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THEME

Post-disaster Landscapes

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Post-disaster Landscapes

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Disasters are a critical topic for practitioners of landscape architecture. A fundamental role of the profession is disaster prevention or mitigation through practitioners having a thorough understanding of known threats. Once we reach the 'other side' of a disaster – the aftermath – landscape architecture plays a central response in dealing with its consequences, rebuilding of settlements and infrastructure and gaining an enhanced understanding of the causes of any failures. Landscape architecture must respond not only to the physical dimensions of disaster landscapes but also to the social, psychological and spiritual aspects. Landscape's experiential potency is heightened in disasters in ways that may challenge and extend the spectrum of emotions. Identity is rooted in landscape, and massive transformation through the impact of a disaster can lead to ongoing psychological devastation. Memory and landscape are tightly intertwined as part of individual and collective identities, as connections to place and time. The ruptures caused by disasters present a challenge to remembering the lives lost and the prior condition of the landscape, the intimate attachments to places now gone and even the event itself.

This issue of *Landscape Review* considers a range of disaster landscapes. It discusses the practical and physical aspects of immediate response to disaster-struck communities and the ongoing monitoring of landscapes experiencing recurrent disasters. Experience and memory are also traced in settings as diverse as the Australian bushfire landscape and a memorial in Berlin. The articles all serve to amplify landscape architecture's potential as part of broader disciplinary and professional frameworks and through the critical and intellectual exploration of the impact of disasters on the human condition.

The 'post-disaster landscapes' theme was initiated in response to the earthquakes that have occurred in Christchurch, New Zealand, beginning in September 2010 and ongoing. The most damaging earthquake was experienced on 22 February 2011. It was a shallow magnitude 6.3 shake centred close to the city and resulted in 185 deaths, thousands of injuries and devastation to the city centre and large swathes of surrounding suburbs. The continuing nature of the earthquakes, with over 13,000 aftershocks (and still counting), defies the notion of a discrete disaster event. That the most devastating quake was not the first in the sequence undermined the idea of a logical progression from an event to recovery. Even after the 22 February aftershock, many more damaging shakes continued to rip the city apart and destabilise any feelings of recovery. Landscape architecture has featured in the post-disaster response in many ways in Christchurch, from

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Genocide
Bushfires

EDITORIAL

the design and build of temporary parks on sites left vacant by collapse and demolition through to taking a lead role in the 'blueprint' developed for the central city's rebuild. The coalescing layers of hydrology, geology and built form have been scrutinised carefully, manifesting the desire to answer the 'why' questions and avoid a return of such an event. While the 'givens' of the biophysical world are immutable, our decisions on how and where to live can be transformative in terms of disaster avoidance.

Beginning with the practicalities of post-disaster response, James Wescoat and Shun Kanda describe the challenges involved in engaging with an immediate post-event landscape. In their article, 'Rapid Visual Site Analysis for Post-disaster Landscape Planning: Expanding the Range of Choice in a Tsunami-affected Town in Japan', they capture the daunting experience of entering into a landscape devastated by a natural disaster. Undertaking an action–research project that combined the post-disaster planning approach of field-based site analysis with visual methods for assessing seismic and tsunami hazards, the authors and teams of students sought to identify potential sites for new community centres. While it can be tempting to jump to conclusions about the ideal location of a community centre, several factors need to be taken into account, with the first challenge being consideration of broad rather than limited possibilities. Using approaches such as transect mapping and slope analysis, the teams carried out a comprehensive fieldwork study. This pilot study identified factors needing further work to maximise the effectiveness of rapid analysis in a post-disaster situation. One of these factors is to develop a package of materials for use by local community-based teams to allow for a response that can cover a landscape where there are numerous sites needing investigation.

Community involvement is also identified as a priority in helping to understand disasters. Paula Villagra and Eduardo Jaramillo demonstrate in their article on the eruption of the Puyehue-Cordón Caulle volcanic complex in southern Chile that providing information about a disaster heightens community awareness and helps people to comprehend what has occurred. Villagra and Jaramillo explain how opportunities to convey information to the public about eruption events were often not realised in the media, which led to misunderstandings about what was happening. Careful documentation of the subtle changes in the landscape following the eruption helped with the community's apprehension of process, and through a public exhibition it was possible for people to become familiar with how these changes were manifested. A story-telling approach was used and multiple senses were employed to narrate the effects of the eruption on the landscape. An interdisciplinary approach helped to provide a robust understanding of the event and prevent people from being influenced by incorrect information. It also allowed for material that might otherwise have been confined to the academic discourse to be shared with the community.

Many natural disasters are recurrent events, and this presents challenges for the landscape response. The landslides discussed by Shenglin Elijah Chang and Pochun Huang in their article on Shenmu village in Taiwan have occurred repeatedly over the past 16 years, highlighting the challenges the community faces by these continual threats. In contrast to the widespread devastation experienced in the March 2011 Japanese tsunami, the Shenmu village event is

small in the geographical scale of impact but broad in terms of the temporal dimension, with at least 18 landslides and mudslides occurring between 1994 and 2012. Paradoxically, despite the ever-present prospect of disaster, the residents have elected not to abandon their village. Through their ongoing work in the village since 1998, Chang and Huang reveal how residents negotiate risk and counter the central and local governments' advice to move. Reluctant to leave their homes – the core of their culture and identity – the Shenmu villagers of the Hakka community have instead developed a practice of dwelling in two places: they can retreat when necessary and then return. They have established a sense of resilience from developing their own rescue procedures combined with the ability to relocate to alternative dwellings. Over time, it may be possible for the villagers to transfer attachment to new dwellings but, for now, they maintain a sense of flexibility and community-based recovery that allows for ideas of home to persist even in the face of inevitable disaster.

Community involvement in disaster response can amplify the political dimensions of planning and management in hazard-prone areas. Joern Langhorst, in his article 'Recovering Place: On the Agency of Post-disaster Landscapes', discusses work undertaken in New Orleans following hurricane Katrina and illustrates how politics can influence who is most at the mercy of disasters and the capacity of groups to respond to crises. In an area of New Orleans already disempowered by political processes, the disaster of hurricane Katrina served to reveal embedded inequalities that led to poor communities being worst hit by the event. Langhorst and his colleagues and students actively worked with the community, realising that 'landscape architecture as a field would need to find ways to better respond to the challenges of disaster and post-disaster landscapes'. A series of design studios and seminars provided an armature on which to construct a response, impelled by the notion of 'counter-mapping' – a subversion of the usual power biases that underpin the act of mapping. Community involvement was vital to the counter-mapping and led ultimately to the construction of a landscape intervention – a platform that allowed for a positive heightening of the connection to the wetlands close by. Volunteers constructed the platform, a structure that has symbolic power far beyond its mere form, sitting as it does on the levee that is the borderland between the human-ordered landscape and un-orderable processes of nature beyond. The platform is also a kind of suture, stitching the community back into the landscape and affording its viability, where, as in the Taiwanese Shenmu village, there is an enduring need to stay attached to the place of home.

The two final articles in this issue confront the existential dimensions of disaster experience and response. The construction of memorials is one of the most explicit design-based post-disaster actions. As complex sites of emotion and experience, memorials are also shaped and interpreted socially and politically. Karen Wilson Baptist views one of the twenty-first century's most potent and controversial memorials – Peter Eisenman's Memorial to the Murdered Jews of Europe – through the lens of the sublime. Baptist's engagement with the memorial prompts a reflection on the sublime and its evocation of sites of disaster or sites of remembering. The two are not necessarily the same thing, and the knowledge of the relationship between a memorial's focus and a site's history can unleash

the sublime. This is particularly powerful in Baptist's unexpected experience at the site of the 9/11 memorial in New York, where she was suddenly struck by the resonance between the water falling from the fountains and the victims who fell from the buildings. The impossibility of memorials to perform remembrance on our behalf places upon each of us our own responsibility to remember. As at the Memorial to the Murdered Jews of Europe no answers are given, no script is provided and each visitor must carry out their own work of remembering. Here, in this place of memory for an entirely human-induced disaster, the visitor must take up this responsibility, and this underscores why memorials matter. As Baptist writes, 'we still erect memorials so we can commemorate the dead, ease the soul of the witnesses, acknowledge the grief of survivors and repair the tears in the flesh of the world'.

Stewart Williams, in 'Rendering the Untimely Event of Disaster Ever Present', points to the dilemma of, on the one hand, a need for some degree of certainty about the scale and nature of disaster events and, on the other, their absolute unknowability. The landscape Williams explores is one where fire is always an imminent presence but one that hovers outside the bounds of graspability, echoing Baptist's recounting of the sublime. Following Tom Griffiths, Williams provocatively suggests that returning to a landscape of known threat is an experiment, a sense of constantly testing the possibility of living in a bushfire landscape. In his own poetic exploration of such a landscape, Williams takes the notion of experimentation into the realm of time and experience, an excursion of embodied experience through a place that manifests both permanence and constant flux.

Williams delivers us to the necessary confrontation and encounter that arises from disasters. After all, it is well established that disasters are never 'natural' – either because they are acts of humans against humans, as in the case of genocide, or a result of humans being in the way of natural processes. Earthquakes, tsunamis, floods, landslides, volcanic eruptions – all of these frightening and damaging events are only disasters when they affect communities. The ultimate challenge therefore is how we respond and react to disasters, in physical terms through design and in metaphysical ways through how we process and even poeticise the events. Nature and culture, art and science, thinking and dwelling continue to drive the investigation of post-disaster landscapes, with this issue of *Landscape Review* offering insight into current research and reflection.

Rapid Visual Site Analysis for Post-disaster Landscape Planning: Expanding the Range of Choice in a Tsunami-affected Town in Japan

JAMES L WESCOAT JR AND SHUN KANDA

Problem statement

In post-disaster situations, it is often necessary to undertake rapid visual site reconnaissance to characterise patterns of damage and identify reconstruction opportunities and constraints. Rapid visual site analysis can occur over a period of hours to days rather than weeks to months. The time constraint is often necessary to assess the viability of initial reconstruction scenarios and help broaden the range of choice among site planning options. Rapid assessment can also minimise the use of scarce local post-disaster resources during the initial reconnaissance phases of planning. Because it involves visual methods rather than equipment-intensive survey techniques, it serves as an initial scoping of alternatives. It may follow emergency shelter response planning methods (for example, Sphere Project, 2011, ch 4) and be followed by more comprehensive site mapping and screening.

This action–research project reviews the literature on post-disaster site analysis with an emphasis on the tsunami-affected area of north-eastern Japan. Because research on rapid visual site analysis in post-disaster contexts is limited, we combined field-based site analysis methods, adapted for post-disaster planning, with visual methods for assessing seismic and tsunami hazards.

Tsunami damage and pilot study project

The site analysis and visual methods were tested in a pilot study that sought to identify potential sites for new community centres in a tsunami-devastated town in north-eastern Japan. The town of Utatsu is one of several major coastal settlements in the administrative district of Minamisanriku, in the Miyagi Prefecture of the Tohoku region (Figure 1). The coastal landscape of Minamisanriku consists of steep watersheds that drain the southern tip of the Kitakami Mountains in eastern Honshu Island. It has a *rias* ('drowned' or 'sawtooth') coastline with highly productive artisanal fisheries in a large number of small coastal settlements. The steep hillslopes have an evergreen forest cover (*Pinus thunbergii*) and deliver abundant sediment to valley floors that, before the tsunami, supported rice paddies and discharged onto small coastal plains that had mixed residential, commercial, transportation and civic development.

As a result of tsunamis in the nineteenth and twentieth centuries, settlement patterns were established and protective measures designed to reduce people's exposure to disaster (Noh, 1966). Initiatives included marker stones of previous wave inundation heights, land use zoning, siting schools on higher terraces, warning and evacuation procedures and seawall construction. Over time, however,

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RESEARCH

alluvial coastal and riparian flats were developed, streams were channelised and evacuation scenarios were not sufficiently tested; and, therefore, many settlements could not cope with the unprecedented magnitude of the earthquakes and tsunami in March 2011.

The earthquakes and tsunami struck on 11 March 2011. The greater Sanriku coast in eastern Honshu was directly and severely impacted, with wave elevations and run-up along river valleys of more than 15 metres above mean sea level (Mikami, Shibayamay and Esteban, 2012, p 4). The number of dead and missing in Minamisanriku Town was estimated to be about 900 out of a population of just over 17,000 (ibid, p 6). Devastation of coastal buildings was nearly total. Regional Japan Rail tracks and coastal highway bridges were knocked down. Saltwater inundation damaged agricultural and forest vegetation. Massive amounts of debris from the built, cultural and natural landscape posed challenges for recovery. Six months later, the Miyagi Prefectural Government (2011, p 2) released a disaster recovery plan that called for new methods of reconstruction planning and design.

Pilot study aims

On 12 March, the day after the great north-eastern earthquakes and tsunami, architecture faculty from Miyagi University approached colleagues at Massachusetts Institute of Technology (MIT) in Cambridge, Massachusetts, to organise a joint reconstruction design studio. Initial reconnaissance trips and contact with community officials and members, followed by weekly Skype conversations, sought to identify a town, project type and approach for a pilot

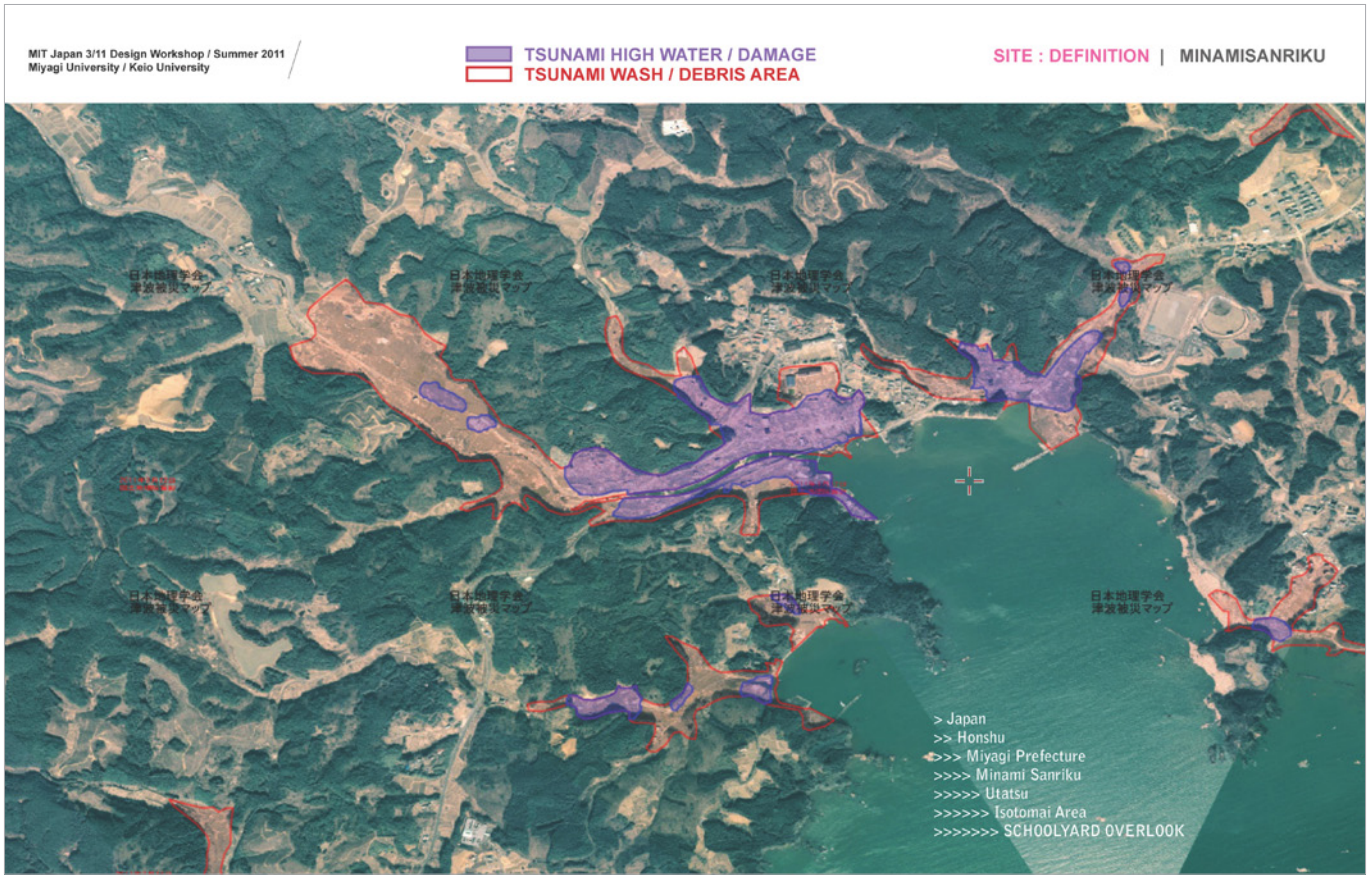


Figure 1: Map of Utatsu with tsunami damage area and Minamisanriku.[1]

study. As the government of Japan had placed a moratorium on rebuilding pending larger-scale policy and planning decisions, the organisers of the design studio decided to focus on the expressed need for 'community centres' with an emphasis on small towns that had lost much of their civic space as well as housing and infrastructure.

This pilot study explores what hazards researcher Gilbert White termed 'the range of choice' among reconstruction alternatives (Mitchell, 2008; Wescoat, 1987, 2011; White, 1961). White observed that reconstruction often occurs on sites subject to repeated risk and focuses quickly on a single alternative that overlooks other possibilities. The location of a post-disaster community centre, for example, might begin with assumptions about a high-elevation, high-visibility site. While this is a reasonable option, the sensitivity of high-elevation areas provides an argument for exploring alternatives.

The 'range of choice' phase of site analysis focuses on site conditions that help expand the perceived array of community building possibilities, opportunities and constraints. The community building programme was not pre-specified and was itself a variable discerned in part through the process of site analysis, community observations and discussion.

Review of post-disaster site analysis research

Peer-reviewed research on site analysis in post-disaster contexts is limited, so we examined research on tsunami reconstruction and site analysis methods. The former body of research is extensive. The Avery Index of Architectural Periodicals alone yielded 82 peer-reviewed hits that included significant contributions by landscape architects and planners, for example, Mazereeuw (2011) and Mitani, et al (2011) (see also National Research Council and National Academy of Environmental Design, 2010). The Tohoku Geographical Association published assessments of tsunami damage and reconstruction planning including geographic information systems (GIS) mapping in the Onagawa port area (Ikoda, 2011; Mimura, et al, 2011; see also Kyoto University, 2012). The American Society of Civil Engineers (ASCE, 2011) conducted multi-team rapid reconnaissance in the Minamisanriku area. The Indian Ocean tsunami of 2004 also generated a large volume of evaluation literature (ALNAP, 2007; Jayasuriya and McCawley, 2010). In a study comparable with this one, but covering a much larger region, Free (2005) developed site analysis checklists for reducing seismic–tsunami risk when siting facilities.

For previous research on site analysis methods, a bibliographic search was conducted in the following major interdisciplinary journal indexes:

- Avery Index for Art and Architectural Periodicals;
- Engineering Village (Compendex);
- Web of Knowledge (including Science and Humanities indexes);
- WorldCat – books and articles.

The results were disparate but with some interesting patterns. The major scientific journal indexes included tens of hits for the phrase 'site analysis' in title, abstract and key word searches (Table 1).

Index	Key words	Gross hits
Avery (art, architecture)	'Site analysis' anywhere	12
Compendex (engineering)	'Site analysis' in title or abstract	13; 21
ArticleFirst (interdisciplinary)	'Site analysis' as key word AND 'landscape' OR 'hazard' OR 'disaster'	99; 47; 26
Web of Knowledge (science, humanities)	'Site analysis' as topic AND 'landscape' OR 'hazard'	26; 29; 3

Table 1: Summary of journal index search results for 'site analysis'.[2]

In this case, the Avery Index yielded only 12 hits on 'site analysis', none of which dealt with hazards.[3] Four of the hits were reviews of James LaGro's 2007 influential textbook *Site Analysis: A Contextual Approach to Sustainable Land Planning and Site Design*. We cross-checked the Avery results with searches of online journal archives and obtained further results: *Landscape and urban planning* (36 hits); *Landscape Research* (10 hits); *Journal of Landscape Architecture* (3 hits); *Landscape Journal* (8 hits plus book and conference reviews). These results indicated several patterns of site analysis research:

- early research on terrain analysis in landscape assessment (Harris, 1988; Way, 1982);
- late twentieth-century frameworks for site interpretation vis-à-vis traditional site analysis (for example, Corbin, 2003, on the significance of vacancy; Francis, 2001, on landscape architectural case studies; Meyer, 2001, on Marcel Smets's ideas about *casco* as a guiding concept for seeing; Braae and Diedrich, 2012, on the concept of site specificity; and National Research Council and National Academy of Environmental Design, 2010);
- continuing development of spatial analysis, computer cartography and GIS applications (for example, Jun, 2000; Mutunayagam, 1986; and Showalter and Lu, 2010).

The Compendex index added technical studies of facilities siting, site analysis failures and site analysis in environmental restoration (for example, Anon, 1985; Miron, Rutz and Ray, 2007; Powers, 1981). The Miron, et al (2007) article, in particular, describes a semester-long site analysis course at Tuskegee University in Tuskegee, Alabama, on radiation and hazardous waste hazards assessment. General article indices, such as the ArticleFirst and Web of Knowledge, added important research on GIS methods in siting emergency evacuation shelters (Kar and Hodgson, 2008); remote sensing of seismic hazards in site analysis (Xu, et al, 2010); landslide susceptibility (Gabriele, Barchiesi and Catallo, 2009); avalanche hazards simulation (Bocciola, Medagliani and Rosso, 2009); and sustainable site planning for disaster risk reduction (Ozdemir, 2008).

The *PreventionWeb* of the United Nations International Strategy for Disaster Reduction (UNISDR) yielded 82 hits on site analysis in disaster risk reduction websites. UNISDR (2006) also produced a *Tsunami Bibliography* in the wake of the 2004 Indian Ocean tsunami. A study by the National Tsunami Hazard Mitigation Program (2001, p 22) highlighted the role of site analysis in tsunami preparedness:

> The site analysis phase can be used to establish site plan parameters for tsunami mitigation. Many communities have mapped hazard areas. Within these areas, communities may also have more detailed plans that include site analysis. The analysis typically includes geographic conditions, critical infrastructure (see

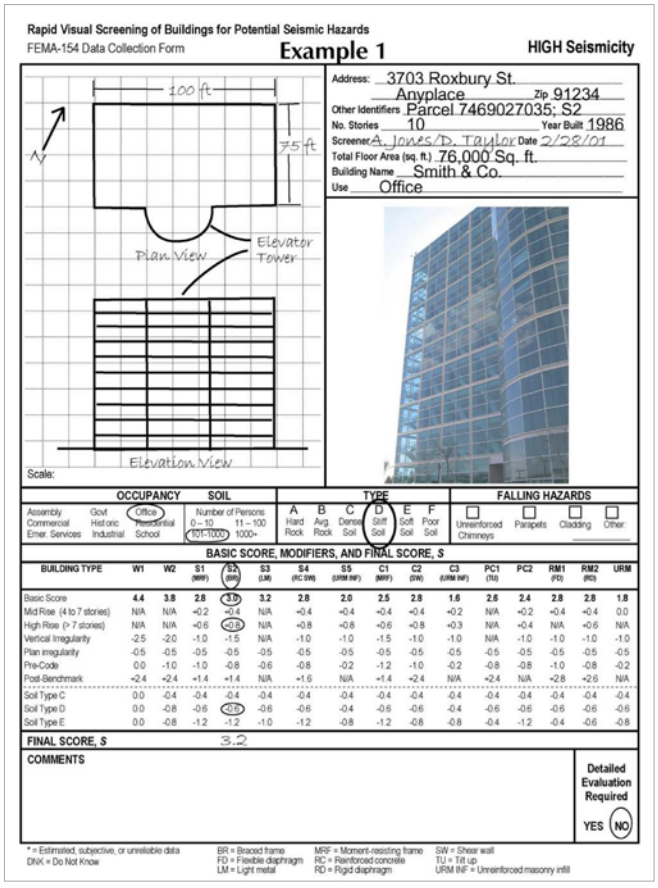
Principle 6), area access and egress (see Principle 7), and existing and future development patterns. The analysis may also include economic feasibility and community design objectives.

Because our study emphasised visual methods conducted by non-expert design students and faculty, it also drew upon the *Rapid Visual Screening of Buildings for Potential Seismic Hazards: A Handbook* by the US Federal Emergency Management Agency (FEMA) (2002) (Figure 2). That volume developed visual assessment techniques for screening potential seismic hazards in buildings and, thus, differs in subject and purpose from our study of site alternatives in post-disaster contexts; however, they share an emphasis on rapid visual screening methods. Our study identified the presence and absence of tsunami damage and debris to identify different types of sites for potential community use.

The literatures surveyed above were used to adapt the site analysis variables listed in LaGro (2007) and other environmental planning texts (for example, Marsh, 2010; Murphy, 2005; White, 2004) and to incorporate post-tsunami landscape disturbance and siting considerations (Table 2).

Site analysis methods

The site analysis methods were developed in three phases. The first involved off-site preparation, compiling and studying base maps, satellite imagery before and after the tsunami, supporting data, and field logistics before arrival. The second phase involved design and implementation of the on-site transect analysis procedures. The third phase involved off-site studio synthesis of fieldwork results. These methods are elaborated in further detail below.


Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA-154 Data Collection Form
Example 1
HIGH Seismicity
Address: 3703 Roxbury St.
Anyplace Zip 91234
Other Identifiers Parcel 7469027035; S2
No. Stories 10 Year Built 1986
Screener A. Jones/D. Taylor Date 2/28/01
Total Floor Area (sq. ft.) 76,000 Sq. ft.
Building Name Smith & Co.
Use Office
100 ft
75 ft
Plan View
Elevator Tower
Elevation View
Scale:
OCCUPANCY: Assembly, Commercial, Emer. Services, Govt, Historic, Industrial, Office, Residential, School
SOIL: Number of Persons 0 – 10, 11 – 100, 101-1000, 1000+
TYPE: A Hard Rock, B Avg. Rock, C Dense Soil, D Stiff Soil, E Soft Soil, F Poor Soil
FALLING HAZARDS: Unreinforced Chimneys, Parapets, Cladding, Other
BASIC SCORE, MODIFIERS, AND FINAL SCORE, S
BUILDING TYPE: W1, W2, S1 (MRF), S2 (BR), S3 (LM), S4 (RC SW), S5 (URM INF), C1 (MRF), C2 (SW), C3 (URM INF), PC1 (TU), PC2, RM1 (FD), RM2 (RD), URM
Basic Score: 4.4, 3.8, 2.8, 3.0, 3.2, 2.8, 2.0, 2.5, 2.8, 1.6, 2.6, 2.4, 2.8, 2.8, 1.8
Mid Rise (4 to 7 stories): N/A, N/A, +0.2, +0.4, N/A, +0.4, +0.4, +0.4, +0.4, +0.2, N/A, +0.2, +0.4, +0.4, 0.0
High Rise (> 7 stories): N/A, N/A, +0.6, +0.8, N/A, +0.8, +0.8, +0.6, +0.8, +0.3, N/A, +0.4, N/A, +0.6, N/A
Vertical Irregularity: -2.5, -2.0, -1.0, -1.5, N/A, -1.0, -1.0, -1.5, -1.0, -1.0, N/A, -1.0, -1.0, -1.0, -1.0
Plan Irregularity: -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5
Pre-Code: 0.0, -1.0, -1.0, -0.8, -0.6, -0.8, -0.2, -1.2, -1.0, -0.2, -0.8, -0.8, -1.0, -0.8, -0.2
Post-Benchmark: +2.4, +2.4, +1.4, +1.4, N/A, +1.6, N/A, +1.4, +2.4, N/A, +2.4, N/A, +2.8, +2.6, N/A
Soil Type C: 0.0, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4
Soil Type D: 0.0, -0.8, -0.6, -0.6, -0.6, -0.6, -0.4, -0.6, -0.6, -0.4, -0.6, -0.6, -0.6, -0.6, -0.6
Soil Type E: 0.0, -0.8, -1.2, -1.2, -1.0, -1.2, -0.8, -1.2, -0.8, -0.8, -0.4, -1.2, -0.4, -0.6, -0.8
FINAL SCORE, S: 3.2
COMMENTS
Detailed Evaluation Required: YES (NO)
* = Estimated, subjective, or unreliable data
DNK = Do Not Know
BR = Braced frame, FD = Flexible diaphragm, LM = Light metal
MRF = Moment-resisting frame, RC = Reinforced concrete, RD = Rigid diaphragm
SW = Shear wall, TU = Tilt up, URM INF = Unreinforced masonry infill

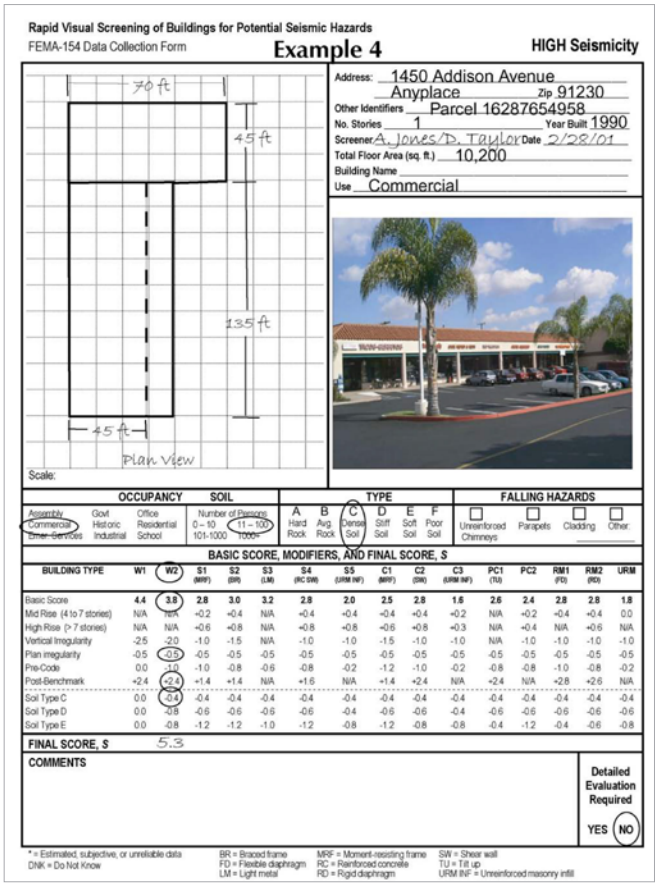

Rapid Visual Screening of Buildings for Potential Seismic Hazards
FEMA-154 Data Collection Form
Example 4
HIGH Seismicity
Address: 1450 Addison Avenue
Anyplace Zip 91230
Other Identifiers Parcel 16287654958
No. Stories 1 Year Built 1990
Screener A. Jones/D. Taylor Date 2/28/01
Total Floor Area (sq. ft.) 10,200
Building Name
Use Commercial
70 ft
45 ft
135 ft
45 ft
Plan View
Scale:
OCCUPANCY: Assembly, Commercial, Emer. Services, Govt, Historic, Industrial, Office, Residential, School
SOIL: Number of Persons 0 – 10, 11 – 100, 101-1000, 1000+
TYPE: A Hard Rock, B Avg. Rock, C Dense Soil, D Stiff Soil, E Soft Soil, F Poor Soil
FALLING HAZARDS: Unreinforced Chimneys, Parapets, Cladding, Other
BASIC SCORE, MODIFIERS, AND FINAL SCORE, S
BUILDING TYPE: W1, W2, S1 (MRF), S2 (BR), S3 (LM), S4 (RC SW), S5 (URM INF), C1 (MRF), C2 (SW), C3 (URM INF), PC1 (TU), PC2, RM1 (FD), RM2 (RD), URM
Basic Score: 4.4, 3.8, 2.8, 3.0, 3.2, 2.8, 2.0, 2.5, 2.8, 1.6, 2.6, 2.4, 2.8, 2.8, 1.8
Mid Rise (4 to 7 stories): N/A, N/A, +0.2, +0.4, N/A, +0.4, +0.4, +0.4, +0.4, +0.2, N/A, +0.2, +0.4, +0.4, 0.0
High Rise (> 7 stories): N/A, N/A, +0.6, +0.8, N/A, +0.8, +0.8, +0.6, +0.8, +0.3, N/A, +0.4, N/A, +0.6, N/A
Vertical Irregularity: -2.5, -2.0, -1.0, -1.5, N/A, -1.0, -1.0, -1.5, -1.0, -1.0, N/A, -1.0, -1.0, -1.0, -1.0
Plan Irregularity: -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5, -0.5
Pre-Code: 0.0, -1.0, -1.0, -0.8, -0.6, -0.8, -0.2, -1.2, -1.0, -0.2, -0.8, -0.8, -1.0, -0.8, -0.2
Post-Benchmark: +2.4, +2.4, +1.4, +1.4, N/A, +1.6, N/A, +1.4, +2.4, N/A, +2.4, N/A, +2.8, +2.6, N/A
Soil Type C: 0.0, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4, -0.4
Soil Type D: 0.0, -0.8, -0.6, -0.6, -0.6, -0.6, -0.4, -0.6, -0.6, -0.4, -0.6, -0.6, -0.6, -0.6, -0.6
Soil Type E: 0.0, -0.8, -1.2, -1.2, -1.0, -1.2, -0.8, -1.2, -0.8, -0.8, -0.4, -1.2, -0.4, -0.6, -0.8
FINAL SCORE, S: 5.3
COMMENTS
Detailed Evaluation Required: YES (NO)
* = Estimated, subjective, or unreliable data
DNK = Do Not Know
BR = Braced frame, FD = Flexible diaphragm, LM = Light metal
MRF = Moment-resisting frame, RC = Reinforced concrete, RD = Rigid diaphragm
SW = Shear wall, TU = Tilt up, URM INF = Unreinforced masonry infill

Figure 2: FEMA rapid visual screening templates (FEMA, 2002, pp 57, 63).

Physical conditions

- Post-tsunami conditions
  - surviving features
  - rubble surfaces (composition, materials, texture, foundations)
  - post-disaster actions (grading, sorting, removal, filling)
- Land forms and slopes
  - land form types, relations, assets
  - relative elevations
  - slopes (percentage, shape, cut/fill, constraints on circulation/building)
- Soils
  - type/description (texture, colour, moisture)
  - drainage/compaction
  - erosion (existing/potential)
- Geology (visible bedrock, alluvial, fill land, stability)
- Hydrology
  - drainage patterns
  - channel width, depth, form
  - flood hazards
- Coastal
  - access/assets/exposure
  - structures (breakwater, edge)
  - nearshore/offshore currents, tides, features
- Microclimates (sun/shade, temperature, humidity, precipitation, wind)

Biological conditions

- Ecosystem types/assets/impacts
- Vegetation
  - structure (tree/shrub/groundcover; evergreen/deciduous)
  - density (percentage cover – 100 percent to bare ground)
  - tsunami damage (wave, salinity)
- Wildlife (terrestrial, marine)
- Fisheries pre-tsunami and post-tsunami (nearshore, offshore habitat and abundance)

Socio-economic, cultural and built environment conditions

- Communities (locations, structure, needs, interests, demographics)
- Shelter – camps/temporary housing (locations, structure, needs, interests, demographics)
- Places of work (temporary, supply chain, industrial organisation and restructuring)
- Land use and tenure
  - public/private, owned/leased
  - land use/open space pattern
- Public infrastructure and services (transportation, access, utilities, social services)
- Extant buildings
  - building typology/architectural assets/settlement morphology
  - rapid visual screening (adapt FEMA forms)
- Cultural heritage (structures, places, sites, intangible)
- Visual analysis and landscape aesthetics
  - visual experience (view directions, lengths, qualities)
  - sense of place

Table 2: Site analysis variables.

Preparatory phase of site analysis

Site information is often inaccessible, damaged or destroyed in post-disaster landscapes, which means intensive preparation is required before arrival on site. The Japan 3.11 workshop preparatory analysis included the following.

1. The international team's aims, scope, methods, logistics and funding were coordinated through Skype and telephone conversations held nearly each

week for several months before the workshop. These deliberations and reconnaissance visits led to the selection of Utatsu, one of three main towns in Minamisanriku (the others being Shizugawa and Togura; there are many other small settlements like Minato and Hadenya; and an inland town at Iriya). It also led to the decision to focus on the need for small community centres.

2. Preparatory meetings were held with workshop members that addressed the potential hazards of field work (earthquake aftershocks; typhoon storms in late summer; scientific information about radiation plumes in the atmosphere, water, land and food chain; tsunami debris hazards and general first aid).
3. A 'Resource-CD' was compiled for workshop members, which included:

   01_Key Workshop Documents (for example, schedule, contact information, project brief)

   02_Base Maps (at multiple scales and geographic extents, from satellite imagery to Japan's Zenrin topographic maps at 5-metre contour intervals)

   03_Site Analysis Resources (for example, literature review above)

   04_2011 Tohoku Earthquake and Tsunami Documents (initial damage assessments and monitoring data)

   05_Japan Disaster Research and Management Resources (institutional mapping of Japanese government and non-governmental aid organisations involved in Tohoku earthquake and tsunami recovery; list of Japanese disaster research centres and downloaded publications)

   06_Technical Disaster Resources (for example, FEMA manuals and US Army Corps of Engineers *Coastal Engineering Manual*)

   07_Disaster Resilient Design Resources (for example, design precedents database from the United Nations Human Settlements Programme (UN-HABITAT), Active Learning Network for Accountability and Performance in Humanitarian Action (ALNAP), Architecture for Humanity and 2004 Indian Ocean tsunami case studies).

These digital resources were deemed important because internet access was negligible in Minamisanriku during the early months following the tsunami disaster.

4. Base maps were selected and printed at multiple scales to provide a perspective of the regional context as well as for site analysis. The three main scales selected were the:
   - full Minamisanriku administrative area, which consolidates the three main towns and their coastal watersheds;
   - greater Utatsu area, which comprises the formerly settled coastal bay, middle terraces that support the town's schools and emergency housing, upper forested hillslopes and riparian corridors that drain the hillslopes to the coastal bay;
   - detailed imagery of Utatsu town including areas that survived the tsunami where community safe havens might be located, as well as areas partially or wholly damaged that might have other community purposes (for example, for workplace and livelihood-related activities).

Cartographic resources for the Utatsu area were greater than what would have been available a decade ago but still limited. For example, Google Earth historical maps and images, and tsunami inundation maps, were available soon after the event. However, Zenrin topographic base maps for coastal towns were available at a 5-metre contour interval, which provided limited information on buildable or evacuable slopes. The Utatsu area did not have GIS coverage for land use or land cover.

5. Site analysis field drawing packages were prepared for all participants (12 pages of pre-formatted field mapping sheets linked with daily fieldwork at 297 × 420 millimetres (A3)). These drawing sets enabled continuous mapping, note taking and drawing while site transects were walked (Figure 3).

On-site analysis

The US–Japan design team travelled by road from Sendai to Minamisanriku. The initial arrival on site began with silent meditation and an intuitive walk through the coastal area, adjacent river valleys and upland settlements without photography, discussion or analysis. This first step was suggested by our Japanese project leaders as an appropriate way to begin. It resonates with the interpretive cultural traditions of site inquiry noted above, and is important for responders as well as survivors in post-disaster contexts (Aloudat and Christensen, 2012; Hewitt, 2012).

Day 1: *Transect analysis*. Site analysis teams of two to four members analysed one transect each of nearly 0.5 kilometres in length (the distance from sea to upper settlements or steep forested slopes). Transect methods were demonstrated in the field (for example, delineation of sections, distance pacing, slope and height estimation, documentary photography and annotation). Seven transects were selected based on Minamisanriku's complex terrain; they followed or cut across major ridge and valley land forms in a gridded alignment that might be more applicable in gentler terrain (bracketed numbers below refer to transect numbers in Figure 4). The transects included:

- three riparian corridors (the main stream valley [1], west valley [3] and east valley [7]), which supported rice cultivation and limited settlement;

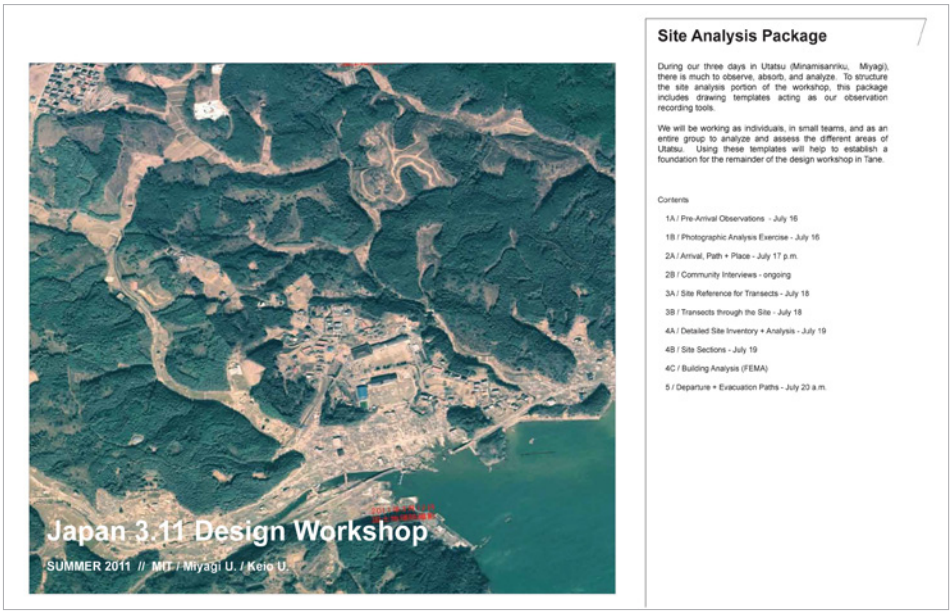


Figure 3: Site analysis drawing package cover page.

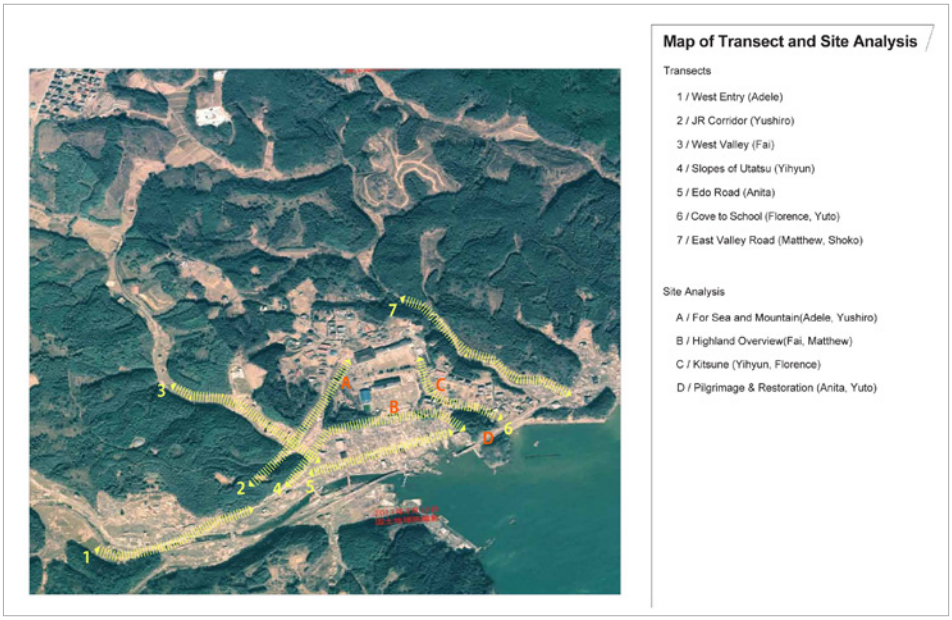


Figure 4: Transects identified in yellow lines.

- three transportation corridors (the Japan Rail line [2], an historic coastal road [5] and a small road from a coastal cove to upland school buildings [6]);
- a series of six hillslope sections [4], most of which were sharp barriers to evacuation and settlement, though several had paths or small switchback roads to upland areas and midslope terraces that escaped tsunami damage and served important community functions.[4]

As a *rias* coast, with steep mountain drainages and heavily forested hilltops, Utatsu has a limited buildable area and significant barriers to vertical evacuation.

Transect analysis is a method of site sampling that intensively examines conditions observable over linear paths through a study area. It is widely employed in geomorphology, biogeography, disturbance ecology and built environment research (for example, Buckland, 2001; Goudie, 1990; Kent, et al, 1997; and www.transect.org where land use transects are linked with development codes). In this project, transect analysis entailed the following field tasks.

- Longitudinal sections were constructed along the transect line. Longitudinal transects looked in both directions from the centre line to evidence at a visible distance from, as well as immediately along, the section line (these drawings used conventions of lighter lines for more distant information). As transects followed rather narrow paths, this background information ranged from 5 to 50 metres from the centre line (Figure 5).
- Transverse sections were constructed across the transect line at intervals selected to identify major construction constraints (for example, slopes greater than 30 degrees, the ocean and densely forested areas) and opportunities (for example, elevated open areas, trafficable slopes and attractive sight lines) (Figure 6).
- Surface conditions (damage, debris, land use and land cover) were mapped on a gross scale between the transverse sections to the boundaries of the visible evidence.

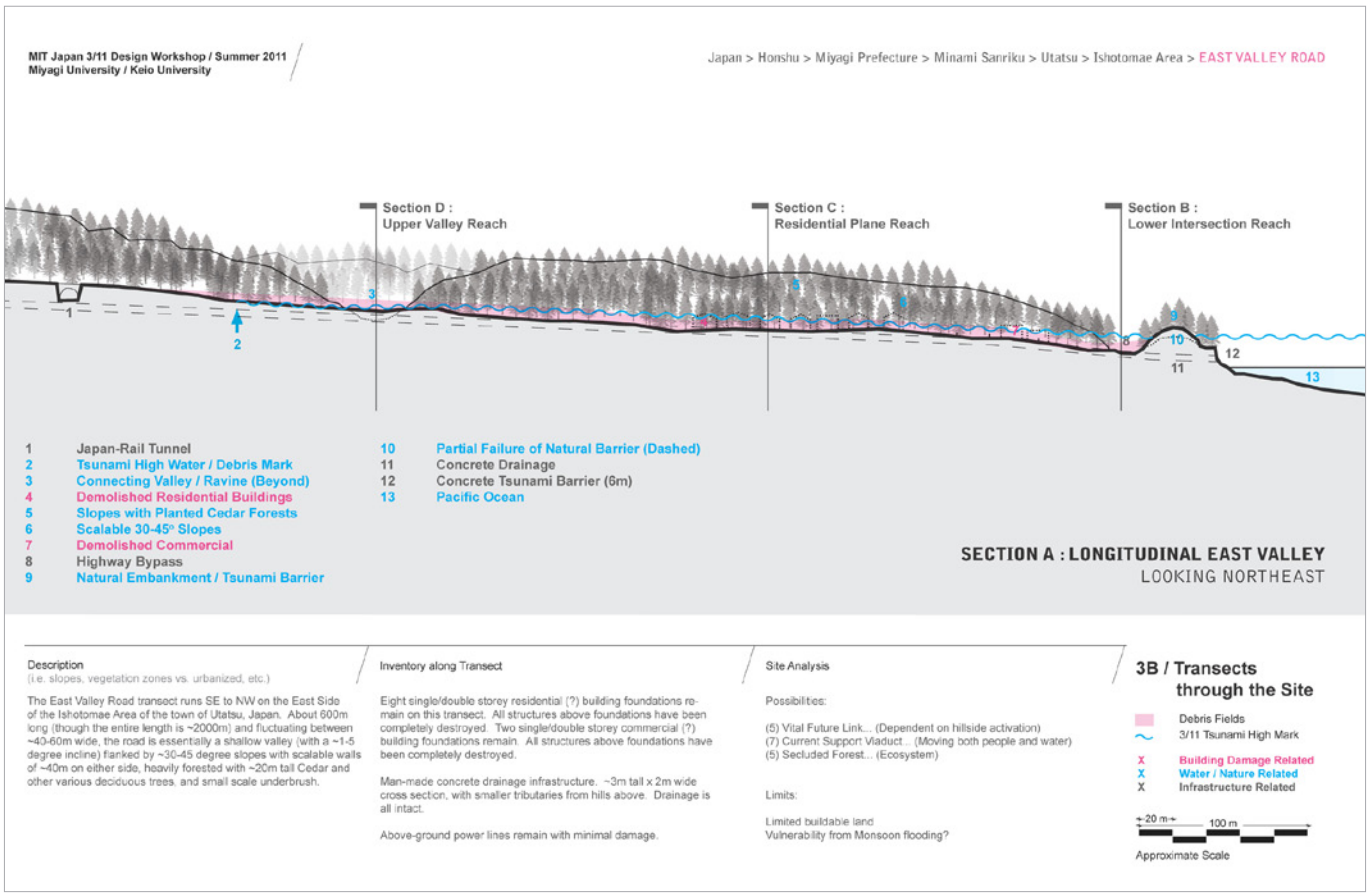


Figure 5: Longitudinal transect along a coastal river valley. (Image courtesy of Matthew Bunza.)

In each section and plan, the aim was to identify slope conditions affecting evacuation, damage and debris patterns that indicated relative safety in this event, and areas of around 20 square metres or more that might support community activities. This one-day survey along a well-defined transect helped each team develop a fine-grained perspective on post-disaster landscape conditions, forensics, opportunities and constraints. The information recorded was collected by direct observation while walking transects repeatedly to gain insights from viewing transects in different upslope and downslope directions.

In the evenings, teams attended community meetings in the towns of Utatsu and Togura for insight into redevelopment interests and concerns. They compared hand-drawn transect maps and sections, which had two main benefits. First, it indicated more and less successful drawing and mapping techniques. Participants showed creativity in annotation methods, map symbols, observational acuity and supporting analysis (for example, the slope analysis matrix in Figure 7). Comparing preliminary transects also helped develop a collective understanding of the complex terrain of Utatsu (as indicated in Figure 4 above).

Day 2: Potential community spaces along the transects. In the morning of the second day, teams re-surveyed transects for missing data and inferences about pre-disaster development patterns, tsunami damage processes and reconstruction prospects. The teams then tested the fruitfulness of these methods by identifying potential community spaces along each transect. Draft site planning criteria and programme possibilities were informed by discussions with local residents and the evening meetings with community members. These discussions revealed diverse

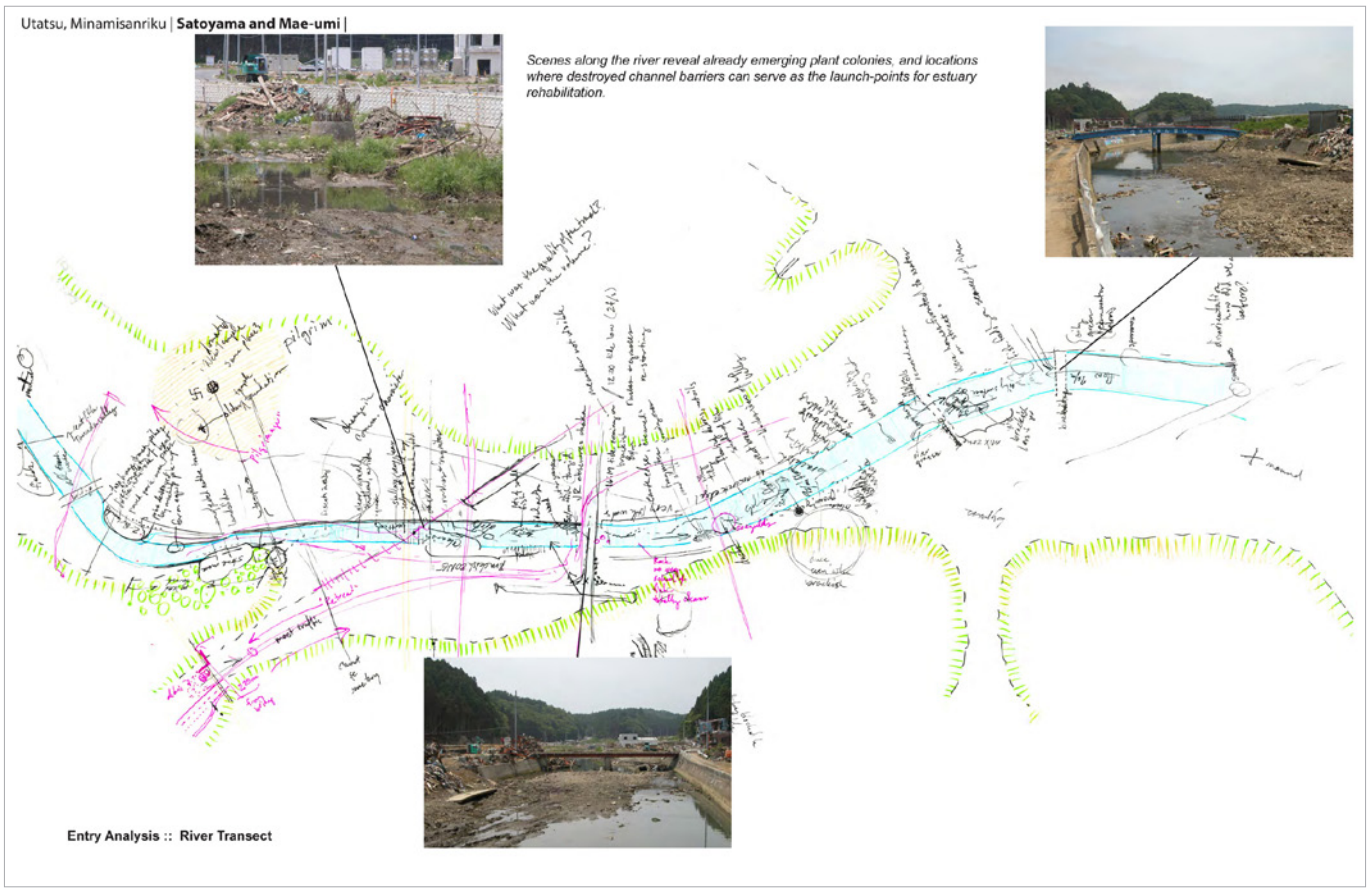


Figure 6: Lateral transects across a coastal river channel. (Image courtesy of Adele Phillips.)

interests and attitudes. Some community members sought to resume coastal fishing livelihoods as soon as possible while others wanted to relocate away from the ocean – visually as well as spatially. This combination of diverse views and complex terrain supported the approach of expanding the range of community spaces considered rather than seeking to identify a single site as the community centre. Potential sites identified along the transects are described below.

- The three riparian corridors yielded important information about tsunami damage caused by 'run-up' that swept away bridges, buildings and rice fields, as well as hillside 'splash-up' that aggravated salinity impacts on pine forests. In light of this severe damage and the steep sideslopes, no community centre spaces were identified along the east or west valley transects. However, the mouth of the main riparian corridor was identified as an estuarine restoration area that could link the reconstruction of community fishing livelihoods and workplaces with environmental education and recreation. This coastal lowland site had not been anticipated at the outset of inquiry and thus its inclusion expanded the range of choice.

- The three transportation corridors also suffered major structural damage from direct tsunami wave forces. Japan Rail tracks were torn off; highway bridge structures and buildings along the old Edo-period road on the coastal plain were destroyed. However, the cove to school road team identified variable damage patterns, including areas where small differences in exposure resulted in differential damages and protection. Each transportation corridor team identified protected areas that could support

	A	B	C	D	E	F
DESCRIPTION (CULTURAL/BUILT ENVIRONMENT)	SLOPE BY ENTRY ROAD TO UTATSU	ARTIFICIAL MOUND FOR JR TRAIN. TUNNEL AT GROUND LEVEL	SLOPE BEHIND PARKING LOT	CUT AND FILLED SLOPE BY TWO SCHOOLS	SLOPE BEHIND RESIDENCES. DIVIDES HOUSES ON TOP FROM BELOW	SLOPE WITH SHRINE AT TOP. ELEVATED HIGHWAY CUTS ACROSS
POST-TSUNAMI CONDITIONS	TREES DAMAGED BY SALT WATER. UPROOTED TREES	EXPOSED TOP OUTER SURFACE OF TUNNEL	DEAD BAMBOO. UPROOTED TREES	NOT MUCH IMPACT	UPROOTED TREES AND BAMBOO. HANGING ITEMS	UPROOTED TREES, HANGING ITEMS (UNREMOVED)
SURFACES	CONCRETE REINFORCEMENT, CONCRETE COVERED PATH, PILED STONE AT TOE.	PILED UP STONE. GRASS	ROCKY SURFACE, STONE CLIFF	CONCRETE WALL, GRASS PATHCES	TREES, EXPOSED BEDROCK, SOIL COLOR IS DIFFERENT	SALT WATER DAMAGE TO CEDAR TREES, DAMAGED HOUSE NEXT TO STAIRS
SLOPE/LANDFORM (DEGREES)	50	40	50-80	50-90	60-70	30 (STAIRS)
APPROXIMATE HEIGHT	8-10m	10-12m	18-22m	VARIES	15m	30m
CUT/FILL	CUT ON ROAD SIDE	ARTIFICIAL	CUT AT TOE, PILED STONE	CUT AT TWO LEVELS FOR RAMP, CONCRETE WALL	CUT AT TOE, FILLED WITH CONCRETE WALL	TOE/MIDDLE CUT AT NN SIDE FOR ROAD, SLICED AT SW SIDE FOR HIGHWAY
ACCESSIBILITY	THRU CONCRETE COVERED NARROW SLOPE PATH	RAMP UP TO STATION	NOT ACCESSIBLE	RAMP (CARS + PEOPLE)	HIDDEN PRIVATE RAMP BEHIND DESTROYED HOUSES	STAIRS TO SHRINE
SOIL/EROSION	SLIGHT EROSION ON SIDES EXPOSED BEDROCK	EXPOSED STONE INNER FILL, MISSING GRASS PATCHES	EROSION +++ 5M UP FROM GROUND ALL ERODED	NO VISIBLE EROSION	NEAR GROUND	NEAR GROUND
VEGETATION (SHRUB,TREE,GROUND COVER)	CEDAR TREES, SHRUBS	GRASS	TREES, BAMBOO, GRASS	GRASS	THIN TREES, BAMBOO, SMALL SHRUBS	DENSE CEDAR TREES
SLOPE SECTION						

Figure 7: Slope analysis and classification matrix. (Image courtesy of Yihyun Lim.)

community activities. The Japan Rail team identified a small upland site adjacent to the rail line used for overflow parking that was protected from, yet had partial views of, the ocean, which could serve the varied wishes of residents with respect to views of the ocean. Another team identified an upland site adjacent to the school road that had a small abandoned play area suitable for redevelopment. The coastal road team suggested that restoration of highway corridor cut slopes could accommodate some of the massive volume of debris along the coastline and could, in turn, re-link a hilltop Shinto shrine with a high coastal promontory park. Although the first two sites might have been discovered through other methods, their strong linkages with potential evacuation routes and adjacent community land uses were identified through transect analysis. The alternative for restoring a highway cut through the coastal headlands had not been imagined at the start of the project.

