

Before It is Washed to the Sea? - Coastal Development and Erosion

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SUMMARY

The coastal erosion hazard is increasing with climate change (including sea-level rise and more frequent serious storm events) and with continuing demand for coastal land for development and housing. Our planning responses must focus on the infrastructure and social side of the hazard as there is little we can do to affect the climate. Experience has shown that interference with coastal processes has unintended consequences; sea walls exacerbate adjoining shoreline erosion and destroy the natural character of the coastal environment.

National and local policy statements identify the importance of natural landscapes and character of the coastal environment. District and Regional plans attempt to identify hazard zones. And yet coastal property remains subject to high development pressure, coastal property values continue to rise, and owners continue to resist the clear warnings about coastal hazard, and demand protection.

A variety of planning responses to coastal erosion, including managed retreat of existing development, setback lines and design restrictions for proposed development will be examined. Property owners are understandably very protective of their land so resent anything that will adversely affect their investment; they object to their land being identified in a hazard zone, and restrictions imposed on their development potential. This paper concludes that coastal land owners must be prepared to balance the attractions of living on the coast with the threat of their land being lost to the sea. They should not expect public effort and money to protect their private assets. Land developers and local authorities should consider tenure arrangements that allow for short term occupation and use, but provide for longer term retreat.

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1. COASTAL LAND DEVELOPMENT

A very large proportion of the population of New Zealand live in close proximity to the sea. Settlers to New Zealand arrived from the sea - their first point of contact was the land adjacent to harbours. As the country proved to be so suitable for agriculture and the production of primary produce, most of the trade, both throughout New Zealand and overseas, was delivered through these harbours. Most harbours and urban waterfronts are now highly modified with reclamations and sea walls protecting essential infrastructure and strategic assets (oil terminals, storage areas, service industries, and more recently, public social spaces). Furthermore, much of our vacation and recreation time is spent at the seaside in a wide range of accommodations and styles, from open camping grounds to luxury villas and apartments. In short, we are very connected to the sea.

The affinity many New Zealanders feel to the sea is illustrated by the popularity of coastal land and baches. Many older coastal communities were relatively remote and self sufficient – they enjoyed simple structures, having their own water-storage tanks, septic tanks, unreliable electricity delivery, difficult roads. Beachside baches are the archetypal representation of New Zealand summers and holiday recreation, with the typical bach being a simply built structure used for essential shelter, while most of the living was done out on the beach or at sea.

Greater population demands and more affluent lifestyles today are changing that image. Modern coastal communities, reliant on a high level of infrastructure, now demand high quality roading, reticulated sewerage, reliable water, electricity and telecommunications delivery. This has changed the character of coastal settlement and the expectations of local authority responsibilities. There is ever-growing demand for more beach-front property to be developed, and new luxury housing is taking over from the simple bach. Recent development typically involves high value holiday homes dominating coastal landscapes, built to maximize view and proximity to the beach. Baches were often able to be uplifted or even dragged and relocated away from the encroaching sea – retreat was a reasonable option. The newer housing, with concrete slab floors, cannot be uplifted; protection or demolition are the only options when the sea encroaches.

This new development represents “an increase in both the scale and average cost of coastal development...” (Harker, 2011). This more recent style of coastal development suggests that “we have ‘given up’ on preservation and protection of natural character of much of our coast. ... A cohesive and informed community concerned about the health of their local coastal system becomes replaced (if it ever existed) by individuals concerned with the protection of private property and the effective removal of now hazardous coastal processes from their proximity” (Brookes 2001;8-9).

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Coastal property is subject to high demand that pushes property prices up, so it appears to be a good investment opportunity. Proprietors are therefore alarmed by attempts to identify that land as vulnerable (identified hazard zone, restricted development zone, or designated for managed retreat, documented in LIM reports) which reduces the value of their land. But coastal property values do not reflect the hazard threat (Turbott 2006;12, Hiatt 2008;376) nor the temporary nature of that land. American research (cited in Corrina Dahm 2002;24) has found that coastal property owners find “the risk [of coastal erosion] acceptable because they ‘want to be there’, the amenities of an oceanfront location (e.g. view, easy access to the beach, water recreation, peace and quiet) appearing to meet deeply felt emotional needs of the people who owned property there.” In Australia also, there is an increasing desire to live on the coast (O’Donnell & Gates, 2013;220).

Most coastal communities are affected and need to respond. Alongside the two major trends of response (protection of land and infrastructure with hard engineered structures, or maintaining the natural processes, character, landscapes and public access of and to the coastal area), local authorities appear to be pitted against coastal property owners who obviously want to defend their investment and lifestyle. The engineering solutions that have often been the first response to coastal erosion: sea walls, groins, beach replenishment, have often been shown to be of limited effect and non-sustainable – practically, economically, environmentally, and socially. Local authorities need to consider how they can more effectively promote public access and provide for natural coastal processes. Coastal development must be carefully managed to allow for enduring solutions (Strack, 2014).

