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Fluctuating Shorelines and Tidal Boundaries: An Unresolved Problem

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COMMENTS

FLUCTUATING SHORELINES AND TIDAL BOUNDARIES: AN UNRESOLVED PROBLEM

Problems arising from disputed boundaries between adjacent land owners are of real importance to the practicing attorney. These problems are no less significant, and a good deal more complicated, when they involve tidal boundaries between upland and tideland ownership. To the layman who owns or purchases beachfront property, one of the main concerns is that his land extends to the water's edge, and he probably expects that such is the case. But when the description in the deed describes the boundary as the ordinary high-water mark, does he really know how much he owns or where his boundary line actually is? Does he know how that will be determined? When coupled with the fact that the "mapping of the . . . tidal boundary between private property and state-owned 'tide lands,' is becoming increasingly important to our coastal states as property values increase,"[1] and considering that "[o]ur country has about 90,000 miles of tidal shoreline and the shore boundaries of all the properties along that shoreline are tidal boundaries,"[2] significant problems are presented. The totality of these factors can only escalate the desire for meaningful and understandable answers to the questions the landowner may ask his attorney. The case of *People v. William Kent Estate Company*[3] is illustrative of the difficulties involved in answering these questions.

The William Kent Estate Company is the legal owner of certain beachfront property located in northern California on a

1. Karo, *Establishment of Tidal Datums*, SHORE AND BEACH, April 1965, at 27 [hereinafter cited as Karo]. Admiral Karo was the director of the U.S. Coast and Geodetic Survey at the time this article was written.

2. Tison, *Tidal Datums and Tidal Boundaries*, SHORE AND BEACH, October 1965, at 7 [hereinafter cited as Tison]. Admiral Tison was the director of the U.S. Coast and Geodetic Survey when this article was prepared.

In the measurement of the shoreline of the United States in 1939-1940, the Coast and Geodetic Survey arrived at the total of 88,633 statute miles. The coastline of California alone measures 3,427 statute miles. 2 A. SHALOWITZ, SHORE AND SEA BOUNDARIES 483 (Coast and Geodetic Survey Pub. No. 10-1, 1964) [hereinafter cited as 2 SHALOWITZ].

3. 242 Cal. App. 2d 156, 51 Cal. Rptr. 215 (1966) [hereinafter cited as *Kent*].

sandspit separating the Bolinas Lagoon from the Pacific Ocean. The property is bounded on the east by the lagoon and on the west by the ocean. In 1950, the company brought a quiet title action to determine the exact location of the waterfront boundaries. Following a state survey, a decree was entered fixing the lagoon boundary at "the 'low water mark in Bolinas Lagoon, as fixed by the . . . State survey.' "[4] The decree described the ocean boundary as " 'the ordinary high-water mark on the shore of the Pacific Ocean,' and thence along the shore by courses and distances,"[5] with no reference to the state survey.

Due to seasonal changes in the weather and ocean currents, each year sand is deposited on the beach during the summer months, resulting in an increase in the beach area, while in the winter months, sand is eroded from the beach, thus decreasing the beach area. As a result of these yearly fluctuations, the actual high tide line moves in and out as the beach itself moves in and out. During the summer months, the company, the upland owner, finds itself with a beach approximately eighty feet wider than during the winter months.[6] (See Fig. 1.)

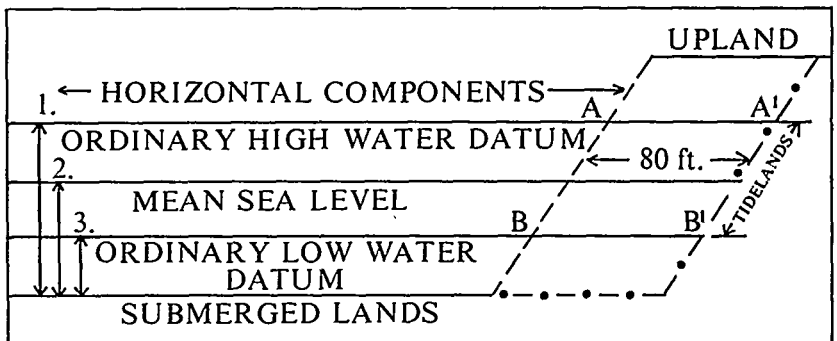

Figure 1. Tidal datums and the migrating beach in *Kent*. Not to scale.
------ Position of the beach during summer.
-•-•-• Position of the beach during winter.

