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## The Curious Untidiness of Property & Ecosystem Services: A Hybrid Method of Measuring Place

John Page  
*Southern Cross University, Lismore, NSW, Australia*

Ann Brower  
*Lincoln University, New Zealand*

Johannes Welsch  
*Lincoln University, New Zealand*

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## ARTICLE

# The Curious Untidiness of Property & Ecosystem Services: A Hybrid Method of Measuring Place

JOHN PAGE,\* ANN BROWER,\*\* AND JOHANNES WELSCH\*\*\*

### I. INTRODUCTION

In this paper, we look at property and ecosystem services, and the physicalized context in which the two converge. Ecosystem services (ES) are those services provided to society by functioning ecosystems, intact and modified; they include recreation, water filtration, and carbon sequestration. ES combine ecological and economic spheres, while property encompasses the political and economic. Ecosystem services, like property rights, are anthropocentric in nature. Each benefits human well-being.<sup>1</sup> But ecosystem services do not fit neatly into fixed land parcel boundaries or orthodox conceptions of property. This leads to an untidy overlay of property rights, claims, and uses across the natural capital and resource flows of ecosystem services.

Such untidiness could be explained by the fact that ES, while no longer new,<sup>2</sup> is not yet fully developed within the law,

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\* Senior Lecturer, Property Law, Southern Cross University, Lismore, NSW, Australia.

\*\* Senior Lecturer, Environmental Policy, Lincoln University, New Zealand.

\*\*\* Department of Ecology, Lincoln University, New Zealand.

1. "Ecosystem services are the many and varied benefits that people obtain from ecosystems." DEP'T OF THE ENV'T, WATER, HERITAGE & THE ARTS, AUSTRAL. GOV'T, ECOSYSTEM SERVICES: KEY CONCEPTS AND APPLICATIONS 8 (2010).

2. One of the first and broad characterizations came from Gretchen Daily, defining ES as "the conditions and processes through which natural ecosystem, and the species that make them up, sustain and fulfil human life." GRETCHEN C.

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especially so in a property framework.<sup>3</sup> Or, it could be because they are fundamentally beyond comparison. Some commentators call for a revised “mechanism for distributing rights among the broad spectrum of property owners.”<sup>4</sup> Others suggest that the “very nature of ES defies assigning property rights.”<sup>5</sup> To us, this defiance is hard to reconcile. Both ES and property seek to assign value to natural resources. In this sense, ES is a property response to the bounties of nature. As such, property and ES are two sides of the same coin.

Since its inception, the idea of ES has developed theoretically,<sup>6</sup> intrinsically related to place. By contrast, property

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DAILY, NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 3 (Gretchen C. Daily ed., 1997). Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253, 254 (1997) (defines ES from an economic standpoint, “flows of materials, energy and information from natural capital stocks which combine with manufactured and human capital services to produce human welfare.”); see, e.g., Rudolf S. De Groot et al., *A Typology for the Classification, Description and Valuation of Ecosystem Functions, Goods and Services*, 41 ECOLOGICAL ECON. 393, 396 (2002) (similar definitions and lists of ES have been compiled with a primarily holistic view, but lacking specifics to advance systems management and the benefits they provide). Efforts to make the concept more accessible and concrete for both decision makers and the public resulted in the Millennium Ecosystem Assessment (MEA). The MEA grouped ES into four groups: provisioning services (food, fodder, fuel, timber and water); regulating services (pest and weed control, climate regulation, pollination); cultural services (recreation, aesthetic, cultural heritage, sense of place); and supporting services (services that support and maintain ecosystem services). Gretchen Daily & Shamik Dasgupta, *Concept of Ecosystem Services*, in 2 ENCYCLOPEDIA OF BIODIVERSITY 353–62 (Simon Levin ed., 2d ed. 2001).

3. J.B. Ruhl et al., *The Context of Ecosystem Services*, in THE LAW & POLICY OF ECOSYSTEM SERVICES (2d ed. 2007).

4. *Id.* at 96.

5. *Id.* at 95.

6. Numerous international studies subsequently advanced an understanding of ES, particularly around their ecological dynamics. See, e.g., Claire Kremen et al., *The Area Requirements of an Ecosystem Service: Crop Pollination by Native Bee Communities in California*, 7 ECOLOGY LETTERS 1109 (2004); Harpinder S. Sandhu et al., *The Future of Farming: The Value of Ecosystem Services in Conventional and Organic Arable Land: An Experimental Approach*, 64 ECOLOGICAL ECON. 835 (2008). The economic value of ES to human communities has been suggested to be worth approximately U.S. \$33 trillion per year. Costanza et al., *supra* note 2, at 259. For an example of their geographical distribution throughout the landscape, see Ian A. Dickie et al., *Ecosystem Service and Biodiversity Trade-offs in Two Woody Successions*, 48 J. APPLIED ECOLOGY 926 (2011); Claire Kremen, *Managing Ecosystem Services:*

theory is often described as devoid of place.<sup>7</sup> But the placement of ES into landscapes has revealed measurement difficulties. Given the shortcomings of ES and property theory, we approach the question of untidiness empirically. We use two well-loved cultural landscapes on New Zealand's South Island, the Tekapo Basin and Taylor's Mistake, and use three methods of describing place that fall along the quantitative-qualitative spectrum.

Theoretically, this paper builds on ideas of ES in landscapes, property theories of plurality and marginality, and the legal geography of localized place. Methodologically, we will explore three divergent ways of measuring ES in a propertied landscape. Substantively, combining property theory and spatial methods in this way will allow for future consideration of property arrangements that might be more optimal<sup>8</sup> and representative of contextualized place.

Part II presents the qualitative method—a narrative description of the flow of resources and services across a transect from the mountains to the sea. Narrative is effective in describing the aesthetics and indelibly human values of landscapes. This sense of place is itself an ES, a cultural service.<sup>9</sup> Part III turns to the state-of-the-art spatial modeling technique, Geographic Information Systems (GIS). GIS is Cartesian, rational, defensible, and replicable. It is useful for configuring and implementing all forms of property measurement and transaction—whether zoning, planning, purchasing, owning, managing, or subdividing. In its layers upon layers of detail, it captures the multiple dimensions and scales, in time and space, of ecosystems, landscapes, and property.

Part IV discusses property plurality, a nascent theory based on an instinctive understanding of property in land outside the mainstream private ownership model. We use plurality as our third method. It draws on diverse sources: different concepts of mapping property, the potential of property marginality to

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*What Do We Need to Know About Their Ecology?*, 8 *ECOLOGY LETTERS* 468 (2005); Ruhl et al., *supra* note 3.

7. See *THE EXPANDING SPACES OF LAW: A TIMELY LEGAL GEOGRAPHY* 3 (Irus Braverman et al. eds., 2014) [hereinafter *EXPANDING SPACES*].

8. By optimal, we mean a property model that would deliver ecosystem services most efficiently, equitably, and effectively to communities near and far.

9. *AUSTL. GOV'T*, *supra* note 1, at 9.

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explain the truth of our relationships with land, and the simplistically appealing idea that property is because it is performed, constantly and ceaselessly. Part V addresses three key questions that combine and compare the methods of describing the landscapes of Tekapo and Taylor's. In Part VI, we ask what those combinations and comparisons mean for property and ES. Part VII concludes.

The methodological comparison reveals a curiosity: the more rational and detached the method of representation, the less recognizable the landscape. Lines dissecting landscapes tend to distort reality.<sup>10</sup> They risk making somewhere appear as anywhere. In the case of ES, the inevitability of distortion may still be truthful. But in the case of property, the lines go further, so impoverishing the diversity of propertied relationships *in situ* that these relationships are rendered invisible. Property lines not only distort reality, they distort the truth of place.<sup>11</sup> Anywhere becomes a propertied nowhere. Ironically, it is not the Tekapo Nowhere described in Part II. In the end, our criticism is not of GIS, but of an atomized, parceled, abstract view of property. Maps show gaps in property, not in maps.

This curiosity speaks to the question of untidiness of property and ES in landscapes. It suggests that the explanation for the untidiness is neither incomparability, nor under-theorization, but both. The empirics of place bell the cat. This has profound implications for property. Disparate though they may be, property and ES are two sides of the same coin. This is the paradox we wade into.

## II. THE LIVED EXPERIENCE: THE NARRATIVE METHOD

This section presents a narrative transect from the Mountains to the Sea of New Zealand's South Island. It attempts to encompass Dagan's "full orchestration"<sup>12</sup> of the lived experience of property and ecosystem services. In the tradition of

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10. Boaventura De Sousa Santos, *Law: A Map of Misreading: Toward a Postmodern Conception of Law*, 14 J. L. & SOC'Y 279, 282-86 (1987).

11. *See id.*

12. HANOCH DAGAN, PROPERTY: VALUES AND INSTITUTIONS 72 (2011).

Blomley,<sup>13</sup> grounding the descriptive method to place crystallizes the interplay between ES and property, and allows us to explore the untidiness at the margins between the two. The transect reveals that though we are aware of ES only occasionally, they contribute much to our lives, our personal and national identity, aesthetic pleasure, relaxation, clean air, clean water, recreation, health and fitness, agriculture and productive industries, climate regulation, soil productivity, and so on.