There is an opportunity for local authorities to take a principled and proactive stand, in the face of overwhelming evidence of climate change, to plan for the maintenance and restoration of the natural and public character of our coastal land. The legal conflicts between private property rights (including the right to protect your own land), public space (public rights of access and expectations of protection) and environmental adaptation/sustainability (the inevitability of coastal change and the protection of natural character), are now being played out in political and legal forums. The conflicting influences of statutory and case law, policy documents, financial capacity, private property interests, and maintenance of the natural environment, result in slow response times, disputed decisions and inertia.

In the face of resistance to change, the ‘perfect storm’ (climate change, coastline change, property demand) will force a re-evaluation of how we live with the sea, a paradigm shift may be required to allow private property rights to make way for the inevitability of natural forces and for a consideration of social and environmental justice.

2. NEW ZEALAND COASTAL POLICY STATEMENT 2010

The New Zealand Coastal Policy Statement 2010 was prepared “to state policies in order to achieve the purpose of the [Resource Management] Act in relation to the coastal environment of New Zealand” (DoC 2010;5). It is based on the implementation of sustainability goals, including

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applying a precautionary approach: “Adopt a precautionary approach towards proposed activities whose effects on the coastal environment are uncertain, unknown or little understood, but potentially significantly adverse” (DoC 2010;12).

The policy statement supports the preservation of the natural character of the coastal environment and protection from inappropriate subdivision (Policy 13), the preservation of the natural features and natural landscapes of the coastal environment and protection from inappropriate subdivision (Policy 15) and allows for the management of subdivision and use (Policy 25), while enhancing the public utility of the coast as accessible and public open space (Policies 18 & 19). It states that coastal hazard risks should be managed by “locating new development away from areas prone to such risks; considering responses, including managed retreat, for existing development in this situation; and protecting or restoring natural defences to coastal hazards” (DoC 2010;10 Objective 5). Coastal hazard risks are to be assessed having regard to “the physical drivers and processes that cause coastal change including sea level rise” and to “the effects of climate change on ... storm frequency, intensity and surges; and coastal sediment dynamics” (DoC 2010;23 Policy 24(a) & (h)). Local authorities shall “avoid redevelopment, or change in land use, that would increase the risk of adverse effects from coastal hazards ... and encourage managed retreat by relocation or removal of existing structures or their abandonment in extreme circumstances (DoC 2010;24 Policy 25).

On the other hand, the NZCPS explicitly recognises the social, economic and cultural needs for development in the coastal marine area, including providing for the demands of a growing population, and especially including infrastructure for energy supply and transport, mineral extraction, and other activities that have a functional need to occupy the coastal marine area.

In public perception, the right of the public to access and use coastal land is part of natural law for New Zealanders. However, private property owners are similarly adamant that private rights should be protected and provide for (reasonably regulated) freedom of use of land, including the right to exclude others. Some legislation and policy would suggest that in advancing the cause of sustainability, emphasis should shift from the private property protections to considerations of environmental enhancement and public benefits.

The NZCPS could have led a change toward this perspective, but it is (perhaps disappointingly) somewhat ambiguous on this matter. The NZCPS has been described as a ‘damp squib’ (Peart 2009;237) with respect to putting any effective controls on coastal development. However, recent case law has put a more positive spin on the application of the NZCPS.

3. LEGAL PROTECTION OF PROPERTY

Unsurprisingly, governments (including local governments which have a strong interest in property, land use and land values) are reluctant to act against the interests of personal investment in land. “Balancing the public interest against the realm of private property rights, ... is difficult terrain.” (O’Donnell & Gates 2013;228). It is evident in the actions of governments that there is a reluctance to interfere with property. In the mid 2000s when the Labour government proposed a strip of land

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should be opened up alongside all rivers, lakes and the sea to provide for public access, there was widespread dissent and active protest from rural landowners, until the government withdrew the proposal.

Coastal property owners have a valuable investment to protect and they may tend to defend their rights more assertively. Litigation to protect private property illustrates “deeper, intuitive and psychological sense of what private property means to those who hold it” (O’Donnell & Gates 2013;232). Proprietors have often been successful in the courts in overriding sensible and justifiable local authority planning based on enhancing the natural environment or supporting public rights. They assert their private property rights: their supposed freedom to do what they wish on their own land; the freedom from local authority intervention and regulation. The interests of the public and the environment often do not attract strong advocacy defenders. Public interest groups have to be very well resourced to fight court cases brought by well resourced, skilled and professional proprietors defending their private interests.

