Who Owns the Beach? Living with Increasing Uncertainty

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ABSTRACT: *As the NSW population increases so does the demand for public access and enjoyment of the iconic Australian beach experience. However, this is matched by an equally increasing demand for protection of coastal properties at risk, particularly as the limited number of beach front properties escalate in value. The tension is exacerbated by long-term coastal recession and climate change trends that are reducing the width of, and access to, the traditional beach available to the public. It is therefore not surprising that the boundary between private and public property is developing into a major issue. Coastal boundaries are generally of two types; the high water mark line which has always been accepted as being an ambulatory boundary, and "fixed" surveyed boundaries often termed "right-line" boundaries, which have traditionally been considered non-ambulatory. However, common law decisions have determined that "right line" boundaries are also ambulatory thereby generating uncertainty as to who owns the beach. It is not difficult to demonstrate that neither of these boundary types have a scientifically sound basis nor can they be robustly substantiated. What has seemed straight forward in the past is, in reality, of questionable meaningfulness, particularly in regard to legal interpretations. The uncertainties are becoming of increasing concern for coastal managers as they try to wrestle with demands for protection of private property against the progressive loss of public beach. There is a pressing need to revisit how coastal boundaries are both scientifically and legally defined and how they will be managed into the uncertain future of climate change. Reliance on old statutes and common law decisions needs to be replaced by modern, scientifically based, statutes that recognise and manage the ambulatory nature of the coast in the interests of both private landowners and the broader communities. Without timely action the question of "who owns the beach?" will be replaced by "what beach?"*

KEYWORDS: *Coastal property boundaries, beach access, revetments, seawalls.*

1 Introduction

The first European settlements in New South Wales centred on the foreshores of natural harbours in bays, estuaries, or rivers. The unattractive nature of the open coastal area meant much of it was considered to be unalienated Crown Land. Over time ownership of the coast (and therefore the beach) has depended, rightly or wrongly, on the prevailing views of the Surveyor General of the day. Many of the earliest land grants created private holdings down to High Water Mark (HWM). Later, Crown reserves of various widths were created between private land and the water.

Public access to, and the management of, coastal foreshores is a matter of growing concern not only in Australia, but also in Europe, the United States, South Africa, and New Zealand, due to increasing competition for the coastal resource and an associated escalation in coastal land values. These conflicts in resource utilization focus attention on the definition of the private coastal property boundary, along with the rights of private property owners to protect and delineate their property over the rights of the public to access and enjoy the amenity of the coast (Thom, 2020). Embodied within this debate are the management obligations of various governments for the publicly owned coastal lands. Rising sea levels, along with the general recessional trends of many coasts, are likely to exacerbate the increasing loss of public enjoyment of foreshore access, and hence escalate the debate.

Because Australians have enjoyed a relative abundance of public coastal and estuarine foreshore in the past, the relatively limited alienation of coastal areas as a result of private development has not been a matter of wide public concern. The current planning thrust towards urban consolidation is producing higher population densities in major cities and an associated increase in demand for access and utilization of the coastal and estuary foreshore areas. In conjunction with this is the realisation that much of the Australian coastline is experiencing long-term recession that is likely to become more significant due to future climate change trends. This has resulted in private

property owners utilizing a range of methods to protect their land against the increasing erosion threat; these actions have stimulated the debate on the rights of owners to protect their property at the cost of the communities' beach environment. Both Native Title (the recognition of customary rights and interests indigenous peoples have in lands) and Land Rights (the return of Crown Lands to indigenous peoples as compensation) can further complicate coastal and estuary boundaries.

For coastal engineers, coastal zone managers, and consent authorities, the boundaries issue is of critical concern; the issue being the ownership of the land on which persons seek to build protective structures. This is compounded by the potential impacts such structures may have on adjacent properties (including the public beach). Often, while protective structures may be substantially located on private land, the type, location, and construction of the toe can be challenging considerations. Beach nourishment can also trigger boundary issues, particularly if nourishment raises what is believed to be eroded private land back above the HWM.