### A. Tekapo

We start the journey at the head of Lake Tekapo, just below the confluence of the Godley and Macauley Rivers and to the northwest of Tekapo Township. The craggy peaks leaning over the lake reveal the obvious glacial history of the basin, and contrast the surreal blue of the lake. Images of Narnia, Lord of the Rings, and fairy tales spring to mind. The blues of the lake, the golds of the hills, and the greys of the sometimes-angry sky are not soon forgotten. If you are a New Zealander, you might well feel that you are coming home to a place you have never been. As a latte-sipping Aucklander or black-clad Wellingtonian, you have neither mustered nor sheared sheep, but the distant memory lives in your heart, nerve, and sinew. Though you have never been to this here spot, it is who you are.

A few minutes after arriving by car, the engine will cool and you will slowly start to notice something that you cannot identify right away. It is not a presence but an absence. You soon realize that you are noticing silence. The absence of noise. Just nothing. The air is so crystalline, the water so blue, and the silence so profound that visitors have to take a step back to avoid being swallowed whole by the pure, unadulterated space.

But the space is far from empty. Though the peaks look abrupt, and the sky may appear angry, the space welcomes New Zealanders and tourists alike. The Te Araroa Trail passes between the head of the lake and the Main Divide on its long and often arduous route from the northern apex to southern apogee of New Zealand. Look down the lake and you'll see sheep and deer

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13. *See generally* NICHOLAS K. BLOMLEY, *LAW, SPACE, AND THE GEOGRAPHIES OF POWER* (1994).

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production, and Round Hill ski field, a private alpinism concession serving international and domestic clients. On the true left of the lake, you'll see the steep slopes of ridge after ridge of the Two Thumb Range, which hosts independent and guided trampers, hunters, and Nordic skiers who might travel up the seemingly never-ending Snake Ridge to traverse Stag Saddle into Mesopotamia Station, formerly a Crown pastoral lease and now largely conservation land with a lucrative exclusive hunting concession over much of it. These visitors, be they New Zealanders coming home or adventurous tourists from faraway lands, might fish for trout, or hunt for deer or tahr along the way. From Mesopotamia, they might shiver and stumble their way across the rocky rapids of the Rangitata River into the country of Nowhere, made paradoxically famous by Samuel Butler's *Erewhon*.<sup>14</sup>

High above the lake on the true right, clings the University of Canterbury's Mount John Observatory, visited by 14,000 per year (of whom ninety percent come from overseas).<sup>15</sup> The observatory depends on the crystalline air that Tekapo's Nowhere provides. The uninterrupted darkness was protected in 2012 by the Aoraki Mackenzie Dark Sky Preserve, the biggest starlight preserve in the world.<sup>16</sup> The Christchurch and Canterbury Tourism chief executive officer said of the protection of unadulterated darkness – "I genuinely believe getting this status is going to drive a lot more interest by people . . . it is quite an important accolade to get."<sup>17</sup>

While appearing empty at first glance, the interplay of property and ecosystem services at Tekapo's Nowhere contributes to the lives of New Zealanders and their guests in many ways. First, the sheep and deer farming provide basic needs of food and clothing. The broad expanses of deep-rooted tussock sequester

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14. SAMUEL BUTLER, *EREWHON* (Dover Thrift ed. 2002) (1872).

15. Alan Wood, *Starry Skies Boost for SI Tourism*, THE PRESS, June 11, 2012, <http://www.stuff.co.nz/the-press/business/7076945/Starry-skies-boost-for-SI-tourism>, archived at <http://perma.cc/9MJR-KEV3>.

16. *Id.*; Paul Gorman, *Southern Skies Get Starlight Reserve Status*, THE PRESS, June 10, 2012, <http://www.stuff.co.nz/science/7075550/Southern-skies-get-starlight-reserve-status>, archived at <http://perma.cc/L82H-BKH8>.

17. Wood, *supra* note 15.

carbon, stabilize soil, host nitrogen-fixing microbiota,<sup>18</sup> and burn into the mind's eye of New Zealanders homesick for the home turf on which they might never set foot. In addition, the undammed braided rivers flowing into Lake Tekapo provide flood protection, native and sports-fish habitat, and clean water for drinking and teeth-chattering swimming. On the other hand, the dammed water flowing out of the lake generates electricity and irrigates pastures. Finally, the cliffs, ridges, nooks, and valleys provide recreation, leisure, and tourism opportunities that contribute to fitness and weight management, fill hunters' freezers with lean meat, and remind us who we are when the twists, turns, and jolts of life make us forget.

### **B. Taylor's Mistake**

We finish at Taylor's Mistake beach and the Godley Head Peninsula, a popular peri-urban coastal landscape on the outskirts of Christchurch, on the east coast of the South Island. With seventy-five percent of New Zealanders living within ten kilometers of the sea,<sup>19</sup> Taylor's is one of many such coastal nooks. On the southeast edge of Christchurch, Taylor's Mistake is a narrow cove sandwiched between the steep black bluffs of Scarborough Heads, the grassy slopes of the Godley Head Peninsula, and the sometimes sparkling but often-moody Southern Pacific Ocean. The northeast aspect of the beach and the topography of the sea bottom and surrounding cliffs make Taylor's Christchurch the most popular surfing beach. The only large permanent structures in the valley are the public toilets and showers and the Taylor's Mistake Surf Lifesaving Club, whose members patrol the beach on summer days and compete in city, regional, and national surf lifesaving competitions. But for the ice cream truck playing a plinking version of "Greensleeves" between the parking lot and the beach on summer days, there are

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18. See M.A. Line & M.W. Louitt, *Studies on Non-symbiotic Nitrogen Fixation in New Zealand Tussock-grassland Soils*, 16 N.Z. J. AGRIC. RES. 87 (1973).

19. *Are New Zealanders Living Closer to the Coast?*, STATISTICS N.Z., [http://www.stats.govt.nz/browse\\_for\\_stats/population/Migration/internal-migration/are-nzs-living-closer-to-coast.aspx](http://www.stats.govt.nz/browse_for_stats/population/Migration/internal-migration/are-nzs-living-closer-to-coast.aspx) (last visited Apr. 20, 2015), archived at <http://perma.cc/CF9G-HTQQ>.



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no cafes, shops, or vending machines in Taylor's Mistake. Even cell phone coverage is spotty.<sup>20</sup>

At the southeast corner of the beach lies the trailhead of the Godley Head walkway and mountain bike track that winds around the peninsula. Entire sections of the walkway fell into the sea in the 2011 earthquakes, leaving Boulder Bay in a cloud of dust, and a whole layer of cliff faces newly exposed to the winds and the waves. Following the quakes, the track was closed for nearly eighteen months. But so well loved is Godley Head that the closure was roundly ignored by walkers, runners, and mountain bikers.<sup>21</sup> Transgressions to the closure were so frequent that the council staff repairing the track had no choice but to smile, wave, and comment on the weather to each and every transgressor, often more than once.

The Anaconda mountain bike track climbs the hill almost immediately after the track leaves the beach, slicing through pasturage of grazing sheep. From the top of the peninsula, the track continues in view of the deep blue waters of Lyttelton Harbor and the Banks Peninsula beyond. The tip of Godley Head peninsula hosts a small sheep farming operation and World War II era gun emplacements dug into the hill to guard against the feared Japanese attack that never arrived.

The track then loops down to the top of the cliffs hanging over the ocean. Just over the lip of the newly exposed cliff, a predator-proof fence guards a colony of little blue penguins (*Eudyptula minor*). Before the quakes, visiting the penguins was a local highlight for adults and children alike. A bit further, a narrow track branches off and sidles down the hill to Boulder Bay, a small rocky cove with tidal pools and a small cluster of quaint and quirky one-room seaside cottages, or "baches" in the New Zealand vernacular.

So seamless are the boundaries of ownership of ES provision at Taylor's that the public track to Taylor's from the west passes

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20. Giles Brown, *Splish, Splash Cools Hot Summer Day*, THE PRESS, Dec. 31, 2008, <http://www.stuff.co.nz/the-press/news/our-communities/779034/Splish-splash-cools-hot-summer-day>, archived at <http://perma.cc/NF72-JGBF>.

21. Rachel Young, *Quake-hit Port Hills Tracks Reopen*, THE PRESS, Jan. 2, 2013, <http://www.stuff.co.nz/the-press/news/christchurch-earthquake-2011/8134920/Quake-hit-Port-Hills-tracks-reopen>, archived at <http://perma.cc/P3Z4-E7A3>.

directly through a bach. “Public Track” signs point up the bach stairs and across the veranda. Signs then lead up the neighbor’s stairs and in front of the next veranda. On sunny weekend days, an ever-present and ever-ebullient naked man on the veranda pleasantly greets walkers. Such is the offbeat charm of Taylor’s. As the emptiness of open spaces offers solace and center in the Tekapo high country, the idiosyncratic topography of Taylor’s Mistake offers the freedom to be naked on a sunny Saturday.



**Figure 1:** The public/private interface at Taylor’s, minus the ever-ebullient naked man.

The seemingly empty spaces at both ends of the Mountains to the Sea transect typify Wilson’s biophilia hypothesis,<sup>22</sup> the innate feeling of coming home to a place one has never been. Indeed, a curiously important contribution that the unadulterated yet bounteous spaces like Tekapo and Taylor’s provide is shelter from the proverbial storms of urban life. In the weeks and months following the February 2011 earthquake in Christchurch,

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22. See generally *BIOPHILIA: THE HUMAN BOND WITH OTHER SPECIES* (Edward O. Wilson & Steven R. Kellart eds., 1986).

