Compliance with biodiversity compensation on New Zealand's public conservation lands

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Abstract: This article assesses compliance with biodiversity compensation on New Zealand's conservation land. Of the 261 Department of Conservation (DOC) concessions for commercial activity searched, only about 15% included compensation provisions. A sample of 20 concessions of that 15% suggests 68% achieve full compliance. Our results suggest compliance is influenced by factors such as habitat and activity type, protected area category, and whether a concession holder has pending concessions and/or renewals. Inconsistencies in compliance monitoring, enforcement, and reporting merit attention. Although New Zealand's rate of full compliance with biodiversity compensation conditions is higher than that observed in other countries, compensation is rarely requested. This rarity and the lack of national guidelines on how and what to ask for in compensation, suggest that compliance with compensation once requested, and the quality and consistency of requests, limit biodiversity protection. Jurisdictions engaging in biodiversity compensation should attend not just to compliance, but also to the requests themselves. To do so, they should develop clear guidelines, enforcement strategies, and reporting processes.

Keywords: biodiversity compensation; compliance; concession; Conservation Act; Department of Conservation; enforcement; implementation; monitoring; New Zealand; policy

Introduction

Biodiversity compensation employs positive conservation actions to mitigate the adverse effects of resource use and development (Burgin 2008; Gordon et al. 2011; Pilgrim et al. 2013). It is a prominent and growing practice on public and private lands around the world (Burgin 2008; Madsen et al. 2011) as it promises to advance development and conservation simultaneously (Ten Kate et al. 2004; McKenney & Kiesecker 2010; Bull et al. 2013; Linterman 2014). While growing in popularity, biodiversity compensation is fraught with complications, particularly in biodiversity offsets, a subset of compensation (Walker et al. 2009; Maron et al. 2012; Brownlie et al. 2013). One such complication, and our focus, is inadequate compliance monitoring and compliance outcomes (Gibbons & Lindenmayer 2007; Bull et al. 2013).

In New Zealand, compliance with compensation is fretted over more than measured (Tonkin and Taylor 2012; Brown et al. 2013; Linterman 2014). A 2017 report by the Environmental Defence Society found that New Zealand's environmental compliance regimes are less than robust throughout the sector (Brown 2017). This issue represents an unquantified threat to biodiversity (Bekessy et al. 2010; Brown et al. 2013) and undermines the credibility of biodiversity protection (Hornyak & Halvorsen 2003). Reasons for poor monitoring and compliance of biodiversity compensation include lack of: (1) a regulatory framework for biodiversity compensation; (2) monitoring resources; (3) clarity in responsibility for monitoring; (4) training in biodiversity compensation monitoring; (5) clear and effective methods for measuring biodiversity; and (6) political will (Walker et al. 2009; Tonkin and Taylor 2012; Rega 2013).

Biodiversity compensation occurs *ad hoc* under two of New Zealand's most prominent biodiversity laws, the Conservation Act 1987 and the Resource Management Act 1991 (RMA) (see http://legislation.govt.nz). Currently, there is no national policy guiding implementation and evaluation (Madsen et al. 2011; Brown et al. 2013), but we defined compensation as additional conservation actions that went beyond what would be required under the traditional avoid-remedy-mitigate approach. Brown et al.'s (2013) study was the first systematic evaluation of compliance with biodiversity compensation on predominantly private land, under the RMA. Ours is the first study on public conservation land, under the Conservation Act.

Administered by the Department of Conservation (DOC), the Conservation Act governs the conservation estate – one third of New Zealand's landmass. While the Act favours conservation over development on public conservation land, DOC will allow commercial activity in some form through a concession. DOC can place conditions on a concession, requiring compensation or remediation in some form for detrimental effects that were impossible to avoid, remedy, or mitigate (DOC 2014). This article explores geographic, procedural, regulatory and social influences on compliance, and recommends improvements for compensation to better avoid biodiversity loss.

