



Making space for hybridity: Industrial heritage naturecultures at West Carclaze Garden Village, Cornwall

Nadia Bartolini*, Caitlin DeSilvey

Environment and Sustainability Institute, University of Exeter, Penryn, Cornwall, UK



ARTICLE INFO

Keywords:

Assemblage
Heritage
Nature
Industrial
Garden village
Cornwall

ABSTRACT

The paper explores the diverse forms of renaturing and reinscription which arise from the materiality of industrial decline and the desire to make space for nature in new peri-urban developments. As productive use is sought for post-operational spaces, remnant industrial objects and ecologies are either removed or incorporated into new landscape narratives and forms. When they are retained, the status of such remnants often remains unstable, as their identities are (re)inscribed through diverse and sometimes competing value frameworks. Instability and ambivalence are particularly pronounced in relation to features that straddle categories of nature and society: nature-culture assemblages produced through both industrial and ecological processes. In this paper, we examine two such assemblages at West Carclaze, Cornwall, in the SW of the UK, a site shaped by the process of china clay extraction and now undergoing redevelopment as a 'garden village'. The paper considers an artificial hill formed of clay-processing waste and a rare bryophyte species which depends for its survival on ongoing industrial process. Both of these objects represent a category which we describe as 'industrial heritage naturecultures' – hybrid entities whose recognition potentially signals a new willingness to accept the blurring of nature-society distinctions in planning and heritage management contexts.

1. Introduction

In critical geographical scholarship, there is now a broad consensus that the distinction between nature and society represents a false binary (Collard et al., 2018), and an established and growing body of research explores diverse expressions of nature-culture entanglement (Haraway, 1992; Law, 2004; Hinchliffe, 2007; Castree, 2013; Clancy, 2019). In applied contexts, however, such as the management of specific heritage assets or the planning of new developments, some form of nature-society distinction is still often taken as a given, with a normative force that shapes perception of possible actions and options (DeSilvey et al., 2020). In this paper, we explore this relation between theory and practice with reference to a case study about a post-industrial development proposal in mid-Cornwall, UK, in an area known as the 'Clay Country' for its long association with the extraction of china clay (kaolin). We draw on recent scholarship examining how a concern for nature and environment shapes discourse around urban spaces (Hinchliffe and Whatmore, 2006; Kaika and Swyngedouw, 2011; Gandy, 2013, 2016; IUCN, 2014; Langemeyer, 2015; Swyngedouw and Kaika, 2016; Clancy, 2019; Nyman 2019), and also on research exploring the intersection between nature and culture in emerging landscape planning and heritage management approaches (DeSilvey, 2017;

Harrison, 2015; Jorgensen and Tylecote, 2007; Taylor and Lennon, 2011).

Specifically, our paper considers how regeneration and redevelopment proposals surfaced a range of values associated with the industrial history of the area and catalysed the recognition and reinscription of industrial waste objects and ecologies as heritage entities (Jorgensen et al., 2017; Gandy, 2013, 2016; Quivik, 2007; Instone, 2017). Our study is grounded in appreciation of the situational and relational character of the category 'waste' (Gregson and Crang, 2010; Sosna and Brunclíková, 2017), particularly with reference to post-industrial landscapes and their complex and layered histories (Hourdequin and Havlick, 2015; Krupar, 2011; Hoskins and Whitehead, 2013; Jorgensen and Tylecote, 2007). Our work also contributes to a body of research on post-industrial heritage (Orange, 2012; Swanton, 2012; Mah 2012; Storm and Olsson, 2013; Barndt, 2010; Laviolette and Baird, 2011; Storm, 2014), focusing specific attention on objects not amenable to conventional preservation and consolidation approaches. We situate our analysis within "a growing awareness of the complexity of urban environments" (Kaika and Swyngedouw, 2011: 97) as "[u]rban planners realize that the successful referencing of nature can be linked with the promise of economic redevelopment" (Benton-Short and Short, 2013: 11). Whilst most research in this area has considered the

* Corresponding author.

E-mail address: n.bartolini@exeter.ac.uk (N. Bartolini).

‘renaturing’ or greening of existing urban environments, here we engage with the peri-urban (see Jorgensen et al., 2017; Clancy, 2019), and explore how a proposal for the creation of a new ‘garden village’ (previously described as an ‘eco-town’ and an ‘eco-community’) highlights the textures and tensions involved in the everyday lived experiences of natureculture relationality (Massey, 2005; Haraway, 1992; Hinchliffe and Whatmore, 2006).

Our conceptual framework draws on Haraway’s (2008) notion of ‘naturecultures’ to capture the situated knowledges that are produced through her non-dualist approach to nature and culture. We also draw on assemblage thinking (Baker and McGuirk, 2017) and the emergent potentialities of novel human/nonhuman combinations in place (Deleuze and Guattari, 1987; Kirksey, 2015; DeLanda, 2016; Saldanha, 2017) to help us tease out the various ways that naturecultures are mobilised in official and unofficial practices. Here, we are particularly attuned to local urban learning (McFarlane, 2011) and to the practice of ‘studying through’ networks (McCann and Ward, 2012) that bring centralised powers of heritage and planning frameworks to bear within a devolved region (Allen and Cochrane, 2007). In our case study, assemblage thinking helps highlight human and nonhuman relationality, focusing on complex ecologies and interactions in ‘friction’ (Rocheleau, 2011; Tsing, 2015), which break down binary distinctions, such that ‘waste’ can be reframed as ‘heritage’, and industrial residues can be renatured as green amenities in a ‘new wilderness’.

The research in the Clay Country stems from Heritage Futures, a four-year AHRC-funded interdisciplinary programme that compared and contrasted heritage-making processes across different fields of conservation practice. Our investigation drew on a range of sources, including museum archives, digital archives of planning documents (and associated public comments) and semi-structured interviews with former china clay workers, local authority staff and developers. Our mixed qualitative methods also incorporated visual ethnography, collaborations with artists and practitioners (including an extended collaboration with Heritage Futures senior creative fellow, Antony Lyons) and the co-creation of a knowledge-exchange workshop.

The paper is structured in three parts. The first part gives a brief overview of the china clay industry and its legacies. The second part examines how the china clay industry’s past and present influenced the planning process, and how national and regional planning frameworks over the last decade led to the eventual approval of the West Carclaze Garden Village development. The third section hones in on two assemblages that illustrate how industrial heritage naturecultures can be integrated into planning discussions and decisions: the Great Treverbyn Sky Tip and the rare bryophyte species *Marsupella profunda*. We conclude that the recognition of these assemblages within the West Carclaze Garden Village development potentially signals a growing acceptance of hybrid, unstable entities in planning and heritage management contexts.

2. China clay’s unnatural legacy

China clay is essentially decomposed granite, created through a process of ‘kaolinisation’ in which feldspar deposits in the granite transform into kaolinite, a fine white powder (Bristow, 1996). In the middle of the eighteenth century, Plymouth chemist William Cookworthy discovered that kaolinite could be used in the making of porcelain, and subsequently the substance has acquired a range of other uses, in the production of paper, paint, plastics, cosmetics and pharmaceuticals (Barton, 1966; Thurlow, 2005; Wheal Martyn, 2012; Cornwall Mining Alliance website). Since extraction and production of china clay began in Cornwall in the eighteenth century, the primary china clay deposits in Cornwall have “yielded more than 165 million tonnes of marketable clay” (Kirkham, 2014: 3). To appreciate how china clay mining has shaped the landscape, an understanding of the three main phases of the process is key: *extracting* involves breaking up the clay in situ through the use of high-pressure washing techniques;



Fig. 1. An example of the distinctive pattern of pits and tips in the Clay Country, here with the former Great Treverbyn Pit (now a mica settling pond) next to the Great Treverbyn Tip, with an area of restored heathland in the foreground. Photo by Caitlin DeSilvey, 15/9/2019.

refining involves further separation of clay particles from unwanted waste material; and *drying* involves removal of moisture from the clay product, in preparation for shipping (Thurlow, 2005). These activities result in the creation of large amounts of waste, as clay particles are separated from unwanted sand, mica and quartz. In the early twentieth century, the industry developed a disposal process for ‘tipping’ the waste into conical tips (known locally as ‘sky tips’), adjacent to the ‘pits’ where the raw material had been extracted. The tips were largely composed of white quartz sand: fresh tips appeared like snow in reflected sunlight, leading to the area acquiring the nickname of ‘The Cornish Alps’ (Thurlow, 2007; Smith, 2008). Disused pits were often used to hold waste water laced with mica sediments, and the distinctive turquoise sheen of these ‘mica ponds’ is also a distinctive element of the landscape (Fig. 1).