2 The doctrine of accretion and erosion

The "Doctrine of Accretion and Erosion," long established by Common Law, applies where a boundary between land and water alters so slowly that the change is not readily noticeable. It was initially established to resolve issues relating to rivers changing course when the boundary between adjacent properties was the river (or some characteristic of it). The doctrine broadly provides that gradual accretion of land from water ("alluvion") belongs to the owner of the land gradually added to; conversely, land encroached upon by water ("diluvion") ceases to belong to the former owner. An important factor is that alteration to a boundary must be "gradual and imperceptible". There seems to be no minimum time over which change must take place for the doctrine to apply; each case is decided on its merits. If over an extended period of time, there is gradual change interspersed with one or more occasions where there has been noticeable shoreline movement, the doctrine is still in effect. In applying the doctrine to a dynamic coastal or estuarine environment, while beach fluctuations may result in sudden change from day to day, an underlying trend of gradual recession or accretion may still be considered "gradual change".

In NSW the doctrine has been modified regarding accretion. Section 28 of the Coastal Management Act 2016 states: "The Minister administering the Crown Lands Act 1989 (or a person authorised by that Minister) has no power under Division 5 of Part 2 of the Surveying and Spatial Information Regulation 2012 (or any regulation made by way of replacement, or in substitution, for that Regulation) to approve a determination concerning a water boundary that would increase the area of land to the landward side of the water boundary if:(a) a perceived trend by way of accretion is not likely to be indefinitely sustained by natural means, or (b) as a consequence of making such a determination, public access to a beach, headland or waterway will be, or is likely to be, restricted or denied".

3 Water mark boundaries

Generally, HWM is taken to be Mean High Water Mark (MHWM) and Low Water Mark (LWM) is Mean Low Water Mark (MLWM). However, HWM can have a variety of representations including but not limited to Mean High Water, Mean High Water Ordinary Spring Tides and Highest High Water Mark. LWM can similarly have a range of definitions including Indian Springs Low Water (ISLW) — that being the Datum on many hydrographic charts, sometimes referred to as Chart Datum (CD). ISLW is approximately equivalent to Lowest Low Water Mark (LLWM) and is not the MLWM. Further, they vary in elevation from location to location. Importantly, they are *water marks* — not *tidal levels* — a common mistake. Historically there is considerable evidence of confusion in their definition and interpretation. Limitations of space preclude a detailed discussion; however, it is important to note the potential for error introduced by persons not versed in the scientific basis of "water marks" and their use, particularly in a dynamic environment such as an open-coast beach.

There is a further complication. Throughout legal literature, the terms "riparian" and "littoral" are sometimes used interchangeably, "riparian" is generally applied to riverbanks whereas "littoral" is used for coastal beaches. The mistaken transposition of these words, combined with the lack of reference to the dynamic movements caused by wave action on erodible open-coast and exposed estuary beaches, has resulted in courts assuming that riverbank, estuary, and coastal beaches are all subjected to the same physical processes. Hence, the court's application of the riparian

dictum of slow and imperceptible riverbank movements onto coastal and estuarine beach situations which experience significantly different dynamics to riverbank processes results in a somewhat confused legal outcome. If a river suddenly changes course, it is generally considered not a valid boundary shift as the process was not “slow and imperceptible”. However, for coastal beaches change generally occurs suddenly in response to storm action; this sudden change often masks an underlying net shoreline movement resulting from an imbalance in the erosion/accretion process. The coastal equivalent of a “slow and imperceptible” shift in riverbanks is the underlying long-term trend in shoreline movement, which is generally masked by the coastal dynamics of repeated erosion/accretion cycles of “sudden change”.