Court hearings provide an opportunity for diverging views to be asserted and some expert advice and guidance about some uncertain legal interpretations. A very significant case (*Falkner v GDC*) allowed for a discussion about the common law right to protect property, a Crown duty to protect property and the Crown’s legislative power to override the common law. In this case the court accepted that the planning regime established by the RMA and district policies allowed for abandoning coastal defences in favour of the legitimate planning policy of managed retreat. However, as development proceeds, demands for protection become more insistent. A case for protection can develop from the purposes of the RMA which seeks the sustainable management of natural and physical resources to provide for the social, economic and cultural well-being of people and communities.

Councils and planners are under pressure to consent to more development of the coastal land and current guidance from the Resource Management Act 1991 (RMA), the New Zealand Coastal Policy Statement 2010, and some rules in the district plans do little to restrict future development. For example, an appeal to the Environment Court (*ORC v DCC* 2010) allowed consent for a dwelling house on coastal land that was occasionally inundated by the sea, and would likely be more so in the future. The grounds for the decision were that proprietors should be able to take responsibility for their own decisions about building in hazard zones. “There comes a point where a consent authority should not be paternalistic but leave people to be responsible for themselves, provided they do not place the moral hazard of things going wrong on other people” (para2).

3.1 Environmental Defence Society v New Zealand King Salmon 2014

Since the Resource Management Act regime of the sustainable management of natural and physical resources (s5 RMA) was established 25 years ago, judicial interpretations have evolved along an “**overall judgement**” approach and a balance must be worked out between the economic benefits and environmental protection, and the ability to avoid, remedy or mitigate effects. This court has decided that some statements in planning documents are written prescriptively and must be applied

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strictly as if they present some “**environmental bottom lines,**” and that they have the effect of rules to be complied with. The policy statements are not just lists of potentially relevant considerations to be balanced: “the intention must be that any such requirement will be binding on the relevant regional councils [and] cannot simply be a factor that a regional council must consider or about which it has discretion” (para 121).

The idea that there are environmental bottom lines to development has the potential to more effectively promote the sustainable management of natural and physical resources. This case goes some way in interpreting appropriate responses to effects; to mitigate is about ring-fencing the effects to limit their extent, to remedy is to fix up the adverse effects, while avoid means that all must done to ensure that there are no adverse effects.

The NZCPS policies 13 and 15 “provide a graduated scheme of protection and preservation based on features of particular coastal localities, requiring avoidance of adverse effects in outstanding areas but allowing for avoidance, mitigation or remedying in others” (para 90). So while salmon farming may be provided for in many coastal areas, it will not be allowed if it will have adverse effects on “outstanding” character or landscapes.

3.2 Mason v Bay of Plenty Regional Council 2007

This case deals with erosion on Waihi Beach. Building consent had been granted for beachfront properties for many years, and the Council had maintained hard defence structures to protect those dwellings. The council’s proposal was not to abandon the defence works but to provide various ‘soft’ and ‘hard’ engineered structures that sought to mitigate adverse effects on the coastal environment. The Regional Council had consented to a plan of defensive structures to protect beachfront properties, but an appellant argued against the proposed structure and for the retention of the natural beach. The court observed: “Plainly enough, this case gives rise to strongly opposed viewpoints – the concern on the one hand of the relevant beachfront property owners that their properties of considerable value and pleasantness of outlook towards the sea should continue to be protected against coastal hazards erosion; and, on the other hand, the interest of the first appellants and others in looking to enhance the amenity of the beach and providing for all-tide public access along all parts of it” (para 59). The court decided that it was for the council to decide about its response to coastal erosion and it had adequately justified its decision to continue to provide engineered protection. “The principles of maintaining and enhancing natural character are hard to apply to an environment where there are well established physical resources present” (para 81).

3.3 Weir v Kapiti Coast District Council 2013

This is a case of ratepayers objecting to Council hazard notices, the effect of which was expected to be a serious devaluation of their property and a restriction of the proprietors’ options for future development. However, the Kapiti Coast, council position was: “We are better to debate these issues now and plan accordingly, rather than turn a blind eye and just hope for the best. No-one will thank us in 30 or 50 years time for doing that” (Pat Dougherty chief executive Kapiti Coast District

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Council). While on behalf of the residents: “The effect is the taking of beachfront properties by bureaucratic stealth, without any compensation to thousands mainly retired home owners.” (Christopher Ruthe, chairman of Coastal Ratepayers United). The council was required to provide further evidence of erosion vulnerability. Such litigation has the effect of making local authorities very cautious about acting in a way that may compromise property values and rights

