, astrology, shipbuilding, architecture, accurate geological knowledge

systems, elements of mariculture and pharmacology, as well as cultivation techniques based in a complex understanding of regional soil and climatic conditions (Belich, 1996; Howe, 2006). This knowledge was embedded in complex social structures and customary resource management regimes (Palmer, 1994). As Belich emphasises, “The picture of 'gathering' as an ad-hoc, hand-to-mouth activity is false, for New Zealand at least. Exploiting ‘nature's bounty’ was a matter of foreknowledge, planning and complex processing …. An all year round living could be wrested from New Zealand nature … but it took immense effort and organisation, aimed at a wide range of targets" (68-69). At the point of Tasman’s arrival in New Zealand, many Iwi were prospering as a result of complex intertribal trading networks and the effective exploitation of marine resources and horticulture. Māori had developed land-use systems tailored to the New Zealand ecosystem that had been modified in response to the catastrophic resource depletion and fauna extinction in the first centuries of Polynesian settlement, and these systems were generationally transmitted through oral histories and genealogies (Wehi *et al*, 2019).

As colonisation proceeded, the policy of assimilation was introduced to eradicate most aspects of Māori culture, language and knowledge, and mātauranga Māori was ether rendered invisible or relegated to the status of mythology - something of great interest to social historians and anthropologists - but of little relevance to the physical sciences (see Campbell, 2020: 83-118; Walker, 2016). Both Māori knowledge and knowledge generating practices were positioned as either highly inferior to ‘western science', or an anachronistic remnant to be overcome by assimilation.

Over recent years scholars within and on the boundaries of the physical sciences have become increasingly aware of the value of Traditional Knowledge (TK), Indigenous Knowledge (IK), or Traditional Ecological Knowledge, amongst other terms (Nicolas, 2018). In New Zealand, mātauranga Māori has only recently gained a level of recognition within scientific and policy fields for encompassing knowledge comparable or complimentary to the scientific method and/or science-driven sustainability policy. Moreover, tikanga Māori

increasingly represents a corrective to the productivist ethos, the limitations of the ecological modernisation project embodied in the New Zealand RMA, and as a potential paradigm shift in environmental policymaking (Muru-Lanning, 2020; McIntosh *et al.*, 2021; Campbell, 2022). [25]

A number of key policy drivers over the past 30 years have enhanced Māori participation in freshwater and marine research, planning, policy and management. These include the Conservation Act 1987, the Resource Management Act 1991 (RMA) and the related National Policy Statement for Freshwater Management 2014, the Marine and Coastal Area (Takutai Moana) Act 2011 and the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 (Clapcott *et al.*, 2018, p. 458). The Waitangi Tribunal has made substantial criticisms of the New Zealand Resource Management Act for allowing "a serious degradation of water to occur in many ancestral water bodies", highlighting the government's failure to recognise Māori rights and interests in water (Waitangi Tribunal, 2021). In turn, these policy drivers should be understood within broader political and historical context of the Māori Renaissance and the evolution of the Māori protest movement since the early 1970s, a movement broadly concerned with reasserting Māori rangatiratanga (sovereignty) over culture and language, seeking redress for the colonial theft of productive resources, defending and extending the principles of Te Tiriti across the state sector, and integrating the perspectives of tangata whenua and the values of kaitiakitanga (guardianship) into resource use decision making (O'Malley, 2009; Wheen, 2013; Clapcott *et al.*, 2018). In both freshwater and co governance spaces, these shifts have themselves been driven by experienced and effective Māori legal activists who work across multiple policy, legislative and governance fields, such as Margret Mutu, Jacinta Rutu, Annette Sykes and Mahina-a-rangi Baker, to name just a few key agents.

[25] Tikanga Māori translates roughly as 'Māori values'. Within Tikanga Māori people are not considered dominant in the world; instead all parts co-exist equally. Therefore, natural resources cannot be owned individually, rather iwi live by the principle of kaitiakitanga (obligation to nurture and care). Natural resources are considered tupuna (ancestor) and as part of this relationship they are responsible for its care and protection. This principle of kaitiakitanga (guardianship) flows from the Māori understanding that the environment is part of their broader family. They refer to this as whanaungatanga (kinship) which encompasses the relationships between people living and dead, the environment and the spiritual world.

While there has been a modest increase in Māori scientists from 0.7% in 1996 to 1.7% in 2008 (the most recent available survey data is from Sommers, 2008), Māori were and still are underrepresented in New Zealand science. Māori also face a series of constraints to meaningful advice and decision-making roles in science policy formation (McIntosh et al, 2022). The Vision Mātauranga (VM) Capability Fund was established in 2010 to "strengthen capability, capacity, skills and networks between Māori and the science and innovation system, and increase understanding of how research can contribute to the aspirations of Māori organisations and deliver benefit for New Zealand" (MBIE, 2021). In August 2018 the government established Kahui Wai Māori (the Māori freshwater forum) with the intention of "bring[ing] perspectives, insights and skills from a wide range of Māori society" to freshwater governance problems and the design of the 'Three Waters' legislation that was to replace the NZ RMA in 2023 (MfE, 2023 8). The members of the forum are ministerially appointed and serve a mostly consultative and advisory role with a strong ecological focus, with the core aims of: 1. Stopping further degradation and loss of freshwater resources, 2. Reversing past damage and 3. Addressing water allocation issues (MfE, 2018: 5). Today, the majority of national science programmes now contain research informed by VM policy and over 140 VM Capability Fund projects were granted between 2013 and 2018 (Clapcott, et al, 2017: 459). Moreover, the Kahui Wai group was instrumental in establishing Te Mana o Te Wai, a new hierarchy of water use values that places river ecosystem health above both human health and economic values (MfE, 2023). The process of establishing Te Mana o Te Wai as a central component of the sixth Labour government's National Policy Statement of Freshwater (2020), as well as its significance in relation to national and regional freshwater management is explored in s5.3.3 of Chapter Five.

Despite the growing public, academic and political awareness of the value and relevance of traditional knowledge systems, some scientists in New Zealand have adopted a reactionary stance in the face of the growing symbolic capital of mātauranga Māori. For example, in July 2021 a group of seven academics from the University of Auckland published an open

letter entitled “Defending Science”, in which they criticised an NCEA discussion paper that called for the inclusion of elements of mātauranga Māori in secondary school science curriculums (NZ Listener, 2021). The letter resulted in intense public controversy, and The New Zealand Tertiary Education Union, The Royal Society Te Apārangi and the New Zealand Association of Scientists all released statements critical of the Listener letter. After receiving five anonymous complaints, The Royal Society launched an investigation against two of the letter’s coauthors, ultimately deciding against disciplinary action "by reason of [the letter] demanding the open-ended evaluation of contentious expert opinion or of contested scientific evidence amongst researchers and scholars” (NZ Royal Society, March, 2021). One of the letter’s coauthors, psychologist Micheal Corballis, later acknowledged that "Some of mātauranga Māori is science” and that the intention was not to characterise Māori knowledge as "inferior”, but reaffirmed his concern that "unscientific" elements, such as creationism and spiritualism, may be given parity with the natural sciences in classrooms (Sadler and Forbes, August 2021).[26]

[26] While Corballis maintained that the authors did not wish to present mātauranga Māori as “inferior” to western science, he notes that while pre-colonial Māori made some significant scientific discoveries, these have been largely superseded: "Nowadays we have GPS. The science of navigation has proceeded a long way beyond what those early navigators did … The thing about science is it changes, it progresses. At the time, they were as good scientists as anyone… As navigators, they were terrific. But navigation now has moved light-years beyond that” (Sadler and Forbes, August 2021). On one hand Corballis is making a seemingly uncontroversial argument: spiritualism and creationism are outside the domain of the physical sciences. On the other, by appearing to define mātauranga Māori as a primitive form of utilitarian practical science, Corballis comes very close to echoing the outmoded evolutionary scientific universalism epitomised by James George Frazer’s The Golden Bow (2020), the central argument of which is that indigenous religions and knowledge-systems are a primitive form of western scientific rationality. Given that The Golden Bow is mostly viewed by social scientists today as a symbol of the limitations (and arrogance) of an unreflexive colonialist anthropology, it is unsurprising that such comments caused offence.

Leaving aside the issue of creationism, it seems a central issue is the fact mātauranga Māori combines values and facts, which is not antithetical to ‘science’; more specifically, it is incommensurable with positivist or empiricist definitions of science (other New Zealand academics have sought to “defend science” using a similarly universal positivist framing, such as Edmendes in his (2004) critique of the science reforms that lead to the creation of CRIs). Corballis argues that he is only “defending science” and had no intention to devalue mātauranga Māori (Corballis, quoted in Sadler and Forbes, August 2021). But it could be countered that the universalising and positivist mode of discourse Corballis employs in this "defence" had the effect of intensifying the binary between indigenous knowledge and 'western' science, and tacitly reduces mātauranga Māori to primitive form of utilitarian applied science: contextually impressive, historically interesting, culturally significant, embedded in the past and of limited relevance today. From a sociology of science perspective, which, beginning with the work of Merton, problematises the separation of facts and values (discussed in Chapter 2), it would seem Corballis is actually defending the notion of positivist applied science, which - while it accurately describes widely shared dispositions of many scientists and science commentators

While VM is increasingly integrated into science funding processes, Campbell has observed that there are various practices that science practitioners use to 'manage' VM elements:

> "…. various administrative manipulations ensure VM is 'present' but not 'influential' in the operation of 'good science.' Consequently, science programmes tend to compartmentalise VM elements into the 'social', 'values', or 'applied outcomes sections' - anywhere except those aspects that determine core research ontologies" (2021: 133).

The 'management' of VM elements has also been documented in a 2009 MoRST evaluation report on Vision Mātauranga and the Māori Knowledge and Development Research output class (MKDOC) in 2009. It found that "the influence of Vision Mātauranga within research organisations was limited", and "its primary use was as a document that informed bids for research funding" (MoRST, 2009). This ministry evaluation was framed as "process focused", and "did not extend to a review of results of funded research". In a special issue of New Zealand Geographer dedicated to VM, Clapcott *et al* observed that in "the early years" of VM:

> … outcomes were arguably contrary to the original intent and marginalised VM to a 'cultural objective' rather than enabling Māori research of relevance to Māori… [But] more recently, VM has evolved to include more meaningful assessment criteria for government-funded research, ensuring distinct traditional and contemporary knowledge is valued and used in Māori communities according to their needs, aspirations and circumstances (Clapcott, et al, 2018: 459).

More recently, the authors of *Te Pūtahitanga: A Tiriti-led science-policy approach for Aotearoa New Zealand* (McIntosh *et al.,* 2022) have explicitly framed mātauranga Māori as a potentially transformational paradigm shift in environmental policymaking, the first sentence of the report stating that "there is growing acknowledgement that drawing on a

in New Zealand - is itself culturally constructed and only one among multiple competing notions of what science should be and do.

singular, Western knowledge system to address complex challenges, such as climate change, is a folly" (2022: 9). Te Pūtahitanga maintains that the COVID-19 pandemic demonstrated that mātauranga Māori is still undervalued, under-resourced and the science-policy interface leaves little "obvious" room for Māori participation or leadership, noting that "… this is perhaps unsurprising given that Aotearoa's political and science systems have largely failed to recognise Māori as innovators, scientists or policymakers" (McIntosh *et al.*, 2022, p. 17). The report chastises the government for its "negligence" in "not evaluating the Vision Mātauranga policy over the 15 years it has been in place", arguing that "neither Māori nor funders are currently able to identify how, where or to whom investment in Māori research is allocated, nor what transformational impacts are being derived" (2022: 34). Te Pūtahitanga identifies a series of structural barriers to Māori participation in and leadership in science-informed sustainability policy, including under-representation within the university workforce, institutional racism, and a tokenistic approach to the funding and integration of Mātauranga Māori, where Māori expertise is often "diluted" by policymakers (McIntosh et al, 2022). Te Pūtahitanga recommended appointing Māori chief science advisors in key government agencies, creating Tiriti-based guidelines for science and innovation funding, and establishing an independent mātauranga Māori entity.

While VM is undoubtedly influencing the nomos of the scientific field in New Zealand and subsequently necessitated some contingent and partial reconfiguration of the habitus (or, at least the performance of scientific habitus) on the part of scientists and researchers, presently it seems that VM represents a partial science-policy or science-funding paradigm shift, or a shift towards a culturally-indexed epistemological pluralism, rather than a scientific paradigm shift *per se*. Interpreting the limited VM related literature, it seems VM is primarily used as a normative framework for academics and government institutions when addressing particular environmental problems or social issues, as a discursive guide for generating successful funding applications, and as a cultural framework to assist institutions or organisations partnering with Iwi (Campbell, 2021; MoRST, 2009, Jackson

and Dixon, 2007, Clapcott et al 2007; Kaiser and Saunders, 2022, McIntosh et al, 2022). For example, the authors of Te Pūtahitanga maintain that mātauranga Māori encompasses both values and knowledge aligned with existing scientific method, that “Techniques used to generate Mātauranga are often aligned with empirical methodologies rooted in observation but are explained according to Māori world views" (2022: 15). Here, mātauranga Māori obviously presents a challenge to normative expectations regarding positivist science and the epistemological separation of facts and values central to 'evidence-driven' policy in New Zealand, as well as the Environment Court's *Code of Conduct for Expert Witnesses* (2022) (discussed in more detail in s4.8.1). But there is obviously a very significant divergence in the way mātauranga Māori is understood, valued and used by researchers in different disciplines and institutions, and the way it is employed by policymakers and politicians. To use Zygmunt Bauman's most famous idea from *Liquid Modernity* (1999), it could be said that mātauranga Māori is 'liquified' insofar its symbolic capital within environmental governance spaces has increased, and this liquefaction aids the process of channeling Māori knowledge into policy making and science funding systems, losing any fixed meaning as it is displaced, appropriated and multiplied across different disciplinary and institutional fields.

As mātauranga Māori liquifies, the category of 'western knowledge' hardens (although, ‘western knowledge’, like mātauranga, is not substantively defined). [27] Despite the vocal

[27] There is a tendency for MM advocates to define “western knowledge systems” in reference to negative impacts on indigenous peoples. When applied to science, “western knowledge” often appears to stand-in for positivism, commercialism, productivism and the institutional structures that support them: some of the epistemic stances that characterise 'colonial science' in relation to contemporary politics of environmentalism and land use (for example, Liboiron, [2021] argues that the symbolic capital afforded to positivism and productivism within resource management law and policy in Canada is inseparable from the history and politics of colonialism). For McIntosh *et al.*, (2022: 17): "The mainstream science-policy model has several features that result in Māori exclusion. One is the embedded assumption that ‘West is best’. Within the RSI sector generally, there is a strong belief that Western science is universal and culture-free, and that it should be as values-free as possible. The place of science is distinguished from other policy inputs by its “relative objectivity obtained through formal processes designed to limit bias in data collection and analysis.” It is the belief in objectivity and universality that enables Western scientists to hold their own knowledge system above others, often in a non-critical way.”

In such accounts western knowledge and Māori knowledge are in a binary system: two theoretical opposites that reciprocally determine each other. Māori knowledge is Māori firstly because it is not western; western

and arguably misleadingly amplified criticisms from academics such as Corballis and Rata (NZ Listener, 2022), mātauranga Māori is increasingly becoming part of what Bourdieu (1988, p 65) would call the "*communis doctorum opinio"* of freshwater science and ecology in New Zealand - a 'learned common opinion' - particularly as some inclusion or awareness of the principles of mātauranga Māori are now included across central government science funding criteria. The forces influencing this shift are not just or even primarily coming from *within* science in the classically Kuhnian sense, but are being driven by Māori political agency partially external to (and both historically and contemporaneously excluded from) the operations of normal science. This is a process that can be analysed within a field-theoretic, both as a form of capital conflict and also as a component of disciplinary development relative to 'socially grounded necessities' (here, the 'socially grounded necessity' for central government to at least be seen to redress exclusion of Māori from scientific practice and policy, while also supplementing the diminishing political and symbolic capital of ecological modernisation as ideology). In regard to the latter, Bourdieu explains that,

> "In general fashion, the progression of academic disciplines … corresponds to the substitution of an academic necessity which is socially arbitrary for a social necessity which is academically arbitrary. Although academic knowledge tends to gain social recognition, and thereby also social efficacy, both of which increase as scientific values become more generally recognised … it can only receive its social force *from the outside*, in the form of a delegated authority able to use socially grounded academic necessity to legitimate its 'arbitrary' social values" (Bourdieu, 1988, p 64).

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knowledge is western insofar as it is not Māori. Within this binary system, western knowledge is first defined by what it lacks in comparison to Māori knowledge. For example, "The benefits and value of Māori science within a policymaking system comes from the manaakitanga that is Māori policymaking – it's caring for Māori communities but also for everyone else. That comes naturally from a Kaupapa Māori policy standpoint. We know the converse is not true when we think about Western policies" (McIntosh et al, 2022: 23). While there is obviously much truth in such criticisms, it could equally be argued that McIntosh *et al*. adopt the inverse discursive strategy to the authors of "Defending Science" (New Zealand Listener), upending the binary so that Māori knowledge occupies the dominant position and western knowledge is primarily characterised by its own lack. The 'liquification' of mātauranga Māori thus enables a naturalised redefinition by both the advocates and critics of mātauranga Māori, both of which place Māori knowledge in binary relation to western knowledge.

In relation to the protracted and politically fraught reform of New Zealand's legal framework for resource management, mātauranga Māori could be interpreted positively as a potentially forceful alternative to the ecological modernisation/green-growth paradigm that has dominated environmental governance in New Zealand since the establishment of the RMA (Jackson and Dixon, 2007). Or, more tentatively, the shift could be interpreted as the potential co-option of the symbolic capital of indigeneity by the state in order to discursively reframe and rejuvenate the ecological modernisation agenda: ecological modernisation *me te moko* (ecological modernisation with a 'Māori face'). While this section has focused on mātauranga Māori in relation to science provision and science funding, section 3.7.3 below discusses how Māori legal agency has reshaped environmental management law.

4.6 Tertiary reform and academic capitalism

The reform of tertiary institutions in New Zealand has occurred roughly parallel to the protracted reform of the public science sector, beginning with the Fourth Labour government's introduction of student fees in 1989 (Roper, 2018). Unlike the reforms that created CRIs, the RMA and the NZEnvC however, policies aimed at the partial commercialisation of the tertiary sector were met with significantly more energetic, focused and effective opposition from students and academic staff, and this resistance was largely enabled by the historic coalition formed between the largest university staff union, the Tertiary Education Union (TEU) and student associations across polytechnics and universities (Roper, 2018; Shaw and Russell, 2022). The ability for unions and student associations to sustain coordinated resistance against neoliberalisation was decisively curtailed by the introduction of the Voluntary Student [Association] Membership Act (VSM) by the centre-right National government in 2011, which stripped student associations of their financial and political autonomy (Kelsey, 2015, pp. 104-106; Roper, 2018; Nissen, 2019; Shaw and Russell, 2022). In the absence of a platform for coordinated

opposition, student associations have become increasingly apolitical and the TEU has reverted to a more limited focus, seeking to gain small improvements in academic working conditions and salaries within a neoliberal model that is now largely unquestioned in public or policy forums (Kelsey, 2015; Roper, 2018).

Like the DSIR and CRIs, New Zealand's eight universities are formally public institutions, and legally defined as 'not for profit' organisations whose mission is still defined in relation to public good teaching and research (MoE, 2021). And like the old DSIR, universities have *always* been involved in external partnerships with communities and industry (Shore and McLauchlan, 2012). Unlike CRIs, and in response to coordinated resistance from staff and students against the early phases of commercialisation, the social role of universities was explicitly defined in an amendment to the Education Act 1989 (Grant, 2021). Section 169 of the Education Act 1989 (repealed and replaced by the Education and Training Act 2020), statutorily enshrines universities' obligation to act as a "critic and conscience of society" (Education and Training Act 2020, s162). However, the degree to which university-business linkages have been institutionalised by universities themselves as part of deliberate strategies to convert academic capital into revenue has greatly diminished academic autonomy and has undermined this 'critic and conscience' role (Roberts, 1999; Kelsey, 2015; Roper, 2018; Shaw and Russell, 2022; Saprong, 2023).

Today the situation that tertiary institutions find themselves in largely mirrors the conditions that exist throughout the NZ publicly-funded science field and universities internationally, particularly U.K. and U.S. universities (Slaughter and Rhoades, 2001; Mirowski, 2011; Harlow, 2020). Responding to state disinvestment, universities have increasingly adopted market-like behaviours involving institutional and departmental competition for contestable external grants and contracts, endowment funds, university–industry partnerships, student fees and intellectual property and licensing agreements (Roper, 2018; Shore and McLauchlan, 2012). Most universities have invested in the creation of limited liability companies, such as Auckland University's Uniservices Ltd,

which allow institutions to channel public funds into high-risk commercial ventures free of the restrictions imposed by the State Sector Act 1988 (Shore and McLauchlan, 2012). If institutions are unsuccessful in generating sufficient external funding, there is no state-level recourse; they must do without - typically by a combination of rolling redundancies, 'voluntary' retirement, continual tuition fee increases, deferment of building maintenance, and the winnowing of critical staff and student resources (Slaughter and Rhoades, 2001; Mirowski, 2011; Kelsey, 2015; Roper, 2018). This financial instability has immense consequences for research autonomy, preventing researchers from setting their own research agendas, rendering public-good research marginal and largely irrelevant to research performance measurements (Mirowski, 2011; Kelsey, 2015; Roper, 2018), and has produced an observably fractured, misfit habitus amongst academics who formed their disciplinary habitus in a completely different tertiary environment. Moreover, continual financial instability has introduced high degrees of precarity into university staffing models throughout New Zealand universities, with the majority of teaching, grading and research assistant work delegated to tutors on either casual or fixed term arrangements (with contracts often reviewed annually according to projected student enrolment numbers), with minimal long or short-term employment security or avenues for career progression or development (Simpson *et al.* 2022).

Parallel to the transformation of science funding policy discourse examined by Leitch *et al.* (2014), tertiary policy has been increasingly framed in commercial language. As Roberts observed in the late 90s:

> "Education" has become a commodity, to be bought, sold, traded, and consumed. Competition between "providers" is explicitly fostered. Students become consumers of course offerings, and are expected to wander the educational "marketplace" making supposedly "free", "autonomous" and "rational" choices … Instead of educational processes, we now have "inputs", "throughputs" and "outputs" (as well as "outcomes"), with (ostensibly) clearly defined "pathways" (1999, p. 68).

The entrenchment of what Slaughter and Rhoades (2000) influentially defined as "academic capitalism" has been driven by long term declines in tertiary funding coupled with a neoliberal narrative in which both policymakers and university managers view tertiary education as a private good, rather than a right of citizenship, and "higher education policy is [treated] as a subset of economic policy" (Slaughter and Rhoades, 2000, p 4). Whereas university students were fully funded until the late 1980s, the fourth National government reduced funding to around 75% of total course costs per student by 1998 (Roper, 2018, p 16). University administrators responded with substantial annual fee increases during much of the 1990s and early 2000s (Roper, 2018, p. 19) which was accompanied by the introduction of strict parental income based means testing for student financial support by the Fifth Labour government (Kelsey, 2015, pp. 104-106). In 2002, the same Labour-led coalition introduced the Performance Based Research Fund (PBRF) system whereby institutes would not only be funded according to the number of student enrolments, but six-yearly assessments of the research productivity of academic staff members (Harvey, 2010). As well as vastly increasing the size of the managerial and administrative tier in universities (Hazeldean, 2014), this emphasis on the need for public sector management based on reporting, monitoring, and accountability mechanisms has transformed "universities into increasingly authoritarian and coercive spaces" (Roper, 2018, p. 25).

Public funding of 'the cost of provider-based provision' per Effective Fulltime Student Unit (EFSTU) declined from 71% in 2011 to 68% in 2016 (Shaw, 2017, as cited in Roper, 2018, p. 29). While this reduction was temporarily offset by a 38.4% increase in unsubsidised international student fee revenue during the same period, universities were forced to raise tuition fees to cover for the compounded decline in government funding (Shaw, 2017 as cited in Roper, 2018 p. 29). Average tuition fees rose by 25.5% from 2011 to 2016 (Shaw, 2017, as cited in Roper, 2018, p. 30). Overall, government spending on tertiary education as a percentage of GDP declined from 2.0% in 2011-12 to 1.7% in 2016-17 (MoE, 2017). By 2018, the Tertiary Education Union (TEU) estimated that "cumulative underfunding to the [tertiary education] sector reached $3.7 billion this year [2018] from 2009 levels" (TEU, 2018,

n.p.). An unintended consequence of winnowed student support combined with the exponential student fee increases was a decline in domestic student enrolments, with the total participation rate of domestic students declining from 12.5% of the total population in 2008 to 9.4% in 2016 (Roper, 2018, p. 31). An analysis of fifty nations with top-ranking universities ranked New Zealand fourteenth most expensive, averaging $8696 per student per annum (Keogh, 2019). The heavy reliance on unsubsidised international student tuition revenue meant that the travel and immigration restrictions in force during the COVID-19 pandemic wreaked havoc on universities' finances and led to a wave of redundancies and union-led strike action across the tertiary sector throughout late 2022 and early 2023 (Radio New Zealand, Nov 2022).

While many academic commentators have pointed to the erosion of research autonomy as a central and undesirable consequence of the tertiary reforms that produced the semi-commercial university (Kelsey, 2005, 2015; Edmendes, 2005; Robinson, 2015; Roper, 2018; Tie, 2021; Saprong, 2022), the critical importance of student associations in defending academic autonomy is almost always overlooked (Roper, 2018, is the exception that proves the rule). The Voluntary Student [Association] Membership (VSM) Act, introduced by the far-right and anti-union Act Party, greatly limited the ability of students to protest and lobby central government on tertiary policy and funding matters. Post-VSM, student associations could no longer charge membership fees directly to students (which was set at approximately $150 per annum). Instead, institutions now include this charge in student fee payments (Shaw and Russell, 2021; Nissen, 2018). While VSM did not reduce any costs for students, it did remove both the financial independence and the political autonomy of student associations, who are now unable to engage in any activity critical of their institutions without risking a cataclysmic loss of funding (Nissen, 2018; Roper 2018; Shaw and Russell, 2021). In a further attack on unionism and representative governance, the Education Amendment Bill (No. 2) 2015 removed student and staff representation on university councils, tipping the balance of power in university councils away from staff and students and towards management and government appointees (Roper, 2018, p. 29).

In the absence of a sustained, coherent, publicly visible opposition to the neoliberalisation of universities, resistance from academics has also declined. In 2023, decades of state divestment culminated in what appeared to be the largest tertiary redundancy exercise in New Zealand's history, and resistance from academics (and the national academic union, TEU) was half-hearted and ineffectual (Russell *et al*., 2023). Responding to very similar conditions, academic unions in the U.K., Australia and the U.S. have responded with increasingly militant tactics aimed at rolling back casualisation, reestablishing research autonomy and reassembling academic labour. In contrast, the TEU remains wedded to a service model of unionism characterised by low density (approximately 40% nationally), a highly passive membership and a preference for partnership-building and messaging over industrial action (Russell *et al*., 2023).

To recap, the neoliberalisation of tertiary institutes has involved three fundamental changes which are the product of successive government policies over the past four decades (Roper, 2018). The first was the introduction of student fees and the shift towards the user pays model that now exists to various degrees across the public sector. The second is greatly restricted access to student support and declining public funding per student, which has placed universities in a state of continual financial precarity resulting in lean production and a heavy reliance on external research funding. The third is the pacification of both students and staff through a combination of rolling employment precarity, the proletarianisation of the workforce, reorganisation of the funding and governance of tertiary education with the establishment of the TEC and introduction of the PBRF, and the removal of the governance structures and representative bodies that were the basis of campus democracy and student-staff activism. The imposition of neoliberal metacapital functions to supplant and replace the use-value of academic research with an exchange-value represented by financially calculable outcomes and quantitative auditing processes, to the point, as Tie (2021, p. 130) observes, "[These] representations of performance appear in the place of science 'itself' [and] only those representations enable

science to appear as a calculable field, amenable to managerial administration." The discourse of the entrepreneurial university is almost solely oriented towards resource acquisition and effectively sidelines the problem of autonomy by conflating 'public good' research with the objectives of business and commerce (Slaughter and Leslie, 1997, as cited in Shore and McLauchlan, 2014, p. 270).

4.7 The New Zealand Resource Management Act

The New Zealand Resource Management Act was also an indirect product of neoliberalism, but one principally inspired by the Brundtland Commission's concept of sustainable development, which was then inflected through the principles of NPM. The Muldoon National Government's 'Think Big' projects - the largest state-led surge in industrial construction in New Zealand history - had resulted in a vocal environmental lobby, and the Lange Labour party entered the 1984 election campaign with a strong platform for reforming local government institutions and adopting more sustainable environmental policies (Wheen, 2002).

On its reelection in 1988, the Fourth Labour government initiated a major resource management law reform exercise and made unprecedented efforts to involve local communities through consultative processes (Harris, 1993). Against the backdrop of economic crisis, increasingly assertive and militant expressions of Māori and Pacifica protest, as well as growing public awareness and discontent with what was widely perceived as Thatcherite economic policies, environmentalism (coupled with a commitment to empowering local and regional democracy by decentralising resource management) became a means for the Labour party to demonstrate it still retained a semblance of social democratic values, even as it dismantled and winnowed the key components the social democratic welfare state that the First Labour government had built following the Great Depression (Kelsey, 1998; Boston, 1998; 2004; Poata-Smith, 1999; Wheen 2002).

In many ways, the Brundtland Commission's final report, entitled "Our Common Future", was and remains a radical document. The Commission's blindness to the possibility of decoupling economic growth from environmental sustainability was a fundamental flaw; arguably the "original sin" of sustainability discourse (Liu, 2003). But the report frankly and systematically outlined what it called the "new realities", a range of environmental catastrophes that threatened to engulf the ecosystems globally: desertification, climate change, industrial pollution, soil erosion, species extinction, arctic melting, extreme weather nuclear catastrophe (Brundtland, 1987, p 1). The Brundtland Commission explained these problems as a series of "interlocking crises", repeatedly restating the impossibility of separating environmental effects from developmental causes (Brundtland, 1987, pp 2-3). The report calls for a new era of international cooperation for the "common good", with a special emphasis on developing policies that sustain and expand environmental resource bases and promote a more equitable distribution of resources (Brundtland, 1987, p 5). This approach was integrated under a new strategy the Commission defined as 'sustainable development'. Sustainable development was famously defined as "Development which meets the needs of the present, without compromising the ability of future generations to meet their own needs" (Brundtland, 1987, p. 43).

While the Commission's definition of sustainable development was written (with significant alterations) into the RMA, the provisions for integrating social inequality into sustainable development strategies were largely ignored (McChesney, 1991; Wheen, 2001, 2009). Fletcher (1989, cited in McChesney, 1991, p. 24) reported that MfE's efforts to get sustainable development on the policy agenda were blocked by opposition from the Treasury and the Ministry of Commerce, meaning that 'sustainable development' was redefined in the RMA as the more limited concept of 'sustainable management' (the term 'sustainability' now restricted to the management of non-human physical resources.) The Brundtland Commission's developmental approach to sustainability was further undermined with the addition of the word "unduly", so that the RMA's definition of sustainable resource management is ""Development … without *unduly* compromising the ability of future

generations …" (McChesney, 1991, p. 33). As McChesney observed, legislatively coding an element of ambiguity into the meaning of sustainability meant that "On many issues there is no clear delineation between sustainable and non-sustainable practices." (1991, p 34).

Despite these compromises, the RMA was heralded as "a new era in environmental management" (MfE, 1989, as quoted in Wheen, 2013, p. 287) and provided for a much more ambitious, integrated and radically decentralised resource management regime compared to the suite of legislation it replaced (Jackson and Dixon, 2005; Palmer, 2013; Wheen 2013). The RMA also allowed for an unprecedented degree of public input into both resource consent and plan formation decision making through consultation, submissions on draft plans and the ability to appeal local and regional decisions in the Environment Court and NZ High Court (Palmer, 2013; Grinlinton, 2013).

Under the RMA regional councils are the primary resource management agencies and are responsible for developing and implementing regional policy plans, and for granting resource use consents for activities that are not ruled as of right in a regional or district plan (Grinlinton, 2013). District plans must not be inconsistent with a regional plan, and a regional plan must not be inconsistent with any National Policy Statement developed by central government. But it is regional councils that have responsibility for implementing, monitoring and ensuring compliance with the environmental standards and regulations enshrined in regional policy plans and National Policy Statements (although any decision relating to either regional plans or resource use consents can be appealed in the EnvC) (Grinlinton, 2013; Palmer, 2013, Wheen, 2008).

As is often pointed out, the RMA was designed to act as a 'framework' rather than a 'blueprint' – it gives regional authorities the power to independently devise and implement the most effective means to solve resource management problems in their local context. [28]

[28] The RMA's central purpose is to provide for "sustainable management" of natural resources, with sustainable management defined as:

As Frieder (1997: 26) puts it, “Local authorities may write plans with rules, they may use market mechanisms, or they may use outreach and advocacy so long as they avoid, remedy or mitigate the effects of activities on the environment.” Since the enactment of the RMA, central government has attempted to reverse elements of this devolution; first tentatively, through amendments to the Local Government Act 2002 and the 2005 RMA amendments, and directly through National Planning Standards, National Policy Statements and the proposed 'Three Waters' legislation which would transfer control of these services from local councils to four new publicly owned entities that would operate on a regional scale (DIA, 2022).

Agency theory set the policy agenda in New Zealand for much of the mid-1980s through to the late 1990s wherein "government failure [was seen] very much in terms of agency driven by self-regarding, marginal utility maximising behaviour of individuals within the institutions that distorted policy goals and implementation" (McNeill, 2008, p. 17). Institutional devolution and decentralisation were common themes within the NPM and progressive management literature, and was an element of the 'new wave' in which "new political parties, new philosophies and new management techniques sprung up and explicitly attacked the centrist premises of the previous ruling paradigm" (Toffler, 1981, as quoted in McNeill, 2008, p. 18). This was a managerial devolution in the service of both simulating market conditions and avoiding so-called bureaucratic capture, rather than a democratic devolution. While the RMA did radically decentralise resource management, in the absence of any clear guidance from central government, and consistently low levels of

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Managing the use, development and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic and cultural wellbeing and for their health and safety while –

a. Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
b. Safeguarding the life-supporting capacity of air, water, soil and ecosystems; and
c. Avoiding, remedying, or mitigating any adverse effects of activities on the environment (New Zealand RMA, Part 2, Section 5).

voter engagement in local and regional government (Asquith *et al*. 2020) critics questioned whether the RMA enabled a genuinely democratic devolution meant to empower communities and harness local knowledge, or rather enabled central government's *divestment* of its responsibility to provide national guidance and policy direction on complex, politically fraught resource use problems (Jackson and Dixon, 2005; McNeill, 2007; Wheen, 2012, 2013; Grinlinton, 2013).

In just under two and a half decades since the RMA has been established there has only been *one* National Policy Statement specifically tailored for freshwater management (introduced in 2014 and then amended in 2017 and again in 2021). Every iteration of the NPS-FM has been met with broad and vocal criticism from ecologists, scientists and environmental groups for weak standards and lack of enforcement mechanisms (Koolen-Burke and Peart, 2022).

Part 2 of Section 5 of the RMA instructs regional councils to formally acknowledge the existence of various and competing resource values and to use deliberative, multi-stakeholder, participatory models to establish regional rules, policies and objectives. As many have noted, the logic of integrated water resource management (IWRM) is implicit within the RMA through its holistic definition of the 'environment' (covering any proposed development's impact on land, water and air), its focus on stakeholder-driven policy formation, and the legislative recognition afforded to multiple and conflicting water-use values (Frieder, 1997; Memon and Skelton, 2001; Memon and Weber, 2010; McNiell, 2016; Paterson-Shallard *et al*., 2022). Collaborative and integrative approaches to water use have been given a renewed prominence through amendments to the RMA planning regime and associated legislation. Memon and Weber (2010: 35) observed, "The community engagement and strategic planning provisions of the *Local Government Act 2002* and the 2005 RMA amendments, embedded in a wider shift from government to governance, are improving the potential for integrated water resource management with community engagement." In New Zealand, IWRM is usually termed Integrated Catchment

Management (ICM). Although there has only been one major, central government funded research programme specifically utilising IWRM methods, the *Integrated Catchment Management for the Motueka River* programme (Landcare Research, ND), which ran between 2000 and 2010, many of the tenants of IWRM are observable across regional council plan formation processes, EnvC casework, EPA hearings and STAGs (Memon and Weber, 2010; McNiell, 2016; Paterson-Shallard *et al*., 2022).