3.1 The importance of the origins of the HWM boundary

The concept of a Water Mark boundary has its origins in the British law that evolved to manage the rivalry between kings and nobles over the ownership of the booty from shipwrecks (Baldwin, 1982; Coutts, 1989). As shipping formed the major mode of transport at the time, considerable wealth could accrue to the person on whose land a ship and/or its cargo came to grief or landed. Lord Chief Justice Sir Mathew Hale (c. 1666-67) is taken as the author of the statutes delineating the boundary between the territory of the monarch and that of the adjoining noble landowner. Hale argued that the monarch's title extended to "land that is usually overflown by the sea at ordinary tides". The meaning of the term "ordinary" as currently applied was determined by a judgment in 1854 (*Attorney General v Chambers*) as being the “medium high tide line” between the high spring tide and the neap tide (Baldwin, 1982; Nichols et al. 1984). This determination resulted (rightly or wrongly) in MHWM being synonymous with the Mean High Tide line — which it definitely is not. In addition, Shalowitz (1962) argues that Hale's definition of tides was ambiguous.

Of more significance was the court in *Chambers* (1854) drawing attention to Hale's reasoning that the land above his chosen boundary was "for the most part dry and manorable" (capable of cultivation) (Nichols et al. 1984). Clearly, Hale did not have in mind the surveyed MHWM on a NSW coastal or estuary beach, as in NSW dry and "manorable" coastal lands are usually well landward of the defined water line at mean high tides.

The fundamental question exists: Given that the basic reason behind Hale’s considerations of ownership was where ”booty” ended up on the foreshore, the "land that is usually overflown by the sea at ordinary tides" would include not only tidal influences but also wave setup and wave run-up — as these components usually have an important role in the area “overflown by the sea” and, more particularly, the place where any cargo or debris would be propelled. It is argued that Hale, without recognising what caused land to be overflown by the sea, used the term intending to mean where the net combination of factors resulted in the end point of transport of cargo/debris; that is why he specified that beyond the area of inundation the land was “dry and manorable lands”.

A general principle of boundary law established by Sir Samuel Griffith is that, in determining the meaningfulness of boundaries, the object must be to ascertain the original intentions of the boundary (Moore, 1968). In this context it would seem that a mean high tide line was never Hale’s intended boundary; rather, it has been misconstrued due to the lack of consideration of what was the original intention and the naive understanding, in the Chambers case, of what determines water levels on beaches. Hence Hale’s original intention has arguably been subverted.

3.2 The fragility of HWM and LWM boundaries

It is important that, in many cases both in Australia and overseas, MHWM property boundaries were mainly approximated by the early surveyors (Moore, 1968). In some instances, permanent vegetation lines or cliff tops were used as convenient surrogates for HWMs (Baldwin, 1982; Titus, 1998). Today, open-coast HWM boundaries are still notoriously unreliable. There is little evidence that early surveyors undertook a suitable tidal analysis on which to base the accurate determination of the horizontal plane of mean high tide, nor considered wave runup and set up. Also, to be technically robust an 18.6 year tidal analysis would have been necessary.

Atmospheric pressure also plays a role in water levels with 1 millibar of pressure producing a 1 cm change and hence, depending on the conditions on the day the survey was

undertaken the water level on the beach could be substantially different to that on a different, but notionally similar occasion.

Further, concepts of erosion and accretion were poorly understood and the associated potential horizontal fluctuation of water marks on beaches were not included in the reliability of the surveyed line. The relatively flat slope of most beaches means small errors in the vertical delineation of a water plane translate into large errors in horizontal position.

The situation is more interesting for rock platforms and cliff headlands. In some cases, the historical HWM boundary follows the frontal edge of the rock platform; in others, the base of the cliff or bluff. Where the lack of a rock platform precluded access (or perhaps when the sea made access difficult), early surveyors sometimes set the HWM boundary along the top of the cliffs or somewhere landward of the cliff top — no doubt because of the danger in sending the surveyors assistant ("chainman") too close to the edge. The result can be a "HWM" metres inland, on top of cliffs that are tens of metres above "water level".

The reliability of historically surveyed LWM is even more problematic. At least with a HWM a convenient debris line can be used as a surrogate. However, apart from the difficulty in establishing the horizontal plane of low-water intersection with the beach face in the very flat littoral swash zone, with constant wave action, there is the problem of having sufficient time at low tide to simultaneously survey its location at many points along a beach in order to construct a meaningful surveyed line. Further, given the complication of undertaking this task around cliffs and rock shelves, LWM location is often a matter of "considered approximation" (that is, "best guess").