4. EROSION

Erosion is not an evil ... “Indeed erosion has several natural and societal benefits: it liberates sediment for the coastal system that leads to deposition elsewhere, thus maintaining beaches, barriers and dunes; it is a mechanism by which the coastal topography adjusts to minimise wave energy levels at the coast; it provides materials upon which coastal ecosystems depend and it creates the scenic cliffed coastal landscapes that are so valued by society for their aesthetic appeal as well as their geological interest” (Cooper & McKenna 2008;296). A USA Court has stated: “the courts of this state have considered natural occurrences such as erosion and migration of waters to be, in fact, natural occurrences, a consequence of being a riparian or littoral owner, which consequence at times operates to divest landowners of their property.” (Kalo 2005;1489). Similarly, O’Riordan et al (2008;154) suggest “a whole new ecological, economic and societal arrangement would emerge on the new coastline” when new wetlands and conservation areas are created during the process of coastal inundation.

Owners of coastal property need to be aware that the nature of their natural ambulatory boundary requires them to relinquish any claims to land lost by a landward movement of the sea. The question about what action such owners may take to defend their land from any loss to the sea and what governments can do to balance conflicting interests is at issue here.

The debate is also being played out internationally. Many major harbourside cities like Sydney and New York are planning on billion dollar expenditures to protect coastal land. “First, as the time when we could prevent dangerous climate change slips away, the time for costly investments to protect ourselves has arrived. Second, for some cities, less well situated or less wealthy than New York, protection is going to be extremely challenging—and in some cases perhaps impossible” (National Geographic, 2013).

5. SOLUTIONS

A political solution would be ideal, but strong leadership is needed and does not look imminent in our economically and rights driven society. Planners should come up with planning solutions: managed retreat; building setbacks; foreshore reserves; and tenure solutions: rolling easements; lease/buy back; short term occupation licences or leases. But the first move must be to stop further development around the coast: “pressure for high value development [in the coastal margin] makes it difficult for local authorities to use either land-use planning (land-use rules to control the direction of development) or market instruments (e.g. acquisition) to avoid the risk from such coastal hazards. The best options for managing coastal hazards are based on avoiding buildings and

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infrastructure in coastal hazard zones” (MfE QP). “If redevelopment is located in known coastal hazard areas, or those potentially at risk over a longer term, this can increase the amount of investment at risk and strengthen demands for hard coastal protection works.” (Brake & Peart 2013;13).

The notification of owners is essential to ensure all coastal property owners are adequately alerted to the risk and therefore take on their own responsibility for future loss. “Increasing community awareness is essential to assist people in taking natural-hazard risks into account when undertaking development” (Goldsmith 2014;11). Local authorities must ensure that hazards and liability are clearly and comprehensively identified and recorded on Certificates of Title (CTs) and Land Information Memoranda (LIMs), highlighted on District Plan maps, and then that appropriate restrictions are imposed on land occupation and development. CTs should note development conditions: e.g. “Subject to development restrictions as notified in District Plan and resource consents.”

The Dunedin City Council has recently mapped the coastal hazards (storm surge, tsunami, erosion, sea-level rise) and in the coastal suburb of Brighton proposed a red line zone – indicating ‘extreme’ risk of coastal hazards. The residents were upset at the assessment and expected that it would affect their property values and make insurance harder to get. The council conceded that the ‘Red Lining’ was unfortunate given the same terminology used for Christchurch earthquake zoning, and they moderated their stance by suggesting that nothing would be finalised until widespread community consultation was completed. The Council appears very cautious about making decisions here.

While the main responsibility for coastal planning should rest with land owners and the local authorities, insurance companies and banks have a role to play. Property insurance is the normally expected fallback position for property owners affected by loss. Property damage from flooding is insurable, and usually such property can be reoccupied. Eroded land is gone for good, there is a total loss. Given the inevitability of sea-level rise and the hazard implications, higher premiums, higher excesses, and even withdrawal of cover are legitimate responses that should alert property owners of the impermanence of their investment in coastal land (ICNZ 2014). Similarly, banks and lenders have a responsibility to impose appropriate notice on owners, by limiting mortgage finance on property subject to a hazard. They can warn borrowers, limit exposure to inflated values, and establish a policy to deny development finance on high risk properties.

5.1 Engineering interventions

A logical response to the threat of coastal erosion is to seek to protect property from loss, and huge efforts have been exerted to design and build coastal defences. Previous coastal management paradigms have seen this as a challenge: to defend against the natural forces of erosion; to assert mastery over nature and retain property as a core value.