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Cantabrians who were able flocked not to cities, but to New Zealand's vast places of emptiness and calm.<sup>23</sup>

### III. THE MAPPED EXPERIENCE: THE SPATIAL METHOD

Another method for observing the untidiness between property lines and ES in a landscape is the burgeoning field of Geographic Information Science (GIS). GIS is more often seen in ecology and conservation biology journals than in law reviews. Our intent is not to undertake a formal GIS evaluation of ES and their values in the case study landscapes. Rather, we aim to convey how GIS would depict existing data sets of ecosystem services. GIS offers many advantages: illustrations are readily available; it renders complex resources more measurable, and their values more estimable. Yet to measure and estimate values properly is exceedingly difficult, and the data collection requirements prohibitively expensive. Further, GIS is inherently spatial, which gives the wonderful capacity to depict the scale of aquifer recharge processes in the Tekapo basin, as an example. However, estimating the value of the aquifer recharge contribution of a particular legal parcel of land is as easy as holding water in bare hands. New Zealand holds a fantastic depth and breadth of spatial data about its territory, more than in other countries, but there are still important, and inherent, holes in the available data.

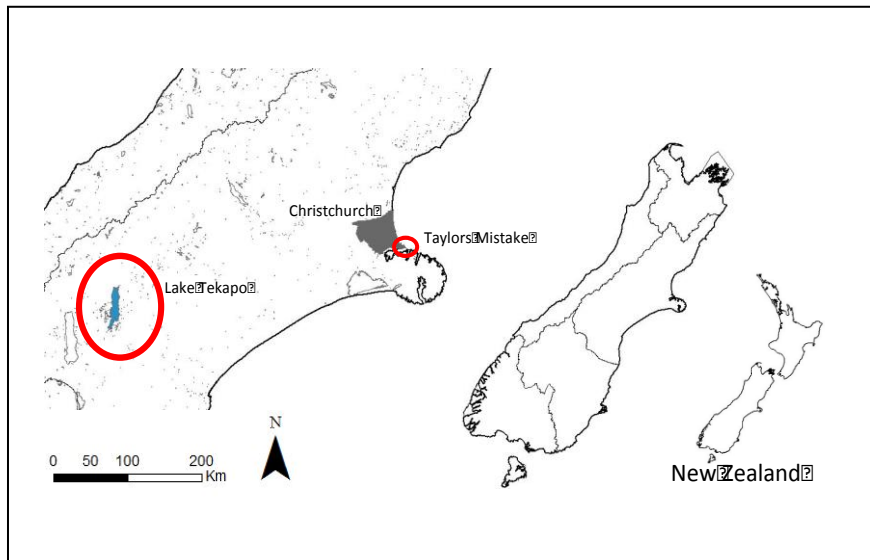
The most readily available spatial data are of course the legal parcel boundaries, which have no relation to the scale of most ecosystem services. Spatializing an experience of a place like Tekapo or Taylor's Mistake combines mundane data such as sales prices, with the seemingly esoteric such as soil microbes, with the rarefied such as threatened species habitat, with the other-worldly such as subterranean minerals and caverns. Combining all of those is a bit of a puzzle. In this section, we make a start.

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23. STATISTICS N.Z., USING CELLPHONE DATA TO MEASURE POPULATION MOVEMENTS 14 (2012) ("Low-populated regions close to Canterbury attracted the highest percentages of Christchurch cellphones after the 22 February quake"), available at [http://www.stats.govt.nz/tools\\_and\\_services/earthquake-info-portal/using-cellphone-data-report.aspx](http://www.stats.govt.nz/tools_and_services/earthquake-info-portal/using-cellphone-data-report.aspx), archived at <http://perma.cc/25BV-SWL6>.

Figure 2 locates Tekapo and Taylor's Mistake on the map of the South Island of New Zealand, Tekapo in the Southern Alps, and Taylor's some 200 miles to the northeast, on the coastal fringe of Christchurch. Figure 3 depicts a number of readily accessible data sets on different ES in the Lake Tekapo region. As the legend indicates, the maps include a simple Google view, legal land boundaries, soil types, vegetative cover types, waterways and recreational trails, public and private lands, agricultural land uses, and representative land values. Figure 4 focuses more closely on the crossovers between land boundaries and public and private lands in Tekapo. Figure 5 repeats the same sequence of maps in Figure 2, this time for the simpler coastal landscape at Taylor's Mistake.

The maps in Figures 2 through 5 speak for themselves. The GIS representations describe the two case study landscapes in the detached, objectified discourse of the cadaster.<sup>24</sup> Analysis beyond the pictorial is postponed to Parts V and VI.

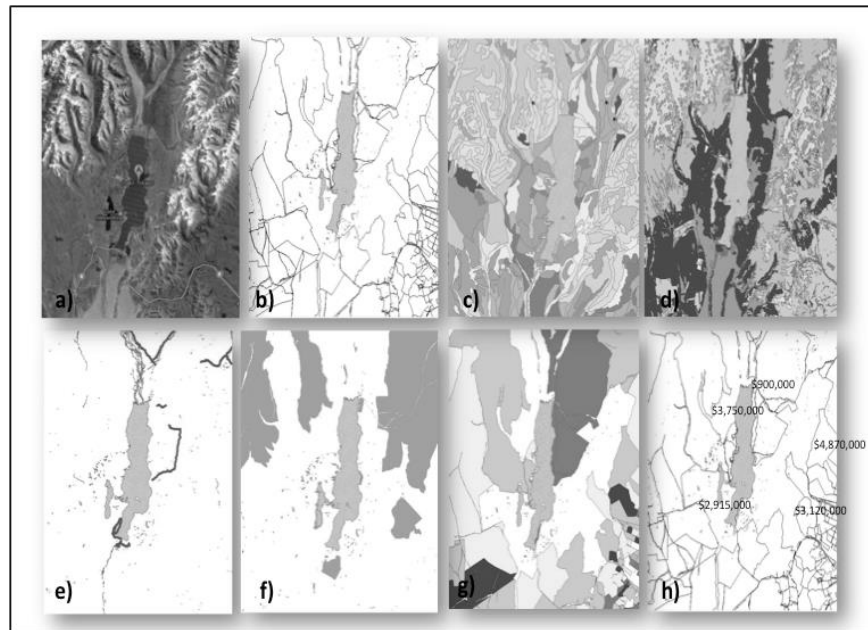


**Figure 2:** Showing the two case examples for the Mountains to the Sea transect with the mountainous start at Lake Tekapo in

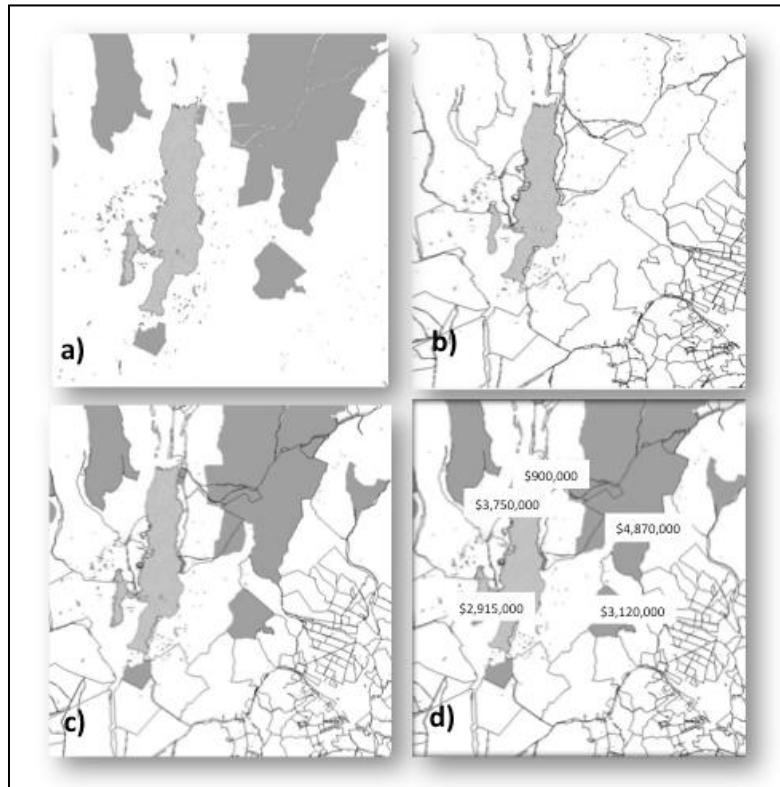
24. BLOMLEY, *supra* note 13.

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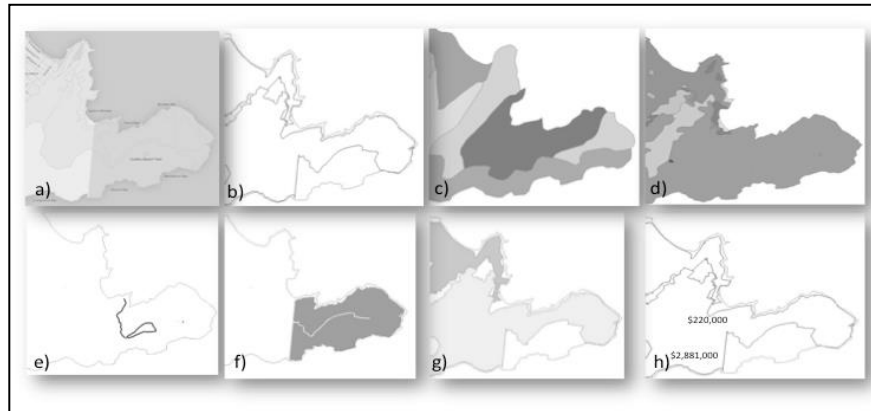
South Canterbury including mountains and foothills, and Taylor's Mistake on the coast near Christchurch on the South Island of New Zealand.