While the implicit logic of IWRM is widely recognised as a central component of the NZ RMA, the theoretical basis of IWRM is *never* explicitly acknowledged or critically evaluated within Aotearoa in the way it has been in European and American jurisdictions (see Memon and Skelton, 2001; Memon and Weber and 2010; McNiell, 2016 for NZ-based examples of pro-IWRM scholarship). Quoting Saravanan *et al.* (2009: 77): "The core principle implicitly underlying the contemporary approach of IWRM is the Habermasian communicative rationality." Although invocations of Habermas's work, particularly his *Theory of Communicative Action* (1984), are present throughout the international IWRM literature, his influence tends to feature implicitly, rather than being the subject of sustained discussion or critique. Nevertheless, there are prominent 'family resemblances' or 'ideological homologies' between Habermasian social theory and the field of IWRM, specifically regarding his concept of the "ideal speech situation", his discursive theory of democracy, and his faith in the consensus-bringing force of argumentative speech.

For the twenty years leading up to the landmark Supreme Court decision *Environmental Defence Society Incorporated v The New Zealand King Salmon Company Limited & Ors* (2014), both the EnvC and regional authorities interpreted Section 5 as instructing decisionmakers to take an "overall broad judgement approach" that effectively asked councils to reduce plural and conflicting resource use-values to a level of equality with one and other, and then achieve 'balance' between them. The EnvC described the 'broad overall judgement' approach as follows:

> "Our approach is to weigh the matters in section 5(2)...[and all matters are] to be accorded full and equal significance. Accordingly, they are to be applied having regard to the circumstances of each case. Applying section 5 involves a broad overall judgement of whether a proposal...would promote the single purpose of the Act. This allows for the balancing of conflicting considerations in terms of their respective significance or proportion in the final outcome" (*Geotherm Group Ltd v Waikato Regional Council*, 2006).

Although this 'overall broad judgement approach' was interpreted by elected councillors, independent commissioners, regional council CEOs and industry stakeholders as a 'balancing exercise' requiring a trade-off between monetary and non-monetary values, as Warnock explains, "in reality, the 'overall judgement' approach required decision-makers to choose which value to prefer on the facts" (2012, p 511). It was an approach that assumes value commensurability which encourages attempts to achieve 'balance' through the use of a common measure through which different values can be traded off against one and other – the most commonly used measure being monetary value. As Wheen has written, balancing tests contain an intrinsic bias towards development:

> "By reading section 5 as creating what is essentially a balancing test, the courts have opened [the RMA] up to the same central criticism as was made of earlier legislation. Balancing tests are inherently biased towards development, for in the process of balancing tangible economic and social benefits against intangible environmental benefits, the tangible wins out every time" (2008: 185).

The lack of clear water quality standards from central government, combined with the EnvC's "broad overall judgement" interpretation of section 5 established the conditions in which regional councils were able to give excessive weight to socio-economic factors over 'biophysical bottom lines', (Jackson and Dixon, 2005; Wheen, 2007; Warnock, 2012; EDS, 2023). More fundamentally, this situation ensured "that there were no guaranteed 'environmental bottom lines' in New Zealand resource management law" (Warnock, 2012,

p. 512). The Supreme Court judgement on *Environmental Defence Society Incorporated v The New Zealand King Salmon Company Limited & Ors* (2014) overturned the "overall broad judgement" interpretation however, and provided badly needed clarity to the EnvC and regional council's enactment of the RMA.

In the New Zealand juridical context it is exceptionally rare for the Supreme Court to rule on resource management issues, and the *King Salmon* ruling "is the most far-reaching in terms of its implications for how planning instruments are to be interpreted, adopted and applied" (Nolan *et al.*, 2014, p. 1). Greatly simplified, the case concerned an appeal lodged by the Environmental Defence Society (a semi-autonomous environmental NGO) against the proposed development of a salmon farm by King Salmon Ltd Co. Crucially, the basis of the Supreme Court's judgement was not the RMA, but rather central government's New Zealand Coastal Policy Statement (2010) (Warnock, 2013, 2014). The EnvC had previously taken the view that while higher-order instruments like national policy statements could "weigh heavily" against proposals, they were not "vetos" or hard rules, and had to be considered relative to the conflicting values outlined in section 5 (Nolan *et al*., 2014, p. 2). The Supreme Court disagreed, and ruled that the 'overall judgement' approach undermined the democratic processes that created national policy statements, created uncertainty, and undermined the strategic, region-wide approach that the NZCPS requires regional councils to take to planning (Warnock, 2014, p. 181). The court also ruled that while the degree to which any NPS could be implemented by the EnvC and regional councils would be influenced by the NPS's specificity, in the case of the NZCPS, the direction is unambiguous. The NZCPS requires decision makers to "avoid" adverse effects, and in relation to section 5 of the RMA, "avoid" means "not allow", placing a firmer obligation on decision makers to prioritise the life supporting capacity of ecosystems (Warnock, 2014, p 182). In sum, the court rules that the intent of section 5 is not to allow decision makers to deliberate on which values take precedence in a particular context; rather, it instructs them to manage resources in a way that accounts for *all* of the values contained in section 5.

While the King Salmon case set an important legal precedent by introducing clarity to the EnvC and regional council's enactment of the RMA, the Court's decision also entrenches the two-tiered integrated freshwater management regime of the RMA. Central government is responsible for providing national direction and limited resources to enable municipal and regional councils to make decisions and implement policy, allowing central government to keep the socio-political fallout of these decisions at arm's length, thereby continuing to partially insulate itself from the messiness of regional resource use conflicts. Regional councils remain responsible for subnational policy and policy implementation (albeit, now with a more limited remit in interpreting Section 5).

Very low public engagement in regional council elections means that many regional councils continue to be politically dominated by sectoral interests, and this is particularly apparent in regions with high concentrations of intensive dairy farming, such as Manawatū-Whanganui region (McNiell, 2016). Despite abundant evidence of advanced degradation in these areas (Joy, 2012), the extent of and solutions to freshwater degradation remain strongly contested. Dairy exports are the basis of the country's economy, and both central and regional government are wary of any regulatory action that increases the costs of or reduces dairy production. In the absence of an NPS-FM with strong water quality standards and robust mechanisms for enforcement, immediate economic and sectoral objectives can continue to be prioritised over ecological and community considerations.

In 2020 a major MfE commissioned report concluded that the RMA lacked strategic focus and clarity of implementation, gave insufficient recognition of te ao Māori, and enabled the continuing degradation of natural ecosystems, recommending that the legislation be repealed and replaced (Randerson *et al.*, 2020). [29] Although the RMA was devised as

[29] This report, known as the "Randerson report" (MfE, 2020) was the primary impetus for the proposed 'Three Waters' legislation which was meant to replace the RMA in 2023, but has been mired in the (mostly) Pākehā reaction to the provisions for co-governance of natural resources, among other issues. Unsurprisingly, the proposed Three Waters legislation (the composite parts of which are the Natural and Built Environments Bill, The Local Government (Rating of Whenua Māori) Amendment Bill and the Three Waters Services Bill) has generated significant resistance from regional councils, who have argued the legislation will enable 'asset theft' and result in higher rates for ratepayers (Luxon, Oct 2021). The issue of co-governance as afforded by The

"behaviour changing and behaviour forcing" legislation (Frieder, 1997: 12), regional councils have historically been loath to use regulatory mechanisms to achieve environmental outcomes when they interfere with production (Wheen, 2012; McNiell, 2016), and when they do attempt to implement regulatory policies, they are met with vigorous and effective industry resistance (Russell, 2012).

4.8 Between science and law: the New Zealand Environment Court and the emergence of new agents

As discussed in Chapter Two, while field theory is flexible enough to be applied to different legal systems, most (but not all) of Bourdieu's writings on the juridical field relate to the French legal system, which is based on the Napoleonic Code or the French Civil Code. In relation to the scope of this study, the most important difference between the French civil code and the English common law system is the enhanced agency of the judiciary in interpreting the way legislation can be applied, and the setting of legal precedents which are the basis of future judgements (Merryman, 1985; Jorieman, 2001). To my knowledge Bourdieu does not go into specific detail comparing the two systems, but he would undoubtedly argue against abstract or philosophical definitions of legal agency and instead for a *practical* analysis of agency in relation to the objective stances and positions available to agents within a juridical field. Adhering to the field-theoretic, enhanced juridical agency could also mean the axis of the juridical field is more vulnerable to being tipped towards heterogeneity, with legal counsel, judges and court officials within common law systems potentially *more* exposed to extra-juridical influences. All of this occurs within the totality of neoliberal meta-capital, which is not only seen in the historical development of

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Local Government (Rating of Whenua Māori) Amendment Bill is particularly fraught. For two contrasting critical perspectives on this resistance from local authorities and an account of Pākehā misrecognition on the issue of co-governance, see (White Man Behind a Desk, Nov 2021 and Edwards, May 2022). While regional councils' resistance to recentralisation and the wider public backlash against co governance is both fascinating and exceptionally amenable to a field-theoretic analysis, these issues are currently in flux and unfortunately beyond the limited remit of this study. The opposition right-wing National party has promised to scrap 'Three Waters' if elected in October 2023 and have indicated that this will be a central campaign issue (Luxon, Oct 2023).

environmental law and policy, but also represents the conditions of its present and future development.

As discussed in s4.7, the *King Salmon* ruling was a significant precedent for environmental management law and policy. Not only did *King Salmon* settle long standing confusion as to the meaning and appropriate implementation of Section 5 of the RMA by regional councils and central government, it also invariably curbed an element of the juridical autonomy of the EnvC by "indirectly [serving] to remind the Environment Court of its appropriate role and value as a judicial body, requiring the use of traditional judicial method to interpret, rather than reevaluate the intentions of documents produced by other branches of government with the participation of the public" (Warnock, 2014, p. 517). However, the juridical autonomy afforded by the specialist nature of the EnvC within a common law framework, combined with the RMA's emphasis on sustainable management and participatory decision making, have allowed the New Zealand Environment Court to develop a series of 'homegrown' mechanisms and procedures for environmental litigation and adjudication, allowing it to operate as a specialised juridical 'field of fields', a field with the power to influence both the *nomos* and practices within other interconnected fields in RMA spaces. [30]

The development of the EnvC's ability to influence norms and practices in other RMA related fields RMA builds upon traces from its institutional progenitors: the Planning Appeal Boards, which were "more or less judicial" tribunals established under the Town and Country Planning Act 1953 (Birdsong, 2002, p. 27). In 1978, the numerous regional

[30] The influence of the EnvC's decisions across resource management fields has been explained by Warnock and Pederson who argue that the EnvC represents the "fulcrum" of environmental management in Aotearoa with a significant "qualitative role in norms development" (2017, p. 637). They write, "the NZEnvC has certain features that might limit its contribution to the development of environmental law if a strictly legalistic or formalist approach is adopted, but its norm generating role has significant implications if conceived of as part of the broader governance structures … decisions of the Court act as norms for local authorities (who make the vast majority of resource management decisions) as well as informing other decisions of the Court itself, and while the Court hears appeals de novo from authorities, decisions may also act as a review of administrative action, helping to influence future administrative behaviour. Further, it is possible to see a deferential approach by the superior courts to the Environment Court, particularly in its interpretation of planning documents, deemed regulations under the RMA" (2017, p. 368)

Planning Appeal Boards were consolidated into the national Planning Tribunal and elevated to the status of a court of record under the Town and Country Planning Act 1977 (Birdsong, 2002). Both the Planning Appeal Boards and the Planning Tribunal relied heavily on expert-testimony and advice. Experts were drawn primarily from the DSIR, who were selected because of their specialised knowledge of issues before hearing panels, and often acted in an advisory role to decision makers (Forrett, 2002). Through the legal auspices of the RMA, the Planning Board was replaced by the EnvC in 1996, with the RMA greatly expanding the EnvC's powers. Quoting Birdsong: "Under the RMA, virtually every important mechanism for environmental management is subject to review by the Environment Court, including regional policy statements, regional and district plans, resource consents, and water conservation orders" (2002: 28).

The EnvC is empowered by the RMA in three key ways: 1.) The power to make declarations of law; 2.) The power to review on a *de novo* basis; and 3.) The power to enforce the RMA through civil or criminal proceedings (Birdsong, 2002: 28). As Newhook has commented, "the New Zealand Environment Court is apparently one of the few courts in the world that receives appeals about substantive issues in the preparation of local government planning instruments" (Newhook, 2016, para 60). Environment Court judges are judges of law who are appointed for a lifetime tenure by the Governor General (RMA, s247). To ensure that the EnvC includes a mix of 'lay' knowledge and expertise, non-judicial EnvC commissioners are appointed for three year terms (RMA, s250).

While the EnvC has the powers of an ordinary trial court, it retains a tribunal-like structure wherein Environment Court Commissioners are often empanelled with judges and have an equal say in proceedings and judgments. Unlike an ordinary trial court, the EnvC is concerned with predicting the future consequences of proposed developments and policies, and hence retains a tribunal structure and relies heavily on the submission of expert evidence from experts employed by opposing parties. In most instances, one EnvC judge and one EnvC commissioner constitute a quorum. In practice however, it is the court's

practice to empanel two commissioners and one judge involving plan references of consent appeals and while the judge presides over the proceedings, with a decision by the majority representing a decision by the court (EnvCC, Jan 2023). The increasing importance of key actors within the EnvC, principally expert witnesses and the Environment court commissioners who are expected to facilitate deliberation of contested expert knowledge claims, points to the emergence of a set of agents who must act as 'mediators' of the impasse between science and law.

4.8.1 The expert-witness and expert-conferencing

In order to accommodate broad public interest and 'lay' participation, the EnvC is not bound by the same procedural formalities and evidentiary rules of other courts of law (Birdsong, 2002, Fitzpatrick, 2022). [31] Part 2 of the RMA covers a range of value-laden concepts (social, cultural, aesthetic and ethical preferences) which are not capable of being 'proven' by witnesses as a matter of primary fact or by statutory interpretation. Quoting Warnock (2014, p. 510), "Judgment mixed with facts, policy ideas, opinion, discretion, or philosophical preferences must be employed, and the specialist Court must use the whole range of its collective experience to determine these so-called legislative facts". While there are numerous examples of the EnvC reframing intangible values as legal concepts and translating Māori cultural ontologies into legal contexts (see Warnock 2014, p 510-511), Henry *et al*, (2023, forthcoming) point to an implicit hierarchy of evidence in Part 11, s.276 of the RMA which privileges numerical, quantitative data (generated by regional council employees) which is then used as evidence to assess the economic costs and benefits of a proposed development and the effectiveness and efficacy of any provisions in a proposal.

Arguably the EnvC's most powerful mechanism for encouraging expert witnesses to adopt a juridical habitus is the practice of expert-conferencing, which must occur according to the

[31] While the RMA allows for a broad definition of what constitutes 'evidence' in hearings and appeals, the Chief Environment Court Judge recently emphasised that the Evidence Act 2006 still supersedes RMA provisions for expert and lay testimony (Fitzpatrick, 2022).

framework of rules outlined in the *Code of Conduct for Expert-Witnesses* and the Court's recently updated *Practice Note for Expert Witnesses (2023)*. Section 9.2. of the EnvC's *Practice Note for Expert-Witnesses* (2023) states:

> (a) An expert witness has an overriding duty to impartially assist the Court on matters within the expert's area of expertise. This duty to the Court overrides any duty to a party to the proceeding or other person engaging the expert.
>
> (b) An expert witness is not and must not behave as an advocate for the party who engages them.
>
> (c) An expert witness must declare to the Court any relationship with the party calling them or any interest they may have in the outcome of the proceeding including under any conditional fee agreement which depends on the outcome of the proceeding.
>
> (d) Every expert witness must treat the evidence of other expert witnesses with the respect due to the opinions of a peer, even if there is fundamental disagreement between the views expressed by the expert witnesses. Any criticism should be moderate in tone and directed to the evidence and not to the person.

The 2023 update to the *Practice Note* included additional guidelines, requiring an expert witness to identify any knowledge gaps they are aware of, any uncertainties in scientific information, and to discuss the potential implications of these knowledge gaps in their evidence (*Practice Note* 2023, s9.3). The *Code of Conduct for Expert Witnesses* instructs experts to act as impartial, disinterested and autonomous repositories of facts, and expert conferencing requires expert witnesses to perform this impartiality in relation to contested knowledge claims from experts employed by opposing parties.

While expert-conferencing was first used and has been developed principally within the NZEnvC (and has developed according to the agency of EnvC judges and EnvC commissioners), expert conferencing (sometimes called 'caucusing') is now used within every judicial and decision-making field central to RMA decision making: from the Environmental Protection Authority (EPA) on major infrastructure projects of "national significance" (EPA, 2023), within science and technical advisory bodies that advise

government on policy development (typically called STAGs), down to regional council and unitary authority resource consent and plan hearings. Within the EnvC, expert-conferencing is used both for alternative dispute resolution (ADS) processes (principally mediation) and in formal court hearings, and functions both to incentivise experts to perform objectivity and impartiality when conferencing with other experts and providing evidence to the Court, with mostly informal disincentives for experts whom the Court deems to be non-compliant.

It is exceptionally rare for the EnvC to publicly question experts on the obligations in the *Code of Conduct*, but a particularly instructive example of expert witnesses behaving badly can be found in the case of *Tram Lease Ltd v Auckland Council* (2015). In its ruling the court recorded "significant concerns"' with the expert-evidence submitted by a team of planners on behalf of Tram Lease Ltd, describing the evidence as "unconstructed, unsupported by much reasoning" and using "pejorative and unprofessional expressions about other people and other evidence" (*Tram Lease Ltd v Auckland Council* (2015). The expert had unilaterally terminated expert conferencing, which raised the ire of the judge and was viewed as a contravention of 9.2d of the *Code of Conduct*. The Court sternly reprimanded legal counsel for neglecting their responsibility "to ensure witnesses undertake conferencing to a professional conclusion and manage client expectations in this regard" (Holland-Beckett, 2015, para 2). In particular, the court viewed the expert as displaying a tendency towards "over-confident assertions of opinion without professional analysis of fact, planning instruments or other evidence", and "numerous statements which amounted to advocacy, which was contrary to the Expert Witness Code of Conduct" (*Tram Lease Ltd v Auckland Council* [2015]). Because the Court has been subjected to voluminous, and what it deemed to be "unhelpful" evidence from the Tram Lease planners, it went as far as to threaten to adopt the New South Wales approach of limiting expert witnesses to one Court-sanctioned witness per discipline (Holland-Beckett, 2015, para 2). The Court gave the lead planning expert the option of amending his evidence, which he refused to do, and Tram Lease's expert-evidence was deemed to be "totally unreliable" and given no weight in the final

judgement, in which Tram Lease's appeal was rejected (*Tram Lease Ltd v Auckland Council* (2015).

4.8.2 Independent Commissioners and Freshwater Commissioners

While the EnvC has driven the development of expert-conferencing according to its own internal *nomos*, a number of key juridical practices of the EnvC have been replicated at the central and regional government level. A major example is the establishment of The Office of the Chief Freshwater Commissioner in July 2021, with ex-EnvC Chief Judge Lawrie Newhook appointed as Chief Freshwater Commissioner for a three year term (New Zealand Beehive, July 2020). Judge Newhook was the first to commission a study into the use of expert-conferencing in Australian jurisdictions in 2008 (EnvCC, Jan, 2022), and has championed its use within formal hearings and mediation within the EnvC during his tenure (Newhook *et al.*, 2012; EPA, 2012, 2021).

The Office of the Freshwater Commissioner (hereafter OCFC) has a dual role, encompassing both central and local government. In regard to the former, the OCFC is required "to provide independent advice to the Government on how to improve freshwater management", and to support central government's "efforts to implement the National Policy Statement for Freshwater Management (NPS-FM) and improve the health of the country's freshwater ecosystems" (Ministry for the Environment, July 2022). While the OFC itself provides advice to central government, twenty-two Freshwater Commissioners have been appointed to provide enhanced expertise of freshwater management to regional and unitary authorities, with special emphasis on "assisting with the development of regional policy statements and regional plans" and "hearing appeals of council decisions related to freshwater management" (MfE, 2022). The primary role of the twenty-two Freshwater Commissioners is to chair local and regional consent and plan hearings, and to facilitate expert-conferencing that occurs adjunct to consent and plan hearings, and are expected to provide more integrated, specialised expertise on freshwater resource management in particularly complex or politically fraught cases, (Freshwater Commissioner, Dec 2022;

EnvCC, Feb 2022). While regional and local councils are still responsible under the RMA for managing freshwater resources in their respective regions, the introduction of Freshwater Commissioners represents a partial, tentative move by central government to re-centralise aspects of resource management decision-making, and Freshwater Commissioners are charged with the seemingly paradoxical task of providing "an independent perspective [while] ensuring that freshwater management is carried out in a way that is consistent with the government's objectives" (MfE, 2023).

The "independence" of freshwater commissioners therefore does not mean autonomy from the political objectives of central government, but rather, a level of independence or at least 'distance' from the politics of regional and local government (Freshwater Commissioner, Jan 2023). The ability to make decisions on resource use *independent* of the influence of local and regional council politics is the primary purpose of independent commissioners, who have existed since the inception of the RMA regime in 1991. Prior to the RMA, resource consent hearing panels were typically composed of elected regional council representatives (Grinlinton, 2013: 23). One of the arguments for devolved decision making under the RMA was to provide for local input, knowledge and accountability in resource management decisions (Grinlinton, 2013). The RMA (1991) provided for a range of options for the composition of resource consent and plan hearing panels, including hearing before a panel of elected council members, as well as appointing independent commissioners to make decisions on behalf of the council. Although the use of independent commissioners is known to vary widely across councils, a mixed composition of councillors and independent commissioners appears to have become the norm since approximately the early 2000s (McNiell, 2008: 146). The independence of independent commissioners was already underwritten in sections 34 to 40 of the RMA, which outlines the qualifications and experience requirements for independent commissioners, including the requirement for them to be objective, impartial and free of conflicts of interest or perceptions of bias (RMA ss 34-50). While councils themselves can choose to appoint independent commissioners, Sections 100A and 357AB of the RMA also empowers applicants and submitters making a

resource consent application or regional plan submission or appeal to request that at least one independent commissioner sit on a hearing panel (NZ RMA, ss 100A, 374AB). If such a request is received, then the council must delegate some of its powers and duties to an independent commissioner who will be empanelled on a hearing panel, usually alongside elected representatives (RMA, s 100A). Councils retain the discretion to decide on the number of commissioners appointed, as well who they employ as an independent commissioner, provided they meet the accreditation requirements of s39B of the RMA and are not a member (elected representative or staff) of the council (RMA s39B; s100A).

Given that the RMA already contained provisions for the impartial and unbiased role of independent commissioners, the recent establishment of Freshwater Commissioners can be interpreted as a response to a need to impose a greater degree of both specialisation and impartiality on the composition of regional council hearing panels for freshwater decision making. This is a specialised juridical habitus that emerged from within the EnvC, and, along with expert-conferencing, has been translated across multiple fields. However, unlike matters dealt with by the New Zealand Environment Court, regional consenting and plan formation processes remain partially-democratic, politically-charged, quasi-judicial and often generate high levels of stakeholder involvement and public interest. Regional Councils must engage with a range of perspectives across broad policy domains, drawing on not only scientific knowledge but also lay knowledge and explicitly value-laden perspectives. As highly heterogeneous institutions, this means that regional authority hearing panels retain a significant degree of agency in both interpreting scientific-evidence and RMA law, allowing for broader stakeholder involvement, as well as setting the standards of evidentiary burden for different types of expertise and expert and lay evidence. As noted in Chapter One, there is very little NZ-based literature on either the politics of hearing panels, expert-witnessing or expert conferencing. These matters are explored in detail in Chapter 5.

4.8.3 Te Ao Māori and Resource Management Law

The RMA is generally recognised for its partial incorporation of Māori interests and values. Quoting Nolan *et al.* (2022, p 812): "The various Māori references in the Act provide a gateway to the spiritually and culturally symbiotic relationship between tangata whenua and the environment." Section 7(a) of the RMA legislatively defines kaitiakitanga as "the exercise of guardianship by the tangata whenua in an area in accordance with tikanga Māori in relation to natural or physical resources; and includes the ethic of stewardship" (RMA, s7[a]). In *Tautari v Northland Regional Council* (1996) the Planning Tribunal noted that "kaitiakitanga required ongoing involvement and is a responsibility to care for something of great value to the survival of the tribe" (Nolan, 2022, p 829).

While the RMA provided the broad legislative framework for the inclusion of Māori values and perspectives into resource management, it is Māori legal and juridical agency within the EnvC and High Court/Supreme Court that has led to the incremental conversion of specific Māori values into the language of jurisprudence, which is argued to represent the very uneven and partial decolonisation of elements of resource management law and practice (Muru-Lanning, 2016; Ruru; 2018; Kukutai and Ruru, 2021; Parsons *et al.* 2022). Along with the expert-witness, independent and freshwater commissioners, lawyers and Environment Court Commissioners, Māori have emerged as one of the key 'mediating' agents in RMA spaces. There is a large body of case law which describes this process, a simplified review of some of the most significant examples of which are discussed below.

Perhaps most fundamentally, the notion of a relatively homogenous and unified 'Māori worldview' has been legislatively recognised and encoded by the EnvC, which is often placed in binary relation to western approaches. The difference (and incompatibility) between these 'two worlds' (the notion of a singular and largely unified 'Māori worldview' in contradistinction to an equally singular but vaguely defined 'western' epistemology) is

now legislatively recognised and encoded. As the EnvC noted in *Ngati Rangi Trust v Manawatu-Wanganui Regional Council* (2008) "in the world as conceptualised by Māori, the spiritual and physical realms are not closed off from one and other, as they tend to be in the European context."

In *Bleakly v Environmental Risk Management Authority* (2001) the High Court addressed the question of whether taonga can be included in the intangible matters that are covered under s 6(e) of the RMA, ultimately deciding in the affirmative and setting an important precedent for future decisions. In T*e Runaga o Ati ki Whakarongoti Inc vs Kapiti District Council* (2002), the High Court accepted that taonga can also relate to kōiwi (human remains) and treasures buried with them. In *Beadle v Minister of Corrections* (2002) the Environment Court considered whether a proposed prison would adversely affect taniwha, which was considered taonga by the parties opposing development of the prison. The Court ultimately decided that "neither the statutory purpose nor the terms of [RMA] ss 6(e), 7(a) and 8 suggest that decision makers should be influenced by interference with mythical, spiritual or symbolic and metaphysical beings, or effects on their qualities" (EnvC, as quoted in Nolan *et al*., 2022, p 826). In an appeal to the High Court, while the Court upheld the decision of the EnvC, it stated that metaphysical beings can in certain contexts be considered taonga, "the critical feature for consideration being the connection with physical effects and impacts on people who hold those beliefs" (High Court, quoted in Nolan, 2022, p 826). The Environment Court reconsidered the spiritual and cultural relationship between tangata whenua and taonga in *Te Runanga o Ngai Te Rangi Trust Board v Bay of Plenty Regional Council* (2003) deciding that 'The [RMA] does not dismiss relationships or metaphysical matters at all, as is noted in *Bleakly v Environmental Risk Management Authority* … Social and cultural well-being may, in a particular case, involve relationships with metaphysical factors, particularly under provisions such as Section 6(e) of the [RMA]." Given that the RMA does not contain an authoritative list of Treaty Principles available for decision makers to consider, in C*arter Holt Harvey Ltd v Te Runaga o Tuwharetia Ki Kawerau* (2003), the High Court outlined a list of "central principles" of the Treaty, which included a.)

partnership; b.) mutual obligation to act in good faith; c.) the Crown's obligation to actively protect Māori interests; d.) mutual benefit; e.) development and f.) Rangatiratanga (the tribal right to manage resources in a manner compatible with Māori custom.)

There are numerous examples of the EnvC struggling to accommodate Māori cultural and spiritual principles (such as wāhi tapu and taonga), and practices (such as the oral, genealogical transmission of tribal knowledge). [32] A common issue that the EnvC must address in wāhi tapu cases is the evidentiary weight to be given to oral evidence, especially in the absence of corroborating documentary evidence, as well as determining the assignment of wāhi tapu to a particular Iwi when Māori genealogical knowledge claims are contested (Nolan et al., 2022, p 832). In situations that have involved conflicting evidence from Māori witnesses, the Courts have been required to choose between conflicting positions of various tangata whenua. For example, in *Friends of the Community of Ngawha Inc v Minister of Corrections* (2003), the Court of Appeal upheld the EnvC's decision that certain tribal groups were the primary kaitiaki for the area, which excluded other groups. Similarly, the EnvC has considered whether "tuakanatanga" of a Māori witness should elevate the weight of their evidence, ultimately deciding that "[the witnesses'] status was a factor, along with others, that should add weight to his testimony" (*Beadle v Minister of Corrections* [2003]). In other situations, the NZEnvC has rejected the claim that it has the jurisdiction to determine tribal assertions of exclusive mana whenua in relation to particular areas, such as was decided in the case of *Ngāti Whātua Orākei Whai Maia Ltd v Auckland Council* (2018).

In some cases, this is further complicated by the fact that knowledge of wāhi tapu is passed down generationally and orally, and may be closely guarded or held only by a particular person with elevated tribal status. In *St Lukes Group Ltd v Auckland Council* (2001), the EnvC

[32] Indicative of the very recent legal and policy recognition of mātauranga Māori (as well as, perhaps, symbolic of the EnvC's own struggle to understand and translate mātauranga Māori into a western legal context), the word Māori is misspelt as "Mori" throughout the entirety of the 68 page index of *Environmental and Resource Management Law 7th ed* (2020, p. 1281-1349), along with every other Māori word requiring a macron.

rejected wāhi tapu evidence on the basis that "the assertions of the existence of special sites and wāhi tapu in the application land was at best general assertions based on indirect sources." On appeal, the High Court stated that the EnvC made an error in law in rejecting oral wāhi tapu evidence on the grounds of "general assertions based on indirect sources", stating that,

> "The Court complains about a lack of "back-up history" or "tradition." Again, it is difficult to understand what this means. Those in the Iwi entrusted with oral history of the area have given their evidence. Unless they were exposed as incredible or unreliable witnesses, or there was other credible and reliable evidence which contradicted what they had to say, accepted by the Court, how could the Court reject their evidence? The Court complained it was bereft of "evidence"and had "assertion" only in preference of koiwi. The evidence was given by kaumatua based on the oral history of the tribe. What more could be done from their perspective? The fact no European with a pen and paper to record such burials could hardly be grounds for rejecting evidence. Nor could the claim for geographical precision demanded by the Court be reasonably expected" (*Takamore Trustees v Kapiti District Council*, 2003).

While the RMA does not include a definition of wāhi tapu, in *Ngati Hokopu ki Hokowhitu v Whakatane District Council* (2002, as quoted in Nolan, 2022, p. 832) the EnvC constructed a methodology for assigning evidentiary weight to Māori values, including wāhi tapu:

> That "rule of reason" approach if applied by the Environment Court, to intrinsic and other values and traditions, means that the Court can decide issues raising beliefs about those values by listening to, reading and examining (amongst other things):
> - Whether the values correlate with physical features of the world (places people);
> - people's explanations of their values and traditions;
> - whether there is external evidence (e.g. Māori Land Court minutes) or corroborating information (e.g. waiata or whakatauki) about the values/ By "external" we mean before they became important for a particular issue and (potentially) changed by the value-holders;

- the internal consistency of people's explanations (whether there are contradictions);
- the coherence of those values with others;
- how widely the beliefs are expressed and held.

In their *King Salmon* (2014) ruling, the Supreme Court further noted that the reinterpretation of Section 5 had both procedural and substantive implications for Māori involvement in RMA decision making:

> "Decision makers are required to "take into account" the principles of the Treaty of Waitangi … . For example, the Treaty principles may be relevant to matters of process, such as the nature of consultations that a local body must carry out while fulfilling its obligations under the RMA. The wider scope of s 8 reflects the fact that among the matters of national importance identified in s 6 are "the relationship of Māori and their culture and traditions with their ancestral lands, water, sites wāhi tapu and other taonga" and protections for historic heritage and protected customary rights and that s 7 addresses kaitiakitanga" (*Environmental Defence Society Incorporated v The New Zealand King Salmon Company Limited & Ors* [2014]).

Probably the most internationally recognised example of the legal codification of te ao Māori is the Te Awa Tupua (Whanganui River Claims Settlement) Bill, which was the result of the arguably the longest running legal dispute in New Zealand history, involving Māori protest, petitioning and legal action since the 1920s (Ministry of Culture and Heritage, 2023). For Whanganui Iwi, the construction of a major hydroelectric dam in the mid-60s and the subsequent extraction and mixing of the Whanganui River waters was a violation of both the river, and subsequently the Iwis' mana (Salmond, 2014). Historically, the RMA and Local Government Act 2002 required local authorities to consult with Iwi, but did not require Council to partner with or directly involve local actors in the decision making processes, and the failure of the Crown to uphold Te Tiriti principles resulted in longstanding conflict between the government and Whanganui Iwi (Talbot-Jones and

Bennett, 2022). The new policy framework developed as part of the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 provided a radically new direction for water management in the Whanganui catchment by granting the Whanganui River the status of legal personhood, with the same rights, duties and liabilities as a human citizen (Kukutai and Ruru, 2021; Talbot-Jones and Bennett, 2022). The Act has been praised internationally as "a unique framework stemming from the intrinsic spiritual values of an indigenous belief system… a new blueprint for caring for the earth's arteries" (Lurgio, 2019, p 321), and domestically as "an empowering example of what can happen when we trust Māori and mātauranga Māori" (Kukutai and Ruru, 2021, p. 77). But some, like Collins and Easterling (2019: 21) have criticised the Act for failing to secure Māori ownership. Arguing from an indigenous-rights perspective, they suggest that "the Te Awa Tupua Act looks less like a change of heart rooted in a fundamental commitment to human rights, and more like a reflection of settler-states selectively endorsing certain human rights that do not ask for, or require, any domestic change" (2019: 21).

To summarise, the RMA has provided the legislative basis for Māori legal and political agency, and this agency has resulted in an incremental and partially realised paradigm shift in environmental management and governance over the lifetime of the RMA, where te ao Māori is now invested with significant symbolic capital throughout RMA decision making spaces. Quoting Nicola Wheen: "While including Treaty principles in environmental legislation has not succeeded in delivering appropriate levels of control, partnership and influence on kaitaiki Māori, it has given Māori a formal voice in environmental management and some significant victories" (2013, p. 286). The force of the symbolic capital of te ao Māori is reflected in academia through the enthusiastic, and largely uncritical adoption of ideas associated with the 'new materialism' and ontological turn, of which Campbell (2022) is a leading exponent.

The assertion of Māori symbolic capital can involve a strategic binary between Māori and western epistemologies. 'Western science' is a signifier for utilitarianism, positivism,

productivism, developmentalism and anthropocentrism, whereas te ao Māori includes both interrelated Māori physical and spiritual principles combined with an ecological holism that closely resembles aspects of deep ecology (Naess, 1973; Sessions, 2014), social ecology (Bookchin, 2005) and pure ecology (Lévêque, 2003). While these cultural and epistemological differences are significant and real, the subsumption of developmentalism, productivism, utilitarianism and positivism within the category of western science also serves to naturalise the composite effects of neoliberalism and, in doing so, inadvertently reproduces neoliberal *doxa* as a force that operates at a level beyond critique or even discussion. As Lave has observed of the U.S. based literature on amateur science and local knowledge, much of the New Zealand based literature on mātaurangā Māori ignores neoliberalism, "which seems to be viewed as irrelevant to the micropolitics and struggles for legitimacy of knowledge developed outside the [publicly funded science system]" (2012b, p. 28).

Relating Māori legal agency with the commentary on mātaurangā Māori in s.4.5, it could be argued that both the critics and advocates of mātaurangā Māori display different degrees of misrecognition relative to one and other. Critics like Corballis (2021) misrecognise Māori knowledge as an inferior form of applied productivist science. In contrast, the strategic assertion of the symbolic capital by mātauranga Māori advocates partially relies on the simultaneous critique and perpetuation of the idea of 'western science' as a singular epistemology very similar to the applied positivism that Corballis (2021) *et al.* espouse. This would seem to preempt intersectional dialogue and alliance-building with 'western' environmental science approaches with complimentary values and objectives, such as environmental Marxism (Foster, 2020), dark ecology and postcolonialist ecology (Morton, 2014; Liborion, 2022) or the more explicitly structuralist strands of political and social ecology (Bookchin, 2005; Joy, 2018, Lave, 2012b, 2015). Similarly, defining the current configuration of the publicly funded science system as "mainstream science" (McIntosh *et al.*, 2022) obfuscates the historical imposition and resistance to neoliberalism within different communities and prevents the emergence of any totalising politics that can draw

connections and possible alliances across field-specific struggles for autonomy/rangatiratanga.

The Pākehā misrecognition of mātauranga Māori is a very common example of Pākehā reaction against Māori assertions of rangatiratanga (see O'Malley, April 2023), which is repugnant (both for its reductionist view of mātauranga Māori and so-called 'western science'), but relatively uncomplicated. The Māori misrecognition of 'western science' on the other hand, which is particularly evident in McIntosh *et al.* (2020), while entirely understandable, arguably has higher political stakes because it potentially blunts the transformative force of te ao Māori by conceptualising current neoliberal science regimes as the natural (rather than the historically and politically constructed) institutional expression of a mostly homogenous and singular western worldview/epistemology, which it itself naturalised. By framing assertions of Māori symbolic capital in naturalistic epistemological terms (as McIntosh *et al.* 2020 and the EnvC do), it seems the binary (and therefore the fundamental incommensurability) between the 'two worlds' will be maintained.