- The hillslope sections identified a promising community site on a central axis from the former town centre through the middle terrace with surviving schools and emergency housing. This central location, served by an existing road, was envisioned at the outset of the inquiry. However, the transect slope analysis identified opportunities for lower slope reconstruction with tsunami-deposited debris and access and/or evacuation road improvements.

In these ways, transect analysis helped advance the concept and substance of expanding the range of choice. It identified two completely unanticipated sites, two unanticipated sites that might have been identified through different methods

but that were closely linked with evacuation paths through transect analysis, and one anticipated site whose opportunities and requirements were innovatively elaborated through transect analysis.

Day 3: Departure and reflection. Field work ended with reflections similar to the way that it began. The team had a silent departure with reflections on leave-taking, reconstruction and return. The analytical field methods were thus bookended by contemplative experience. While the methods described above emphasise the analytical approach, the importance of subjective experience deserves comment. Participants underscored their reflections on, as well as observations of, the patterns of devastation – and a sense of promise in the alternatives identified. They reported that these emotive aspects of field work shaped the interpretive level of transect analysis, and that balancing the reflective, analytical and descriptive aspects of site analysis is important for imagining the potential implications of site conditions.

Off-site analysis workshop methods

Following the field work, the team lived for three days in a Zen monastery in Kyoto, continuing to reflect in part on landscape analysis, experience and alternatives at Utatsu. The design workshop then resumed off-site for three weeks where multi-university teams transcribed field data into digital format and developed initial site planning concepts. One test of the rapid visual site analysis methods was whether team members would retain a high level of clarity, detail and salience of site analysis knowledge during the off-site portion of the project. (A point of comparison was Orland and Bellafiore, 1990, where that did not occur, and where the authors reported that landscape experience and alternatives lost salience over time and with distance from the site.)

Evaluation and discussion

This section presents the participant and author evaluations of how well different site analysis materials and techniques performed in practice. Criteria for evaluation were whether a method or resource was used, participant comments about its utility and author judgements about its contribution toward the identification of site alternatives. We distinguish methods that worked well as planned, worked well when adapted, performed with mixed results or performed weakly.

Preparatory materials

The site analysis drawing set had an overall positive performance. Participants described the package as valuable for orientation in a complex post-disaster landscape, as an effective format for rapid recording when walking transect alignments and for comparing observations. Maps, plans and section worksheets were intensively used. The transect section methods worked well only after they were demonstrated in the field. The list of site analysis variables was deemed useful but would have been more so if reformatted as worksheets and checklists similar to those in some of the disaster literature reviewed above. Community meeting and personal reflection worksheets were used less. Although deeming them important, participants preferred other formats for note taking.

The Resource-CD held a large volume of relevant technical reports and data, but its performance was weaker. It worked well as a repository for immediately

relevant project information, for example, base maps, but technical resources were little used. Its lack of use should perhaps not come as a surprise in a study that stresses visual methods, but we conclude that use of supporting scholarly information could be enhanced by establishing specific links with site analysis variables and hotlinks for ready access in the field.

On-site field methods

Overall, the transect analysis method worked well. Each team was able to cover the nearly 0.5 kilometre alignment in the time available and record detailed visible evidence on commonly formatted plans and sections. Each team succeeded in using site analysis to expand the range of community centre alternatives and justify further study of those possibilities with fine-grained analysis. As emphasised above, rapid visual site analysis is an early phase of post-disaster reconstruction inquiry that must be followed by detailed site survey, screening, siting and planning.

Participants reported one way in which transect analysis as designed in this study was limited. Namely, time should have been allocated for all participants to undertake a rapid reconnaissance of all transects. Although the transects had several points of intersection, particularly in the coastal lowlands, which gave some sense of connectivity, the team concluded that expanding the range of choice is not merely an additive process but also one of envisioning combinations of site alternatives, for example, in networks or constellations of community spaces in Utatsu (Figure 8).

Again, participants reported favourably on the balance between descriptive, analytical and interpretive methods in the transect analysis. They stressed the challenges of maintaining that balance in post-disaster field work and indicated that each mode of site inquiry contributed separately and jointly to the aim of expanding the range of site alternatives worthy of further consideration.

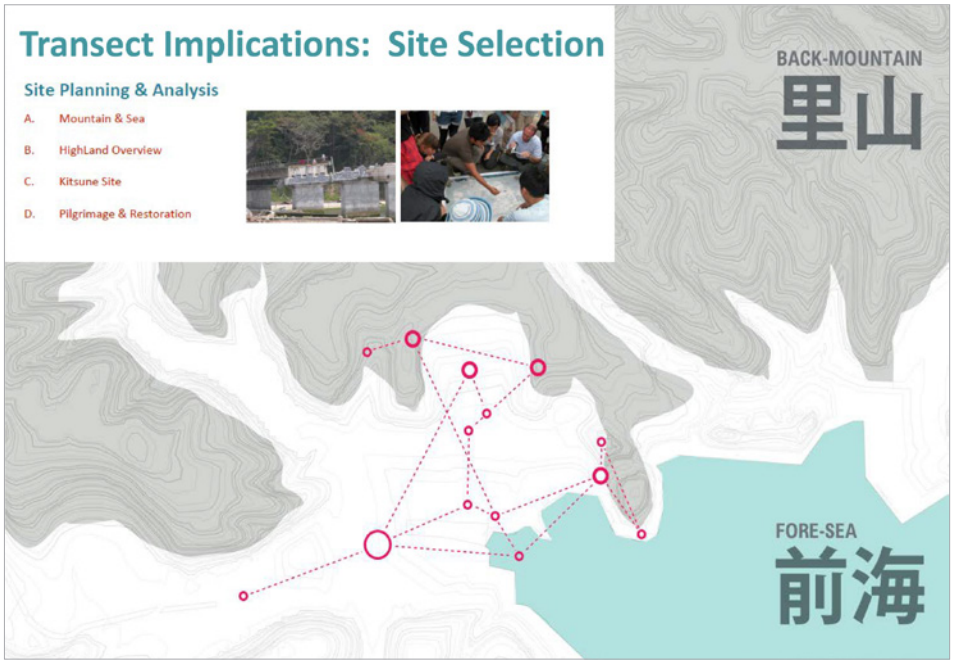


Figure 8: Constellation of community centres and spaces identified in Utatsu, Japan. (Image courtesy of Yoshiro Okamoto.)

Off-site synthesis

Site analysis and planning methods employed after the field work had mixed results. On the positive side, the field-based site analysis work appeared to retain its salience and clarity for participants and in the evaluation of project leaders. Few expressed concerns about information gaps or deficiencies for the purposes of this initial pilot study. The main challenges involved changes in team membership that included the departure of some field researchers and arrival of others who had not participated in the field work. These challenges could be mitigated to an extent by more robust field drawing and annotation methods. The final section of this paper identifies further extensions of rapid visual site analysis methods for post-disaster landscape planning and design.

Future extensions

Future research should enhance and test the replicability of methods employed at Utatsu. Enhancements could include refined field worksheets, stronger links with supporting scientific data and testing of alternative recording methods (for example, audio and/or video and tablet computing platforms). In substantive terms, it is important to determine how rapid visual assessment performs in different types and sizes of towns, for example, from the large municipal centre of Shizugawa to small fishing settlements such as the Hadenya area of Togura in Minamisanriku.[5] Further testing of transect methods for their robustness across different types of terrain is also necessary, for example, from rocky coastal headlands to the flat Sendai coastal plain. Future research must link visual site analysis with community-based methods of post-disaster landscape planning. Finally, in light of the hundreds of small coastal communities affected by disasters such as the Tohoku earthquake and tsunami, priority should be given to the adaptation of rapid visual site analysis methods for numerous small teams of local designers and community members.

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NOTES

1 All figures were prepared by MIT–Miyagi University Japan 3.11 workshop participants except as noted. The workshop took place in July 2011 (see Acknowledgements).

2 After screening to eliminate unrelated terms (for example, in the fields of chemistry, biology, physics), false hits ('web site analysis') and related terms that denote different types of environmental site analysis ('on-site analysis', 'multi-site analysis').

3 These limited results may reflect the move away from site analysis and related survey analysis and design methods in late twentieth-century practice (for example, Turner, 1991; though see response by Stiles, 1992). In the journal searches, new approaches were sometimes contrasted with 'conventional' or 'traditional' site analysis. Interestingly, one article included a critic's argument that site analysis was not research because it compiles existing knowledge and does not create new knowledge, which the critic deemed a matter of practice rather than research (Milburn and Brown, 2003).

4 Technically, the hillslope analysis follows an irregular alignment along the toe of slopes rather than a straight line and is not a 'transect' in a strict sense but rather a series of mini-transects cut where lower hillslopes meet the coastal plain.

5 Enhanced methods were tested in the settlement of Hadenya in August 2012 that included circuit and thematic areal analyses to complement transect and siting methods.

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Environmental Education through an Interdisciplinary Approach: The Effects of the Volcanic Eruption of the Puyehue-Cordón Caulle Volcanic Complex on the Landscape of Southern Chile

PAULA VILLAGRA AND EDUARDO JARAMILLO

After the 2011 eruption of the Puyehue-Cordón Caulle volcanic complex (PCC) in southern Chile, an exhibition was prepared to show to the general public the findings of academic expeditions in the area affected. This paper discusses the objectives and content of this expedition, as well as the interpretation tools used to prepare it. A volcanic system operates (generally unnoticed) at different times and scales, creating a landscape of great scenic beauty. However, it is also a system that changes dramatically and can become dangerous. The exhibition made these changes visible to the community by using photographs, videos and oral discussions to convey the effects of the eruption on the landscape. The objective was to educate people about the differences between temporal visual effects (which are not always harmful) and others that cannot be observed but can damage the environment and for which we must be prepared. The discussion provides insight into the extent to which interpretation tools and landscape narratives can contribute to a full understanding of the dynamics and changes of natural landscapes.

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Nowadays, a wide range of organisations deals with similar environmental challenges: to learn about and explore the natural world, and to re-interpret it into displays that can catch the attention of the public. For this purpose, acquired knowledge about nature needs to be transformed into environmental messages that can be conveyed to the general public in a useful way (Davis, 1996; Uzzell, 1989).

In the context of zoos, traditional cages are being transformed into habitats that replicate the environment of the animal species on display (for example, Valencia Biopark, Spain). Similarly, museums and botanical gardens are creating story-driven displays to heighten awareness of and concern about environmental issues (Davis, 1996; Falk and Dierking, 2002). Newer displays engage people with ecological processes that govern the natural environment (Monem, 2007; Villagra, 2011). In the same vein, universities have a responsibility to share research outcomes about the natural world with the public. In particular, they should share information about the direct effects of natural disturbances, using activities and messages that the non-academic community can easily understand and access.

The recent changes in the way the natural world is displayed are a response to global strategies developed by the Convention on Biological Diversity in June

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1992 at the United Nations Conference on Environment and Development, Rio de Janeiro, Brazil (Secretariat of the Convention on Biological Diversity, 2002). These strategies have influenced the objectives of organisations around the world that care about our ecological diversity. The aim is to use innovative environmental interpretation tools to enhance people's understanding of and relationship with the dynamics and elements of nature. Thus the concept of interpretation is as an 'educational activity which aims to reveal meanings and relationships through the use of original objects … rather than simply to communicate factual information' (Tilden, 1977, p 8). It can be more effective if people are engaged with the topic of exhibitions through their own personal characteristics and values. In addition, the message needs to be narrated through appropriate media (Chang, Bisgrave and Liao, 2008); indeed, improving people's interpretation of environmental phenomena and associated effects can be a highly effective way of diminishing environmental risk and improving their environmental behaviour. When they are aware of the dynamics and effects of natural disturbances in their surroundings, communities have a more accurate understanding of the risks and are better prepared to initiate the process of hazard adjustment (Lindell and Perry, 1993).

However, improving the environmental interpretation of the dynamics of nature – including the timeframe in which they occur and the scale of their effects – is not an easy task because landscape change is usually slow, visible only after a period longer than the human life cycle (Bell, 1999). In addition, the scale of change may be too small or too big for people to see. To counteract these difficulties, scholars have suggested that exhibitions can be shaped as a story of natural processes, by using representative parts of the environment that people can understand easily (Potteiger and Purinton, 1998; Spirn, 1998). Also potentially useful are heuristic devices such as visual conceptual maps or graphs (Corner, 1999; Soliva, 2007). These and similar techniques are used to teach people to 'read' the landscape from new perspectives.

In the process of creating new exhibitions, it is important to consider that people can misunderstand environmental messages when the 'medium' becomes the 'message' (Uzzell, 1989). For example, where technology is overused, it becomes overwhelming and also conveys the wrong meaning. In the case of the Eden Project in the United Kingdom (Eden Project, 2009), for example, visitors engage with the exhibit itself instead of focusing on the topic of the display. Other, less provoking exhibitions can go completely unnoticed (Davis, 1996), creating a different kind of problem for communication.

Based on the literature concerning the challenges to educate people on a natural process and its associated effects, we discuss the approach taken by a group of researchers of Universidad Austral de Chile to convey to the regional and local society a basic understanding of the eruption of the Puyehue-Cordón Caulle volcanic complex during June 2011. We used a multidisciplinary approach to examine the effect of the volcanic eruption on the visual landscape and on the water quality and aquatic fauna of nearby rivers. Based upon the existing literature discussed above, we offer an innovative approach for gaining a greater understanding and appreciation of natural landscapes of southern Chile.

The Puyehue-Cordón Caulle Volcanic Complex

The PCC is one of 500 active volcanoes of Chile (Sernageomin, 2011). It includes a strato volcano, a fissure zone and remnants of earlier Pleistocene volcanoes, all located in the Andean Southern Volcanic Zone at 40.5°S latitude (Singer, Jicha, Harper, et al, 2008). Its activity has been recorded from the Pleistocene to the present, with the latest three eruptions occurring in 1932, 1960 and 2011.

The area around the PCC corresponds to the lake region of Chile, characterised by the lakes Ranco and Puyehue and by rivers such as Iculpe, Muchi, Caunahue, Calcurrupe, Nilahue, Los Venados, Quiman, Coique, Riñinahue and Gol Gol. Foothills and valleys extend between 70 and 2,230 metres above sea level and a network of roads through them enables access to several small human settlements. The local economy is based on small-scale agriculture, fish aquaculture and tourism. This socio-ecological system was disrupted during the latest eruption of 4 June 2011. During this event, the temperature of several rivers rose, lakes were covered by pumice stone and entire human settlements were exposed to the effect of ashes. Indeed, the ash column reached 10 km high and affected the entire southern hemisphere. Ashes from the volcano reached Argentina, Uruguay, Brazil, South Africa, Australia and New Zealand, hindering daily human life, agriculture and air traffic activity across this region.

Following the day of the eruption, the media showed only images of destroyed landscapes, losing the opportunity to educate the community about the dynamics and process of the natural landscape in which they live. Yet the media can have a great influence on people's perception of landscapes (Jensen and McPherson, 2008). Furthermore, incomplete information can contribute to misunderstandings in the community, influencing the manner in which people interact with the environment and the decisions they make that affect their life quality and security. These considerations were among those that motivated a group of academics to study and communicate about the effect of the eruption on the landscape used for tourism due to its visual attributes and on the freshwater habitats useful for fly fishing (Figure 1).

Expeditions and exhibition

This section offers an overview of the main results of each study, without describing the study methods and outcomes in detail. This content reflects the level of information that was most useful for preparing the story about the effects of the eruption of the PCC on the landscape.

The touristic landscape

Although the PCC can create a risky environment, it has also been instrumental in shaping the territory by generating a landscape of high scenic beauty and touristic resources. However, local tourism is being described as not diverse enough to keep developing in the long term (Rivas, 1998). The objective of this study was to record landscape change in the touristic landscape, in order to explore how the visual changes due to volcanic activity could affect tourism. This aim was based on a growing interest in Chile and the region to develop Special Interest Tourism aimed at educating communities about the characteristics of their landscape (Agenda Local 21, Subdere and Programa Eco-región, 2008).

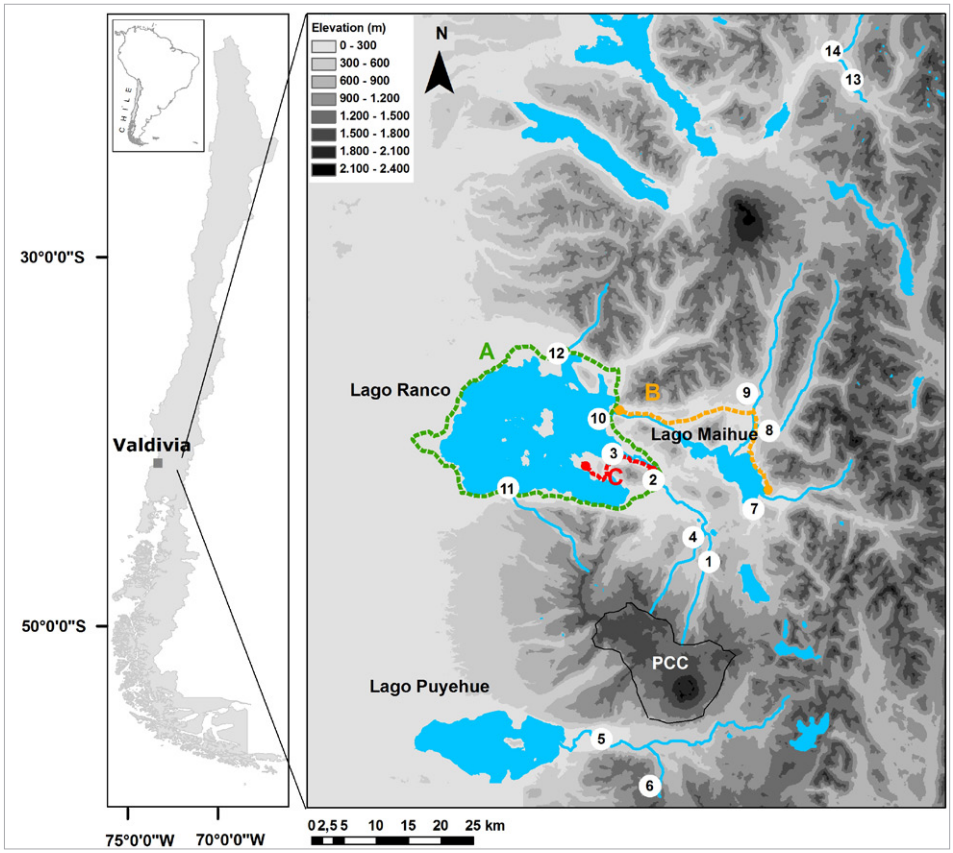


Figure 1: The Puyehue-Cordón Caulle volcanic complex in southern Chile. Circuit routes (A, B and C) indicate the areas covered to study visual changes in landscapes, while numbers refer to the river sites examined.

The study was focused around Lago Ranco where most of the tourist attractions are concentrated. The area is readily accessible and the lake setting is well suited to water sports such as rowing, boating and swimming. In addition, nearby rivers support top-quality fly fishing, which is highly prized. Visitors can enjoy nature while travelling by horse or on foot. All these attractions become even more desirable when they can be experienced while looking at a stunning landscape that features water bodies, a diverse topography with depth of view, ever-green trees, signal natural features and a variety of bright colours. According to landscape perception studies, people are drawn to all of these attributes in a landscape (Da Pos and Green-Armytage, 2007; Kaplan, Kaplan and Ryan, 1998). Such attributes also contribute to an area's restoration and recreation (Hartig, 2007).

During June, August and October 2011 and January 2012, 26 sites in the area were photographed by following the rephotographic technique to record visual landscape change over time (Figure 2). The sites were selected among the three most visited tourist routes of the area. The first route (A = 120 km) included a circuit around Lago Ranco; the second route (B = 50 km) ran from Llifén to Lago Maihue; and the third route (C = 35 km) started in the village of Riñinahue and extended to Bahía Illahuapi (35 km) (see Figure 1 above). This approach was taken to obtain a representative and comprehensive record of the landscapes that support tourism in the area and to avoid biases introduced by the researcher while selecting study sites (see Daniel and Boster, 1976).

Comparisons of the same landscapes photographed in the days and months following the eruption suggest that basic visual features were indeed affected by the eruption. In areas where volcanic material such as pumice stone and ashes was found, changes were evident in: i) colour, varying from bright to dull; ii) line,

Figure 2: Repeated photographs were taken from each site to the same vantage point after the eruption. Photographs were taken at eye level, in a horizontal position and with a 55 mm lens. The coordinates of each site visited were recorded with a Garmin GPS.

changing from blurred to sharp; and iii) arrangement of spatial attributes that define focused and dominant landscapes, in contrast to the usual panoramic landscape of the area (Figure 3). Changes were observed in water bodies such as lakes and rivers, as well as in landscape borders, such as beaches and promenades. As the images recorded with the rephotographic technique show, visual change is only temporary and the landscape recovers its visual attributes over time.

In summary, the findings from the expeditions to the area suggest several landscapes that are useful to convey the effects of the volcanic complex over time. These landscapes change visually but only temporarily, such that they do not damage the visual attributes of the landscape that make it so attractive to people. In the long term, therefore, such changes do not affect tourism that is focused on the scenic beauty of the area. The observed landscapes are included in the tourist routes of the area; however, they are not considered in tourism planning as a source of scientific and educational tourism.

The freshwater habitats

Nearly three years before the volcanic eruption of PCC, researchers from the Institute of Environmental and Evolutionary Sciences had studied several rivers located around this volcanic area; that study included analyses of water quality,

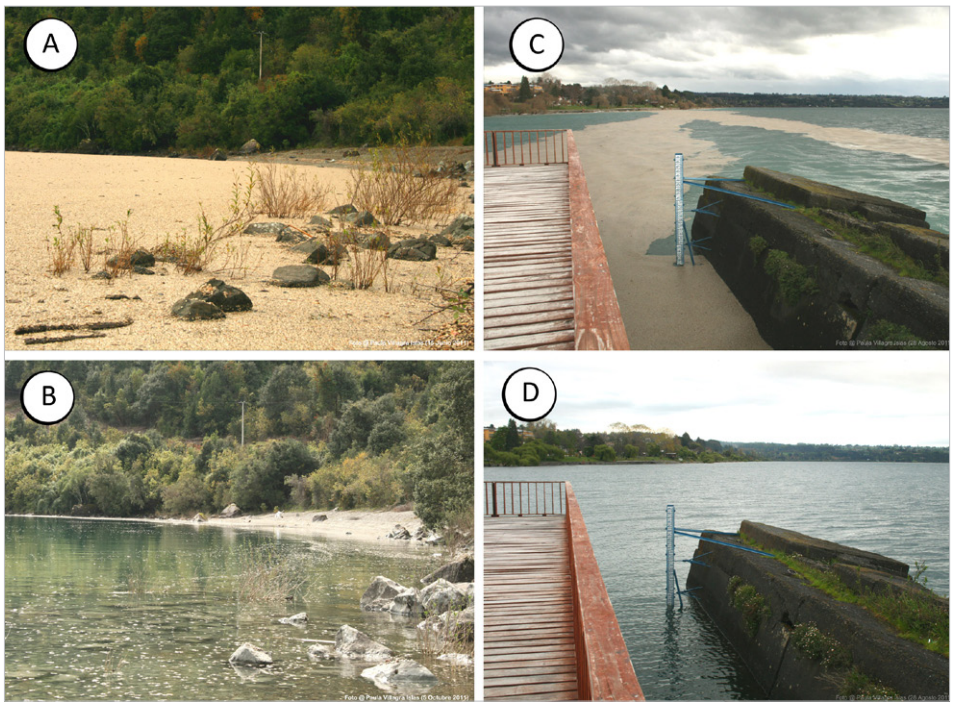


Figure 3: Examples of changes in basic visual landscape features after the eruption, observed in Ensenada Beach (lower reach of Río Nilahue) (A and B) and Lago Ranco (C and D). Photographs A and C were taken days after the eruption in June 2011 and photos B and D four months later in October 2011. Photograph A is characterised by a sharp, horizontal line and high-colour contrast between the water body and the forest, while in photograph B the contrast of colours and the sharpness of lines are less marked. Similarly, photograph C depicts a landscape dominated by the body of pumice stone carried by the lake stream, in contrast to photo D which illustrates a more panoramic scene.

species richness and abundance of the freshwater macrobiota. Days after the eruption, therefore, they took advantage of that earlier work and moved to the field to repeat similar samplings at 14 river sites located to both the north and the south of the PCC (see Figure 1 above). Since then, samplings have been repeated during June 2011 and January, March, June and August 2012. The aim has been to analyse the effects of the eruption on water temperature and conductivity and on concentrations of total suspended particulate matter, silica and fluoride, as well as on the diversity and extent of aquatic insects and fish in the area. Because the eruption occurred during winter, flooding as well as fallout of volcanic material (pumice stone and ashes) contributed to the contents of particulate suspended matter on water during the first months following the eruption.

The results of the samplings show that rivers closer to the basement of the volcano had higher loads of pumice stone (Figure 4). In Nilahue River, for instance, samplings of the biota revealed a very low level of aquatic insects and a total absence of fish for several months after the eruption. In contrast, rivers somewhat further away from the basement of the volcano had lower loads of pumice stone (Figure 4). In addition, the diversity and extent of the biota were quite similar to those of rivers further away from the PCC or to the measurements gathered in the same rivers during the pre-eruption period (unpublished results).

In general, the water of rivers closer to the basement of the volcano had higher temperatures and conductivities (that is, more salts). The concentrations of total suspended particulate matter, silica and fluoride were also higher (Table 1). This difference most probably has arisen because the rivers Nilahue and Gol Gol received a higher load of material from the eruption, either through the air (ashes) or from the material flushed from the volcano.

During the first months after the eruption of PCC, water quality was the main concern of local communities and of officials from the regional and local governments. Thus much effort was devoted to explaining that the higher content

Figure 4: Load of pumice stones at the rivers Nilahue (A) and Gol Gol (B) two days after the eruption. The valleys of these rivers come down to the lakes Ranco and Puyehue from areas very close to PCC. In contrast, rivers Los Venados (C) and Anticura (D), which show lower loads of pumice stones, have valleys that are somewhat further away from the volcano.

River	Temperature (˚C)	Conductivity (µS/cm)	TSPM (g/L)	Silica (mg/L)	Fluoride (mg/L)
Nilahue	12.6 (2.0)	293.5 (102.3)	1.26 (2.51)	17.6 (6.6)	0.33 (0.15)
Gol Gol	8.7 (3.1)	106.0 (17.4)	1.71 (1.50)	9.7 (2.5)	0.26 (0.05)
Los Venados	8.5 (2.7)	95.6 (28.7)	0.03 (0.02)	12.1 (2.0)	0.09 (0.03)
Anticura	6.6 (1.5)	60.7 (19.5)	0.03 (0.04)	7.1 (0.2)	0.04 (0.00)

Table 1: Water quality of rivers located closer (Nilahue and Gol Gol) and further away (Los Venados and Anticura) from the basement of the volcano. The values are means (n = 5; except for fluoride where n = 3) with standard deviations in brackets. The samplings were carried out in June 2011 and January, March, June and August 2012.

of pumice stones and ashes in rivers such as Río Nilahue was actually not proof of water pollution. In contrast, transparent waters without loads of that volcanic material could actually be quite polluted due to high concentrations of heavy metals, which are not visible to the naked eye. Coming into the spring, the ash plume extended west and northward arriving in several towns as far away as Temuco and Valdivia (about 200 km away from the volcano); thus the chemical composition of ashes triggered public awareness.