Methods

We examined compliance with biodiversity compensation conditions in DOC concessions. An agreement with DOC allowed data collection for no more than 20 concessions, due to time constraints for field inspections and the commercially sensitive nature of the concessions database. Each of the 20 concession cases required up to five compensatory conditions, for a total of 32 conditions. We had to exclude four conditions due to insufficient data. In total, our sample included 28 conditions.

Measuring compliance

In the absence of national policy goals for biodiversity compensation, we used the terms of concession conditions themselves to measure compliance. Compliance was assessed on a binary scale, of 'full compliance' (1) or 'less than full compliance' (0). We used mixed-methods to score compliance because the literature suggests agencies' poor compliance monitoring and record-keeping (Hornyak & Halvorsen 2003; Reiss et al. 2009; Brown et al. 2013) would have rendered a desktop analysis of records difficult and of limited utility. Methods were modelled on compliance studies for the New Zealand government (Tonkin and Taylor 2012) and academic studies of compensation (Breaux et al. 2005; Brown et al. 2013). They included: a review of concession contracts and monitoring files; a field assessment where possible; consultation with key DOC staff; spatial analysis; and investigation into financial data held by DOC. We then reconciled information from various sources to assess compliance. Compliance scores reflect only compliance with the stated condition, not the sufficiency of the condition.

To examine relationships among variables in a small number of observed cases, we used General Linear Models, with a binary response variable and a Bernoulli error distribution, to investigate the possible influence of the following on compliance: geographic characteristics such as conservation land category, habitat type, activity type, and procedural, regulatory and social characteristics such as condition type and applicant type.

Sampling and stratification

To select the 20 concessions, we conducted a stratified random search of the approximately 2300 active South Island concessions that were approved between 1992 and 2013. We first selected the concession activity types that are both most common and most likely to include compensation (telecommunications, structures, access (typically access ways into the conservation estate), and grazing). Within each category, we searched a random segment of up to 30% and chose five compensation cases per category. The criteria for choosing a case were: (1) the concession cited negative effect(s) on the biophysical environment such as resource extraction, species loss, vegetation clearance, land alteration, or discharges to land or water; (2) the concession included negotiation for biodiversity compensation under the Conservation Act and these compensation requirements were specific and enforceable; and (3) the concession was old enough for the permitted activity, structure, or facility to be complete or under way.

Limitations

We could investigate only a small sample of active biodiversity compensation conditions of particular activity types on New Zealand's South Island, constraining the power of our findings and recommendations. There is much scope for a larger and broader national study, an international comparison, and a study on the sufficiency of DOC's compensation measures.

More specifically, we note the following limitations of this study: we relied on the completeness and accuracy of the information provided by DOC; the number of variables investigated and the limits of DOC's concessions database affected the representativeness of the sample; despite considerable effort to ensure compliance scores accurately reflected multiple sources of information, scoring was to some extent subjective.

Results

Of the 261 concessions searched, approximately 15% asked for compensation. Among that 15%, a sample of 28 compensation conditions from 20 concessions was assessed. Of those 28, 68% achieved full compliance (score 1) and 32% achieved less than full compliance (score 0). Despite expectations that compliance on public conservation land would be higher than on private land (Dasgupta et al. 2000), our finding of 68% compliance under the Conservation Act is statistically indistinguishable from Brown's (2013) finding of 65% under the RMA.

The most common form of compensation requested was additional weed or pest control beyond that which DOC already performs. Other requirements included compensation payments to DOC, environmental premiums (payments intended to reflect the environmental impact of the concession activity on the land), planting, and species management programmes (i.e. management and monitoring of a particular species). Many of the compensation cases involved the exchange of dissimilar ecological values, such as weed control in exchange for the removal of habitat.

Variations in compliance

Of the geographic characteristics of concessions and compensation conditions (Table 1), compliance varied with both activity type ($P = 0.062$) and habitat type ($P = 0.064$), the latter echoing international findings (Race & Fonseca 1996; Breaux et al. 2005; Quigley & Harper 2006). The lowest complying activity was grazing; and the lowest complying habitat was grasslands; given the prevalence of grazing on grasslands, there is quite likely some interaction between the two.