China clay has been mined in mid-Cornwall for over 250 years, in a process which not only transformed the landscape, but also generated a sense of pride for the communities around the St Austell area, with the pits and tips “a constant reminder of the hard physical labour which was a defining part of their working lives” (Smith, 2008: 10). Many boys started working in china clay as soon as they left school, and women were also involved in carrying out particular tasks in drying the clay (Wheal Martyn, 2012). Tight-knit local communities developed strong identities around the connection with the china clay industry (Barton, 1966; Bristow, 2016; Raxworthy, 2019). Up until the 1950s, between 7000 and 8000 people were employed in china clay, with the industry dominating the area both economically and socially (interview, 19/4/2017).¹ By the 1970s, however, the gradual modernisation of processing had rendered many earlier methods redundant, and the Wheal Martyn Museum (now the Wheal Martyn Clay Works) was formed to preserve the heritage of the industry and educate the public about its continued activities. French conglomerate Imerys acquired English China Clays (ECC) in 1999, and their intensification of modernization efforts begun by ECC resulted in significant job losses (as in other similar industries). When Imerys took over from ECC, a group of former industry employees salvaged unwanted records and created the China Clay History Society to look after the new collection (interview, 19/4/2017; Raxworthy, 2019). Whilst the industry still employs around 1000 people in the area, the centre of production has moved out of the

¹ The short film ‘Archives in Place’ produced by Nadia Bartolini and Jennie Morgan features interviews with former employees of the china clay industry: <https://vimeo.com/223623288>.

UK (Cornwall Council, 2012a; Imerys Minerals Ltd website).

Twenty years on from the Imerys acquisition, the china clay area is a complex patchwork of active pits, access roads and infrastructure; small villages and isolated settlements; pre-industrial agricultural fields and farmsteads; and post-operational pits, tips and facilities. Some post-operational areas have been intentionally restored and revegetated (as woodland or heathland) by Imerys, working in partnership with Natural England and other stakeholders; other areas, particularly those where industry withdrew many decades ago, have remained unmanaged, and have gradually been colonised by ruderal plant communities and adopted for a range of informal public uses (DeSilvey, 2020; Lyons, 2020). These remaindered landscapes – as with other similar interstitial, ecologically-unruly places – have significant value for the people who live in the area (ClayFutures, 2009; Jorgensen and Tylecote, 2007). Partly in recognition of this value, and also as a way of managing (and controlling) access to these areas, over the past decade Imerys partnered with local government and organisations in creating over 40 km of permissive paths. This has led to increased appreciation of the post-operational landscape by residents and visitors to the area, and also, arguably, functioned to help people cope with change, as walking the paths criss-crossing the area creates a link between the industrial past and the renatured present (Bartolini, 2020). Imerys is committed to securing sustainable futures for its post-operational sites by supporting appropriate regeneration and redevelopment in the area (Imerys Minerals Ltd website). The next section provides a history of proposed plans associated with the West Carclaze Garden Village development, as a background to the analysis that follows.

3. From spoil heap to green infrastructure

The area now known as ‘West Carclaze’ is an amalgamation of former extractive sites mined for china clay from the beginning of the twentieth century (John Tonkin Collection; China Clay Trade Review, 1921), although tin streaming in the vicinity appears to date back to the Bronze Age (Bristow, 2016). A complex ownership pattern developed in the area around china clay extraction, with pits worked by several different companies. A portion of the area originally belonged to the Duchy of Cornwall, and then passed through other owners until acquisition by ECC in the 1950s (John Tonkin Collection; interviews, 5/6/2019). In the 1940s, one of the most active pits in the area was the Great Treverbyn Pit, which eventually also came into the ownership of ECC. During the height of operations, several ‘sky tips’ were deposited (Figs. 2a and 2b). Part of the works were shut down in 1972, and operations on the series of pits ceased on the land in 1980 (Cornwall Council, 2017). Imerys retained post-operational ownership when it took over from ECC in 1999, and although the network of walking trails was routed around the edges of the West Carclaze site and some pits



(a)

Fig. 2a. Aerial survey from 1948 featuring the Great Treverbyn Tip (now known as the Sky Tip) and the village of Penwithick. Image courtesy of China Clay History Society.



(b)

Fig. 2b. 1965 photograph of the Sky Tip alongside other tips at the West Carclaze area. Image courtesy of China Clay History Society; photo by Jim Jeffery.

were back-filled, the core of the area remained unused, with one highly visible sky tip (which has come to be called by the singular, Sky Tip) rising above a remnant mica pond, and the abandoned Baal Pit on the other side of the A391 grown over in rhododendron, gorse and brambles.

In 2006 Imerys announced that a restructuring in their china clay operations would result in over 700 additional hectares of land in the region becoming surplus to their operational needs (Cornwall Council website, 2017a), sparking deliberation about the future of redundant post-operational sites like West Carclaze and Baal. When the UK Government introduced an initiative in 2007 to build more sustainable housing to meet rising demand, conversations began about possible regeneration opportunities. The Eco-Towns programme aimed to deliver 200,000 environmentally-friendly homes on old industrial sites in new towns “powered by locally generated energy from sustainable sources” (BBC, 2007; Communities and Local Government, 2009). The programme also highlighted that proposals should allocate at least 40% of the area to green space, encourage healthy lifestyles in the built and natural environment, and enhance heritage assets (Communities and Local Government, 2009: 10). Imerys submitted the Clay Country Vision proposal to the Eco-Towns programme in 2008, promising to meet the highest standards of sustainability in building 5000 new homes across six sites in the Clay Country, including the West Carclaze site (BBC, 2008). The Eden Project – which is itself a site borne out of a reclaimed china clay pit – was commissioned by the local authority to develop a community engagement and consultation process about the proposed regeneration plans. The ClayFutures project involved local charities and organisations working in collaboration with schools, parish councils, designers, planners and artists, and reached out to over 1000 people between April and July 2009 (ClayFutures, 2009). In July 2009, the UK Government announced that the Clay Country Vision was one of four selected Eco-Town proposals that would be able to bid for some of the £60 m funds allocated to support local infrastructure development (McCarthy, 2009).

In March 2010, an exhibition of the Eco-Town proposals took place in St Austell (Business Cornwall, 2010). Details were provided on the housing and regeneration developments proposed for six post-operational sites (West Carclaze/Baal, Par Docks, Goonbarrow, Blackpool, Nanpean, Drinnick). The exhibition also unveiled a new joint venture, Eco-Bos, between Imerys and the real estate developer Orascom Development. In July 2010, the newly elected UK Coalition Government announced that it would audit the Eco-Town projects before releasing further funding under the planned scheme (Barclay, 2012). Although Eco-Bos had begun to submit planning documents for the proposed redevelopment, changes in planning policy at the national level also introduced uncertainty to the process, and progress was stalled. Around

the same time, Cornwall Council began work on an interim Regeneration Plan that sought to ensure sustainable, high-quality development in the region (Cornwall Council, 2012b; interview, 22/6/2017). At the end of 2012 Eco-Bos announced that due to the difficult economic conditions and the evolving planning framework, it was putting the £1 billion Eco-Town project on hold (BBC, 2012). Cornwall Council, which had been looking to the redevelopment to help bolster the lagging local economy² and deliver new housing, subsequently sought funding from the Department of Communities and Local Government to employ experts to do a masterplan and environmental impact assessments, and submit a planning application (Cornwall Council website, 2017a). In autumn 2013 the funding was granted, and the proposal was revived by Cornwall Council, working in consultation with Eco-Bos.

A series of public consultations took place in 2014 which surfaced some of the tensions around heritage values that will be described in the next section. Branded as the West Carclaze Eco-Community, the new development focused on one regeneration area (West Carclaze/Baal) and promised to build 1500 new homes. The proposal highlighted that development would “ensure landscapes, features and habitats of heritage importance are conserved” and would “not cause harm to the ecology, features or characteristics of SINC’s (Sites of Importance for Nature observation) or Local Nature Reserves” (Savills, 2014a, 2014b: 66). A new planning application (PA14/12186) was submitted in December 2014. In March 2015, the UK Government cancelled the Eco-Towns programme, effectively stalling the proposal again. The next year, however, Cornwall Council exercised its new powers under the Devolution Deal³ to publish a new Local Plan which targeted the ‘Clay Country Area’ as one of two priority areas for strategic regeneration and investment (Cornwall Council, 2016a, 2016b). According to the Local Plan, the delivery of affordable housing, the regeneration of the economy, provision of green space and the conservation of heritage assets were key drivers for the area (Cornwall Council, 2016b: 48–49). The aims of the Local Plan broadly aligned with the West Carclaze development plans (interview, 22/6/2017), but the negative identification of “despoiled, degraded, derelict, contaminated and unstable land” and the stated desire to convert it to “the best productive and positive use” suggested that recognition of the unique heritage that arises from post-operational dereliction and its unstable post-industrial ecologies might be less than straightforward (Cornwall Council, 2016b: 49).