The story

From the results of the above studies, it is clear that the pumice stone and ashes produce landscape changes, which may be positive or otherwise. On one hand, the accumulation of pumice stone and ashes generate changes that are visible in the main tourist routes. The volcanic action thus changes attractive aspects of the landscape in ways that may be less appreciated, but the finding does not imply that the environment is polluted. On the other hand, areas that are not visually affected by the eruption, such as transparent waters that do not accumulate pumice stones and ashes, can be highly polluted due to effects of other components not visible to the naked eye.

We found it interesting to present these results through a public exhibition. Here we could educate people about the differences between temporal visual effects (which are not always harmful) and other effects that cannot be observed but can damage the environment and for which we must be prepared. Our concern was to inform the community about the effects of a volcanic eruption on the natural landscape.

The most characteristic elements of the eruption – the pumice stones and ashes – were selected to create a story on the outcomes of both expeditions, which could be used to educate the community. In order to reveal evidence of a natural process triggered by volcanic activity, the story told of the effects of the eruption at different landscape scales and times, and of the extent of the effects on different landscape elements. Through the expeditions, it was possible to observe changes associated with environmental and visual landscape variables, such as the colour of terrestrial forms and water. Due to the different times and scales of the changes, people may well not notice them or, if the changes occur suddenly and appear to threaten their familiar environment, may view them negatively.

To help the community to interpret these issues, three different communication media were chosen: visual, auditory and verbal. The process of creating the story involved: i) selecting photos of visual, educational and scientific value that show landscape change in different scales and times (for example, see Figure 2 above); ii) creating audiovisual material; and iii) writing a narration of the effects of the volcanic complex in the territory (Figure 5).

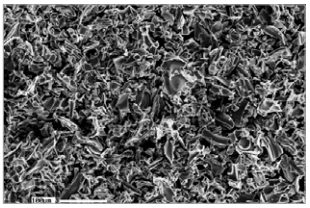
Visual aspect of ash at different scales and on different landscape features	Visual aspect of pumice stone on the lake shore at different times	Selected captions of pictures presented at the exhibition to explain how non-evident fresh habitat features are analysed
		
Ash plume over the PCCVC, June 2011	*10 June 2011*	*Samplings to analyse changes in water quality due to effects of volcanic material run off*
		
Ash deposited along Río Nilahue, 5 January 2012	*5 October 2011*	*Samplings of aquatic insects to evaluate the effects of pumice stone and ashes on these benthic organisms, the food of fishes*
		
Ash deposited on leaves of ferns, 5 January 2012	*5 January 2012*	*Use of plastic graduated cones to evaluate loads of sedimentable material*
		
Microscopic view of ashes deposited on the bottom of Río Nilahue	*12 January 2012*	*Use of electric shock fishing machine to analyse fish communities*

Figure 5: Examples of the photographic material selected to explain changes in different scales and times due to the pumice stones and fallout of ashes in the study area.

Selection of photographs. On first approaching the exhibition, the community met with only visual content from which they could make their own interpretation. The selected photographs illustrated microscopic images of the ashes as well as panoramic views of its effects on the landscape. In addition, images taken from the same place but at different times were exhibited to emphasise the idea of change in the landscape and to add the concept of different timeframes to the display.

Audiovisual material. During the second stage of the exhibition, the objective was to add background material to complement the personal interpretation of the photographs. This new information would describe the relationship between the eruption of a volcano and the shaping of landscapes. After the community

had toured the exhibition, a video was played to emphasise the role of volcanoes in Chile and its evolution. Images, sound and text were used to explain how a volcanic eruption is generated, linking to evidence of the time and scale of such eruptions in the country. The video also familiarised the community with the recent fieldwork of the researchers.

Narration. Once the community had seen the photographs and video, and understood the effects of the eruption at different scales and times, researchers presented scientific information from the recent expeditions. After explaining the results of their own study, each researcher had a conversation with the audience.

The story of the PCC eruption of June 2011, shaped by these three tools of interpretation, was shared with a diverse community in a small village (Riñinahue) and with communities in the cities of Lago Ranco and Valdivia, all of which were affected by the eruption of the PCC. In addition, this story was exhibited in Santiago, the capital of Chile, which was not impacted by the eruption (Figure 6). In general, visitors found the exhibition a good source of information – feedback that highlights the relevance of this type of approach to environmental education. Inhabitants of the affected areas indicated that 'it's mostly a tangible proof of us, as locals, have seen and experienced'. Indeed, they describe the exhibition as a reminder of how remarkable the social environment was after the eruption: 'it is interesting because (it was a time) I could share with the volcano, nature, life and family'. In this regard, local inhabitants suggest that the exhibition is a way 'to inform and educate the community about the effect of natural phenomena present in our country' (extracts from the Visitor Books, city of Lago Ranco, 2012).

Landscape narratives, environmental education and the benefits of an interdisciplinary approach: final remarks

The manner in which the story and exhibition were produced relates to the proposal from Potteiger and Purinton (1998) on how to create landscape narratives. Such narratives comprise a set of events about nature, in which the aim is to inform people of natural processes and changes, and which could not be

Figure 6: Exhibitions and discussion with the communities in Riñinahue (A), Lago Ranco (B), Valdivia (C) and Santiago (D).

conveyed any other way. The story told to the Chilean public was framed by using representative parts of the environment that people can easily understand – the pumice stones and ashes. These iconic features can easily connect people with the volcanic environment.

Moreover, a narrative (as explained by Potteiger and Purinton, 1998) has a story (content) and a telling (expression). In this case, these elements were the stories about the effects of the volcanic activity in the touristic landscape and aquatic habitat, and the different tools of interpretation. These tools need to be selected according to the intended message with the aim of improving people's interpretation of phenomena of the environment and their associated effects (Chang, et al, 2008). For this reason, photographs and videos were thought to be useful tools to compare and reproduce landscape changes.

Another aspect of the narrative of this story was that it was developed by both landscape architects and scientists. Through this interdisciplinary approach, it was possible to show the landscape from different points of view, minimising the chance of introducing bias into interpretation. Such bias can create misunderstandings and, in turn, mislead the education system about the environment (Uzzell, 1989). The value of using an interdisciplinary approach is that it creates a story that gives more detailed and accurate information, helping the public to develop a better-informed understanding of landscapes that is less influenced by any one particular discipline.

The way in which the territory was decoded and recoded to create this landscape narrative has allowed the presentation of complex issues that are described primarily in academic journals and are rarely accessible to the general public. For this purpose, a highly useful approach has proved to be finding elements or parts of the landscape that have a dual purpose; these aspects must be central to research outcomes as well as easily recognised by the community. It is important to explore how to include other aspects of the landscape that change after a large natural disturbance, so that researchers can improve the public interpretation of it. For example, in the volcanic context it would be important to include the effects on flora and fauna, as well as on the cultural milieu.

The landscape is not just about what is visible but also about that which is hidden; the landscape is the result of different interacting stories, at different scales and times. The observation that 'what becomes visible and familiar, over time often becomes invisible' (Potteiger and Purinton, 1998, p 151) is relevant in environments that suddenly become dangerous, as they do in an active volcanic landscape. Landscape narratives, as described in this paper, can become a useful approach to improve environmental education about natural events, thereby increasing awareness about landscape change and its effects.

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When Disasters are a Part of Home: The Hakka Community's Rootedness and Resilience to Periodic Landslides in Shenmu Village

SHENGLIN ELIJAH CHANG AND POCHUN HUANG

> We never agreed [to the evacuation plan], we are definitely living here [Shenmu village]. We will only consider relocating to a safe and suitable location in order to rebuild our homes here. Some villagers had moved out, but they have come back now (Wang, 2009, cited from Kao, 2011).

According to Saylor's (1993, p 2) definition, a disaster 'has an identifiable beginning and end; adversely affects a relatively large group of people; is "public" and shared by members of more than one family'; and 'is traumatic enough to induce distress in almost anyone'. While we agree with Saylor's definition in general, in this paper, we address certain cases wherein disasters recur and it is difficult to define their origins and ends. In such instances, they are repeated events possessing their own life cycles. Under particular circumstances, the aftermath of such disasters takes from a few months to years to correct. In worst-case scenarios, these periodic disasters never cease but become integrated into the residents' way of life, shaping and reshaping their dynamic relationships within the physical landscape. The people and landscapes continually impacted by these events might never be able to return to their pre-disaster conditions. Instead, the landscape and its relationship to the local people are often repeatedly changed engendering new forms of landscape identity. Paton and Johnston (2006) argue that continual disasters could function as catalysts for socio-environmental change. People, communities and societal institutions might 'generate a stronger sense of community amongst those affected than had prevailed prior to the disaster' (Paton and Johnston, 2006, p 8).

More importantly, for communities, surviving continual disasters usually requires members to obtain local knowledge to reduce the impact of such disasters and carry on with their livelihoods. For half a century, scholars (Anderson, 1968; Dynes, 1970; Moore, 1964; Perry and Lindell, 1978; Wenger and Weller, 1973) have identified the residuals of survival knowledge as 'disaster subcultures'. Moore (1964, p 195) first proposed that a disaster subculture included 'adjustments, actual and potential, social, psychological, and physical, which are used by residents of such areas to cope with disasters which have struck or which tradition indicates may strike in the future'. Researchers (Dekens and Hewitt, 2008; UNISDR, 2008; Wisner, Blaikie, Cannon and Davis, 2004) in the field of disaster risk reduction (DRR) particularly argue that values, belief systems and organisations, as well as behavioural patterns, all integrate with the practices of disaster subculture. Different cultural communities respond to

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RESEARCH

similar disasters differently, even though they might co-exist in the same region. The topic of how cultural practices have integrated with disaster adaptations and subsequent changes in lifestyle has been evolving in disaster studies. Lately, this focus has been mainly transformed into the critical research fields of community resiliency and disaster risk reduction studies.

More importantly, in this paper, we propose that the understanding of evolving processes of cultural practices is as crucial as the identifications of the cultural practices themselves. Culturally based problem-solving and risk management have to be cultivated and established within sequences of trial-and-error steps. Including 'natural' and 'technological' disasters, Dynes (1994) argues that mainstream disaster responses and emergency planning models in the United States have been based on a military response to an enemy attacking. It is a false assumption. A culturally based 'problem-solving' model is the orientation to move on. Within this line of scholarship, the Indian Ocean tsunami on 26 December 2004 plays a significant role. According to the Gaillard research team (Gaillard, et al, 2008), while 170,000 Acehnese and Minangkabau people died on the northern tip of Sumatra, only 44 Simeulue people were victimised on Simeulue Island close by and located near the earthquake epicentre. The research team argues the difference in the death toll does not lie in the nature of the hazard but, rather, in the cultural practices and ethnic contexts that produce different human behaviours. One year after the 2004 tsunami, the United Nations held a disaster reduction conference in Kobe and initiated the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters. The Hyogo Framework supports local knowledge as well as disaster subcultural practices. This further inspired the trend of culturally based disaster studies worldwide, including studies related to indigenous knowledge (Shaw, Uy and Baumwoll, 2008) or to gender and age (Giuliani, et al, 2009), those initiated by the United Nations (United Nations, 2009) and so on.

The study on Shenmu village presented in this paper comes under the theoretical backdrop mentioned above. It is an example of a village disrupted by continual mudslides and landslides for 16 years and how its disaster subculture and community-based resilient mechanisms have sustained residents' livelihoods in the village. In Nantou County, Taiwan, Shenmu village (it literally means the holy giant Camphor tree village) has been associated with landslides since 1996 (Figure 1).

Mudslides and landslides refer to massive debris flow events caused by the fragile geology of upper streams and by the extended periods of high-intensity rain normally associated with typhoon seasons in Taiwan. The damage caused by landslides and mudslides can lead to the loss of properties, buildings, public infrastructure (that is, bridges and roads) and even residents' lives. Interestingly, although Shenmu villagers have regularly experienced massive mudslides and landslides, the majority have decided to remain in their village homes. Under this backdrop, around 1994, one of us (Pochun Huang) first visited the village with his family before the disasters. Our fieldwork began officially in 1998, and the project has been ongoing since then (Huang, 2001). With a longitudinal scope of observations and investigations, we assert that Shenmu villagers' homes have been transformed by, and are intertwined with, the disasters of the past 16 years.

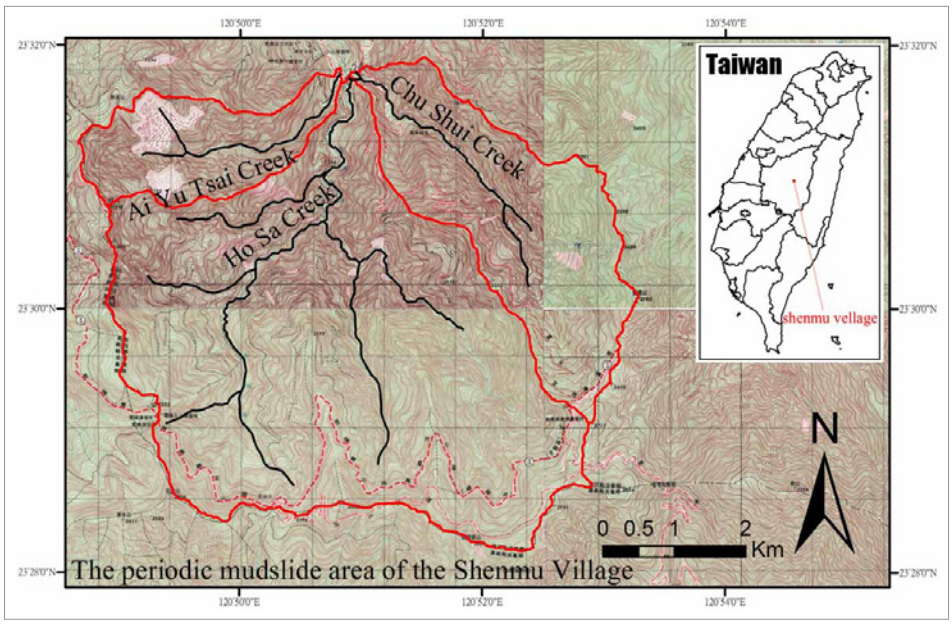

Figure 1: Location of the Shenmu village in Nantou County, Taiwan (cited from Chen, Chen and Wu, forthcoming).

Instead of undertaking post-disaster restorations, the villagers live with the disasters. Resilience to disaster is a core mechanism for rebuilding their village and transforming their home identity.

In brief, during this 16-year period, the central and local governments of Taiwan have been repeatedly repairing the damaged infrastructure and trying to convince residents to relocate to safer areas.[1] However, local residents, mostly farmers aged over 50 years, need the land as a source of income and cannot afford to buy or rent in another area. They argue they have had no choice but to stay in their landslide homes because the government's relocation plans cannot provide a reasonable means of production for their livelihood.

In this paper, we analyse the evolving relationship that characterises the residents' processes of internalising the continual landslide events within their home identities. Why have most families, from 1996 to 2011, decided to remain in their homes while some have departed in search of new homes? How is their emigration or rootedness related to the cultural practices of the Hakka (the people who live in this area)? While handling the intensifying landslide disasters for more than a decade, how has the Shenmu village community cultivated its capacity for resilience?

Applying an ethnographical approach, we have made frequent visits to Shenmu village for 14 years. We have revisited the village after most major mudslides and landslides (Figure 2), staying from a few days to several months. During our visits, we conducted in-depth interviews and participatory observations. We also engaged in different action research activities, such as teaching at the Shenmu Elementary School for one semester in 1999. By doing so, we have extended our understanding of the livelihoods of local families. In this paper, we introduce the local background of Shenmu village and explain the history of its landslides and mudslides. We then analyse the dynamics of dual residency between homes and shelters during the disaster period. From the perspective of community resilience, we have investigated local survival strategies in the face of periodic mudslides and landslides. Our research contributes toward a better understanding of how people handle periodic disasters through community-based and culturally related internal mechanisms in this era of climate change.

Figure 2: The mudslide river has formed an everyday landscape for Shenmu villagers since 1996.

Remote Shenmu village and its Hakka residents

Located in the Yushan Range, the highest mountain range in Taiwan, with an altitude of 3,952 metres, Shenmu village is a remote forest community between 1,200 metres and 2,000 metres above sea level. The name, Shenmu, refers to the 1,500-year-old giant camphor tree (*Cinnamomum camphora*) growing nearby (Figure 3). The Hakka ancestors of Shenmu village migrated to this area from the north-east Hakka communities of Taiwan. They believed the giant camphor tree was spiritual and mysterious; hence, the tree was considered to be a 'Shenmu', a holy tree. The Hakka (literally means 'the guest') are a sub-ethnic group of the Han Chinese who were the last group to immigrate to Taiwan in the eighteenth century. They often have had to struggle to survive on less desirable lands. They have been known for their diligent attitudes, willingness to pioneer new frontiers and take risks to seek new opportunities, while still preserving their cultural heritage and a sense of their roots (Chen, 1999a, 1999b).

The Shenmu Hakka migrants first arrived during the Japanese colonial period at the beginning of the twentieth century. Before World War Two, Shenmu Hakka villagers were workers in the camphor forest (Huang, 2000; Wen and Yeh, 2003). Shenmu villagers also had farms of castor beans (in the 1950s) and lemongrass (in the 1960s). After the 1970s, they gradually switched to agricultural production, especially summer vegetables and fruits.[2] However, they did not own their land. The land first belonged to the Japanese forest administration before World War Two. After the war, ownership of the land was given to the National Taiwan University. According to the 2012 census (Sinyi Township Household Registration, 2012), 345 households (924 people) lived in 12 sub-areas (called 'Lin' in Chinese) within Shenmu village.

'The major problem we confront at Shenmu village is losing young people because of lack of land to farm.' Mr Huang, a fourth generation Shenmu villager,

*Figure 3: 'Shenmu' refers to this 1,500-year-old giant camphor tree (*Cinnamomum camphora*).*

stated this on our first meeting at his Shenmu home in 2012. For Mr Huang, Shenmu village is similar to any other remote rural village in Taiwan. He believes the relocating of younger generations to urban areas is the key factor in his village's rapid decline. Although he might have been expected to narrate dramatic stories of the landslides, he never mentioned them until asked. Other residents we spoke with also seldom mentioned the topic of landslides during our conversations. To them, their homes seemed to be just as normal as anyone else's in Taiwan.

Landslides and home stays

Most Taiwanese know Shenmu village as the home of landslides. The first major one occurred on the last day of July in 1996 (Huang, 2001). At the time, the weakening typhoon Herb brought an unexpected amount of high rainfall to the central mountains of Taiwan. This 24-hour downpour, measuring 2,000 millimetres, was the worst disaster in Taiwan since the 7 August 1959 flood. As a result of the typhoon Herb rainfall, 51 victims died, 22 were missing and 463 were hurt. More than 500 properties were destroyed, while nearly 900 were made uninhabitable. More than 2,000 hectares of farmland were damaged by seawater. The 2009 Morakot typhoon hit damaged even more.[3] According to the report of the Control Yuan (2009), the total cost of the Morakot disaster was more than half a billion US dollars. Among the damaged areas, Shenmu village was one of the worst hit, and the Taiwanese people learnt how tragic the consequences of mudslides and landslides could be from this single event.

Officials and villagers differ in their interpretations of the cause of the mudslides and landslides that have created continual disruption. The official disaster reports state that betel nut and summer vegetable farming led to topsoil

erosion problems, thereby fomenting mudslides and landslides. However, the local villagers believe the massive mudslides and continual landslides near Shenmu village are the result of construction dumps from the Central Cross-Island Highway project. Before completion of the road in 1991, Shenmu village was one of the tourist destinations in the Yushan Range. In spring, visitors would come to see the cherry blossoms. 'We had many food stands and huge tour buses parked on terraces at that time', Ms Hsu, an elementary school teacher, told us, while recalling her experiences before typhoon Herb in 1996. Now, everything has changed (Figure 4).

Compared with large-scale earthquakes and tsunamis (Table 1), such as the 2004 Indian Ocean earthquake and tsunami (Sumatra–Andaman earthquake), the 2008 Wenchuan earthquake in China, the 2011 Christchurch earthquake in New Zealand and the 2011 Tohoku earthquake and tsunami in Japan, the Shenmu village landslides could be identified as a local incident affecting only those within central Taiwan. However, the importance of the Shenmu village landslides comes from the resulting periodic disruptions. An account of the disasters unfolds different dynamics of human stress and environmental interference (Norris, et al, 2008). Table 1 shows the major landslides that occurred in Shenmu village between 1994 and 2012. When typhoons occur, the resulting landslides destroy bridges, bury roads, tear down homes and wash away farms. Even on less noteworthy rainy days, minor landslides are frequent. When the rolling stones move together and make a frightening noise, local residents prepare to run away from their homes to a place that can shelter them temporarily. However, as Mr Wang stated at the beginning of this paper, they never plan to evacuate to places outside Shenmu village, especially the residents living in the most vulnerable areas from 8 Lin to 11 Lin. Relocation is acceptable only if the new place is within Shenmu village.

Figure 4: Mega-scale mudslides and landslides have dramatically changed the local landscape of Shenmu village.

Year	International disaster(s) (selected)	Taiwan disaster(s)	Shenmu village disasters
1994		Typhoon Doug	Mudslides and landslides
1995	Great Hanshin earthquake, Japan		
1996		Typhoon Herb	Mudslides and landslides
1997		Heavy rain	Mudslides and landslides
1998	1998 Yangtze River flood, China Hurricane Mitch, Honduras, Guatemala and Nicaragua	Heavy rain	Mudslides and landslides
1999		921 earthquake	Mudslides and landslides
2000		Heavy rain	Mudslides and landslides
2001	Gujarat earthquake, India	Typhoon Nari and Typhoon Toraji	Mudslides and landslides
2002	2002 eruption of Nyiragongo volcano, Congo	Heavy rain	Mudslides and landslides
2003	Bam earthquake, Iran	Heavy rain	Mudslides and landslides
2004	2004 India Ocean earthquake and tsunami, Indonesia, Sri Lanka, Thailand, India, Somalia, Burma, Maldives, Malaysia and elsewhere	Typhoon Mindulle	Mudslides and landslides
2005	Maharashtra floods of 2005, India Hurricane Katrina, United States of America 2005 Kashmir earthquake, Kashmir	Heavy rain	Mudslides and landslides
2006	Java earthquake at Yogyakarta, Indonesia	Typhoon Bilis	Mudslides and landslides
2007		Typhoon Krosa	Mudslides and landslides
2008	Cyclone Nargis, Burma Wenchuan earthquake, China	Typhoon Sinlaku	Mudslides and landslides
2009		Typhoon Morakot	Mudslides and landslides
2010	2010 Haiti earthquake	Heavy rain	Mudslides and landslides
2011	Tohoku earthquake, Japan Christchurch earthquake, New Zealand	Heavy rain	Mudslides and landslides
2012		Heavy rain	Large-scale mudslides and landslides

Table 1: Timeline of selected international disasters, disasters in Taiwan and landslides and mudslides in the Shenmu village, 1994–2012 (data compiled by the authors).

According to geological researchers (Chen, 2011; Jan, 2004), channel conditions such as sediment yield and the width of river sections are important for analysing landslide-impacted rivers. Chen and colleagues (Chen, Chen and Wu, forthcoming) have provided a longitudinal analysis of how chronic landslides have been widening the riverbanks and changing sections of rivers in Shenmu village (Figure 5). They point out that typhoon Krosa in 2007 was the turning point. Before 2007, four major typhoons visited the area, but the width of the rivers had not changed much. The image of 2007 after Krosa shows clearly the width of rivers had dramatically changed. As time went on, the riverbanks widened more. By the time that typhoon Morakot hit the Shenmu village area in 2009, the profiles of local rivers had been dramatically and substantially widened. The rivers have forever been changed and moulded by landslides and mudslides. Figure 6 is a satellite photo taken after typhoon Morakot.

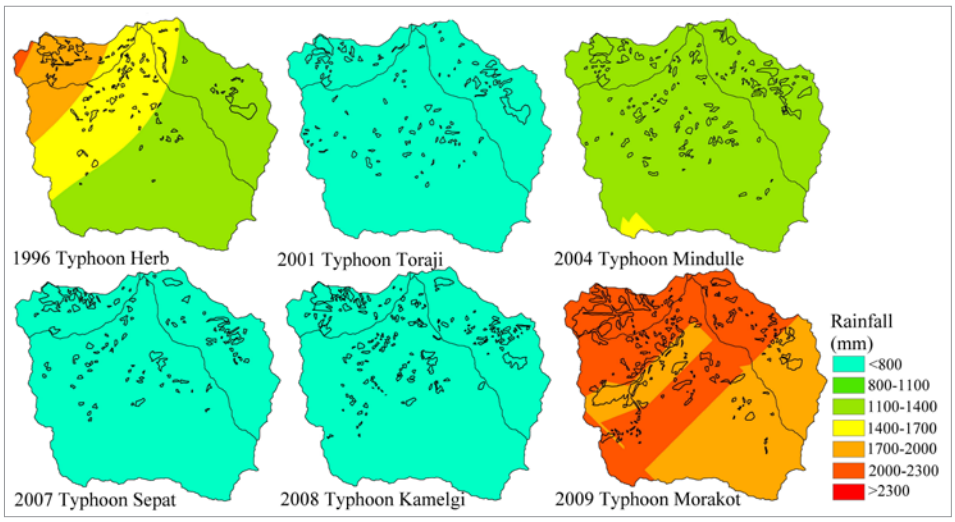

Figure 5: Chronic river profile analysis of the Shenmu village area from 1996 to 2009 (modified and cited from Chen, Chen and Wu, forthcoming).

Relocation not evacuation: Dual home identities with emergency sheltering

One of the most challenging transformations for a disaster victim is to bid farewell to their home that has been destroyed or made uninhabitable by a disaster (Dugan, 2007). Marcus, as well as other cultural landscape researchers, has recognised that home is a meaningful structure that intertwines with self-identity and cultural values (Altman and Low, 1992; Appleyard, 1978; Marcus, 1974, 1979, 1986, 1992, 1995). Psychologists and psychiatrists have showed that leaving behind a destroyed home and moving forward on an unknown life journey significantly traumatises the psychological health of residents of various age groups (Freedy, Shaw and Masters, 1992; Silverman and La Greca, 2002).

Figure 6: Chronic river profile analysis of the Shenmu village area post-typhoon Morakot in 2009 (Formosat-2 image © 2012 National Space Organization, Taiwan (NSPO) Formosat-2 image processing: Global Earth Observation and Data Analysis Center, National Cheng Kung University).

Indeed, for Shenmu villagers of the Hakka community, evacuation to a new place suggests a temporary or permanent loss of culture and rootedness that can create an identity crisis for an individual. More importantly, villagers have been economically troubled by the fact that, by uprooting from their family farms, they would lose their means of survival (Figure 7). The relocation plans proposed by government officials provide temporary or permanent housing solutions. Villagers, however, argue that the fundamental challenge for them is how to make a living when they cannot farm. Mr Huang spoke for the rest of the villagers, 'Most villagers are senior farmers over the age of 50. How can we feed ourselves without our farmlands? What new job skills could we learn that will allow us to switch to new careers? Who will hire us?'. Permanent relocation outside Shenmu village is not acceptable to most villagers living in the government-identified danger zone (between 8 Lin and 11 Lin). Although their lives are often disturbed by broken bridges, destroyed roads and damaged farms and houses, the majority of the residents show no interest in relocating. Mr Huang told us, 'Only a few neighbours whose farms were destroyed by the mudslides moved out'. From typhoon Herb to typhoon Morakot (1996–2009), less than 5 percent of the villagers inhabiting the danger zone relocated. After typhoon Morakot, residents negotiated with government officials and bargained for their farmlands. The most recent version of the relocation plan was finally modified to include a three-year farmland contract. However, residents still worry about their means of survival after the contracts expire.

Shenmu villagers have been practising dual residency between their homes and shelters during mudslide seasons. Even after the severe typhoon Morakot, most refused to relocate from their Shenmu village homes to new ones in the city of Nantou. In addition to the prospect of losing farmlands and a means of survival, their true fear is the cancellation of their household registrations within Shenmu village. Mr Huang told us, 'If we relocate to the new permanent houses,

Figure 7: Hakka families disagree with the government's evacuation plan; they do not want to be uprooted from their homes and farms.

our household registrations will be cancelled. None of us will be allowed to report disaster damage and request government aid. However, I belong to one of the pioneer Hakka families who relocated here about hundred years ago. Why should I abandon my home in Shenmu village?'[4] Residents speculate that relocation to new permanent houses is a government conspiracy. They believe Shenmu village will be abandoned after the comprehensive evacuation plan.[5] Huang's wife said to us, 'How can we come back to farm, if our government doesn't repair roads and bridges?' Villagers have agonised about the long commute between the new government-provided houses and their Shenmu village farms and family homes.