4.9 Conclusion

The imposition of neoliberal metacapital has proceeded to the degree that it is now a fundamental component of the *nomos* of New Zealand's publicly funded science system and is largely unquestioned and unnamed in science policy discourse. Neoliberal metacapital successfully mimics the logic of officialisation-universalisation, a process "whereby [agents] can give the appearances of systematicity and necessity to a vocabulary, which then presents itself as independent of the historical agent[s] who produces it and the social conditions of which it is a product" (Bourdieu, 2004, p. 75). The publicly funded science system in New Zealand can be defined as a "neoliberal science regime" (Lave, 2012, Mirowski, 2011), but unlike neoliberal science regimes that exist in the United States, the composition of New Zealand's export economy results in very low levels of private sector R&D funding necessitating heavy reliance on public funds which in turn allows for a high

degree of government influence and control over scientific research agendas. These conditions have produced a neoliberal science regime that operates primarily on government created markets that are maintained by contestable funding structures and the RMA resource consent and planning regime, which has itself created the basis for an industry of expertise, a "consultocracy" (Hodge and Bowman, 2004) or "knowledge economy" (Kelsey, 1999), wherein the production of knowledge is heavily publicly subsidised, but its provision is largely privatised. Keeping the totality of social fields and the field of power in view, the historic de-autonomisation of New Zealand's science system is just one part of New Zealand's transformation from a colonial, corporatist welfare state into a legislatively bi-cultural, institutionally monocultural neoliberal one (Kelsey, 1999). Combined with cultural egalitarianism, which is characterised by anti-intellectualism, political quietism, and the low cultural capital assigned to any non-applied forms of knowledge (Pearson, 1951), neoliberalisation greatly constraints the scope and depth of any public contest of ideas, which itself "normalises our radically altered world and embeds the neoliberal regime" (Kelsey, 1999, para 1).

Whether or not the New Zealand science reforms achieved their objectives, or whether or not the publicly funded science system is meeting the needs of the public now seems largely irrelevant to the continuation of the model. Neoliberalism shambles onwards in zombie-form regardless of its failures, propelled by the crises and problems that it itself creates (Peck, 2010). While the current CRI model has been criticised both externally (OECD; 2008, 2022) and internally (CRI Taskforce Report, 2010; MBIE: 2022) these criticisms no longer take the form of an "asymmetrical contest between those left arm "spending ministries" - "the trace within the state of those social struggles of the past" - and those right arm agents of austerity, privatisation, deregulation and marketisation" (Bourdieu, 1992, as quoted in Peck, 2010, p, 105). As Peck argues, drawing on Wacquant (1999), "the left and the right hand of the state are working in ways that are functionally and organisationally *complimentary*, to fashion new types of active and punitive statecraft in the context of the contradictory order that is 'deregulated capitalism'" (Peck, 2010, p. 105). Neoliberalism continues to fail, but in the ideological and moral vacuum in large part created by the

de-autonomisation of every major publicly funded knowledge producing institution in New Zealand, it "tends to fail forwards" (Peck, 2010, p. 107).

The contradictions that were being produced by the early phases of the commercialisation of New Zealand's science system are now the objective conditions of the field. For individual scientists, de-autonomisation involves the removal of scientific agency in the setting of research agendas and the ability to speak publicly on matters of scientific concern (Galbreath, 1998; Edmendes, 2004; Robinson, 2015; Hendy, 2015). For government funded science producing organisations, universities and CRIs, the disproportionate emphasis on financial performance and coupled with long-term public disinvestment has greatly reduced the ability to engage in any public good science that does not have a direct market application (Cartner and Bollinger, 1997; Edmendes, 2004; NZRS 2008; NZAS, 2014, Leitch *et al.*, 2016, Roper, 2018). As Bourdieu would anticipate, faced with this immense shift in the objective structure of their field, a small minority of scientists have refused to 'adapt' and this refusal takes the form of a fractured or torn "misfit" habitus, a habitus which bears "the mark of the contradictions which produced it" (Bourdieu, 1997, p.78).

By contrast, while these misfits of science are increasingly marginalised both within their institutions and within the science/policy nexus, Māori are increasingly taking the lead in freshwater policy and law. Te ao Māori is arguably the last ideology with any symbolic capital in New Zealand, and its current status within RMA related policy and juridical spheres is the result of generations of Māori social and legal activism. Unlike misfits of science, whose habitus has been torn from the relatively autonomous (and privileged) conditions of its formation, Māori political agency is anchored in the historical consciousness of *already lost* autonomy, the theft of tino rangatiratanga by Pākehā and the symbolic violence perpetrated against te ao Māori by Pākehā through colonisation and assimilation. In this sense, Māori are close as possible to 'textbook' examples of the Bourdieusian misfit, those rare agents who, at a great disadvantage, manage to convert an imposed 'weakness' into a strength and use a previously devalued form of symbolic capital

(indigeneity) to challenge the conditions of a field (Bourdieu, 2005, p. 45). However the transformational force of Māori symbolic capital in relation to freshwater governance is unclear, given that the neoliberal field of power is often obscured by a naturalistic discourse that is used to both defend and extend the symbolic capital of Māori indigeneity and their legal and cultural status as tangata whenua, which in turn reifies the effects of neoliberalism as just one component of a singular western epistemology.

This chapter has focused on the 'external', macro-level field-mediated effects that have transformed the publicly funded science system and the corresponding influence this transformation has had on the connected juridical and quasi-judicial fields central to RMA decision-making. The following chapter shifts to an internal, micro-level analysis of juridical practice and scientific agency across multiple fields including the EnvC, regional councils, government policy advisory bodies, universities and CRIs.

Chapter Five: Discussion and analysis

5.1 Introduction

The preceding four chapters have provided a review of how Bourdieusian field-theory has been critiqued and applied within the realms of science, technology and policy social science; outlined the historical and epistemic context for the current institutional, legal and political configuration of the New Zealand's publicly funded science system; and methodologically operationalised field-theory with reference to the institutional settings and policy framework in which different types of scientific expertise inform freshwater law and policy. This chapter draws principally on legal judgements and commentary alongside seventeen in-depth interviews with key agents at New Zealand's 'science/policy interface' to address the central question of the thesis: have the practices of expert-witnessing generated their own specific form of culture and politics and if so, what are the implications for the contribution of science to the legal resolution of resource management conflicts?

The answer to the first part of this question is undoubtedly yes. As discussed in 3.7 and 3.7.1, the New Zealand Environment Court (hereafter EnvC) has developed an innovative and fairly unique set of practices and rules aimed at disembedding expert facts from expert positions and client interests. These processes function to habituate and discipline scientists into a juridical habitus whereby they must be seen to act in an impartial and deliberative manner when engaged by parties as expert-witnesses. This chapter builds on this work and conceptualises the New Zealand Environment Court, Regional Plan Hearings and STAGs as three separate but interconnected fields in which scientific knowledge must be translated into the *nomos* of the juridical field. While each space has its own distinct rules, behavioural norms, institutional structure and statutorily enshrined purpose, there are sufficient 'structural homologies' to conceptualise "a bundle of relations" (Eyal, 2013: 159) or a collection of related spaces that comprise an overarching field in which expertise is organised and then mobilised to not only inform decisions on matters of freshwater policy

and law, but also to legitimise these decisions in relation to standards of accountability that are broadly similar across these three fields. The purpose of this chapter is to delve into the depths of practice and describe the clusters of professional and disciplinary habitus, games and practices that can be observed across each subfield, the influence that field logic has on the disciplinary habitus of university and CRI based ecologists, and how experts attempt to act within these fields while maintaining or increasing their scientific capital.

The position of the expert-witness constructed by the NZ EnvC is largely alien to Bourdieu's characterisation of the scientific field, which he argues is a highly competitive, highly *interested* struggle for a monopoly over legitimate scientific capital. In a passage of *Science of Science* worth quoting at length, Bourdieu argues that competition, cooperation, consensus, dissensus, negotiation, struggle, doctrinalism, free-thinking, disinterest *and* self-interest are all part of the 'game' of science, and that this is an 'unanimously disguised open secret' of scientific fields:

> "Just as one has to move beyond the unacceptable choice between idealist constructivism and realist positivism, towards a *realist rationalism* which argues that scientific construction is the precondition of access to the advent of the 'real' that is called discovery, so one has to move beyond the opposition between the naïvely idealised vision of the 'scientific' community as the enchanted kingdom of ends of reason and the cynical version which reduces exchanges between scientists to the calculated brutality of political power relations … . The official vision of science is a collective hypocrisy capable of guaranteeing the minimum common belief that is necessary for the functioning of a social order; the other face of science is known to all those who take part in the game and unanimously disguised, as a jealously guarded open-secret (economists would call it 'common knowledge'). Everyone knows the truth about scientific practices, which the new sociologists of science noisily discover and unveil, and everyone keeps pretending not to know and to believe things do not happen that way … . Science works, to a large extent, because people manage to believe and make others believe that it works as it is said to work, because this

> collectively maintained collective fiction continues to constitute the ideal norm of practices" (Bourdieu, 2004, p. 77-78).

The EnvC's *Code of Conduct for Expert Witnesses*, alongside the norms that order the widespread practice of expert-conferencing (which are codified in the Court's *Practice Note for Expert Witnesses [2023]*), aims at recreating an idealised scientific community, the 'enchanted kingdom of ends of reason' *within* the juridical field. In many ways, expert witnessing and expert conferencing represent a subfield within the juridical field characterised by its own distinct *illusio*, which is partially derived from and closely resembles a juridical *illusio*, but is designed to create a space where science can be purified of extra-scientific influences, translated into a juridical language and then used as evidence to justify decisions and substantiate legal arguments.

The norms and rules of expert-conferencing in the EnvC aim at perpetually constructing and reconstructing something closely resembling the Habermasian 'ideal speech situation', a highly regulated context in which 'communicative rationality' can occur; the environment where the ‘unforced force of the better argument’ can prevail (Habermas, 1999). While expert conferencing can involve non-experts, this is an ideal speech situation tailored specifically for the mediation of contested scientific knowledge claims and is characterised by elements of the Mertonian ethos of science (especially the principles of disinterest, communism and organised scepticism), inflected through a particularly *New Zealand* version of the role and value of science, which is itself partially a product of the public sector reforms detailed in Chapter 3. The juridical reconstruction of an "enchanted kingdom of ends of reason" (Bourdieu, 2004, p. 77) where scientists can operate as pure scientists autonomous of any external influences can and should be interpreted as a practical juridical response to the historic de-autonomisation of the publicly funded science system which the EnvC (and every RMA policy and legal field) are so heavily reliant.

As Bourdieu would anticipate, the majority of scientific experts (primarily ecologists and conservation scientists) approached for this study display high degrees of reflexivity in

relation to the political-economy of expert witnessing. A number of research participants speak of expert witnessing as a 'game' in which a range of strategies can be employed to craft expert knowledge claims in such a way that client objectives can be met, while maintaining the semblance of impartiality and adhering to the behavioural and evidentiary rules outlined in the *Code of Conduct*. Experts' performative adherence to the *Code* represents the collective maintenance of the "collective fiction [that] constitutes the ideal norm of [scientific] practices" (Bourdieu, 2004, p. 78). For most freshwater ecologists interviewed for this study, the primary personal interest in acting as an expert witness is to convert their own scientific capital into juridical capital, which they hope will result in legal and policy outcomes that either mitigate or begin reversing the most deleterious effects on freshwater ecosystems. Frustrated by structural barriers that repeatedly prevent or problematise the conversion of accumulated scientific capital into juridical and policy capital, some of these ecologists have developed self-consciously misfit dispositions, which are variously articulated as anger, hopelessness, reflexive cynicism and a depressive realism. A number of these ecological experts explicitly recognise the leadership role that Māori have assumed in this area and see contracted consultancy and expert-witness work for iwi (alongside small environmental NGOs) as one of the last bastions of relative scientific autonomy.

The structure of the chapter is as follows. In the first section I conceptualise the New Zealand environment court within a field-theoretic and outline the development of expert-conferencing both in formal hearings and ADR, and the rules for expert evidence as defined by the *Code of Conduct for Expert Witnesses*, the RMA and the Evidence Act (2006). In the following section I describe the way elements of the Environment Court practice for separating facts and positions in expert-evidence has been adopted at the regional authority level in an effort to depoliticise the contribution of expert evidence to water resource decision making. Here I use the Horizons Regional Council's One Plan and the Ruataniwha Dam decision to explore how the alignment of expertise with external client objectives occurs in practice. In the third section I discuss the conflict between experts within the STAG that informed the creation of the National Policy Statement on Freshwater (2020), and

explain how this conflict influenced the final policy statement. In the last section I use field theory to conceptualise the development of the freshwater management juridical field as a response to the commercialisation of New Zealand's publicly funded science system and the RMA regime, the impact this has had on public good science, and the growth of a hybrid system of environmental expertise and governance, the "consultocracy" (Hodge and Bowman, cited in Kelsey, 2015: 131).

5.2 The New Zealand Environment Court as a juridical "field of fields."

For the purposes of this study the New Zealand Environment Court is conceptualised as a "field of fields" (Bourdieu and Waquant, 2005), meaning that it is a relatively autonomous field with its own internal *nomos* and *illusio*, but one with a high degree of influence on related fields which are not juridical but selectively replicate elements of the *nomos* and *illusio* of truly juridical fields. While the EnvC is subordinate to the Supreme Court, the EnvC is the preeminent specialist environmental adjudicative body in New Zealand, empowered specifically to determine cases under the RMA, meaning that all of the Court's decisions must enact its statutory mandate to "promote sustainable management" (RMA S 5(1)). How to promote the sustainable management of a resource is determined contextually, but guided by the legislation and national policy framework that the Court both interprets and, through established precedent, has itself played a role in creating (Warnock and Pederson, 2017). Quoting Warnock and Pederson (2017, p. 241): "The Court has considerable flexibility in terms of procedure, methods of interpretation, the decision making process, with legal and non-legal expertise feeding into both fact and law evaluation, and the application of law to facts and remedies." The Environment Court is therefore a relatively autonomous field of fields, characterised by a high degree of symbolic capital and an unusual degree of procedural flexibility, which is formally separate from, but heavily influences practices within related, quasi-judicial and non-juridical fields within RMA legal and policy making spaces.

The EnvC, as a purely juridical field, represents the most autonomous pole of the New Zealand science/policy nexus, where external factors can be effectively refracted through a juridical logic, but never entirely eliminated. By contrast regional councils and STAGs occupy the heterogeneous pole of the science/policy nexus, where external socio-political and economic forces play a major role in water resource decision making. As Lave (2012, p. 11) emphasises, the structural positions that constitute a field are "analytically distinct from the agents who occupy them." While agents will bring a range of dispositions into a field, once a field is established, "its structure is more determining than the habitus of the individual agents occupying it … [and] except in extraordinary circumstances, individual agency cannot change the structure of the field itself" (Ibid, p.12).

5.2.1 The development of expert-conferencing in the Environment Court

Given the absence of any dedicated history of the development of expert-conferencing within the EnvC (or any NZ-based social science literature on expert witnessing/conferencing in general), the brief narrative reconstructed here is primarily based on the institutional memory of EnvC officials as well as judicial commentary and conference and training material produced by the EnvC and the Resource Management Lawyers Association (RMLA). But the relative newness of expert conferencing as a practice is indicated by the very short entry on conferencing in the most recent (7th) edition of the *Environmental and Resource Management Law* handbook (Nolan *et al*, 2020). The handbook has no entry specifically dedicated to expert witnessing, and only a very cursory entry on expert conferencing, which is a subsection of larger section on ADS and is largely restricted to summarising aspects of the EnvC *Practice Note* relevant to conferencing (Nolan *et al.*, 2020, pp 1191 - 1192).

According to a long-serving senior EnvC official, expert conferencing was first undertaken as part of an EnvC process in 2008 following a study undertaken by then Chief Environment Court Judge Laurie Newhook on its use in Australian jurisdictions (EnvCC,

Nov 2022). As Nolan *et al.* note (2020, p. 1191), expert conferencing is "increasingly utilised by the Court and parties … the purpose of [which] is for experts to debate their differences objectively and scientifically and identify issues on which they can or cannot agree, and the basis for any continuing disagreement." Parties may request expert conferencing as part of an ADR process, or the managing judge may direct it if the Court perceives gaps in expert-evidence (EnvCC, Nov 2022). Counsel and parties are not present at expert-conferencing, which is procedurally (although not always practically) confidential to the experts themselves, and this confidentiality is seen as necessary to allow experts to feel "safe" engaging in good-faith scientific deliberations (EnvCC, Feb 2023).

As Bourdieu notes, two important characteristics of a juridical habitus are political neutrality and proceduralism, meaning that EnvC officials are not prone to making statements that could be construed, even indirectly, as a criticism of the EnvC or government policy. Unsurprisingly, court officials tended to articulate the operations of the EnvC as partially independent from, and acting *on* ("in service to") society, rather than as being a product of society (EnvCCs, Nov, Dec, 2022; Feb 2023). This is a disposition common to fields with high degrees of relative autonomy, and is a subjective expression of the juridical field's ability to refract external influences according to its own *nomos*. Therefore, overly direct lines of questioning, such as, "What problem(s) was expert-conferencing introduced to address?" tended to elicit deflective responses from EnvC officials. Similarly, questions related to the configuration of the publicly funded science system that provides the EnvC with expert evidence were largely eschewed on the grounds that such matters are "outside the scope of [an EnvC Commissioner's] role" (EnvCC, Feb 2023). The EnvC Commissioners who agreed to be interviewed for this study were extraordinarily generous with their time and evidently motivated by a genuine commitment to public service, but were predictably cautious in their responses and largely refused to stray into any commentary on extra-juridical matters, or any 'external' topic that could not be translated into the language of jurisprudence.

Judges and EnvC officials prefer to describe the development of expert-conferencing as "evolving practice" (Newhook, 2018, p. 17; Hodges, 2022) rather than a juridical response to specific 'problems'. Informants emphasised the efficiency gains of expert conferencing, often with reference to EnvC's increasing use of ADR processes, which largely echoes existing legal commentary on expert-conferencing, (such as Kirkpatrick and Todd, 2011; RMLA, 2012; Newhook *et al.*, 2018). It seems efficiency gains were paramount in the early use of expert conferencing, as the RMLA *Steering Group on Expert Conferencing* rather bluntly puts it, "The important factor from the Court's perspective was that conferencing of experts should save time and cost in the resolution of cases. That is - it should be **cost effective**" (RMLA, 2012, p. 2 - emphasis original).

ADR methods have themselves been introduced to expedite the EnvC's track case management system and to avoid litigation in favour of mediated settlements in which parties delegate authority to reach an agreement to a neutral third party (usually an EnvC Commissioner or independent facilitator), with any mediated agreement then subject to final binding decision by the presiding judge (Kirkpatrick and Todd, 2011). The most commonly used form of ADR is mediation, which is used across the three main types of civil jurisdiction that come before the EnvC, which are appeals regarding regional and district plans, appeals regarding resource consents and enforcement matters (Newhook, 2018, para 22). Mediation is usually undertaken in the very early stages of a case, and "results in resolution of approximately 75% of all cases filed in the Court" (Newhook, 2018, para 15). While mediation is not compulsory, it is strongly encouraged by judges, because "even if a case is not capable of full settlement, some aspects can get resolved, thus narrowing issues in dispute, reducing Court hearing time and reducing cost to all parties" (Newhook, 2018, para 18). Not only does ADR generate efficiency gains for the EnvC, but it can also greatly reduce costs for the parties themselves who can resolve their disputes without the need for lengthy and resource-intensive court proceedings (Newhook, 2018, para 21).

Since 2008, expert-conferencing has increasingly been used in both pre-hearing ADR processes and formal court hearings, and the ability to effectively facilitate expert conferencing is now part of the preferred skill-set of EnvC Commissioners (EnvCC, Dec 2022). According to one EnvC Commissioner, "In the very early days it was hit-and-miss; sometimes conferencing was initiated, sometimes it wasn't - but it certainly wasn't the norm. But it has progressed to the point [today] where it is usually court directed" (EnvCC, Feb 2023). While EnvC Commissioners can be direct ministerial appointments, they are more usually appointed by The Chief EnvC judge in consultation with the Minister for the Environment. While EnvC Commissioners are expected to have a broad range of 'lay' skills and knowledge, it is only recently that training specifically for the facilitation of expert-conferencing has become an area of focus, with EnvC Commissioners now expected to undertake formal training through the New Zealand Resolution Institute, attend seminars, workshops, and participate in peer support networks (EnvCC, Feb 2023). But given the EnvC is the only truly juridical body to use expert-conferencing, most of this knowledge is necessarily accumulated through observation and practice, as an interviewee explains:

> "When I first joined (the EnvC) X years ago there was no support at all - you were thrown in the deep end. You were sitting on a case next week and you just had to get on with it. [But] it's evolved in recent times, and there's a little bit more peer support in terms of … . We try to ensure that the other Commissioners sit-in on conferencing and sit-in on mediation etcetera. And the Chief Judge strongly supports this. And we also [encourage Commissioners] just to sit as an additional member on a panel for the court. So there is an element of training wheels there now, simply by sitting in and learning from that experience" (EnvCC, Feb 2023).

As another EnvCC noted, as conferencing has become more common, both Commissioners and experts have habituated themselves to the interpersonal dynamics and behavioural norms of conferencing:

> "During early expert conferences I facilitated, where everyone was still learning about the process and what the risks and benefits were, there was an understandable nervousness among experts to be completely open with each other because they did not know what the consequences might be for them or their clients. In the same circumstances I would have felt the same.
>
> "In those early days, experts would listen with a view to defending their positions, rather than listening to understand what each other was saying. Reaching agreement under those circumstances did not seem likely until I started to realise when I listened carefully, that they were often saying similar things but in different ways. Once they became aware of that, they started to find the common ground and build on what each other was suggesting, ending up with agreement on many issues and narrowing differences in others. In this way, experts were able to learn from each other and in my view, it enabled them to realise that by doing so, they could use their combined knowledge and experience to assist the Court with clear answers to its questions" (EnvCC, Jan 2023).

There are many different types of expert conferences and they can range from two or more experts in a single specialist area up to several experts from up to ten (indicatively) specialist areas, which, in particularly complex cases, are sometimes undertaken sequentially so that each group has the benefit of understanding the other evidence that is relevant to their topic (EnvC Commissioner, Dec, 2022). Typically conferences are discipline specific: freshwater ecologists conference with other freshwater ecologists, hydrologists conference with other hydrologists, planners conference with other planners. In some cases, joint conferencing of experts in complementary or overlapping specialist areas may occur, for example, planning experts conference with other experts to develop conditions of a resource consent; ecology, water quality and mātauranga Māori experts conference together, or design and/or construction experts conference with noise, landscape and/or experts in other environmental assessment areas to explore options to minimise or mitigate effects (EnvCC, Jan 2023). Individual conferences can last anywhere from a few hours to 10 days in particularly complex cases (EnvCC, Jan 2023).

Once an EnvC Commissioner has been appointed to facilitate an expert conference, unless matters of process arise, the managing judge has no further involvement in conferencing (EnvCC, Jan 2023). While the facilitating commissioner may seek guidance from the judge on procedural matters, the facilitating commissioner cannot discuss matters of substance with the managing judge (EnvCC, Jan 2023). It is generally accepted practice that the facilitating commissioner cannot sit on the Court bench to hear the case because of the need to maintain confidentiality of the conferencing process (EnvCC, Jan 2023). The *Practice Note* expressly assigns lawyers the task of preparing the witnesses, in particular explaining the duties of objectivity and impartiality, and managing client expectations (*Practice Note*, 2023, s9.6.).

The final product of expert conferencing is a Joint Witness Statement (JWS) which is signed by all participating experts and provides a coherent and unified statement of agreed-upon facts and points of disagreement. JWSs serve to streamline the presentation of expert evidence, avoid duplication and provide a clear account of agreed upon facts (Kirkpatrick, 2022). The discussion and debate between experts is strictly confidential, the only details of the conference that are made public and seen by the judge and court bench are those that are included in the signed JWS (EnvCC, Jan 2023). Once an expert has signed a JWS, they cannot introduce any further issues which the participants in the conference agreed did not need to be considered (*Practice Note*, 2023, s9.5d). While strict confidentiality is recognised as a fundamental principle of effective expert conferencing, in a number of cases in recent years, the Court has undertaken a process (unfortunately) named “hot-tubbing” (Hodges, 2022). Hot-tubbing involves the empanelling of all experts together in open court, and is generally undertaken after expert conferencing and allows the Court bench and counsel to seek clarification on elements of the JWS, or to probe the reasoning behind expert disagreement (EnvCC, Jan 2023).

5.2.2 Expert conferencing as a juridically constructed ideal speech situation

The behavioural, procedural and evidentiary rules that order expert-conferencing and direct EnvC Commissioners' facilitation of conferencing aim at recreating, case-by-case, the conditions for "communicative rationality" (Habermas, 1999) wherein experts (and the Court) are able to evaluate each other's knowledge-claims solely on the basis of reason in an artificially constructed environment nominally free of 'external' or 'coercive' influences. According to McCarthy (1978: 278; cited in Hillier, 2004: 40), Habermasian communicative rationality entails a "coherentist theory of truth"; "what is true, or what is right, is determined by the consensus resulting from an uncoerced, free and open deliberative discussion between all relevant actors". For Habermas, rationality is built into the very structure of human language use. Consensus is possible because understanding is the *telos* of 'normal' human speech, there is an "already operative potential for rationality contained in the everyday practice of communication" (1999: 11). Deceiving, manipulating and lying are, on Habermas's account "parasitic" on normal communicative practices; which, under ideal conditions, are orientated towards "bring[ing] about an agreement that terminates in the intersubjective mutuality of reciprocal understanding" (Habermas, 1999: 24). The "ideal speech situation" is the regulative context in which Habermas' communicative rationality can occur; it is the environment in which the 'power of the better argument' can prevail (Habermas, 1999). While expert conferencing does not necessarily result in or aim for consensus between experts, it does aim at producing the conditions in which so-called 'parasitic' external influences, such as institutional allegiance, disciplinary elitism or chauvinism, client bias and intellectual egotism, are as far as possible minimised in the service of producing impartial information useful to the EnvC.

Expert conferencing is an ideal speech situation tailored for deliberation over scientific and technical knowledge claims which involves the creation of a juridical vision of the ideal operations of scientific inquiry. However, confidentiality (or, to put it another way, secrecy) is not a component of the Habermasian ideal-speech situation or of normal scientific argumentation or research, which (in its idealised form) should involve methodological transparency and an openness to falsification (Merton, 1973, Popper, 1932). And while a

JWS will include a technical or scientific justification for points of agreement and disagreement, the process leading up to a JWS is theoretically known only to the expert-witnesses and the facilitating commissioner: "What you don't get in that JWS of course, if you've had eight hours of expert-conferencing, six hours of which is quite heated, you don't get a transcript of who said what and how it was said (Conservation scientist - consultancy, Jan, 2023).

In the views of EnvC officials, the confidentiality of expert-conferencing is itself what allows scientists to engage with each other as pure scientists, disembedding them both from their institutional position and the position of their client. As a senior EnvC Commissioner explained:

> "I see the confidentiality of expert conferencing providing an opportunity for experts to explore different ideas openly, some of which may be very new to them, without having the Court, their client or counsel or a whole court full of other people listening in. That enables them to genuinely engage with each other before deciding at the end if they do or do not agree" (EnvCC, Jan, 2023).

Another EnvCC explained expert-conferencing by analogy to the evaluation of scientific research through peer-review:

> "That's essentially what we're doing [in conferencing] - giving the scientists space to interact like scientists, away from their clients, away from counsel, away from whatever rivalries or alliances or whatever they may have in their own areas. We know *we're* not the experts - they are. So [a commissioner's] role is really limited to making sure [the experts] stay focused on whatever issues are relevant to the Court, make sure they're all playing nicely, and allowing them to debate in a way they might debate each other in a lab or a classroom or in a peer reviewed journal, but within the scope of what's useful to the Court. It's not supposed to be a negotiation or a competition [but] more like a collegial fact-based discussion.``" (EnvC Commissioner, Feb, 2023).

While facilitation practices vary widely between the EnvC, regional council hearings and STAGs, within the EnvC the facilitating commissioner will usually begin conferencing by outlining the Court's *Practice Note for Expert-Witnesses* (2023) and re-emphasise the expert's duty to impartially assist the court (EnvCC, Feb, 2023). In contrast to mediation (which is often explicitly about negotiation and compromise), expert conferencing "is a process in which groups of expert witnesses are required to attempt to reach technically accurate agreement on facts, issues, and matters of expert opinion" (Newhook, 2018, para 24). The facilitating commissioner records agreements reached and identifies issues on which experts cannot agree and the reasons for those disagreements Generally, experts tended to view expert-conferencing within the Environment Court positively, in marked contrast to their experiences with expert conferencing in quasi-judicial and policy spheres (regional council hearings and STAGs). One expert also described the 'best' expert conferences with reference to peer-review,

> "Most of the time [conferencing in the EnvC] is very civil, and sometimes it can be really enjoyable because there's a bunch of smart people who have been thinking about the issue you're dealing with, and having a good conversation about it. And that can be very intellectually stimulating sometimes, and also tests your own thinking … . It's like a good paper review: you hate it the moment you get it back and you say "What!?", and then you reflect on it a bit and think, "Oh no, that's actually a good line of questioning, let me think about that." And it either entrenches you, and you say "No no no, I'm happy with my position", or you change it slightly, add in that extra table or whatever it is that they wanted and you thought was entirely unnecessary, but actually improves it. So that whole side of that process can be hugely valuable. And you often end up in a better place in terms of management plans and effects management and consent conditions and the end of those processes. Usually. Sometimes it goes bad. It's not uniform that it's always a good outcome" (Conservation scientist: consultancy, March 2023).

Habermas accepts there will be a gap between the ideal of the "ideal speech situation" and the reality of practice, acknowledging that "a set of unavoidable idealisations forms the

counterfactual basis of an actual practice of understanding" (1996: 4). Here, the practice of facilitators is crucial. The extent to which experts 'play nice', and the degree of genuine deliberativeness in conferencing evidently rests heavily on the authority, skills and attentiveness of the facilitating commissioner. As one expert explained, "Whether or not [a hearing] goes well is completely dependent on the commissioners and their ability to hold a fair hearing, call people to account when they are misbehaving, and allow everyone to speak" (Freshwater ecologist: consultancy, Feb 2023). Most experts interviewed for this study expressed their views on both 'good' and 'bad' commissioners. The 'good' commissioner was defined as somebody who "is very [clear] about the boundaries [set by the Code of Conduct] from the outset" and who also:

> "… smells bullshit, and will drill down and interrogate when there is an expert perhaps trying to get themselves off the hook. By off the hook I mean sitting on the fence a little bit, perhaps not wanting to give a view that's unpalatable to their client, holding back on the full known facts of something because it's difficult and not going to make the case any easier. A good commissioner would recognise that and push a line of questioning to ensure that the expert answers" (Freshwater ecologist: consultancy, Jan 2023).

This same expert explained that it is the *Code of Conduct for Expert Witnesses* that "protects" experts within the EnvC, arguing that as a consequence conferencing at the regional level and the EnvC are "poles apart": "I much prefer work in the EC. It's much more structured, people get a fairer hearing … . I think the thing that protects us experts is the *Code*. And I think this is why it works so much better in [the] EnvC. Our overriding duty is to assist the Court not our client or anybody else. Not to serve ourselves" (Freshwater ecologist: consultancy, Jan 2023).

EnvC Commissioners spoke of a range of practices used to ensure experts are adhering to the behavioural norms of conferencing and remain within the *Code of Conduct*. For example, if a commissioner notices that a younger or more inexperienced expert is not speaking

during conferencing, the commissioner may ‘offer guidance’, which can be done by taking steps to ensure the expert is heard in conferencing, or in a private, informal conversation between the expert and the commissioner, which was described as "taking the good citizen approach" (EnvCC, Feb, 2023). Situations sometimes arise in which an older and more experienced expert is openly dismissive of the views of less experienced experts, or "an expert tries to force their views on other experts" without demonstrating due deference to conflicting viewpoints (EnvCC, Feb, 2023). Ego-management is evidently something that every EnvC Commissioner must engage in from time to time, and Commissioners have significant flexibility in addressing (or ignoring) such instances. One Commissioner noted that "Occasionally - more often than you’d like - experts get bound up with their own self-importance" (EnvCC, Jan 2023). In a 'best-practice' scenario, a commissioner will identify and attempt to address 'self-importance' first in conferencing, and if the issue persists, directly by meeting one-on-one with the problematic expert (EnvCC, Feb, 2023). While noting that such instances are "extremely rare", one EnvC Commissioner outlined their own process for managing experts who attempt to dominate conferences:

> “Experts who push their own views without listening and trying to understand what others are saying are not complying with the Practice Note in my view. The facilitator can often assist by trying to find common ground among experts or, if that doesn’t work, make it clear to the expert they are not assisting the Court. This could either be done in front of other experts or privately during the conference, or both, which is a judgement call. Sometimes it is necessary to do it in front of all experts so that they can see the facilitator’s impartiality and unwillingness to allow any expert to dominate unreasonably” (EnvCC, Feb, 2023).

The EnvC *Practice Note* (2023, s9 a-b, p 24) states that the expert witness's duty to the court overrides any duty to the client who has employed them, and that "An expert witness is not and must not behave as an advocate for the party who engages them". A major part of a commissioner's job is to monitor experts and ensure a separation of facts and values, so experts must assume an impartial stance, and perform this impartiality during

conferencing, hot tubbing and cross-examination. In the words of a senior EnvCC official: "There is no place for taking sides in expert conferencing, which is advocacy, and I would make that clear in a very firm way at a very early stage if it looked like becoming a problem" (EnvCC, Feb, 2023). Advocacy was referred to by one expert as 'the dirty word':

> "[Advocacy] is the brush you get tarred with if you dare to have a view on anything. I have real difficulty with that, with the idea that we're all objective automatons, and that's the goal of science. Because everyone takes their values with them wherever they go, and there's no getting away from that" (Freshwater ecologist: consultancy, Jan 2023).

Another expert felt that displaying any overt emotion either at conferencing or the oral presentation of evidence through cross examination is "risky" as it can potentially be interpreted by commissioners or members of the bench as an indication of bias or advocacy:

> "I've been told I'm passionate a number of times, and my impression is that this is a way of sidelining what I'm saying, without really having to say that. Passion means emotion and emotion means bias, and for an ecologist this makes no sense whatsoever … most of us are ecologists *because* we're passionate!" (Conservation scientist: NGO, Oct 2022).

An EnvC Commissioner disagreed, noting that, "passion, per se, is not the issue. I'm passionate about making sure everyone gets a fair hearing and the court makes decisions based on the best information, and I don't think that constitutes bias. Passion without objectivity is where problems arise" (EnvCC, Feb 2023).

So how do EnvC Commissioners monitor for and detect bias or slippage into advocacy? In interviews with both experts and commissioners, the term "hired-gun" came up frequently. An EnvC Commissioner defined a hired-gun as "somebody who would change their opinions to suit their client's needs" (EnvCC, Feb 2023). Because New Zealand has such a

small pool of specialists to draw on, the reputational capital of experts is extremely important, and expert-witnesses (and Commissioners) tend to become known quantities relatively quickly. But Commissioners tended to express high degrees of confidence in their own ability to detect expert bias through observation. As one EnvC Commissioner explains, hired-gun behaviours usually manifest in fairly obvious ways during conferencing:

> "An individual expert will continue to question every aspect of their peers' work and the information available. And continuously do that. Even when they raise a point and it's satisfied and there's no problem or no value in [continuing a line of questioning] there is *always* another point. There's *always* another question. There's *always* another challenge [on the grounds of] deficiency of information. When that's occurring, that's always a clear signal to me that this person is not being particularly impartial. They are looking for ways to disrupt this process on behalf of their client. It is very unusual, but it does occur" (EnvCC, Jan 2023).

While EnvC commissioners expressed similar views on how expert bias manifests itself, there was some variance in their views as to how far it can be removed from the conferencing process. As a whole, EnvC and independent commissioners maintained that, if conferencing is rigorously and fairly facilitated, bias can be effectively removed or at least minimised to the point it will have no influence on the Court's decision making. Here there was some tendency to see the norms and rules of expert-witnessing as a partially self-regulating system similar to Merton's theorisation of the norms of science as providing an internally self-regulating system that upholds the objectivity and integrity of scientific inquiry (Merton, 1973). One Court official referred back to their pre-EnvC experience as a planning consultant, during which he "took the view that credibility comes from giving the same opinion on an issue or case regardless of who engaged me" (EnvCC, Feb 2023). This commissioner continued to explain that, as a consultant, he was often in a position of having to give evidence or advice that he knew his client would not like:

> "[And I thought that advice] that would be the end of the engagement. In all but one occasion that I can recall, they continued to engage me and with very few exceptions it resulted in much more work than I was originally engaged for. In my experience, most

> clients like to know they can rely on the advice they receive, even if they would have preferred it to be different. Again in my experience, word gets around and you can find yourself with more work than you can handle" (EnvCC, Feb 2023).