The West Carclaze development proposals were taken off the shelf for the final time in 2016, when the UK Government issued an expression of interest seeking fourteen communities that wished to create ‘Locally-Led Garden Towns, Villages and Cities’ (DCLG, 2016). The initiative made an explicit connection to the nineteenth century Garden City movement, which followed Ebenezer Howard’s 1898 publication *To-morrow: A Peaceful Path to Real Reform* (published as a second edition in 1902 as *Garden Cities of To-Morrow*). Howard sought to combine elements that were often seen as binaries (urban/rural; nature/society) and his vision was that “human society and the beauty of nature are meant to be enjoyed together” (Howard quoted in Benton-Short and Short, 2013: 89). The adoption of the Garden City precedent in

contemporary urban planning mobilises it as part of a broader sustainability agenda (Clark, 2003). The 2017 initiative sought proposals that embedded “key garden city principles” (DCLG, 2017: 6), giving them a twenty-first century spin with reference to green infrastructure, net biodiversity gains and zero-carbon technology (TCPA, 2018). Cornwall Council worked with Eco-Bos to revise the West Carclaze development proposal, and in 2017 it was named as one of the garden villages selected to receive UK Government support under the new scheme (interview, 22/6/2017; DCLG, 2017). With this announcement, the West Carclaze Garden Village proposal incorporated the earlier eco-town and eco-community proposals into a renewed vision:

“West Carclaze Garden Village will be a ‘Village of Gardens’ carefully woven into a framework of green infrastructure. It is a landscape-led approach that draws on the traditions of the Garden City Movement and respects and responds to the natural landscape of the Clay Country.” (West Carclaze Public Consultation, 2018).

The Cornwall Council Strategic Planning Committee granted outline planning permission for the West Carclaze Garden Village development in March 2017 (Cornwall Council, 2017a). The site is made up of 318 ha (or 786 acres) of former china clay workings at West Carclaze and Baal, of which 66% of the site will be reserved for green open space (Fig. 3). Two solar farms have been built on the site, and it is anticipated that they will produce enough electricity to provide for the 1500 new homes. Other planned new infrastructure includes a primary school and nursery, a surgery, a community centre and shops.

The approval of the West Carclaze Garden Village development was subject to conditions to ensure compliance with UK policy frameworks, most notably the National Planning Policy Framework (NPPF). NPPF outlines two elements that are useful to consider for our purposes: the provision for the “conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure”, and the directive to anticipate longer-term futures (over 15 years) in planning decisions (HCLG, 2019: 9). The Cornwall Council Strategic Planning Committee, in considering the West Carclaze proposal against the NPPF, concluded that while the proposal would “result in adverse impacts to the environment”, the actual harm “is tempered... by existing and proposed mitigation” in relation to: the low sensitivity of the land having been already degraded by mineral extraction; the retention of key features, such as the Sky Tip; and the creation of new managed areas for habitat retention (Cornwall Council, 2017).

The details of the mitigation plans were outlined in a Section 106 Agreement (Cornwall Council, 2017). Section 106 Agreements (a provision of the 1990 Town & Country Planning Act) are negotiated between developers and the local authority, and attached to planning permissions. In this case, the Agreement – signed in September 2018 – relates to the phasing of the West Carclaze development, which, for the purposes of this paper, includes specific schedules associated with Green Infrastructure (Schedule 6), the Sky Tip (Schedule 9) and a particularly rare species of moss – the Western rustwort (*Marsipella profunda*) (Schedule 11) (Cornwall Council, 2017, 2018). The Green Infrastructure provision mainly pertains to the involvement of a local land trust (Cornwall Council, 2018: 61–62), which will work with local people and stakeholders in the creation of a China Clay Heritage Park in the designated open space, ensuring that the development is, according to the website, “a place of wilderness, wetland and wonder” (West Carclaze Garden village website, 2019). The concept of wilderness is deployed to reframe the former wasteland not as a space of pristine nature but as something much messier and more ambiguous, an evolving natural-cultural landscape (Jorgensen and Tylecote, 2007). The next section maps the assemblages that led to inclusion of the Sky Tip and the rare moss in the Section 106 Agreement as anchor elements of this new ‘wilderness’.

² The China Clay Area is located in the 20% most deprived areas in England (Kirkham, 2014; Cornwall Council, 2015). Since 2010, the number of Cornish neighbourhoods included in the 20% most deprived areas increased, with a range of factors influencing the decline, such as Cornwall’s slower economic recovery after the recession (Cornwall Council, 2015; Smallcombe, 2019).

³ In July 2015, Cornwall and the UK Government signed a Devolution Deal in which devolved powers would be conferred in a number of areas including transport, skills and social care (HCLG and BIS, 2015). The devolution agreement also outlined a process between Cornwall Council and Historic England that would examine cultural distinctiveness in the creation of a Cornish Historic Environment Forum, recognizing “Cornwall’s rich and unique heritage” in the fabric of its identity – as well as an economic driver for tourism (HCLG and BIS, 2015: 19).



Fig. 3. Aerial perspective of the West Carclaze Garden Village development. Image courtesy of Eco-Bos Developments Ltd.

4. Re-valuing heritage: scarring, listing, renaturing

4.1. Waste tip heritage: *The Sky Tip*

The Great Treverbyn ‘Sky Tip’ which sits at the heart of the new West Carclaze Garden Village site, now solitary and symbolic, was once one of hundreds of such tips scattered throughout the china clay region. Every tonne of china clay produced generates up to nine tonnes of waste, and over 500 million tonnes of waste have been produced and deposited in the landscape over time (Barton, 1966; Cornwall Council, 2000 in Kirkham, 2014: 12). In the 1900s, Cornwall’s sky tips “became part of the cultural background to the St Austell uplands” (Smith, 2008: 10). Whilst primarily a twentieth century phenomenon, the distinctive conical tips became an intrinsic part of the area’s heritage, appearing on school badges, business logos and pub signs (Smith, 2008). However, regulations introduced after the 1966 Aberfan disaster⁴ saw the practice of sky-tipping that produced the ‘Cornish Alps’ replaced by the deposit of waste in benched formations. The Great Treverbyn Tip, deposited as part of operations on the site from 1943 to 1958, has become a rarity and an iconic local symbol, with its significance increasing as other conical tips have been re-profiled or consumed in subsequent clay workings (English Heritage, 2014).⁵ According to an archaeological assessment of sky tips in the Clay Country, the handful of sky tips remaining in the landscape represents less than 15% of the original number (Smith, 2008: 15).

The original plans for the West Carclaze development did not address the issue of the Sky Tip directly, and it was not until Cornwall Council reintroduced the proposal in 2014 that the feature became central to discussion and debate (Cornwall Council website, 2017b). In a public consultation in May and June 2014, Cornwall Council collaborated with property agents Savills to present a series of panel displays, one of which sought public comment on possible future scenarios for the Sky Tip: one scenario highlighted the possible modification or relocation of the feature, and two scenarios suggested that the Sky Tip could be removed (West Carclaze Eco-Community Public Consultation,

⁴ The Aberfan disaster in South Wales in 1966 involved the collapse of a colliery spoil tip that killed 116 children and 28 adults. It precipitated the passing of the Mines and Quarries (Tips) Act in 1969, part of which legislated over the dangers of conical tips, and subsequent tips were carved through “bench-formed 80-foot steps” (interview, 19/4/2017).

⁵ Antony Lyons’s film-poem ‘Sky Tip Circumstance’, created during his residency at the Wheal Martyn Museum in 2018, documents the unique character of the landscape feature: <https://vimeo.com/267828721>; <https://heritage-futures.org/limbo-landscape-lab-wheal-martyn/>.

2014: 3-4; 6). The consultation also shared information from technical assessments showing that “small scale slippage on the majority of the slopes” of the Sky Tip would make it unsafe to allow public access (West Carclaze Eco-Community Public Consultation, 2014: 9). The material prepared for the 2014 public consultation visually referenced other UK landmarks in terms of how it could potentially be remodelled or memorialised. Examples included the Lady of the North, a landscape sculpture created on remediated mining land in Northumberland, and the Wellington Monument in Somerset.

Although the Sky Tip was recognised as a regional landmark and the removal option was never formally proposed, the consultation’s inclusion of a removal scenario generated attention, and some members of the community started to voice their concerns over the threat of loss of the feature. The emerging endangerment narrative conformed to a common trope identified in heritage studies – the perception that heritage is ‘at risk’ raises public awareness and incites action to ‘save’ the imperilled asset (Holtorf, 2015; Vidal and Días, 2016; Rico, 2016; May 2020). In his work on loss aversion, Holtorf (2015) argues that the value and significance of cultural heritage is actively produced through the threat of destruction. In June 2014, local newspapers published a number of articles that drew on the potential scenarios outlined in the public consultations, but most attention was given to the possibility of losing the ‘iconic’ Sky Tip. In the following months, the Sky Tip became a material representation of public opposition to the development proposals, as the regeneration initiative was framed by some through a narrative of developers threatening local interests in the pursuit of profit.

Although there were local people who were supportive of the development proposals (interview, 22/6/2017), these perspectives were not widely represented in local media. Articles about the development tended to emphasise the positive value of the Sky Tip and the threat of its removal.

Interviewed for an article in a local newspaper at the time, local resident Ross Side commented:

This [Sky Tip] to some may seem an ugly reminder of the industrial history of this area. But to many this is a symbol of the heritage of the Cornish china clay industry and the start of the Cornish Alps, which gave this area its unique looks and wealth. The Sky Tip should be preserved for future generations to admire (quoted in Swift, 2014).

The comment hinges on the assertion of contested values, with an unattributed ‘some’ viewing the Sky Tip as an ‘ugly reminder’ and others seeing it as a symbol of an industry at risk of being forgotten (Ricoeur, 2004) by future generations. The waste tip is mobilised as a

complex heritage assemblage, linked to pride in the Cornish china clay industry and expressive of an alternative aesthetic character unique to this evolving post-industrial landscape.