Some senior villagers have pleaded with government officials to grant residents more time to live in these two homes. They believe that younger generations will identify the new houses as their homes, while the older generation will remain attached to the homes in Shenmu village. They trust that time will resolve the dilemma of dual home residencies. After a few decades, as they move on, home identity would transfer to the new houses. Shenmu village will gradually transform into a symbolic home. This symbolic relationship would be similar to their Shenmu village and Hakka hometown in northern Taiwan. Villagers only return to their Hakka hometown in the north every spring for the April tomb-sweeping festival. They wonder with deep frustration, 'Why does the government want to rush us so much?'

Resilience: Shenmu local wisdom with internalised know-how processes

For all these years, villagers have been engaged in ongoing debates over whether to rebuild Shenmu village or evacuate to the new permanent houses. In Shenmu villagers' minds, the periodic landslides do not prevent them from living in the village. To stay in their Shenmu village homes, they have collectively developed 'do-it-ourselves' rescue procedures beyond institutional services and resources. These procedures echo contemporary theories of community resilience, which see grassroots efforts as enabling communities to recover from disasters (Coles and Buckle, 2004; Ganor and Ben-Lavy, 2003; Manyena, 2006; Paton and Johnston, 2001, 2006; Paton, Millar and Johnston, 2001). In current disaster recovery theories, scholars emphasise that community resilience contributes to collective actions to plan for and ensure disaster readiness. Among the community resilience body of knowledge, Norris's research team (Norris, et al, 2008) notes two essential ways in which it can make this contribution: (1) restoration of mental and physical health and (2) management and organisation of survival capacity during the disruption period. The Shenmu case obviously falls into the latter category.

Based on their local knowledge, Shenmu villagers have developed a comprehensive know-how for coexisting with predictable disasters on days with heavy rain (Figure 8) (Kao, 2011). We have generalised three critical 'Shenmu villagers' processes' from our long-term field observations. First, they identify the intensity of the disaster by listening to different levels of noise made by the rolling stones. Ms Hsu told us, 'When it rains, I pay attention to the thunder-like sound that mud creates. I know when to run'. Second, villagers organise recovery teams for construction of temporary structures. Mr Huang said, 'It is too late to

Figure 8: On any days with heavy rain, landslides and mudslides of the Shenmu village might destroy roads and bridges. Villagers, therefore, have developed their own 'do-it-ourselves' rescue plan.

wait for our town officers to rescue us in such major landslides. We were forest workers before, we know how to cut trees and build makeshift bridges. We work as a team to build temporary paths, and the local government might come a week later. In some cases, we have had to wait even longer'. He explained that, besides the community-made bridges, villagers also took a narrow detour route for reconnecting to the main road, the Central Cross-Island Highway. Third, regarding food and water supplies, the villagers are all farmers. As Mr Huang said, 'We eat our own vegetables from our farms, and we know where to collect spring water around here [Shenmu village]'. In addition, power outages do not drastically affect the villagers. Many households store woodpiles at home, and they usually heat water using wood fires, not electricity.

In brief, the villagers have developed their own 'route' to survive from each mudslide and landslide. Between typhoon Toraji (2001) and typhoon Morakot (2009), no deaths were reported from periodic mudslide disasters. People have learnt where to run and how to reduce the level of damage to their properties, and, during those nine years, fewer than 10 households among the 90 most endangered ones had to relocate. Most of these migrant families had lost their farms during the mudslides and so, without any land to farm, were compelled to find other ways to make a living. Relocation was the only choice for them, and they moved to places close to their relatives in other townships and counties. Counting her students over her 13 years of teaching at the Shenmu Elementary School, Ms Hsu found that families of only three had left during that time.

Conclusion

After examining the Shenmu village case, we have highlighted two key findings for periodic disaster recovery. First, victims' home identities are strongly associated not only with culture but also with their means of survival. A successful relocation proposal must consider solutions that accommodate victims' daily needs and

their permanent connection with their destroyed home. It may take generations to transfer their identity from their old home to a new one. Second, survivors of continual disasters often develop strong and flexible community resilience processes for handling emergencies. Professional rescue plans and rebuilding projects may help them in the long run, but they have to survive the first critical period of three to five days using their own grassroots efforts. According to residents' experiences, professionals often propose inappropriate strategies for infrastructure reconstruction (that is, roads and bridges) that cause new problems during subsequent mudslides or landslides.

In conclusion, we have discovered that design and planning professionals play a minor role in rectifying the problems caused by Shenmu village's periodic disasters. The people in the community have creatively established methods for surviving the first critical stage of an event. Their deep bond with this remote village has profoundly influenced their perception of the safety of their lives by remaining at the mudslide-prone Shenmu village. In this era of climate change, it is likely that periodic disasters will be more frequent in many cities and countries. For this reason, it is critical to analyse the lessons from the Shenmu village case. Rootedness and community resilience have enabled the Hakka residents to maintain their sense of home in Shenmu village, even though mudslides and landslides have become a regular part of their environment.

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NOTES

1 According to Taiwanese hazard law, governments are responsible for the repair of damaged infrastructure. Local residents, as long as they have household registration in the area, can report to a local government office and request a repair project. Therefore, local residents of Shenmu village do not dare to relocate and change their household registration status. They worry that, if they lost their household registration status, they would not be eligible for any post-disaster repair projects, and then would not be able to transport their agricultural products from Shenmu village to outside markets.

2 According to Kao (2011), Shenmu villagers learnt where the safe locations for farming were from their landslide experiences. They decided to separate their vegetable farms to different locations to avoid the risk of losing many farms close together in the same mudslide. However, according to our field notes, farmers have contracted land from the National Taiwan University and the 40-year rental contracts are not sufficiently flexible for change. Farmers could only farm within land under the National Taiwan University agreement. We doubt they had the flexibility mentioned in Kao's research.

3 However, the Morakot disaster recovery project in the Shenmu Village of Xinyi township and other projects in the Renai township of the Natou County involved scandals for Mr Lee Chao-chin, the Nantou magistrate. Mr Lee was accused of bribery in relation to the Morakot recovery road repair project on 30 November 2012. Lee and seven county officers were brought in for questioning. More importantly, Mr Hung Chia-yuan, acting chief prosecutor of Nantou District Prosecutors Office,

stated that 'the alleged kickback involved in the case amounts to approximately NT$10 million'. (Adam Tyrsett Kuo, *The China Post*, 30 November 2012, www.chinapost.com.tw/taiwan/national/national-news/2012/11/30/362626/Nantou-magistrate.htm)

4 According to Taiwanese laws, only registered residents can report infrastructure failures and receive compensation when major disasters occur.

5 Villagers are also afraid that the National Taiwan University will eventually cancel the land rental contracts. They vacillate between relocating and staying. If they relocate to the new houses, their commute time for farming would be four hours per day. However, if they do not relocate, they stand to lose everything when the National Taiwan University terminates the land rental contracts.

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Recovering Place: On the Agency of Post-disaster Landscapes

JOERN LANGHORST

Based on the author's ongoing involvement in the recovery after hurricane Katrina in New Orleans, and the Lower Ninth Ward neighbourhood in particular, this paper discusses the implications of alternative strategies and tactics involved in the recovery, restoration and rebuilding of post-disaster landscapes. It emphasises that the recovery and rebuilding of community is as important as physical restoration. The empowerment of disaster-affected communities is posited as a central element, in particular, because disasters often reveal long-standing underlying dysfunctions and uneven development patterns as important factors disproportionally affecting communities that were already victimised and marginalised.

Design and planning approaches that gain the trust of local residents can reveal hidden, suppressed and alternative narratives and histories central to understanding the processes leading up to the disaster and to the development of viable and sustainable future scenarios. The active participation of traumatised communities is critical to an inclusive discourse on their future, allowing them to become co-authors of the landscapes and places they inhabit instead of victims of hegemonial agendas that created pre-disaster conditions in the first place.

The paper discusses a modest spatial intervention in the Lower Ninth Ward and its impacts as an example of the agency of landscape in processes of cultural change. It discusses the instrumentality of a truly public space in a critical location in asserting the viability of a post-disaster neighbourhood and in changing the discourses on human–environment relationships to facilitate a sustainable future in a landscape shaped by challenging social and environmental dynamics.

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Introduction

> New Orleans is an inevitable city on an impossible site (Lewis, 2003, p 17).

The recovery of post-disaster landscapes usually focuses on the rebuilding or restoration of physical and infrastructural systems. Consequently, spatial design and planning fields emphasise physical and biophysical processes and conditions often to the point of exclusivity.

Landscape and place are both artefact and agent in a continuous interplay of natural forces and human activity. The analysis and interpretation of this interplay through physical evidence is a core activity in design and planning processes. Traditional modes of site analysis and interpretation in landscape architecture and related fields divide landscape into discrete fragments with particular methodologies and implicit value systems (for example, ecological, cultural, economic) and subsume nature and culture (or, in a less contentious vocabulary, non-human and human processes) as dichotomies.

REFLECTION

This approach conflicts with an understanding of landscape and place that transcends the consideration of physical conditions that design and planning disciplines habitually focus on. It includes 'soft' qualities, such as meaning, memory, attitudes, and the events and experiences that shape and frame a place and define its people.

It also ignores a more dialectic and dynamic understanding of landscape itself as an ongoing negotiation between conflicting and complementary human and non-human processes, their agency and consequences. Landscapes and places can be construed as being simultaneous 'natural' and 'cultural' ruins, with their position on a gradient between those extremes changing continually.

This paper investigates post-disaster landscapes as critical locations for realising the much-touted potential of landscape as an 'agent of cultural change' and 'a synthetic and strategic art form, one that aligns diverse and competing forces into newly liberating and interactive alliances' (Corner, 1999a, p 2).

Disaster recovery: Between reconstruction and betterment

Outside of large-scale war, natural disasters have the biggest impact on human settlements. It is critical to qualify the concept of 'natural disaster' in this context. Whilst non-human processes are the immediate cause of disaster, human systems and their performance frequently play a significant role in the disaster's occurrence, severity, impact and the corollary damages in the aftermath.[1] Erikson and Yule (1994) frame environmental disasters 'caused by the invisible hand of man' as a 'new species of trouble' that is particularly hard to bear for the communities affected (cited in Tonnelat, 2011, p 5).

The most significant mid- and long-term impacts of such disasters do not originate in the physical destruction and loss of life and livelihood. Instead, these impacts originate in the post-disaster conditions and recovery processes that reveal underlying patterns of uneven development and systemic and systematic discrimination, marginalisation and disenfranchisement of particular neighbourhoods, communities and demographics.[2]

Almost all post-disaster recovery and rebuilding efforts operate in a tension between reconstruction and betterment. These efforts are constrained by the urgent and time-sensitive need to address the immediate rebuilding of critical infrastructure and housing as well as economic recovery (Olshansky and Johnson, 2010). The longer timeframes needed for a thorough analysis and development of alternative future scenarios, let alone for a meaningful participation of affected communities, often make it impossible to develop proposals for significant betterment. The pressure to rebuild as fast as possible creates situations in which spatial designers and planners, with their focus on reconstructing functioning physical and ecological systems, become inadvertently complicit in perpetuating the processes and patterns of uneven development, discrimination and marginalisation, and thus they serve (often hidden) hegemonial, capital and colonial agendas (Harvey, 1996; Mitchell, 2003; Smith, 1984).

'Bring New Orleans Back': A plan and its implications

New Orleans and the Lower Ninth Ward neighbourhood, in particular, are a pertinent example of where such agendas have been served because they present

a wide range of issues typical for post-disaster conditions and the processes of recovery. New Orleans is a place with a high risk of natural disasters, among them tropical hurricane systems with their combination of high winds and precipitation. Its location in a coastal delta system, with low-lying lands, continuous land subsidence and deteriorating coastal wetlands, makes New Orleans particularly susceptible to flooding – from storm surges originating in the Gulf of Mexico and from high water levels descending from the upper reaches of the Mississippi River.[3]

The landscape planning and design efforts for the rebuilding of post-Katrina New Orleans are a textbook example of the continuous contestation and competition between different agendas, institutions, interests, values, forces and protagonists. An even cursory overview is beyond the scope of this article, and, in all likelihood, would be impossible because many critical decisions were made by political and economic power elites behind closed doors without any attributable authorship.[4]

A particularly telling example for the inherent political and cultural agency of any design and planning decision, and for the aforementioned inadvertent complicity of designers and planners in long-standing hegemonial agendas, is the plan for the rebuilding of New Orleans brought forward by the 'Bring New Orleans Back Commission'. This entity, charged with managing the process of recovery and rebuilding, reiterated the past insensitivities and systematic discrimination against the historically marginalised black and poor New Orleanians. Recommendations received by the commission from the Urban Land Institute in November 2005 and from over 50 development experts became the foundation for a recovery plan developed by Wallace Roberts Todd (WRT).[5] The 95-page plan did not mention how to address social and racial inequalities in housing or access to infrastructure nor how the proposed parks and other infrastructural elements would improve or exacerbate those inequalities. Consequently, the ensuing public debate focused on how:

> ... reducing the urban footprint, reintroducing wetlands into the city in the form of new urban parks, or building mixed-income housing in low-income neighbourhoods, as suggested by WRT, is really informed by a mindfulness of long histories of urban renewal and interstate highway and park construction in New Orleans which caused their own devastation in mostly black residential neighborhoods (Breunlin and Regis, 2006, p 744).

A key element of the WRT plan was to convert several low-lying and flood-prone residential neighbourhoods, among them large parts of the Lower Ninth Ward, into parks and wetlands – a plan lauded by the American Society of Landscape Architects (ASLA) as exemplary (ASLA, 2006) (Figure 1). From a physical planning perspective, this proposition seems more than reasonable – as ASLA elaborated in its defence of the proposal. A fact unacknowledged in the plan – the neighbourhoods were occupied predominantly by poor blacks and had an unusually high level of home ownership – is responsible for its highly contentious reception, which took the plan's authors by surprise (Langhorst, 2011).

The ensuing – and very public – debate equated the creation of wetlands, parks and greenspace[6] with acts of racism. Ancillary proposals to redevelop large

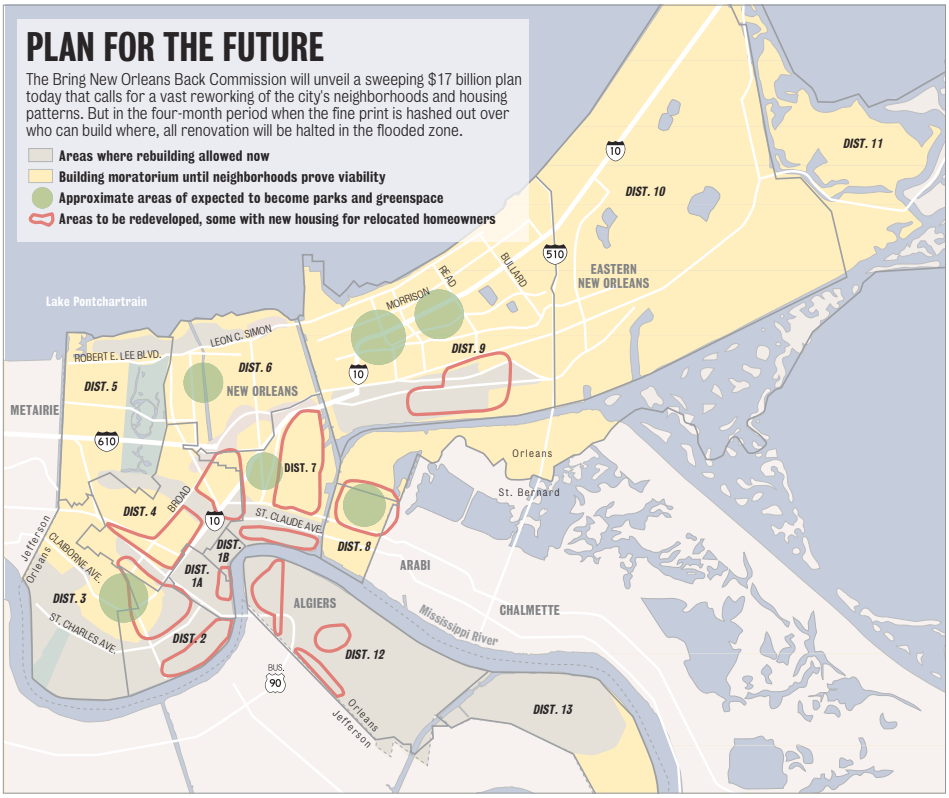


Figure 1: The 'Bring Back New Orleans' plan and its proposed parks and wetlands. The Lower Ninth Ward is designated as 'Dist. 8'. Image courtesy of the Times Picayune*, based on the 2006 report from the Bring New Orleans Back Commission.*

and less flood-prone parts of New Orleans, based on New Urbanist concepts of higher density and transit-oriented development, were criticised as thinly veiled attempts for the wholesale gentrification and 'whitewashing' of New Orleans. This prompted then mayor Ray C Nagin to assert that a rebuilt New Orleans would remain a 'chocolate city' and would, once again, be as diverse as it had been before Katrina.[7]

Even leaving aside multiple obvious, less obvious and hidden agendas for a 'new New Orleans' and their underlying interests and value systems that may have been served by the suggestions of the 'Bring Back New Orleans' plan, it is clear its emphasis on landform, hydrology and other tangible, physical and 'hard' qualities of landscape, and a total lack of engagement with the 'soft' aspects of place, are largely to blame for the plan's failure. In December 2005, it was clear any successful proposal for the rebuilding of New Orleans would need a new approach that, at a minimum, expanded on the type of site analysis that focuses exclusively on physical environmental change as employed by WRT.

A key element of this approach is the need to engage with a place and its communities and their interactions over time in considerably more depth and breadth than the typical site analysis. A much more comprehensive understanding of the socio-cultural, economic and environmental histories, and, in particular, of the development of landscape–community relationships over time, is necessary to understand the current landscape as the product of complex human–human, and human–environment interactions over time.

Equally critical, and a corollary to the first, is establishing trust with community members – without that, many narratives and histories that may prove critical in determining appropriate design and planning responses will remain hidden. Traditional maps and easily accessible historical data are not sufficient to reveal

critical information because they tend to be biased[8] and, because of their narrow instrumentality, are mostly ignorant of conditions, events and processes central to the identity and functioning of a neighbourhood. These characteristics hold all the more true for neighbourhoods that are a product of marginalisation and discrimination, such as the Lower Ninth Ward (Landphair, 2007; Regis and Breunlin, 2006).

Responding to the response: Getting involved

Conversations among faculty members at the University of Colorado Denver's Department of Landscape Architecture in autumn 2005 about the worsening situation in New Orleans quickly led to the realisation that landscape architecture as a field would need to find ways to better respond to the challenges of disaster and post-disaster landscapes. The department, led by Dr Austin Allen, a landscape architecture faculty member and documentary filmmaker, whose filming in the Lower Ninth Ward was interrupted by hurricane Katrina, started a unique process. It committed three whole design studio sections taught by four faculty members to work on alternative future scenarios for the Lower Ninth Ward neighbourhood in the spring semester of 2006. In the following two years, at least one studio every semester addressed evolving issues in the recovery and redevelopment of the Lower Ninth Ward and New Orleans (Table 1). Since then, there have been seminar and studio classes that revisited the neighbourhood in different contexts.[9]

Informed by the shortcomings of the 'Bring Back New Orleans' plan, Austin Allen's experiences in the Lower Ninth Ward and the author's experience in disaster recovery in developing countries, it was decided to continue the involvement with the Lower Ninth Ward for at least four semesters. This constant association would provide the time necessary to develop a thorough understanding of landscape and community, and to establish reliable connections with community members. Additionally, providing students with the opportunity to be involved with one place and project for more than one course would help them to reflect on their experiences and critically explore their actions and ideas more deeply.

Moving with a neighbourhood through the process of recovery and rebuilding over several years provided an opportunity to discover, develop, evaluate and adapt alternative approaches to the rebuilding and remaking of post-disaster landscapes and communities. This ongoing involvement facilitated the deeper understanding of community and place, the building of trust and, ultimately, the modest physical landscape intervention that catalysed meaningful and sustainable cultural and environmental change in the Lower Ninth Ward.

Two central questions moved quickly to the forefront of decision making about how to approach the studio pedagogy and studio projects. First, how can the aforementioned understanding of human–environment relationships in their physical, ecological, economic, social and cultural dimensions be developed, in particular, in a place the designer has essentially no familiarity with? Second, what are key considerations and elements in the processes of developing responses (whether it be planning documents, design proposals or actual physical interventions) that need to be considered?

Course	Semester	Title/content/outcomes
Advanced Landscape Architecture Design Studio (Allen, Langhorst, Frankhouser, Mazzeo)	Spring 2006	*Re-thinking New Orleans: Strategies for Landscape Change* • Analysing and understanding the place and its history of human–environment interactions using multiple and transdisciplinary approaches • Understanding immediate needs and long-term desires • Developing strategies and tactics for short-term, mid-term and long-term change Outcomes • Comprehensive mapping and data collection, analysis • Establishing connections and trust with community • '9 for 9' – nine proposals for the short-term, mid-term and long-term change in the Lower Ninth Ward
Documentary in New Orleans (seminar) (Allen)	Summer 2006	Students created short documentary films, using their own footage shot in New Orleans in spring, amended by found footage and still images
Advanced Landscape Architecture Design Studio (Allen, Brink, Langhorst (consultant))	Autumn 2006	*A Rejuvenation of Place: The Holy Cross School Site* • Proposal for the redevelopment of the Holy Cross School site *Creating Social Spaces in the Context of an Ecological Restoration* • Proposals for the platform providing access to the Bayou Bienvenue
Advanced Landscape Architecture Design Studio (Langhorst, Cockerham, Allen (consultant))	Spring 2007	*Design–build Studio: Access Platform for the Bayou Bienvenue* • Design development and construction documents for an access platform • Building of platform at the end of the semester was made impossible by the withdrawal of permission from the Levee Board
Contested Terrains (seminar) (Langhorst)	Autumn 2007	Three-week unit on New Orleans and the Lower Ninth Ward to analyse economic, ecological, social and cultural forces and factors and their impacts on place and community
Platform Build (Langhorst, Cockerham)	18–21 January 2007	Construction of platform based on spring 2007 studio, involving community volunteers, students from the spring 2007 studio and previous studios
Landscape Architecture Design Studio, Louisiana State University (Allen, Langhorst (consultant))	Spring 2008	*Comprehensive Water Strategies for the Lower Ninth Ward, Part 1* Taught at Louisiana State University, but involved University of Colorado Denver landscape architecture students • Collaboration with University of Wisconsin, Water Management students and faculty • Comprehensive plan for Bayou Bienvenue restoration, involving alternative treatment for storm-water runoff and sewage treatment
Contested Terrains (seminar) (Langhorst)	Autumn 2008	Two-week unit on the transgressive appropriation of public space by marginalised communities, rituals of open-space use, looking in particular at second-line processions and the concept of 'neutral ground'

Table 1: University of Colorado Denver, Department of Landscape Architecture, courses addressing New Orleans and the Lower Ninth Ward.

Course	Semester	Title/content/outcomes
Landscape Architecture Design Studio, Louisiana State University (Allen, Langhorst (consultant))	Autumn 2008	*Comprehensive Water Strategies for the Lower Ninth Ward, Part 2* Taught at Louisiana State University, but involved University of Colorado Denver landscape architecture students • Collaboration with University of Wisconsin, Water Management students and faculty • Comprehensive plan for Bayou Bienvenue restoration, involving alternative treatment for storm-water runoff and sewage treatment
Advanced Landscape Architecture Design Studio (Langhorst, Allen (consultant))	Spring 2009	*Living with Water: Alternative Scenarios for the Lower Ninth Ward* • Comprehensive storm-water strategy for the Lower Ninth Ward

Approaching a post-disaster landscape and its communities: Counter-mapping and building trust

As students and faculty members started to research the histories of New Orleans, its regional context and the Lower Ninth Ward, the first overwhelming response was 'Why would anybody want to live in a place like that?'. Consequently, initial ideas focused on shrinking the city, abandoning it altogether or moving it to 'safer ground'. These conclusions were largely driven by an analysis of existing maps focusing on physical–geographical and hydrological information. After the first visit to a devastated New Orleans and Lower Ninth Ward in February 2006, and after meeting some of the few residents who were back in the Lower Ninth Ward, students' ideas changed drastically, and the main impetus became 'We need to help these people to get back'. The ensuing critical conversation in the studio then engaged the concept of multiple contested and conflicting histories and narratives that revealed and constructed landscape and community. There was a strikingly obvious discrepancy between the fragmentary narratives and histories from residents about their place and community, on the one hand, and the histories told by 'official' maps, publications and mainstream media on the other. Students started to recognise the need to develop a critical and much broader perspective if they were to understand a devastated landscape and traumatised community, and their interrelations over time, well enough to develop ideas, approaches and scenarios that were appropriate, just and sustainable.

To organise the necessary deeper and more critical research into the history of the Lower Ninth Ward and the development of New Orleans, the method of counter-mapping appeared inherently suitable.[10]

Counter-mapping is a comparatively new approach in critical and human geography. As a method and approach, it is specifically designed to subvert the hegemonial bias of maps and mapping projects to map 'against dominant power structures, to further seemingly progressive goals' (Hodgson and Schroeder, 2002) and reveal and assert subaltern and marginalised cultures and their spatial presence. Counter-mapping has been undertaken most in the Third World to assert the claims of indigenous peoples to resources and territories and introduce non-expert local knowledge into environmental disputes. Indigenous peoples

are increasingly turning to participatory mapping, appropriating both the state's techniques and manner of representation (Hodgson and Schroeder, 2002). Counter-mapping is also a frequently successful tool for building indigenous identity: 'More indigenous territory has been claimed by maps than by guns. And more indigenous territory can be reclaimed and defended by maps than by guns' (Nietschmann, 1995, p 34). Because the Lower Ninth Ward was reduced to a problem area on most official maps (based on elevation and demographics), counter-mapping other aspects, qualities and histories helped to establish the community's interrelation with the place it occupied as well as its identity.[11]

It is critically important to not rely on counter-mapping alone – it is as biased as the maps produced by hegemonial power structures. Interpreting a combination of the traditional maps, produced to further the agendas of dominant interests,[12] and the results of counter-mapping offers a close read of a landscape and its communities over time as it developed in response to conflicts and contestations between different systems, forces, factors and interests. It is precisely this dynamic and processual understanding that is necessary to locate a disaster in the long-term interplay between human and non-human processes. Any meaningful disaster response will have to write the next chapter for this interplay – hard to do if one relies on a snapshot at a particular point in time that shows only a small portion of the relevant information.

Discovering and understanding the Lower Ninth Ward: A counter-map

The counter-mapping revealed the dual and contested identity of the Lower Ninth Ward – as a systematically marginalised neighbourhood with a long history of being discriminated against.[13] The neighbourhood is seen as a place on the margins of New Orleans that started as a colony of escaped slaves and continued to become a location of resistance against the political and economic elites controlling the mechanisms of spatial production. Even for New Orleans, the Lower Ninth Ward is a very particular neighbourhood. Settled first by escaped slaves, it slowly was incorporated into the growing urban and suburban fabric as the city grew. It has a long history of remaining isolated and being systematically disenfranchised, discriminated against, underfunded and undersupplied with even the most basic infrastructure and civic amenities. The following complaint from the Ninth Ward Civic and Improvement League, filed with the city in 1955, illustrates this experience rather drastically:

> 'Specifically,' the complaint read, 'we refer to poor housing and overcrowded conditions of our schools; the disease-breeding septic tanks, cess pools, outdoor toilets, stagnant water in the gutters; the flooded and muddy streets; the uncollected trash and garbage and the foul odors in the air.'[14]
>
> Upon researching the conditions alleged in the petition, an incredulous Councilman Fred J. Cassibry responded, 'It is almost unbelievable that some of the things listed in your complaint do exist' (Landphair, 1999, p 1).

This attitude, prevalent among city, state and federal officials, did not change in the aftermath of hurricane Katrina. Residents in Lakeview and parts of

New Orleans East (more affluent, predominantly white neighbourhoods), which lie partially lower than the Lower Ninth Ward and sustained more flooding, quickly had power and services restored, and returning residents were supplied with Federal Emergency Management Agency trailers. Lower Ninth Ward residents could 'visit' their houses under the 'Look and Leave' policy enforced by the National Guard.[15]

Among other factors, the systematic indifference of city officials toward the quality of human life turned the Lower Ninth Ward residents into early key players in the struggle for school desegregation and civil rights. The Lower Ninth Ward became a critical location in the civil rights struggle, and one of the first examples of school desegregation, and continued a long tradition of neighbourhood activism:

> ... for as long as black New Orleanians have been marginalized, they have also created their own organizations that formed a subaltern mainstream. For hundreds of years, African-American communities have organized themselves into social clubs in the New Orleans second line tradition, participating in a long-standing socio-political tradition of self-help, mutual aid, and resistance to structures of oppression (Breunlin and Regis, 2006, p 746).