Sea walls and bulkheads, solid concrete barriers can hold back rising sea and stabilise shorelines, they can provide artificial public amenity for access and recreation around waterfront, they can be

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used for urban infrastructure and to enhance waterfront development – parking, storage, wharfs, etc. On the other hand they are expensive, vulnerable to damage, and degrade beach amenity and natural character. Sea walls on a beach shoreline will almost inevitably result in the withdrawal of sand, such that there will be no beach at high tide. Levees can provide a sacrificial barrier against storm damage and surface flooding, but cannot stop the effects of raised inland water tables due to sea level (tidal) rise (as occurs in south Dunedin). Barrier gates can enclose inland waters against storm damage and inundation, while allowing navigation during normal sea states, but are expensive and disruptive to ecological processes. Offshore Breakwaters dampen wave action and promote beach build up, but may disrupt coastal processes (longshore drift, surf breaks, etc).

However, engineers will still come up with engineering solutions: hard structures: sea walls; groins; barrier reefs. These are usually expensive and of dubious long-term efficacy (Pilkey & Young 2009;180). Sea walls “have a high probability of failure and would be likely to give false expectations of security to the adjacent beachfront owners” (Wainui Beach v GDC 2004;35).

Soft engineering interventions include dune and beach replenishment, dune stabilisation and revegetation which replace natural defences. There may be a problem sourcing appropriate sand (colour, grade, acceptability) from other beaches or offshore and they may increase the damage to marine ecosystems (e.g. shellfish beds) (Pilkey & Young 2009;161). In NSW, the 2010 planning guideline provides that “where feasible, ‘soft engineering’ options are preferred to hard engineering works if protection of both assets and coastal habitats are to be achieved” (O’Donnell & Gates 2013;224). If dunes are not a natural occurring feature they are unlikely to provide stable and secure protection.

The engineering solutions that have often been the first response to coastal erosion have been shown to be non-sustainable; practically, economically, environmentally and socially. Changing the ways we develop near the coast may provide more enduring solutions. The focus is shifting in recent years towards an acceptance of nature and a desire to work with her forces.

6. PLANNING RESPONSES

6.1 Stopping future development

All coastal zones should be assessed for erosion risk. Property in areas of risk should be identified and the right to develop should be removed. The right to develop is a privilege subject to the legitimate regulatory powers of the local authority, so there need be no complaints about the issue of taking or undermining the property package.

The assurances and protections that attach to a fee simple title in New Zealand suggest that title to land is forever. “Fee simple property tenure is probably the largest barrier to implementation of managed retreat. This is because it involves an expectation of permanent use of the titles. Unfortunately, the underlying physical land may not be permanent. This problem is compounded by the high and increasing value of coastal property” (Turbott, 2006;2).

6.2 Development design guidelines

Probably the best coastal management strategies of all, although mostly limited to future land use planning on undeveloped land, is to establish regulations requiring mandatory setback distances, setting aside of wide public land margins, requiring relocatable housing, and only allowing the subdivision of land into short timeframe leasehold titles.

Development setback lines can be created in district plans to control and regulate building within a coastal hazard zone. They can be imposed over bare land, which will affect the subdivision potential of coastal land, or over previously developed land where they can affect building locations. A development setback is used “to manage the location of new dwellings under the Building Act, to ensure the houses are safely located and the need for seawalls is avoided. It also informs property owners of the potential risk posed by coastal erosion” (Dahm & Gibberd 2009;2). All development opportunities (defined by the possibility of gaining a land use consent on coastal land) should be restricted to the extent that a generous setback line, measured from the dune or cliff toe (rather than the title boundary), ensures coastal land is free from any development infrastructure or building. The land may remain as open space, or in pastoral or arable use.

Coastal development design guidelines should, along with the wide publically accessible coastal margin, prescribe deep narrow allotments that allow for retreat, and roads established perpendicular to the coast to provide public access points without fixed and hard infrastructure as would be required for a coastal road.

Building standards can be modified to accommodate sea level rise. Housing and structures can be designed to withstand some flooding – building on levees, on piles, retrofitting existing buildings by raising floor levels. District plan rules could allow buildings to be elevated without being penalised for height limitations; relocatables could be allowed with less stringent building code compliance because of shorter life expectancy; and short term occupation licences could be offered.

Local authorities could plan for development zones to convert to wetland ecosystems. Wetlands can be restored to expand tidal zones to dampen wave and tide action and for coastal habitat restoration. Inevitably the coastal environments will change – planners can manage such change to enhance ecosystems. Wetlands and other ‘undeveloped’ space is not waste land – these places must be valued and enhanced to restore natural ecosystems and biodiversity.