Following on from the press coverage, Nicholas Storey started an online petition campaigning to grant UNESCO World Heritage status for the Sky Tip. The petition describes the feature as “an enduring memorial to all the people and the industry which won the highest grade of China clay from this place for export all over the world” (Storey, 2014). By identifying the waste tip as a memorial, the petition shifts the representation of the Sky Tip to focus on its status as a site of remembrance; perhaps one could go so far as to suggest a site of mourning for the death of a once prominent industry (see Maddrell and Sidaway, 2010). The Sky Tip is a living remnant, a ‘natureculture’ object (Haraway, 2008) that enables the past, in its transformed state, to still be present—although its representation fluctuates between that of a (fixed) monument and a (dynamic) landscape feature. In an online comment to a *St Austell Voice* article, Storey stated that he will leave the petition open as he sees “no undertaking that [the] Sky Tip will be preserved as a white pyramid and there is also the risk that, if the Eco-Town proposals go ahead, there will be purported ‘health and safety’ reasons found soon enough to destroy the Sky Tip” (Swift, 2015). At the time of writing, this petition had reached over 1600 signatures.

Storey’s petition also asserts that the “Sky Tip is as worthy of recognition and protection as the industrial black hills or Terrils, at Loosen-Gohelle, Nord-Pas-de-Calais, France” (Storey, 2014). Here, Storey compares the UNESCO World Heritage Site status obtained for the coal mining slag heaps of northern France with the china clay industry’s tips. Other slag heaps and post-mining sites have been given protected status⁶ (Quivik, 2007), including the Cornwall and West Devon Mining World Heritage Site – a copper and tin mining landscape designated as a World Heritage Site in 2006. Cornwall Council recognizes that while the china clay industrial remnants are not included within the existing World Heritage Site, “these features are of comparable significance” (Cornwall Council, 2011). An archaeological assessment of the area suggested that modern industrial features should be considered as heritage assets when no longer needed for operational purposes, but recognised the challenge of preserving such features in an area still actively used for industrial extraction (Kirkham, 2014: 148). If other mining landscapes have achieved UNESCO recognition, it may be because in their case, the industries that created them had passed into history. As we have pointed out, the china clay industry is still ongoing in mid-Cornwall, and therefore cannot be seen as a *post-industrial* site; the china clay industry is simply surviving in a different form.

In light of the rising concerns about the place of the Sky Tip in the proposed development, a request was made to English Heritage (now Historic England) to assess the Sky Tip for designation. In the English Heritage Assessment Report, the reason given for requesting the assessment is described as concern “about the future of the sky tip” (English Heritage, 2014: 1). The perceived threat of “loss” of the tip catalysed an effort to establish its significance through formal listing. As Vidal and Dias have observed, “an indispensable step for coping with endangerment consists in inventorying and rating” (2016: 2). As “[n] one of the sky-tips in the St Austell area are protected by designation” (Smith, 2008: 6), the listing request attests to a desire to verify whether the preservation of an industrial remnant can be recognized by a national heritage body. English Heritage’s report, however, rejected the scheduling of the Sky Tip as it “does not have a sufficient level of innovation or the extremely high level of historic importance in the context of the overall china clay industry required to meet the criteria for national importance” (English Heritage, 2014: 3). The assessment report recognizes, however, that the Sky Tip “has become an important

local landmark” (English Heritage, 2014: 3).

Ongoing concerns over the Sky Tip’s future were evidenced in public comments to the outline proposal for the West Carclaze Eco-community (PA14/12186) submitted in December 2014, including one commenter who described the tip as a ‘monument’:

I am very concerned about the Sky Tip. It appears that the developers want to remove or change it, this surely must not happen. The Sky Tip is not just an iconic landmark; it is also a monument to the industrial heritage of the St Austell China Clay Industry (public comment, 27/5/2015).

Andrew Dean, a local landlord who also set up the No Eco Town campaign, described his attachment in a BBC Radio 4 episode on the Cornish Alps:

This is our Angel of the North (...) You go to Redruth and see an old tin mining engine house; this is what we’ve got to show for our heritage. This is St Austell. This is mid-Cornwall. We wouldn’t be here if it wasn’t for this. And this is what reminds us of it. And a lot of the reminders are being bulldozed, built on, and this is our last stand, I suppose. This needs protecting; it’s our heritage. Hands off our heritage. (BBC, 2015: 4.00 in the audio-recording).

Cornwall Council’s planning delivery manager indicated that she understood how people had “grown attached to the iconic conical shape of the Sky Tip”, but stated that it was important to recognise that “[t]his community will take 20 years to be built and the decisions we make today must meet the needs of the community in those 20 years” (Western Morning News, 2014).

The commitment to retain the Sky Tip in some form in future development was confirmed in 2015 by Eco-Bos’s managing director, John Hodkin, who stated in a newspaper interview:

(...) to be absolutely clear, Eco-Bos has never proposed removing the Sky Tip, so its future is not in doubt. Sky Tip is and always has been staying as part of the West Carclaze regeneration—not only to reflect the area’s mining history but as the focal point for our exciting proposals for a major new heritage park (quoted in Swift, 2015).

With the promise of retention secured, attention turned to strategies for managing the dynamic feature within the planned residential and recreational development. Documents submitted with the 2014 planning application pointed to some of the risks associated with retention, including the “[d]eep erosional gullies and several shallow failure features” on the slopes of the tip (Savills, 2014c: 24). The report stated,

The Great Treverbyn Tip is unusual in that it can be considered to be a potential receptor as well as a potential source of impact. The tip is a recognised landmark for the local community. If construction works were to undermine the toe of the slope, or increased loads were to be applied to the tip (...) this might result in slippage and potentially large scale failure of the tip face. (Savills, 2014c: 35)

The report signals the character of the Sky Tip as a potentially unstable material structure; the status of the heritage object shifts from that of a traditional built environment feature that can be ‘preserved’ to one that is closer in character to a natural heritage feature, with potential for change and evolution. Eco-Bos was also careful to communicate the dynamic nature of the Sky Tip to local communities in initial publicity for the revived plans (informal conversation, 10/5/2018). In an early version of the West Carclaze Garden Village website, the Heritage tab specified:

The Tip will naturally weather and erode, as it already has, producing its dramatic sculptural shapes. Our plans are to let nature take its course and allow it to evolve as the centrepiece of an extensive recreational and wildlife habitat (West Carclaze Garden Village website, 2017)

⁶ See, for instance, Broken Hill, Australia (<http://www.environment.gov.au/minister/hunt/2015/mr20150120.html>); ‘Bings’ in Scotland (<http://www.snh.org.uk/publications/on-line/advisorynotes/50/50.htm>) (accessed 4/9/2019).



Fig. 4. Twitter post from Des Callaghan on 22 December 2018 describing the rare liverwort's presence in St Austell. Used with permission of Des Callaghan.

Here, there is an admission and an acceptance of potential transformational change. The implication is that the Sky Tip may not retain its present-day shape, although it will be present in the landscape in some form. Following the approval of the development in 2019, a new website was issued, which highlighted on its FAQ page, in response to the question 'Will the Sky Tip remain', "Yes, the Sky Tip will remain as it is today..." (West Carclaze Garden Village website, 2019). This reinforces the ambiguity associated with the Sky Tip's meaning as a heritage object which assembles and embodies both natural and cultural elements. If the previous website text appreciated the Sky Tip's eroding nature – and therefore its gradual transformation as a natural material entity – the new website seems to promise a more stable, fixed form. This shift in language aligns with commitments given under Schedule 9 of the Section 106 Agreement, which safeguards against any further re-profiling of the Sky Tip (Cornwall Council, 2018: 76), noting that "any significant amendments to the profile would require a separate planning application" (Cornwall Council, 2017: point 65).

Inevitably, management of the tip as a heritage object will require management of change through time, and an appreciation of how it formed from, and has been altered by, human intervention. Hydroseeding has taken place in an attempt to stabilise the slopes, and as part of a wider effort to green the waste tips in the area over the last fifteen years (BBC, 2015; informal interview, 4/7/2017). An Environment Agency representative working with Imerys to restore post-operational landscapes mentions that Imerys "used suitable composted waste and soil to create artificial soil for spreading on otherwise barren waste slopes" (Pilcher, 2014). The 'wild' nature celebrated in the re-branding of the garden village as a place of "wilderness, wetland and wonder" is a renatured wild, layered on an intensely industrial landscape. In some sense, the wildest element of the Sky Tip is its uncontrolled form. While the 'global' stability of the structure has been established, it remains locally unstable, and current management involved the collection of eroded sediment in a 'moat' at the foot of the feature, where it is removed and shipped off the site (informal conversation, 9/9/2019). The Sky Tip highlights the variegated ways that naturecultures can assemble, and the human interventions involved in the construction of the heritage landscape. The effort to ensure the Sky Tip's longevity (and to enshrine this in the planning documents) sits in tension with the dynamism and instability of the feature. Perhaps it is this tension, and ultimately its inherent uncertainty as a monument, that generates its enduring value in the Clay Country landscape.