The ability to reliably define MHWM or MLWM at a site is a matter that has been questioned at length (Moore, 1968; Baldwin, 1982; Nichols et al., 1984; Coutts, 1989; Titus, 1998). As previously discussed, whether a surveyed MHWM is in fact the coastal boundary as intended by the statutes is also highly questionable. As previously mentioned, MHWM on the open coast technically includes not only the tidal effect but also wave set-up, wave run-up and air pressure, along with wind set-up or set down, not to mention coastally trapped, and edge waves (long waves impacting on coastal water levels) and the mean effect of these various components at spring tides.

A further complication is that the intersection of this combined water level with a beach profile on any day is also a function of the beach "condition" at the time.

3.3 The "coup de grâce"

Beach profiles are in a state of constant fluctuation within a dynamic envelope associated with the short-term fluctuation responses of the beach to prevailing weather conditions (Gordon, 1987). This concept of a short-term fluctuation zone is embodied in the 2016 NSW Coastal Act, as discussed by Thom (2020). Surveyed MHWMs can change by more than 30 m horizontally following a single event and may take weeks, months, or even years to fully "recover" from that event, only to be again modified by a subsequent event. Baldwin (1982) reinforces this by quoting the American case of the *People v Wm Kent,* which noted that a "horizontal movement of the zero contour of 67 feet in a single day" had occurred.

Beyond the fragility of using water marks to determine property boundaries, the concept of locating the interception of the horizontal plane of a water level with a dynamic beach profile (constantly changing from tide to tide and storm to storm) in order to obtain a repeatable property boundary is demonstrably ridiculous. In the words of Baldwin: "there is little point in accurately determining a boundary position that will be devastated by the next minor storm." Coutts (1989) also concludes that the current method of using MHWM as a coastal boundary definition "is quite clearly flawed", as it is "based on the false premise that at least one of the surfaces is in a stationary or stable state."

A surveyed MHWM line on any one ordinary spring tide can be significantly different from that on a subsequent, similar tide, meaning that the "location" of MHWM is, due to beach fluctuations, a probabilistic distribution rather than a single line; a zone rather than a unique location. So, seeking to establish a true "mean" position of a "water mark" for an open-coast beach would require extensive observations aimed at generating a statistical distribution which could be used to establish the modal, most likely, location of MHWM — and even that could be meaningless if the beach is undergoing long-term accretion or recession and is therefore not a "closed system", and hence water line location is not a statistically stationary series capable of meaningful

statistical analysis. Importantly, the usefulness of defining MHWM as a zone with statistical characteristics, or a non-stationary series is hardly a reliable and robust basis for a legal delineation of property boundaries.

So, while the concept of MHWM as a boundary may be notionally simple, in reality it is complex, idealistic, and unreliable. Further, past precedents regarding boundary matters, such as the often-quoted court findings of the late 1930s regarding the *Verrall v Nott* case are demonstrably in error as the court was not able to avail itself of the modem science of coastal engineering.

The understanding of coastal processes substantially changed following World War II (C.E.R.C, 1954). Beach landings were a critical aspect of the allied attacks in both the Pacific and in Europe. A new science had to be developed to ensure the success of this type of warfare. This new coastal engineering science shed a new light on beach dynamics and hence beach fluctuations. Therefore, precedents such as pre-1950s case law on HWM boundaries for wave-influenced shorelines must now be considered of very limited value when evaluating contemporary situations.

4 Australian coastal property boundaries

In the past, the accurate and legally defendable determination of boundaries was not an issue of great importance, particularly when they were used to delineate boundaries of low value private or public land. However, as coastal land values have increased, and public access issues have developed, the society has become much more litigious. With a variety of government bodies having different duties of care for particular parcel of land, and with insurers and bankers taking an increasingly keen interest in their clients' liabilities, it is essential that unambiguous and legally valid boundaries can now be established.