A report to the Ministry for the Environment warns that “coastal development and global warming are on an eventual collision course” and that “managed retreat and adaptation are the only reasonable long-term options” (Bell et al. 2001;viii). Regional councils have also prepared documentation (Turbott 2008) to assist the planning for coastal erosion and particularly the issues arising from implementing managed retreat. Many local authorities have implemented policies to abandon hard coastal defences and implement a policy of managed retreat – allowing land to be lost to the sea and requiring property owners to retreat from the coast. But such a policy is strongly objected to by private owners. It is unlikely that managed retreat will gain any headway if left to

resistant private land owners, especially those who have considerable economic, professional and political clout. Central government would be reluctant to intervene in local matters and, as long as local government provides an alternative to the strict implementation of managed retreat, there would be little pressure on government to become directly involved with coastal investment and management.

6.3 Buy and lease back

A fee simple title is dependent on a grant from the Crown, however, the state rarely uses the compulsory acquisition opportunity implicit in the Doctrine of Tenure – that the state has ultimate ownership, authority and control of all land. However, it is at least possible that the state could acquire coastal land (compulsorily or otherwise, through legislative means) then offer it back to the original owner or to the open market for a short term lease (dependent on predictions of erosion loss). The benefit of this approach is that it would “enable the social and economic future of the settlement to remain intact for as long as possible, yet enable the areas at risk slowly to be removed over a period of time” (O’Riordan, et al. 2008;154).

If the Crown purchased vulnerable property it could then lease it back, the state would earn a return on its land and the leasehold owner would be well notified that the term is not perpetual and that it was a matter of natural forces when the land must be abandoned and given up to the sea. In the meantime the lessees would retain full occupation, possession and use rights.

From the proprietor’s point of view, the alternative is that in due course, the land will be lost to the sea without any compensation, and the final investment return will be negative. As owner, the Crown can be sure that the land will be cleared of structures before it succumbs to the encroachment of the sea and can allow for the natural coastal processes. It can enhance public access to the coast, and can manage the ecological systems by planting appropriate coastal vegetation to restore natural character and enhance natural defences. This scenario is predicated not on any legal requirement on the state to compensate for land lost to the sea but on political expediency, and for the opportunity to be proactive in implementing a preferred approach to managed retreat.

6.4 Rolling Easements

Ambulatory public access or conservation strips, as are allowed for in New Zealand in relation to public strips abutting water (usually rivers and streams), and as have been described in an American context by Titus (1998;1313) as rolling easements, could provide appropriate notice to coastal property owners of the vulnerability of coastal titles.

Rolling easements are “a collection of arrangements under which human activities are required to yield the right of way to naturally migrating shores” (Titus 1998;1313). They have been used to good effect in many USA coastal regions. Rolling easements are strips of land that are defined by and move with the coastal boundary. All land remains in the hands of the owners of the upland

parcel (except as it is encroached upon by the sea) but there is a public right of access over that land. They continue to allow productive use of the land until the sea eventually takes the land, which may be decades away.

The property bears no cost of the easement until the sea is ready to take it, except to the extent of granting public access rights over the land. “Rolling easements do not render property economically useless; they merely warn the owner that someday, environmental conditions may render the property useless, and that if this occurs, the state will not allow the owner to protect the land. By the time the sea threatens the property, owners will have had decades and perhaps centuries to factor this expectation into their plans; and into the price they paid for their property” (Titus 1998;1389).

Because designating land for the protection of public values is a legitimate planning tool, similar to the ability to take an esplanade reserve upon the subdivision of riparian or littoral land under the RMA, the setting aside of such an easement is not a taking of property rights and there should be no expectation that compensation is due for the loss of any rights. However, rolling easements could be purchased at affordable prices because the lost property right would have little value. “Developers who deny that the sea will rise would view the policy as costing them nothing” (Titus 1998;1285) while developers who foresee sea level rise would be planning for retreat anyway. “Rolling easement policies ... foster political consensus by forcing developers to concede that sea level rise is likely before they can argue that the regulation will affect property values” (Titus 1998;1331).

Rolling easements do not require particular lines to be drawn on plans or on the ground. They would not depend on defining a MHW, but can be measured from time to time as an offset from the toe of a dune or cliff. They would be identified by a note on the survey plan and the title document as a publicly reserved easement in much the same way as a marginal strip is shown after riparian land is alienated from the Crown or an esplanade strip created over private land.

Legislation could be passed to establish the process, the rights, the decision making authority and the detail, so it would require an active stance from government. Given the high public benefit, this would be a reasonable response, and one that has precedent. The shore line boundary could move, the owner would get plenty of warning of loss and the need to retreat, the public would retain access along the coast, and the beach’s natural character could be retained.