4.2. Heritage through disturbance: *Marsupella profunda*

The post-operational Clay Country landscape has also provided a home for nonhuman living entities that are today part of what makes

this area appear as a 'new wilderness', formed of entwined natural and human processes (Jorgensen and Tylecote, 2007). The "wilderness, wetlands & wonder" tagline for the new garden village development taps into a common theme in urban renaturing initiatives (see Clancy, 2019), but revises the conventional, Romantic understanding of 'wilderness' as unpeopled and pristine (Cronon, 1996; Ward, 2019) to emphasise instead opportunities for 'freedom' and contact with unmanaged nature afforded by these hybrid landscapes. A Council representative we spoke to suggested that because the West Carclaze site has been redundant for a long time, "it has a unique wilderness beauty about it" (interview, 22/6/2017). The use of the term 'wilderness' by the Council representative suggests an appreciation for the way in which the West Carclaze area was left essentially unmanaged and uncontrolled following industrial disturbance. The passage of time opened possibilities for the colonisation of the site by plants and animals, many of them classed in ecological terms as "ruderal" species – "plants that grow on disturbed ground" (DeSilvey, 2017: 85). One such species which established at West Carclaze is the Western rustwort (*Marsupella profunda*).

A ruderal bryophyte (moss) species, the Western rustwort is a globally rare leafy liverwort that has only been reported in three geographical locations worldwide: Portugal, Spain and Cornwall (Paton, 1990; Bristow, 2007; JNCC website). In Cornwall, most of the population is located in the Clay Country (Fig. 4).

The moss is a pioneer species that establishes on exposed surfaces, and in Cornwall it can be found in areas of calcareous micaceous rock (Bristow, 2007: 4; Paton, 1990). It prefers the open, scoured landscapes left behind by china clay extraction, colonising the non-kaolin bearing rock left in situ after extraction of the valuable kaolin deposits. The plant is threatened throughout its range and listed as vulnerable on the UK Red List (JNCC website). It is recognised as a priority for biodiversity conservation in the UK under The Natural Environment and Rural Communities Act 2006, and is protected under Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) (Callaghan, 2014: 1). One of the series of Environmental Impact Assessments commissioned in 2013/2014 was a survey of *Marsupella profunda* in the West Carclaze site, completed in December 2014 (Callaghan, 2014). The survey revealed that the West Carclaze site featured the largest population of the moss ever to be documented in Britain (Fig. 5).

What is striking in the case of *Marsupella profunda* is that in order to survive, the moss is "critically dependent on periodic and large-scale disturbance" (Natural England, 2015: 4), provided in the Clay Country

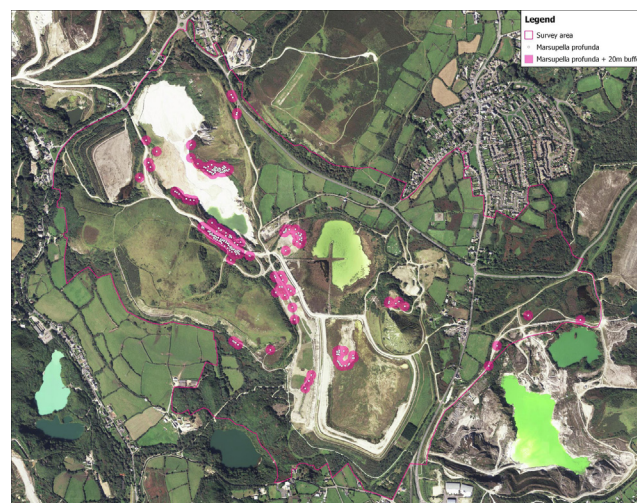


Fig. 5. Distribution of *Marsupella profunda* in the West Carclaze Garden Village development site.

Source: Callaghan (2014: 18); Satellite image © 2014 Google, DigitalGlobe. Used with permission of Des Callaghan.

by ongoing industrial operations. Without further large-scale disturbance, however, the moss “will gradually decline to local extinction” (Callaghan, 2014: 7). Callaghan reports that, in the absence of ongoing disturbance, extinction has occurred in some areas as open habitats progressed to denser scrub and woodland (2014: 7). Interestingly, extinction has also occurred in areas recognised as hosting moss populations and subsequently given protective designations. The desire to protect the species eliminated the necessary disturbance, and as the areas became overgrown the moss disappeared – a vivid demonstration of the challenge of ‘preserving’ a dynamic natureculture feature.

As early as 2001, the moss had been recognised as a significant entity within the Clay Country (Callaghan, 2014). Davies (2018a) points to a long history of surveys and management initiatives from 2008 to 2018. As Imerys was investigating ways to convert its post-operational lands, it was also involved in efforts to increase biodiversity at the proposed West Carclaze Garden Village development site. Large-scale management work took place in 2012 in a collaboration between Imerys and Natural England to enhance the value of the moss's habitat and identify refuge sites, which have subsequently been classified as SAC and SSSI⁷ (Callaghan, 2014: 6–7). The successful translocation of colonies demonstrates that the survival of *Marsupella profunda* is possible, though without general disturbance, “the plant will eventually be lost... as vegetation and soil succession proceeds” (Callaghan, 2014: 8).

From February to June 2015, over 200 comments from locals objecting to the planned West Carclaze Garden Village development named *Marsupella profunda* as an important aspect of the area's wildlife that would be under threat if the development proceeded. The extensive individual comments on the reasons for the objection to the planning proposal appear to have been developed and shared amongst a community network. The following is one of the variants to the public comments received in relation to *Marsupella profunda*:

This SSSI and SAC are designated for the presence of Western Rustwort (*Marsupella profunda*), a plant species which is so rare that this location is one of only three sites within the UK, where it is known to live. Inhibiting its potential for expansion, in a currently wild area, is inexcusable. Worldwide, it is found only in a few locations (public comment, 2/6/2015).

It is unclear whether Callaghan's report, uploaded at the end of December 2014 on the Cornwall Council website, was responsible for triggering the flurry of public comments in the first half of 2015. However, the comments highlight the recognition and significance of the rare moss for local people. This is also evidenced by the inclusion of *Marsupella profunda* in the notes for the guided walks along the clay trails led by the China Clay History Society, dating from 2007 (Bristow, 2007; Tonkin, 2007).

In May 2015, Natural England published a Site Improvement Plan covering a number of Natura 2000 sites, including the St Austell Clay Pits (Natural England, 2015). The plan listed a series of management actions necessary to support liverwort populations in the Clay Country, including control of ‘inappropriate scrub’ and invasive species. The threat to *Marsupella profunda* is exacerbated by the competition with other plants, and shading out by more dominant species. As such, Cornwall Council and Imerys collaborated to clear and treat scrub and invasive species – specifically rhododendron and laurel – with herbicide at regular intervals (Natural England, 2015: 3). Engaging in periodic large-scale disturbances (both within and outside of the SAC boundary) to expose rock surfaces for colonisation was a third measure recommended by the plan, whilst a fourth was to implement a landscape-scale conservation strategy and monitoring programme—agreed by key landowners and other stakeholders in 2012 (Natural England, 2015: 4).

Importantly, the human-nonhuman relationality evidenced in both

the Natural England conservation strategies and in the environmental impact assessment of the West Carclaze Garden Village development is fundamental in the preservation of a species that has developed from, and is intimately related to, the Clay Country's industrial heritage. The colonisation of *Marsupella profunda* stems from the process related to mining the clay; in turn, the presence of this rare species can only survive through the performance of a similar disturbance. If the future of the West Carclaze site is as a peri-urban development, then the only means to ensure the rare liverwort's conservation is through ongoing human intervention. When outline planning permission for the development was obtained in March 2017, the strategic planning committee's recommendation was to secure measures relating to a number of aspects – including ecological mitigation for *Marsupella profunda* (Cornwall Council website, 2017b). To do this, a management strategy and a detailed 5-year plan for *Marsupella profunda* were commissioned and published in August 2018 (Davies, 2018a, 2018b).

Taking into account Natural England's priorities (2015), a number of interventions are recommended to maintain a favourable habitat condition, including the ongoing control of scrub and invasive species, the creation of disturbed and bare ground, and the prevention of direct impact or losses (Davies, 2018a: 7–8). These actions are intended to support, create and manage colonies inside and outside the designated sites by expanding refugia areas (Davies, 2018a). With the overall aim of enhancing biodiversity, translocation of *Marsupella profunda* outside the designated areas is meant to increase the probability of its long-term survival. Whilst this general aim of providing a net gain for biodiversity coincides with an ecological sensibility, it also aligns with a moral obligation associated with the duty to preserve what is deemed a valued resource (Vidal and Días, 2016). In this example, however, preservation can only be delivered through disturbance, and the perpetuation of a ‘wild’ species is only possible through intensive controls. The future-natural heritage of the *Marsupella profunda* can be read as a parable for the Anthropocene, in which heritage is not only about the past, but about actively producing future ecologies which carry with them complex cultural histories.