An independent commissioner with a background in environmental and planning consultancy explained how impartiality is incentivised within the EnvC from an expert's position:

> "In one EnvC case where I appeared as an expert-witness - and I'm sorry I have to be a little bit vague here - [my client's] position was X, but the court found out that X was actually X + Y. Therefore I couldn't keep arguing, "You can stick with X, because the other party's expert is an expert in this particular area, which is outside of scope." So I amended my position to deal with it, and came up with answers as though it was X + Y. And the Court will look more favourably on that because you've actually done your job properly … But if you didn't amend your evidence, you might get slammed by the court" (Independent commissioner, March 2023).

In these official's view, the objectivity demanded by the EnvC serves to incentivise experts towards a virtuous cycle of objectivity wherein the repeated demonstration of objectivity provides experts with cumulative reputational capital. Within this mostly self-regulating system, a Commissioner's role is primarily the enforcement of procedural rules and standards, and as long as these procedures are rigorously and fairly applied, expert bias can be effectively managed. The authority of commissioners does not rest on accumulated technical knowledge, but rather the ability to make judgements based on disputed facts and knowledge claims which often involve high degrees of uncertainty:

> "All Commissioners recognise that we are not appointed because of our specific technical expertise. We are all capable of sitting on any possible case that comes before the Court. So we're here, I guess, because of our professional backgrounds. But more for our ability to make judgments. So it's bringing a broader element of wisdom into decision making beyond the legal or technical" (EnvCC, Jan 2023).

In a particularly instructive elaboration of this procedural juridical habitus, this same EnvC Commissioner described conferencing as an "art form" requiring a sense of the game

that can only be acquired through practice. This Commissioner had difficulty articulating the key skills of an EnvC Commissioner, noting he feels they are "instinctive", which points to the way a sense of the game typically operates on a pre-reflective level, operating in the background, shaping agents behaviour and judgements in subtle ways (Bourdieu, 1972). This commissioner made an important distinction between pure science and expert witnessing:

> "In conferencing, that pure scientific debate is what you'd like to see happening, but in practice there is always an element of client bias. We recognise that there is *always* an element of that bias. And by the way that the discussion progresses and the way that the conference is facilitated by the commissioner, you can overcome much of that. But often an expert will rely on their evidence in chief. By the time conferencing begins, generally expert evidence has already been circulated, and often there is a tendency for an expert witness to simply say, “Have a look at my evidence”, "Look at my evidence”, “It’s in my evidence”, rather than recognise that there is something that may have influenced their evidence if they had taken a wider view, or taken something else into consideration. So for the commissioner, it’s a matter of making sure that all the evidence is on the table, and all the views are on the table. And then have - as close as you can get - an impartial discussion about what the best outcome is in relation to the specific technical issue that is in front of them" (EnvCC, Jan 2023).

The EnvC officials interviewed for this study emphasised that by far the majority of experts acting as witnesses display high degrees of professionalism, and that breaches of the *Code of Conduct* are exceptionally rare. When breaches do occur, they argued, they are relatively easy to identify and can be effectively mitigated by facilitators.

It is important to note that expert witnesses who appear in the EnvC and regional council hearings are overwhelmingly drawn from the CRI and consultancy sectors, and according to informants, university experts are relatively minor players in EnvC hearings. Quoting a senior EnvC official, university experts "represent a very small percentage of experts, probably in the very low single digits" (EnvCC, Jan 2023). In the words of another EnvC Commissioner, "It's never been common in my experience to have academic input into conferencing and witnessing. Generally we see consultants and CRI people - those sort of experts" (EnvCC, Nov 2022). High compliance with the *Code of Conduct* reported by EnvC

Commissioners would tend to indicate that CRI scientists and scientists employed by consultancies are *already* habituated to the standards of expert witnessing, with both CRIs and consultancies offering internal training and support that is not available to university employed scientists (Ecologist: CRI, March 2023). As an EnvC Commissioner observed, experts appearing in the EnvC "are generally familiar with resource management processes in New Zealand and with the Environment Court's *Practice Note*, and the Court's expectations of experts" (EnvCC, Dec 2022).

It should also be noted that the EnvC has no input into what type of experts appear on behalf of parties. The employment of an expert witness is solely a matter for the parties themselves and the expert's status as a reliable expert, and the weight assigned to their evidence is a determination that the court bench must make. Such determinations are primarily based on an expert's written evidence (individually or included in a JWS), or during cross-examination, which is typically undertaken in instances where the JWS shows significant gaps in expert evidence (EnvCC, Dec, 2022). But there is evidence to suggest that in practice, 'common sense' frames of reliability are still used by the EnvC to determine the credibility of contested technical information. Judge Newhook expressed that "an expert witness's main capital in his or her professional life is, after all, reputation" (2013, para 12). However, the reputational capital of an expert is something that is primarily determined by the EnvC itself.

For example, in *Sea-Tow Ltd vs Auckland Regional Council* (2006) Judge Sheppard considered conflicting scientific evidence from six experts. In resolving this conflict, Judge Sheppard primarily relied on reputational capital, rather than technical argumentation. In determining a preferred expert, it was reasoned that "there was nothing in the evidence... to indicate that [they were] not independent, and carefully and thoroughly applying scientific method to analyse the available data" (2006, p 327). Here, an absence of observable evidence of bias, rather than technical competence, seemed to be the more important factor in determining evidentiary weight. While this juridically recognised reputational capital resembles academic capital - experts are defined by their qualifications, track record, professional standing - is not generated in the same way academic capital is generated, but rather, primarily through institutional standing combined with repeated expert witnessing. While CRI scientists may publish some

academic research papers, it is more likely that they will provide, as part of their written evidence, a list of externally commissioned technical documents and reports as proof of their expertise in a specific area (Ecologist: CRI, Dec 2022; Ecologist: university, Feb 2022). These are typically technical reports that have themselves been produced for a client under paid commission and 'peer reviewed' by one or two experts from within the CRI sector (Ecologist: CRI, Dec 2022). This means that, in a somewhat circular pattern, CRIs and resource management consultancies have significant autonomy in setting their own standards of scientific validity and authority, which decision makers are more likely to defer to in instances where an expert has already developed reputational capital through repeated expert witnessing (Ecologist: CRI, Dec, 2022). As a university based ecologist put it:

> "In these situations you're up against consultants, and most of these consultants have not published a research paper in their *fucking life*. And if they work for NIWA, they would have just published a bunch of reports. And they self-cite. It's incredible! Reports they've done for Fonterra or whatever. And these aren't peer reviewed journal articles or anything - they are reports produced under a brief for a client. Writing reports for someone else and then citing that, writing more reports and more citing" (Ecologist: university, Jan 2023, emphasis added).

The low level of academic input in EnvC cases also relates to the type of knowledge that is perceived to emerge from university research. A commissioner commented that the EnvC requires "Experts who are grounded in pragmatic reality … experts who are exposed to a wide range of clients that have different perspectives and requirements as part of their day-to-day work" (EnvCC, Feb 2023) These "pragmatic" CRI and consultant-experts are contrasted with academic experts, who "tend to be more theoretical and not have as strong an understanding of practical realities: that things don't always work as well in practice as they do in reality" (EnvCC, Feb 2023). This explicit distinction between the pragmatic and *useful* scientific knowledge that is generated by CRIs and consultancies, against the abstract, theoretical (*not* useful) knowledge that produced within universities was a recurring theme in interviews with EnvC commissioners. While a university-based expert may have accumulated significant scientific capital in the academic field, this academically recognised scientific capital is not straightforwardly (or even commonly) convertible into

symbolic capital within the juridical field. The EnvC Commissioner quoted directly above went on to explain,

> "I've had academic witnesses [who have] been absolutely excellent. There's no question about that. But often my experience - and it's really only my experience I guess - is that [academics] can tend to [have the attitude of], "I am the expert in the room, because I have published 50 papers on this topic and I'm recognised as a world leader. Therefore *I am* the expert in the room, and I'm really not that interested in your view on this as a practising consultant rather than an academic." I'm not saying that's the norm, but there is a tendency towards that approach. And the court generally says, "That's OK, I can see you've got all these qualifications. But what do you actually have to *say* here? What are you actually saying about the issue in front of us and how does that stack up against what Joe Bloggs from the big consultancy is saying which is quite different?""

Habermas maintains that the capacity for communicative action hinges on an enabling institutional environment that allows each agent to participate on a level of equality with other agents, which provides the conditions in which rational and informed choices can be made between alternative actions (Flynn 2004: 434). The rules of conferencing and the facilitation practices of EnvC Commissioners are aimed at both minimising the adversarial, competitive nature of scientific practice and disembedding experts from their commercial relationship with their client; establishing ideal-type conditions in which scientists can cooperate and deliberate on matters relevant to the court. However, the same fundamental inequality that exists in criminal litigation also exists in environmental litigation - experts, consultants and lawyers are expensive to retain. In criminal litigation the burden of proof lies with the Crown: the Crown must prove its case beyond a reasonable doubt. The EnvC is much different, particularly as it must rely on expertise to attempt to predict the long-term future consequences of resource exploitation, regulation or the application of broad policy frameworks. [33] Despite the fact that technical expertise is arguably *more* crucial to

[33] It is more difficult to identify where the "burden of proof" lies in relation to the three main forms of environmental litigation that come before the EnvC. The issue of burden of proof was addressed in *Shirley Primary School v Telecom Mobile Communications Ltd* (1999) NZRMA 66, wherein Judge Jackson stated that the burden of proof lies with the applicant in this case, but in general there is no one standard of proof required by the EnvC and must instead be determined on a case-by-case basis.

judgements in resource management law than criminal litigation (or at least, technical expertise is central to every case that comes before the EnvC, unlike criminal litigation), there is very little NZ-based qualitative or quantitative analysis on the political economy of expert witnessing in the EnvC.

Here, Ong's (2001) research is an exception. Using both classification tree and logistic regression probability models, he found a numerical correlation between the number of expert's employed by a party and a party's likelihood of a favourable judgement in the EnvC, arguing that "of all the variables analysed, the one most likely to have a significant influence on the outcome was the number of experts" (2002, p. 274). Ong notes that local and regional authorities and large commercial organisations have the most resources to employ expert-witnesses, whereas Environmental NGOs, Iwi, community groups and individuals have the least resources (2001: 275-276). He found that where environmental NGOs, community groups and individuals do have the financial capacity to employ expertise, usually they can only employ a single expert (2001, p. 274). Ong further cites anecdotal evidence suggesting some experts are "shy" of accepting commissions from environmental groups on the grounds this may taint their reputation for impartiality in the eyes of commissioners and judges (2001, p. 275). Quoting Ong: "A side without experts, or with a much reduced number, is at a very distinct disadvantage from the start of the process" (2001, p. 276).

It is broadly recognised that "while the RMA regime appears to create a highly inclusive system of policy formulation and planning … these rights of participation are illusory for many people" (Grinlinton, 2013, p 40). Under the RMA, local and regional authorities have the discretion not to notify a resource consent application, or to follow a process of "limited notification" (RMA 1991, s 95B). [34] Grinlinton found that 95% of applications for resource consents are not notified, meaning that "many potential submitters may not become aware

[34] Local and regional authorities have the discretion not to notify resource consents where it decides the likely adverse effects will be "less than minor." Authorities may also decide to follow a process of "limited notification" if it is determined that the effects of a proposed development are restricted to a small group of people (RMA, ss 95A-G).

of a significant proposal until it is a *fait accompli*" (2013, p. 41). In 2000, the Labour-Green coalition government established the Environmental Legal Assistance Fund which allows not-for-profit community groups to apply for a maximum of $50 000 in legal aid to assist with the employment of expertise, legal counsel and consultant services (NZ Beehive, Dec 2000). However, the high cost of litigation along with the possibility of costs being awarded (the threat of which can be employed strategically by legal counsel to deter community participation) remains a significant barrier to participation in consenting processes. [35] Moreover, as Grinlinton observes, "the income/disposable asset threshold for eligibility [for legal aid] is set at a level that precludes most people from assistance" (2013, p 42). While individual academics and small consultancies with an ecological focus have been known to provide their services *pro bono* or at a reduced rate for Environmental NGOs and Iwi, this would be relatively uncommon.

ADR processes, particularly mediation or joint settlements, were introduced both to expedite cases and also to reduce costs to parties, with mediation "invariably much less expensive than a court hearing with its attendant witness expenses, legal costs and risk of an award of costs by the Court" (Newhook, 2018, para 18). While mediation has significant advantages, ADR processes effectively takes resource management out of the public sphere with parties negotiating confidential 'side deals' often involving significant trade-offs that are hidden from public view (Resnick, 2014). Mediating parties can potentially disregard future generations on account of their inherent bias towards their own immediate interests (Brown Weiss, 1995, cited in Borrie *et al.*, 2002). Moreover, the same unequal access to expertise, resourcing and knowledge apparent in environmental litigation also exists in mediation, although these power imbalances can sometimes be cloaked in the more informal tone and nature of ADR processes (Borrie *et al.*, 2002). While an experienced and diligent commissioner may be able to guarantee procedural fairness, they are unable to address social power inequalities. Rather than substantively engage with the many potential shortcomings of ADR, juridical commentary emerging from the EnvC tends to

[35] There are a number of cases in which substantial costs have been awarded against community and public interest groups (Grinlington, 2013, p 42, footnote 112).

acknowledge these issues as "challenges" and then sidestep them. In the words of Judge Newhook *et al.* (2017, para 14):

> "Some academics such as Judith Resnik have expressed concern that ADR risks creating "privatisation of adjudication", removing public law disputes from the public sphere. We consider that there are important safeguards against this in the context of the work of the NZ Environment Court because first, ADR processes are facilitated by members of the Court, our Commissioners, and secondly, resolution of cases in those processes is subject to final approval by a Judge who will not sign off without enquiry or even a hearing in open Court if there are problems such as want of jurisdiction."

Newhook *et al.* (2017) are effectively asking the public to trust in the strength of the EnvC's procedural safeguards and the wisdom and integrity of EnvC Commissioners, which seems to be a fairly typical disposition of EnvC officials when responding to any question relating to the various ways that social relations of domination may restrict or complicate access to environmental justice. In one EnvC Commissioner's view "levelling the playing field" between developers and the wider community is an important part of his public service (EnvCC, Jan 2023).[36] This Commissioner said they took "personal responsibility for community consultation wherever possible", and this consultation enabled him to "understand first-hand what the projects might mean for those directly affected and to learn from the local knowledge of those living in an area" (EnvCC, Jan 2023). Community perspectives are included on the agenda for expert conferencing, which he said "provides an element of levelling the playing field and access to justice for those who are unable to afford to engage experts for themselves … [and] provides an opportunity for less well-resourced parties to seek expert opinion on issues of particular concern to them" (EnvCC, Jan 2023).

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[36] EnvC Commissioners' comments on the "artistry" of conference facilitation, "levelling the playing field" and recognising the inherent client bias of expert witnesses' parallels the "sporting theory of justice" in which, "witnesses for each party might tend to partisanship, but somehow from their clashing testimony, the [court] in its infinite wisdom would distil the truth … so long as parties had an equal opportunity to bring forward opposing experts, under the same rules and with the same judge as umpire, then whatever the [court] made of the competing experts' stories was acceptable" (Mnookin, 2008, p. 1005).

Similarly, another senior Commissioner claimed that imbalances can be overcome through attentiveness to lay evidence, and the balanced assignment of evidentiary weight to conflicting viewpoints. Although a party may be able to 'stack the deck' with multiple expert witnesses, an 'imbalance' of expertise does not necessarily produce a biased judgement (inequality is usually referred to as 'imbalance'):

> "For the most part, at the Environment Court level, that [imbalance between parties] is recognised as a reality, and the decision-making system largely tries to even-up that balance in terms of how it deals with [expert-evidence], what weight it gives [expert-evidence]. You're aware of that imbalance and an enormous amount of effort is put into understanding what the community are saying, what their beliefs are and how they can be incorporated into the decision. So, while on paper it sometimes looks like a pretty severe imbalance, that's not always the case in reality. To some extent, yes, but not as much as you would perhaps think on first look."

> "Both in mediation and at a formal court hearing, we will have a number of lay-witnesses, if you like, who are community people or people representing community groups who have a strong point to make about an issue that's in front of the court, but they don't have the capacity to be represented by experts. And it's all about the weight that you give to that: it's about making sure that these groups and individuals are heard and listened to both in court and in mediation, and that they're not swamped. And this [comes down to a Judge or commissioner's] control of the process" (EnvCC, interview Feb 2023).

This commissioner went on to explain how imbalance between parties can be addressed during mediation:

> "What will often happen in mediation is that the primary parties will be there with their four or five experts and their lawyer. The other parties, the principles are not there - there's just the lawyers and the experts. And then there are a bunch of community groups who are just kind of floundering around. And there is often an

> attempt by the principal party's lawyers to dominate the discussion. Then it's the role of the Commissioners to ensure that that doesn't happen, and ensure that equal time and equal input that comes from every individual that's in the room. And when a party says, "Well our experts say this" [the response is], "Well OK that's fine, but I want to hear from these people who live next door" (EnvCC, Feb 2023).

Here it is important to emphasise that individual commissioners determine the most appropriate way to facilitate any conference based on their own experiences and case-specific requirements. As one senior Commissioner commented, "There is no one-size fits all [approach]" (EnvCC, Feb 2023). There are currently twelve EnvC commissioners and four deputy commissioners, and all but two of the latter group have facilitated expert conferencing to varying extents (EnvCC, Feb 2023). Three long serving EnvC Commissioners were interviewed for this study, so while interviews give an insight into proactive 'best practice' as it applies to expert conferencing, case management and ADR, actual practice could vary significantly depending on the Commissioner appointed to facilitate. EnvC Commissioners have central and increasingly crucial agency within the EnvC as both expert conferencing and ADR have become more common, they have arguably become more consequential agents within the EnvC than judges themselves. The increased agency of EnvC Commissioners has emerged in the absence of any clear legislative guidance on how to run ADR and expert conferencing, which has allowed the EnvC to develop its own strategies and procedures (Warnock and Pederson, 2007). EnvC Commissioners must attain certification and swear an oath to office stating they will "honestly and impartially perform the duties of office", however there is no clear code of ethics for commissioners or ADR participants (RMA s253, as quoted in Borrie *et al.*, 2002, p. 157).

The preceding three sections have described the juridical logic of expert witnessing and expert conferencing within the EnvC with an emphasis on the perspectives of court officials. A core argument is that expert conferencing represents the juridical reconstruction of the pure scientific community which, when refracted through a juridical

nomos, resembles something very close to the Habermasian ideal speech situation. The EnvC has endeavoured to produce a system in which experts' best interests are served by the aforementioned 'interest in disinterest' and this is the fundamental *illusio* of the game of expert witnessing. Quoting Crossley: "Rational debate… is 'regulated conflict' for Bourdieu, but integral to its regulation is the condition that interlocuters answer 'a demonstration with a refutation, one scientific fact with another'" (Bourdieu, 2000 as quoted in Crossley, 2005, p 91). Although court officials do not recognise the rules of expert witnessing as having any relation to the configuration of the publicly funded science sector, Bourdieu would argue there is a mutually reinforcing structural homology between the de-autonomisation of the publicly funded science system and the juridical re-autonomisation of science through the rules of expert witnessing and conferencing within the EnvC. Together, these rules and norms could be conceptualised as a *juridically constructed theory of expert practice* which itself operates as a form of juridical meta-capital exerting its influence across homologous resource management decision making fields.

That the structural configuration of public science providers is deemed to be 'outside of a EnvC Commissioner's role' presupposes the "practical privilege" of EnvC officials, a practical privilege which, "unrecognised as privilege, leads to an implicit theory of practice which is the corollary of neglect of the social conditions which make [this theory] possible" (Bourdieu, 2012, p. 1). As noted above, Bourdieu maintains that an absence of reflexivity in relation to the historical development of a field would be a generally held disposition of powerful agents within a field with a high degree of relative autonomy (Bourdieu, 2004, p. 74-77). The legal field's autopoietic (normative and operational) closure from the rest of society is not a novel observation, as Luhmann influentially argued, legal systems are "constituted [by] the elements of which it consists through the elements of which it consists" (Luhmann, 1988: 14). Part of what makes the legal autonomy distinct (alongside the development of a differentiated legal habitus) is its role as a mediating field within the totality of fields, and its particular relationship to conflict (Bourdieu, 1987). The EnvC's judicial theory of expert practice is asocial in the sense that it is an explicit attempt to

bracket out 'real world' conditions in the service of equal, rational deliberation between parties who are manifestly unequal in many ways beyond an access to expertise. Social and political relations of domination are juridically redefined as 'imbalances', and these imbalances can be corrected by a combination of court procedures, judicial oversight and the 'artistry' or sense of the game embodied by EnvC Commissioners.

Mutually reinforcing structural homologies are also observable between the CRI and consultancy sector and the EnvC, with experts within these sectors seemingly already well habituated to the type of applied, practical and locally embedded knowledge the court requires. Seven of the twelve EnvC Commissioners cite backgrounds in industrial and environmental consulting prior to joining the Court (Ministry of Justice, 2022), which would indicate a degree of commonality between the professional dispositions of consultants, CRI scientists and powerful EnvC officials. Consultants, CRI scientists and EnvC Commissioners are already 'speaking the same language' to some degree, which would appear to point towards a strong "structural coupling" (Luhmann, 1992) in relation to key positions within the consultancy, CRI and juridical fields. Paraphrasing one of Bourdieu's key philosophical influences, EnvC Commissioners and expert witnesses do not agree on the basis of facts alone, they also agree within a shared "form of life" (Wittgenstien, 2009, para 241). In contrast, university employed scientists are relatively minor players in the EnvC and, aside from a small handful of highly active freshwater ecologists, are rarely employed as expert witnesses on behalf of parties undertaking either mediation or litigation. The marginalisation of university based ecologists in key RMA decision making spaces is explored in more detail in the sections below.

While the sections above have described expert witnessing and expert conferencing from an ideal-type or 'best practice' perspective drawing on interviews with EnvC officials, the following section moves towards a closer examination of the complex messiness of expert witnessing as practice, shifting towards a closer focus on the experiences of experts across

overlapping water resource management decision making spaces: the EnvC, regional councils and the Environmental Protection Authority (EPA).

5.3 Expert conferencing as contextually embedded practice

Communicative rationality and the ideal speech situation have been the subject of voluminous critique within planning and policy literature which it is not necessary to retread here (Tewdwr-Jones and Thomas, 1998; Flyvbjerg and Richardson, 2002; Gunder, 2003; Hillier, 2004; Crossley, 2004; Innes and Booher, 2005; Saravanan *et al.*, 2009).[37] The Habermasian influence in NZ-based water resource management literature comes by way of the more general 'communicative turn' in planning theory, which started to become influential in Aotearoa in the early 2000s (Memon and Skelton, 2002). The theoretical basis of IWRM approaches does not feature explicitly in NZ-based literature, which tends to focus on enabling mechanisms and barriers to achieving IWRM under the RMA regime (Memon and Skelton, 2002; Bowden *et al.*, 2004; David and Threlfall, 2008; Painter and Memon, 2008; McNeill, 2016). The unacknowledged diffusion of elements of Habermasian

[37] There are many prominent criticisms of Habermas' social theory within planning theory and resource management literature, most of which are directly relevant to integrated water resource management. Habermasian informed consensus-forming processes typically fail because communicative action is based on the belief that the 'ideal speech situation' can result in transcendental mutual understanding and agreement between all participants (Gunder, 2003). His almost entirely discursive understanding of democratic action means he never practically elaborates the legislative and policy requirements that, according to him, form the material basis for ideal speech (Tewdwr-Jones and Thomas, 1998) Others argue he assumes that participants in deliberative processes all possess equal knowledge and have the capacity to make rational choices involving self-reflexivity and self- criticism (Saravanan *et al.*, 2009). Centrally, his continuing faith in the consensus-bringing force of communicative rationality is simply not supported by empirical evidence from the planning and development literature. Rather, the majority of research on participative and democratic planning processes indicates that "actors see little benefit in behaving 'communicatively rationally' when strategic, instrumental power-plays and manipulation of information results in more favourable outcomes for themselves" (Hillier, 2004: 41). In a rare, political-economic account of IWRM processes in NZ, Anne Bower (2016, p. 119) has argued that "the outlook for environmental quality in New Zealand under collaborative processes is bleak but perhaps not dismal", continuing that, "No matter how well intentioned the government officials, well trained the scientists, and altruistic the collaborative constituents, the logic of collective action predicts that the vested resource development interest will usually emerge as the winner."

communicative rationality throughout judicial and quasi-judicial resource management fields has no doubt been eased by the ‘natural affinity’ between Habermas' theory and "certain motifs of traditional liberalism … [including the] tacit assumption that free and uncontrolled discussion will always contribute to clarifying and resolving problematic situations, and that it is, at least ‘in principle’ always possible to attain consensus" (Guess, 2019, para 7, 8).

While a few academics have argued that Bourdieu's notion of field autonomy and the ideal speech situation can be combined in complementary ways (Crossley, 2004; Benson, 2009), for the purposes of this discussion, it is more useful to emphasise the differences. At the most general level, Bourdieu's notion of field autonomy is empirical and descriptive: it seeks to understand the historical, epistemic and socio-economic conditions of relative field autonomy/heteronomy and the way that a field's autonomy is reproduced through practice and always encroached upon by field-external forces, especially the field of power (Mangez and Liénard, 2014). By contrast, Habermas' ideal speech situation is theoretical and prescriptive: it sets forth a theoretically posited normative model for communicative 'safe zones' where relations of domination and exclusion can be transcended so that the *telos* of human speech, rational dialogue, can be realised (Flyvbjerg and Richardson, 2002).

Bourdieu is thoroughly against any transcendental appeals to universal rationality, which he says are based on a misrecognition of dispositions and epistemologies that are historically and socially contingent: "The necessity and self-evidence of these transcendental beings only impress themselves on those who have acquired the necessary aptitudes to 'receive' them" (Pascalian Meditations 2000, p 114). For Bourdieu, the ideals of rational communication do not come from the universal structure of language. Rather, they emerge from the dynamics and interactions of human history in highly differentiated forms depending on the autonomy/heteronomy of the field in question (Bourdieu, 2000, p 114-116). Habermas is criticised for relying on a reified and flawed prototype of human communication but, from a field-theory perspective, agents’ communicative practices must

be contextualised within the logic of the particular social fields from which they emerge. This differentiation does not mean relativity, however, and what emerges from historical processes can have 'transhistorical' significance (Bourdieu, 2004). The universal forms of rationality widely perceived to operate in scientific and juridical fields, for example, presupposes their relative autonomy. Once these fields establish the methods and procedures for 'good judgement' they must maintain sufficient autonomy from external political and economic forces to allow these criteria to continue to guide future judgements (Bourdieu, 1987; 2004).

Unlike the ideal speech situation, power relations are central to a field's relative autonomy. Agents are constrained by rules of the game and any agency is thereby contextual. The exercise of agency almost always entails some form of compromise between the *nomos, doxa* and *illusio* of the field and field-external influences. Fields are structured by contradictory principles of hierarchisation: "an external or heteronomous principle of hierarchization that applies to the field the hierarchy prevailing in the field of power, and an internal or autonomous principle that hierarchises in accordance with the values specific to the field" (Mounier 2001, quoted in Mangez and Liénard, 2014, p. 185). The field of power operates as meta-capital such that it influences the value taken by forms of capital within fields, being "the space of relations of force between agents or between institutions having in common the possession of the capital necessary to occupy dominant positions in the different fields" (Bourdieu 1992: 300). For Bourdieu it is capital-related conflicts, rather than discursive conflicts, that determine the scope for agency within a field. Highly rational fields, such as science and law, enable discursive debate within the range of discourse that hold scientific or judicially recognised symbolic capital. While neoliberal meta-capital (like any form of capital) can obviously take discursive forms, it primarily operates below the level of discourse as *doxa* - mostly as prereflective and embodied habits and dispositions. Likewise, society as a whole can tolerate discursive 'freedom of expression' insofar as the overarching field of power maintains the capacity to influence the symbolic capital assigned to the

particular forms of discourse that reproduce that field's own *doxa* (Crossley, 204, p 100). Quoting Crossley:

> "[*Doxa*] reflects the interests of dominant groups, whose rise to dominance has enabled their views and interests to achieve a taken-for granted status, beyond opinion and beyond question. This, moreover, allows these groups to adopt an apparently 'disinterested' and rational stance in debates. It is easier for them to be or at least appear disinterested because their interests are secured at a level of assumption and habit, below the threshold of discourse" (2004, p. 101).

While the EnvC's *Code of Conduct*, combined with the authority and diligence of EnvC commissioners and judges, can operate quite effectively in separating client interests from expert positions, the system is much messier at the more heterogeneous end of the science/policy nexus, and a major cause of this messiness is the absence of the specialised juridical logic which operates within the EnvC. While EnvC Commissioners stress they are not appointed for their technical expertise, all twelve commissioners (minus one whose background is in national and local body politics) cite professional backgrounds in RMA consultancy, legal or publicly funded science related fields (MfE, 2023). Because most Commissioners are appointed for multiple three year terms, they will invariably accumulate significant technical expertise which will include both 'epistemic competence' (Mnookin, 2008) and 'interactional expertise' (Collins and Evans 2007). The EnvC is therefore "both a judicial body and a court of expertise" (Warnock and Pederson, 2017, p. 374). The accumulation of this specialised expertise is reflected in comments from EnvC Commissioners, who emphasised that continual learning is both a necessary and highly fulfilling aspect of the role: "One of the benefits of being a facilitator is that you are constantly learning from some of the best experts in the country, about new and interesting things" (EnvCC, Jan 2023), and, "It's one of the beauties of the job really - always engaging with highly intelligent people and learning new things" (EnvCC, Feb 2023).

EnvC Commissioners must develop a specialised judicial habitus to manage scientific and technical disagreement and monitor for both client bias or overly 'interested', non-objective expert knowledge claims, both of which are defined as advocacy (*Practice Note*, 2023, s9.1-9.5). This is a juridical habitus with strong structural linkages with the professional habitus of CRI scientists, regional council scientists and consultant-scientists, and this commonality is demonstrated both in the professional backgrounds of the majority of EnvC commissioners and by the low level of capital assigned to academic science and a preference for what is perceived as more 'practical' expert knowledge produced within CRIs and consultancies. Practical knowledge is defined as knowledge "that includes some awareness of the challenges of implementing [what the science] is telling us in a practical way" (EnvC Commissioner, Feb 2023). While EnvC commissioners do not elaborate on what these 'challenges' are, the key barriers to implementing science driven sustainability law and policy as identified in the relevant science-policy literature are the political risk and economic cost of implementing science-driven, water use regulatory policy, law and enforcement at both the regional and national level (Jackson and Dixon, 2005; Wheen, 2013; Christensen, 2013; Koolen-Bourke and Peart, 2022).

While the EnvC is nominally free of political risk and must interpret the RMA on the basis of judicial precedent guided by policy statements as set by central government, decision making at regional councils is usually undertaken by a mixture of independent commissioners and elected councillors (McNeill, 2014). Informants who have served as independent commissioners on mixed hearing panels report that councillor contributions to panels is very mixed, observing that many elected councillors have limited capacity to understand the technical complexities of environmental management. Not only are councillor contributions variable, but it also seems both independent commissioners and judges sometimes display an unnerving lack of basic technical knowledge. One CRI expert commented that:

> "… I've certainly had what I consider to be quite shocking questions from some of the commissioners. On [an EPA board of inquiry hearing], some of our evidence was quite late in the hearing, and I had to explain in some detail what an MCI (macroinvertebrate community index) was to the judge. Even though they'd had lots of experts from the other side talking about water quality, I would have assumed by then they would've known what an MCI was" (Ecologist, CRI, interviews, March 2023).

Not only are many elected councillors and some juridical decision makers viewed as "out of their depth" (Freshwater Commissioner, Jan 2023), it appears independent commissioners often need to both re-emphasise the need for impartiality to elected councillors when sitting on mixed panels, and continually monitor for any behaviours that could lead to the perception of bias. One highly experienced independent commissioner expressed frustration at some councillors' conduct during hearings, which included a tendency to neglect preparation work, leaving the room in the middle of a hearing and demonstrating bias through behaviours such as shaking hands with submitters or applicants prior to the beginning of a hearing or inserting their own viewpoints or the viewpoints of their constituents into proceedings (Independent Commissioner, March, 2023). By way of example, this commissioner recalled that:

> "I've been sitting with councillors sometimes and we'll be questioning a witness, and there are three of us [on the panel]. And then I'll see, up in the corner, a councillor walking out to go to the bathroom or something. And you *can't* do that! If you're not there for the entire time, you can't make a decision. It's not a council meeting. It's a hearing under the RMA, and the principles of natural justice apply. [For the process to work, councillors] need to understand what [their] role is, in the same way that everybody else who is involved in a hearing needs to understand their role as well" (Independent Commissioner, March 2023).

Because of the mixed performance and capabilities of elected councillors, this commissioner stated that, generally, sitting on mixed panels is "something I do not like to do" (Independent Commissioner, March, 2023). Moreover, he noted that the performance of

independent commissioners is also variable, commenting that "there are some independent commissioners that I will not sit with, because in my own personal view, they do not operate as commissioners should. Or they can't write the decision. Or they are on the panel and then the next day [you'll find out] they are off on holiday for six weeks" (Independent Commissioner, March 2023).

Experts interviewed for this study near-unanimously viewed elected councillors, high ranking Regional Council staff *and* some independent commissioners as highly susceptible to industry stakeholder pressure. This led, in their estimation, to a general bias towards industry interests in water resource decision making at the regional level, which is particularly acute in regions with a high concentration of intensive dairy farming. Referring to the EnvC's power to review resource consents, regional policy statements and regional and district plans, one expert summarised the role of the EnvC as "cleaning up the expensive messes made by [regional] councils" (Conservation scientist: consultancy, Dec 2022).

As nominally democratically representative authorities, it is entirely appropriate for regional councils to involve stakeholders in plan formation and for independent commissioners to engage with a range of stakeholder views. Quoting an EnvC Commissioner:

> "I would say [independent commissioners] are quite right to [listen to and be influenced by stakeholders]. There's two things at play here: the development of a plan and its adoption by a council. This is a community process, and elected representatives are there to ensure that the community is involved. There can be different interpretations [of the RMA] but in the end they produce something that the council, as a political body, adopts as their plan. And once that plan is adopted by the council, essentially they have written a piece of law. And then when that plan is appealed to the EnvC, the EnvC is there to establish whether the plan conforms with the [RMA]. So it's

> a different role: [regional councils' role] is writing a law, [the EnvC's role] is establishing that the law is kosher" (EnvCC, Feb 2023).

However, this faith in the democratic 'community process' conducted by regional councils seems to rest on the assumption that civil society is composed of an informed and active citizenry and that communities are highly engaged in regional and local body politics. This assumption has clear parallels with the Habermasian/traditional liberal idealisation of the inherently democratic power of communicative action, an assumption that is clearly not reality based. Voter turnout in regional council elections has declined severely over the last three decades from a national average of 57% in 1989, to a low of 38.2% in 2019 (Local Government New Zealand 2019). This exceptionally low and declining electoral turnout is especially troublesome in view of the vast resources that regional councils are empowered to manage, which include both natural resources as well as rating revenue, with regional councils on average generating 85% of their income through local property taxes (DIA, 2015).

There are multiple overlapping structural causes for community disconnection from regional and local body politics, but an important cultural and socio-political factor is the historical development of regional councils as "landholder democracies" (Hill, 2003). For Hill (2003), this has created a deep-seated perception in the general electorate that regional authorities exist primarily for the 'protection of ratepayers', a perception that is reinforced during regional election cycles wherein promises to reduce (or at least, to not increase) council rates is the most common platform for successful election (Asquith *et al.*, 2021). While every citizen pays council rates, only homeowners and landowners directly receive a rates bill in their mailbox (with non-homeowners paying their council rates indirectly through rent payments). Within this context, declining levels of home ownership in New Zealand function as a major barrier to regional democratic engagement, particularly among the young and the poor (Dean, 2015). Inside this vacuum, councils have a tendency to eschew community engagement in favour of sectoral stakeholder engagement, which

makes regional councils highly susceptible to capture by vested interests (Joy and Canning, 2020; Joy, 2022). [38]

The increasingly common use of at least one or two independent commissioners alongside elected officials is one element of EnvC practice that has been replicated at a regional level, with the objective of introducing a greater degree of juridical impartiality to the composition of hearing panels (Independent Commissioner, Dec 2022). An EnvC commissioner explains:

> "At the hearings level, it's changed markedly over the last 25 years. I was involved through the 90s with the first generation of plans under the RMA, and *all* of the hearings were put to a panel of politicians. They obviously had [council] staff there, but most of the time panels were elected members.
>
> It's evolved over the last ten years, and most councils now will appoint independent hearing commissioners. That's a major change that has occurred at the local government level. Even though those panels are not headed by judges, to some extent that replication of EnvC processes has occurred." (EnvCC, interview Feb 2022).