6.5 Coastal reserves

The Resource Management Act 1991 forms the statutory basis for the setting aside of most coastal reserves. The setting aside of a 20m wide esplanade reserve along the mark of MHWS is an expected condition of any subdivision consent of land. Esplanade reserves are vested in the local authority, and are established to protect conservation values and enable public access and recreational use. It is unlikely that a well integrated and connected coastal reserve will be established by this means. However, legislation could be passed to enforce the public nature of the coastal margin, in much the same way as the Marine and Coastal (Takutai Moana) Areas Act 2011 has set aside the foreshore as public commons.

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6.6 Tenure restrictions

Appropriate legal interventions may include covenants on titles identifying a coastal hazard (including no-complaints covenants preventing claims being made against neighbours, or local authorities, or even the acts of nature), time limited landuse consents, and short term occupation licences.

It could also be possible, through legislative intervention, to convert existing use rights on the sale of any at risk property, to short term occupation licences. Such takings or confiscations of otherwise unencumbered title would, however, inevitably initiate compensation applications that would be hard for government to defend (Stallworthy 2006:367).

Upon any subdivision of land or application for resource consent, conditions could be imposed such that fee simple titles (which have an indefinite duration) could not be issued but rather only leasehold titles (of defined duration; say 20 years with the possibility of renewals) could be issued. It is not usually the prerogative of local authorities to determine such tenure arrangements, but with the right statutory support, the opportunity is there to demonstrate the impermanence of coastal land subject to erosive forces. A similar condition could be imposed on any building being granted consent: a condition that it be removed at a defined time or on the occurrence of an event (say the encroachment of the sea towards the structure).

7. CONCLUSION

Land and water are national resources that all people have an interest in. Private property is a flexible and negotiated institution of conventions established to suit society at any particular time. In an age of new environmental awareness, and developing concern for humankind's dominating influence on our resources, we need to take a more environmentally responsive and sustainability focused view of our land, including the interests of the public and of natural processes. There is more at stake than just private rights. The institution of private property is only valid when it serves the needs of society. If we are serious about sustainability, private property rights will have to give way to ethical land management.

The policy of managed retreat must be made ubiquitous – expecting voluntary or forced relocation as the threat of coastal damage or inundation approaches. “[I]f society wants to retain its natural shorelines, then governments will have to induce property owners to yield their land to the sea” (Titus 1998;1308). However, from a political and pragmatic point of view, it will be difficult to require property owners to relinquish their rights. As Coutts has observed, “the result of planning is likely to be ‘democratic’ in that it imposes the limits that are acceptable to society at large rather than those that are necessary for wise management of the resources” (1989;314).

While property owners hold considerable political power and continue to assert their rights rather than defer to their responsibilities to the wider public (for coastal access) and to the environment

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(for the protection of natural character of the coast), planning solutions will be contested. Planning approaches in the nature of setting aside land, easements or reserves have the potential to accommodate an acceptable balance of interests. Government must make that attitudinal shift to override property rights and prioritise appropriate conservation of coastal land, maintain the natural character and promote public access (all these being the significant objectives of the NZCPS). Solutions that infringe on property rights may require legislative backing and that may be viewed as too hard. However, the sea continues to advance on the land and property retreat is inevitable.

“The romantic desire to live on the seashore is in doomed conflict with an age-old pattern of beach migration” (Kaufman & Pilkey 1983). The coastal margins of our land mark a significant zone of conflict, where not just the land and the sea clash, but environmental, social, economic, legal and engineering issues also are at odds. The extremely strong preference for coastal property exhibited by the population ignores the hazard risk evident by even casual observation. Furthermore, there is a strong expectation that land and property rights should be permanent and protected from loss. The judicial, legislative and policy suggestions to the contrary will require careful negotiation. But just as the physical defences against the power of the sea are failing, inevitably, so too will people and property give way to the sea. We cannot afford, economically or environmentally, to hold back the sea.

REFERENCES

Bell, R. G., Hume, T. M. and Hicks, D. M. (2001). Planning for Climate Change Effects on Coastal Margins. ME410. Ministry for the Environment, Wellington.

<http://www.mfe.govt.nz/publications/climate/effect-coastal-sep01/> viewed: 20/11/09.

Brake, L & Peart, R. 2013. *Caring for our Coast*. Environmental Defence Society. Auckland

Brookes, H. c.2001. Chances Beckoning: Integration in New Zealand’s Coastal Management. retrieved 20/11/09. www.rmla.org.nz/publications/h_brookes.doc

Corrina Dahm, Eco Nomos. 2002. *Beach User Values and Perceptions of Coastal Erosion*. Environment Waikato. Technical Report 2003/03. 68. Retrieved 20/11/09

<http://www.ew.govt.nz/Publications/Technical-Reports/Beach-user-values-and-perceptions-of-coastal-erosion/>

Coutts, B.J. 1989. Mean High Water as a Cadastral Boundary. *Ocean & Shoreline Management*, 12 (1989) 309-330.