The 5-year-plan for *Marsupella profunda*'s survival also acknowledges the challenges associated with managing this complex assemblage, and recognises that attempts to provide detailed management for the entire period of the plan are “likely to be erroneous and, over time, increasingly fraught with inaccuracies and supposition” (Davies, 2018b: 5). Once the 5-year plan is completed, a discussion between key stakeholders, the developer and Natural England is advised to determine a further review of the frequency of surveys and monitoring (Davies, 2018a: 17). The combination of statutory planning frameworks with conservation objectives to preserve the species suggests that an effort is being made to consider the unique bryophyte's presence in the Clay Country. It also acknowledges *Marsupella profunda*'s meaning as both an ecological and a cultural identifier for the location and its inhabitants. By incorporating *Marsupella profunda*'s management strategy into the West Carclaze Garden Village planning permission, this example may offer a practical way forward in terms of thinking about how non-human agency can be taken into account and valued.

5. Conclusion

This paper has examined how the materiality of an industry's decline and the desire for renatured green spaces have influenced the public and planning dialogue around a garden village development north of the town of St Austell, Cornwall. We have explored how proposed redevelopment of the China Clay Area's post-operational lands provided opportunities for re-assessment and re-inscription of features emblematic of industrial process and practices. Concurrently, we have examined how the same industry's reshaping of the landscape produced ‘new’ nature now valued in regeneration plans. We detailed the process of planning and public consultation that led to the retention of two features as part of the final West Carclaze Garden Village development,

⁷ SAC: Special Areas of Conservation, and SSSI: Site of Specific and Scientific Interest.

a remnant sky tip and a population of rare moss. In this particular landscape, the framing of dereliction and devaluation was contested by local actors who, through their response to the redevelopment proposals, asserted both the cultural value of the post-operational features and the natural value of the site's unusual hybrid ecologies. We aimed to demonstrate how these examples of industrial heritage naturecultures challenge and disrupt normative planning and conservation frameworks, whilst consideration was given to the multitude of stakeholders negotiating shifting regulatory frameworks.

Our study shows how the planning and development process inscribed industrial heritage natureculture features as part of the site's unique history, and in doing so, evidenced a commitment to principles of both sustainability and heritage conservation. Assemblage thinking in this study highlighted the unbounded and unstable character of the region (Allan and Cochrane, 2007), and helped to articulate how a contested planning process led to an assertion of regional exceptionalism, in the area locally known as the 'Clay Country'. We agree with McCann and Ward that "cities become coherent entities through the assembling and mobilizing work of their inhabitants" (2012: 49). Here, we wish to go further: the actions of local actors in contesting and valuing industrial heritage naturecultures, as well as the response of the developers and authorities to address their concerns, suggest that the Clay Country became a coherent and powerful entity through the assemblage of human and nonhuman actors in the consultation process surrounding the West Carclaze Garden Village development.

The different yet related stories of the Sky Tip and *Marsupella profunda* speak of how hybrid naturecultures can stem from industrial processes and abandonment. It is within these wasteland assemblages that developers, local authorities, legal representatives, land managers, expert ecologists and local populations negotiate value and give voice to emerging and unstable ecological processes. It is also through these assemblages that futures are selected. The Cornwall Local Plan states that the vision is to make the St Austell, St Blazey and China Clay Area the 'Green Capital' of Cornwall (Cornwall Council, 2016b: 49) – a future that combines sustainable employment, housing, sense of place and green spaces. If "greening-up' St Austell will ensure its future" (Vergnault, 2018), then perhaps a recognition of industrial heritage naturecultures within planning frameworks is a way in which peri-urban communities can recognize shared pasts as part of the "greening" process.

By honing in on two particular industrial heritage naturecultures, we found that whilst local and national actors recognised that the Sky Tip had changed through time, there was also a desire by many to keep it somehow 'fixed' as a landmark monument. We also explored the paradox of the rare bryophyte *Marsupella profunda*, which is valued for its contribution to the 'wild' character of the site but requires ongoing disturbance in order to survive. There remains uncertainty in terms of how these natureculture assemblages will persist into the future. Monitoring and management of these assemblages through regulatory frameworks and by local actors suggest that human intervention is necessary to maintain their integrity – whilst allowing for change and evolution. This has implications both for our understanding of the kind of 'new wilderness' that can be found in peri-urban developments, and for our understanding of heritage, which usually focuses on the act of preserving a heritage asset at a particular point in time.

Over a decade ago, Jorgensen and Tylecote called for urban planning approaches that recognised the value of ambivalent landscapes and green infrastructure, but they considered planning in the UK at that time to be too compartmentalised to accommodate these approaches (2007: 458). They suggested that "the varied landforms and natural habitats that are frequently the aftermath of industrial dereliction could provide the framework for new landscapes" and argued that a traditional "heritage approach... would... destroy the very qualities it sought to preserve, which are dependent on natural and human processes and their continuing interaction" (2007: 459). The West Carclaze Garden Village case suggests that we may have reached a point where

other approaches are possible, within existing planning and heritage management frameworks, and where there is a new willingness to recognise "a multitude of existing, possible, or practical socio-natural relations" (Kaika and Swyngedouw, 2011: 102) in peri-urban contexts. Our study shows that we can have spaces that are both cultivated and wild, preserved and processual, if there is a willingness to live with productive ambivalence.

CRediT authorship contribution statement

Nadia Bartolini: Conceptualization, Methodology, Investigation, Writing - original draft. **Caitlin DeSilvey:** Conceptualization, Writing - review & editing.

Acknowledgments

The research presented in this article draws on field visits, interviews and ongoing collaborations with Wheal Martyn Museum, the China Clay History Society, Cornwall Council, Future Terrains, Imerys, and Eco-Bos, undertaken by the authors and Antony Lyons as part of a broader comparative study of transformation in heritage practice (one of four major areas of thematic foci for the Heritage Futures research programme). The authors would like to thank all of our collaborators, and in particular, with regards to this paper, Des Callaghan, John Hodkin and the anonymous reviewers. Heritage Futures is funded by the UK's Arts and Humanities Research Council (AHRC) 'Care for the Future: Thinking Forward through the Past' Theme Large Grant (AH/M004376/1), awarded to Rodney Harrison (principal investigator), Caitlin DeSilvey, Cornelius Holtorf, Sharon Macdonald (co-investigators), Antony Lyons (senior creative fellow), and Nadia Bartolini, Sarah May, Jennie Morgan, and Sefryn Penrose (postdoctoral researchers), and assisted by Esther Breithoff, Harald Fredheim (postdoctoral researchers), Hannah Williams and Kyle Lee-Crossett. The Heritage Futures programme received generous additional support from its host universities and partner organisations. See www.heritage-futures.org for further information.

References

- Allen, J., Cochrane, A., 2007. Beyond the territorial fix: regional assemblages, politics and power. *Regional Stud.* 41 (9), 1161–1175.
- Barclay, C., 2012. Eco Towns. Standard Note SN/SC/4406. Library of the House of Commons. researchbriefings.files.parliament.uk/documents/SN04406/SN04406.pdf.
- Baker, T., McGuirk, P., 2017. Assemblage thinking as methodology: commitments and practices for critical policy research. *Territory, Politics, Govern.* 5 (4), 425–442.
- Bardt, K., 2010. "Memory traces of an abandoned set of futures": industrial ruins in postindustrial landscapes of Germany. In: Hell, J., Schönle, A. (Eds.), *Ruins of Modernity*. Duke University Press, Durham NC, pp. 270–293.
- Barton, R.M., 1966. A History of the Cornish China-Clay Industry. D. Bradford Barton, Truro.
- BBC, 2007. 'Eco-Towns' target doubled by PM. 24 September. http://news.bbc.co.uk/1/hi/uk_politics/7010888.stm.
- BBC, 2008. Plans for 5,000 clay pit houses. 8 April. <http://news.bbc.co.uk/1/hi/england/cornwall/7336029.stm>.
- BBC, 2012. St Austell's eco town project 'on hold'. 5 December. <https://www.bbc.co.uk/news/uk-england-cornwall-20606304>.
- BBC, 2015. Radio4 OpenCountry: Cornish Alps. 20 August. <http://www.bbc.co.uk/programmes/b065xcgp>.
- Bartolini, N., 2020. Fixing naturecultures: spatial and temporal strategies for managing heritage transformation and entanglement. In: Harrison, R., DeSilvey, C., Holtorf, C., Macdonald, S., Bartolini, N., Breithoff, E., Fredheim, H., Lyons, A., May, M., Morgan, J., Penrose, S., *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices*. UCL Press, London. (in press).
- Benton-Short, L., Short, J.R., 2013. *Cities and Nature*, second ed. Routledge, New York, London.
- Bristow, C., 1996. *Cornwall's Geology and Scenery: An Introduction*. Cornish Hillside Publications, St Austell.
- Bristow, C., 2007. Notes for a guided walk at Carclaze. China Clay History Society. Unpublished.
- Bristow, Colin, 2016. The role of Carclaze tin mine in eighteenth and nineteenth century geotourism. *Geological Society, London, Special Publications* 417 (1), 187–197. <https://doi.org/10.1144/SP417.11>.
- Business Cornwall, 2010. Eco-town proposals on show. 26 March. <https://www.businesscornwall.co.uk/news-by-location/st-austell-business-news/2010/03/eco->