A and A'—Respective ordinary high water marks.
B and B'— Respective ordinary low water marks.

1, 2, and 3—Vertical components.

4. *Id.* at 159, 51 Cal. Rptr. at 217. For the purposes of this discussion, the lagoon boundary is not in issue.

5. *Id.* at 159, 51 Cal. Rptr. at 217.

6. The extent to which the beach actually does "grow" or "shrink" was and is an

The company, wishing to make full and complete use of its land, without interference, claimed ownership of the beach property to the ordinary high-water mark as it exists during the summer months when the beach is at its maximum width, and built a fence to that point bearing a "no trespassing" sign. During the winter, however, as the beach erodes shoreward, some portion of the fence is located seaward of the then-existing high tide line. The State brought an action against the company "to enjoin the defendant from asserting ownership to and excluding the public from areas periodically covered by the tidal waters of the Pacific Ocean and claimed to be sovereign lands of this State,"[7] and to otherwise protect its public trust.

The trial court gave judgment for the State and "enjoined defendant from interfering with the public use of the land lying 'seaward of the ordinary high water mark.' "[8] It refused to accept defendant's argument that the 1950 survey and the subsequent decree had established a fixed boundary line, but ruled that the boundary was " 'the ordinary high water mark of the Pacific Ocean as it may fluctuate naturally from time to time.' "[9] It also found that due to natural erosion and accretion, the ordinary high-water mark shifts seaward and landward.

On appeal, the district court reversed and remanded for a new trial. The court disagreed with the findings that the ordinary high-water mark fluctuated as the beach changed, and that accretion and erosion had occurred. Additionally, the court held that the trial court had mistakenly applied the federal standard rather than the state standard in computing the height of ordinary high water. In order to fix the boundary between the upland and the tideland, the parties should determine the average line of the shore throughout the year, taking into consideration the seasonal movement of sand.

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issue upon which the parties are not agreed, and remains to be determined. But as the district court noted: "This movement of the sand can account for variations of as much as 80 feet in the point at which the water, at ordinary high tide, touches the shore line." *Id.* at 158, 51 Cal. Rptr. at 217.

7. Plaintiff's Petition for Hearing at 1, 2, People v. William Kent Estate Co., 242 Cal. App. 2d 156, 51 Cal. Rptr. 215 (1966). A petition for a rehearing was denied June 10, 1966, and respondent's petition for a hearing by the California Supreme Court was denied July 6, 1966. *Id.* at 161, 51 Cal. Rptr. at 219.

8. *Id.* at 158, 51 Cal. Rptr. at 217.

9. *Id.*

I. Tidal Datums and Tidal Boundaries

An understanding of the implications arising from the district court decision requires some knowledge of the technical concepts relating to tidal boundaries. First, the location of a tidal boundary is dependent upon the fluctuations of the tides.[10] Secondly, from observations of the tides, tidal datums, or mean elevations of the tidal planes, such as mean high water or mean low water, are computed.[11] Following that, it must be determined which of several tidal datums will be used. These tidal datums must then be related to the slope of the beach. In more technical terms:

> Boundaries determined by the course of the tides involve two engineering aspects: a vertical one, predicated on the height reached by the tide during its vertical rise and fall, and constituting a tidal plane or datum . . . ; and a horizontal one, related to the line where the tidal plane intersects the shore to form the tidal boundary desired . . . . The first is derived from tidal observations alone, and, once derived . . . , is for all practical purposes a permanent one. The second is dependent on the first, but is also affected by the natural processes of erosion and accretion, and the artificial changes made by man.[12]