However, unlike EnvC commissioners, independent commissioners do not swear an oath of office, and the only criteria for accreditation is the completion of the two-day Making Good Decisions course run by the private training establishment Environmental Training Centre, with recertification required every five years (MfE, 2022). There are currently 1138

[38] Asquith et al. (2021) provide a fairly robust analysis of the structural barriers to voter engagement at the regional and local level, although their discussion does not extend to sectoral capture identified by Joy and Canning (2020) and Joy (2021). Another important cause of voter alienation identified by Asquith *et al.* (2021) is the lack of party affiliation at the regional level. While many local and regional body candidates have party affiliations, it is exceptionally rare for candidates to be transparent about these affiliations, preferring to campaign as 'independents'. This lack of transparency allows for "covert political activity, for example the centre-right National Party masquerading as the group Citizens and Ratepayers" (Asquith et al. 2021, p. 84), or Federated Farmers representatives campaigning as independent property owners (Rural News, June 2022). This lack of party support means that candidates must either generate campaign funding themselves, or else through industry channels (Asquith et al. 2021, p 86). The lack of formal party involvement in local and regional government elections also means an absence of "quality control" (Asquith et al. 2021, p 89), which has been clearly exhibited in the recent and frightening surge in far right candidates expressing support for Q-anon, white supremacist, anti-vaccination and sovereign citizen ideologies (Peacock, Aug 2022). The actively disruptive influence of some elected councillors on council hearing panels is further discussed with reference to the Horizons' Regional Council One Plan below.

accredited Independent Commissioners in Aotearoa (MfE, 2022). Not only does this number reflect the low barriers to entry, but it also points to a large and diverse marketplace of independent commissioners where councils are the primary clients. As the same EnvC commissioner noted, "Every council has their 'go to' if you like - a list of people who they call on to act as commissioners, all of whom are qualified through the government system. But they are drawn from a pool that the council holds" (EnvCC, Feb 2023).

For the experts themselves, the political economy of regional councils manifests primarily as a pro-development, pro-agriculture bias in hearing panels. In the view of one expert, "I can pretty much see how a hearing will go from who the panel are, and how hard a job I'll have trying to get a point across … Some [independent] commissioners can be very dismissive of experts. Cut you off in the middle of giving your evidence. Not allow you to finish what you're trying to say, things like that" (Freshwater expert: consultancy, Feb 2023). This expert recently attained accreditation as a freshwater commissioner, but believed their previous consultancy work with environmental organisations and Iwi meant she would not be seen as sufficiently 'objective' to be commissioned by regional councils to sit as an independent:

> "[Experts] tend to get pigeonholed … I have worked for a lot of NGOs, tangata whenua and DOC. I'm known to work in those spaces. So there is potentially a perceived [reputation for] advocacy, because those are the clients I've chosen to work for. I don't see it as advocacy - I just see it as choosing the work I want to do (Freshwater expert: consultancy, Feb 2023).

The "pigeonholing" of experts does not only occur on an individual level. Small and medium scale environmental consultancy firms can also develop reputations as 'advocates', and a conservation scientist explained:

> "Some people probably think [our firm] has a bent. Probably the same way we know which of our peers are swayed by whoever they are working for. We all have a view of each other. I find it really hard to stomach that. And we have been asked from time-to-time, "What are the examples of you working for the 'other side?'", or "How can you be qualified to talk on this when you've never worked for a developer?" … But I've never seen it go the other way. I've never seen anyone say, "Oh look, you've never worked for hapū, how can you be in this forum?" Or "You've never worked for Forest and Bird; how can you be in this forum?" So I just disregard that stuff as all part and parcel of this notion of [scientific/expert] objectivity and bias: close mindedness seems to flow one way, and what a surprise which way it flows!" (Conservation scientist; consultancy, March 2023).

A university based ecologist commented that it is 'naive' to believe that independent commissioners are fully independent:

> "[Independent commissioners] are appointed by the regional councils, and councils will appoint people who really have very similar views to the ones they want to express through their plans. And so, in my opinion, it's not a level playing field. They are not [just] judging the facts, they are interpreting the facts through their perception of the world.
>
> So they all have to [complete] the commissioner course, but then the councils will choose from a list of people. So I know some people who have trained as commissioners, but have never had the opportunity to sit on these panels. And these people I know are the more green-focused people. There are other commissioners who routinely appear on regional council panels, and to me they are well known as being pro-agriculture, pro-development. I feel the decision is really predetermined" (Ecologist: university, Nov 2022).

At the regional level, experts' adherence to the EnvC's *Code of Conduct* is voluntary, rather than mandatory as it is in the EnvC (RMA, s 72). Although an expert's refusal to abide by

the *Code* should greatly reduce the weight a hearing panel gives to their evidence (Independent Commissioner, March 2023), the degree to which opposing expert witnesses are monitored for impartiality will vary depending on both the composition of the hearing panel and the integrity, skill and knowledge of the facilitating commissioner. Although a commissioner should instruct experts to adhere to the confidentiality of the conferencing process, according to informants, confidentiality is routinely broken and communication between experts and clients is commonplace. According to one informant, an obvious sign of expert-client collaboration is when an expert changes their position in between conferencing sessions:

> "You can see it if an [expert] has agreed to a statement that has gone beyond or contradicts what their evidence had said, and isn't helpful to their client's case. And then they come back round at it, and they've got some wording to add or something like that. You've just spent a day with them and you see how confident they are in communicating something, and then you see a change in that. So that's an example, where [the expert] really has to bite their tongue and not say who they've been talking to. [What you feel like saying is], "Oh, did your client not like that?" But you can't really. Sometimes - and I've done this and I've seen others do this - you just quietly remind each other. You just quietly and politely and professionally remind each other of what the process is: we're here to help the court, not our clients … Depending on the individual, the response would either be outrage or quietness, and everything in between (Conservation scientist; consultancy, March 2023).

A number of experts stated that the principles of objectivity are often weaponised against ecologists within regional councils, EPA hearings and within the EnvC. A key difference between regional councils and EnvC and EPA hearings is that the cross-examination of experts does not occur at the regional council level, as it does within EnvC and EPA hearings.[39] Every expert interviewed for this study who had appeared in the EnvC could

[39] The Environmental Protection Authority is a Crown agency that regulates new organisms (plants, animals, GM organisms) and hazardous substances and chemicals, administers the Emissions Trading Scheme and manages the environmental impact of economic activities in NZ's maritime boundaries (NZ Government, 2020). Section 87 (a) of the RMA empowers the Minister for the Environment to direct that a regional council

cite various strategies employed by legal counsel to undermine the authority of their evidence. A common strategy appears to be asking questions that are designed, in the view of experts, to lead witnesses away from their specific area of expertise and breaching the 'stay in your own lane' principle (Gluckman, 2018), which can then reduce the weight given to an expert's primary evidence.[40] A university based ecologist explained how this tactic is employed:

> "During the EnvC appeals for [plan X], the [regional council's] lawyer was asking me questions that were really to do with farm management. And it's in that really tenuous grey area: "how would you manage your farm to control nutrients going into your river?" I'm a freshwater expert, and so my area of expertise is in the water. So I feel you have to be very guarded about not straying out of your area of expertise in case you say something that they consider out of scope, and as soon as you do that, they tend to ignore all of your evidence."
>
> I feel, and this is just my perception, but I feel they are really looking for an excuse to disregard everything that you say. And they don't do that in a piecemeal process: if they can find you say something outside your area of expertise, that's a good excuse to ignore everything you say" (Ecologist: university, Nov 2022).

Another CRI-based freshwater expert cited similar experiences within an EPA hearing, where legal counsel retained by a regional authority attempted to lead him towards stating an opinion on the projected economic cost of proposed mitigation measures:

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plan change or resource consent that is deemed to be of 'national significance', or involves complex or controversial issues that would benefit from an independent decision making process, is referred to the EPA. The EPA then takes over decision making power from the regional council. EPA hearings operate in a manner very similar to EnvC hearings, with EnvC judges appointed to oversee cases, EnvC commissioners or independent commissioners facilitating expert conferencing, and lawyers advocating for parties and cross-examining expert witnesses.

[40] The 'stay in your own lane' principle as explained by Sir Peter Gluckman (2018) in an influential address to the Resource Management Lawyers Association is essentially the same as the common law "area of expertise rule", which requires that "the area of expertise from which evidence is being given is an area that has credible theoretical foundations and methodology, and is recognised by others capable of evaluating those foundations" (Forret, 1999, p 44). The way this principle - as defined by Gluckman and practised in resource management law and policy fields - disadvantages ecological knowledge is returned to at the end of this chapter.

> "One of the elements [in this case] was on mitigation and offsetting [the ecosystem damage of a development] by helping to address fish passage [through a waterway]. And the [council's] lawyer was commenting on a certain dollar figure that had been applied to what was considered an appropriate level of [mitigation], and the lawyer was trying to get me to say, "Well, shouldn't it be ten times that [cost to achieve mitigation], or a lot more than that amount?" And I had to say, "Well it's difficult [for an ecologist] to put a straight dollar value on [mitigation measures], but I understand the process that was used to get to that amount, and I'm comfortable with that." But I was not the person who had come up with the [costing] so it wasn't appropriate for me to comment too much on that aspect" (Ecologist: CRI, Jan 2023).

Here the regional council's lawyer was attempting to lead this expert witness to make a comment on the economic cost of environmental mitigation, with the apparent aim of both leading the expert to breach the 'stay in your lane principle', as well as, assumedly, directing decision makers' attention to the high cost of the proposed mitigation measures. The experts quoted above have extensive experience in expert witnessing across multiple fields and felt they were well-equipped to deal with such tactics, primarily by avoiding any overt value statements and refusing to be led into any topic which is beyond their juridically defined scope of expertise.

Where an expert is implacable during questioning, an alternative legal tactic seems to be the avoidance of issues that would strengthen the opposing party's case. Quoting a university-based ecologist: "Most of what I say is very solidly backed up … I never make statements that are tenuous, so it's very difficult for lawyers and their associated experts to find flaws in what I say. So the [strategy] is usually [more about] *not* asking me particular questions" (Ecologist: university, Nov 2022). These experienced expert witnesses did note that less experienced experts, or experts with 'lower' order qualifications, tend to be much more vulnerable to such tactics. The ecologist quoted directly above talked of a highly

experienced, highly respected ecological consultant who, despite her experience, often struggles to have her evidence accepted during regional council and EnvC hearings:

> She's often the only expert for the green side of an issue, up against five, seven, ten other experts. She doesn't have a PhD. And she's a woman. And I find that really shocking, because she's had lots of job experience and she understands the plans and the legal side of it *far* better than I do - and she understands the science as well - but she sometimes appears to be disregarded. It's almost as though they're weighing it up: you've got one woman scientist without a PhD against three male NIWA scientists with doctorates. And so they give much more weight to [the NIWA scientists' evidence], even though her evidence can be much more credible and factually correct compared to that presented by the opposite perspective. And although she doesn't have that piece of paper, because of her years and years of experience, she actually knows far, *far* more than your average CRI scientist with a doctorate. (Ecologist: university, Nov 2022).

The rules of objectivity enshrined in the *Code of Conduct* combined with the broad application of the 'stay in your own lane' principle particularly disadvantages those forms of expertise that involve integrated, cross-disciplinary and transdisciplinary forms of knowledge, which includes most forms of applied ecology. While expert conferencing tends towards broad-ranging discussions, it seems decisionmakers expect experts to stay within strictly defined disciplinary boundaries when answering questions and presenting evidence - disciplinary boundaries which bear little resemblance to the way freshwater ecology is taught in universities, or the way ecological knowledge is practically applied in resource management spaces (Thoms and Parsons, 2002; Cadenasso, 2003; Barclay, *et al*., 2020). Quoting a university-based ecologist:

> "You're meant to focus purely on the science from a science perspective. But in my experience, certainly in all the caucusing that goes on prior to the actual hearings, there is very much a tendency to go outside that scope. And when I first started, I didn't really understand the rules very well. During one of the caucusing sessions we had for

> [regional council Plan X], we spent the whole caucusing session talking about planning issues. And I didn't know enough to say, "I'm not a planner, we shouldn't be talking about this stuff." And so I've learnt a lot since then" (Ecologist: university, Nov 2022).

These disciplinary boundaries, which result in the siloing of disciplines within expert conferencing, as well as guiding the weight assigned by decision makers to evidence from ecological experts, is a major (but mostly unacknowledged) barrier to achieving anything close to the 'integrated' approach to water resource management numerous planning researchers have argued is enabled by RMA amendments (Memon and Skelton, 2002; Bowden *et al.*, 2004; David and Threlfall, 2008; Painter and Memon, 2008; McNeill, 2016). An ecologist described the 'self-defeating' pattern of this approach:

> "In [a recent EnvC appeal hearing] all the experts got split up into topics [for conferencing]. So there was a water quality group of experts, an ecology group, a hydrology group and so on. And to some extent that was self-defeating, because these are highly integrated, 'mountains to the sea' type questions that are being asked …. The science has become increasingly interdisciplinary and transdisciplinary, so simply treating people like they have one singular set of expertise, especially in ecology where everything is linked, is not really a smart way of moving forward.
>
> And it became particularly evident that [the regional council's] choice of experts was quite limited, and other experts [who were excluded from conferencing] would have had quite a lot to contribute, and the quality of the answers that came back was constrained by the people who were selected to conference and address those questions" (Ecologist: CRI, Jan 2023).

The marginalisation of particular scientists *within* regional councils was also a recurring theme in interviews with ecological experts. As with independent and freshwater commissioners, informants commented that council scientists and technical staff with 'green' reputations are often not approached to act as expert witnesses on behalf of regional councils, and are excluded from environmental reporting processes. This also

seems to be the case within CRIs that have strong economic linkages with agriculture (principally NIWA, AgResearch, GNS Science, Landcare Research and Plant and Food). Within these CRIs, gaining a reputation as a 'greenie' is viewed as having a generally negative impact on career development and institutional advancement (*Interviews* - Conservation scientist: consultancy, March 2023; Conservation scientist: CRI, March 2023; Ecologist: university, Dec, 2022; Ecologist: university, Nov 2022; Ecologist: consultancy, March 2023; Entomologist: CRI [retired], March 2023). Here informants made similar and mostly negative comments regarding CRI and regional council science managers generally, some of whom are viewed as sacrificing scientific integrity in favour of institutional advancement (*Interviews* - Conservation scientist: consultancy, March 2023; Conservation scientist: CRI, March 2023; Ecologist: university, Dec, 2022; Ecologist: university, Nov 2022; Ecologist: consultancy, March 2023).

These types of perspectives were generally shared by the relatively small pool of experienced experts interviewed for this study, and while these interviews do not have generalising power, the fact these sentiments recurred throughout interviews would seem to indicate shared institutional rules of the game within regional councils and CRIs. It appears that, for certain purposes, regional council science managers will bypass internally employed scientists, despite their accumulated scientific capital, in favour of the short-term commissions with CRI scientists for particular purposes. A university based ecologist argued that "It's almost impossible to do public good science in CRIs or councils, and they know that" (Ecologist: university, Dec 2023). He continued:

> "My classic example is [expert X], and he's left [regional council X] now. But he was their freshwater scientist, and a really good scientist. Very on to it, straight-down-the-line ecologist, you can't get him to compromise or buckle on stuff - he would hold the line and he won awards for it. [Regional council X] celebrated him for it! But they started to realise, within the council, that if they went to him for the science, he would say, "No, you can't do it [because] the environmental impact will be too high." So after a while, they wouldn't use him at all. They would just get NIWA

> scientists to do it. So [expert X] is sitting around, fired-up with nothing to do. So he carries on writing papers. So while the NIWA people weren't publishing anything, they were the ones commissioned to do the work that [expert X] should have been doing….
>
> So you get these structures within councils where they won't touch their own scientists. If you've got a scientist who will write what you want, you'll go to them. But if you have a staunch one, like [Expert X], then he ends up not getting touched from within his own organisation. He won't get touched because they know he'll stand up for the river" (Ecologist: university, Dec, 2023).[41]

The recurring argument from this group of experts is that CRI scientists are viewed by regional councils, developers and industry stakeholders as being a 'safe set of hands', meaning they have been habituated to the political economy and tacit norms of expert witnessing, and that they are highly adept at tailoring evidence in such a way that both meets the objectives of their clients while maintaining the semblance of impartiality and scientific rigour. Scientists who actively defend their autonomy are marginalised within their institutions, and face barriers to career advancement (Conservation scientist; consultancy, March 2023; Conservation scientist: CRI, March 2023; Ecologist: university,

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[41] 'Expert X' was not available for an interview during the timeframe of this study. However, prior to leaving his employer, he sent an email to a large network of colleagues and friends across resource management fields. In order to provide an insight into the rules of the game that influence freshwater ecology within regional councils and the disconnect between an ecological habitus and the objective conditions of resource management fields that have produced the misfit disposition addressed in the final sections of this chapter, an abridged section of that email is quoted unedited with the permission of the author:

"I've finally made the very tough decision, at least for now, to leave freshwater aquatic science completely for a while. I can't really describe to you how frustrated and demoralised I feel regarding the state of freshwater in our region and the lack of policy and political will to arrest these declines and issues, even in the face of robust science info …. Realistically with this sort of framework I know I can't affect the change no matter how hard I try so I've decided for my own mental state I'd rather not know about [it] anymore. Sounds defeatist and maybe it is but I'm tired of being regularly upset about it and subjecting my family to it. I'd love to be proven wrong, but I just can't see how as a region, and as a country, we can service the amount of environmental debt we have allowed to accrue without a major and lasting change in policy and enforcement (and likely economic collapse in a number of primary areas). My purpose is not to demoralise anyone, but I think collectively we need to be realistic regarding what we can actually achieve given existing constraints rather than pretend like we can do everything, because it's simply not possible and it is also creating social anger and resentment (particularly among rural communities) which I also experience regularly. I can understand and sympathise with both sides but sadly that's irrelevant."

Dec, 2022; Ecologist: university, Nov 2022; Ecologist: consultancy, March 2023; Entomologist: CRI [retired], March 2023).

Ecological expert witnesses must therefore remain hyper-vigilant of any statements that may be perceived 'slippage' into advocacy, which, alongside adhering to judicially constructed disciplinary boundaries, appears to also include avoiding any expression of ecological values whatsoever. A university-based ecologist reported that, during a regional council hearing, Fonterra's lawyer asked him, covertly through the panel chair, if he was "philosophically opposed to discharges": [42]

> "And I said, "Yes, I'm philosophically opposed to *any* discharge." And apparently what happened afterwards - and I heard this through a colleague who was friendly with the chair - that meant that they could disregard my evidence. Because I'm an ecologist who is philosophically opposed to pollution! Imagine if I'm an forensic expert at a murder trial. And the lawyer asks you, "Are you philosophically opposed to murder?" And I respond, "Yes I am philosophically opposed to murder." And that means the judge can disregard everything I say as biased" (Ecologist: university, Jan 2023).

This instance occurred early in this expert's career, before he had learned the practical rules of expert witnessing. Ecological experts could cite numerous, similar examples where either an independent commissioner or legal counsel asked questions, they believed were tactically framed to destabilise their evidence by leading them to express pro-environmental values. Another expert recalled that during a council consent hearing, the first question put to her by the developer's lawyer was whether she was a member of Forest and Bird, "Because then I wouldn't be an independent expert witness - I'd be a member of this radical, scary organisation Forest and Bird! [laughs]" (Conservation scientist: consultancy, Jan 2023).

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[42] As mentioned above, lawyers do not directly question or cross-examine expert witnesses in regional council hearings. However, five ecology experts interviewed for this study stated they are aware of lawyers asking questions on behalf of their clients covertly and indirectly through either the panel chair or an independent commissioner, and this occurs "when [lawyers] they think they can get away with it" (Conservation scientist: consultancy, March 2023). While this practice is highly unethical, it appears to be relatively common.

The majority of ecological experts expressed little faith in the Code of Conduct's power to enforce impartiality independent of the agency of those commissioners with sufficient epistemic and technical competence to 'smell bullshit' (Freshwater ecologist: consultancy, Jan 2023). Experts pointed to both overt and subtle mechanisms that can be used by expert witnesses to align their evidence with the agenda of paying clients while staying within the bounds of the Code of Conduct. Every expert will receive a brief from their client which will include their clients' preferred outcome in a consent or plan appeal. Experts are left in the hands of their client and their client's lawyers until a written statement of evidence is produced, at which point the EnvC will determine if conferencing is necessary (EnvCC, Feb 2023). Pre-conferencing, the expert will generally be reliant on either their client or their client's lawyers, not only for a retainer, but for instructions on the issues in dispute and for the briefing of relevant information (Rackemann, 2011). As Judge Rackemann notes in relation to NSW jurisdiction, "The lawyers, doing their job, will ensure that the expert is fully conscious of all of the matters of relevance which may be thought to favour their client and will tease out any preliminary views helpful to the client's case while testing the expert on any doubts or misgivings the expert may have about the client's position" (2011, p. 7). Unless the EnvC directs conferencing early in the proceedings, the expert will begin to craft their evidence without consultation with the experts retained by opposing parties, and the experts retained by the other parties will typically be going through a similar process. As noted above, when conferencing occurs, experts are largely siloed according to either discipline or specialisation.

Expert witnesses can craft evidence in various ways to meet that brief, while adhering to the form, if not the spirit, of the *Code of Conduct*. One scientist working within a consultancy commented that this can be achieved by the omission of information that will hurt a client's case: "You're not directly lying, you're not being overtly dishonest; you're just failing to mention things. I mean I have seen it happen so many times" (Conservation

scientist: consultancy, Nov 2022). A university-based ecologist explains the pressure faced by CRI and consultant-scientists:

> "I have done consultancy work where, you know, I know how [consultants and CRI experts] feel. When you have the data - you might have six variables that you are looking at - and two have improved, two haven't done anything and two are getting worse. You do stress the things that have improved, to make your client look better. You can still be objective, but you put a bit of a spin on that objectivity. Which you *will* do if you are working for someone. You know, I like to think that I have a high level of integrity. But I know that I will do that if I am hired by a farmer or a developer to do a particular thing, I wouldn't ever say - and some consultants do - they'll produce a report, and it will say that things are really bad. And then they'll have an executive summary where they'll say "things are less than minor, it has no effect." I couldn't do that. But I could certainly highlight the good characteristics, and downplay the bad characteristics" (Ecologist: university, Nov 2022).

The expansion of the consultocracy over the lifetime of the RMA has given rise to a network of 'professional' expert witnesses (Forret, 2000). The environmental and planning consultocracy encompasses the CRI sector, hybrid research organisations such as the Cawthron Institute, as well as planning and environmental consultancy firms with national reach such as Boffa Miskell, Pattle Delamore Partners, Tonkin and Taylor, WSP, Morphum, 4sight, to name only the very biggest. It also includes the major industry players such as Fonterra and Dairy NZ which house a substantial staff of in-house experts, who, while nominally engaged in research and consultancy roles will, in fact "spend more time giving expert testimony than actively participating in research, development and other activities within their respective fields" (Forret, 2000, p. 46). As a conservation scientist working in a medium sized consultancy explains, this results in highly patterned interactions between experts during expert conferencing:

> "It's remarkable where the division of views falls in mediation or conferencing. Just about *every single time* the division is [the same]. On this side you have the species

> experts who work for DOC, people like The Catalyst Group, people working for Forest and Bird, people working for EDS. Iwi representation can depend where they are on a particular issue for a particular space and place, but they are generally [on the conservation side]. On the other side of the room you'll have the applicant's ecology experts and sometimes the council representation in that process. The expert working on behalf of the council - maybe on some things they're on the left side, on some things they're on the right side, sometimes they are very firmly in one camp or the other - but quite often council is more on the side of the applicant than not" (Conservation scientist: consultancy, March 2023).

The RMA regime *requires* an industry of scientific experts. While countries like the United Kingdom have an Academy for Expert Witnesses and an Expert Witness Institute which provide courses in expert testimony and produce a directory of expert witnesses (Forret, 2000, p. 47), no such body exists in New Zealand (the Resource Management Lawyers Association and the New Zealand Planning Institute produce material on expert witness best practice, but these are associations of lawyers and planners, not scientists). An EnvC commissioner said he saw "no value whatsoever" in expert witnessing as a full-time profession, arguing that "an expert's value relies on their current and-up-to-date hands-on involvement and experience in their specialist field" (EnvCC, Jan, 2023). However, commissioners have limited means of determining expert witnesses' extra-juridical activities beyond the curriculum vitae of qualifications and experience that is included at the beginning of an expert's written evidence (which, as anyone who has written a CV understands, allows for a degree of creativity and selective omission).

When asked how he detects client bias in expert evidence, an independent commissioner replied, "There are certain people… who might either be a hired gun for a developer or for some type of environmental organisation where they just roll out the same people. [And] you get to know how those people operate" (Independent Commissioner, interview March 2023). In this commissioner's view, seeing the same people repeatedly giving the same types of evidence for the same clients is a potential sign of bias. However, as explained

above, there is a relatively small group of experts who regularly act as expert witnesses for environmental NGOs and iwi, and they *choose* to do this type of work precisely because it aligns with their environmental values, which, they feel, enables them to maintain their scientific integrity and professional autonomy. Environmental NGOs, community organisations and tangata whenua must rely on a much smaller pool of experts, most of whom will be either academics, or who work in small to medium size consultancies and can offer their services at competitive rates (Conservation scientist: consultancy, March 2023; Freshwater ecologist: consultancy, Jan 2023). Small and medium size consultancies operate within tighter margins and with a smaller, under-resourced client base, and will necessarily attempt to build long-term relationships with these groups, along with chronically under-resourced government agencies such as the Department for Conservation (Conservation scientist: consultancy, March 2023; Ecologist: university, Nov 2022; Freshwater ecologist: consultancy, Jan 2023). By contrast, industry bodies and council authorities have access to a significantly greater network of external and in-house experts, with the capacity to rotate these experts between regions. This has the effect that expert witnesses can avoid gaining reputations as hired guns by staying in constant motion across regions, cases and institutional roles (an example of which is detailed in section 5.3.1 below). Independent Commissioners' understanding of what types of expert behaviour constitutes bias or advocacy therefore appears to be another factor that can disadvantage ecological knowledge claims.

Moreover, along with the absence of any institutionalised monitoring of the activities of expert witnesses, the lack of oversight over regional councils' own resource consents has created a situation where regional councils can circumvent elements of decisions made by superordinate juridical bodies. Usually, regional councils are responsible both for granting resource consents and then ensuring the conditions of the consent are met by the applicant. As noted above, the EPA will assume responsibility for resource consent if a development is deemed to be of national significance or if it generates sufficient public

interest. Regional councils are then subject to the decision reached by an EPA appointed board of inquiry, which operates in a manner similar to an EnvC hearing.

A clear example of a regional council ignoring an EPA decision can be seen in the Transmission Gully highway consenting process, which has been analysed by Joy (2022), Monod-de Froideville and Louisson (2022) and reported on by Williams (April 2022). Dr Mike Joy was commissioned by Kapiti Coast District Council to act as their freshwater expert for the Transmission Gully project, a four-lane, 27-kilometre motorway running from Wellington to the Kāpiti Coast. During expert conferencing, Joy had argued that, for the project to go ahead, two consent conditions must be met in order to protect for indigenous fish migration near the Paekākāriki river: the construction of a bridge over Te Puka Stream, and the replacement of a culvert blocking fish passage over the Wainui Stream (Joy, 2022). The catchment is home to a number of threatened or at-risk indigenous fish species, and is an important passage for long-finned eels' migratory journey to Tonga (Williams, April 2022). Joy's evidence was deemed persuasive by the EPA and conditional consent was granted (EPA, 2022). As Joy explains,

> "So we went through what seemed like a good [conferencing] process. It wasn't adversarial. In caucusing you get to agree and disagree, and they deliberately try not to make it adversarial. And it's just the experts in the room and they're just agreeing on points of disagreement basically.
>
> So we do all that work, and the commissioners go away and write a big report and they put all these [mitigation] conditions in, pretty much agreeing with what we'd said. And they did a really good job of getting our disagreements on paper and getting conditions that would work. The biggest issue I thought I'd won on was to get rid of that old culvert on the old state highway, and to build an actual bridge so [there's still] a natural stream flowing under [the highway] and you don't restrict fish passage. And you don't have sediment build up" (Joy, personal communication, Feb 2023).

Three years later, at an advanced point in construction, Joy discovered that neither the bridge nor the culvert had been built. Once the EPA has established consent conditions, the agency is no longer involved. Greater Wellington Regional Council (GWRC) became responsible for ensuring the public-private consortium undertaking construction adhered to consent conditions set by the EPA (Monod-de Froideville and Louisson, 2022). With major construction delays and substantial cost blowouts (Howard, Feb 2020), the New Zealand Transport Authority had approached GWRC in October 2015 requesting a change to the EPA's consent conditions, which were quickly approved without public notification (Williams, Jan 2022). Instead of a bridge, the GWRC's revised conditions required for the installation of 'fish ladders' which had already been raised and deemed insufficient by the EPA and, in Joy's view, further restricts passage and exposes fish to predation (Joy, 2022).[43] Despite altering the resource consent no action was taken by the incumbent National government, which was strongly in favour of the new highway (Williams, April 2022). For Monod-de Froideville and Louisson (2022, p. 29), corporate interests, working together with the New Zealand Transport Authority and the GWRC, were able to secretly circumvent the EPA's consent conditions, “The proposed changes are, instead, material and substantive changes to the conditions that were to operate as the outcome measures.”

If not for the fact that Joy lives near Paekākāriki and has built a public profile as a pro-environmental science advocate, these changes may have remained secret. Joy believes he was manipulated during both the conferencing and consenting process. He speculates

[43] Joy explained on his blog that the 'fish ladder' idea had already been found wanting during EPA facilitated expert conferencing. He argues that the new consent conditions amount to the subsequent (secret) acceptance by the GWRC of a mitigation measure that had already been deemed unworkable by EPA commissioners, without any input from the experts who had deliberated on the original consent conditions. He writes:

"To make it clear and this is how I explained it in caucusing: a ‘fish ladder’ only mitigates the impact of fish passage obstruction in theory but not in practice. My analogy is blocking Lambton Quay with a 10-metre-high wall and proposing that putting a step ladder on either side would mitigate that blockage for office workers and shoppers in Wellington. This analogy is apt in two ways: the numbers of people moving along Lambton quay is variable, at 3am a ladder might mitigate the barrier when only a few people need access, but not at 8am, in the same way migrating fish arrive in large numbers at certain times. Another point I made in caucusing is that these ladders become chokepoints where predators can pick off migrating fish" (Joy, 2022, np).

that the reason the Boffa-Miskell consultant-ecologists working on behalf of the New Zealand Transport Authority agreed so readily to his proposed mitigation measures was because they knew they would probably not have to implement them. Quoting Joy:

> "In retrospect, [conferencing] was just a bunch of consultants telling me what they thought I wanted to hear …. But I mean, what was the point of the EPA hearings? The EPA is supposed to be for [developments] of national significance - you take it off the hands of the regional council and you have it as an EPA process. But once they've done that, that's it. The EPA doesn't have anything to do with it after that. Then all the conditions are just managed by the Regional Council as though it was one of their consents. And they just say "Yes, yes, yes" to everything the roading companies ask for, because they don't want to hold up the progress.
>
> So now I'm starting to think the reason that the NZTA [consultant-experts] were so agreeable to everything I said in caucusing was because they knew they wouldn't have to do it." (Joy, personal communication, Feb 2023).

In major infrastructural projects spanning districts and involving multiple government agencies and complex state/corporate partnerships, it is difficult to determine which agency holds superordinate responsibility. In New Zealand, central government usually retains ultimate authority over any resource management decision but in absence of direct intervention from the Minister of the Environment, what is left is "a diffuse situation of organised irresponsibility, in which no one – neither the ineffectual councils and agencies, nor the corporates – are culpable for environmental harms" (Howard, Feb 2020, np). This allows the regional authorities to perform good environmental governance within public facing decision making processes such as EPA hearings, reserving the option for subsequent backchanneling with private sector interests. Monod-de Froideville has calls these performative measures "cooling discourses", which are "reactions to claims that are gathering momentum about activity deemed harmful to the environment through acknowledging concerns and by appearing to address said activity in order that [the

activity] might continue unopposed" (2020, p 2). In a manner reminiscent of Gramsci's passive revolution, cooling discourses function as pacification techniques aimed at alleviating public concern in the service of maintaining the status-quo.

This section has described expert witnessing as a practice, with an emphasis on the views of a small pool of highly active and highly experienced ecological and conservation science experts working across multiple RMA spaces from different institutional positions. The EnvC and the EPA represent the more autonomous end of the New Zealand science-policy nexus, whereas regional councils are much more heterogeneous and highly susceptible to capture by economic and sectoral interests. While academic experts are generally minor players within EnvC proceedings, a small group of highly active university experts have significant experience across the range of resource management fields. A clearly recurring theme in conversation with experts from academia and small to medium-size ecological consultancies is that the evidentiary rules established by the EnvC and used throughout RMA decision making spaces puts ecological knowledge claims at a significant disadvantage compared to other types of expert knowledge produced within CRIs and larger consultancies that are more likely to work on behalf of regional councils, developers and primary producers.

Strong structural couplings between the resource management consultocracy and the EnvC and regional councils further devalues the capital of university based ecological experts, along with any form of integrated or interdisciplinary freshwater ecology generally. While interdisciplinary forms of ecological knowledge may have high symbolic capital within institutions such as universities, larger regional councils and 'green' consultancies, there are a series of structural barriers to the conversion of ecological knowledge claims into juridically recognised symbolic capital that can influence decisions. Predictably, these barriers, which are the material and ideological actualisation of neoliberal metacapital in resource management law and policy, are the most powerful at the most heterogeneous end of the science-law nexus: regional councils, CRIs and the

largest consultancy firms. Although experts tend to articulate these barriers as 'bias' on the part of independent commissioners and elected councillors, this bias is the outcome of the structural homologies that exist across formally distinct but operationally and ideologically coupled resource management spaces and will often operate on a dispositional, prereflective level. Individual agency plays a part, but experts are well aware that the 'bias' towards developmentalism observable across regulatory bodies is more the outcome of structural linkages between government ministries and agencies, industry and the environmental consultocracy, and these structural linkages are what entrench the capture of regulatory bodies by economic interests and heavily determine the objective conditions of overlapping resource management fields.

The following three subsections turn towards specific cases that illustrate how this 'bias' manifested in three major and fairly recent water resource management conflicts across relatively autonomous and relatively heterogeneous RMA decision making fields. At the more autonomous pole of the science-law nexus is the EPA board of inquiry that determined the consent conditions for the Ruataniwha dam scheme. Moving towards an analysis of the heterogeneous pole of the science-policy nexus are the Horizons Regional Council's attempts to implement the One Plan, and the Science and Technology Advisory Group (STAG) that informed the government's National Policy Statement on Freshwater (2020).

5.3.1 The Ruataniwha dam scheme

One example of how the aforementioned 'rotation' of experts works in practice can be seen in the unsuccessful attempt by the Hawke's Bay Regional Council (HBRC) to gain consent for construction of the Ruataniwha Dam between 2012 and 2014. The purpose of the $600 million dam was to provide water for irrigation, which would have enabled the expansion of intensive dairy farming into previously pastorally focused areas of the Hawkes Bay

region. It involved intractable conflict between a handful of expert witnesses employed by Fish and Game and Forest and Bird on one side, and a substantial cadre of NIWA and Cawthorne scientists employed by HBRC (Hendery, Oct 2014). As a project of national importance, the consenting process was transferred to the EPA who formed the Tukituki Catchment Board of Inquiry to oversee the consenting process (RNZ, Sept 2013). Freshwater experts witnessing on behalf of Fish and Game and Forest and Bird argued that the dam would greatly increase already unsustainable levels of nitrogen and phosphorus in the Tukituki catchment leading to levels of periphyton (algae) biomass and nitrate toxicity which would imperil the life supporting capacity of the river and its tributaries (Death, 2013; Joy, 2013). Of particular concern was the validity of the TRIM model developed by NIWA scientists to predict future nitrogen and phosphorus levels in the catchment, which NGO experts opposing the dam argued was designed to downplay the levels of nutrient run-off consequent of the increased fertiliser use from increased intensive dairy farming (Death, 2013; Joy, 2013). A core argument from NIWA scientists was that their modelling system predicted that more nitrogen could enter the river without causing more periphyton growth as long as phosphorus levels were managed (Hendery, Oct 2014; EPA, 2014).