**Figure 3:** The figure depicts a number of readily accessible data sets on different ecosystem services in the Lake Tekapo region representing the mountains and foothills of the transect; a) simple Google map, encompassing the Mount John Observatory described in Part II; b) land property boundaries; c) a map of the dozen or so listed soil types (of about 275 observed in New Zealand); d) a map of vegetative land cover types (e.g. tussock grasslands, exotic pine) of about 100 observed in New Zealand; e) rivers, creeks, lakes, and recreational trails (the latter are bold lines); f) public & private land (the public land is shaded dark gray); g) agricultural land uses; and h) a representative sample of land property values.



**Figure 4:** This figure illustrates the overlay of land boundaries and the distribution of public and private landholdings in the Lake Tekapo area. The map a) shows public and private lands, with public lands shaded in dark gray; b) indicates land property boundaries; c) is an overlay of map b) on map a); and d) is again a map of representative land property values.



**Figure 5:** The figure depicts a number of easily accessible data sets on different ecosystem services in the Taylor's Mistake area as part of the coast and sea transect. Figure 5 shows a) a simple Google map; b) land property boundaries; c) soil types; d) vegetative land cover; e) agricultural land uses; f) public & private land (the public land is shaded in dark gray); g) rivers, creeks and lakes and recreational trails (the latter are bold lines); and h) a representative sample of land property values.

#### IV. FROM THE OWNED TO THE SHARED EXPERIENCE: THE PROPERTY PLURALITY METHOD

Part IV introduces a third method of examining the untidiness of property in ES that departs from the orthodox private model. Property plurality favors the shared experience of landscapes and ES, over the owned experience of property monism. While the methods used in Parts II and III examined ES more closely, plurality focuses on property. Property plurality is closer to the narrative of Part II than the spatial of Part III. The challenge is mapping this less than orthodox measurement of property, such that places like Tekapo and Taylor's become property truths of their grounded reality. Part IV draws on multiple, overlapping sources: concepts of mapping property to place, the potential of property marginality to explain the truth of our relationships with land, and the simplistically appealing idea that property exists because it is performed.

John Nagle observes “there is a special need . . . to recover the importance of places in environmental law.”<sup>25</sup> The same holds true for property. Re-physicalizing property to place is to engage in “resistant re-mapping,”<sup>26</sup> a process that recognizes that the lines of property do not obediently conform to the surveyor’s draft, and that concepts of ownership extend beyond narrow, supposedly settled, paradigms of private title. Instead of a conventional tale of possession and right, the landscapes of Tekapo and Taylor’s possess a narrative of inter-connected property plurality, a “persuasive” story<sup>27</sup> commensurate with the rich array of ecosystem services that these two landscapes likewise yield.

Property plurality is, by its nature a rejection, of property monism. It is a willingness to see the otherness of property, to imagine a diversity of property rights, claims, and uses sited to contextual place. As Andre van der Walt argues, “we cannot afford to see the hegemony of the normal, the everyday or the mass consensus as a norm; we have to leave room for otherness, for difference.”<sup>28</sup>

We sense the Tekapo Nowhere as an intuitive, omnipresent silence of *just nothing*. At the same time, the background white noise of property plurality is similarly *just there* in the landscapes that surround us. Property plurality describes the vast range of relationships people share with land, from exclusive individual dominion to shared collective use, and from enforceable alienable right to claims of entitlement based on vague notions of belonging. It acknowledges the grounded truth that our coastal and mountain landscapes, amongst others, are intensely propertied places, *terra populi*,<sup>29</sup> rather than the neat, yet

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25. JOHN COPELAND NAGLE, LAWS ENVIRONMENT HOW THE LAW SHAPES THE PLACES WE LIVE 252 (2010).

26. *See generally* BLOMLEY, *supra* note 13, at 224-26.

27. *See generally* CAROL M. ROSE, PROPERTY AND PERSUASION ESSAYS ON THE HISTORY, THEORY AND RHETORIC OF OWNERSHIP (Robert W. Gordon & Margaret Jane Radin eds., 1994).

28. A.J. van der Walt, *Property and Marginality*, in PROPERTY AND COMMUNITY 81, 104 (Gregory S. Alexander & Eduardo M. Peñalver eds., 2010) (internal citations omitted).

29. NICHOLAS BLOMLEY, UNSETTLING THE CITY: URBAN LAND AND THE POLITICS OF PROPERTY 93 (Dave McBride ed., 2004) [hereinafter BLOMLEY, UNSETTLING].



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fundamentally empty cadasters of abstract, objectified lines, separating one freehold, or quasi-freehold,<sup>30</sup> parcel from another.

### A. The Mapping of Property Plurality

The truism that “context is everything”<sup>31</sup> is not helpful for property. Rather the reverse is truer; the nature of modern property in land is profoundly abstract. Law students are taught that property concerns rights between persons about things.<sup>32</sup> The legacy of this lesson is an unswerving faith in property as a form-less bundle of stick rights “divorced from the specificities and bonds of place and community.”<sup>33</sup> Abstraction means that property focuses on the lines that divide atomistic private parcels, rather than the land in between and across such lines. Joseph Sax recognizes this perspective as myopic; his aspiration is that in a future “economy of nature,” “[v]iewing land through [its] lens [will] reduc[e] the significance of property lines.”<sup>34</sup> Mapping property plurality is to reject the rudimentary sketch of the orthodox ownership model, and to imagine in its place a collective “warp and woof”<sup>35</sup> of property type that weaves a diverse and pluralistic fabric across landscapes.

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30. In the New Zealand South Island, Crown pastoral tenure is equivalent to freehold title. *The N.Z. Fish & Game Council v. Her Majesty’s Attorney-General in Respect of Comm’r of Crown Lands* (2009) C.I.V. 2008-485-2020 (H.C.). See also Ann Brower & John Page, *When the Law is Silent, Trespassers W...: Law and Power in Implied Property Rights* 42 ENVTL. L. REP. 10242, 10252 (2012).

31. See Jane Holder & Carolyn Harrison, *Connecting Law and Geography*, in *LAW AND GEOGRAPHY* 3, 3 (Jane Holder & Carolyn Harrison eds., 2003).

32. See generally STUART BANNER, *AMERICAN PROPERTY: A HISTORY OF HOW, WHY, AND WHAT WE OWN* 94 (2011).

33. BLOMLEY, *supra* note 13, at 53.

34. Joseph L. Sax, *Property Rights and the Economy of Nature: Understanding Lucas v. South Carolina Coastal Council the Economy of Nature*, 45 STAN. L. REV. 1433, 1445 (1992). Singer likewise sees a weakening of boundaries. JOSEPH W. SINGER, *ENTITLEMENT: THE PARADOXES OF PROPERTY* 90 (2000) (“The boundaries of property do not separate owners inexorably from others or entitle owners to consider their own interests alone. What we do inside our borders affects those outside.”).

35. ALDO LEOPOLD, *FOR THE HEALTH OF THE LAND: PREVIOUSLY UNPUBLISHED ESSAYS AND OTHER WRITINGS* 168 (J. Baird Callicott & Eric T. Freyfogle eds., 1999) (“Doesn’t conservation imply a certain interspersion of land-uses, a certain pepper-and-salt pattern in the warp and woof of the land-use fabric?”).

Legal geographer, Nicholas Blomley, is not unique in writing of property's estrangement from place.<sup>36</sup> However, his work is groundbreaking in its geographic imagery.<sup>37</sup> Blomley identifies at the heart of property law is a conscious disembodiment from context, a liberal "project" commenced in the seventeenth century by common lawyer Edward Coke:

[T]he Western legal project is underwritten by an organized forgetting of [the places and spaces of social life], given that spatial diversity may affect core principles such as the rule of law and legal rationality . . . . [The] English common law has been designed as a form of dis-embedding. The systemization of the English common law [by Coke] . . . entailed the attempt at the creation of a unitary legal map in which the diverse local knowledges of the law were immediately suspect. Increasingly, legal knowledge is imagined as disembodied, true to its own internal logic . . . . This was a very conscious project, designed to eradicate the plurality and radical decentralization of legal voices.<sup>38</sup>

Blomley contests the truth of this project, and traces the "shared complicities"<sup>39</sup> of real property and cartography<sup>40</sup> that together erased context and diversity from the geography of place. While Coke was systematically homogenizing property in the late 17<sup>th</sup> century,<sup>41</sup> Blomley identifies a simultaneous

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36. See, e.g., Maggie Chien, Book Note, *Landscape: Property, Environment, Law* by Nicole Graham, 48 OSGOODE HALL L. J. 719, (2010).

37. Blomley's scholarship is described as "agenda-setting" in a 2014 review of legal geography. EXPANDING SPACES, *supra* note 7, at 5.

38. Nicholas Blomley, *From 'What?' To 'So What?': Law and Geography in Retrospect*, in LAW AND GEOGRAPHY 17, 25 (J. Holder & C. Harrison eds., 2002) [hereinafter Blomley, *Retrospect*].