- town-proposals-on-show/.
- Callaghan, D., 2014. Survey of Western Rustwort (*Marsupella profunda*) and other bryophytes at land at West Carclaze, Cornwall. Part of PA14/12186 Environmental Impact Volume 2, Appendices 9.2 Bryophyte Survey. 28 December.
- Castree, N., 2013. *Making Sense of Nature*. Routledge, London.
- China Clay Trade Review, 1921. Electrical machinery in china clay production: a visit to Great Treverbyn and Ruddle Common Mines and Works. March. Volume 11 (22), 740–741.
- Clancy, C., 2019. *Wild entanglements: exploring the visions and dilemmas of 'renaturing' urban Britain*. PhD Thesis. University of Plymouth, UK.
- Clark, B., 2003. Ebenezer Howard and the marriage of town and country. *Environ.* 16 (1), 87–97.
- ClayFutures, 2009. Which Way For The Clay? Creative Community Engagement Project Report. Eden Project, Cornwall. <https://www.edenproject.com/sites/default/files/documents/ClayFutures%20final%20report.pdf>.
- Collard, R.-C., Harris, L.M., Heynen, N., Mehta, L., 2018. The antinomies of nature and space. *Environ. Plan. E* 1 (1–2), 3–24.
- CLG (Communities and Local Government, UK), 2009. Planning Policy Statement: eco-towns – A supplement to Planning Policy Statement 1. <https://www.gov.uk/government/publications/eco-towns-planning-policy-statement-1-supplement>. CLG.
- Cornwall Council, 2011. China Clay. Historic environment character. Version 2 dated 20 April. <https://www.cornwall.gov.uk/media/3640976/China-clay.pdf>.
- Cornwall Council, 2012a. China Clay Community Network Area Discussion Paper - Preferred Approach. 9 January. https://www.cornwall.gov.uk/media/31080313/09_china_clay_community_network_area_discussion_paper_-_preferred_approach_7839416513889186979.pdf.
- Cornwall Council, 2012b. St Austell, St Blazey and China Clay Area Regeneration Plan. Guidelines for Transformational Development Projects. October. Cornwall Local Development Framework. <https://www.cornwall.gov.uk/media/3628685/Regeneration-Plan-October-2012-FINAL.pdf>.
- Cornwall Council, 2015. Indices of Multiple Deprivation 2015: Headline data for Cornwall. 30 September. <https://www.cornwall.gov.uk/media/15560743/imd-2015-analysis.pdf>.
- Cornwall Council, 2016a. Cornwall Local Plan: Strategic Policies 2010–2030. 22 November. <https://www.cornwall.gov.uk/media/22936789/adopted-local-plan-strategic-policies-2016.pdf>.
- Cornwall Council, 2016b. Cornwall Local Plan: Strategic Policies 2010–2030. Community Network Area Sections. December. <https://www.cornwall.gov.uk/media/28188310/local-plan-cna-sections-pr2.pdf>.
- Cornwall Council, 2017. Strategic Planning Committee Report. Application PA14/12186. 30 March 2017.
- Cornwall Council, 2018. Section 106 Agreement relating to the Development at West Carclaze, Cornwall. Application PA14/12186. 21 September.
- Cornwall Council website, 2017a. About the eco-communities project. Last updated 1 February. <https://www.cornwall.gov.uk/environment-and-planning/planning/eco-communities/about-the-eco-communities-project/>.
- Cornwall Council website, 2017b. West Carclaze eco-community. Last updated 5 July. <https://www.cornwall.gov.uk/environment-and-planning/planning/eco-communities/projects/west-carclaze-eco-community/>.
- Cornwall Mining Alliance website. <https://cornwallminingalliance.org/imerys-minerals-1td/>.
- Cronon, W., 1996. The trouble with wilderness: or, getting back to the wrong nature. *Environ. History* 1 (1), 7–28.
- Davies, I., 2018a. West Carclaze Garden Village Reserved Matters. Ecology: *Marsupella profunda* Management Strategy. Code 7 Consulting. August 2018. Pre-Application PA18/00998.
- Davies, I., 2018b. West Carclaze Garden Village. Ecology: *Marsupella profunda* Detailed Management Plan. Code 7 Consulting. August 2018. Pre-Application PA18/00998.
- DeLanda, M., 2016. *Assemblage Theory*. Edinburgh University Press, Edinburgh.
- Deleuze, G., Guattari, F., 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. University of Minnesota Press, Minneapolis.
- DCLG (Department for Communities and Local Government, UK), 2016. Locally-Led Garden Villages, Towns and Cities. March. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733047/Locally-led_garden_villages_towns_and_cities_archived.pdf.
- DCLG (Department for Communities and Local Government, UK), 2017. First ever garden villages named with government support. Press release. 2 January. <https://www.gov.uk/government/news/first-ever-garden-villages-named-with-government-support>.
- DeSilvey, C., 2017. *Curated Decay: Heritage Beyond Saving*. University of Minnesota Press, Minneapolis.
- DeSilvey, C., 2020. Ruder heritage. In: Harrison, R., Sterling, C. (Eds.), *Deterritorialising the Future: Heritage in, of and after the Anthropocene*. Open Humanities Press, pp. 289–310.
- DeSilvey, C., Bartolini, N., Lyons, A., 2020. Processing change. In: Harrison, R., DeSilvey, C., Holtorf, C., Macdonald, S., Bartolini, N., Breithoff, E., Fredheim, H., Lyons, A., May, M., Morgan, J., Penrose, S., *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices*. UCL Press, London. (in press).
- English Heritage, 2014. Assessment Report: Great Treverbyn Tip, Carluddon, St Austell, Cornwall. 14 August.
- Gandy, M., 2013. Marginalia: aesthetics, ecology, and urban wastelands. *Ann. Assoc. Am. Geogr.* 103 (6), 1301–1316.
- Gandy, M., 2016. Unintentional landscapes. *Landscape Res.* 41 (4), 433–440.
- Gregson, N., Crang, M., 2010. Guest editorial – materiality and waste: inorganic vitality in a networked world. *Environ. Plan. A* 42 (5), 1026–1032.
- Haraway, D., 1992. The promises of monsters: a regenerative politics for inappropriate/d others. In: Grossberg, L., Nelson, C., Treichler, P. (Eds.), *Cultural Studies*. Routledge, London, New York, pp. 295–337.
- Haraway, D., 2008. *When Species Meet*. University of Minnesota Press, Minneapolis.
- Harrison, R., 2015. Beyond “natural” and “cultural” heritage: toward an ontological politics of heritage in the age of Anthropocene. *Heritage Soc.* 8 (1), 24–42.
- Hinchliffe, S., Whatmore, S., 2006. Living cities: towards a politics of conviviality. *Sci. Culture* 15 (2), 123–138.
- Hinchliffe, S., 2007. *Geographies of Nature: Societies, Environments, Ecologies*. Sage, London.
- Holtorf, C., 2015. Averting loss aversion in cultural heritage. *Int. J. Heritage Stud.* 21 (4), 405–421.
- Hoskins, G., Whitehead, M., 2013. *Mining Memories: Placing the Anthropocene*. Aberystwyth University, Aberystwyth.
- HCLG (Ministry of Housing, Communities and Local Government, UK) and BIS (Department for Business, Innovation and Skills, UK), 2015. *Cornwall Devolution Deal*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/447419/20150715_Cornwall_Devolution_Deal_-_FINAL_-_reformatted.pdf.
- HCLG (Ministry of Housing, Communities and Local Government, UK) (2019) *National Planning Policy Framework*. Updated February. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.
- Hourdequin, Marion, Havlick, David G. (Eds.), 2015. *Restoring Layered Landscapes: History, Ecology, and Culture*. Oxford University Press.
- Imerys Minerals Ltd website. <http://www.imerys.com>.
- Instone, L., 2017. A post-wilderness National Park: naturecultures of destruction and recuperation in the Castlemaine Goldfields. *Environment & Society Portal*, Arcadia (Summer), no. 17. Rachel Carson Center for Environment and Society. <https://doi.org/10.5282/rcc/7920>.
- IUCN (International Union for Conservation of Nature), 2014. Re-naturing Cities – Using nature based solutions to address urban challenges. accessed 02/04/2019. <https://www.iucn.org/content/renaturing-cities-using-nature-based-solutions-address-urban-challenges>.
- John Tonkin Collection, Great Treverbyn (volume 2.1 China Clay Works A to L, p.385) and West Carclaze (volume 2.2. China Clay Works M to Y, no page number). China Clay History Society.
- JNCC (Joint Nature Conservation Committee) website. Lower plant species – 1390 Western rustwort *Marsupella profunda*. <http://jncc.defra.gov.uk/protectedsites/sacselection/species.asp?FeatureIntCode=S1390>.
- Jorgensen, A., Tylecote, M., 2007. Ambivalent landscapes—wilderness in the urban interstices. *Landscape Res.* 32 (4), 443–462.
- Jorgensen, A., Dobson, S., Heatherington, C., 2017. Parkwood Springs – a fringe in time: temporality and heritage in an urban fringe landscape. *Environ. Plan. A* 49 (8), 1867–1886.
- Kaika, M., Swyngedouw, E., 2011. The urbanization of nature: great promises, impasse, and new beginnings. In: Bridge, G., Watson, S. (Eds.), *The New Blackwell Companion to The City*. Wiley-Blackwell, Malden, Oxford, pp. 97–107.
- Kirkham, G., 2014. United Kingdom china-clay bearing grounds: mineral resource archaeological assessment. Report prepared for English Heritage and Cornwall Council. December.
- Kirksey, E., 2015. *Emergent Ecologies*. Duke University Press, Durham NC.
- Krupar, Shiloh R., 2011. Alien still life: distilling the toxic logics of the Rocky Flats National Wildlife Refuge. *Environ. Plann. D: Soc. Space* 29, 268–290.
- Langemeyer, J., 2015. *Urban ecosystem services: the value of green spaces in cities*. PhD Thesis. Stockholm University, Sweden.
- Lavolette, P., Baird, K., 2011. Lost innocence and land matters. *Eur. J. English Stud.* 15 (1), 57–71.
- Law, J., 2004. Enacting naturecultures: a view from STS. Version of 24th February 2004. <http://www.heterogeneities.net/publications/Law2004EnactingNaturecultures.pdf>.
- Lyons, A., 2020. Sensitive chaos: geopoetic flows and wildings in the edgelands. In: Harrison, R., DeSilvey, C., Holtorf, C., Macdonald, S., Bartolini, N., Breithoff, E., Fredheim, H., Lyons, A., May, M., Morgan, J., Penrose, S., *Heritage Futures: Comparative Approaches to Natural and Cultural Heritage Practices*. UCL Press, London. (in press).
- McCann, E., Ward, K., 2012. Assembling urbanism: following policies and ‘studying through’ the sites and situations of policy making. *Environ. Plan. A* 44 (1), 42–51.
- McCarthy, M., 2009. From 15 down to four: eco-towns get go ahead. *The Independent (Environment, Green Living)*. 16 July. <https://www.independent.co.uk/environment/green-living/from-15-down-to-four-eco-towns-get-go-ahead-1748467.html>.
- McFarlane, C., 2011. *Learning the City: Knowledge and Translocal Assemblage*. John Wiley and Sons, Chichester.
- Maddrell, A., Sidaway, J. (Eds.), 2010. *Deathscapes: Spaces for Death, Dying, Mourning and Remembrance*. Routledge, Abingdon.
- Mah, A., 2012. *Industrial Ruination, Community, and Place: Landscapes and Legacies of Urban Decline*. University of Toronto Press, Toronto.
- Massey, D., 2005. *For Space*. Sage, London.
- May, S., 2020. Heritage, endangerment and participation: alternative futures in the Lake District. *Int. J. Heritage Stud.* 26 (1), 71–86.
- Natural England, 2015. *Site Improvement Plans by Region: St Austell Clay Pits*. 20 May. <http://publications.naturalengland.org.uk/category/5755515191689216>.
- Nyman, M., 2019. Food, meaning-making and ontological uncertainty: exploring ‘urban foraging’ and productive landscapes in London. *Geoforum* 99, 170–180.
- Orange, H., 2012. *Cornish mining landscapes: public perceptions of industrial archaeology in a post-industrial society*. PhD Thesis. Institute of Archaeology, UCL, UK.
- Paton, J.A., 1990. *Marsupella profunda* Lindb in Cornwall, new to the British Isles. *J. Bryol.* 16 (1), 1–4.