As a starting point, it should be noted that the characteristics of the tides are influenced by four factors:

1. The tide-producing forces of the sun and moon.
2. The bottom topography and configuration of the major ocean basins.
3. The bottom topography and configuration of bays and estuaries.
4. Meteorlogical phenomena.[13]

The interaction of these four factors affects the frequency, the range (the vertical difference between low water and the preceding or following high water), and the height of the tides throughout a fortnightly cycle.[14] Furthermore, the range of the

10. *See* Tison, *supra* note 2, at 7.

11. *Id.*

12. 1 A. SHALOWITZ, SHORE AND SEA BOUNDARIES 89 (Coast and Geodetic Survey Pub. No. 10-1, 1962) (footnotes and illustrations omitted) [hereinafter cited as 1 SHALOWITZ].

13. Tison, *supra* note 2, at 7.

14. *Id.*

tide is affected by other astronomic factors which have a cycle of 18.6 years.[15] "Thus to arrive at a reliable mean value for . . . tidal datums, we need to observe the tide for almost 19 years."[16]

The interaction of these variable factors also produces three different types of tides in our oceans. Along the Atlantic Coast, there are semidaily tides comprised of two practically equal low waters and two practically equal high waters in each tidal day. Along the Gulf Coast, the tides are mostly daily, with only one low and one high water per day.[17] Along the shores of the Pacific, a mixed type of tide prevails. There are two highs and two lows each day, but there exists a high degree of inequality between successive highs and successive lows. Thus, on any one tidal day,[18] four different levels are reached by the tides, called lower low water, low water, high water, and higher high water. All of these factors must be taken into consideration to understand how the tides are caused, and more importantly, to understand how the tides are used to determine a boundary line.

The next step is to compute the tidal datum. For the purposes of boundary demarcation, four tidal datums are available. Two of these, mean low water and mean high water, have received almost universal acceptance because they are incidental to all three types of tides. One authority defines them as follows:

> The mean high water at any place is the elevation of the mean level of high water determined, either directly or indirectly, by averaging the height of all the high waters at that place over a period of 19 years. Similarly the mean low water at any place is the mean level of low water determined, directly or indirectly, by averaging the heights of all the low waters at that place over a period of 19 years.[19]

Along the Pacific Coast, because of the mixed type of tide

15. *Id.* at 8.

16. *Id.* The most thorough and up to date source on this subject is the two volume work by Shalowitz referred to in notes 2 and 12 *supra*. The Tison article, *supra* note 2, is based in part upon that work, but is in a shorter form.

17. There are variations to this, however. At times, there are two of each, very much unequal. This has caused considerable difficulty in the establishment of tidal datums and boundaries. For a more detailed discussion, *see* Tison, *supra* note 2, at 9-10.

18. A tidal day is approximately 24 hours and 50 minutes long. This corresponds to the daily retardation in the time of the moon's meridian passage. 2 SHALOWITZ 669.

19. Tison, *supra* note 2, at 9. The author's reference to 19 years is actually a

which occurs there, and to some extent along the Gulf Coast also, two other datums are computed. These are mean lower low water and mean higher high water. In conjunction with the mean high and mean low water, these additional tabulations provide a mean value for every tide that occurs along these shores.