39. Sarah Whatmore, *De/Re-Territorializing Possession: The Shifting Spaces of Property Rights*, in LAW AND GEOGRAPHY 211, 211 (J. Holder & C. Harrison eds., 2002).

40. See generally BLOMLEY, *supra* note 13, at 67-105. Blomley identifies transition in both land law and geography in the late sixteenth and early seventeenth centuries, personified by jurist Edward Coke and cartographer Christopher Saxton, who were "engaged in a representational project in which space, place, and law begin to be cast in an increasingly modern and 'liberal' fashion." *Id.* at 63.

41. BLOMLEY, *supra* note 13, at 80 (Coke's "common law systemization" was not only an "interjurisdictional struggle between rival legal structures," it signaled "a shift in the spatiality of legal knowledge . . . . [T]he legal world

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“cartographic sea change” that caused a “profound change in social scale, from the world of the local community to the national and international spaces of mercantile capitalism and the nation-state.”<sup>42</sup> Their combined effect was to institutionalize a “displacement of the locus of social identity,”<sup>43</sup> such that maps came to represent space as “an objectified and asocial entity to which the cartographer has special access”<sup>44</sup> to a refined map of “space is emptied of the complexities and particularities that give it meaning on the ground.”<sup>45</sup>

The sensuous and tactile nature of premodern mapping . . . gives way to a rational . . . presentation of space. Space no longer appears to have a subjective quality, but increasingly appears as an objective and pre-given surface . . . . [This] modernist conception of space as something to be measured, contained, divided, manipulated, and – crucially – alienated.<sup>46</sup>

Yet, as Blomley posits, modern maps fail to account for “striking evidence of other understandings of property . . . divergent, and sometimes oppositional understandings of property” that “can entail very different spatial representations and practices.”<sup>47</sup> Blomley uses the modern global city to situate his theory. His objective is to “unsettle the city,”<sup>48</sup> to disrupt the empty ownership model by showing that cities comprise distinctive communities with unique local practices and local knowledge.<sup>49</sup> Blomley fleshed out his “unsettling” city map in 2004, with a lengthy case study of the Downtown Eastside precinct in Vancouver, Canada. Blomley cites community claims to an abandoned department store, struggles against gentrification, and community ownership of a small neighborhood

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increasingly is presented as unitary and centralized, rather than as fragmented and localized.”).

42. *Id.* at 83.

43. *Id.* at 80.

44. *Id.* at 91.

45. BLOMLEY, UNSETTLING, *supra* note 29, at 68.

46. BLOMLEY, *supra* note 13, at 91.

47. BLOMLEY, UNSETTLING, *supra* note 29, at 55.

48. *Id.*

49. Property law must be seen as a form of “local knowledge.” See BLOMLEY, *supra* note 13, at 56-57.

park, as exemplars of how competing and unorthodox property can be mapped to specific place. Blomley concludes that “a closer examination of urban property reveals a greater diversity of possibilities than the map suggests . . . . The ownership model however, invites us to overlook or ignore these other estates,”<sup>50</sup> “to gloss over the plurality of ‘legitimate’ claims to, and interests in, land.”<sup>51</sup>

In particular, the narrative of Woodward’s, the disused ex-department store, illustrates the limitations of the ownership model map. Arguing also that property is inherently contested, Blomley describes the fault lines between competing conceptions of property seen in conflicts over the store’s future.

The unitary claim of the developer is challenged by the argument that the poor also have a legitimate property interest in, and claim to, the [Woodward’s] site. This interest is a collective one – note the frequent invocation of ‘us’ – and also a clearly localized one (‘the community’). This property interest in Woodward’s, moreover, is not one of alienation or transfer. It cannot be monetarized but is, rather, predicated on use, occupation, domicile and inherent need . . . . The redevelopment of Woodward’s is bad, activists say, not simply because it displaces but because it appropriates and encloses. It turns a collective interest into an individualized one.<sup>52</sup>

Woodward’s demonstrates that collective claims to property are not represented, nor are they representable, on conventional maps. They are only revealed by default, through unsatisfactory absences or gaps.<sup>53</sup> This is unsurprising, given property’s negative relation<sup>54</sup> with place which renders “localization and heterogeneity” invisible.<sup>55</sup> It is also unsurprising, Blomley argues, because the primary purpose of cartography is to

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50. BLOMLEY, UNSETTLING, *supra* note 29, at 22.

51. *Id.* at 18.

52. Nicholas K. Blomley, *Enclosure, Common Right and the Property of the Poor*, 17 SOCIAL & LEGAL STUD. 311, 316 (2008) (internal citations omitted).

53. See BLOMLEY, *supra* note 13.

54. See Blomley, *Retrospect*, *supra* note 38, at 24-27. (“[T]he tendency of the law [is] to erase spatial specificity and local difference in the name of an ordered and apparently cohesive unity.”)

55. BLOMLEY, *supra* note 13, at 79.

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arbitrate, not record, determining not so much what is property, but what to *count* as property.<sup>56</sup> For maps to become reflective of the truth of property, diverse property must be re-embedded into its fragmented locality. Blomley exhorts that maps of such multiple geographies should not be ignored. “In large part these maps have not been documented in critical scholarship. This is not because they are absent but because no one has looked for them.”<sup>57</sup>

Paul Carter is one scholar who has “looked for them.” Carter questions why “our representations of the world become hard and dry?”<sup>58</sup> Like Blomley, Carter attributes blame to Enlightenment geography, noting that “the rectilinear grid imposed on the earth’s surface . . . ha[s] no connection to the lie of the land—and, in a sense, no interest in it.”<sup>59</sup> As if describing the dramatic coastline at Godley Head, Carter asks why we accept without question the information such maps disclose.

A description of the world is accounted most authoritative when it contains no trace of the knower. . . . Maps do this with their alluringly complete coastlines . . . . Nothing moves in these ideal representations. They are theaters from which the possibility of anything happening has been removed. . . . How remarkably silent our graphic descriptions of the world are: no breaking surf is heard in them, no animated conversation, no reports of gunfire or anguished whale song.<sup>60</sup>

Carter concludes that lines on maps are simply “narrow pencils of shadow, . . . dark mortar joining the parts of the world together.”<sup>61</sup> Carter shifts the focus from what is seen to what is unseen, the equivalent of the Tekapo Nowhere, “the swarm of possibilities that had to be left out when this line was taken.”<sup>62</sup>

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56. *See, e.g.*, BLOMLEY, UNSETTLING, *supra* note 29, at 15, 97.

57. BLOMLEY, *supra* note 13, at 54.

58. PAUL CARTER, DARK WRITING GEOGRAPHY, PERFORMANCE, DESIGN 8 (2009).

59. *Id.* at 80.

60. *Id.* at 5.

61. *Id.* at 1.

62. *Id.* Carter uses western desert paintings by Australian Aboriginal artists as a counter-example of contextual mapping. *See, e.g., id.* at 129.

## B. The Marginality of Property

The property plurality method is also dependent on an openness to the marginal or eclectic,<sup>63</sup> the prolific array of practices, uses, norms, and claims that define people's heterogeneous relationships with land beyond enforceable right. In particular, marginal property explains the social implications of different forms of ownerships, articulating their meanings in truthful, unadorned ways.

Andre van der Walt argues that property's "logic of centrality" blinds us to the importance of property's margins.<sup>64</sup> This logic refers to a habitual acceptance by "lawyers, owners, and users of property . . . that property institutions naturally assume a central place in society and that property—as an organizing concept—similarly assumes a central role in law and legal theory."<sup>65</sup> The consequences of centrality are twofold: first, that intellectual habits about property become unreflective and narrow, and second, that this inhibits a "much-needed social and legal transformation."<sup>66</sup> The marginal perspective on property seeks to "unsettle the assumed 'normality condition' of liberal tradition."<sup>67</sup> While marginal rights may lack the imprimatur of formal legal standing, they do not lack property indicia. They are identifiable, enacted by diverse performances, and occasionally vindicated. They even possess a certain doctrinal logic.

Marginality . . . requires paying more attention to facts and unique circumstances and relying less on abstract principles and doctrine. . . . [It] has its own logic in that it will tend to look for the paradox and the contradiction rather than for broad theory and grand narrative, for diversity rather than uniformity, for dissent rather than consensus, for conflict and chaos rather than

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63. Marginal refers to the marginality thesis developed by A.J. van der Walt. See GREGORY S. ALEXANDER & EDUARDO M. PEÑALVER, *PROPERTY AND COMMUNITY* (2010). 'Eclecticism' is a virtue according to Joseph Sax. See Joseph L. Sax, *Do Communities Have Rights? The National Parks as Laboratories of New Ideas*, 45 U. PITT. L. REV. 499, 509 (1984).

64. A.J. van der Walt, *supra* note 28, at 81.

65. *Id.* at 81-82.

66. *Id.* Van der Walt's marginalized property holders are post-apartheid black South Africans in urban townships and rural areas. See *id.* at 97-102.

67. *Id.* at 83.

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consent and order. In other words, it directs our attention to fault lines or historical breakdowns rather than concentrating on or searching for the golden thread of continuity.<sup>68</sup>

Amnon Lehavi's "local public commons" is an example of marginal property that erodes atomistic views of property and enhances cohesion.<sup>69</sup> Local public commons are modest public lands (small parks, playgrounds, swimming pools) claimed and controlled by residents in close proximity to the resource.<sup>70</sup> Lehavi analyses the factors that make successful local public commons work, identifying a neighborhood intimacy that allows frequent users to become acquainted, and develop "a limited level of reciprocal norms of 'contribution in return for use.'"<sup>71</sup> Importantly, access to and use of the local public commons is enforced by collective fiat.