It was precisely the experience of this tradition that started to inform student projects and the actions of returning neighbourhood activists in parallel, forming the basis for an ongoing critical dialogue. Because community members had experienced maps as tools of discrimination, there was a profound distrust of this visual language and representational medium. Many meetings between students and a slowly growing number of returning residents started the realisation that this hegemonial language could be amended and reappropriated to tell the residents' stories and assert their participation in the discourse on the future of their community by asserting their right to narrative.[16] 'The right to narrative (...) is to tell stories that create the web of history, and change the direction of its flow' (Bhabha, 2003).

A community needs to be able to reclaim its past before it can establish its identity and participate in the processes and discourses for its future. This precondition is particularly critical for communities traumatised by disaster.[17] For the Lower Ninth Ward, the memories of hurricane Katrina are layered on the flooding and destruction from hurricane Betsy in 1965,[18] and exacerbated by the abovementioned systematic and systemic neglect. The Lower Ninth Ward, based on its hydrological and topographical location below river and sea levels, is a particularly vulnerable community. It is almost an island – bounded by the Mississippi River to the south, the Bayou Bienvenue wetlands to the north, the industrial and inner harbour canal system to the west and, to the east, Jackson Barracks, a National Guard garrison that forms a de facto wall from river to bayou and isolates the ward from St Bernard Parish (see Figure 2).

Yet, as vulnerable as the Lower Ninth Ward is, its community also has a long tradition of resistance and resilience. It was the experience of this resilience[19] that gave direction to a series of projects that addressed a wide range of issues in the context of rebuilding and re-imagining a sustainable Lower Ninth Ward.

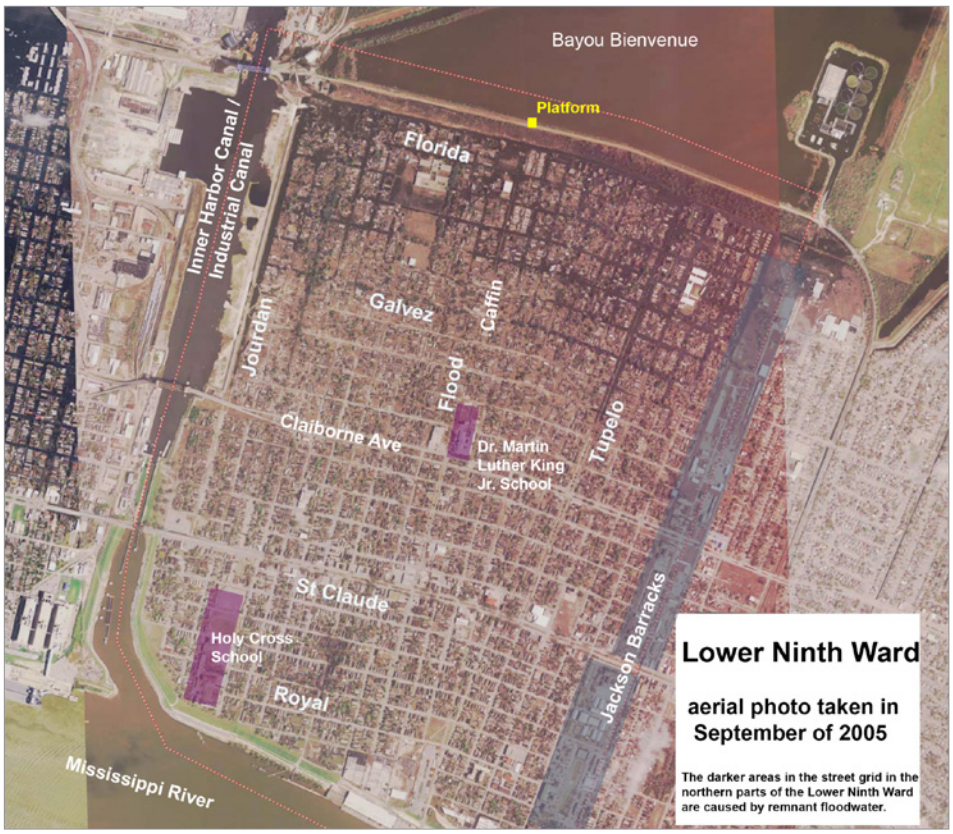


Figure 2: Aerial view of the Lower Ninth Ward, taken in September 2005 weeks after Katrina. The destruction in the north-west quadrant, close to the levee breach, is clearly visible. The darker colour in the street grid in the northern part of the Lower Ninth Ward is remnant floodwater. (Aerial image courtesy of the Federal Emergency Management Agency 2005, student work 2006.)

Building trust

While counter-mapping was the method central to developing a different and more inclusive understanding of place and community, it became apparent that a successful counter-mapping would only be possible if community members were involved. Without developing a relationship of trust it would have been impossible to get community members to talk about their experiences, concerns and ideas, as well as share the unwritten histories of the neighbourhood. Without this input, the understanding of the Lower Ninth Ward, its problems and opportunities would have been incomplete and any attempt at developing scenarios for its future would have been flawed and negligent. For faculty members and students, building this trust took considerable time and a willingness to suspend their prejudices, listen and slowly enter into a critical dialogue with upset, traumatised and angry residents (see Figure 3).Equally, it required community members to overcome their deep distrust of outsiders and 'experts'.

A key part to the success of this process was to listen without prejudice, to walk a fine line between taking the residents' concerns and ideas seriously, and being critical and forthcoming about possibilities, limitations and challenges.[20]

In hindsight, it was the length of involvement and the frequent returns of student groups that removed community members' distrust. An 83-year-old resident's comment, 'By the third time y'all were coming back down here, all that way from Colorado, just to help us, we figured y'all might be serious', describes one of many moments that established this all-important trust – after which community members shared more and more of their experiences, insights and stories. Sustaining this immensely time- and energy-consuming dialogue put the Department of Landscape Architecture in a unique position in the Lower Ninth Ward and formed the foundation for a successful continuing involvement.

Figure 3: Workshops with University of Colorado Denver landscape architecture students and Lower Ninth Ward residents and stakeholders, spring 2006.

With a growing number of residents returning, the dialogue became increasingly complex and involved more and more conflicting positions. It became clear that there was not just a single, monolithic community in the Lower Ninth Ward but a complex social and cultural network that was almost impossible to decipher. Many times consensus or compromise could not be reached, and this frustrated students and residents who were pushing toward a quick result. Agreement usually was on the process of ongoing communication, and a large part of the success of the Lower Ninth Ward in ultimately reinventing itself lies in a communication structure that can be most appropriately described as a forum. While leaders emerged quickly, at every workshop and meeting residents and students felt they could freely state their ideas and positions.[21]

Counter to initial expectations, the first studio produced an outcome very different from a recovery and redevelopment masterplan; it ended with a kit of parts addressing the short-, mid- and long-term needs of the Lower Ninth Ward. Its proposed actions ranged from developing alternative evacuation strategies to wetland restorations, from alternative flood-resistant and flood-responsive housing schemes to urban redevelopment schemes identifying and developing key sites. It included communication strategies for a community in diaspora and ideas for memorialising hurricane Katrina and its victims, with some of the projects operating well outside the traditional scope of landscape architectural projects.

From understanding to intervention: Landing, finding, grounding, founding

Christophe Girot's (1999) framework, with its focus on a method and techniques that 'expand the simple amelioration of sites towards practices that also reactivate the cultural dimensions of sites' (p 59), seemed eminently suitable as a structure for the approach developed in the first studio. Girot labels his framework as 'Four Trace Concepts' because they relate to issues of memory and 'underlie the fact that a designer seldom belongs to the place [in] which he or she is asked to intervene' (ibid, p 60). The four concepts of landing, finding, grounding and founding each 'focus on particular gradients of discovery, inquiry and resolution' (loc cit). Girot's

framework, although not deliberately used as a process in the first studio, became a critical tool for explaining and evaluating the processes the studio went through and began informing the pedagogy for the following studios.

'Landing refers to the point when a designer reacts to the difference between his or her preconceived ideas of a place and the reality that appears during the first steps of a visit' (ibid, p 61). This step seemed particularly important and pronounced because the preconceived notions formed by students and faculty members before their first visit could hardly have been more different from their actual experiences. The necessity to negotiate this differential facilitates discoveries that would otherwise go unnoticed. The Lower Ninth Ward was experienced as an extremely foreign and unfamiliar place, one resembling a war zone more than anything else. Walking through areas of extreme destruction, and being able to put physical experience to the previously unimaginable, became a powerful agent in quickly changing expectations and prejudices.

Grounding, as the second step, describes the processes of getting to know a site better, through more systematic research, mapping and successive experiences. During the grounding phase, multiple ideas about, and readings of, a place might emerge, including identification of the array of forces, factors, protagonists and processes that shape it. Grounding is a process 'implying successive layers, both visible and invisible. It is not necessarily what remains visible to the eye that matters most, but those forces and events that undergird the evolution of a place' (ibid, p 63). Grounding was likely the most challenging and difficult step for the students. With their mandate to engage multiple and often radically different constructions and conceptions of the same place, with seemingly equal validity, the constant challenge to any conclusion drawn and position argued often led them to buy in – thankfully temporarily – to simplistic interpretations and ideologies. These relapses seemed to be a standard response to dealing with too many positions and too much open-endedness and uncertainty. Girot's framework offers no guidance on how to ultimately engage the level of contestation, complexity and uncertainty. Students started to look for value systems that could provide normative guidance. Ethical considerations quickly took precedence over the pragmatic or descriptive and forced students to reflect on their own role in the process of developing ideas on how to change the Lower Ninth Ward.

Finding appears as the most elusive and open trace concept:

> ... findings escape design invention and import, they are something unique (though hidden) that definitely belongs to a place and contributes durably to its identity ... [F]inding is not limited to the discovery of objects, it also includes the experience of relating and associating ideas, places, and themes (ibid, p 64).

What people find can be an integral part of the landscape structure and performance. One of the conclusions drawn after the first two studios was that 'finding' in a meaningful way can only occur if there is sufficient familiarity with the place. Many students commented that, without having had the experience of being in the Lower Ninth Ward and connecting with community members, they might have 'found' the same idea but would not have been able to understand its agency and relevance or been able to develop it.

Founding is probably the 'most durable and significant of the four trace concepts' (ibid, p 65). It can be either conservative – referring to some past event or circumstance – or innovative – importing something new into a place. Founding might change or redirect a particular site, by physical alteration or changing the uses. Founding 'corresponds, in archaeological jargon, to an epoch – a given period in history when a cultural relationship to the landscape evolves and changes … extending the legacy of a place toward a productive future' (loc cit). Founding then becomes a key concept to any successful recovery of post-disaster communities and landscapes: living well within disaster-prone locations first and foremost requires a particular accultured attitude. Any sustainable approach to dwelling in such areas would require the development of an appropriate 'cultural relationship to the landscape', and any successful landscape change, no matter what its scale or scope, would have to contribute to such a cultural relationship as part of its agency.

Finding and founding: Discovering a critical resource

Without the trust built during the studio's continuous involvement, and the growing willingness of residents to share more and more aspects of the rich histories of the Lower Ninth Ward, it is highly unlikely that either the finding of the Bayou Bienvenue and its critical importance to the community or the founding of a comparatively modest intervention with immense impacts would have ever occurred.

In several conversations as early as the summer of 2006 long-term residents Steve Ringo and John Taylor started to emphasise the historic importance of the former cypress swamp to the north of the Lower Ninth Ward. While maps and aerial photographs clearly show its existence, it is invisible from within the Lower Ninth Ward, separated by a wall of steel sheet piling (Figure 4).

> Taylor recalls his childhood, before Hurricane Betsy hit in 1965, when the bayou was still freshwater and he'd go out fishing among the bald cypresses – in fact the stumps of the old trees can still be seen sticking up out of the water. 'Back then you

Figure 4: Levee and sheet piling along Florida Avenue, Lower Ninth Ward, New Orleans, 2006.

> couldn't even see across to the other side of the bayou because the woods were so dense. And the water was covered with lily pads' (Tonnelat, 2011, p 1) [Figure 5].

Many residents subsequently confirmed the importance of the bayou as a resource for fishing, shrimping and other activities. These activities formed an important ritual that was part of the identity of the neighbourhood.

This in itself was a 'finding' in Girot's sense because the common understanding always centred the Lower Ninth Ward on the Mississippi River to the south. In the context of the neighbourhood's precarious position at the interface between coastal wetlands and human settlements, the Lower Ninth Ward 'might be said to embody the breadth of the build/no-build line between land to be abandoned and land to be maintained that is so well described by Richard Campanella (2008) in his book *Bienville's Dilemma*' (ibid, p 2).

This line is physically inscribed into the landscape as a nearly 6-metre tall sheet piling. It separates not just the Lower Ninth Ward from a resource that was critical to its cultural identity and economic survival, but also the site of a human disaster from the site of an ecological disaster, both integral parts and signifiers of the catastrophe of hurricane Katrina. Any place can be described as 'simultaneous ruins of culture and nature' (Langhorst, 2012), but there are few that have both expressions of the continuous renegotiation of human and non-human processes separated neatly by a wall of steel.

In various ways, the Lower Ninth Ward has become a symbol in the discourses on rebuilding post-Katrina, struggling with proving its viability as a neighbourhood after still only about a third of its pre-Katrina inhabitants (as at 2011) have returned. However, the residents and their high level of activism, as well as the media portrayal as a microcosm of the contested cultures of New Orleans, are deemed reason enough for its reconstruction (Regis, Breunlin and Lewis, 2011). The identification of coastal wetlands as the most critical element of alternative strategies for flood control (or, in other words, of non-human processes and

Figure 5: Stumps are the only remnant of the bald cypresses that grew in the Bayou Bienvenue before saltwater intrusion killed them.

performances as critical infrastructure) has put the Lower Ninth Ward even more firmly at the centre of discourses on sustainable futures in the region. This status has made overcoming the sheet-piling wall between Bayou Bienvenue and the neighbourhood a centrepiece for the recovery, rebuilding and reimagination, its potential agency and efficacy, extending beyond its immediate spatial context.

> Every mile of planted bayou can reduce the flood in case of a hurricane by two feet. The bayou used to stretch all the way to the sea, 75 miles from here. So you do the math. If the bayou had still been alive in 2005, the Lower Ninth wouldn't have got flooded when Katrina hit. That's all on account of the Mr. Go [Mississippi River – Gulf Outlet] Industrial Canal, which, starting in the '60s, connected the gulf directly to the bayou, bringing plenty of brackish water – which the cypresses couldn't take. But it's also on account of the canal that the waters surged into the bayou, first with Betsy in 1965 and then with Katrina in 2005, their speed and their force compounded by its funnel effect. It's because of Betsy, by the way, that they built this seawall, which has separated us from the bayou, cut us off from its riches, but above all which has kept us from seeing its gradual demise. Before this deck, most of the neighborhood folks, the ones younger than me, didn't even know the bayou existed (John Taylor, interview with Stephane Tonnelat, April 2010, in Tonnelat, 2011, p 1).

The initial 'finding' of this particular condition and location led to the 'founding' of the Bayou Bienvenue Wetland Observation Platform, in local parlance referred to as 'the deck' or 'the platform' (Figure 6) . The platform did fit neatly into the neighbourhood's tactics of asserting its right to exist[22] and to rebuilding not by a massive repatriation of former residents (as in New Orleans East) but by turning itself into an ecological and cultural model of a community immersed in a coastal wetland–river delta environment. This development in itself might not be surprising, but in the context of the initiatives and formal and less formal neighbourhood organisations that developed rapidly and were carried forward by neighbourhood members, people who rapidly acquired the necessary knowledge and assertiveness, quickly became respected participants and voices.

Figure 6: Lower Ninth Ward and Bayou Bienvenue Triangle, looking west. The red dot denotes the location of the platform. (Aerial photo 2007, courtesy of Daryl Malek-Wiley.)

The collaboration between the University of Colorado Denver's Landscape Architecture Department and emergent neighbourhood organisations expanded quickly. It included a fast-growing array of other institutions, among them a team of water resource management students and faculty members from the University of Wisconsin-Madison. The idea of restoring the Bayou Bienvenue to a freshwater marsh, and eventually converting it back into a cypress forest, became the central argument and objective for the Lower Ninth Ward. This focus helped the community to turn itself into a model on how to survive and thrive in particularly challenging environmental conditions, thus fundamentally changing the narrative on its future identity.

Building the platform

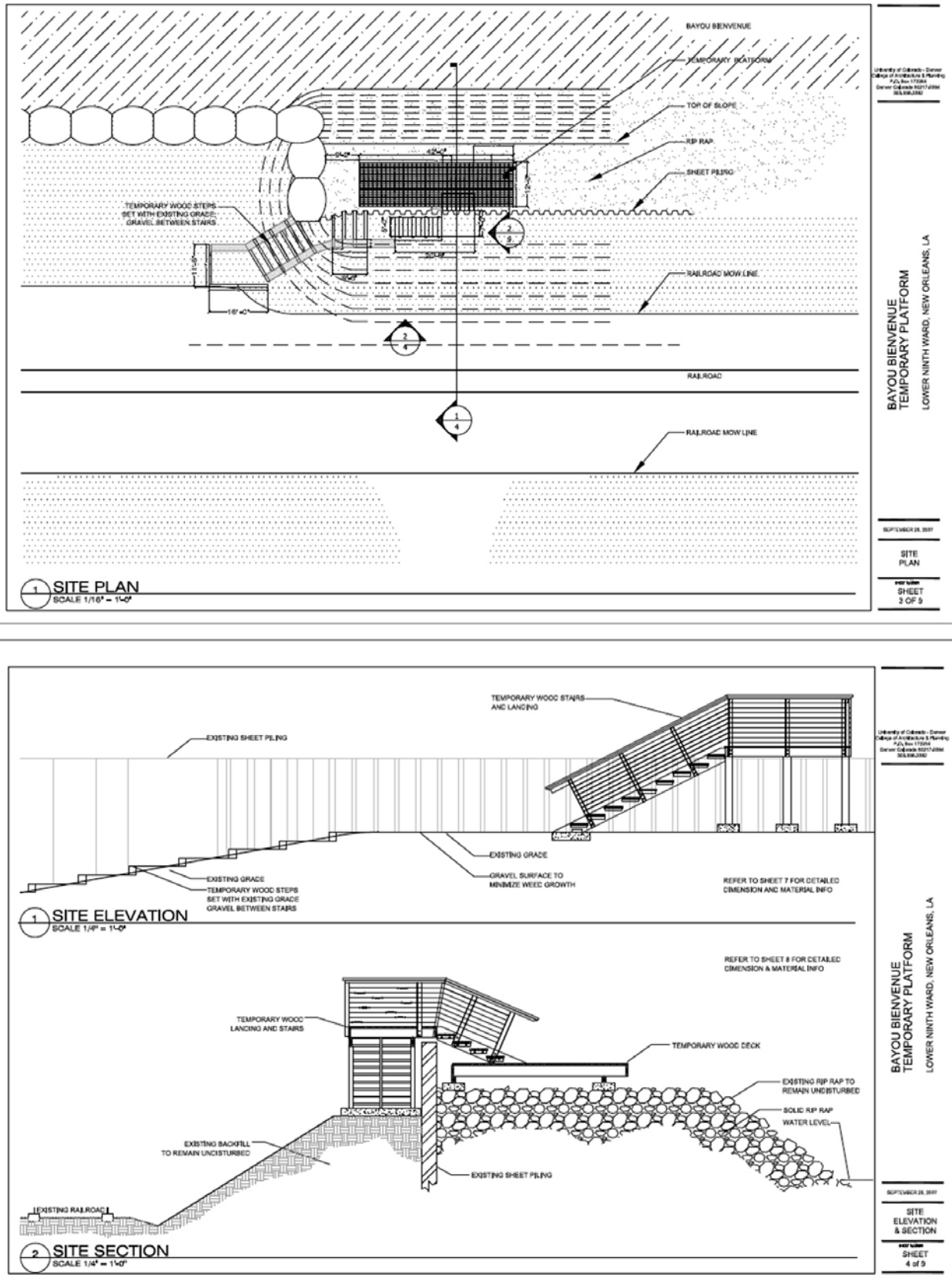
Access to the bayou became the first priority for the residents to reconnect to a once critical resource, and for water resource management students to regularly test salinity and water quality. Access to the top of the sheet piling and levee provided a place for the landscape architecture students and faculty and all other interested parties to visually understand how human settlements are nested within non-human systems and to experience the thick and thin edge that defines life in the region. This access was not just limited by the sheet-piling wall but also by a thicket of vegetation and a freight rail line (Figure 7).

One particular location quickly became the favourite, for both pragmatic and symbolic reasons. At the end of Caffin Avenue, the sheet-piling wall was frontfilled and backfilled with riprap, reducing the height to be overcome to about 2 metres. Caffin Avenue formed something of a civic corridor, with a former community centre and the Dr Martin Luther King School within viewing

Figure 7: Aerial view showing the platform location. Note the 60-metre strip of successional vegetation thicket and the freight rail line as obstacles to accessing the bayou. (Image © 2011 Google Earth.)

distance of the sheet piling. Despite the challenges, two successive studios developed a proposal from a conceptual to a buildable design and, ultimately, constructed the platform (Figure 8).[23]

Figure 8: Draft construction documents of the platform (student work, spring 2007).



After testing numerous design alternatives, the studio decided to prefabricate the platform frames and transport building materials and tools to the Lower Ninth Ward because building materials were in scarce supply in New Orleans. A construction date in July 2007 seemed attainable after the New Orleans Levee Board, the administrative body in charge of the floodwall, had granted approval for the construction. In preparation, students and neighbourhood organisers cleared a path through the thick vegetation (Figure 9).

After three students drove a truck with supplies from Denver to New Orleans, and a large group of students had flown in to start construction, the Levee Board withdrew its approval and threatened legal action hours before construction was set to begin. The faculty decided not to pursue construction. Students felt victimised by a hegemonial–political system they did not understand, and personally experienced what had become commonplace for the residents of the Lower Ninth Ward and New Orleans in general.[24] Neighbourhood organisations, in particular, the Holy Cross Neighbourhood Association, lobbied persistently and ultimately successfully. After six months of negotiations, involving a renowned local architect and assurances not to structurally affect the sheet piling and frontfill and backfill ('the platform elegantly straddles the sheet piling, resting on floating footings set on the riprap, without penetrating any levee systems' – Tonnelat, 2011, p 4), the Levee Board reinstated its approval. Students and faculty volunteered their time and, in January 2008, the platform was constructed under an incredibly tight timeframe of 48 hours (figures 10 and 11).[25, 26]

Agency of landscape

Almost immediately after its completion, the platform became an important location in the Lower Ninth Ward (Figure 12). Its prominent location and visibility draws casual visitors as well as residents and facilitates first-hand experiences of the position of the Lower Ninth Ward in relation to the bayou, and of coastal and delta ecologies. Explaining to visitors that they are standing on a coastline provides a powerful reminder of the precarious environmental situation, and an equally powerful visual argument for the restoration of coastal wetland systems in the Bayou Bienvenue and beyond.

Figure 9: Volunteers clearing vegetation and establishing access to the sheet piling before the platform construction. (Photo courtesy of Daryl Malek-Wiley, 2007.)

Figure 10 (left): Design–build studio constructing the platform with local volunteers, January 2008.

Figure 11 (right): Completed platform and stairs, January 2008.

The platform emerged as a central location for all conversations on wetland issues – evidenced by many photographs of and news reports on the deck that have been posted and circulated on the web. In December 2008, two community organisers, the late Pam Dashiell, then Director of the Lower Ninth Ward Center for Engagement and Sustainable Development, and Darryl Malek-Wiley, a Sierra Club environmental organiser, were filmed on the deck by ABC26, a local branch of the nationwide network, explaining the stakes involved in restoring the bayou (Tonnelat, 2011). Aaron Viles, Deputy Director of the Gulf Restoration Network, states that 'the wetlands viewing platform is quite possibly the most important education/outreach element we have got in the city' (Viles, pers comm, 14 February 2012).

The closure of the Mississippi River – Gulf Outlet canal (MRGO, or Mr Go in local parlance) by the Army Corps of Engineers in 2009 finally created the necessary conditions to go forward with an ambitious plan for the restoration of the Bayou Bienvenue. The MRGO canal, completed in 1965, was designed to shorten the shipping lanes from the Gulf of Mexico to the Port of New Orleans by 60 kilometres (37 miles). Thereafter, however, it was little used, and is held responsible for the storm surges during hurricanes Katrina and Betsy that

Figure 12: Completed and repaired platform, bayou side, 2011.

caused the devastation of the Lower Ninth Ward and other neighbourhoods. Moreover, the slow increase in salinity that killed the bald cypress forests and the freshwater marshes in and around the Bayou Bienvenue is attributed to the MRGO Canal.

The New Orleans Sewerage and Water Board is actively pursuing a plan to desalinate the bayou waters by discharging effluent from a wastewater treatment plant visible from the deck, thus effectively creating treatment wetlands to treat nitrate and phosphate nutrient loads. The Army Corps of Engineers also proposed rerouting some of the waters of the Mississippi towards the bayou to supply it with freshwater and dredging mud at the bottom of neighbouring Lake Borgne to raise the bed of the bayou to facilitate the growth of semi-aquatic vegetation. For their part, the Wisconsin water management students planted small 'floating islands' in June 2009 to test the viability of various species of brackish-water plants. Another group set up an information booth on the history of the bayou. When an egret made its home on the floating islands, the residents took that as an encouraging omen. That same month, the *Times-Picayune*, the leading local daily newspaper, came out with a list of sights worth discovering in New Orleans: the observation deck came in ninth on the list (Tonnelat, 2011). After parts of the deck were damaged in an accidental fire in 2009, it was promptly rebuilt, and a pergola and steps down to the water were added.[27]

The deck has become a local landmark, with a high level of visibility. It has become a required stop for visiting dignitaries, such as Bartholomew, the Greek Orthodox Patriarch in Istanbul, who came to see the progress on the project and to bless the waters in autumn 2009, and Nancy Sutley, Chair of the White House Council on Environmental Quality, who came to assure residents of the US president's support. John Taylor, who gave them the same lesson in delta ecology described above, greeted them both, and many other visitors (Figure 13).

The deck allows the Lower Ninth Ward community to experience something of critical importance for its past, present and future. Its location on the levee, on the very edge of the negotiation between human order and non-human processes, has turned it into the centre stage of the discourse on coastal wetland restoration and the survival of gulf coast communities. 'In fact, by making the bayou visible, the deck has also helped make the neighbourhood viable' (Tonnelat, 2011). Its aesthetic performance is a critical part of this agency – it enables community members to experience something that environmental philosopher Arnold Berleant, in his definition of environmental aesthetics, refers to as 'being in process with the environment' (1992, p 4). To the north is the Bayou Bienvenue, littered with cypress stumps, a veritable ruin of nature to the north, and to the south the Lower Ninth Ward, a ruin of culture where empty lots by far exceed houses, can both be experienced and engaged from the platform (Figure 14).
A polyphonic narrative, based in this and other immediate experiences of a complex environment, and in the histories and narratives that created the identity of the Lower Ninth Ward, has replaced the hegemonial narrative that ultimately created the landscape conditions responsible for the hurricane Katrina disaster. This new narrative now allows a marginalised community to imagine alternative landscapes and put itself back at the centre of the discourse on its own future.

Figure 13: John Taylor and Patriarch Bartholomew on the rebuilt platform, 2009. (Photograph ©Ecumenical Patriarchate.)

Figure 14: Bayou Bienvenue in context, looking south-east. The Lower Ninth Ward is to the right of the image, the sewage treatment plant is on the far end of the triangle and the Gulf of Mexico can be seen in the background. The red dot denotes the platform location, 2009. (Aerial photograph courtesy of Daryl Malek-Wiley.)

The deck has become a public space in two senses of the word. It is a space accessible to everyone and a forum in which to discuss the future of the neighbourhood and city in general, and how to live in an environment characterised by recurring and violent negotiations of human and non-human processes. In fact, it is one of the few public spaces in New Orleans and the Lower Ninth Ward that is not implicitly 'owned' by a particular group or organisation. It does not have a history or current practice of privileging certain users to the point of implicitly or explicitly excluding certain people. As such, it finds itself expressing the concept of 'neutral ground', a spatial tactic[28] with a long tradition in New Orleans that appropriates the wide median strips on roads for a variety of uses by local residents.[29] 'Now, at least until the next disaster strikes, no-one in the neighbourhood, in the city, or in the United States will question the Lower Ninth Ward's claim to be a fully-fledged part of the city' (Tonnelat, 2010, p 5).