The primary responsibility for the determination of these values falls upon the United States Coast and Geodetic Survey.[20] The Coast and Geodetic Survey makes tidal observations and the computations necessary to establish tidal datums, and erects bench marks from which elevations above and below sea level can be measured.[21] These observations and computations are also published separately in loose-leaf form so that datums for any particular area of the coast can be extrapolated.[22]

For general purposes the most important datum is mean sea level, defined as the "elevation of the mean level of the sea at any place determined . . . by averaging the heights of all stages of the tide over a long period (usually 19 years)."[23] It is the most important because it is "used for referencing elevations of bench marks in the network of precise levels established by the Coast Survey throughout the United States and Alaska, it being the most practicable and the most stable datum for general engineering use."[24] After the tidal datum to be used in determining the boundary has been selected, the computations are extracted from the published manuals, and referenced to the bench marks erected as evidence of mean sea level. This method provides an accurate and authoritative boundary accepted in courts of law.[25]

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reference to the 18.6 years considered to be the full tidal cycle. Shalowitz explains why this period was chosen:

> A period of 19 years is generally reckoned as constituting a full tidal cycle because the more important of the periodic tidal variations due to astronomic causes will have gone through complete cycles, and because the variations of a nonperiodic character resulting from meteorological causes may be assumed to balance out during this epoch.

1 SHALOWITZ 89 n.16.

Tison's statement that the height of *all* the high waters is used is the correct federal rule. But this is not universally accepted, as will be discussed *infra*.

20. *See* Karo, *supra* note 1, at 27.

21. 2 SHALOWITZ 60-61, 72.

22. *Id.* at 72, 74.

23. Tison, *supra* note 2, at 9.

24. 1 SHALOWITZ 88.

25. *See* Karo, *supra* note 1, at 28.

The question now arises, which tidal datum should be selected as the vertical component? The answer to this question has most often been based on sheer practicality due to the great divergence in the nature of the beaches and submerged lands surrounding our oceans. The selection of one tidal datum rather than another will have the effect of determining ownership of the tidelands. Since the real difference between the tidal datums is the height of the plane of water, that difference determines where that plane will intersect the beach. (See Fig. 1.)

Initially, it may be well to point out that the principles of tideland ownership and tidal boundaries are closely related, since the definition of the former results in the delineation of the latter. These principles have their source in the English common law of the Seventeenth Century. From that time on, "it has been considered as settled law in England that the title and the dominion of the sea, and of the rivers and arms of the sea, where the tide ebbs and flows, and of all lands below high-water mark, are in the King."[26] The logic underlying this principle is that:

> [s]uch waters, and the lands which they cover . . . are incapable of ordinary and private occupation, cultivations, and improvement. Hence the title . . . in such lands, belonged to the King as the sovereign, but was held by him as the representative of the people and was subject to the public right . . . of navigation and fishing. This includes the "shore," which according to the English courts is confined to the "flux and reflux of the sea at ordinary tides."[27]

This principle has been followed by most American jurisdictions. Except where private grants were involved prior to independence, the tidelands "became vested in the original states and in the State of Texas as to land within the confines of their respective boundaries, and in the United States as to that within the boundaries of its public land territory."[28] Furthermore,

> it is the general rule that a conveyance . . . of land traversed by or bordering upon a water whose bed is not expressly included or excluded does nevertheless . . . [exclude] it when the water is navigable. In spite of rather numerous exceptions, the foregoing is the rule in enough jurisdictions that it may well be termed the general presumption.[29]

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26. 1 SHALOWITZ 90.

27. *Id.* at 90-91 (footnotes omitted).

28. 3 AMERICAN LAW OF PROPERTY § 12.26 (A.J. Casner ed. 1952) (footnotes omitted).

29. *Id.* at § 12.27.

When new states joined the Union, they succeeded to the ownership previously held by the federal government, or the previous sovereign, in the case of Texas.[30]

In California, tideland ownership is codified in section 670 of the California Civil Code. "The State is the owner of all land below tide water, and below ordinary high-water mark, bordering upon tide water within the State . . . ."[31]

The federal government has confirmed the principle of state ownership of the tidelands by the enactment of the Submerged Lands Act.[32] Section 1311 confirms and establishes "title to and ownership of the lands beneath navigable waters . . . to the respective States . . . ." Section 1301 defines lands beneath navigable waters as "(2) all lands permanently or periodically covered by tidal waters up to but not above the line of mean high tide . . . ."