Between 1857 and 1875, all Australian colonies (now states and territories) adopted the Torrens Title system of land registration. It is important to note that Torrens Title is the system of registration of ownership, not the definition of the boundaries of the land. Confusingly, although stemming from the original English law, each state and territory has its own specific legislation regarding boundary definition and dealings — the Real Property Act (NSW, 1900), the Property Law Act (Victoria, 1958), the Property Law Act (Queensland, 1974), the Law of Property Act (South Australia, 1936), the Property Law Act (Western Australia, 1969), the Conveyancing and Law of Property Act (Tasmania, 1884), the Land Title Act (Northern Territory, 2000), and the Civil Law (Property) Act (ACT, 2006).

Original NSW “Old Title” land grants often had their foreshore boundary defined by the nebulous but convenient concept of an approximated marked/drawn HWM — or simply defined by a “metes and bounds” description which used cultural features such as headlands and in between these features the boundary was prescribed as “there by the South Pacific Ocean”. As previously discussed, the accuracy of the original definition of the HWM boundary for individual properties is highly questionable (Moore, 1968). Many of the original land grants were later subdivided and, as a result, most have undergone a title change to bring them under the relevant state property legislation with a redefinition of their coastal boundary from a conceptual MHWM to a Right Line (“fixed line” surveyed boundary). However, the NSW Real Property Act still employs the concept of MHWM in determining to what land the Act applies.

Although each Australian State has differing statutes regarding property boundaries, each continues to rely on three broad categories of boundary regarding coastal lands. These are: HWMs, LWMs, and “Right Line” boundaries. These boundaries apply to both private land and Crown Lands that were reserved for a specific purpose. The Right Line category, now more common than “water mark” boundaries, takes the form of a linear boundary defined by survey from established reference marks. Often the Right Line was originally set back from a perceived HWM by a distance of approximately one chain (a road width). While watermark boundaries have always been viewed as ambulatory, it has been traditionally assumed that Right Line boundaries are “fixed” in location and hence not ambulatory.

However, in NSW the question of what happens when land that was defined by Right Line survey permanently falls below MHWM has been discussed at length by Corkill (2013). He points out that the issue of whether land that falls below MHWM reverts to the Crown was addressed in a case in 1994 when the Environment Protection Authority took a Mr. Saunders to court for his action on lands he

believed were still his but had fallen below the defined MHWM. Justice Bannon ruled that “land” as defined by the NSW Real Property Act meant land above the MHWM, and that when land permanently fell below MHWM it reverted to the Crown. The case went to appeal and, because the original issue was in regard to an offence, it went to the Criminal Court of Appeal — which in 1995 unanimously upheld the judgement.

On this and other evidence, Corkill (2013) argues Right Line boundaries are, by Common Law, defined as being ambulatory. The Victorian Surveyor General supports this view as indicated by his notes “where a boundary can be shown to have been, intended to be the sea boundary, although marked on titles as a “straight line” or by reference, to metes and bounds, it will be regarded as a boundary in respect of which there may be an accretion or diluvion”. That is, Right Line “fixed” boundaries are not “fixed” they are ambulatory. The important word in the Bannon decision is “permanently” — in the coastal context, not land affected by short-term beach fluctuations, but rather land affected by the longer-term gradual net loss that produces permanent recession of a shoreline. Much of many beach berms are permanently below the “mean” of the actual water mark made by the contributory factors of tides, wave setup and run-up and atmospheric pressure, hence are technically owned by the Crown, regardless of the location of property “right line” surveyed boundaries.

5 Publicly owned “lands” in NSW

Because the States of Australia are individual Crown entities, they are "owners" of all Crown Lands within the particular State — “land” that includes seabeds out to the States offshore limit and the bed of estuaries and rivers. The only exception is that any Australian Capital Territory land located within a State — such as ACT Canberra or Jervis Bay — are not “owned” by the State. Note: The State’s offshore limit extends a league offshore — a 3-nautical-mile limit with its origins in the distance a cannon could shoot in the 18th century — which was proposed by the Dutch Jurist Bynkershoek in 1702 (Moore, 1977). That’s an interesting historical artifact in the current age of intercontinental ballistic missiles.