The platform fulfils, in many ways, James Corner's concept of landscape:

> ... as a metaphor for inclusive multiplicity and pluralism, as in a kind of synthetic "overview" that enables differences to play themselves out ... In these terms, landscape may still embrace naturalistic and phenomenological experience but its full efficacy is extended to that of a synthetic and strategic art form, one that aligns diverse and competing forces (social constituencies, political desires, ecological processes, program demands, etc.) into newly liberating and interactive alliances (Corner, 1999a, p 4).

The platform's main agency extends to empowering a previously marginalised and victimised community to participate in the discourses on its own future – and on the future of the landscape and place it occupies. This participation is critical for broadening the discourses on future human–environment relationships; including narratives and knowledge habitually excluded and suppressed as 'non-expert'. And – maybe foremost – it allows traumatised communities to become co-authors of the landscape they inhabit instead of merely victims of hegemonial agendas, thus reasserting their 'right to place'[30] and identity.

Conclusion

The recovery of the Lower Ninth Ward in New Orleans, and the ways in which landscape architecture students and faculty members were involved, suggest several elements that are necessary in a general approach towards the recovery of post-disaster landscapes.

A thorough, critical, deep and broad understanding of the co-evolution of landscape and community is central to any successful attempt to develop scenarios and projects for post-disaster change. This understanding needs to extend beyond physical–environmental dimensions of place to include the more contested social, economic and cultural dimensions. Girot's (1999) 'Four Trace Concepts in Landscape Architecture' can provide a generative framework in this context, but it needs to be applied within an ethical understanding of the role of the designer and of communities.

Another key element is counter-mapping as a method of identifying and asserting alternative constructions of landscape and place, including those generated by non-expert communities in combination with a thorough and critical analysis of traditional maps. Together, these methods can generate the necessary understandings of place that Girot's framework – and any kind of meaningful, effective and sustainable response to post-disaster conditions – depends on.

Equally important is to establish clear relationships between designers and community members. The necessary community trust is frequently achievable only if designers are heavily involved over long periods and prove reliable in their commitment.

Visible physical change for the better is, for several reasons, a critical and powerful element of any post-disaster recovery. A single restored house has a bigger impact than walls full of colourful plans and renderings of a new neighbourhood. The symbolic value of actual physical change – even if it is a mundane gesture such as removing debris or overgrown vegetation – is a powerful way of involving oneself in environmental change, of not being a victim of disaster any more. 'Finding' and 'founding' a physical intervention that goes beyond improving the immediate physical context and serves to locate, develop, catalyse, energise and/or organise a community discourse on its own future might well have an immediate and long-term impact that transcends what would be possible with even the most sophisticated planning document.

Last, disaster recovery can be a long, sometimes multi-generational process. It is critical to establish a process that fairly and equitably identifies and involves as many of the different interests, and establishes basic rules for resolving conflicts. Such an approach is even more important if the disaster involves communities that have already been victimised by patterns of uneven development and environmental and social injustices. Re-establishing and supporting the fundamental right of communities to participate in discourses on the future of the place they inhabit will be central to any long-term, just and sustainable recovery.

NOTES

1 For an excellent overview and timeline of the flooding events, in particular, the failures of flood-control systems and the role of the Mississippi River – Gulf Outlet canal, see www.nola.com/katrina/graphics/flashflood.swf

2 Harvey (1973; 1996), Mitchell (2003), Soja (1996) and Scott and Soja (1996) peripherally address this issue in their writings on 'right to the city', as does Smith (1984) in the context of uneven development and environmental and spatial justice. Campanella (2007) and Landphair (2007) describe aspects of such patterns in the context of New Orleans. See also Lewis (2003).

3 For a comprehensive description of the development of New Orleans in relation to its environmental contexts, see Colten (2005) and Campanella (2008).

4 For an ambitious but ultimately incomplete overview of the post-Katrina planning processes and efforts, see Olshansky and Johnson (2010). For insights into the political cultures of New Orleans, as they impacted on the events leading up to hurricane Katrina, the emergency responses during the disaster and the rebuilding efforts, see Baum (2009), Lee (2006, 2010), Dantas (2010), Lessin and Deal (2008) and Landphair (2007). The author's own involvement and participation in the recovery attempts in the Lower Ninth Ward since January 2006 have supported the readings of political cultures of New Orleans as particularly invisible and insidious. Long-term resident, nephew of former mayor Marc Morial and political activist Jacques Morial suggested it is preferable to understand New Orleans not as the 'most dysfunctional North American city, but the most organized Caribbean city'.

5 Wallace Roberts Todd (WRT) was co-founded by Ian McHarg and has a reputation for thorough environmental inventories and analyses.

6 Since then, the terms 'park' and 'greenspace' have been fraught with suspicion and, for several years, have held mostly negative connotations for New Orleans residents, in particular, those living in the affected neighbourhoods. This is an excellent example of the impact that even small acts of appropriation of commonplace language can have in changing a whole discourse.

7 Nagin also stated that New Orleans 'will be a majority African-American city because this was what God wants it to be'. (See 'Evoking King, Nagin calls N.O. "chocolate city"', *Times-Picayune*, 17 January 2006, http://www.nola.com/frontpage/t-p/index.ssf?/base/news-4/1137481512176100.xml, accessed 23 February 2011 and CNN, 'Nagin apologizes for "chocolate" city comments', 18 January 2006, accessed 23 February 2011, http://edition.cnn.com/2006/US/01/17/nagin.city.)

8 For critical perspectives on the agency and instrumentality of maps, see Harley (1999), Cosgrove (1999) and Wood, Fels and Krygier (2010).

9 I am particularly grateful to my colleagues Austin Allen, Tony Mazzeo and Jake Frankhauser, and to all 44 students who participated in the first New Orleans studio. Their efforts, energy and willingness to face the most challenging situations with creativity and sensitivity made it possible for a most interesting, insightful and empowering process to emerge. For an overview of the early studios, and the 'lessons learnt', see Langhorst and Cockerham (2008).

10 The term 'counter-mapping' was coined by Nancy Peluso in 1995 to describe the commissioning of maps by forest users in Kalimantan, Indonesia, as a means of contesting state maps of forest areas that typically undermined indigenous interests. The resultant counter-hegemonic maps strengthened forest users' resource claims. For an overview, see Peluso (1995), Hodgson and Schroeder (2002) and Wood, Fels and Krygier (2010). For an example of counter-mapping of New Orleans and the Lower Ninth Ward, see Meirath (2008).

11 I believe this interrelation between a location and people who occupied and shaped it over time is inherent in the term 'neighbourhood'. All too often this co-evolution as a critical dimension is ignored. See Tilley (1994), Casey (1998), Ingold (2000) and Massey (2005).

12 For excellent insights into the instrumentality and agency of maps, as well as the history of their political use and concomitant development of mapping techniques, see Wood, Fels and Krygier (2010) and Harley (1999).

13 See Landphair (2007) and Breunlin and Regis (2006). The Lower Ninth Ward did not receive, for example, a sanitary sewer system until the 1960s.

14 *New Orleans Times-Picayune*, 9 November 1955, cited in Landphair (1999, pp 35–62).

15 The National Guard did sweeps through the Lower Ninth Ward every evening, forcing people to leave. The Lower Ninth Ward's geographic situation made access control easy – there was only one open bridge over the Inner Harbor Canal connecting it to downtown New Orleans, and two roads transecting Jackson Barracks on the St Bernard Parish side.

16 The visualisation techniques and media and the respective representational conventions used did not just employ maps. Videography became a powerful tool to facilitate a two-way communication between residents and students and expert communities (Langhorst, 2010a).

17 See Huyssen (2003) and Foote (2003).

18 A particularly powerful memory goes back to 1927 'when, at the behest of powerful New Orleans businessmen who feared that the engorged Mississippi River might break over the Crescent City, local officials ordered the public dynamiting of the Poydras levee south of New Orleans, destroying the homes and livelihood of thousands of residents of St Bernard and Plaquemines parishes' (Landphair, 2007, p 841). Hurricane Betsy's devastation in the Lower Ninth Ward 'contrasted sharply with minimal damage to the rest of the City, and residents, used to decades of neglect, were certain that officials blew up the Industrial Canal to protect the richer upriver areas' (ibid, p 841). Although no evidence for intentional levee destruction was recovered, a 1965 New Orleans Sewerage and Water Board report conceded 'that much of the area's drainage system could not handle above-average rainfall. In the aftermath of Katrina, Betsy was recalled time and again by residents convinced that the 2005 storm damage and recovery effort involved elite malfeasance' (ibid, p 842).

19 The discourses on post-disaster recovery have replaced the concept of 'vulnerability' with 'resilience' when analysing how a particular landscape will respond to disaster. Olshansky and Johnson (2010) state that resilience 'occurs in the aftermath of disasters', and the Lower Ninth Ward with its long history of disasters illustrated a rather high degree of resilience. It has lost parts of its population after every single disaster, though, and different estimates put its current population at about 25–33 percent of its pre-Katrina total of an estimated 18,000 to 20,000 people. While it is reasonable to assume the traumatic experience will have discouraged many residents from returning, it is also likely many simply do not have the means to return from their diaspora in cities such as Atlanta and Houston.

20 The continuous assessment of students' thoughts, attitudes and responses quickly became a central element of studio pedagogy. Regular conversations occurred in desk critiques, in group and studio meetings dedicated to giving students an opportunity to reflect and voice concerns, and in exit interviews at the end of the semester. While most students from the first studio continued their involvement with the Lower Ninth Ward throughout subsequent classes and beyond graduation, a small group remained adamantly resistant to changing their prejudices. In studios later in the sequence, the mix between 'veteran students' and students with no previous exposure led to the most interesting and successful examples of collaborative learning as they constructively challenged and interrogated each other's experiences, attitudes and assumptions.

21 The position of students and faculty members in the community was an unusual one, and possibly responsible for their ability to participate in community meetings and discussions as trusted people rather than outsiders. Their early presence in the Lower Ninth Ward established relationships with people who quickly became community leaders, and their association with the community leaders allowed them to establish an immediate rapport with newly returning residents.

22 Mayor Nagin's policy in the aftermath of the 'Bring Back New Orleans' plan required neighbourhoods to prove their viability and develop plans for rebuilding.

23 The studio that developed conceptual designs was co-taught by Austin Allen and Lois Brink, and the design-built studio was co-taught by the author and senior instructor Lori Cockerham.

24 The level of frustration students experienced led to many teachable moments. Distraught students were comforted by community members and activists, inversing the assumed and socially constructed roles of 'helpers' and 'victims'. Many of the students volunteered their time when construction finally began after a six-month delay.

25 The construction would not have been possible without huge support from the community and the many organisations that provided tools, workers, food and transportation, in addition to the much-needed moral support. I would like to acknowledge in particular the New Orleans Fire Department, which generously allowed us to store massive amounts of building materials in one of its warehouses.

26 For a description of the design–build process, its challenges and lessons learnt, see Langhorst and Cockerham (2008) and Tonnelat (2011).

27 This work was done by a crew from Brad Pitt's 'Make it Right' foundation.

28 The term 'spatial tactic' is used deliberately with reference to De Certeau (1984) and Lefebvre (1991). Both describe spatial tactics as forms of occupation or use, often temporary, employed by marginalised cultures against the spatial strategies of hegemonial elites in control of the mechanisms of spatial production. See also Franck and Stevens (2007).

29 Street medians in New Orleans are called 'neutral grounds', and are used, in particular, during the Second Line parades. Second Line parades are traditionally organised by social clubs and African American organisations in the 'long-standing sociopolitical tradition of self-help, mutual aid and resistance to structures of oppression' (Breunlin and Regis, 2006, p 746).

30 The concept of 'right to place' is an extension of the 'right to the city', as put forward, for example, by Lefebvre (1968), Harvey (1973; 1996), Smith (1984) and Mitchell (1993; 2003).

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Shades of Grey: The Role of the Sublime in the Memorial to the Murdered Jews of Europe

KAREN WILSON BAPTIST

> In our mind's eye we are accustomed to think of the Holocaust as having no landscape—or at best one emptied of features and color, shrouded in night and fog, blanketed by perpetual winter, collapsed into shades of dun and gray; the gray of smoke, of ash, of pulverized bones, of quick-lime (Schama, 1995, p 26).

As a 'post-disaster' landscape, the Memorial to the Murdered Jews of Europe does, arguably, occupy ground where the mass extermination of the Jewish people of Europe was masterminded, but it is not physically a site of death. Commonly, memorial landscapes are erected upon the location where violence, tragedy and disaster have occurred. Divorced from the diasporic dead it seeks to honour, the memorial employs spatial form, the surrounding atmosphere and human memory to potentialise a sublime experience for visitors. The sublime plays an essential role in memorial landscapes because sublime experiences are heightened, unforgettable and enduring. This reduces the possibility that visitors will depart the memorial unscathed, leaving the monument to bear the burden of memory. While a sublime experience can be optimised, it cannot be given, thus, the onus of remembering the Holocaust remains our responsibility.

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The Memorial to the Murdered Jews of Europe (which was unveiled in 2005) rises like an ancient forest in the heartland of Berlin a mere 100 metres from the Brandenburg Gate. The roots of the memorial are nourished by tainted soil. The office of Joseph Goebbels stood here in 1937, and the bunker where Adolf Hitler committed suicide on 30 April 1945 is nearby. During the 1960s, the memorial site was part of no-man's-land – a fault line separating East from West Berlin (Quigley, 2005). The notorious Berlin Wall once flanked the plaza, now apartment blocks, office buildings, a sports field and coffee shops surround the 19,000 square metre site. An allée of trees eases the transition between the memorial and the Tiergarten situated to the west, but, with only a few scattered plantings, the site is an exercise in contrasts, a stark concrete chiaroscuro.

I was initially unsure how I felt about this vast grey acreage. Described by some as banal (Lee, Bae and Choi, 2006, p 243), sober and drab (Quigley, 2005) and controversial even to the survivors Eisenman strived to commemorate (Brunberg, 2005b), the memorial is materially minimalist and monolithic, deceptively chaotic, as if assembled by a tremulous earth, and spread like a great dehiscence across the cityscape. 'In Berlin, a whole block near Potsdamer Platz in the centre of the city has been given over to a national memorial to the murdered Jews of the holocaust—the size of the gesture commensurate with the guilt that Germany feels' (Long, 2007, para 1). Perhaps in light of Shaw's (2006) comment,

REFLECTION

'In terms of the sublime, the pain of the Holocaust is such that it exceeds our ability to supply a concept' (p 128), it is appropriate that I struggle to comprehend the memorial, as it commemorates an event beyond knowing. I cannot find a way to be *within* a place I have never been, to understand a memorial that exceeds my lived experience of death, disaster and trauma.

The initial seeds for the memorial sprouted in the late 1970s when, as Schlör (2005) describes, there was a discursive desire within German society to open up discussions about '*de Schoah*' (p 25). Schlör reports that Federal President Richard von Weizsäcker's speech, conducted on 8 May in commemoration of the fortieth anniversary of the end of World War Two, acknowledged a desire for open remembrance of atrocities committed (ibid, pp 28–32). Initially, the site of Prinz Albrecht Palais was to be set aside as a location for a Holocaust memorial. The exclusion of the Sinti and Roma from this initial memorial incited controversy (ibid, p 32). In 1993, German chancellor Helmut Kohl selected the Neue Wache, a nineteenth-century guardhouse as the 'National Memorial for Victims of War and Tyranny' (Brunberg, 2005a, para 4). The inclusion of a sculpture depicting the Pieta by Käthe Kollwitz offended the Jewish community (ibid, para 4). April 1994 saw the launch of a competition to 'define Germany's own present-day memory of the Holocaust, a complex and difficult memory' (Schlör, 2005, p 34). The monument was to be sited 'in the heart of the German capital' adjacent to the Tiergarten (ibid, p 34). The winning design by Christine Jackob-Marks was rejected and the competition relaunched in 1997. A team headed by Peter Eisenman and Richard Serra won the competition. Construction began on 1 April 2003. Brunberg (2005b) reports that on the day the memorial opened, 10 May 2005, the sky over the concrete blocks was a uniform grey.

> As the last cobblestones were laid, and a temporary media pavilion was erected on the southern edge of the site, hail flew. Water lay on the stones like broken glass. It seemed a fitting atmosphere for a project whose completion had taken seventeen stormy years (Quigley, 2005, 'Endings', para 1).

Trolling the internet for images, I spy, amongst the sombre black and white photographs, models posing, a person performing calisthenics, children leaping from stela to stela as if the memorial were an enormous concrete funhouse. For residents in the overlooking apartment complexes, the continual vision of a megalithic sunlit acreage seems a cruel fate for generations two or three times removed from the horrors of the Holocaust. 'An unavoidable fixture of the city's life', observes Ouroussoff (2005), 'reassuring those who see the Holocaust as a singular marker of human evil while upsetting those who feel that Germany has already spent too much time wallowing in guilt' (para 5).

As a 'post-disaster' landscape, the Memorial to the Murdered Jews of Europe occupies ground where the extermination of homosexuals, people suffering from mental and physical illnesses, the Roma and Sinti people, Nazi adversaries and the Jewish people of Europe was masterminded, but it is not physically a 'traumascape'. Traumascapes, as defined by Tumarkin (2005), are 'a distinctive category of places transformed physically and psychically by suffering, part of a scar tissue that stretches across the world' (p 13). At sites of tragic death and destruction, regardless of scale, the presence of death hovers, visible and

tangible. But the deathscapes of the Holocaust are diasporic – former ghettos, concentration camps, cities and villages scattered across Europe, single-family homes, farms, forests and hillsides. Itinerant landscape memories must be gathered into this singular memorial. Situated upon a former ministerial garden, the Memorial to the Murdered Jews of Europe lies mute before us; as Brunberg (2005a) comments:

> In the end the design can't in itself wake up emotions among people who have not been affected by the Holocaust one way or another. The strongest emotions are to be found in the hearts of the people that experienced the atrocities, as perpetrators, victims or liberators (para 9).

When we see death markers – the singular cross on the roadside, the cairn that marks the resting place of a coffin, the tumuli, the headstone – we are aware that this is a site of human death, even if, as in the case of the Memorial to the Murdered Jews of Europe, we know that this is not physically a burial site. Following Treib (2005), the death signification of memorial marking is 'derived from the transaction between the perceiver and the place' (p 15) and is certainly not a transmission from an inanimate object situated within the landscape. The great field of 2,711 concrete stelae was intended by designers Peter Eisenman and Richard Serra (who withdrew from the project in 1998) to recall the standing stones that marked ancient sacred spaces. Each pillar is 95 centimetres wide by 2.375 metres long and the pillars vary in height, greatly exceeding the scale of a singular pine box; however, for some, they evoke a casket and collectively they may call to mind sites of mass extermination. Some stelae are expressed at the ground plane, while others are as tall as 4 metres, large enough to bury visitors in a dark labyrinth-like space. Eisenman (2005b) states:

> The markers that were formerly symbols of individual life and death must be changed, and this has a profound effect on the idea of both memory and the monument. The enormity and horror of the Holocaust are such that any attempt to represent it by traditional means is inevitably inadequate (para 1).

In initial proposals for the site, Eisenman presented a vast monumental maze with massive pillars that threatened to collapse upon visitors to the memorial. Site lines to the surrounding city were obscured to potentialise a 'labyrinthine fear of entrapment' (Kaplan, 2007, p 157). Critics' objections surrounded three issues: that the memorial invoked a fascist monumentalism, that the lack of narrative 'muffled' victims' stories and, finally, that the memorial failed to achieve a 'new aesthetic capable of representing the Holocaust' (ibid, p 158).

Kaplan extensively explores the association of beauty and the sublime with representation of the Holocaust, stating: 'I chose beauty over the sublime as my central theme because the aesthetics of the sublime align politically with the idea that the Holocaust is too terrible to be represented' (ibid, p 9). While Eisenman does not specifically discuss the notion of the sublime in the context of designing the memorial, it is clear he did not wish for the site to be perceived as beautiful. 'I think it is a little too aesthetic. It's a little too good looking' (Eisenman, 2005a, para 8). The sublime traditionally contrasts the beautiful; it is associated with the unrepresentable, a masculine monumental scale, which is beyond human

comprehension (Kaplan, 2007, p 7). By employing abstract, immense non-representational forms, perhaps it was Eisenman's desire to evoke the horror associated within Burke's (1998) notions of the sublime, 'How, then, is it possible to aestheticize their crime against humanity if to aestheticize means in some way to transcend the ordinary through some form of beauty?' (Eisenman in Rauterberg, 2005, np).

Shaw (2006) draws a distinction between the 'natural' sublime and 'cultured' sublime – the sublime as a product of language. The natural sublime is constructed as a 'quality inherent in the external world' and, in the past, was often associated with divinity (p 28). As Treib (2005) observes: 'nature was the great source of the sublime, a world of precepts so vast and so beautiful that they reflected the Divine Nature of the deity. Landscapes, rendered or constructed, embodied these visions' (p 17). Sublime experiences in nature are often triggered by atmospheric conditions, encounters with forms that greatly exceed or compress human scale, and moments of embodiment where we somehow release our iron grip on the material world and become one with landscape. These spatial experiences can be expressed in dimensional language and harnessed within memorial landscapes to optimise sublime experiences. While Shaw (2006) posits that, as a product of language, the contemporary sublime can be 'freed up from its slavish dependence on the natural world' (p 47), memorial landscapes *are* experienced in the 'natural world' and those conditions temper our experiences of built works.

Regardless of origin or application, the sublime remains a difficult experience to capture. 'Our ability to discern boundaries or spatial or temporal limitations is brought into question by the sublime … The sublime frustrates judgment … the sublime, in short, is presented here as an affront or "outrage" to our powers of comprehension' (Shaw, 2006, p 78). Clearly, in the design of the Memorial to the Murdered Jews of Europe, Eisenman intended to push visitors beyond the limits of understanding, to distil a sense of dislocation, to wangle uncertainty (Eisenman in Rauterberg, 2005, np). The paradox of representing the Holocaust in such a manner is that, in divining the sublime, one may reawaken trauma in survivors; alternatively, the initiation of a sublime experience in visitors could 'induce a visceral understanding' (Kaplan, 2007, p 159).

The memorial is deliberately disorienting and the banality of form and lack of material reflectivity bury the visitor in shades of grey. One could lose all sense of self within the disordered blocks. I imagine it feels like death.

> These spaces condense, narrow, and deepen to provide a multilayered experience from any point. The agitation of the field shatters any notions of absolute axiality and reveals instead an omnidirectional reality. The illusion of the order and security in the grid and the frame of the street grid are destroyed (Lee, Bae and Choi, 2006, p 243).

Hopelessness, emptiness, death. 'The stones make us deaf, they swallow the everyday' (Rauterberg, 2005, np). Death is the ultimate in sublime because, despite our apparent denial, there is nothing we fear more than our own dying. Thoughts of death are limitless – vast, horrifying – and can paralyse us with fear; and yet our own death is inconceivable. Freud (1939) observed:

> Our own death is indeed unimaginable, and however often we try to imagine it, we realize that we are actually still present as on-lookers. Thus … fundamentally no one believes in his own death or, which comes to the same thing: in the unconscious each of us is convinced of his immortality (p 183).

When walking within the memorial, does death awareness violate being, flooding consciousness with thoughts about the victims of the Holocaust and about the endless grief of the bereaved? Or does the evocation of the sublime awaken our own fears? Perhaps the experience of the memorial forces a confrontation with our own terrors – fear of losing loved ones, the seemingly randomness of death and our own demise. If we have suffered trauma, this confrontation with the memorial could break down emotional firewalls, allowing for the interpenetration of banished emotions. I wonder: Do we bear our own stones to the memorial?

'All attempts to give voice to this event necessarily fail since, at present, no idiom exists by which to do it justice. In terms of the sublime, the pain of the Holocaust is such that it exceeds our ability to supply a concept' (Shaw, 2006, p 128). For designers of memorial landscapes, the challenge is to say that which cannot be said, to use built form to stimulate memory and, where appropriate, communicate the sublime embedded within spatial expressions of tragic death. But for Holocaust survivors, recovery from traumatic loss and grief is particularly convoluted. Memories are not merely repressed; they are repudiated (Krystal, 2002). To design a memorial to commemorate the Holocaust is to *bring to speech* that which should never be forgotten nor remembered, for the very presence of the memorial could reawaken terrors beyond description for survivors. 'The people who have lost everything really have no chance of completing mourning successfully' (Krystal, p 213). However, as Huyssen (2003) remarks:

> Everybody recognizes that there can be no perfect solution to memorializing the Holocaust in the country of its perpetrators. But it must be commemorated, through an act of political will and with a commitment to the democratic future, even though any monument will always run the risk of becoming just another testimony to forgetting, a cipher of invisibility (pp 80–81).

Events of contemporary violence, tragedy and disaster unsay the world (Corner, 1997, p 99); they are seemingly beyond our ability to express them. Sites of death wound the flesh of the earth. Battlefields tear pastoral landscapes asunder – the remnants of a regiment buried beneath a series of hand-hewn crosses, the scorched girders of the World Trade Center towers remaining erect amongst the smoke and ashes, a room of empty ovens; even as images, these places have the power to evoke pathos, absence, pain, terror – to awaken the sublime. As Burke (1998) states:

> Whatever is fitted in any sort to excite the ideas of pain, and danger, that is to say, whatever is in any sort terrible, or is conversant about terrible objects, or operates in a manner analogous to terror, is a source of the sublime; that is, it is productive of the strongest emotion which the mind is capable of feeling (p 36).

Sometimes the sublime is evoked in memorial sites because of our pre-existing knowledge of the tragedy. When visiting the National September 11 Memorial in New York City recently, I had no idea that viewing the endless stream of water

within the memorial fountains would awaken the horrific memory of victims tumbling from the tower heights. Sometimes, it is our knowledge of history or a willingness to delve deeper into the seemingly benign appearances of a site that releases the sublime. Tumarkin (2005) names this form of inquiry the 'vertical imagination' (p 224):

> To answer a vertical question, of course, we need vertical imagination, the eyes to see what lies under the surface. Horizontal imagination flattens the layers of history, making complex, shared, resonant spaces appear empty of meaning and barren of history. Yet places of loss and trauma are never empty or blank (pp 224–225).

This notion, that sites of loss and trauma taint the earth, could be seen as a projection of pathetic fallacy – the scars of grief that invisibly mark the body of mourners are echoed upon the death plain. Senie (2006) observes: 'there is pervasive evidence that we believe the ground we walk on holds the content of its history—offers direct access to what has occurred there. Mourners at spontaneous memorials often act as if the bodies were buried there' (p 46). To host such woe creates a palpable atmosphere of sorrow in the landscape. For example, when I pass a roadside memorial at highway speed, the vision of a site marking death initiates an atmosphere of sorrow inclusive of the surrounding landscape – the vast prairie, the endless sky, the storm clouds rising on the horizon – collectively these awaken the burden of grief that slumbers fitfully in my heart.

To Norberg-Schultz (1979) the atmosphere that lies dormant within particular environments is the *genius loci*. As Seamon (1984) explains, 'The ancient Romans held that all natural places possessed a *genius loci*, a spirit of place. This spirit, it was believed, gave life to people and places and determined their character or essence' (p 134). Norberg-Schulz (1979) posits that particular landscapes are entrenched in human cosmology because they allow us 'to dwell between heaven and earth' because of their association within human consciousness and experience (p 23). We often equate the sublime with ancient forests, vast deserts and stormy seas. For the Nazis, the concept of *Blut und Boden* or 'blood and soil' expressed the intertwined relationship between a pure Aryan being and a 'native' landscape. This concept extended to all manifestations of 'dwelling' (Heidegger, 1971) – art, architecture, farming practices, landscape gardening, landscape architecture – each was potentially an expression of fealty to National Socialistic doctrine, but, on a deeper level, these modes of 'dwelling' were seen to emit from 'deep roots in place attachment, a chthonic "spirit of place"' (Dovey, 1999, p 58).

Gröning (2002) extensively discusses the role of German landscape architects in the blood and soil campaign, noting that, once a landscape had been cleansed of 'inferior races', designers were to convert the landscape into one where 'the Germanic man would feel at home and where his "Nordic longing for landscape" would be met' (p 122). For Eisenman, there was a deliberate effort to subvert the Aryan *genius loci* of blood and soil by avoiding the use of materials 'that came out of the soil because the soil was for the Germans' (Eisenman, 2005a, para 6). Further, by destabilising the ground plane of the memorial, Eisenman imposes a shattered grid, introducing a chaotic topography that expresses the disorienting spirit of a damaged place and breaks the rationalist grid of an ordered city.

Further, the absence of arboreal elements denies any association with a Teutonic landscape mythos.