Compliance varied suggestively ($P = 0.093$) with category of protected area. Protected area categories follow DOC's land classification categories (1–4; reflecting the International Union for Conservation of Nature's (IUCN) protected area categories), which are used to calculate environmental premiums for telecommunication concessions and fall along a scale of legal protection, such that the higher the protection status (Category 1, national park, nature reserve, ecological area, national reserve, wilderness area, wildlife sanctuary or sanctuary area) witnessed higher compliance. It is notable that all grazing concessions in this study were on category 4 land; thus, reasons for low compliance among grazing concessions also apply to concessions on category 4 conservation land.

None of the procedural or regulatory characteristics exhibited significant or suggestive relationships with compliance (Tables 2, 3 & 4). Of the social characteristics, only the presence of pending applications for concessions exhibited a significant relationship with compliance ($P = 0.037$).

Discussion

Compliance and conservation

While 68% full compliance might appear admirable, DOC requested compensation in only approximately 15% of the observed concessions initially examined. Further, there is no national policy guiding when and what to ask for in compensation, making it difficult to assess when and where DOC is asking for too little or too much. Thus, in considering compensation, it is worth thinking about more than just rates of full compliance.

Table 1. Compliance scores by land characteristics.

Geographic characteristics of the condition	Cases	Compliance score			P-value
Habitat type (LCDB4)		**0 (less than full)**	**1 (full)**	**Percent of cases in full compliance**	
Forest	18	3	15	83%	0.064*
Grassland	8	5	3	38%	
Others	2	0	2	100%	
Activity type					
Access	8	4	4	50%	0.062*
Grazing	5	3	2	40%	
Structure	15	2	13	87%	
Conservation land					
Category 1	6	0	6	100%	0.093*
Category 2	5	2	3	60%	
Category 3	12	4	8	67%	
Category 4	5	3	2	40%	

** Significant result (p= <0.05)
* Suggestive result (p= <0.1)

Table 2. Compliance by procedural characteristics.

Procedural characteristics of the condition or concession	Cases	0	1	Percent of cases in full compliance	P-value
Administrative condition (paper-based, such as a payment or conservation covenant)	11	3	8	73%	0.655
Non-administrative condition (action-based, such as planting, species management or monitoring, or weed/pest control)	17	6	11	65%	
Professional ecologist involved	12	3	9	75%	0.480
Professional ecologist not involved	16	6	10	63%	
Concession notified (under the Conservation Act)	18	4	14	78%	0.135
Concession not notified	10	5	5	50%	
Application processed by Christchurch office	6	3	3	50%	0.276
Application processed by Dunedin office	10	4	6	60%	
Application processed by Hokitika office	12	2	10	83%	
Concession approved pre-2010	23	7	16	70%	0.682
Concession approved post-2010	5	2	3	60%	
Concession reviewed	9	3	6	67%	0.926
Concession not reviewed	19	6	13	68%	

** Significant result (p= <0.05)
* Suggestive result (p= <0.1)

One way to achieve high compliance is to ask for very little (Brower 2008). This approach has implications for conservation on the ground. Perfect compliance with a low rate of compensation request might be no worse for conservation than low compliance with a high rate of request. Further, there is the question of whether the compensation requests themselves were sufficiently rigorous. High compliance with insufficient compensation requests risks yielding a hollow victory. In other words, the constraint on protecting biodiversity lies not only in the compliance with compensation once requested, but also in the sufficiency of the request itself.

Observed constraints on compliance

Five institutional factors within DOC were observed during the study that might be inhibiting compliance. Taken together, they suggest that some of the imperfections in compliance rates stem from within the agency, rather than just from recalcitrant concessionaires. These factors were anecdotally observed and reported, not quantified. However, as they affirm others' predicted and observed constraints on compliance (Matthews & Endress 2008; Tonkin and Taylor 2012; Rega 2013), they bear further investigation

Table 3. Compliance by regulatory characteristics.