- Pilcher, M., 2014. A whiter smile, a greener environment: cleaning up with china clay. Blog post, Environment Agency, UK. 25 April. <https://environmentagency.blog.gov.uk/2014/04/25/a-whiter-smile-a-greener-environment-cleaning-up-with-china-clay/>.
- Quivik, F.L., 2007. The historical significance of tailings and slag: industrial waste as cultural resource. *Indust. Archaeol.* 33 (2), 35–52.
- Raxworthy, R., 2019. Excavating the Archive: Heritage-Making Practices in Cornwall's Clay Country. PhD Thesis. University of Exeter, UK.
- Rico, T., 2016. *Constructing Destruction: Heritage Narratives in the Tsunami City*. Routledge, Abingdon.
- Ricoeur, P., 2004. *Memory, History, Forgetting*. University of Chicago Press, Chicago.
- Rocheleau, D., 2011. Rooted networks, webs of relations, and the power of situated science: bringing the models back down in earth in Zambrana. In: Goldman, M.J., Turner, M.D., Nadasdy, P. (Eds.), *Knowing Nature: Conversations at the Intersection of Political Ecology*. University of Chicago Press, Chicago, pp. 209–226.
- Saldanha, A., 2017. *Space After Deleuze*. Bloomsbury, London.
- Savills, 2014a. Environmental Impact Assessment Scoping Report West Carclaze/ Baal Eco-Community, prepared for Cornwall Council, 143pp. July. Document 773 from PA14/12186.
- Savills, 2014b. Supporting Planning Statement West Carclaze Eco-community, prepared for Cornwall Council, 105pp. December. Document 837 from PA14/12186.
- Savills, 2014c. Environmental Statement West Carclaze Eco-community, Planning, Chapter 6: Ground Conditions & Mining Legacy, 60pp. December. Document 861 from PA14/12186.
- Smallcombe, M., 2019. The 17 Cornwall neighbourhoods that are among the 10 percent most deprived in England – revealed. *Cornwall Live*. 15 September. <https://www.cornwalllive.com/news/cornwall-news/17-cornwall-neighbourhoods-among-10-480393>.
- Smith, J.R., 2008. *Sky-Tips in the St Austell China Clay District: an archaeological assessment*. Historic Environment Service, Cornwall Council.
- Storey, N., 2014. Save Sky Tip for St Austell. Online petition. 38 Degrees website. <https://you.38degrees.org.uk/petitions/save-sky-tip-for-st-austell>.
- Storm, A., Olsson, K., 2013. The pit: landscape scars as potential cultural tools. *Int. J. Heritage Stud.* 19 (7), 692–708.
- Sosna, Daniel, Brunclíková, Lenka (Eds.), 2017. *Archaeologies of Waste: Encounters with the Unwanted*. Oxbow Books.
- Storm, A., 2014. *Post-Industrial Landscape Scars*. Palgrave-Macmillan, New York.
- Swanton, D., 2012. Afterimages of steel: Dortmund. *Space Culture* 15 (4), 264–282.
- Swift, N., 2014. Petition over threatened 'Sky Tip'. *Newquay Voice*. 31 July. <http://www.newquayvoice.co.uk/news/0/article/4664/>.
- Swift, N., 2015. Heritage park future for Sky Tip. *St Austell Voice*. 16 December. <http://www.staustell-voice.co.uk/news/0/article/5192/>.
- Swyngedouw, E., Kaika, M., 2016. Re-naturing cities: great promises, deadlock... and new beginnings? In: Archer, K., Bezdecny, K. (Eds.), *Handbook of Cities and the Environment*. Edward Elgar Publishing, Cheltenham, pp. 42–64.
- Taylor, K., Lennon, J., 2011. Cultural landscapes: a bridge between culture and nature? *Int. J. Heritage Stud.* 17 (6), 537–554.
- Thurlow, C., 2005. *China Clay from Cornwall & Devon, fourth ed.* Cornish Hillside Publications, St Austell.
- Thurlow, C., 2007. *China Clay*. Cornish Hillside Publications, St Austell.
- Tonkin, J., 2007. *Walks Along the Clay Trails with The China Clay History Society*. Notes. Unpublished.
- TCPA (Town and Country Planning Association), 2018. *Understanding Garden Villages: An Introductory Guide*. January. TCPA, London. <https://www.tcpa.org.uk/Handlers/Download.ashx?IDMF=3507c991-fde2-4218-8920-641416f521b5>.
- Tsing, A.L., 2015. *Friction: An Ethnography in Global Connection*. Princeton University Press, Princeton, Oxford.
- Vergnault, O., 2018. Vision for future of St Austell to make Clay Country 'best place to live and work in the county'. *CornwallLive*. Updated 11 May. <https://www.cornwalllive.com/news/cornwall-news/vision-future-st-austell-make-1549134>.
- Vidal, F., Dias, N. (Eds.), 2016. *Endangerment, Biodiversity and Culture*. Routledge, Abingdon.
- Ward, K., 2019. For wilderness or wildness? Decolonising rewilding. In: Pettorelli, N., Durant, S.M., Du Toit, J.T. *Rewilding*. Cambridge University Press, pp. 34–54.
- West Carclaze Eco-Community Public Consultation, 2014. June. Obtained via an archived pdf from the Cornwall Council website.
- West Carclaze Public Consultation, 2018. August. Obtained via the archived West Carclaze Garden Village website, 2017.
- West Carclaze Garden Village website, 2017 – archived.
- West Carclaze Garden Village website, 2019. <http://westcarclaze-gardenvillage.co.uk/>.
- Western Morning News, 2014. The campaign to keep Mount Kernow. 18 June.
- Wheal Martyn, 2012. *Wheal Martyn*. Museum guide book. Wheal Martyn, St Austell.