Living in closer proximity to an 'animate Earth' (Abram, 1997, p 149), as our hunter-gatherer and agrarian ancestors once did, promoted a deep intertwining of earth-being and human-being, and a healthy respect for the raw power of nature. Regardless of how we moderns might romanticise this prelapsarian intimacy (Oelschlaeger, 1991), the exposure to pestilence and disease, warring rivals, marauding animals and extreme weather destabilised everyday life. In response, the ancients developed cultural rituals, systems of belief and gods to account for phenomena beyond their understanding. These cultural schemas stabilised the relationship between human beings and nature by providing a means of accounting for the cosmological chaos that extends beyond human control. Yet particular phenomena continue to resist human desire to rationalise their occurrence. We do not always possess the ability to express particular sensations such as fear, pain, death and the wonder of the wild in plain language. There is a moment, as Shaw (2006) observes, where 'the ability to apprehend, to know, and to express a thought or sensation is defeated' (p 3). Regardless, artists, poets, architects and landscape architects continue the struggle to express these notions, to portray the sublime.

The scar, the wound, the place marking death exceeds our sense of order. One impulse is to repair, to repudiate, to erase in an attempt to aid forgetting. In discussing the fate of traumascapes, Tumarkin (2005) observes the propensity to soothe over sites of tragedy, to erase 'the material remnants of past horror' when, potentially, these relics have the power to 'provide entry points into human experiences' (p 200).

> Material remnants of atrocities testify to histories that elude language altogether or for which a new language is yet to be invented. They reach people in a myriad of unknowable ways, which, by virtue of being pre-verbal and pre-ideological, can never be fully manipulated or contained (p 200).

To depart from the knowable is to enter the infinite world of the sublime. As Derrida (1987, as cited in Shaw, 2006, p 118) notes, '[The sublime] "is not contained in a finite natural or artificial object", it must be sought, rather, in that which has no boundary'. The irony of this notion of boundary is, of course, that once we attempt to define sublime phenomena through language, written, spoken or spatial, we thereby bind it. Glickman (1998) observes that, 'Language therefore serves a mediating function: it attempts to name and contain the sublime, to make sense of it' (p 40). In reflection of this comment, certainly the Memorial to the Murdered Jews of Europe, as a built form, potentially contains a sublime experience, but it cannot give one. It remains an object, bounded by its inanimate state; only by experiencing the monument can we bring its purposes to presence. The realm of the sublime may exceed everyday language, but it can be experienced. In this, we turn to Heidegger (1971) who states, 'A boundary is not that at which something stops but, as the Greeks recognized, the boundary is that from which something begins its presencing' (p 154). In other words, the sublime emerges from our conscious awareness of it, through our *presence* within a given lived experience.

Schama's (1995) inquiry into landscape and memory employs 'vertical imagination' to excavate the subterranean subliminally of the terror that lies beneath the beauty of the ancient forest, the *puszcza*, that spans the borders of Belarus, Lithuania and Poland.

> There was, I knew, blood beneath the verdure and tombs in the deep glades of oak and fir. The fields, forests and rivers had seen war and terror, elation and desperation; death and resurrection; Lithuanian kings and Teutonic knights, partisans and Jews; Nazi Gestapo and Stalinist NKVD (p 24).

A tumulus in the landscape attracts his glance towards the town of Giby in north-east Poland. Atop the hill stands a wooden cross. Schama describes the vision as if it were a scene from a Caspar David Friedrich painting, all Gothic and dramatically lit by the late-afternoon sunlight. The mound is a commemorative site, dedicated to supporters of the Polish Home Army slaughtered in 1945 by Stalin's security police (Schama, 1995, p 25). Stones bearing the names of 500 men and women are raised upon the hill. Standing atop the burial mound, gazing about the landscape, Schama marks the scene to memory – small timber residences surrounded by agrarian scenes, crops in the fields and fowl in still waters, a river glistening through the valley floor, and framing the scene – the darkness of the forest primeval.

Schama finds the beauty of Giby at odds with his expectation of place and of ancestry, 'I had always thought of the Jews of the Alte Land as essentially urban types' (ibid, p 27), but many lived and laboured in the forest, amongst them members of Schama's family. The beauty of the fringe lands aside, the ancient ancestral forest fills Schama with discomfort, for the 'brilliantly vivid countryside' is under-painted with the horror of the Holocaust. 'For Poland's Jews en route to the charnel house, a view of the countryside had been blotted out by the shutters and nailed-down slats of transport wagons clattering relentlessly toward the death camps' (p 26). These two landscapes coexist in Schama's mind. The sublime beauty of the great primal woodland of the *Bialowieza* and the picturesque villages of the forest fringe are tempered by memories of the regional violence – the earth blood-soaked and the sky choked in plumes of ash. 'Landscapes', he concludes, 'are culture before they are nature; constructs of the imagination – projected onto wood and water and rock' (p 61).

Running through an allée of elms one morning, I thought of the Memorial to the Murdered Jews of Europe. It was early spring in Manitoba, and the trees were only beginning to flesh out. A tiny cluster of fledgling leaves clung to the dark limbs overhead. Each twinkled like a verdant little star. After a long, cold winter, the awakening of the world seems nothing short of a miracle. I thought of the grey gorges of the memorial and the stelae creeping across the uneven ground. I thought of despair, of the oppressiveness of the massive blocks and the sensation of feeling lost and overwhelmed within the space. Quigley (2005) was there and she describes moving through the stones:

> Walking down one of these passages is disorientating, and scary; you can't see who is approaching you, nor who is behind. The tilting ground and lack of vision offers some small idea of the Jewish experience from WWII: your past snatched away, your future insecure, little hope of escape (para 7).

I recall Schama (1995) and his portrait of the ancient forest: 'The woods became instead their colony of death, a place of mass executions dispatched close to the roadside perimeter of the dark forest; a dirty business of hasty entries and exits' (p 71). In this reflection, the Memorial to the Murdered Jews of Europe acquires a new identity. I characterise it as a forest of wild nature, raped of greenery, and of the human beings who once brought it to speech. The intertwining of humanity and landscape is ruptured. 'We must describe Nature', posits Merleau-Ponty (1968) in the working notes he wrote just before his death, 'as the other side of man (as flesh)' (p 274). Here, instead, is death by landscape; I recognise the memorial as the other side of the other, a *terror incognitus*, where the living inhabit a necropolis in which only the dead should dwell. Something wicked has been set loose upon the lived world. A deathscape has been divined from darkness and placed squarely in the public realm, rupturing the taken-for-granted stability of the everyday landscape. As Cosgrove (2005) observes, 'Terrorism's incoherence cuts deep across those late twentieth-century debates about the cultural politics of commemoration; the sickening poetics of its violence acknowledge no identity in its victims' (p 97). Perhaps this is what provokes the greatest horror here – the loss of identity. The dead are nameless sentinels set in an endless grey purgatory. As visitors, we fear that we, too, could lose our individuality amongst the endless standing stelae. Never remember. Never forget. The memorialised dead are beyond memory – absent now, set in an endless void. The dead have now 'assumed the form of the landscape itself. A metaphor had become a reality; an absence had become a presence' (Schama, 1995, p 25).

'There are few settings which conjure up this equivocating feeling of the Sublime more than the places of the dead', observes Worpole (2003, p 17). Living within, tending and attending to places of death and disaster in landscape might bring solace and adaptation to loss or, alternatively, *attending to* deathscapes may awaken terror, recognition of the magnitude of evil and the ferocity of wild nature. It would seem to me that, although we can will away our primitive self, a deep connection with the natural world remains affixed within our psyche. Experiences of the sublime transcend the everyday; they are unforgettable. The Memorial to the Murdered Jews of Europe aims to disturb, to induce an embodied response, to hoist upon each visitor the burden of remembrance. This is why the sublime is such a powerful tool in commemorative culture. But when we emerge from the darkened corridors, when the cacophony of the city stills the ringing in our ears, do we experience relief? Are we granted respite from the burden of memory? Tumarkin (2005) reminds us that catharsis can be the post-traumatic effect of experiencing the sublime, 'The cathartic experience that traumascapes can trigger is a release from the burden of the traumatic past, but also of the anxious and uncertain present, from the burden of political correctness, the burden of knowledge and ignorance, of innocence and guilt' (p 53).

So, once again, we find ourselves in a paradoxical position. If the Memorial to the Murdered Jews of Europe succeeds as a monument because of its capacity to induce a sublime experience, and if the after-effect of that experience is purifying, does it succeed as a memorial? Young (1993) suggests the monument can remove us from the burden of memory, from the 'obligation to remember' (p 5). A monument is self-referential, an aesthetic object. A memorial is

phenomenological, experiential and potentially transcendent; the memorial is mutable, its discursive values evolve. Does the Memorial to the Murdered Jews of Europe exist as a monument or a memorial? Does it inspire us to become agents of memory, keepers of the stone? If experienced as sublime, the Memorial to the Murdered Jews of Europe has the capacity to disseminate discomfort, to disturb, to incite discord. 'Discord', Dewey (1934) reminds us, 'is the occasion that induces reflection … The artist … cultivates them, not for their own sake but because of their potentialities, bringing to living consciousness an experience that is unified and total' (p 15). However, this consciousness can only be individually awoken within the memorial experience. The agency of remembrance remains the responsibility of each of us.

The human capacity to execute acts of violation is realised all too often in contemporary life. Nature's acts of violence are equally cataclysmic and seemingly expanding in scale. The earth where these events occur is contaminated by violence and death. And we still erect memorials so we can commemorate the dead, ease the soul of witnesses, acknowledge the grief of survivors and repair the tears in the flesh of the world.

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Rendering the Untimely Event of Disaster Ever Present

STEWART WILLIAMS

So-called 'natural' disasters are an integral part of the Australian landscape, with the nation being celebrated as a land of fire and flooding rains. Yet extreme events do not often impact directly on most Australians. A disaster, by definition, comprises relatively exceptional phenomena. It is often experienced as a mediated product and representation of something that has already happened and is now a fading memory or a threat looming closer, perhaps, but always still to come. The disaster is no longer or not yet present in the landscape and is thus located elsewhere, relegated to the past or the future.

The absence rather than presence of such events is no more evident than in the way they are handled in the conception as well as actual practice of disaster management. The common approach is generic in that four main stages are identified, with preparation and planning for a possible event and then response and recovery should it ever arrive (Williams, 2008; Williams, et al, 2009). Whilst rarely remarked, there seems to be a process of foreclosure at work here, refusing to let the horrendous blot that is a disaster remain on the landscape for any length of time beyond what is deemed absolutely necessary. The associated 'before' and 'after' periodisation dominates how we might engage with an event, encouraging its erosion from the here and now. Referring to 'post-disaster landscapes' also contributes to such a temporal ordering.

I caution against dismissing any disaster as ever fully over, gone or driven from the landscape, however, and instead suggest exploring it as a possibly more enduring material presence. I start with a review of the spatio-temporal understandings of landscape in relevant disciplines as they have shifted from the fixity of framing to a fluidity of feeling. I note how some of the most significant bushfires over recent decades in south-eastern Australia still tend conversely and quite problematically to get 'fixed' in time and space as elsewhere in the past with, subsequently, limited connection to any here and now. Responding to this concern, I document and reflect on the temporal phenomena of one particular bushfire-affected landscape with a meditative sojourn along Old Farm Road in South Hobart, Tasmania.

From framing to feeling in the temporal landscape

Understandings of landscape in the disciplines of geography, archaeology and anthropology as well as landscape architecture have shifted significantly in recent decades. The relatively static framing of landscape as viewed from afar grew out of the painterly and writerly traditions of centuries past. Its spatio-temporal perspective on the world has since been pulled in different directions. Cultural

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geographers first advocated a focus on landscape as 'a cultural image, a pictorial way of representing or symbolising surroundings' (Daniels and Cosgrove, 1988, p 1). Their iconographic concern with representing space also draws together the historical aspects of environment, art and politics but has primarily been dialectical such that 'the material face of the land reflected the social face of the landscape polity … The physical environment was a reflection of the political landscape' (Olwig, 2002, p 21; also Mitchell, 2002; Naylor, 2006).

These historico-geographical stances towards the landscape have, however, given way to a more dynamic 'enchantment' with worldly things and interactions with 'more-than-human' as well as human bodies and their 'affects' (Bennett, 2001; Braun and Whatmore, 2010; Lorimer, 2006; Rose and Wylie, 2006; Whatmore, 2006). Such scholarly developments have followed the move away from representational epistemology towards 'non-representational theory' (NRT), which has a stronger ontological focus on the relational constitution of things in place (Anderson and Harrison, 2010; Thrift, 2005, 2008). This latter concept has also appealed to landscape architects not least because of the shared interest in material objects (including, to some degree, their form and function). In this journal, Abbott (2012, p 25) asked recently, 'what are the ways we should move, inhabit and sustain ourselves within landscapes, such that the activities we undertake bring us *within* the wider ecological weavings of the environments in which we dwell?'. His critique of the descriptive empiricism dominating cultural geography's work on the material landscape invites an attention to temporality that he has explored elsewhere (see Abbott, 2007a, 2007b, 2011).

Abbott (2012) seeks to prescribe current action with an implicit view to the future, but other aspects of time, especially the past, are central to his work on heritage landscapes (Abbott, 2007a, 2007b). This focus on environmental or ecological history is valuable in portraying the landscape's spatio-temporal constitution as both 'multiple and discontinuous' (Abbott, 2007b, p 32) and 'a time-driven living process' (ibid, p 36). Alternatively, much research on performative, embodied and affective ways of being in the landscape tends to be captive to the now. Abbott (2011, p 81) also sees landscape simply as providing 'an opportunity to develop moments, both in time and place, that show sensitivity not only to the qualities of specific places, but also to the experiential and cognitive possibilities that these places afford'. Similarly, some of the leading acolytes of NRT advocate dismissing a Cartesian ideal of certainty 'for "infinitive" and distinctly geographical understandings – tak*ing*-place, mak*ing*-sense – which speak of the time of the present, not of all Time' (Dewsbury, et al, 2002, p 440; emphasis in original). To explore disaster's presence in the landscape, a non-representational stance seems appropriate. Still, its under-theorised temporality becomes a problem if one is investigating a phenomenon's duration or persistence with linkages backwards and forwards through time as much as any experience or sensing of some single ephemeral moment (even though this latter remains key). Hence, Thrift (2005, p 139) is critical in this context of one of NRT's key concerns and notes, 'One thing which is often neglected about affect is that it involves temporal extension'.

The notion of dwelling in the landscape (so familiar to landscape architects) thus proves helpful here. From the archaeological and anthropological disciplines,

Ingold's work is most relevant because he adopts a phenomenological perspective on our being in the world that has parallels with NRT but also addresses 'the temporality of the landscape' (2000, pp 189–208; compare Abbott, 2007b; Cloke and Jones, 2001; Massey, 2006; Wylie, 2007). For Ingold, time as well as space has its basis in embodied human perceptions and practices. He is therefore critical of *chronos* or historical clock time and prefers the seasonal and social forms of lived time that are associated with the continuous present of duration. Of 'this moment, a particular vista of past and a future', he suggests 'it *constitutes* my present, conferring upon it a unique character':

> Thus the present is not *marked off* from a past that it has replaced or a future that will, in turn, replace it ... And just as in the landscape, we can move from place to place without crossing any boundary, since the vista that constitutes the identity of a place changes even as we move, so likewise we can move from one present to another without having to break through any chronological barrier that might be supposed to separate each present from the next in line (Ingold, 2000, p 196; emphasis in original).

This phenomenological temporality has us interacting with the landscape 'not as spectators but as participants' (ibid, p 196). It is in contrast to most approaches to understanding and managing disasters, however, where instrumental conceptions of space and time continue to rule.

Locating the event of disaster: Bushfires in Australia

Bushfires present an exquisite case of disastrous natural phenomena, being reduced to brief but specific moments and locations in the landscape. Consider some of the biggest fires in the Australian psyche and a collective living memory: Black Friday on 13 January 1939; Black Tuesday on 7 February 1967; Ash Wednesdays on 20 February 1980 and 16 February 1983; and Black Saturday on 7 February 2009. Each is fixed on just one specific day of destruction that occurred somewhere in south-eastern Australia. Their temporal pinpointing is precise and most pronounced in comparison with the relative looseness of any spatial framing that might be afforded (as Tasmanian, South Australian and Victorian bushfires).

As an event, a bushfire heralds both change and surprise as an unexpected unfolding of the world. As such, the event constitutes a break with the background and its particular socio-material configuration. Derrida (2003) states of the 9/11 disaster in New York, for example, 'something took place' that we never saw coming:

> But this very thing, the place and meaning of this 'event', remains ineffable, like an intuition without a concept, like a unicity with no generality on the horizon or with no horizon at all, out of range for a language that admits its powerless and so is reduced to pronouncing mechanically a date, repeating it endlessly, as a kind of ritual incantation, a conjuring poem, a journalistic litany or rhetorical refrain that admits to not knowing what it's talking about (p 86).

Major bushfires likewise inspire shock and awe and are often followed by due processes of inquiry. Australia's most recent and disastrous event, therefore, saw the 2009 Victorian Bushfires Royal Commission endeavouring to understand

what had happened. It examined not only Black Saturday but many other days and related incidents from around that time. In the process, numerous stakeholders helped the commissioners and the public to better understand what had eventuated over a period of protracted but notably 'unprecedented' weather to give rise to so many intense bushfires. Although the worst aspects were a culmination of the firestorms rather than bushfires occurring on that one day, and with 177 human fatalities concentrated in several now sadly remembered townships, much damage had already been sporadically incurred with the burning of native habitat on protected areas as well as the loss of agricultural land and properties across hundreds of thousands of hectares over several weeks (Teague, Mcleod and Pascoe, 2009).

The excessiveness of the event was manifestly evident but was reflected also in the way it escaped representation. In its wake, Australia's then Deputy Prime Minister, Julia Gillard, described the Black Saturday event in *exceptional* terms:

> 'The seventh of February 2009 will now be remembered as one of the darkest days in Australia's peacetime history ... A tragedy beyond belief, beyond precedent and really beyond words ... It will get worse and Australians need to prepare themselves,' Ms Gillard told the nation's parliament (*The Age*, 9 February 2009).

An appreciation of the growing threat has now seen need for a new language. The interim report from the commission recommended, amongst other actions, developing 'a revised fire severity scale for use in bushfire warnings based on new fire danger ratings' (Teague, Mcleod and Pascoe, 2009, p 25). The new 'catastrophic' level of fire danger, superseding the previously highest level of 'extreme', has subsequently been introduced. Yet our language will, and perhaps inevitably must, fail to capture events that are by nature excessive (Griffiths, 2012).

With work on risk management for climate change and terrorism, scholars are, likewise, now also noting the way in which the unknown potentialities of disaster are being anticipated and enacted with specific logics such as precaution and pre-emption (Anderson, 2010). These attempts to look at and then throw ourselves into the future have analogues in probabilistic prediction, actuarialism, insurance strategies and scenario-building approaches for adaptation to uncertainty (Williams and Jacobs, 2011). The worlds thus created might approach a virtual reality but in truth must remain unknowable. Future events are only ever just about to become present and, hence, available to the sensory experience that renders true our faith in and knowledge of the world. Meanwhile, our existence remains on a knife-edge that separates the familiar and everyday from unimaginable calamity.

It can seem easier to claim that we know and understand past events, with their locations claimed as quite precise. The retrospective treatment of disasters will sometimes involve memorial sites and landscapes of remembrance that involve careful siting in time as well as space. Examples here include responses to such specific and sensitive events as the Holocaust and various wars as well as terrorist acts, including most notably 9/11. Yet they are still inevitably subject to political contest (Edkins, 2003). Even the discretely bounded, everyday spaces of cemeteries are similarly seen to be connected beyond to the different interpretations of cultural meaning with profound attachments to place and

investments in the broader landscape (Bowring, 2000). Their temporal ordering of our worlds is similarly about relating absence and presence.

The Black Saturday bushfires in Victoria have presented similar tensions, for example, around the 'stay or go' policy on householders' decisions either to remain and defend their homes or leave early, and likewise with questions of whether or not to rebuild exactly in situ those townships razed by bushfires. Any response will speak somehow in memory of that particular event (and perhaps also to future ones). The environmental historian Tom Griffiths sees the differential relationship between remembering and forgetting as critical to how Australians might continue to live – or otherwise perhaps die – with bushfires (Griffiths, 2009a, 2009b). Whilst wary of the tendency to describe major bushfires as unnatural, he does note that the long tradition of Australians living with the bush is now faltering. Therefore, he cautions against losing our particular temporal, or what he terms 'local historical' as well as environmental, connections to this landscape.

> There is a dangerous mismatch between the cyclic nature of fire and the short-term memory of communities, and there is often an emotional need, as people return and rebuild, to deny the 'naturalness' of the event, and to remain unbowed. It is hard for humans to accept, and therefore to remember, that nature can overwhelm culture. These bushfire towns – where the material legacy of the past can never survive for long – need to work harder than most to renew their local historical consciousness (Griffiths, 2009a, p 35.5).

Griffiths (ibid, p 35.6) concludes with the comment that those Australians returning to rural Victoria to rebuild their communities are conducting what he describes as 'the most intriguing and important experiment'. But then, peopling the Australian landscape has always been a challenging interaction and iterative process of both testing and being tested, over and over again. I would also add that any such experiments are, by their nature, immediately embodied, experiential engagements with the transitional intensity of a world. Thus, they are something we all might variously and perhaps unavoidably conduct over time.

Indeed, my own forays into the bush near home have of late been undertaken increasingly in the style of experimentation, although the material legacy explored is more obdurate, I suggest, than Griffiths permits. I described earlier how the arrival of bushfire 'heralds both change and surprise as an unexpected unfolding of the world'. Such an event warrants – or rather demands – an analytic approach that is open to both experience and experiment. In fact, the two are intertwined in the knowledge and sense of our being thrown into a world that is always already immediately present whilst in the process of becoming otherwise. From a pragmatic, vitalist perspective, one might agree with Dewey (cited in McCormack, 2010, p 205) that experience 'is experimental, an effort to change the given. It is characterised by projection, by reaching forward into the unknown; connection with a future is its salient trait'. Such an approach provided the methodology for my sojourn into the field as described below. I used mixed methods including the sensing of embodied experience, writing journal notes and taking photographs whilst also engaging in reflection and theorisation. However, in addition to the usual alertness to the future, this experiential and experimental foray was also sensitive to a connectedness with the past.

Old Farm Road, South Hobart, Tasmania: 10:30am Tuesday, 20 March 2012

On a beautiful, bright morning, the crisp, clean and cool mountain air circulates around the back of South Hobart; sunlight warms the houses, the roads and fields that run up to the bushland cloaking the foothills of Mount Wellington. The familiar sounds of human activity nearby merge with the clicking of insects and rustle of wrens. I walk along Old Farm Road and am embraced by the changing vista that discloses itself to me.

It is hard to believe that bushfire is not truly banished from this mosaic landscape of wet sclerophyll and rainforest refugia. Walking briskly, I draw in the sweet, cold, dew-laden air and the tinkling refrain from the small stream of the Hobart Rivulet, with the lush green cushion of marsupial lawns springing back against my footfalls. It is an idyllic place but one that belies another reality: dry winds, heat and flames have also always been part of this environment and remain essential to its regeneration. In 1967, the Hobart bushfires tore across the terrain, resulting in the loss of 62 lives and more than 1,260 homes. This event gets surprisingly little mention nowadays, though. In the meantime, development proceeds apace, with ever more and ever bigger homes and subdivisions continuing to spring up on ridges and hillsides, encroaching into bushland and reworking the city's skyline to capitalise on the wonderful scenic views of the River Derwent glinting far below.

Our attention is perhaps being diverted. In the case of disasters, we look neither to the future nor to the past and, when thrown into their midst, we aim to have everything cleaned up as quickly as possible. Homes and livelihoods need to be reinstated, and the insights from lessons learnt warrant implementation as soon as is feasible. But then people also want to forget; they seek closure. The healing they might want is different from that of a landscape that appreciates these fiery events and is nourished by the hot ash, smoke and cinder. Yet the intensity and trauma, then scarification, that it yields up are part of the processes and experiences of natural change, growth and ageing. These have, for a long

Old Farm Road, South Hobart, Tasmania.

Old Farm Road, South Hobart, Tasmania.

time, been embodied in the rituals of Australia's indigenous peoples, amongst others, as well as in the biophysical environment's own natural cycles. It therefore continues to haunt and be sensed in the landscape.

Old Farm Road starts just 4 kilometres away from the Hobart central business district and, within minutes of walking, opens up another world altogether. It comprises more than just the supposedly 'natural' environment. Here, there are the remnants of human lives impacted by and surviving or succumbing to bushfire events. It is an eerie feeling, with the traces of 1967 still so present. Out of the tempering heat of fires past, rust-red oxidised farm gates and fencing have been salvaged and born again; pickets and droppers, chains and latches, all are reused. Also quite remarkable are the remaining timber rail-posts that still mark driveways and boundaries on old properties; rescued iron now butts up against newly installed galvanised water tanks, Hills Hoists (clotheslines) and rebuilt homesteads. Relict power poles stand as solitary sentinels with their more recent recruits marching in a line up the hill behind. This renewal lends deeper meaning to the idea of Australia being a renovation nation.

Amongst bulldozed bricks, collapsed frames and formwork, cables and rubble, there are now other, often new and different residents making their homes from the remnant materials at hand. Cracked concrete, crumbling to dust, has collected in secret crevices; leaf litter and the microscopic life-forms attending it follow. This matter subsequently affords a foothold for the adventurous insinuations of root and tendril, accommodating what will become – however momentarily – the next new community. Long-buried potential is realised as burnt seed pods split open; seeds germinate; corms and rhizomes explode with energy. Life pushes through the surface of things, reaches out and takes hold. It is life – and death – that have always made themselves present in the changing forms and patterns encountered at different moments in the landscape.

I encountered powerful presences and potentialities on my sojourn along Old Farm Road. My recounting here resonates with the familiar experiential or phenomenological descriptions of being in the landscape detailed by others

Old Farm Road, South Hobart, Tasmania.

Old Farm Road, South Hobart, Tasmania.

(as noted above). In addition to the feelings and possible memories evoked, and the energy or life-force sensed here, the landscape is littered with the materials and artefacts of many (human and non-human) lives. Their duration, albeit in changing form, affords us a place in the world that is constituted through a persistent presence as well as flux, which returns us to issues of temporality in the landscape.

Coda: Rendering the untimely event of disaster ever present

The untimely event of disaster can strike and advance rapidly across a landscape but then also appear to recede at a similar rate. It is commonly situated through those instrumental understandings of space and time that are used to pursue, from emergency headquarters, for example, such practical ends as the identification and management of a specific disaster. Whilst it can subsequently lose any substantive, phenomenological sense of historical as much as environmental connectedness, such is the nature of the event. Reflections on the still-present material evidence of Hobart's 1967 bushfire, as a major incident seemingly long since finished with, have been provided here in text and photo documentation that suggests a need for greater attention to its enduring temporality in the landscape.

The persistence of various aspects of those natural and sometimes disastrous phenomena of fire and flood demands better accommodation than is usually provided through modern approaches to disaster management. Rather, we need to exist with them as the constantly excessive, if also contingent and dynamic, manifestations of a material life-force that we all share. Landscape designers, architects, planners, developers and others would therefore do well to consider how we represent or misrepresent these powerful and at times all-pervading (yet perhaps too easily then dismissed) events. In addition, there is the real and substantive matter of how we might bring them back to presence in our own undertakings so as to continue living with them now. By way of conclusion, I provide examples and suggestions for proceeding, which are set in different contexts and look to floods as well as fire.

There are numerous arenas in which we might actively come to appreciate the multiply constituted complexities of natural disaster. In Australia, at the University of Tasmania, the postgraduate unit KGA518: *Planning and managing for climate change* (taught by this author) offers practical opportunities for student planners to engage with the social-ecology of bushfire (University of Tasmania, nd). One opportunity includes a tour of the local environs to view and discuss recent burns (deliberately planned or otherwise). It also has students interacting with community elders who survived bushfires from as far back as 1967 in Hobart. These actors are deemed critically important here, just like any other stakeholder agency or individual. Their animated retelling of these events reveals embodied memories and experiences of times and places that continue to translate into key learning outcomes for students long after the fact. Similarly, in New Zealand, Abbott (2011) notes research in landscape design that has explored various materials, technologies and ways of being in the landscape (as well as education programmes) that facilitate a more participatory engagement with it. Sympathetic, intimate and enduring relationships are stressed as being key here.

Internationally, landscape architects are also making significant contributions. For example, Mathur and da Cunha (2009, 2010) offer a compelling re-reading of floods in India. They describe various times as well as places in the subcontinent's monsoon terrain through an unusual but most meaningful lexicon. Here, the *nullah* is 'a surface that gathers and dissipates [water] with a complexity and temporality that beguile the eye' and to be considered alongside the *maidan*, which is associated with times of dryness and 'not a demarcated space within the city but one among multiple appropriations of an open terrain that works by the times of various calendars' (Mathur and da Cunha, 2010, np; also 2009). Theirs is a new and exciting approach to how we might think about (and so then get on with living amidst) the persistently problematic, if also enchanting, imbrications of human settlements, history and ecology. It certainly speaks likewise to the need for more novel and timely renderings of natural disasters as ever present with us in the landscape.

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