Regulatory characteristics of condition	Cases	0	1	Percent of cases in full compliance	P-value
Action required before activity	11	3	8	73%	0.616
Action required during activity	12	5	7	58%	
Action required after activity	5	1	4	80%	
Bond required	8	2	6	75%	0.604
Bond not required	20	7	13	65%	
Monitoring required	17	7	10	59%	0.192
Monitoring not required	11	2	9	82%	
Long concession duration (>30 years)	8	3	5	63%	0.208
Medium concession duration (15–30 years)	9	1	8	89%	
Short concession duration (<15 years)	11	5	6	55%	
Action one-off	13	3	10	77%	0.335
Action ongoing	15	6	9	60%	

** Significant result (p= <0.05)
* Suggestive result (p= <0.1)

Table 4. Compliance by applicant characteristics.

Social characteristics of condition	Cases	0	1	Percent of cases in full compliance	P-value
Applicant is an individual	6	2	4	67%	0.869
Applicant is a private organisation or company	14	5	9	64%	
Applicant is a public organisation or company	8	2	6	75%	
Applicant has pending concession applications and/or renewals	5	0	5	100%	0.036**
No pending concession applications and /or renewals	23	9	14	61%	
Frequent DOC visits	12	3	9	75%	0.480
Infrequent DOC visits	16	6	10	63%	
Frequent public visits	11	5	6	55%	0.228
Infrequent public visits	17	4	13	76%	
Concession transferred to a new concessionaire	7	2	5	71%	0.814
Concession not transferred to a new concessionaire	21	7	14	67%	

** Significant result (p= <0.05)
* Suggestive result (p= <0.1)

First, there does not appear to be a systematic and coordinated approach to compliance monitoring of concession conditions in New Zealand. The level of compliance monitoring varied according to the type and scale of activity for which a concession had been granted. Grazing concessions were often monitored annually by DOC staff (although this was not always the case) while telecommunications concessions usually received only a single inspection, despite the compensation measure requiring more frequent checks. Access also played a large role; concessions along major state highways received more frequent visits because of routine drives along these areas. Per anecdotal evidence, much compliance monitoring is *ad hoc* and reactive because of public observations or complaints.

Second, as our results show, compliance reporting and data management are inconsistent. Only seven of the 20 cases had written records of compliance monitoring. DOC staff provided further information for 16 cases. For the four remaining, staff turn-over and loss of institutional knowledge explain the lack of information. Furthermore, of those seven cases where compliance information was recorded, records for each took several forms (email chains, invoices, memos, official inspection reports). These records were then kept either on paper and/or electronic file, with the former filed in several DOC offices. The core concession files were generally kept at the main service centres where the concessions were issued, yet the monitoring files were held in the various local offices

where the monitoring was done. Financial records pre-2003 were archived in an old finance system to which there was limited access. These approaches to data management make it difficult to accurately assess compliance. As such, the final compliance scores determined in this study are a best estimate. Reliance on concessionaires to self-monitor and report also made compliance reporting and data management problematic. Self-monitoring can be poorly conducted and compliance information can be misrepresented (Tonkin and Taylor 2012).

Third, lack of communication inhibits compliance. For example, two compensation payments were never paid because permissions officers did not communicate with finance staff. Permissions staff signed contracts, yet finance staff never sent invoices.

Fourth, lack of resourcing might contribute to the underuse of DOC's authority (Scholz 1984; Friesen 2003). Scholz (1984) explains that regulatory agencies can spread limited resources further by being flexible in acceptable levels of compliance. An example of this was some weed or pest control conditions where DOC stated that concessionaires were in full compliance (the last inspection often several years prior), yet a site visit revealed the opposite.