Thus a swimming pool in small-town Ophir, New Zealand, is owned by its community in the sense that local rules dictate who can access the pool, when, and on what conditions.<sup>72</sup> Communal ownership arose when public liability insurance for ageing school pools became vexed, and the local council threatened to close it. Reverting to community ownership, with its attendant rosters of volunteer maintenance and supervision, meant that this local public commons could stay open as a valuable community resource.<sup>73</sup> While its ambiguous property status means that it is hard to locate on the Ophir town map (there are oblique references to the pool, no specific directions) its presence is obvious through its popular use.

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68. *Id.* at 100.

69. See Amnon Lehavi, *Property Rights and Local Public Goods: Toward a Better Future for Urban Communities*, 36 *URB. L.* 1, 4 (2004).

70. Often, the local government hands control of the resource over to the informal "sub-constituency scale" group. *Id.* at 14.

71. *Id.* at 47. Davina Cooper ascribes similar factors in her analysis of "social commons." See Davina Cooper, *Opening up Ownership: Community Belonging, Belongings, and the Productive Life of Property*, 32 *L. & SOC. INQUIRY* 625, 649-52 (2007).

72. For example, outsiders can only use the pool during certain hours and on payment of a gold New Zealand one dollar or two dollar coin.

73. Central Otago has the hottest summer temperatures in New Zealand. Malcolm McKinnon, *Otago Region – Climate, Plants and Animals*, *TE ARA – ENCYCLOPEDIA OF N.Z.*, <http://www.teara.govt.nz/en/otago-region/page-3> (last updated July 2013), archived at <http://perma.cc/7VGN-45L8>.

The idea of “ownership through belonging” is another manifestation of property marginality. Avitil Margalit’s study of the “social interest” of football fans concludes that the collective relationship fans enjoy with their club is proprietorial since “belonging also denotes a property relationship.”<sup>74</sup> Davina Cooper likewise sees property in the membership of a school community, yet it is “a quite different understanding of property,” one that is “constitutive of community life.”<sup>75</sup> Cooper compares the right to exclude, and its links to space as conventional property, with the norm of inclusion and space being formative of community. Cooper surmises that the school community only makes sense if “the black box of unofficial property interests” is opened up.<sup>76</sup> Looking at property relationships through the crude lens of the freehold landowner not only “misses, but also misrecognizes, what is taking place [at the school].”<sup>77</sup>

### C. Property as Performance

This theoretical discourse ends with performance theory, the proposition that property is a “relational effect, not a prior ground, that is brought into being by the very act of performance itself.”<sup>78</sup> In other words, doing does not merely describe or represent property, but it enacts, such that property becomes a reality through its performance. Geographers use performance theory to constitute place. For example, Tim Cresswell argues that “places are never established. They only operate through constant and reiterative practice.”<sup>79</sup> Blomley says that where performance theory is applied to property, it challenges the

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74. Avitil Margalit, *You’ll Never Walk Alone: On Property, Community, and Football Fans*, 10 THEORETICAL INQUIRY IN LAW 217, 226 (2009).

75. Cooper, *supra* note 71, at 630, 642.

76. *Id.* at 659.

77. *Id.* at 659. Similarly, marginal property is discernible in historic contexts, the interest of commoners in the unenclosed lands of eighteenth century agrarian England was a “form of ownership without possession,” a bond that “created a sense of self: it told commoners who they were,” “one of a tribe.” JEANETTE M. NEESON, COMMONERS: COMMON RIGHT, ENCLOSURE AND SOCIAL CHANGE IN ENGLAND 1700-1820, at 180 (1993).

78. Nicholas Blomley, *Performing Property: Making the World*, 26 CAN. J. L. & JURISPRUDENCE 23, 32 (2013) [hereinafter Blomley, *Performing Property*].

79. TIM CRESSWELL, PLACE: A SHORT INTRODUCTION 70A (2d ed. 2004).



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modalities of the ownership model that recognize only two critical moments in time, the initial creation of property, and any subsequent transfer of title. Instead, time is always important, as performance belongs in the constant acts of doing. Importantly, the constancy of performance over time also has a citational effect, one more or less successful act “cites other such performances and, in so doing, compels future similar performances.”<sup>80</sup> Performance and precedent are no strangers to the common law of property; indeed a sufficiency of doing is emblematic of doctrines such as adverse possession. Nor is doing illogical, for as Oliver Wendell Holmes observed, “[t]he life of the [common] law has not been logic: it has been experience.”<sup>81</sup> We posit performance as a method of examining the untidiness at the margin between property and ES.

Performance is liberating because it escapes the black letter strictures of property.<sup>82</sup> If private property is the more or less successful performance of mowing lawns, building fences, registering title, or paying rates,<sup>83</sup> then community property is just as equally enacted by swimming in village pools, collecting gold coins as entry fees, or drawing up volunteer cleaning rosters. Performativity unfreezes the (often) arcane rules that limit our imagination of what is property in land.

To imagine property plurality is to faithfully depict the “lived experience of property,”<sup>84</sup> to start to explain the untidiness that is the interplay of property and ES. As Hanoch Dagan opines, if property were to start afresh with a blank slate, it would be extraordinary if it were conceived as a formless, context-free

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80. Blomley, *Performing Property*, *supra* note 78, at 36 (By the same logic, “[c]itational failures, conversely, are less likely to have performative effect.”).

81. Robert Goldstein, *Green Wood in the Bundle of Sticks: Fitting Environmental Ethics and Ecology into Real Property Law*, 25 B.C. ENVTL. AFF. L. REV. 347, 412 (1998) (citing OLIVER WENDELL HOLMES, *THE COMMON LAW* 5 (1881)).

82. See generally Thomas W. Merrill & Henry E. Smith, *Optimal Standardization in the Law of Property: The Numerus Clausus Principle*, 110 YALE L.J.1 (2000) (An example of a closed list mentality is the doctrine of *numerosus clausus*, a civilian doctrine adopted to eliminate custom from French property law. Some common lawyers argue it also applies to the common law).

83. See Blomley, *Performing Property*, *supra* note 78, at 37.

84. See DAGAN, *supra* note 12, at 72-74.

bundle of rights.<sup>85</sup> To use another Dagan analogy, plurality is akin to “a complex piece of music with full orchestration”; its alternative is “looking only at a melody line [that] risks missing most of the performance.”<sup>86</sup>

## V. COMPARING AND COMBINING METHODS: IMPLICATIONS FOR THE GROUNDED TRUTH OF ECOSYSTEM SERVICES IN LANDSCAPES

Thus far, this paper has explored three disparate ways of exploring the untidiness: the lyricism of narrative, the rational data sets of GIS, and the marginalized otherness of property plurality. Part V begins to draw all three together through the prism of three questions, to try to discern the “complex orchestration” amidst the din of many singular melody lines.

### A. Property on Its Own: Who Owns Interests in Ecosystem Services on Public and Private Land?

Broadly speaking, the vesting of ownership of ES is an arbitrary and indiscriminant consequence of where surveyed or natural boundary lines fall. This question, though seemingly obvious, is an attempt to quantify the interplay between property and ES through the singular lens of ownership. This question, and its answer, reveal the deficiencies of a monistic depiction of property, with the hope that the cumulative knowledge of the others will provide a more satisfactory account.

In the case of private land, the who question is relatively straightforward. Jeremy Waldron describes this as the “single organizing idea - the idea that it is for a certain specific person to

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85. Hanoch Dagan, *Reimagining Takings Law*, in PROPERTY AND COMMUNITY 39, 48 (Gregory S. Alexander & Eduardo M. Peñalver eds., 2010) (“I believe that property should be construed as it actually is in law and in life: a set of institutions, each constituted by a particular configuration of rights. More precisely: the meaning of property, the content of an owner’s entitlements, varies according to the categories of social settings in which it is situated, and according to the categories of resources subject to property rights.”).

86. DAGAN, *supra* note 12, at 72.

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determine how a specified resource is to be used.”<sup>87</sup> While private ownership is relatively uncontested,<sup>88</sup> there is frequent misapprehension as to the ownership of non-private property. Traditionally, the most recognized typology is public and common. Michael Brill observes that common property provides for “community life,” a sociability with “people you know somewhat” versus “public property” that provides for “public life” and a sociability with a “diversity of strangers.”<sup>89</sup> Common property owners hold use rights to common lands, their entitlement derived through membership of the relevant privileged community. By contrast, the who in public property is less certain. It might be the state, a state agency, or Carol Rose’s “unorganized” public at large.<sup>90</sup>

At Tekapo, public owners include state agencies such as the Department of Conservation (DOC), the Crown through its residual interest in pastoral leases, and the New Zealand public at large in the creeks and lake foreshore. More vexing is the hybrid public/common ownership of corporate entities like the University of Canterbury’s dark sky observatory. At Taylor’s, the public interest is equally mixed, between owners as diverse as the Christchurch City Council, DOC, the Godley Head Heritage Trust, and the amorphous public at large with its statutory interest in beaches, surfing waves, and the coastal foreshore.<sup>91</sup> And at Taylor’s Mistake beach, the local surf life saving club is an obvious yet oblivious<sup>92</sup> example of common ownership.