NIWA scientists, working on behalf of HBRC, explicitly defined phosphorus and nitrate mitigation as separate issues. HBRC's proposed plan, informed by these NIWA scientists, adopted what was described as a "single nutrient" approach that focused on the management of phosphorus, with "nitrate controls only intended to avoid toxicity effects on aquatic ecology" (EPA, 2014, p 32). However, the "single nutrient" approach adopted by NIWA for the Ruataniwha hearing directly contradicted NIWA research undertaken by the same group of scientists for Horizons Regional Council (HRC) just five years earlier (Wilcox *et al*., 2008). In their previous research for HRC, these NIWA scientists had strongly and unambiguously reached the conclusion that nitrogen and phosphorus cannot be addressed separately. Wilcox *et al's* (2008) client report for Horizons states:

> "Both N and P need to be managed because of the interconnectivity of waterways (where different nutrients might be limiting the same stream network.) Periphyton growth and vigour is determined by antecedent water quality. This affects periphyton recovery from major disturbance events (floods). Lengthy exposure to high concentrations of nutrients is likely to give rise to vigorous growth of periphyton that will respond more quickly than if it were grown in low nutrient rivers. For this reason, year-long control of both N and P is important" (Wilcox *et al*., 2008, p iv - emphasis original).

Not only do Wilcox *et al.* (2008) identify nitrogen and phosphorus concentrations caused by fertiliser runoff (from pastures into rivers and streams) and groundwater leaching (into underground stream networks) as the main contributor to rapid periphyton growth in rivers, they repeatedly argue against the "single nutrient" approach that NIWA recommended during the Ruataniwha hearing:

> "Applying controls only to the "limiting" nutrient (and not the other nutrient) is not recommended. Nutrient limitation for unwanted algae growth may vary spatially (e.g. estuaries versus upland rivers) and temporally (i.e. seasonally). Where there is a key indication of a single, limiting nutrient (e.g. P) it would be sensible to focus on managing that nutrient without neglecting controls on the other nutrient (e.g. N). Permitting a land use because it is mainly known as being the source of one (non-limiting nutrient), rather than the target of the limiting nutrient, may unwittingly allow other forms of pollution (e.g. faecal [sic] matter and sediment) to occur" (Wilcox et al. 2008, p v).

The Manawatu and the Tukituki catchments both contain heavy nutrient loads and exhibit advanced degradation of macroinvertebrate and fish populations, and both catchments are surrounded by intensive agriculture (Joy, 2015; Ranstead, 2018). In their evidence to the EPA, NIWA did not offer any science-based justification for why their proposed "single nutrient approach" was appropriate for the Tukituki catchment when it had been deemed insufficient in the major client report five years earlier for the Manawatu-Whanganui

region (EPA, 2014; HBRC, 2013). A decisive difference between the NIWA's (2013) evidence for HBRC and their (2008) client report for HRC is that NIWA scientists were solely responsible for developing the single nutrient approach for HBRC, whereas the client report for Horizons was authored by five NIWA scientists in collaboration with one university-based ecologist (Wilcox *et al.*, 2008). The same university ecologist who collaborated on the Wilcox *et al*. (2008) report also acted as an expert witness for Fish and Game during the Ruataniwha board of inquiry hearing and was able to alert decision makers to the clear contradiction between NIWA's evidence across two different catchments with substantial geographic and biophysical similarities. For this expert, NIWA's science for HBRC represents a "black and white example of [expert witnesses] changing their evidence to suit the mandate set by their client" (Ecologist: university, Nov 2022). He explains:

> "[NIWA] wanted to show that phosphorus was causing all the algal problems in the waterways, because they can manage the phosphorus by riparian planting. But if it was shown that nitrogen was the issue then increasing the dairy intensification - which is what they wanted to dam for - would be impossible to mitigate. A lot of those scientists were also involved in the One Plan, and part of the One Plan process was that we all had to get together and write a report on the relationship between nutrients and algal blooms. And we had all agreed that, even when it looks like phosphorus is a limiting nutrient, you also have to manage nitrogen. However in their presentations to the EPA, they were trying to advocate that phosphorus was the issue, so we didn't need to worry about nitrate. And all I did was say "Well, just across the road, in the Manawatu catchment, these same people had said - and I could just quote from the report - that even when phosphorus is an issue, you still have to manage nitrate." So to me, that was just a black and white example of how they had changed the science they were reporting to fit their client's expectations. However, when you present at the EPA, you have to sign a document saying "I'm objective"! It's a total joke" (Ecologist: university, Nov 2022).

The EPA eventually rejected the single nutrient approach advocated by NIWA and HBRC, and the dam was deemed both economically and environmentally unviable (Ranstead, 2017). Instead, the Board of Inquiry enforced the 'dual nutrient' control which manages both phosphorus and nitrogen. Rather than basing nitrogen limits on toxicity, the Board took a broader view of in-stream ecological health as the basis for the levels it set, and with the exception of one zone, dissolved inorganic nitrogen limits were set at 0.8mg per litre (EPA, 2014). As is discussed below, in 2008 Horizons Regional Council was in the late stages of developing and consulting on the One Plan, which included a forceful suite of water quality standards and regulatory mechanisms designed to mitigate the effects of nutrient build-up in the Manawatū River. Therefore it would appear that NIWA provided Horizons with the evidence it needed to move forward with the One Plan in 2008, and in 2013 these same NIWA scientists attempted to provide contradictory evidence that would enable HBRC to move forward with the Ruataniwha dam project.

The Ruataniwha dam gained national prominence and shifted public attention towards the nationwide pattern of regional councils "advancing private economic gain at the expense of degradation to public good resources" (Ranstead, 2017 p. 53). While the dam was supported by the incumbent National government, it was vigorously opposed by a range of environmental NGOs including Fish and Game, Forest and Bird, the Environmental Defence Society, Greenpeace as well as the Green Party (Greenpeace, May 2017; Green Party of Aotearoa, April 2016; Ranstead, 2017).[44] It is within this context that the evidence from this expert, combined with the scientific autonomy afforded by his institutional position and the juridical nature of EPA hearings, became decisive. In this expert's own words, "I was very surprised that the EPA sided with me, because I've been giving essentially the same evidence at regional councils for the past twenty years, and I'm usually ignored" (Ecologist: university, May 2023).

[44] The Green Party also accused HBRC of attempting to manipulate scientific expertise in favour of development. In April 2014, Green Party leader Russell Norman accused HBRC of terminating a contract with a team of groundwater modelling specialists within GNS Science after they raised "serious concerns" about the data supplied to them by HBRC. According to Norman, the Council then used an earlier GNS report which omitted the scientists' concerns in its application for resource consents for the dam (NZ Herald, April 2014).

5.3.2 The One Plan

The Horizons Regional Council's One Plan, which began development in 2002 and became operative in 2014 (with EnvC appeals ongoing today), is a uniquely important event in the history of RMA law and policy. The purpose of the One Plan was to establish a policy framework for sustainable management of natural resources management for every district within the Horizons Regional Council's boundaries, which extend to the Tararua, Manawatū, Horowhenua, Rangitikei, Whanganui and Ruapehū districts, as well as parts of the Waitōmo, Taupō and Stratford districts – a land area covering approximately two thirds of the lower North Island (HRC, 2011). The Plan replaced six separate plans and sought to integrate air, land, water, and coastal resource management into one overarching framework of rules, policies and environmental objectives to guide resource management in the region up to 2030 (HRC, 2020).[45] The Plan involved a particular focus on the 'Big Four' priority problems identified by the Regional Council: water quality, water demand, hill country land use and threatened habitats (HRC, 2008: 1). The core 'environmental enhancement' goals of the Water Part of the Plan were 1) reducing nutrient and pathogens from point-source ('end of pipe') discharges; 2) reducing the run-off of sediment and leaching of nutrients from intensive agricultural and horticultural land-use, and; 3) reducing sediment run-off from erosion prone farmland (HRC, 2008: 1).

In terms of its geographical reach and integrative scope, the One Plan was the single largest natural resource management plan ever attempted by a Regional Council

[45] There were a number of internal and external drivers that provided the initial impetus for Horizons to develop the One Plan. Formally Horizons was approaching its statutory requirement to review its operative Regional Policy Statement and regional plans, and the RMA Amendment Act (2003) required Council to provide for biodiversity in their planning documents (HRC, 2008: 1). Substantively, Council was dealing with a "huge increase in water demand" both from urban and agricultural centres, and the flash flooding which caused approximately $300 million in damage to the Manawatū region during February 2004 served to sharpen public anxiety over issues of sedimentation and soil erosion (HRC, 2008: 1; Manawatu Standard , Feb 2004). On a national level, Fish and Game's high profile "dirty dairying" campaign, which began in 2002, had sensitised the public to the environmental damage and human health risks consequent of intensive dairy farming.

(Conservation scientist: consultancy, March 2023; Freshwater ecologist: consultancy, Jan 2023). It was also arguably the most forceful attempt by any regional council to enact their regulatory mandate under the RMA and impose a robust and comprehensive set of rules on land-use activities in a region dominated by agriculture. Given its ambitiousness and size, and given that it provided a locus for issues of agricultural intensification and environmental degradation that had already been highly politicised nationally, it is not surprising that the One Plan involved intense, prolonged and bitter conflict between industry stakeholders, environmental NGOs and the regional council.

The plan had originally placed comparatively strict nitrogen leaching limits on farmers, making resource use consents dependent on farmers' agreement to meet required nitrogen leaching targets set by Horizons (HRC, 2008, p 271-275). Farmers who met Horizons' required N leaching targets would gain a consent of up to twenty five years, farmers with an approved 'whole farm plan' to reduce their N leaching would be granted a twenty-year restricted discretionary consent, whereas those farms that could not or would not reduce their N leaching would gain a five-year restricted discretionary consent with the requirement of developing a mitigation plan that would bring them into compliance (HRC, 2008, p 271-275). Agricultural stakeholders argued through expert witnesses and in public forums against the proposed regulatory regime on three main criteria: 1) That the modelling software and science informing the proposed regulation was underdeveloped; 2) That industry-lead voluntary initiatives would be more successful in changing farmer behaviour, and, most significantly; 3) That the regulatory initiatives proposed by Horizons would render some farms economically nonviable and imperil the region's economic base (Russell, 2012, p. 21).

Federated Farmers and Horticulture NZ spearheaded a vigorous public media campaign arguing the One Plan represented "Farmergeddon" (Grocott, Feb 2013) and a "war on farmers" (*Rural News*, April 2009) which served to unify and mobilise the farming community against Horizons. Following the October 2009 regional council election, the

composition of the fourteen-member elected council was decisively weighted towards agricultural representatives, with long serving regional council chair Garrick Murfitt dumped and the election of Manawatū-Rangitikei Federated Farmers president Gordon McKellar (*Rural News*, Oct 2009). Following the reassertion of rural political dominance on council, the regulatory components of the Water Part of the One Plan were either removed or greatly "watered down" by the regional council hearing panel (Country Wide, Dec 2010), a result that was widely perceived as “a big win for farmers” (Morgan, Dec 2010).

However, following a lengthy process involving more than 441 appeals to the EnvC from a multitude of parties, the rules for nitrogen leaching were reinstated in 2012, largely reverting the regulatory mechanisms of the Water Part of the One plan back to its 2008 pre-hearing version (EnvC, 2012a, 2012b), a decision widely condemned by agricultural groups, "who say it would make farming uneconomic and force farmers from their land" (Sharpe, Nov 2012). In its combined judgement on the One Plan appeals (EnvC, 2012c, s5-7), the EnvC included an interpretation of Part 2 of the RMA that foreshadowed the interpretation of section 5 formally established by the Supreme Court in *King Salmon* (2014) less than two years later.[46] Much expert evidence that had been rejected by the Horizons hearing panel was accepted by the EnvC. As an ecologist who acted as a witness for an environmental NGO both at the Horizons One Plan hearings and in the EnvC comments:

[46] There are numerous parts of the EnvC's combined judgement on the One Plan appeals that appear to foreshadow the Supreme Court's re-prioritisation of biophysical bottom lines in the *King Salmon* ruling. One example is found in (EnvC, 2012c, s5-7): "We should say, at this early point, that it does not answer that fundamental issue to say, as some did during appeals, that there is no present need to enhance water quality because the quality of some of the water bodies and rivers in the region is no worse than average figures for similar water elsewhere in the country. That is an unappealing argument, the logical extension of which would be to say that so long as the natural quality of all of the country's rivers and lakes deteriorates at more or less the same rate, then we need do nothing to improve any of them. In response to such a view, we simply point to Part 2 of the RMA, and its use of phrases such as ... s*ustaining the potential of natural ... resources*; *safeguarding the life supporting capacity of ... water*; *... the preservation of the natural character of ... wetlands, and lakes and rivers;* and *... the intrinsic values of ecosystems*".

> "Although this isn't how it should be, I've learned that at the regional council level [the decision] is more about which hearing commissioners are selected. I have presented essentially the same evidence at the Horizons One Plan and [Regional Council X] with completely opposite outcomes. One went to the EnvC and the other did not. If Horizons had not gone to EnvC, my evidence would have been ignored" (Ecologist: university, Nov 2022).

Federated Farmers exhausted its final avenue for litigation against the One Plan in an unsuccessful appeal to the Supreme Court in 2013 (Grocott, Feb 2013). However, due to the continuation of agricultural dominance of council combined with the exit of managers and council technical and research staff central to the development of the Plan, Horizons has shifted to a much softer regulatory approach, initiating Plan Change 2 in 2021 to make nitrogen limits "more workable for farmers", on the grounds that "very few existing intensive farming land uses can meet the cumulative nitrogen leaching maximums" (HRC, 2021). In April 2021, Horizons endorsed a Federated Farmers' proposal to negotiate "controlled activity pathways" for farmers who make a reduction in nitrogen loss based on farm baselines rather than catchment baselines, and to negotiate a pathway for consent for intensive farming land uses located in 32 catchments that cannot meet 20% reduction threshold (Edwards, April 2021; Federated Farmers, 2019). NGO and community appeals against Plan Change 2 are ongoing at the time of writing.

Regional Councils have historically been loath to use regulatory measures (Wheen, 2012; Joy, 2022), and the most surprising aspect of the One Plan is that it happened at all. According to informants, during the development phase of the Plan, council staff and enough elected councillors were unified under a science manager and council chair who were dedicated to not only mitigating but reversing accumulated biophysical damage to the Manawatū River (Conservation scientist: consultancy, interview March 2023; Ecologist: university, Nov 2022; Ecologist: consultancy, Feb 2023). Asking how the One Plan was initially developed, an ecologist central to the development of the One Plan explained:

> "From my perspective it was an alignment of stars basically. We had an [elected] council at the time that were either really into it, or they didn't understand what was happening [laughs], so we could get things [makes a *whooshing* gesture] past them. I mean that literally. And the Chair at the time, Garrick Murfitt - a sheep and beef farmer - he was extremely brave and he was a great fan of his staff.
>
> And the other star was [Group Manager X], who was the vision and the drive behind it. And he got together a team of people who were headed in the right direction and equally excited. And that window, that door opened, and we ran for the gap. It was an exciting time. It was very challenging and tough for people and leadership and [Group Manager X] wore a lot of that. The rest of us were just doing our tech reports and we really relied on the support of our manager" (Conservation scientist: consultancy, March 2023).

The importance of [Group Manager X] was emphasised by a number of informants. As the agricultural stakeholders became increasingly aware of the proposed nitrogen leaching regulation from approximately 2007 onwards, some technical staff and scientists working on behalf of Horizons became the target of public and personal attacks from stakeholders (Conservation scientist; consultancy, March 2023; Conservation scientist: CRI, March 2023; Ecologist: consultancy, March 2023; Ecologist: university, Dec, 2022; Ecologist: university, Nov 2022; Ecologist: CRI, Jan 2023). One expert commented that Group Manager X's great strength was his dedication to "protecting" his science and technical staff from agricultural stakeholders and councillors:

> "[It was in] the political process [that] it got really ugly. And there was a bit of a wall built between the staff and the council, and some of that was for the protection of the staff, which was fair enough. That was [Group Manager X's] role: "I'll eat all the shit sandwiches, and you just get on with your work." That was part of what made him a good leader. He [ensured] that the shit didn't run downhill. But then later on it was just a very anti-staff kind of mentality of, "What's your science got to do with our decision making?" [attitude from council]. [Increasingly] there was a real disconnect I think

> between information and decision making: decisions were being made [on the grounds of] “This is what I believe” and "This is my feeling” and “This is what my constituents are telling me", rather than evidence and science. And that became more the norm" (Ecologist: consultancy, March 2023).

From approximately 2007 onwards conflict between council staff and agricultural stakeholders had become intractable, and the scope of public 'debate' shifted decisively away from the need to stall and mitigate environmental degradation caused by intensive agriculture, and towards the economic cost of mitigating this degradation (Conservation scientist; consultancy, March 2023; Conservation scientist: CRI, March 2023; Ecologist: consultancy, March 2023; Ecologist: university, Dec 2022; Ecologist: university, Nov 2022; Ecologist: CRI, Jan 2023). Farmers had little confidence that their interests could be pursued within the formal channels of participation, and instead turned to rural and mainstream media to voice their discontent. From the perspective of a conservation scientist, industry-funded rural 'community' print media such as *Rural News*, *Farmers Weekly* and *Country Wide* (which are freely distributed to farmers and growers nationally) played a pivotal role in the public's understanding of the One Plan:

> "That’s a good platform for [agricultural stakeholders] to make traction I guess, and to spread their side to a relatively uninformed public. Because it’s very technical and very complex. [And no] council would want to go tit-for-tat on that stuff. Council [technical staff] are just focused on the process and it’s the sort of thing that doesn’t play out well in soundbites.
>
> One side will say, “The evidence states water quality is munted and declining. Biodiversity is dropping like a rock.” And the other side will say, “No no no no, and we’ve spent millions of dollars planting trees, and all the waterways are fenced”, and then everyone says, “Oh, they’re doing such a great job! Give them a break!” I think it’s just the nature of it: it’s very hard to have the tough conversations that need to be had, and the technical conversations, in the media. Very little nuance" (Conservation scientist; consultancy, March 2023).

As Lubell (2011: 553) observed, in the context of failed IWRM projects in California, “Because environmental policies often feature diffuse benefits and concentrated costs, environmental interest groups are more difficult to organise than concentrated business groups.” Given the comparatively negligible media presence of environmental NGOs, it was the more organised media campaign of primary producers – led by Federated Farmers and disseminated principally via industry-funded rural media – that well and truly dominated public awareness of the Plan (Russell, 2012, p. 23).

Within this highly politicised context and with limited political agency, Horizons publicly maintained a politically neutral science-driven approach with a heavy emphasis on evidence-based policymaking (Conservation scientist; consultancy, March 2023; Ecologist: consultancy, March 2023; Ecologist: CRI, Jan 2023). This involved the deployment of something closely resembling a "neutral science" strategy. Neutral science refers to the popular notion that the natural sciences possess authority as an objective source of knowledge, which is perceived to exist outside of or independent from the social and political conflict of wider society, and that this perceived neutrality "demands acceptance" (Ozawa, 2005, p. 239). Quoting an ex-Horizons senior staff member:

> "In terms of the One Plan, one of the things we always tried to aspire to do with the science was to get the right experts from around the country expressing their own opinions, so the councillors had every available resource they could to make the right decisions. We asked very openly that everyone come and just be themselves, to express their own professional opinion. In every case we were asking, “What is the best way we do this?” All the experts who worked for Horizons were completely honourable in the way they performed their roles, from my perspective. And we worked really hard to achieve this …. We also made a lot of use of independent commissioners. And when we caucused we got to solutions very fast. Because what it came down to was, “Let’s put aside the mandate of your clients and what is your scientific opinion on this particular aspect?" And we found that in the caucusing sessions we were involved with

> – especially around water quality targets – that it was really a straightforward and quite a neat process because scientists could operate as scientists" (Practitioner: consultancy, March 2023).

However, implementing the model of neutral science also introduces the inherent instability of scientific knowledge claims – the epistemic openness of science to critique and revision. As Ozawa argues, within environmental policymaking and litigation, scientific knowledge is typically deployed in one of two ways, "science can be used to support advocated positions in environmental conflicts, or to prevent policy being made around a rival scientific conclusion" (2005, p. 332). Internationally there is a wealth of literature detailing the successful use of scientific critique to destabilise scientific evidence informing anti-smoking legislation (Rosenstock and Lee, 2002; Bero, 2005; Brandt, 2012 Micheals, 2020). Such analyses show that neutral science is inherently vulnerable to the kind of problematisation and complexification that can be tactically employed to undermine its authority within policy and legal fields. Certainly, ex-Horizons staff and experts interviewed for this study agree that the simulacra of scientific critique is routinely used in a tactical manner by expert witnesses acting on behalf of primary producers. Quoting two experts and one high-ranking resource management practitioner involved in the development of the One Plan:

> "I think the biggest tactic that is used – and it is a tactic in my view – is one of "let's shake the science". I've had that quoted to me by a number of people on a number of occasions. The complexity and uncertainty within science can be used to shake confidence in what has already been presented. And I think we saw a lot of that in the One Plan" (Ecologist: university, March 2023).

> "You can always shoot down the science when it suits you. [Expert witnesses for dairy stakeholders] weren't introducing any new science into the discussion; they were trying to confuse the science that was already there. And their submission was very well put together to achieve that. It didn't actually offer anything new into the debate (Practitioner: consultancy, March 2023).

> People have this mistaken assumption that science should be able to provide 100% certainty, and 100% certainty is what's required to make uncomfortable legislation. Well, when people put that kind of burden of absolute proof on science, it's always going to come up short. That's precisely what tobacco lobbyists have been exploiting for years, and it's just what we saw Fonterra do in the One Plan (Ecologist: university, Feb 2023).

The science programme informing the One Plan was massive, and covered research in relation to land, water, air, and biodiversity and the Regional Council's State of Environment monitoring programme (HRC, 2009). To provide some sense of the scale of these projects, the development of Horizon's Sustainable Land Use Initiative (rejected by the hearing committee) involved twenty-four separate scientific studies, the majority of which were commissioned externally to CRIs (HRC, 2009). In public, agricultural stakeholders, particularly Federated Farmers, were intensely critical of the validity of the science informing the One Plan, particularly in regard to Horizons' method for assessing existing water quality state and trends, as well as measuring nitrogen loss from farms into waterways (*Farmers Weekly*, June 2009; *Country Wide*, April 2010). Federated Farmers Manawatū/Whanganui president Gordon McKellar commented in rural media shortly after the hearings, "The One Plan isn't science leading planners but planners trying to make science fit their assumptions about farming … The shame is that instead of establishing facts, Horizons has wasted millions of our dollars trying to make science squares fit planning's assumed round holes" (*Country Wide*, April 2010). For many rural producers, Horizons were seen as using science in order to legitimate an anti-farmer agenda. However, Federated Farmers did not employ any scientific experts to present evidence on their behalf, and did not make any submissions that directly challenged any of the science within the One Plan. While agricultural groups presented substantial economic, legal, planning and agricultural systems expert evidence against the One Plan, only *one* natural scientist (acting as an expert witness on behalf of Fonterra) challenged the

science as it related to water quality monitoring and the process of determining nutrient loss from point sources and non-point discharges (Scarsbrook, 2009; Horizons, 2009).

It was economic knowledge claims, rather than scientific knowledge claims, that had the most influence on the hearing committee's decision to reject the One Plan's nutrient limits (Ecologist: consultancy, March 2023; Ecologist: university, Dec, 2022; Ecologist: university, Nov 2022; Ecologist: CRI, Jan 2023). Conflict centered on Horizons's Section 32a report, which instructs council authorities to assess both the costs and benefits of a proposed regional plan, as well as explore 'alternatives'. [47] While section 32a is much broader than an economic cost/benefit analysis and instructs authorities to consider social and intrinsic costs and benefits (as well as the costs of *not* acting), in its *Guide to Section 32*, MfE states that section 32 of the RMA "encourages quantification of costs and benefits, emphasises the need to assess economic costs and benefits, and generally requires a more robust, more clearly articulated analysis that is proportionate to the type of proposal" (MfE, 2017, p 6). In addition, the current statement of *Government expectations for good regulatory* practice has a strong economic focus, requiring a "particularly strong case" to be made where a proposal might impact business, private property rights or market competition (Koolen-Bourke and Peart, 2021, p. 15). While a proposed plan or plan change should not hinge on an economic analysis, ministerial guidelines on the application of section 32 clearly privileges quantifiable economic costs and benefits in the planning process. This encourages regulatory authorities to "focus the regulatory impact assessment process on considering the impact of reform on 'regulated parties', with no reference to the broader public good or interest" (Koolen-Bourke and Peart, 2021, p. 15).

In response to industry criticism of the initial section 32a report which predicted an average 5% drop in regional agricultural productivity (HRC, 2008), Horizons agreed to commission an independent economic impact assessment carried out by agricultural

[47] Quoting MfE (2017, p. 5) section 32a of the RMA requires that:

- new proposals must be examined for their appropriateness in achieving the purpose of the RMA;
- the benefits and costs, and risks of new policies and rules on the community, the economy and the environment need to be clearly identified and assessed;
- all advice received from iwi authorities and the response to the advice needs to be summarised; and
- the analysis must be documented, so stakeholders and decision-makers can understand the rationale for policy choices.

consultants Nield and Rhodes (2010). In order to assess the farm-level compliance costs over the twenty years of the Plan's implementation, the report divided farms into four broad groupings according to operational characteristics and geographic location. The report ultimately concluded that there would be significant compliance costs over ten years for approximately 10% of rural producers, which averaged approximately $516 470 per farm (Neild and Rhodes, 2010, p. 4). Approximately 50% of the farmers affected indicated an average compliance cost of $86 900 over a ten year period (Neild and Rhodes, 2010: 4). The report also warned that, since both farm intensification and ecological degradation would advance in the interim, deferring action would result in a significant increase in compliance costs for farmers (Neild and Rhodes, 2010: 3). On appeal to the EnvC, DairyNZ produced its own macroeconomic modelling report that predicted the impacts over thirty years (to 2050) of four policy 'scenarios', which are a sequence of progressively more demanding regulatory policies as they will apply to the dairy sector (Diary NZ, 2013). In press releases, Dairy NZ focused on their 'worst case' scenario impacts, summarising these as:

- Costing 'New Zealand' $6billion/year, by 2050;
- A 24% decline in milk production, representing a 'serious threat to the international competitiveness of New Zealand's dairy sector';
- Exports in total dropping by $8.1billion/year in 2050; and
- Loss of 15-20% of jobs in dairying (Diary NZ, April 2013).

DairyNZ's assessment was strongly criticised by Auckland University economist Tim Hazledean, working as an expert witness on behalf of EDS. In a broad macroeconomic analysis of the export dairy sector, Hazledean's argued that DairyNZ was able to vastly exaggerate the economic impact of nutrient mitigation only by abstracting the projected impact of regulation from New Zealand's position within global commodity chains. Quoting Hazeldean: "Contrary to [DairyNZ's] assertion, our 'international competitiveness' as a dairy exporter will actually be *improved* by cutting back production, in the worthwhile sense of NZ being in a more favourable market position, able to charge a higher price for our dairy products" (2019, para 11 - emphasis original).

In his evidence, Hazeldean further commented on the lack of transparency in economic modelling conducted by industry and deployed against environmental initiatives generally:

> "It may often seem, in resource management affairs, that the technical discussion degenerates to disagreements between experts cancelling each other out, to the confusion and perhaps cynical despair of commissioners and other policymakers. In general, this does appear to be quite common in New Zealand RMA and related processes. However, in the specific case at hand, the economists, at any rate, could probably find much more common ground if all competent experts had access to all the relevant information …. This is not so with respect to the Computable General Equilibrium Model deployed on Dairy NZ's behalf by the economic consultants, Infometrics, and used to generate the rather lurid predictions on which I have focussed above. The model is not in the public domain" (Hazeldean, 2019, paras 32-34).

The economic modelling software is the intellectual property of Infometrics, who refused to share their data with Hazeldean (Hazeldean, 2019, para 34). According to informants, consultancy firms *and* CRIs routinely refuse to provide access to information, on the grounds of either intellectual property or commercial sensitivity, that would enhance expert deliberation (Conservation scientist: consultancy, March 2023; Ecologist: university, Dec, 2022; Ecologist: university, Nov 2022; Ecologist: consultancy, March 2023; Ecologist: CRI, Jan 2023; Practitioner: consultancy, March 2023). [48] As Hazeldean continues, while DairyNZ is able to claim that their macroeconomic modelling is peer reviewed, "in my professional opinion it is simply not possible to satisfactorily peer-review a 'black box' of which the crucial contents are concealed as private property" (2017, para 36). Federated Farmers commissioned yet another economic assessment as part of their EnvC appeal (undertaken by CRI Landcare Research) which projected the One Plan's nitrogen leaching limits would reduce agricultural profits within a range of 22-43% (Sharpe, Nov 2012). However, following protracted conferencing with numerous expert witnesses and

[48] For example, an informant expressed intense frustration regarding the hoarding of public good data within the CRI sector: "And even the public good science that [NIWA] do, they sell it. [Scientist X] at [environmental NGO] was just complaining to me the other day - he wanted a little piece of information from NIWA for something, and they got a quote for $25 000. And he said, "We just can't afford it." This is *publicly funded science!* It should be publicly available and freely accessible" (Ecologist: university, Nov 2022). This view was commonly shared among university and NGO interviewees.

economists, the EnvC determined the cost to be approximately 5% on average (Sharpe, Nov 2012), the figure originally proposed by Horizons in their initial section 32a report (HRC, 2008).

The power of economic modelling produced by industry in resource use conflicts is much stronger at the heterogeneous end of RMA decision making fields, especially within regional councils, but is evident across the range of RMA regulatory and decision making authorities (Joy and Canning, 2021; Joy, 2022). Their authority rests on neoliberal metacapital, the notion that "that economists can do for government what the market does for business: add up the benefits of a public policy and compare them to the costs"(Ackerman and Heinzerling, 2002: 1557). Every expert interviewed for this study agreed that economic modelling is routinely weaponised by industry stakeholders in resource management conflicts in the service of making punitive regulation appear "too risky for decision makers to touch" (Practitioner: consultancy, March 2023). Quoting a conservation scientist from a medium-sized consultancy:

> "There were attempts to put a monetary value on intrinsic values, and you can't do it. That's a nonsensical collection of words. What has always frustrated me is that there is never that call to put on paper the cost of *not* doing those things. So they talk a lot about cost/benefit, but they're just trying to backfill and validate business as usual [which is] the unmitigated exploitation of [natural] resources for private benefit. It's just the same: socialising the costs and privatising benefits" (Conservation scientist: consultancy, March 2023).

As this expert noted, economic models are expensive to produce, and beyond the means of community groups, Iwis and pro-environmental NGOs who do not have the "ability to play" (Conservation scientist: consultancy, March 2023). Hazeldean is a highly respected, university-based economist who provided both advice and evidence free of charge to EDS (Hazeldean, personal communication, May 2023). An ecologist working in a small 'green' consultancy argues that MfE's emphasis on economic quantification has allowed

regional councils to divest their own responsibility under the RMA for assessing the social costs and benefits of resource plans and consenting onto the community:

> "[Economic impact assessments] are used as a weapon in the court process on plans generally. I'm currently working for [a government department] and we raised some appeal points about the toxicity levels of ammonia and nitrate not being ambitious enough to avoid the potential of species extinction within those waterways within the timeframe of the plan. And the response was basically, "Where's your economic analysis?"
>
> The RMA allows for a process for stakeholders to come along and say, "These are my concerns, council needs to find a way through this." But now it's councils turning around and saying, "DOC, you need to have an economist. Everybody needs to have an economist. We need to know what the economic impacts of the things you're asking us to do are." And to me, that's actually the *council's* job. The council's job is to be able to evaluate the costs and benefits to the community as a whole, and to integrate all of the information that's coming in from all these different stakeholder groups and present that information to councillors in such a way that they can make an informed decision. So I see that [economic impact assessments] are weaponised in a way to push back on submitters, particularly with environmental concerns" (Ecologist: consultancy, March 2023).

The One Plan stands as a powerful example of both how vulnerable regional councils are to sectorial capture, and how the conflation of community democracy and stakeholder democracy works against environmental and public good outcomes. It is important to understand the complexity of regional councils as highly heterogeneous resource management fields. The sixteen catchment based authorities (established under the RMA) are influenced by "a diverse range of pressures, including stakeholder pressure (particularly in rural regions), practical complexities and costs associated with implementation, and council placed-based science advisors" (Koolen-Bourke and Peart, 2022, p. 123). Prior to the first NPS-FM (2011), most local authorities based their nutrient

management on the Australian and New Zealand Environment and Conservation Council (2000), guidelines which propose a nitrate instream concentration limit to protect lowland waterways of 0.44 mg per litre (Joy and Canning, 2021, p. B). However, as the section below explains, these internationally recognised baselines have progressively shifted towards more permissive nutrient baselines, which has been enabled by the weak nutrient limits set down in each iteration of the NPS-FM (Joy and Canning, 2021). The "agency capture" of regional councils is increasingly recognised, and includes "a lack of enthusiasm for setting strong limits for freshwater due to a preponderance of agricultural interests in the council" (Brown et al. 2016, p. 20). And it is ratepayers (aka *everybody*) who foot the bill for regional environmental monitoring, enforcement, plan development, economic impact assessments, implementation; not to mention the small legion of lawyers, consultants and experts necessary to defend against the hundreds of private sector appeals heard in the EnvC and Supreme Court.

Although the One Plan's nitrogen mitigation measures were reinstated by the EnvC, the mobilisation of agricultural stakeholders against the Plan resulted in a fundamental change in the composition of Horizons Regional Council, with rural dominance of elected council positions continuing today (Practitioner: consultancy, March 2023). Moreover, following the 2009 hearings, there was a minor exodus of managerial and technical staff central to the development of the One Plan, who, "after working so hard to develop the One Plan, could not work in a political environment that didn't want to implement it" (Conservation scientist: consultancy, March 2023). Many of these staff, burnt-out and disillusioned, have since transitioned to small and medium-size green consultancies where they feel they have relative scientific and professional autonomy (Conservation scientist: consultancy, March 2023; Ecologist: consultancy, March 2023; Practitioner: consultancy, March 2023). As noted above, Horizons has adopted a significantly softer regulatory approach, preferring to negotiate nutrient mitigation outcomes according to farm baselines, rather than ecological baselines (HRC, 2021). While regional councils have a statutory obligation to manage natural resources in the

interests of all ratepayers, informants say it is environmental NGOs, community groups and Iwi that are the most active (and least resourced) agents defending environmental values (Conservation scientist: consultancy, March 2023; Ecologist: consultancy, March 2023; Ecologist: university, Nov, 2022; Practitioner: consultancy, March 2023.) More broadly, neoliberal metacapital is operationalised through "the cumulative impact of the various economically focused regulatory directions [which] operates as a barrier to environmental reforms that have costs associated with them" (Koolen-Bourke and Peart, 2022, p. 16).

The following section shifts to an analysis of perhaps the most heterogeneous point in the New Zealand science-policy/science-law nexus: the Science and Technical Advisory Group (STAG) that informed the government's National Policy Statement on Freshwater (2020).

5.3.3 STAG and the National Policy Statement on Freshwater (2020)

The use of Government appointed specialist advisory bodies to inform policy matters has increased markedly since the 1980s and are a now ubiquitous component of New Zealand's governance framework.[49] Science and Technology Advisory Groups (STAGs) are typically

[49] The history of science and technical advisory bodies in New Zealand is murky and there is a general absence of literature to draw on in reconstructing this history. Galbreath's history of the DSIR covers the various quasi-autonomous research organisations that preceded the DSIR, and notes that "scientists have been in the service of New Zealand governments since the late 1850s, when the provincial governments began hiring geologists to undertake surveys in their provinces for gold, coal and other minerals" (1998, p 11). Contemporaneously, Came *et al.* (2019) have examined the institutional racism within government health advisory groups, and the Environmental Defence Society (Koolen-Bourke and Peart, 2022) have produced an impressively comprehensive, in-depth research report that provides a rare internal insight into the operations of the STAG that informed the National Policy Statement on Freshwater (2021).

The formalised use of scientists as advisors on policy and legislation seems to have started around the 1960s with the establishment of the National Water and Soil Conservation Organisation, which later became Landcare Research (first a department within the DSIR, then a CRI in 1991.) It seems the use of STAGs has become increasingly formalised and structured over the past two decades. In 2009, the government established the Office of the Prime Minister's Chief Science Advisor, which provides independent advice on scientific matters to the Prime Minister and other government officials, and most major government departments have established their own advisory bodies to provide scientific and technical advice on specific

established by government ministries to provide scientific advice and expertise on specific issues or policy processes. While STAGs do not make policy decisions themselves, they are used both to evaluate scientific knowledge and translate that knowledge into advice which then, theoretically, informs policy. To do so, STAGs make extensive use of expert conferencing and experts must agree to remain impartial by signing a declaration of conflict of interest (Koolen-Bourke and Peart, 2022). However, conferencing is often unfacilitated, and ministerial oversight of the STAG's operations takes the place of the juridical oversight which operates in conferencing processes within the EnvC, EPA, and regional councils. While STAG's primary role is 'judging' science for policy, and they do replicate elements of EnvC practice, because their agenda and terms of reference are set by government ministries they are fundamentally political bodies with an apolitical mandate, rather than juridical or quasi-juridical bodies. STAGs are thus an important component of the resource management consultocracy, but because part of their role is the public-facing performance of evidence based policymaking, they are characterised by a greater emphasis on transparency and legitimacy.