Dahm, J. & B. Gibberd. 2009. *Coromandel Beaches – Coastal Hazards: Review of Primary Development Setback at Selected Beaches*. Thames Coromandel District Council. Retrieved 20/11/09. web.tcdc.govt.nz/mvxtprod/cache/0012CBA1.001.pdf

Department of Conservation. DoC. 2010. *New Zealand Coastal Policy Statement 2010*. Department of Conservation, Wellington.

Goldsmith, M. 2014. *Review of Dunedin City District Plan: Natural hazards. Project Overview*. Otago Regional Council. Dunedin.

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- Cooper, J.A.G. & J. McKenna. 2008. Social justice in coastal erosion management: The temporal and spatial dimensions. *Geoforum*, 39 (2008) 294-306.
- Harker, J. 2011. Local Authority Liability for Developments in Areas Subject to Hazards. (2011) 15 NZJEL 277-322.
- Hiatt, M. 2008 Come Hell or High Water: Re-examining the Takings Clause in a Climate Changed Future. *Duke Environmental Law and Policy Forum*. 18:371-397
- ICNZ Insurance Council of New Zealand, 2014, *Protecting New Zealand from Natural Hazards*. ICNZ, Wellington.
- Kalo, J.J. 2005. North Carolina Oceanfront Property and Public Waters and Beaches: The rights of littoral owners in the Twenty-First Century. *North Carolina Law Review* 83;1427-1505.
- Kaufman, W. & Pilkey, O.H. 1983 *The Beaches Are Moving: The Drowning of America's Shoreline*. Duke University Press Books
- Local Government New Zealand. 2014. *Managing natural hazard risk in New Zealand – towards more resilient communities*. LGNZ, Wellington.
- Ministry for the Environment. <http://www.qualityplanning.org.nz/>
- National Geographic. 2013. <http://news.nationalgeographic.com/news/2013/06/130612-sea-level-rise-new-york-bloomberg-sandy-climate-change-science/>
- O'Donnell, T. & Gates, L. 2013. Getting the balance right: A renewed need for the public interest test in addressing coastal climate change and sea level rise. *Environmental and Planning Law Journal* (2013) 30 EPLJ 220-235
- O'Riordan, T., Nicholson-Cole, S.A. & Milligan, J. 2008 Designing Sustainable Coastal Futures, *Twenty-First Century Society: Journal of the Academy of Social Sciences*, 3:2, 145-157.
- Pat Dougherty and Christopher Ruthe, 2013. <http://www.stuff.co.nz/dominion-post/comment/8410415/Kapiti-erosion-Head-to-head>
- Peart, R. 2009. *Castles in the Sand*. Craig Potton Publishing. Nelson.
- Pilkey, O.H. & Young, R. 2009. *The Rising Sea*. Washington. Island Press.
- Stallworthy, M. 2006. Sustainability, Coastal erosion and Climate Change: An Environmental Justice Analysis. *Journal of Environmental Law* (2006) 18:3, 357-373
- Strack, M. 2014. "They'll be drowned in the tide" – Reconsidering Coastal Boundaries in the Face of Sea-level Rise. *Geography Research Forum* Vol. 34 2014:23-39..
- Titus, J.G. 1998. Rising Seas, Coastal Erosion, and the Takings Clause: How to save wetlands and beaches without hurting property owners. *Maryland Law Review*, 57:4 (1998) 1279-1399.
- Turbott, C. (2006). Managed Retreat from Coastal Hazards: Options for Implementation. Environment Waikato. Technical Report 2006/48: 89.
<http://www.ew.govt.nz/publications/Technical-Reports/Managed-Retreat-from-Coastal-Hazards-Options-for-Implementation/> viewed: 20/11/09.
-

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Case law

EDS v NZ King Salmon [2014] NZSC 38

Falkner v Gisborne District Council [1995] NZRMA 462

Mason v Bay of Plenty Regional Council. Environment Court. A98/07.

Otago Regional Council v Dunedin City Council. [2010] NZRMA 263-284

Weir v Kapiti Coast District Council [2013] NZHC 3522

Wainui Beach Protection Society v Gisborne District Council. 2004. EnvC A113/2004

Legislation

Marine and Coastal Area (Takutai Moana) Act 2011

New Zealand Coastal Policy Statement 2010.

Resource Management Act 1991

BIOGRAPHICAL NOTES

Mick Strack teaches land tenure, property law, customary land rights and statutory planning at the School of Surveying in Otago. Research interests include property rights and natural boundaries with the sea and rivers. A recent focus has included the discussion on boundaries that have moved due to shallow surface shift (from liquefaction) subsequent to the Christchurch earthquakes.

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