Ownership yields an unsatisfactory account of how property and ES interact, the consequence of a long-standing institutional

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87. JEREMY WALDRON, *THE RIGHT TO PRIVATE PROPERTY* 60 (1988); *see generally* Jeremy Waldron, *What is Private Property?*, 5 OXFORD J. LEGAL STUD. 313 (1985).

88. Uncertainty lies on the fringes, for example government ownership of an office building may be the practical equivalent of private ownership. At Taylor’s, the private ownership of beaches on public land is a paradox.

89. Michael Brill, *Problems With Mistaking Community Life for Public Life*, 14(2) PLACES 48, 48, 50 (2002). Each is different in scale, density, and physical environment needed to be robust. *See id.*

90. *See* Carol M. Rose, *The Comedy of the Commons: Commerce, Custom and Inherently Public Property*, 53 U. CHI. L. REV. 711, 719-22 (1986).

91. Marine and Coastal Area (*Takutai Moana*) Act 2011, § 4 (N.Z.).

92. *See* Carol M. Rose, *The Several Futures of Property: Of Cyberspace and Folk Tales, Emission Trades and Ecosystems*, 83 MINN. L. REV. 129, 132 (1998).

bias of private property. “Owning . . . natural capital is disfavored in our property law, built as it is on . . . converting wildlands to agriculture (and today to suburbia).”<sup>93</sup> Moreover, “owning property . . . has not traditionally entitled the owner to a continued supply of ecosystem services.”<sup>94</sup>

Seeking insight in the distinction between public and private ownership is similarly unfruitful. There is no “bright line”<sup>95</sup> between the polarities of private and public; the porous divide yields no discernible impact on the intrinsic randomness of the ownership of ecosystem services. As J.B. Ruhl observes, “the distinctions may be purely academic, [as no property] regime[] has performed so as to integrate natural capital and ecosystem service values into resource allocation decision making in any meaningful way.”<sup>96</sup> Rather than informing, the ownership prism reinforces the orthodoxy that “the challenge is insurmountable . . . [,] the very nature of ecosystem services defies assigning property rights.”<sup>97</sup> In other words, the monistic reduction of property only takes us as far as it goes.<sup>98</sup> This leads to the question, will adding a spatial method of measurement yield a more truthful representation?

### **B. Combining Property and Spatial Methods: Does Property Fit Within Accurate Spatial Representations of ES?**

While question one is the classic propertied measurement of a landscape, question two combines the spatial with the ownership model. The answer to question two seems to depend on what type of service is provided by the ecosystem service (i.e.

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93. J. B. Ruhl, *Ecosystem Services: The Nature of Valuing Nature*, in CONSERVATION FOR A NEW GENERATION: REDEFINING NATURAL RESOURCES MANAGEMENT 155, 164 (Richard Knight & Courtney White eds., 2009).

94. *Id.*

95. MARGARET JANE DAVIES, PROPERTY: MEANINGS, HISTORIES, THEORIES 11 (2007).

96. Ruhl et al., *supra* note 3, at 101.

97. *Id.* at 95.

98. See Henry E. Smith, *Property as the Law of Things*, 125 HARV. L. REV. 1691, 1709 (2012).

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whether regulating, provisioning, or cultural under the Millennium Ecosystems Assessment classification).

In the case of two of the regulating services mapped in Part III (soil type and vegetative cover), property lines carve up the landscape without any regard to the services that vegetation or soil provide, whether carbon sequestration, soil stabilization, or the hosting of nitrogen fixing microbiota. In the case of waterways (only relevant at Tekapo), creeks and lakes may fulfill traditional roles as ambulatory natural boundaries, long recognized by the common law through the doctrines of accretion and erosion, but they depict little else beyond demarcation.

However, in the case of agricultural provisioning services, there is a marked and not surprising convergence between patterns of property and ES at both locations. Logically, private owners determine “how a specified resource is used”; in these cases dominant agricultural uses; sheep grazing, deer farming, viticulture, and so on. Agricultural services at Tekapo and Taylor’s neatly correspond to private property lines, perhaps because there is little tillage without title.

In the case of cultural services, only recreational trails were mapped in our GIS exercise. What is depicted in both Figures 3 and 5 is grossly under-representative of the number and scale of recreational trails in existence at both of these well-loved landscapes. At Tekapo, those few trails that are mapped are evenly distributed between public and private lands. The latter is surprising, even perplexing, given the “trespass rights” vigorously asserted by private landowners in New Zealand (including pastoral leaseholders), and the conversely weak convention that secures public access to the “back country.”<sup>99</sup> At Taylor’s, the single trail captured by the cadaster is mapped to public land. Neither spatial analysis nor property lines capture the specialness of place. The cultural service, the lived experience so imaginatively depicted through narrative, is lost even when we combine two stock-standard methods of describing natural resources in landscapes.

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99. ANN BROWER, WHO OWNS THE HIGH COUNTRY 39, 163 (2008); Ann Brower et al., *The Cowboy, the Southern Man, and the Man from Snowy River: The Symbolic Politics of Property in Australia, the United States and New Zealand*, 21 GEO. INT’L ENVTL. L. REV. 455, 478-79 (2009).

### C. Combining and Comparing Narrative, Spatial, and Plurality Methods: What Do They Reveal About the Uneasy Interface Between Property and ES?

Combining and comparing the three methods exposes at least five manifestations of the untidiness at the margin of property and ES. We first discuss the five, then ask what they mean for property and ES.

First, the disparate spatial datasets of the GIS in Part III reveal the ambiguous status of modern public property. At a practical level, this manifests in the inadequate representation of public recreational trails at Taylor's. Comparing narrative to spatial analysis reveals the obvious failure to reflect the many mountain bike and walking tracks loved so assiduously as to be well-used despite "closed" signs warning of the danger of being crushed by earthquake-induced rockfall. At another, more conceptual level, it reveals in the curious non-status of the Summit Road, and the one-room cottages on the coastal foreshore at Taylor's, shown as a white *res nullius* that should otherwise be green in Figure 5, map F.<sup>100</sup> Each map on its own yields an impoverished understanding of public property; however, combining them with narrative reveals a richer understanding of the truth on the ground.

This poverty of singular method is both definitional and valorized. We are confused about what constitutes public property, and if and when identified, we under-value and under-represent its worth.<sup>101</sup> Each method on its own, with its ambiguities and lack of detail, also demonstrates the public estate's implicit subsidiarity.<sup>102</sup> Property and private property have become synonymous, such that public real property is an uncomfortable and at times unwelcome interloper. Using only one method of measurement affirms the perception that all property is private.

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100. Public roads are vested in the Christchurch City Council as the roads authority, while the beach and foreshore are "ownerless" forms of public property under the Marine and Coastal Area (*Takutai Moana*) Act 2011 (N.Z.).

101. See John Page, *Towards an Understanding of Public Property*, in MODERN STUDIES IN PROPERTY LAW (Nicholas Hopkins ed., 7th ed. 2013).

102. See generally Brower et al., *supra* note 99.

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Second, when contrasted to the flowery narratives of Tekapo and Taylor's in Part II, both the spatial and the property analyses are detached and removed. In this sense, the latter represent the more abstract half of a property dialectic; the former represents the contextual. Comparing methods reveals the dialectical tension; combining them resolves it.

This resolution contrasts to a century of property abstraction. Wesley Hohfield's early twentieth century analysis of property as rights between persons *about* things<sup>103</sup> rendered the *res* incidental to the propertied relationship.<sup>104</sup> Around the same time, real property became an anonymous Blackacre,<sup>105</sup> a universalized space stripped of its particularity and defining features.

Legal geographers and property lawyers struggle in how to ground property rights in place. John Lovett cites the Land Reform (Scotland) Act 2003 (LRSA) as an innovative exemplar of a property regime that contextualizes a new property right,<sup>106</sup> in that case to the whims (cultural and geographic) of the Scottish countryside. The LRSA overcomes an "imaginative paralysis . . . about what is possible in property law design."<sup>107</sup> On their own, the property maps (map B in Figures 3, 4 & 5 in Part III) tell little of place. As Paul Carter notes, they are the hard and dry lines of the expert; whose cartographic skills turn somewhere into anywhere. To interpret these maps, we need to recall the narrative constructed by our personal experiences of place. Only

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103. See generally Wesley Newcomb Hohfield, *Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 26 YALE L. J. 710 (1917); Wesley Newcomb Hohfield, *Some Fundamental Legal Conceptions as Applied in Judicial Reasoning*, 23 YALE L.J. 16 (1913).

104. This analysis remains dominant, leading to the oft-cited observation that its logical corollary is illusion, that property is simply 'thin air.' See Kevin Gray, *Property in Thin Air*, 50 CAMBRIDGE L. J. 252 (1991).

105. ERIC T. FREYFOGLE, *AGRARIANISM AND THE GOOD SOCIETY: LAND, CULTURE, CONFLICT, AND HOPE* 110-11 (2007).

106. John Lovett, *Progressive Property in Action: The Land Reform (Scotland) Act 2003*, 89 NEB. L. REV. 739, 741 (2011) (describing the "responsible right of access" to private lands).

107. See *id.* at 742-43. Lovett cites extensive public education for both access takers and landowners as ways of overcoming law and economics analyses that deride contextual property as imposing unfeasibly high information processing costs.

then, in the mind's eye, do these abstract images make greater sense.