Where the coastal boundary of reserves under ownership, trusteeship, or management of councils is "right line" or a defined “HWM” boundary, the council jurisdiction for management of the reserve technically does not extend past that boundary. However (and confusingly), the 1993 NSW Local Government Act extends the Local Government Area of jurisdiction of its planning and management control from HWM to LWM, without necessarily extending the reserve management boundaries to LWM. This has created a situation where the beach (or at least a portion of it) is arguably un-alienated Crown Land; as is the surf and nearshore coastal zone. A similar situation exists regarding headlands and rock shelves including rock pools. Council's authority over management of these areas is therefore potentially more limited than generally understood; conversely, the States' responsibility is potentially far greater. To add to the confusion, there is legal provision in the NSW Act for Local Government to erect signs directing what can happen on Crown Land outside the formal Council boundary. For example, councils can erect signs on beaches regarding surfing activities on Crown “Land” in the surf zone, and legally enforce the directions on the signs.

5.1 Local government boundaries

Most, but not all, local government areas originally had their coastal boundary delineated by the “metes and bounds” type description. For example, in NSW a typical proclamation will indicate that the boundary on the open coast extends from a certain cultural feature (such as a headland or creek) "thereby the shore of the South Pacific Ocean" to another specified feature such as a headland, creek or river. Over time, these “metes and bounds” descriptions were converted to water mark boundaries. As previously mentioned, the 1993 Local Government Act redefined the Local Government jurisdictional boundary from HWM to LWM — which is a meaningless boundary because it cannot be robustly defined. Further confusion arises by the wording of the Act as to whether the boundary follows the LWM around an embayment, or whether it is a line joining the LWM of consecutive headlands. In a 1994 judgement (*Boydtown Pty Limited v Bega Valley Council*), it was determined that the boundary followed the LWM around the embayment. The judge pointed to the special proclamation for Manly Municipality (NSW) in which the coastal boundary definition was modified to include the waters of the embayment by constructing a boundary between headlands. It was argued that this would not have been necessary if the

traditional proclaimed boundary already achieved this end.

In recent years there has been a number of public liability claims lodged against councils as a result of injuries sustained by beach users. Although past claims for disability by surfers striking their heads on underwater sandbars have generally been unsuccessful, in May 2002 the NSW Supreme Court awarded $3,750,000 for injuries suffered by a man swimming at Bondi, outside the “flags” (*Swain vs Waverley Municipal Council*). Further, in 2002 the NSW Supreme Court also awarded $5,054,753 against Wyong Council for injuries suffered by a man who dove into the water and hit his head on a rock at the northern headland of Soldiers Beach (*Vairy vs Wyong Council*). Arguably both of these cases should have been against the Crown, not the councils; however, because councils provided the access and encouragement to the locations without also providing “appropriate” warnings, arguably they therefore “invited” the individuals into areas where the individuals could “sustain harm”.

A paper by Fitzgerald and Harrison (2003) expands on the "Law of the Surf” and provides an interesting history and commentary on legal cases involving claims of negligence against those managing the coast both in Australia and in the United States. The paper concludes with: "The extent to which local authorities and lifesaving clubs will be held liable for inadequate supervision and warnings is in a state of refinement". Given recent changes to the NSW negligence laws placing more responsibility on the person visiting a location with natural hazards, it still may be some time before the picture is clear; however, boundary re-examination is vital regardless of the apportionment of responsibilities.