The STAG that provided science information for the NPS-FM (2020) was one part of the Water Taskforce, jointly established by MfE and MPI, which included Te Kāhui Wai Māori (the Māori Freshwater Forum) and the Freshwater Leaders Group (a group representing primary producers) and the Regional Sector group (a group primarily comprised of regional council CEOs and council chairs) (MfE, 2018). In relation to water resource management, some commentators note that scientific advisory bodies are not only expected to provide expert advice to government, but to do so in ways that "engage with explicitly value-laden and conflicting resource use values as well as the various barriers to policy implementation across complex social and political contexts" (Crowley and Head, 2017: 181). While this may be the case internationally, the STAG informing the NPS-FM had a much more restricted or 'traditional' role. The NPS-FM STAG's terms of reference instructed its members "not to consider the economic implications of potential management categories,

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issues. For example, the Ministry for the Environment retains a Chief Scientist who advises on environmental matters, and the Ministry of Health has a Technical Advisory Group to advise on COVID-19 response.

measures and thresholds" (MfE, 2018), with the aim of "ensur[ing] that the scientists could focus purely on the science" (MfE official, quoted in Koolen-Bourke and Peart, 2022, p. 40). The science component of the Water Taskforce unfolded according to the all too familiar 'neutral science' (Ozawa, 2005) or 'two communities' (Wherens, 2013) approach, wherein the "production of scientific knowledge is seen as a value free process [and] interactions between science and policy are seen as linear and one dimensional" (Wherens, 2013, quoted in Koolen-Bourke and Peart, 2022, p. 5). While cross-conferencing between groups did occur (most commonly between Te Kāhui Wai Māori and STAG) , overall this approach established a very rudimentary division of labour wherein STAG was solely responsible for science provision, Te Kāhui Wai Māori was responsible for ensuring Māori values and perspectives were included in the final NPS-FM, and the Regional Sector Group and the Leaders Group responsible for providing local and economic information on policy implementation, which was assessed primarily on the basis of DairyNZ's modelled cost-benefit analyses (Koolen-Bourke and Peart, 2022).

As discussed above, central government produced its first NPS-FM in 2011, twenty years after the RMA was first established. The first NPS-FM greatly weakened existing nutrient and pathogen limits set by the Australian and New Zealand Environment and Conservation Council (Joy and Canning, 2021; Death; 2020). The next iteration of the NPS-FM (2014) was widely criticised by freshwater ecologists for its limited focus on nitrogen toxicity (NZ Freshwater Sciences Society, 2014) and the omission of a range of ecosystem health metrics including instream nitrogen concentrations, instream phosphorus concentrations, biological monitoring of macroinvertebrate and fish health, and deposited sediment (Webster-Brown, Death and Joy, 2014, quoted by Science Media Centre, Nov 2014). The NZ Freshwater Sciences Society urged the government to "re-engage [ecologists] to help further with limit setting for river health" and to "maintain a commitment to rapidly filling gaps in the current framework for managing rivers in particular" (2014). More substantively, Joy and Canning (2021) have argued that the numeric water quality bands established by the NPS-FM (2014)

represent the "shifting baselines" of water quality monitoring in New Zealand. As they explain (2021, p B):

> "…under the [NPS-FM 2014] an 'A' rating was given to rivers with a nitrate nitrogen concentration up to 1 mg/L; rivers with NO3-N concentrations of 1–2.2 mg/L were given a 'B' rating and those with concentrations of 2.2–6.9 mg/L were given a 'C' rating, with a 'bottom-line' limit of 6.9 mg/L. Under the NPS-FM any river that is in > the 6.9 mg/L 'D' band is required to improve over time until it is at least a 'C' grade. The new NPS-FM limits effectively gave a more than 10-fold increase in the nitrate concentration permitted in surface waters over and above the previous guideline. To put this into global context, the Yangtze and Mississippi rivers would be given a 'B' rating under this system."

It was in the context of these criticisms, and a clear mandate from the general electorate to reverse the degradation of New Zealand's rivers, that the NPS-FM (2020) was developed (Canning and Joy, 2021; Koolen-Bourke and Peart, 2022). The STAG included both Canning and Joy, alongside numerous university and NGO ecologists who had been publicly critical of the 2011 and 2014 iterations of the NPS-FM (MfE, June 2022). After more than two years of work, the majority of the nineteen STAG members agreed that a national 1mg/L DIN (dissolved inorganic nitrogen) and phosphorus limit was necessary to protect river ecosystem health and drinking water quality (Koolen-Bourke and Peart, 2022, p. 128-134). The STAG had advocated for a 1mg/L DIN limit in both their first report and second reports to MfE (STAG, 2018; STAG 2019). However, at a very late stage in the development of the NPS-FM, five members of STAG (with the support of MPI and the Regional Sector Group) changed their position, saying that the science underpinning the DIN limit was "unresolved" (Koolen-Bourke and Peart, 2022, p. 130). On the release of the first draft of the NPS-FM, 14 of the 19 members supported the 1mg/L bottom line and five dissented. Four of the five dissenting scientists were from the CRI sector (three from NIWA and one from GNS Science) and one is a senior science manager at Horizons Regional Council (the one HRC staff member centrally involved in the One Plan who

remains employed by the Council) (Michell, Aug 2022; Ecologist: consultancy, March 2023; Ecologist: university, Nov, 2022; Practitioner: consultancy, March 2023). While the final version of the NPS-FM (2020) dropped the DIN bottom line, it did alter existing nitrogen limits – the existing 6.9mg/L limit for nitrate toxicity was lowered to 2.4mg/L, enhancing protection to aquatic life from the direct effects of toxicity (MfE, 2020), but continuing to neglect the broader effects of inorganic nutrient concentrations on water ecosystem health (STAG, 2019; Joy and Canning, 2022; Michell, Aug 2022; Koolen-Bourke and Peart, 2022). This was an option already substantively discussed in expert conferencing and rejected by the majority of the STAG, who stated that: "We are very uncomfortable with the use of nitrate toxicity data (which is poor for New Zealand ecosystems and does not yield a relatable phosphate limit), as a basis for nutrient limits. As we understand it, this would make New Zealand the only country to try to manage the effects of nutrients on ecosystem health based on nitrate toxicity" (STAG, 2019, p. 24).

The scientific reasoning informing the five dissenting STAG members is difficult to pin down. In a comprehensive, in-depth research report on the NPS-FM process conducted by the EDS, Koolen-Bourke and Peart (2022) run into the same problem. It does not seem that these five dissenting scientists had a clear scientific rationale, rather, they justified their position in reference to a lack of data sufficient to justify the 1 mg/L DIN bottom line. The position of the five dissenting scientists is summarised as:

> "The evidence provided to establish nationally applicable bands and bottom lines is insufficient to provide confidence that a given DIN or DRP [dissolved reactive phosphorus] concentration will achieve the desired improvement in ecosystem health …. There are concerns about the reliability and effectiveness of nationally applied nutrient criteria in managing ecosystem health, given they have been derived from weak relationships that vary spatially" (MfE, 2020, quoted in Koolen-Bourke and Peart, 2022, p. 130).

In the view of the four non-dissenting STAG members and one Freshwater Leaders Group member interviewed for this study, the five dissenting scientists did not have a clear rationale. Each one of these non-dissenting scientists expressed frustration and cynicism regarding the last minute change of position on a matter they believed had been thoroughly discussed and settled:

> "So the initial basis of the 1mg DIN was a research paper that I presented. [STAG] agreed that the approach that I'd used was appropriate, but some of them didn't trust my analysis. So [STAG member X] collected data that they approved, and did essentially the same sort of analysis to come up with the same numbers. And [STAG member X] seemed to do that on multiple occasions, and every time he'd do an analysis [MfE and MPI officials] would say, "What about this, what about that?", and he'd go away and reanalyse that and come up with other solutions.
>
> And that [went on] right through until the draft NPS came out, which had nutrient limits in it. And I was mistakenly convinced that it was going to go through, because the vast majority of the people on STAG were supportive of it. Although the five or six people who didn't like it had made a few comments along those lines, they didn't have any science, or any good reasons not to support what we were doing. And it wasn't really until the draft came out…. And my understanding is that it was someone in NZ First who talked to MfE and said "We should be listening to NIWA, because they are the preeminent science provider for freshwater science in NZ, and not some dodgy academics or Fish and Game scientists" (Ecologist: university, Dec 2022).

The five Water Taskforce members all reported that the draft NPS-FM was the first signal that there was a lack of consensus on DIN. Non-dissenting STAG members argued the dissenting scientists' last-minute reversal was a clear example of 'shaking the science' in the service of maintaining, as close as possible, the status-quo:

> "There was a huge amount of science to support [1mg N limit]. It's very similar to limits in the U.S. and Australia, even China. Europe's got the same kind of thing. It's a

> total joke that we don't. MPI needed an excuse to say no to 1mg and those five or six CRI guys gave it to them. We did have one person who had problems with the DIN, but it was more of a political or policy issue about the strength of basing limits on ecosystem health. But these issues were briefly raised and addressed in conferencing and these five CRI guys only changed their minds after they went back to their own institutions. It was purely political pressure aimed at giving [MfE and MPI] an excuse to say 'no, the science isn't settled'" (Ecologist: university, Feb 2023).

A member of the Freshwater Leaders Group further explains:

> "There's important distinctions to make between the nature of their disagreement. Because some of the dissenting voices agreed with the 1mg limit. They said, 'Yeah the 1mg limit seems about right, but we don't agree with the theoretical background. We don't think we can justify it on an ecosystem health basis." [Dissenter X] was having his cake and eating it too. He was saying "I think toxicity is a less problematic basis on which to decide, but I still agree that 1 mg is the right limit." But because he'd put himself in that dissenting camp, he was able to have his cake and eat it too [by agreeing with the majority while aligning himself with the minority]. In the public mind, nobody is making that distinction: you're either for or against" (Water taskforce interviews, Oct 2022 - March, 2023.)

None of these five dissenters were interviewed for this study, but Koolen-Bourke and Peart (2022, p. 130) report that they "strongly contest this narrative". In the words of one dissenting CRI scientist:

> "Some of us had reservations ... we outlined those concerns back in June 2019 [the time of the first report] and were waiting for further information that might change our position. Our view was always open minded – if our concerns could be allayed with robust evidence then we would support the majority view. Further evidence was not provided until the very end, it wasn't robust enough, so our position remained."

No justification is offered by MfE or MPI as to why unanimity was required to move forward with the 1mg/L DIN limit, and in view of the clear majority in favour of the 1mg/L limit, the views of the five dissenting scientists were clearly given disproportionate evidentiary weight, despite the lack of clear reasoning. One STAG member commented that although, formally, expert conferencing is not supposed to be a negotiation, in practice "compromise" (the outcome of negotiation) is quite common:

> "It's a weird thing in NZ science. For some reason we always need to meet a compromise. I always think of Darwin's theory of evolution: there was no consensus on that! It just seems really weird. It's certainly not science. And these are just excuses not to do things. You're never going to get a total consensus on any science, unless it's something really clear cut and basic" (Ecologist: university, Dec 2022).

As has been pointed out in numerous studies internationally, scientific advisory bodies are "often used strategically or symbolically to legitimise policy solutions that have been arrived at on overtly political grounds" (Junetti *et al.,* 2009, p. 208). The onus of proof was placed on the majority of STAG that agreed with the 1mg/L DIN, but not on the five dissenters. As detailed in the sections above, exploiting the epistemic openness of science in the service of complexification and obfuscation is a tactic routinely deployed by experts working on behalf of industry and developers across RMA fields. As Bourdieu would predict, the different institutional positions and attendant habitus of STAG members was a major barrier to establishing trust. Most of the STAG members had extensive expertise as expert witnesses on different sides of resource use conflicts and as key agents in RMA law and policy development at both the regional and national level. [50]

Koolen-Bourke and Peart report on the formation of "ideological clusters" within STAG, principally "the Massey camp" (a group of freshwater ecologists trained at or employed by

[50] For example, the dissenting scientist from Horizons is well-known across the pool of experts interviewed for this study and was variously characterised by expert informants as "having a long-running beef with some of the other STAG scientists", "basically having a complex of needing to be the smartest guy in the room", "more interested in being a manager than making a real difference" and "an ethical wasteland" (Water taskforce, interviews, Oct 2022 - March, 2023).

Massey University) and "The NIWA camp" (2022, p. 46). The positioning of the 'Massey camp' was criticised by the NIWA experts as "overly idealistic or impractical", whereas the Massey experts viewed the 'NIWA camp' as "institutionally aligned" and overly influenced by the commercial, client-oriented "NIWA culture" (Koolen-Bourke and Peart, 2022, p. 46-47). The epistemic significance of these camps is summarised as "reductionist vs holistic", "academic vs practitioner" and "advocate vs purist" (Koolen-Bourke and Peart, 2022, p 6). The inclusion of university-based academics was seen as an important component of the credibility of the STAG: "We couldn't have had the same credibility without those people, they had to be there. It was probably incredibly frustrating for them, but it was important. It was also the right call that sector groups and industry science weren't [involved in the STAG]" (Ministry official, quoted in Koolen-Bourke and Peart, 2022, p. 46). This official's implicit assumption that universities and CRIs produce research under broadly similar conditions of scientific autonomy (that CRIs do not represent "sector groups" or produce "industry science") could be interpreted both as a sign of the pervasive ignorance of the political economy of the CRI sector generally, as well as the prereflective and dispositional nature of neoliberal metacapital. In this way the symbolic capital of relatively autonomous university based academics is co-opted as a legitimating device, and the partially manufactured, discursive simulacra of scientific conflict becomes a proxy for material social conflict.

According to STAG members, the writing of nutrient limits into the NPS-FM was delayed until the very final stages of policy development. Although the STAG had included its recommendations on DIN levels in the two reports to the MPI and MfE, the decision to specify exact limits was deferred by twelve months (Koolen-Bourke and Peart, 2022, p. 190; Water Taskforce, interviews, Oct 2022 - March, 2023). Given the two year timeline that the Water taskforce was working under, the impact of this deferral was significant. In the view of STAG informants, deferring DIN until the final stages of policy development was a political tactic involving continual interference from MfE staff (Water taskforce interviews, Oct 2022 - March 2023). One NGO member on the Leader's Group with established

relationships with a number of STAG scientists was able to act as a crucial connecting agent between MfE, the STAG and the Leaders Group, informing the Ministry on the STAGs' activities as well as passing information between STAG and MfE. This individual explained the tactical deferment of the DIN limits in detail:

> "So you know, tick tick tick - time's ticking along. Around January [2019] I said to a friend on STAG, "So you folks are working on nutrients right?" And he said, "Nah, we haven't been asked to do that. We've been channeled by [MfE] officials onto other things, but nobody even mentioned nutrients." And I thought, "That's funny, because that is a really important part of what you are doing." So I approached one of the MfE officials and asked, "Didn't you say that STAG was working on nutrients?" And he said "Yeah yeah, they are working on nutrients." So I beckoned over [STAG member X] and I said, "Is the STAG working on nutrients, or has anybody said anything about it?" This is the end of January, the *end* of January for a policy that they're hoping to get out by August! That's not a lot of time right? We can do the maths about how many attributes are necessary and you haven't even got a schedule that includes nutrients in January when you started in October [2018]? That's starting to raise some alarm bells.
>
> Anyway, [STAG member X] said we have no schedule and nobody has raised nutrients yet. And the official said, "Well, we'll really have to get onto nutrients then!" And at that moment, one of the junior officials walked past, and said, "Oh, I thought we said we weren't going to do nutrients?" That was a moment for me where I thought, "Hang on a second, I can't actually trust the information I'm getting from MfE."

At this point, this individual became aware that MfE staff were potentially "running interference" between STAG and the other groups in the Water Taskforce: "At that moment, that's when I thought to myself, "I have to be really vigilant here, because not only am I not getting the information I need, but I'm actively been given *wrong* information" (Water taskforce, interviews, Oct 2022 - March, 2023.) This one individual then assumed responsibility for pushing STAG back towards a sustained focus on nutrients, and after being continually frustrated by high ranking MfE officials, eventually sent a letter directly

to Minister for the Environment David Parker alerting him to the lack of progress on nutrient limits. [51] Only at this point, following ministerial intervention, did STAG resume work on DIN (Water taskforce, interviews, Oct 2022 - March, 2023).

Informants have different explanations as to the motivations behind this tactical deferment on the part of MfE officials. The scientists on STAG believe it was a fairly transparent attempt to either delay or secretly drop any decision on nutrient limits from the final NPS-FM (Water taskforce, interviews, Oct 2022 - March, 2023). The Leaders Group member quoted above believes that it has more to do with the strong relationships between MfE technical staff and managers and industry groups which had developed over the preceding two terms of the National party majority government (2008-2016). In this individual's view, the Key government's emphasis on public private partnerships across government ministries had served to embed a general perception within MfE that national nutrient limits were simply too difficult to implement.

> "I think that some officials in MfE had gotten to the point, because they had been involved in these PPPs for so long, that they basically viewed industry stakeholders as colleagues. And so they were collaborating, but they were collaborating with their industry colleagues who they knew really well - they'd developed relationships over many years by that stage - and so they were collaborating with them, not within the confines of this process. They were thinking, or the idea had been planted that "[DIN is] too hard, don't really want to do that. We know it's going to muck up stuff for people and we're not really that comfortable with it." And I think some of it is probably

[51] The crucial importance of the agency of this one individual was substantiated by scientists within STAG. Quoting one informant: "We had to [deal with] a lot of MfE staff trying to direct us off onto false leads. Like we would have various people come and talk to us about aspects of farm management and freshwater stuff that didn't relate at all to the NPS that we were developing. So that was quite frustrating. And if it wasn't for [Leaders Group member X] basically overhearing MfE staff talking about this [intention to ignore nutrient limits] in the hallway, we probably would have got right up to the draft NPS-FM without knowing [MfE] had decided to drop nutrient limits. And [Leaders Group member X] really had to stick their neck out and battle MfE to steer us back towards nutrients, and I know they copped some serious flak from the chair of the Leaders Forum for basically just telling them to be transparent" (Ecologist: university, Dec 2022).

> conscious, some of it is probably unconscious: people thinking, “I don’t want to mess up my relationship with so-and-so.”

The close relationship between MfE and industry groups was revealed after a series of emails were leaked to the media which revealed significant, covert primary sector backchanneling outside of the official policy process (RNZ, March, 2021; Mitchell, Aug 2021; Koolen-Bourke and Peart, 2022, p. 58-59). These emails, marked "confidential", revealed that MfE officials had engaged in "at least a dozen" meetings with an undisclosed primary sector group (Mitchell, Aug 2021) in which this industry group was "writing policy" for MfE (Koolen-Bourke and Peart, 2022, p. 58). In these emails MfE was outlining the policy it was considering and taking feedback from the sector group, who recommended an entirely different nutrient management framework with the DIN and DRP removed (Mitchell, Aug 2021). Moreover, emails obtained by RNZ under the official information act showed that MPI was also pressuring MfE to drop nutrient limits and "wanted the economic cost of introducing a national nutrient bottom line pushed more prominently in a cabinet paper" on NPS-FM policy options to ministers in May 2020 (RNZ, March, 2021). Following investigative work by Mike Joy (Koolen-Bourke and Peart, 2022, p. 123), these emails revealed that MPI's economic modelling was directly obtained from DairyNZ, the same economic modelling undertaken by Infometrics, an earlier version of which had already been presented to the EnvC during the One Plan appeals in 2012 (Water taskforce interviews, Oct 2022 - March 2023).[52] MPI, informed by DairyNZ, considered the potential negative economic impact of DIN to outweigh the environmental benefits (Koolen-Bourke and Peart, 2022, p. 132). Again, DairyNZ's modelling remains opaque, with the final regulatory impact assessment for the NPS-FM 2020 recording that "information was sought on the extent of current practices, and the associated profitability of different farming practices, but that officials were unable to access more up to date and comprehensive e-data sets held by industry bodies” (Koolen-Bourke and Peart, 2022 p.

[52] In response to economic modelling undertaken by DairyNZ and disseminated by MPI as a ministerial economic impact assessment, Mike Joy gathered data from all Landcorp dairy farms on the same measures and plotted the data himself. He concluded "that DairyNZ’s science was selective and was used to push for measures that suited the sector’s pecuniary interests" (Koolen-Bourke and Peart, 2022, p. 123).

123). While the STAG was faced with a near insurmountable evidentiary burden in arguing for national nutrient bands, it seems economic modelling produced by primary sector groups was (and is routinely) accepted by MPI largely on faith.

According to informants, the major (and perhaps only significant) environmental victory contained in the final NPS-FM was achieved by Te Kāhui Wai Māori (Water taskforce, interviews, Oct 2022 - March, 2023). Unlike the STAG, Te Kāhui Wai Māori were able to successfully defend against what they saw as overly restricted terms of reference that set the scope of their work early in the policy process (Koolen-Bourke and Peart, 2022, p. 4). In negotiation with MfE, Te Kāhui Wai Māori were able to expand their terms of reference to set a new kaupapa based on the intrinsic mana of human and non-human entities, recognising the role, rights and interests of iwi/hapū, the need to adhere to the principle of Te Tiriti o Waitangi, and, crucially, establishing more direct and transparent communication with the Minister for the Environment (Koolen-Bourke and Peart, 2022, p. 4). Te Kāhui Wai Māori were able to greatly strengthen the Te Mana o te Wai component of the NPS-FM (2020), establishing a clear hierarchy of values beginning with the health and well-being of water. The second priority is the health needs of people (such as drinking water) and the third is the ability of people and communities to provide for their social, economic and cultural well-being (MfE, 2021). Informants near-unanimously agree that Te Mana o te Wai represents the most significant environmental victory in any iteration of the NPS-FM (Water taskforce, interviews, Oct 2022 - March, 2023).

Like STAG, the members of Te Kāhui Wai Māori were ministerially appointed, but with a clear view towards the demonstration of credibility, meaning the inclusion of numerous appointees who were highly experienced legal and policy agents with significant mana and high public profiles. Informants put the strength of Te Kāhui Wai Māori down to a combination of the increased symbolic capital of mātauranga Māori across RMA fields, alongside the experience and political nous of key agents. In the view of one interviewee:

> "I think the reality is that Māori have been going through this for decades now. They know *exactly* how tokenistic these processes can be, and they know *exactly* how Māori are sidelined through ostensibly consultative processes. And just they refused that, at a very early stage, and stayed really staunch the entire time …. Really I just think they were smarter political operators than the rest of us, you know?" (Water taskforce, interviews, Oct 2022 - March, 2023)

Here a STAG member made an insightful comment that draws attention to the differences between a scientific habitus and the habitus of Māori legal and policy agents:

> "Most NZ scientists are highly conflict averse. We have this highly competitive [science funding system] and they definitely want the money and the recognition, but they don't like battling anyone too directly …. Most NZ scientists just want to be left alone to study their little flappy bird or whatever their specific area of interest is …. And with that [aversion to conflict] seems to come an aversion to politics. A lot of scientists think they can use science as a barrier against politics - science is all clean and systematic, whereas politics is a bit grubby. So their attitude is, "we provide the best science possible and then it's out of their hands." And I'm guilty of this too - I don't like direct conflict. I can do it, but it really stresses me out. And I honestly believed [Minister for the Environment] David Parker's little speech [to the STAG] about how we should just focus on the science and leave economics and politics up to MfE. But the reality is we were dropped into a highly political situation and to some extent that allowed [political agents to] manipulate the process" (Ecologist: university, Dec 2022).

In this expert's view, some STAG scientists' "aversion to politics" (some of the majority in-between the NIWA and Massey camps) represents at best an anti-political disposition, and at worst an ignorance as to how science is politicised in policy processes. Here it seems Pielke's (2007) notion of the value-neutral and apolitical 'honest broker' is a stance adopted by many scientists enrolled in litigation and policy making, a stance explicitly encouraged by the most influential science commentators in New Zealand (Gluckman, 2008). By contrast, contemporary Māori political consciousness has developed in tandem

with the politics of hegemony enacted by successive governments since approximately the start of the Māori renaissance, the beginnings of which are typically situated in the mid-1970s (Brynes, 1999; Poata-Smith, 1999). In a Gramscian-inspired analysis, Poata-Smith (1999) argues that, following the resurgence of Māori political radicalism from the 1970s onwards, the Crown has been engaged in a prolonged passive revolution aimed at co-opting, diffusing and containing elements of Māori radicalism within the 'moving equilibrium' of state power. Gramsci's passive revolution involves both the co-option of critical voices within decision making processes, as well as the limited or superficial reallocation of resources and/ or power to certain agents perceived to represent otherwise dominated groups (Wood, 1998). Unlike the so-called 'honest broker', Māori policy and legal agents will therefore have extensive experience with hegemonic strategies, strategies which may assign high symbolic value to te ao Māori and place great emphasis on the language of inclusion and biculturalism, but are fundamentally aimed at maintaining the status-quo.

Te Mana o te Wai represents a significant shift centred on the vital mana of water, its health and well-being, and the impossibility of abstracting the well-being of freshwater from that of humans and the broader environment/te taiao. Together with a significantly expanded National Objectives Framework (increased from nine to 22 attributes) it is evident that substantial progress was achieved by Te Kāhui Wai Māori (Koolen-Bourke and Peart, 2022, p. 45). Non-dissenting scientists agreed that the approach of Te Mana o te Wai largely mirrors the perspectives of freshwater ecologists on STAG (Water taskforce, interviews, Oct 2022 - March, 2023). However, Te Mana o te Wai is not a set of inviolable rules, and regional councils retain discretion over how these principles are applied in their local contexts. The value hierarchy will be applied contextually, and "does not require water bodies to be returned to a pristine state" (MfE, 2023). At this early stage it is difficult to make any determination as to how the new hierarchy will be applied in practice. As a CRI scientist put it,

> Yeah well, this relates to the question of how the rubber hits the road. If you have an urban stream, theoretically all the houses on the catchment should be moved off and replaced with native forest. If you read Te Mana o Te Wai literally, that would be the outcome. That won't be the outcome, so how it plays out in real life will be interesting (Ecologist: CRI, Jan 2023).

Celebrating the achievements of Te Kāhui Wai Māori, another ecologist comments that, in order to realise the intrinsic mana of water and the people who rely on it, the work of tangata whenua has just started:

> "Te Mana o Te Wai is *the* opportunity for Māori. Te Mana o Te Wai is the one thing you can actually make happen. But regional councils and government will try to bury it. *You're* going to have to make sure you push it, and you don't give in on it.

> All of these provisions [for including mātauranga Māori] were already in the RMA. But it was just tokenism. It's *so* easy to talk about it, but it's the action that is difficult. And there still is a lot of tokenism, but within that tokenism [Māori] have managed to achieve something real and significant. That hierarchy that is built into Te Mana o Te Wai, it puts the rivers first. That is *such* a turnaround, because everything up to that point was about putting the economy first. Councils will still say they have the economic imperative, so that's why it's going to be easily undermined if it isn't continually defended and fought for."

5.4 Conclusion

This chapter situates four key RMA environmental governance fields along a spectrum of *relative autonomy* to *relative heterogeneity*. As consumers of scientific expertise, the EnvC and the EPA represent the most autonomous point in New Zealand's science-law/science-policy nexus, whereas regional councils and STAGs represent the most heterogeneous point. As science providers, universities and small to medium-size green consultancies allow for the greatest degree of relative scientific autonomy, whereas CRIs

and the largest environmental consultancy firms exhibit the greatest degree of heterogeneity. For the purposes of clarity, the EnvC, the EPA, regional councils and STAGs can be conceptualised as overlapping environmental governance fields, which, when viewed collectively, comprise what could tentatively be called the RMA decision making field. The EnvC and the EPA are relatively autonomous, juridical environmental governance fields with greater capacity to refract the influence of the field of power according to their own internal *nomos*. Regional councils and STAGs are quasi-juridical environmental governance fields more likely to directly reflect the influence of the field of power in their decisions and judgements. All of these fields involve both structural (external) and procedural (internal) barriers that work against the conversion of integrated ecological knowledge claims into symbolic or juridical capital.

Across all of these fields, an important structural barrier is the revolving door relationship between decision makers and the environmental consultocracy, itself created by the RMA and the concomitant science reforms which produced the current neoliberal science regime. Publicly funded CRIs compete with global consulting firms like WSP and Tonkin and Taylor for the same clients, which enables "the conflation of official and private interests without violating the law" (Wedel, 2011, p. 149). Publicly funded CRIs, powerful agricultural lobby groups like DairyNZ and private firms act as privatised "'policy entrepreneurs' operating under the veil of commercial confidentiality" with minimal public monitoring or accountability (Kelsey, 2015, p. 131). This has shifted power from visible, formally public institutions towards an interconnected network of influential agents - Wedel's (2011) ‘shadow elite’ - composed of powerful individuals, government institutes, departments and ministries, sectoral lobby groups, private consultancy firms, sections of the media and NGOs. The shadow elite is able to evade accountability and democratic checks and balances, and impose neoliberal metacapital within key decision making processes through their positions, connections and influence. Decision makers within a consultocracy can selectively use or manipulate scientific and general public input to support predetermined agendas (Wendel, 2011). They can cherry-pick

perspectives that support their agenda while setting an impossible evidentiary burden for dissenting voices and simultaneously working to delegitimise these voices both publicly through the media and covertly within their own networks. This circumvents 'evidence-based policymaking' at its root, leading to resource use decisions and policy that work against the interests of the public while enabling the performance of 'good environmental governance' in public facing forums.

Procedural and cultural norms that operate within the EnvC and EPA disadvantage the conversion of integrated ecological knowledge claims into juridically recognised symbolic capital. The devaluing of integrated ecological knowledge in the EPA and EnvC occurs via the close connection between the consultocracy and juridical agents, which privileges experts already embedded within the neoliberal science regime - CRIs, industry and the biggest environmental consultancy firms. The EnvC's *Code of Conduct for Expert Witnesses* insists on the positivist separation of facts and positions, science and values, objectivity and advocacy. The need to continually monitor for client bias is obviously critical in view of the commercialisation of New Zealand's publicly funded science system, and a necessary part of any adjudication involving expert evidence. However, section 9 of the EnvC's *Practice Note for Expert Witnesses* (2023) is written as though the philosophy and sociology of science - beginning with the work of Merton more than a century ago - never happened (Merton, Kuhn, Feyerabend, Bloor, Bourdieu, Rorty, Longino, Harding, Latour and Woolgar), For example, Richard Rorty (1991) powerfully argued that values are an inherent and crucial part of scientific inquiry, and that scientists should jettison the notion that science is an objective and value free enterprise. For Rorty, all science is necessarily influenced by a "web of beliefs" (1991, p. 32) and that rather than evaluating science on its perceived objectivity, we should shift to evaluating theories based on their practical consequences and usefulness in achieving social (and therefore value-laden) goals. Despite generations of scholarship demonstrating that science cannot and *should not* be separated from values, and that even the most well-intentioned attempts to 'protect' science from politics can render science vulnerable to re-politicisation by bad faith actors, the EnvC

remains wedded to an anachronistic, partially realised version of Habermersian proceduralism.

Under the authority of a skilled juridical agent, this proceduralism can certainly go a long way towards minimising power inequalities in the interests of environmental justice. But it can equally serve to obscure (and therefore further entrench) these inequalities. In the EnvC and EPA, which have high degrees of procedural autonomy, judgements rely principally on the epistemic competence and integrity of judges, EnvC commissioners and independent commissioners. Commissioners have arguably become more consequential agents within these fields than judges themselves, and in the absence of any code of ethics or monitoring of commissioners, the prospects for sustainable environmental stewardship rest far too heavily on the dispositions of these individuals. EnvC Commissioners are subject to judicial oversight and the EnvC makes judgments on matters of RMA law. However, while the EPA may replicate EnvC best practice in reaching decisions, the agency has minimal capacity to monitor or enforce compliance with these judgements. More broadly, juridical agents can do little to substantively address fundamental inequalities of power and resourcing where pro-development and agricultural interests have by far the greatest capacity to both deploy expertise and influence the way this expertise is interpreted by decision makers, whereas community groups, Iwi and pro-environmental NGOs are disadvantaged at every level.

As a field of fields, EnvC procedure has significant influence on the practices of subordinate and more heterogeneous environmental governance fields, particularly regional councils and STAGs. While EnvC *Code of Conduct* does not mention "values", it appears that in practice, the application of the *Code* in more heterogeneous fields allows the expression of values to be interpreted as advocacy, with advocacy indicating bias. The conflation of advocacy and bias enables the weaponisation of the rules of impartiality against integrated ecological knowledge claims, with freshwater ecologists constantly on guard against inadvertently displaying any pro-environmental values or breaching the

'stay in your lane' principle. This not only disadvantages ecology specifically (along with other forms of interdisciplinary knowledge including most of the social sciences), but it also leads to the siloing of disciplines within expert conferencing which erects substantial barriers to transdisciplinary problem solving. The cumulative effect is that ecologists are often forced to adopt a pure science stance and downplay their cross-disciplinary expertise, which makes their knowledge claims highly vulnerable to either destabilisation or complexification by experts deployed by opposing parties.

Most significantly, the evidentiary burden for ecological knowledge claims is far higher than the evidentiary burden for economic knowledge claims. This is exhibited most clearly in the development of the One Plan and the NPS-FM (2020). In both of these cases, opaque economic modelling was clearly privileged over ecological knowledge coming from multiple sources. This reveals two standards of 'impartiality': ecologists' are closely scrutinised for any sign of advocacy, whereas economic projections (often produced by agricultural lobbyists such as DairyNZ) are accepted uncritically. Both the One Plan and the NPS-FM (2000) demonstrate how vulnerable regional and central government are to agency capture by vested interests and how manufactured discursive/pseudo-scientific conflict is used tactically as a proxy for material social conflict. The absence of any extra-juridical evaluation or monitoring of the activities of expert witnesses or the quality of expert evidence produced within councils, CRIs and industry bodies allows significant freedom for well-resourced and experienced agents to play 'a game within a game' (Schirato and Webb, 2002).

Returning to Bourdieu, the 'RMA decision making field', like all fields, is both a space of forces and determinations. It is a space of reproduction and stasis but also, potentially, subversion and change. Every social field involves tensions and contradictions that are the basis of struggle and, in some circumstances, these struggles can generate change. The actions of agents within the field

> "... stem from the confrontation between dispositions and positions, which are more often than not mutually adjusted, but may be at odds, discrepant, divergent, even in some sense contradictory. In such cases, one can observe in history, innovations may appear, when people *en porte-à-faux* misfits, who are put into question by structures (operating through the positions) are able to challenge the structure, sometimes to the point of remaking it" (Bourdieu, 2005, p. 47).

In the final concluding chapter, I shift to implications for the subversive misfits produced, in part, by the conditions described above: 'misfits of science' and tangata whenua, and what their struggles might indicate about the future of expert witnessing and the performance of freshwater science and policy in Aotearoa.

Chapter 6: Misfits and science and creature of habitus

In the early decades of neoliberal rule in New Zealand, Wood (1999) positioned himself against Foucaultian-inspired conceptions of a 'neoliberal ethics' (Larner, 1998), arguing that,

> "In reality, the neo-liberal promise of diversity is hollow; it offers no more than a pseudo-individualism that stamps us all with the same form. Neo-liberal identities are pragmatic calculators who adapt to whatever environment they happen to find themselves in … Neo-liberal identities are an empty formality, a shallow and noxious egotism that lacks collective orientation and thus shows little if any concern for social justice. These are 'subjects' but they are not virtuous characters" (1999, p X).

For Wood, 'ethics' had nothing to do with neoliberal subjectivity. While the early decades of "roll back" neoliberalism involved the conversion of "an austere utopian vision into a political project" (Peck, 2010, p. 105), the power of neoliberal metacapital today does not lie in an "ethos or ethical idea" (Larner, 1998, quoted in Wood, 1999, p. 49) but rather in the suppression of ethics, morality and values across public spheres. For this reason Wood considered neoliberalism a failed political project - while the neoliberal revolution successfully discredited and deposed preexisting ideologies, it did not replace them with anything beyond a self-interested individualism, cost-cutting instrumentalism and bad faith masquerading as clear-eyed pragmatism (Wood, 2000). The culminated ideological and cultural consequences of this suppression of values became frighteningly visible in the explosion of feral conspiratorial populism and confused sovereign citizen and anti-state discourses during the anti-mandate protests in Wellington last year (Bollinger, March 2022; Daadler, March 2022; Spoonley, March 2022). While influential sociologists such as Spoonley suggest that growing right wing extremism is fundamentally a problem of law and order (March 2022), it seems clear that these movements will only grow in significance unless the material conditions that give rise to them - immense and widening economic inequality and the attendant collapse of the liberal ideology of meritocracy - are addressed

(Žižek, 2021). But this is unlikely. In the ideological and moral vacuum created by four decades of neoliberal rule, neoliberalism today remains 'dead but dominant' (Smith, 2008), and continues to 'fail forwards' (Peck, 2010).