Third, comparing the spatial methods of Part III with the plurality method of Part IV illustrates Eric Freyfogle's "tragedy of fragmentation."<sup>108</sup> Unlike Garret Hardin's famous tragedy of the commons thesis, this propertied tragedy occurs when there is too much private property, when parceled private enclaves dominate landscapes in the absence of any overarching regulation or coordination. Unconnected, discrete private ownerships fragment landscapes, and as Figures 3-5 show, fragment the natural capital and resource flows of (especially) regulating ES.<sup>109</sup>

Fourth, the plurality method underscores gaps in our understanding of the diversity of property. For example, the "green blob"<sup>110</sup> of seemingly unilaterally public land at Taylor's (Figure 5, map F) fails to show the nuanced diversity of different types of public ownership - the interests of the Godley Head Heritage Trust, the Christchurch City Council (with and without the private baches), and of DOC - all of whom have differing vested interests in the coastal landscape. These maps also ignore tenure arrangements other than the ubiquitous fee simple; the Crown pastoral leases at Tekapo, the grazing licenses on the Godley headland, or the dark sky preserves at Mount John Observatory.

Fifth, (and not necessarily exhaustive of all the implications these maps pose for property), there is also the barest glimpse of yet another untidiness, the competing values of propriety and commodity in property.<sup>111</sup> The sample land values shown as a separate data set (map H in Figures 3 and 5) contrasts to the propriety of property, or its capacity to enable well-lived lives in flourishing communities. Propriety is the immeasurable and elusive quality of property; to record it is, as noted earlier, like

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108. ERIC T. FREYFOGLE, *THE LAND WE SHARE: PRIVATE PROPERTY AND THE COMMON GOOD* 230, 265 (2003).

109. Ruhl et al, *supra* note 3, at 102 (noting the poorly defined scope of private property rights is analogously referred to in ES literature as a "Tragedy of Ecosystem Services").

110. Richard H. Cowart & Sally K. Fairfax, *Public Lands Federalism: Judicial Theory and Administrative Reality*, 15(3) *ECOLOGY L.Q.* 375, 410 (1988).

111. See GREGORY S. ALEXANDER, *COMMODITY AND PROPRIETY: COMPETING VISIONS OF PROPERTY IN AMERICAN LEGAL THOUGHT 1776-1970* (1997).



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holding water in your bare hands. At Tekapo and Taylor's, it is the ways nature's bounty in the vast spaces at either end of the transect, enhance human flourishing.

## VI. MOVING FROM THE OWNED TO THE SHARED IN ORDER TO UNDERSTAND THE LIVED

The goal of any method of measuring property in ES should be one where the full orchestration of Tekapo and Taylor's is audible, a diverse property paradigm where quirky baches, conservation lands, private freehold, dark sky preserves, historic reserves, Crown pastoral leases, and the eclectic rest collectively give us a better sense of place. Writing in 1992, Joseph Sax presciently describes an "ecosystemic" vision of property that approximates this goal, a conceptualization where the "natural services" that land provides has value.<sup>112</sup> He states:

An ecological view of property, the economy of nature, is fundamentally different. Land is not a passive entity waiting to be transformed by its owner. Nor is the world comprised of distinct tracts of land, separate pieces independent of each other. Rather an ecological perspective views land as consisting of systems defined by their function, not by man-made boundaries. Land is already at work, performing important services in its unaltered state. For example, forests regulate the global climate, marshes sustain marine fisheries, and prairie grass holds the soil in place.<sup>113</sup>

Sax's ecosystemic model is one where connections dominate, land is in service, use rights are determined by physical nature, landowners take on a custodial role, the line between public and private is blurred, and there is less focus on individual dominion.<sup>114</sup> Sax's blurring of property lines "recognizes that most land in the real world is owned in hybrid configurations of rights."<sup>115</sup> Yet despite its flaws and non-alignment with the real

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112. Sax, *supra* note 34, at 1451. Sax's 1992 article on the Lucas case predated Daily's seminal work *NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS* by some five years.

113. *Id.* at 1442.

114. *Id.* at 1445-46, 1451.

115. Ruhl et al., *supra* note 3, at 100.

world, the private ownership model remains stubbornly paramount. We suggest that a full orchestration is more likely when the three methods are combined. The combination yields a grounded truth of the natural resources of landscape, which the others on their own do not.

Let us consider carbon sequestration as an example. As a signatory to the Kyoto Protocol, New Zealand has an Emissions Trading Scheme in force. If a landowner in Tekapo plants a pine plantation, she owns and can trade the carbon credits. We can map that ownership of carbon with the spatial method. By contrast, the lived experience is of the ES— carbon sequestration—not of the carbon credit itself. The ES is in the shared air, not on the owned ground.<sup>116</sup> As such, carbon sequestration is a public good from which no one can be excluded, while the carbon credit is a private good.<sup>117</sup> A combination of the narrative, spatial, and plurality methods takes us closer to understanding the lived experience of the public good nature of the ES than any of the three methods on their own.

Combining the three methods also reveals a curious irony. The more rational and detached the method, the more singular are the melodies and the less recognizable are the landscapes. The lyrical force of narrative is persuasive in its account of place, and the ways in which ecosystem services enhance our well-being. At the other end of the spectrum, GIS is utilitarian in its identification of the readily accessible data sets we set out to record.

Further, rational and detached though it may appear, cartography is not value-free. Its images are selective in “their content and . . . their signs and styles of representation,”<sup>118</sup> and reliant on the cartographer-expert to explain to the layperson the “lie of the land.”<sup>119</sup> As Boaventura Santos explains, “to be practical a map cannot coincide point by point with reality.”<sup>120</sup> This distortion of reality is however not a distortion of truth,

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116. *See generally* THEODORE STEINBERG, *SLIDE MOUNTAIN, OR: THE FOLLY OF OWNING NATURE* (2000).

117. MANCUR OLSON, *THE LOGIC OF COLLECTIVE ACTION* 13, 14 (1965).

118. BLOMLEY, *supra* note 13, at 83.

119. CARTER, *supra* note 58, at 80.

120. Santos, *supra* note 10, at 282.

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provided “the mechanisms by which the distortion of reality is accomplished are known and can be controlled.”<sup>121</sup> Such mechanisms include scale, projection, and symbolization. Scale is “the ratio of distance on the map to the corresponding distance on the ground,”<sup>122</sup> projection transforms “the curved surfaces of the earth . . . into planes,”<sup>123</sup> while symbols graphically represent “selected features and details of reality,”<sup>124</sup> such as rivers or cities.

These factors—historic and normative—permeate the raw objectivity of GIS. Yet, in the end, despite distortion and bias, we do not criticize the mapping of ecosystem services. Maps of basic regulating and provisioning services depicted in Part III do “bring data together in a single perceptible space,” in the process “yield[ing] unexpected new information”<sup>125</sup> and revealing connections. As Carol Rose observes, “the map, far from stifling the imagination, invites the viewer to reflect on the story behind the case.”<sup>126</sup> And in making that invitation, personalized recollections of place, the stuff of narrative, complete the picture.

Maps of property likewise distort reality, using the same contrivances of scale, projection and symbolization to make a version of propertied place fit the page. However, the malformation of property goes further, a perversion of not only its reality but also its truth. The singular focus on property lines conceals diverse tenures and ownerships. More broadly, it fails to account for the truth of our many and varied relationships with land. The simple, easily understood representations depicted on maps of property are crude lines of demarcation, not signifiers of the true lie of the land.

Maps of property reveal profound insights into the hegemonic private ownership model. The vision we get from the singular method is narrow and unrepresentative, and cannot understand the lived and shared experience of ES. The curious irony is that property’s otherness is revealed by default, in the gaps, or swarm

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121. *Id.*

122. *Id.* at 283.

123. *Id.* at 284.

124. *Id.* at 285.

125. ROSE, *supra* note 27, at 277.

126. *Id.*

of possibilities that fail to be recorded. In this way, maps do not show gaps in maps, but gaps in property.

## VII. CONCLUSION

This paper has presented three methods of experiencing property and ES, which range from the detached quantitative to the lyrical qualitative. The spatial analysis of GIS is commonly seen as the most objective and reliable; the plurality method is the most *avant-garde* and post-modern; and the narrative method is the most quirky and least replicable. By itself, none of the three arrives at accurately representing the interplay between property and ES. This is because the lived experience of ecosystem services involves sharing not owning.

Yet comparing methods reveals a curious irony—the more detached and objective the method, the less recognizable the landscape. In other words, the more reliable the method, the less representative its results.

In combining the three methods, we suggest a new hybrid method of interpreting property and ES. The prism of the empirics of the two ends of the Mountains to the Sea transect suggests that attempts to examine the “relationship” between property and ES are misguided. Though the interplay and overlap between the two are tense and untidy, property and ES are the same—two methods to quantify, commodify, and corral nature. Monistic property hides the fact that property and ES are one and the same because it attempts to own nature’s bounty not share it.

The difficulty of re-uniting two sides of the same coin suggests that one side is misshapen. In its current, non-pluralistic, form, property is a poor fit for ES, both spatially and narratively because it focuses on owning not sharing. Adding pluralistic property to the spatial and narrative methods gives a more multi-dimensional form of property, allowing the multi-scalar ES to co-exist. To recognize the symbiosis between property and ES is also to recognize that the lived experience of ES is shared. This recognition, and the hybrid method that bells the cat, has many applications, from dark sky preserves to reconciling ancient native title claims with the hyper-modern world.