6 The Public Trust Doctrine (PTD)

In 530 A.D. Emperor Justinian had his legal scholars put in writing the laws of the Roman Empire — the Institutes of Justinian. The Institutes were passed from Roman law, through British law and on to the colonies including the United States, Canada, New Zealand, and Australia. The Institutes contained the premise that the air, running water, the sea and the shores of the sea are common to all mankind. Through the Institutes of Justinian, the Crown holds in trust the title to these essential resources on behalf of the people, to preserve the resources so they are available to the public; the Public Trust Doctrine (PTD), (Bray, c. 1998; Slade, 1997; Titus, 1998; Thom, 2020). Bray (c.1998) states that "there are two coexisting interests to trust lands: the *jus publicum* which is the public's right to use and enjoy trust lands; and the *jus privatum* which is the private property rights that may exist in the use and possession of trust lands.” The State (Crown) may convey the *jus privatum* to private owners, but this private interest is subservient to the *jus publicum*, which is the State's inalienable interest that it continues to hold in the trust land or water. In short, while the Crown may confer private property rights to foreshore land, such rights do not extinguish the public's right of access. This focusses attention on the potential conflict between private and public rights to a beach, which are in turn inextricably linked to defining robust boundaries.

In addition, Titus (1998) brings into question all foreshore boundary adjustments made by the Crown. Following Titus' reasoning it could be argued that the Public Trust lands were automatically created as being all those foreshore lands that existed at the time the Colony of NSW was founded and that, since the Magna Carta in 1225 A.D., the Crown has not had the power to vary the boundary of such land; only the Parliament could do so. This creates a dilemma because the land/water interface was not surveyed at the time the Colony of NSW was founded, and there is insufficient evidence to enable that boundary to be re-established with any confidence.

In NSW, as previously mentioned emphasis has in the past been placed on the 1939 case of *Verrall v Nott* in defining public and private foreshore boundary rights. Also as previously indicated and supported by recent research from the U.S, the validity of the *Verrall* case must be questioned for yet another reason, apart from scientifically considering the question of "natural accretion", as the Court did not give any consideration to the PTD. In *Verrall*, consideration of the PTD could have made the case unnecessary, as the public would have continued to have access over the reclaimed land regardless of whether it was granted in private ownership to Mr Verralls. With a better understanding of coastal processes, the relevance of historical case law such as *Verrall v Nott* provides a very questionable precedent. With increasing interest in the rights for both public and private use of beaches, the PTD is being resurrected as an approach to balancing the competing interests (Thom, 2012). Further, it has started to make appearance as a point of argument in legal

cases (Slack et al., 2020), and arguably is embodied in the 2016 Coastal Management Act, in particular Section 27 (Thom, 2020).

7 Conclusion - so, who owns the beach?

Until there is a robust legal position that is based on, and reflects, a modern scientific understanding of coastal processes, the question of who owns the beach remains confused and unclear. Given the complexities of attempting to define and survey water-mark boundaries, along with the constant change of their intersection with a dynamic beach system hence their existence as a zone rather than a single line and uncertainties about what legally constitutes the ambulation of a right-line boundary, ownership of the beach is an increasingly contentious issue. MHWM, though demonstrably meaningless as a stable entity, remains a key notion both for physical boundary definition and in various Acts as a key parameter. It is important to recognise the historical errors of confusing MHWM with MHTM and the resulting underestimation of the water-mark boundary. Further MLWM needs to be rejected as it is not a tenable concept.

Contrary to the misunderstanding that coastal processes tend to be abrupt events and thus not subject to the common-law doctrine of erosion and accretion, it is argued that in keeping with that doctrine's intent an underlying trend of gradual recession or accretion of the zone of fluctuation may reasonably be considered as a "gradual change". Seawalls that are ostensibly constructed to manage short-term coastal erosion, but also thwart underlying trends of slow coastal recession, disrupt the public access issue. Hence authorities who approve seawalls or revetments may arguably be in breach of Section 27 of the Coastal Act unless an offset (such as an ongoing beach nourishment program) is an integral part of the project.

There is a pressing need to develop the necessary scientifically based statutes to provide certainty of the location and definition of coastal boundaries and a mechanism by which those boundaries can be equitably varied as circumstances (including sea level rise) change over time. The net movement of the beach fluctuation zone is clearly a reasonable basis for any such initiative. "Who owns the beach" remains a question without a robust answer; however, without a timely solution, the future question will more likely be: "What beach"?

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