The neoliberal science regime, combined with the environmental consultocracy generated by the RMA, has created the objective structural conditions in which a shrinking, fragmented group of New Zealand misfits of science have emerged. They are misfits in the sense that their scientific habitus contradicts the *doxa* of the fields in which they must work, and rather than 'adapting', they have chosen struggle. For Bourdieu, the potential for developing reflexive knowledge is much greater in any social field which disposes agents towards "the systematic exploration of the unthought categories of thought which delimit the thinkable and predetermine thought" (Bourdieu and Wacquant, 1992, p. 40). The conditions which dispose agents towards reflexivity arise from the same factors - habitus and *illusio* - that function to 'delimit the thinkable' for the majority of agents within a field.

Within academic science, the accumulation of capital is still normatively (if not practically) "predicated on the production of knowledge that is disposed to interrogate its own claims to truth and objectivity, both individually and [sometimes] with regard to the field as a whole" (Schirato and Webb, 2002, p. 262). This 'interested disinterest' is only possible because some disciplines continue to produce a relatively autonomous scientific habitus, and in tandem with the continual encroachment of the field of power, this contradiction between habitus and field can produce a subversive form of reflexivity. This is especially so for ecological expert witnesses who developed their scientific habitus in conditions of relative autonomy, and are repeatedly confronted by the effects of the field of power which winnows the institutional basis of this autonomy and frustrates the conversion of scientific capital into juridically and politically recognised symbolic capital. In other words, a breakdown of *illusio* combined with the integrated and holistic nature of ecological knowledge has disposed some ecologists to reflexively perceive and struggle

against the 'game within the game', the rules of which are not reducible to the 'official' *nomos* of either the scientific or juridical field and are never explicitly articulated (unless by these subversive misfits themselves).

While the misalignment of habitus and field may be commonly experienced, this will not normally produce an actively subversive misfit habitus. Sommer and Sommer's (1994, 2000, 2010) series of surveys demonstrate that the fracture between scientific habitus and the objective conditions of the publicly funded science field is deeply felt by scientists across CRIs and universities. Although the science reforms restructured CRIs as semi-commercial entities, they retain aspects of the culture of bureaucratic inertia and quietism that characterised the DSIR (Ecologist: CRI, Jan 2023; Ecologist: consultancy, March 2023; Entomologist: CRI [retired], March 2023). CRI scientists now work within an opaque and contradictory entanglement of 'official' government science and marketised neoliberal science. While these surveys unfortunately ceased in 2010, considering the working conditions of CRI scientists remain much the same as they were in 2010, it is a safe assumption that this contradiction is now thoroughly embedded in the collective habitus of CRI scientists generally. However, compared to ecologists working in universities and small green consultancies, it seems CRI scientists are mostly passive misfits who have grudgingly adapted to the commercialisation of their institutions. Moreover, the consistency of survey responses over time (summarised in Sommer, 2010, p. 3) tends to suggest a relatively captive workforce within CRIs.

Like CRIs in the first two decades of the New Zealand science reforms, structurally reproduced financial instability is now part of the objective structure of universities as social fields. Rolling financial crises encroach upon and limit the autonomy of university scientists through departmental divestment, the valorisation of academic capitalism, the disciplinary effects of structurally reproduced employment precarity and the attendant mass proletarianisation of the tertiary workforce. The impacts of structural precarity are felt most intensely by workers at the bottom of the university hierarchy: postgraduate

tutors and research assistants, general and administrative staff, and postdoctoral researchers (Simpson *et al.*, 2022). However, aside from some sections of HR departments, senior and middle management and the very top tier of so-called 'academic entrepreneurs', no academic worker is entirely insulated from this precarity (Roper, 2018). During the very final months of this study, two highly accomplished, internationally recognised, senior ecology professors within the interview pool were in the process of losing their jobs. One is currently seeking a 'voluntary' retirement deal after what they describe as repeated "muzzling" attempts by middle management, the other is facing redundancy following a departmental restructuring initiated as a cost recovery measure (Ecologists: university, March-May 2023).

Both of these academics are actively subversive misfit ecologists and are currently engaged in consultancy and collaborative research projects with iwi and hapū groups and small green consultancies, with the hope of continuing the work they say they can no longer do within the institutions in which they formed their scientific habitus. Both of these soon to be ex-academics come close to what Antonio Gramsci defined as 'organic intellectuals' - they have dedicated their careers to challenging the hegemony of neoliberal metacapital across the range of RMA decision making fields covered in the preceding chapter, forming close relationships with disempowered and marginalised agents. Their misfit habitus is marked by "pessimism of the intellect; optimism of the will" (Gramsci, 1997, p. 188), a disposition that takes a heavy emotional toll and can only be maintained by the most committed of misfits. What these subversive misfit ecologists have been unable to achieve however (and not through lack of trying) is a cohesive ideology or value framework with sufficient symbolic capital to effectively challenge the dominance of neoliberal metacapital across the totality of social fields. These misfits of science are simultaneously heroic and tragic figures, whose agency is visible in the friction generated by their struggles against vast and immovable structures; structures which, despite their struggles, remain vast and immovable (Nietzsche, 1998).

The emotional burden of living as a misfit of science is variously articulated as defiance, frustration, anger, hopelessness, imposter syndrome, reflexive cynicism and a depressive realism (Interviews, Oct 2022 - March 2023). The misfit ecologists interviewed for this study have spent hundreds of hours presenting evidence across the range of RMA decision making fields, repeatedly coming up against teams of lawyers and consultants acting on behalf of both industry and local and central government. Often retained by NGOs and mostly unpaid local environmental care groups whose resources are stretched to breaking point, many of these "outgunned individuals and groups dropped out along the way as their budgets were drained and their people burnt out" (Joy, 2021, p. 53). Regulatory bodies like regional councils and the MfE are increasingly captured by vested interests (Joy and Canning, 2021; Joy, 2021), whereas DOC has been progressively drained of resources (Gudsell, May 2016), leaving environmental advocacy up to already under resourced iwi and public good NGOs. One university ecologist commented that his work on the STAG, combined with continual budgetary cutbacks to freshwater ecology within his institution, "nearly broke me", and that, "I feel like I've spent my entire career chronicling the destruction of our rivers without seeing any progress, which is incredibly depressing to contemplate" (Ecologist: university, Dec 2022). Another university ecologist, currently formulating an 'exit strategy' from their institution, expressed similar gloom:

> "I'm pretty sure I'm just going to let [my institution] go. I'm going to continue doing this work for [Iwi], and just back off unis a bit. I feel like I've got to the point where this is just impossibly hard now, you know? And it's bad for me. It's depressing. It feels like groundhog day, where I'm saying the same thing I was saying twenty years ago, and I'm just repeating myself ad nauseum and getting nowhere with it. I'm ready for a change" (Ecologist: university, Jan 2023).

As the neoliberal science regime narrows the scope of academic autonomy, small and medium sized consultancies and partially autonomous research organisations like the EDS have become crucial agents. Not only do these firms and NGOs make expertise accessible to groups that would otherwise be marginalised within RMA fields, but they have also

become important providers of juridical activism and public good research. The EDS has driven major changes in the juridical interpretation of the RMA (Aitkens *et al.*, 2015), and recently provided an unprecedentedly comprehensive 'behind the scenes' insight into the agental dynamics and political economy of the NPS-FM (2020) (Koolen-Bourke and Peart, 2022).

The Catalyst Group, a small, green-focused consultancy which operates from Palmerston North, is another example. Run by ex-Horizons technical staff who were instrumental to the development of the One Plan, the Catalyst Group provides their services to community groups, iwi, hapū and NGOs active in RMA fields (Conservation scientist: consultancy, March 2023). Catalyst also produces desperately needed public good research on topics such as the potential for enhanced biodiversity on sheep and beef farms, an area of research that is neglected both within CRIs and universities which are more typically oriented towards dairy and horticulture (Small and Masyk, 2022; Masyk *et al.*, 2021a; Perry *et al.*, 2021; Masyk *et al.*, 2021b). These types of organisations are perceived as the last bastions of public good science for a number of disillusioned academics interviewed in this study. Recent ecology graduates with actively misfit dispositions seem more likely to resort to institutional nomadism, combining activism with temporary post-doctoral work in tertiary institutes and fixed-term research and consultant arrangements within universities, government ministries and departments and NGOs (Conservation scientist: NGO, Oct 2022; Ecologist: consultancy, Feb 2023). [53]

[53] Along with small green consultancies and NGOs, a number of informants pointed to the Cawthron Institute as a science provider that has retained a degree of relative autonomy (*Interviews*, Oct 2022 - March 2023). Established through an endowment from businessman and philanthropist Thomas Cawthron in 1915, the Cawthron Institute is the oldest and largest independent research institute in New Zealand (Cawthron, ND). The Cawthron Institute was never part of the DSIR, although it received funding from the DSIR up until its dissolution in 1993 (Galbreath, 1998, p. 247). While Cawthron competes for the same clients as CRIs and universities and shares the same core government funding sources, it is not a CRI. One scientist with extensive knowledge of the history of the science reforms committed that,

"Cawthron has done well in the competitive environment because [it was] strapped for cash and I guess [they had] to be nimble. [They] were out there establishing relationships and building networks and trying to understand what value we would bring to people's needs. And so by having that philosophy, they've been quite successful in generating research funding and getting client work on that basis. Cawthron is largely driven by impact: they're there to make a difference in NZ and the world, rather than publish a certain

Very few of the subversive misfits of science interviewed for this study could be categorised as 'ecological purists' and most have made reflexive efforts to ensure their knowledge-claims are practical, applicable and as palatable as possible to both primary producers, policymakers and the public. One highly subversive and reflexive ecologist from a small consultancy strongly rejected purism: "To me, there is no point in being a purist. You can go off and do science for science's sake [but] that's not something I'm interested in doing. I'm interested in how we apply science to the real world to achieve outcomes (Ecologist: consultancy, Feb 2023). Another university-based misfit remarked, "My position has never been anti-agriculture, it's that we need to go back to farming the land we have, rather than trying to engineer the land to suit an economic model. Farmers are trapped in this crazy growth model and it's literally killing them, along with the environment. And you see that in [farmer's] suicide statistics" (Ecologist: university, Jan 2023). While many of these misfits identify neoliberal policies and frameworks as a causative factor in river pollution, they avoid speaking of neoliberalism directly, believing that doing so would make them 'advocates', and therefore outside the spectrum of legitimate discourse. When asked why he does not directly link neoliberalism and the erosion of democracy with water pollution in his publications, a misfit ecologist responded,

> "Because you end up getting in this weird situation where you have a crack at capitalism and then somehow it goes left/right, like somehow that's related. Same thing

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number of papers or make X amount of dollars. Their mantra is about making a difference for a better world" (Ecologist, Jan 2023).

A misfit ecologist from a small green consultancy made similar comments, noting that Cawthron's history as a non-governmental science provider has produced a more autonomous institutional culture:

"Out of all the CRIs, Cawthron has the ability to be the most forthright. Because they are not solely a CRI, and they have funding that doesn't come solely from the Crown, they have the ability to be a little bit different and bespoke. They do still rely heavily on publicly available CRI science funding, but they still do have some independence. Because they started as an independent institute. I think that's always been their culture - they were never a government department. Like NIWA, that came up through the DSIR and retained some of that old-school government bureaucratic culture and inertia. I think they've always been a little different in their internal culture" (Ecologist: consultancy, March 2023).

> with democracy. The moment you have a crack at either democracy or capitalism, the response is always, "Oh so you're a commie then?" So I try not to get stuck in that stuff" (Ecologist: university, Jan 2023).

Neither are these subversive misfits necessarily pro-regulation: "I don't care if we use a carrot or a stick, we just have to figure out an approach that gets results. And right now we're not seeing any results" (Ecologist: university, Nov 2022). But it is very difficult for an ecologist to maintain any kind of pro-environmental stance without being positioned as anti-agriculture, as a nomadic ecological misfit currently working within an NGO explains:

> "In New Zealand it's hard to offer good critique. There is this parochial thing where it's: "You've critiqued us now, and that means it's personal!" That's what I find with farming and agriculture. If you critique agriculture and even if you talk about it at a systems level, and you make it clear that it's agricultural systems that are driving particular outcomes - I'd say it's almost *impossible* to make that distinction. People don't want to hear that distinction. Farmers always say, "You're anti-farming, you hate farming!" And I've literally never said I hate farmers, never complained about farmers. I've complained about agricultural systems - I've complained really loudly and actively about agribusiness leadership and the fact that I think they are very problematic - but you can't make that distinction" (Conservation scientist: NGO, Oct 2022).

The cultural "parochialism" identified by this informant also influences the way science is valued and perceived. The environmental consultocracy operates largely below the consciousness of the general public, which is reflected in the fact that New Zealand continually tops the world in surveys measuring public trust in scientists (McClure, Nov 2021). It appears that reflexive scientisation (Beck, 2001, cited in Bäckstrand, 2004) has yet to embed itself in the general consciousness, as one misfit ecologist observed:

> "… if you're a scientist you're a scientist. It's either black of white. There can be good lawyers and bad lawyers; good accountants and bad accountants; good doctors and

> bad doctors. It seems to me that the general public can't comprehend that there are some good scientists and then other people who pretend to be scientists" (Ecologist: university, Dec 2022).

Much of this is related to the type of science that is produced in Aotearoa. As discussed in Chapter Three, except for a few exceptions, state sponsored science in Aotearoa has, since the very earliest phases of colonisation, been overwhelmingly oriented towards applied science supporting primary and secondary industry (Galbreath, 1999; Davenport and Bibby, 2007; McGuinness *et al*., 2009 Robinson, 2015). While Aotearoa has produced a handful of internationally acclaimed experimental scientists such as Roy Kerr, Maurice Wilkins, Alan MacDiarmid and Allan Wilson (all of whom left New Zealand and conducted their research in America and the United Kingdom), only Ernest Rutherford, (who also spent the majority of his career overseas), has any degree of public recognition.

Part of the reason we trust science is that we perceive science simplistically and practically. Science is 'useful', rather than something that identifies complicated problems and reveals inconvenient truths. The inverse of this reverence for pragmatic, practical, instrumental, common-sense and applied forms of knowledge is a general disposition against sustained critical thinking. It is well documented that Pākehā culture includes a deep-seated and sometimes resentful anti-intellectualism rooted in the colonial legacy of cultural egalitarianism, parochialism and puritanism (Pearson, 1951; Jesson, 1979; Kelsey, 1996; Witchel, 2003; Jesson, 2005; Horrocks, 2016; Fairburn, 2008; Easton, 2015; Horrocks, 2016). As Horrocks writes, "New Zealand has outgrown much of the puritanism that dominated its way of life up until the 1960s. But another old repression - anti-intellectualism - still rules" (2007, p. 25) Outside of the tertiary sector and the fields of cultural production, the term 'intellectual' has negative cultural capital. Over one hundred years ago, André Siegfried remarked of 'New Zealand' (aka Pākehā) culture:

> "New Zealanders' outlook, not too carefully reasoned, and no doubt scornful of scientific thought, makes them incapable of self distrust. Like almost all men of action

> they have a contempt for theories: yet they are often captured by the first theory that turns up, if it is demonstrated to them with an appearance of logic sufficient to impose upon them. In most cases they do not seem to see difficulties, and they propose simple solutions for the most complex problems with astonishing audacity" (Siegfried, 1902, as quoted in Easton, 2015, np).

This collective disposition is reflected in the way the value and purpose of scientific knowledge is 'officially' defined. Sir Peter Gluckman, the first Chief Science Advisor established under John Key's National government (2008-2018) is the closest thing Aotearoa has to an 'official' theoretician of the ethos of science. Gluckman is the rarest of New Zealand scientists, a 'man of action' and academic entrepreneur wielding both political and scientific capital. In an influential address to the RMLA, Gluckman (2015) drew on Ravetz and Funtowicz's (1993) definition of post-normal science: "[science] characterised by research in areas of high public interest and urgency meaning that it inevitably must intersect with diverse and often irreconcilable individual and societal values which are reflected in deeply entrenched debates in which these values are in dispute" (Gluckman, 2015, p. 2). Gluckman's advice to scientists in Aotearoa is to avoid being enrolled on either side of social conflicts that are fundamentally about "values", arguing that scientific capital rests on maintaining an impartial distance from "values [which] are based on deeply held beliefs [and] may be unresponsive to science-based logic" (2015 p. 4). For Gluckman, in order to maintain their own authority in legal and policy spheres, scientists must at all costs avoid advocacy:

> "… we can all tell a tale of the scientist-advocate who cherry-picks evidence and appears to offer a seamless narrative in one direction or the other. Indeed lawyers and interest groups may often seek such individuals out. You can see how the tensions and stakes escalate when the challenges of post normal science combine with the types of issues that end up in court" (Gluckman, 2015, p. 4).

Gluckman does not elaborate on what type of "advocacy" he is most concerned with here. Is it the pro-development and pro-industry advocacy carried out by expert witnesses within large and powerful environmental consultancies and CRIs? Or is it the pro-environmental advocacy of ecologists retained by a miniscule body of fragmented and chronically under-resourced NGOs, iwi, and small to medium-sized environmental consultancies? What is obvious is that the political economy of the publicly funded science system and the environmental consultocracy are not within the scope of his concern. Gluckman's address to the RMLA occurred after a controversial attempt to pressure the New Zealand Royal Society to develop a "code of ethics for public engagement", on the grounds that "governments are concerned that scientists are straying into advocacy rather than sticking to their expertise" (Allison, Oct 2014). Comments in the media made it clear that Gluckman's aim was not to empower scientists to speak in public about matters of scientific concern, but rather to discipline scientists "who tend to exaggerate" and whose "advocacy goes beyond what the science is telling us" (Allison, Oct 2014).

These statements, combined with the fact the Royal Society's code of ethics already extensively covers science communication, raised concerns that the purpose of the proposed code was to "gag scientists" (RNZ, Dec 2014; Hendy, 2016). However, as Shaun Hendy (2016, p. 59-80) argues, Gluckman's comments are better interpreted in view of the privileged position that some scientific experts, *especially* Gluckman, hold in policy and juridical fields. Gluckman, a longtime champion of Pielke's concept of the 'honest broker', avers that,

> "Trust can only be maintained if the science advisor upholds the principles and generally acts as an honest broker of knowledge, not an issues advocate … When structured science advice is perceived as advocacy, then trust in that advice or advisor is degraded, even if the advice is accepted" (Gluckman, 2014, quoted in Hendy, 2015, p. 67).

For Gluckman, the authority of scientific expertise in decision making mirrors that of legal expertise: "[which] comes from its set of standardised operating procedures that limit the place of values in the knowledge it produces (Gluckman, 2013, quoted in Hendy, p. 66). As Hendy says, "In Sir Peter's view, the value of science in the policy process stems from its very lack of values" (2015, p. 68).

As Hendy goes on to explain, this is an extraordinarily reductive and one-sided interpretation of Pielke. Pielke (2003) does not privilege the honest broker over the issues advocate, and emphasises that both roles are crucial in policy formation. The issues advocate is essential, for example, in situations that necessitate public awareness to drive change at the political level, or where the expert is providing advice on issues involving entrenched social conflict between unequal agents (Pielke, 2003 as cited in Hendy, 2015, p. 61-67). These are both legitimate stances for scientists to adopt depending on the circumstances, and the distinction lies in recognising and clearly communicating when an expert is assuming each role, maintaining transparency, avoiding (or declaring) conflicts of interest and therefore upholding the integrity of science. As Hendy wisely argues,

> "The situation becomes even more complex for the science advisor when providing advice on policies that are politically divisive. In this case, Peilke argues that the roles of the pure scientist or the science arbiter can be poor choices. By standing back from politics, scientists risk becoming pawns in a contested public debate. When scientists claim to be sticking to the science on hotly contested issues, their scientific authority can be hijacked by special interests" (Hendy, 2015, p. 62).

In focusing singularly on the honest broker, Gluckman is offering "what may be pragmatic advice for a senior advisor for the Prime Minister" (Hendy, 2015, p. 67). As a dominant player imbued with sufficient capital, Gluckman sought to "impose by their very existence, as a universal norm, the principles that [he] engages in [his] own practice" (Bourdieu, 2004, p. 62). But when the honest broker concept is unreflexively generalised into a general principle of scientists' role in law and policy, it is transformed from "pragmatic advice"

into an anachronistically positivist, intellectually and ethically bankrupt, and overtly racist ethos of science. If Gluckman's code was adopted, it would have further restricted scientific autonomy, limited the capacity for scientists to communicate to the public, further circumvented the capital of integrated or transdisciplinary knowledge claims in key juridical and policy fields, and excluded mātauranga Māori entirely.

In direct contrast to Gluckman, Dr Mike Joy is a subversive misfit ecologist who has spent his career attempting to negotiate the boundaries between pure scientist, honest broker and issues advocate. He is one of the only ecologists in Aotearoa who has maintained a national public profile and regularly appears in the media as a critic of government inaction on freshwater issues. Currently working in Victoria University's interdisciplinary School for Governance and Public Policy, he is also highly active across RMA policy and juridical fields and has extensive experience as an expert witness and policy advisor. Within these fields, Joy is continually confronted with "the antinomy of legitimacy" (Bourdieu, 2004, p. 63). Like most intellectuals, writers and scientists in Aotearoa, Joy only became domestically recognised *after* he generated international attention. Joy gained national prominence in 2011 following an appearance by then Prime Minister John Key on the BBC interview programme *Hardtalk*. In this interview, Key had to defend New Zealand's *100% Pure* tourism campaign, with interviewer Steven Sakur repeatedly citing Joy's research (Murray, Oct 2011). At approximately the halfway point of the interview, Sakur said to Key "Dr Mike Joy, of Massey University, a leading environmental scientist in your country, said just the other day, "We are delusional about how clean and green we are." Key replied, "Well that might be Mike Joy's view, but I don't share that view". Sackur replied: "But he is very well qualified, isn't he? He's looked, for example, at the number of species threatened with extinction in New Zealand. He's looked at the fact that half your lakes, 90% of your lowland rivers, are now classed as polluted." Key's flustered response was, "He's one academic and, like lawyers, I can provide you with another one that will give you a counterview" (BBC, 2011).

Key's poor performance during this interview generated public support for Joy and helped to draw attention to the parlous state of Aotearoa's lowland rivers and indigenous fish populations (and also, as Joy remarks, Key's painful ineptitude when faced with a competent interviewer [Joy, ND, p. 2]). Following the publication of a *New York Times* article on the same subject (Anderson, June 2012), Joy became the target of sustained abuse and criticism - publicly, professionally and privately. National Party media operative Cameron Slater said "Joy should be taken out and shot at dawn for economic sabotage" and RNZ host Shaun Plunkett labelled Joy a "traitor" (Stewart, Dec 2012). Joy received an email from prominent conservative political consultant Alan Unsworth, who accused Joy of tourism industry "sabotage", continuing, "You guys are the Foot and Mouth Disease of the tourism industry. Most ordinary people in NZ would happily have you lot locked up" (Martin, Nov 2022). Editorials in the New Zealand Herald positioned Joy as an "alarmist", "prone to exaggeration", lingering on the ill-timed nature of Dr Joy's remarks, which coincided with the release of *The Hobbit* (NZ Herald, Oct, Nov 2012). The NZAS staunchly defended Joy, highlighting that the NZ Herald editorials were based on "the claim that the economic benefit of "big-spending American tourists" outweighs the need for truth in public debate" (NZAS, Nov 2012). Despite the support of the NZAS, a number of prominent scientists continued to attack Joy by targeting his academic autonomy. Controversial National Party-appointed EPA head scientist and dairy farmer, Jacqueline Rowarth, accused Joy in multiple forums of abusing his academic freedom (Hendy, March 2018). In rural media, climate-change denying agricultural consultant Doug Edmendes repeatedly labelled Joy a "biased scientist" and an "issues advocate" who was hiding behind academic freedom (Edmendes, April 2018; Hendy, 2018). Predictably, none of these criticisms engage with Joy's research.

Not only was Joy the subject of private and public attacks, but he was also increasingly attacked from within his own institution. While Joy was employed at Massey it was common knowledge on campus that whenever he appeared in the media, the Vice Chancellor would field complaints from numerous powerful individuals within the

agribusiness sector. Joy himself only became aware of the extent of these complaints when Massey Vice Chancellor Steve Maherey stepped down. Quoting Joy,

> "There were regular complaints to the university about me from the agricultural sector. And I was just very lucky that Steve Maharey was there defending me the whole time. He only told me about it afterwards. Connor English - Bill English's brother - who was the CEO of Federated Farmers, would apparently ring *weekly* and demand that I be sacked. And I only found out about this when [Maherey] was about to leave. I ran into him at graduation and he told me that he admired my work, and as far as he was concerned it was the VC's job to stand up for academic freedom. He said to me "as long as you play with a straight bat I will support and defend you." And then, a few months later, he was giving a talk at Victoria University. And he said "Have you been complained about lately? Well then you're *not fucking doing your job are you*?!" That made me feel pretty good" (Joy, personal communication, Dec 2022).

Along with complaints came threats to terminate funding. After a number of Massey freshwater ecologists acted as expert witnesses for Fish and Game during the EPA board of inquiry hearing on the Ruataniwha scheme, the CEO of HBRC contacted Maharey, suggesting that these ecologist's involvement would mean that the HBRC scientists would not be able to work with Massey in the future, endangering Massey's Memorandum of Understanding with HBRC (Joy, ND, p 146). Joy says he was frequently called into his line manager's office to defend himself about various complaints from industry and regional authorities, which his manager indicated was jeopardising Massey's funding relationships with agribusiness (Joy, ND, p. 147). After Maharey left Massey in 2016 and the Department for Freshwater Ecology was subsumed within the Institute for Agriculture and Environment, Joy became increasingly isolated and vulnerable (Joy, ND, p. 147-148). After Joy publicly questioned whether EPA head scientist Jacqueline Rowarth's financial stake in the dairy industry was a conflict of interest, EPA CEO Dr Allan Freeth complained to the new (and current) Massey Vice Chancellor Jan Thomas (Hendy, March 2018). As Shaun Hendy (March 2018) wrote at the time, Freeth's complaint was not related to Joy's

research, but rather that Joy had referred to Rowarth as the "head" of the EPA, rather than head scientist. When this complaint sparked a formal disciplinary process, Joy, fed-up and tired of fighting his own institution, resigned from Massey, obtaining fixed-term (precarious) employment at Victoria University's endowment funded School for Governance and Public Policy (Joy, personal communication, Dec 2022).

As Joy says, the conditions he experienced at Massey are just an acute version of the same conditions faced by freshwater ecologists working across tertiary, regional authority and CRI fields (Joy, personal communication, Dec 2022). This is substantiated again and again by misfit ecologists who are quoted throughout Chapter Five. While Bourdieu wrote frequently of 'fractured habitus' and 'cleft habitus', what he perhaps could not have anticipated is that, in the context of zombie neoliberalism, this fractured habitus would become "less the exception than the rule" (Emirbayer and Schniderhan, 2013, p. 145). The key difference is that Joy, nominally protected by academic autonomy and driven by his subversive misfit disposition, deliberately put himself into the public arena and sought to expose these conditions. In doing so, he has become a totem for both the pro-environmental movement and powerful agribusiness agents who seek to discredit and marginalise him. As Joy writes, "such experiences kill several birds with a single stone, serving also *pour encourager les autres*, dissuading other scientists from sticking their heads above the parapet" (Joy, 2021, p. 53). While Aotearoa brands itself internationally as environmentally pristine, post-racial, liberal utopia (Mansvelt, 2022), the publicly funded science system has only managed to produce *one* Mike Joy so far. While there are many actively subversive ecologists and conservation scientists quietly getting on with crucially important work across RMA fields, very few have publicly "broken ranks and stood on their values" (Hendy, 2015, p. 74) in the way Joy has. And while Joy has a thick skin, his misfit status has taken a heavy personal toll,

> "It's heartbreaking and disheartening. There are times when I've been very down, questioning whether it's all worth it. You're doing it for all the right reasons and you're still put down, labelled a traitor. [The worst thing] is not being valued, not being

> respected, being treated like a commodity. I turned 63 this year. I want to start winding down. I say it, but I don't know if I actually will. And for almost two years now I have not known what is happening with my job, which has been very stressful. But I've said this all the way through and this is what keeps me going: for every one or two attacks in the media, I get *twenty* supportive random emails, or people patting me on the back" (Joy, personal communication, Dec 2022).

As Bruce Jesson famously remarked in 1977, "Most New Zealand intellectuals, I suspect, are prone to timidity as well as conformity. Those who stand aside from the crowd may find themselves isolated, lacking the support of a cohesive intellectual milieu. Their careers may suffer … Like many frontier societies, New Zealand has not provided a friendly environment to culture or to thought" (Jesson, 1977, quoted in Horrocks, 2007, p. 22). Given that political quietism seems to be a generally shared disposition within Aotearoa's scientific community, it seems likely that Gluckman's proposed code was at least partially motivated by the domestic and international attention generated by Joy. In drawing attention to the political economy of freshwater law and policy, Joy is arguably going outside his direct area of expertise (although, like most political ecologists, he has developed a transdisciplinary scholarly habitus and frequently collaborates with economic, legal, policy, and social science academics within Victoria University's multidisciplinary School of Governance). Quoting Hendy:

> "Joy argues that the environmental damage that comes from intensive dairy farming outweigh the benefits to the economy that come from New Zealand's milk powder exports. In doing so, Joy goes beyond the scope of his scientific expertise and, in some instances, science itself, *but Joy is explicit about this*. He does not claim to be sticking just to the science - rather, he makes it clear that his views are informed by the science" (2015, p. 65 - emphasis added).

Gluckman's emphasis on the need for scientists to inoculate themselves from values and stick to the role of honest broker largely mirrors the already existing rules of expert

witnessing enshrined in the EnvC's *Code of Conduct*. The EnvC is structurally positioned within New Zealand's environmental governance framework to function as a 'field of fields' with a high degree of symbolic capital that influences practice in interconnected fields such as the EPA, regional councils and STAGs. However, like Gluckman's attempt to translate the honest broker role into a general ethos of science, the generalisation of EnvC procedures and practices into a normative guide for *all* expert input in highly politicised quasi-judicial and policy fields functions as a barrier to both integrated ecological knowledge claims and any form of interdisciplinary problem solving. The strict juridical siloing of scientific disciplines during conferencing is a barrier to policy innovation, which are "often engendered at the intersections" (Bourdieu, 2005, p. 65). Together with the privileging of economic cost/benefit analyses described by Koolen-Bourke and Peart (2022), the agency capture of key regulatory bodies described by Brown *et al.* (2016) and Joy and Canning (2020), the extension of the EnvC's procedures and rules on expert witnessing and expert conferencing as *general ordering principles* for Aotearoa's science-policy nexus ensures that private good economic knowledge claims will continue to trump public good ecological knowledge claims.

As Bourdieu writes, "each field has its own time … [with] different histories and different temporalities" (2005, p. 64). Surely, part of the reason that scientific autonomy has so little value in Aotearoa is because so many of our social institutions - the Westminster parliamentary system, the English common law system, the public school system, the tertiary system, the DSIR, SOEs - were *inherited* from Britain. The endless series of historical struggles that established "the scientific field in its relative autonomy with respect to the field of economic and political power" (Bourdieu, 2004, p. 3) happened in another time and in another society's history. In converting scientific knowledge into the language of jurisprudence, the juridical field must forget that scientific integrity rests on a value system that is institutionally reproduced (Merton, 1973). It is the institutionalisation of this value system that allows science to overcome the deficiencies of individual scientists. When the institutions that reproduce scientific integrity have lost their

autonomy, scientific integrity begins to disintegrate. While the juridical field can partially recreate the conditions of scientific autonomy, enforcing deliberation and policing for impartiality, without this extra-juridical, institutionally reproduced scientific autonomy, juridical efforts to recreate the 'enchanted kingdom of reason' can only ever be partial, fallible, and open to manipulation.

This study has focused centrally on Pākehā misfits of science. This is a major shortcoming. If the study could be rebooted, mātauranga Māori would come into clearer focus. Tangata whenua are much closer to Bourdieu's own definition of the 'revolutionary' paradigm shifting misfit - misfits who have managed to convert an imposed 'weakness' into symbolic, cultural and political capital strong enough to influence and potentially transform conditions across scientific, juridical and policy fields. Quoting Bourdieu: "Revolutionaries, rather than simply playing with the limits of the game as it is … transform the game and [its] principles" (2004, p. 63). Two decades ago, mātauranga Māori had negative symbolic capital. Today it is an increasingly key aspect of the "*communis doctorum opinio*" (Bourdieu, 1988, p. 65) of freshwater science and ecology in Aotearoa. This has been partially enabled by the RMA regime and the declining symbolic capital of ecological modernisation and associated green growth discourses, but these shifts have and are being fundamentally driven by Māori political agency across multiple fields. The misfit disposition of Pākehā scientists is predicated on a misalignment of habitus and field which is the effect of comparatively recent incursions on a previously privileged institutional and disciplinary autonomy. Māori political agency, on the other hand, is predicated on *stolen* autonomy/tino rangatiratanga - the colonial theft of productive resources and the attempt to eradicate te ao Māori, firstly through direct military conquest, and thereafter by more than a century of legislatively enabled asset theft and successive government policies of assimilation (Binney, 2009; Salmond, 2020; Moewaka-Burns and McCreanor, 2021).

The EnvC houses one Māori commissioner and one Māori deputy commissioner, neither of whom were able to be interviewed. The Pākehā EnvC Commissioners who were interviewed declined to speak to questions regarding the apparent contradiction between the positivist separation of facts and values enshrined in the *Code of Conduct for Expert Witnesses* and the core tenets of mātauranga Māori, which repudiates this separation. As discussed in Chapter Four, the EnvC and the Supreme Court have developed a series of internal procedures over the past two decades for integrating Māori knowledge into juridical decision making. It is difficult not to speculate that part of the reason EnvC commissioners are cautious of speaking on such matters too openly is the ever-present risk of sparking Pākehā backlash against any example of so-called 'special privileges for Māori', a deeply held mythology that continues to pervade white supremacist, reactionary Pākehā politics in Aotearoa (Meihana, 2023).

In Chapter Four, the binary positioning of mātauranga Māori and western knowledge is interpreted and critiqued. Maintaining this separation allows both for political leverage while safeguarding the integrity of mātauranga Māori as a distinct paradigm, maintaining a strategic barrier against co-option or dilution. This is an approach that parallels the deployment of indigenous knowledge in scholarship on resource use conflicts internationally, where "researchers of indigenous knowledge often take protective stances, analysing these knowledge claims as targets of appropriation and agnotology" (Lave, 2012b, p. 27). Although such an approach might also erect theoretical-ideological barriers to cross-fertilisation between mātauranga Māori, political ecology and other nominally 'western' approaches with complementary values and vision, on the ground, it would seem this cross-fertilisation is already well underway. Quoting a Pākehā misfit ecologist who works closely with iwi:

> "People always ask, does mātauranga Māori compliment science or vice versa? For me, it's not about finding out which compliments which. It's always about finding a good outcome, and working towards that outcome in the most inclusive, holistic way possible. And 'holistic' is a much maligned term, but every good ecologist knows that

> everything is connected to everything else. They are two streams of knowledge. You don't have to have a relationship between them, or you could, and that relationship can look like anything depending on what you're doing and what you want to achieve. So it's not about one having primacy over the other. They're two things, they both hold their integrity, and there's no reason why you can't hold two things together at the same time, and see them both as true and correct" (Ecologist: consultancy, March 2023).

The reason that mātauranga Māori is so attractive to these misfit ecologists (and why Te Ao Māori has become so attractive to so many Pākehā, especially young Pākehā) is precisely because it represents a value-based alternative to the 'hollow individualism', 'noxious egotism' and bad faith pragmatism that pervades public spheres after four decades of neoliberal rule. It is Māori, through generations of political and legal activism, who have managed to build a counter-hegemonic ideology that could, potentially, challenge neoliberal metacapital across the totality of social fields. Not only does mātauranga Māori collapse the positivist/juridical separation of facts and values, but it also collapses the empirco-productivist separation of environmental and human wellbeing. The combined values of mana, manaakitanga, kaitiakitanga, whanaungatanga, ūkiapōtanga and tino rangatiratanga provide not just an "ideological, potentially paradigm shifting change in approach that may provide an important lever for environmental well-being" (Koolen-Bourke and Peart, 2022, p. 192), but an alternative vision for a society in which equality, human dignity, democracy, belonging, environmental sustainability and hope are unambiguously at the forefront. Te ao Māori is arguably the most powerful articulation of collectivist politics in Aotearoa today.

With the autonomy to develop according to its own *nomos,* Mātauranga Māori could provide the basis for more intelligent, reflexive habits and values to take root and thrive across interconnected legal, policy and political fields. Given the very recent recognition of the value of mātauranga Māori within these fields (and various obstacles, barriers, misrecognition and strategies of co-option which refract indigenous knowledge according to the prevailing field logics) it is impossible to predict the future counter-hegemonic

potential of mātauranga Māori. What is clear is that mātauranga Māori offers a strategy for social and political reconstruction, a powerful form of capital that could push Aotearoa towards a more genuinely creative and progressive society.

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