Lack of resourcing cannot always explain low compliance, especially when the contract stipulated that the concessionaire should pay for DOC staff time for monitoring. Friesen (2003) expands on resourcing and the cost of enforcement, predicting that a regulated entity will only comply with a regulation when compliance costs are lower than the expected penalty for violation. Frequent monitoring and strict enforcement strategies, including high fines, are often proposed as solutions (Friesen 2003; Wu 2009). Eckert (2004), Earnhart (2004) and Rousseau (2008) all confirmed the deterrent effect of increasing inspections. However, Friesen (2003) makes the point that, even with low inspection probabilities and small fines, compliance can still be high. Achieving high compliance with low enforcement expenditure requires innovative, non-traditional approaches, such as targeted enforcement (Scholz 1984; Friesen 2003).

A fifth constraint on compliance and compliance monitoring is its level of priority. The New Zealand Biodiversity Strategy advocates the importance of 'appropriate mechanisms to enforce policies and actions to conserve and sustainably use New Zealand's biodiversity…including education, surveillance, compliance monitoring, enforcement programmes and appropriate sanctions for non-compliance' (DOC 2000). However, DOC does not yet appear to have a published compliance monitoring and enforcement strategy.

Comparisons to previous studies

At 68%, compliance with biodiversity compensation measures appears higher on New Zealand conservation land than overseas. For example, a study of compensatory wetland mitigation in Massachusetts, USA found 54% of wetland projects did not comply with the State's wetland regulations (Veneman & Brown 2011). Further, a study of habitat compensation under the Canadian Fisheries Act 1985 found that of 124 developments associated with fish habitat were non-compliant with conditions (Harper & Quigley 2005). An environmental auditing study of artificial waterways in Western Australia found a similar non-compliance rate of 37% with conditions related to the mitigation of adverse effects (Bailey et al. 1992).

Two significant variations in compliance we observed resembled national and international findings. First, we found that grazing concessions had the lowest compliance, echoing Brown's (2013) finding that agricultural consent conditions under the RMA achieved the lowest rates of compliance (4.8% compliance, far lower than our observations). Second, we found that compliance rose with higher levels of protection under IUCN protected area categories 1–4, affirming the predictions of Neyer and Zurn (2001).

Several of our findings and observations confound existing literature. The presence of pending applications for concessions did vary suggestively with compliance, but not in the direction expected. We expected a significant relationship between compliance and a concessionaire's pending application or renewal because frequent exposure to regulatory agents can improve compliance (Friesen 2003; Shimshack 2007). We found the opposite – those with pending applications exhibited lower compliance than those without.

Similarly, four of the expected trends we failed to find confound previous findings and expectations. (1) Dasgupta et al. (2000) and Brown (2013) found higher compliance amongst public concessionaires than private individuals and interests and attributed it to higher public scrutiny of public organisations; we did not find this pattern. (2) Employing a professional ecologist is often assumed to improve design and implementation of conservation measures, including compensation (Binning 2000; Denny 2011; Brown et al. 2013). We did not find this, perhaps because s/he was not always retained throughout the implementation of the compensation measure. (3) A bond was expected to enhance compliance. A bond acts as insurance where, to get the bond back, a concessionaire must comply with conditions. While we observed a 10% increase in compliance for concessions with a bond we again found no statistical relationship, perhaps because bonds were rare (in only 6 of 20 concessions), low, or never paid. (4) Heightened public participation and scrutiny for notified concessions was expected to improve compliance (Morrison-Saunders & Early 2008), but also did not.

Conclusion and recommendations

We conclude that two types of factors limit biodiversity protection within the practice of biodiversity compensation on New Zealand's public conservation land: (1) compliance with compensation once requested and (2) the quality and consistency of the requests. Jurisdictions engaging in biodiversity compensation should attend not just to compliance, but also to the requests themselves. To do so, they should develop formal, enforceable national guidelines on biodiversity compensation, compliance monitoring and enforcement strategies, and a consistent approach to compliance reporting.

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