The nature and extent of the ownership of the tidelands by the states has been summarized as a public trust, and may be devoted to any use not inconsistent with that trust.[33] "Its ownership is subject to the public rights of navigation and fishing as well as to the paramount powers of congress over commerce . . . [and] navigation."[34] Additionally, it is subject to the rights of the upland owner. These include:

> (1) the right of access to the water, (2) the right to wharf out to the line of navigability, (3) the right to accretions and relictions, (4) the right to the natural flow of the water past their land, and (5) the right to make a reasonable use of the water.[35]

But these rights are "subject to being terminated at will by any disposition which the state may choose to make . . . ,"[36] and "although the sovereignty of the state over tidelands does not deprive the littoral owner of his right of access . . . to the ocean as against a stranger, 'this right is not given to the owner . . . as

30. *Id.* at § 12.27(b).

31. CAL. CIV. CODE § 670 (West 1954).

32. 43 U.S.C. § 1301 *et seq.* (1964).

33. People v. Hecker, 4 Cal. Rptr. 334, 346 (1960).

34. 45 C.J. *Navigable Waters* § 212 (1928) (footnotes omitted).

35. 3 AMERICAN LAW OF PROPERTY § 12.32 (A.J. Casner ed. 1952) (footnotes omitted).

36. Carpenter v. City of Santa Monica, 63 Cal. App. 2d 772, 792 (1944).

against the state or its grantee in the exercise of a lawful use or purpose.' "[37]

If the tidelands are confined to lands covered by the "flux and reflux of the sea at ordinary tides," they are necessarily bounded by the limits reached by the ordinary high tides at the landward extreme and the ordinary low tides at the seaward extreme. Acceptance of the common law principle of tideland ownership therefore carries with it as a necessary corollary the acceptance of the ordinary high-water mark as the tidal datum marking the boundary between upland and tideland.

A sufficient number of American jurisdictions have accepted the common law principles of tideland ownership so that it can be stated as a general rule that land which is owned by the state is bounded by the ordinary high-water mark;[38] necessarily, then, so is the land of the upland owner. But, "in the case of a few Mexican grants it has been necessary to recognize that by the civil law the line was fixed at the line marked by the *highest* tide."[39]

In contrast, a significant number of coastal states have adopted the use of other tidal datums as their criteria. Along the shores of the Pacific, California, Oregon and Washington have accepted the mean high-water datum, while Alaska uses the mean low-water datum.[40] Along the Atlantic Coast, eight states have chosen mean high water and seven mean low water.[41] In the Gulf Coast states, several different datums have been used, mean high water, lower high water, and higher high water.[42]

While the principle of sovereign ownership of the tidelands has been commonly accepted, a definition of "ordinary tides" has not had common acceptance, but rather has been subject to continuous disagreement. An English source declared:

> In legal documents the *littus maris* is defined as "that ground between the ordinary high-water and low-water mark".

37. People v. Hecker, 4 Cal. Rptr. 334, 345-46 (1960), *citing* Boone v. Kinsbury, 206 Cal. 148, 170, 273 P. 797, 807 (1928).

38. 3 AMERICAN LAW OF PROPERTY § 12.27 at 250 (A.J. Casner ed. 1952) (footnotes omitted).

39. *Id.* at § 12.28.

40. *See* Tison, *supra* note 2, at 10.

41. *Id.*

42. *Id.* at 11.

> Otherwise stated, the shore "is confined to the flux and reflux of the sea at ordinary tides". The ambiguity of the above definitions has been the cause of endless litigation. It is obvious that the term "ordinary tides" is capable of several definitions. The highest equinoctial spring tides occur in the natural order of things, and are in this sense "ordinary".[43]

It is apparent from the English authorities quoted above that the primary consideration was to make the most practical and efficient use of the land. The only land considered capable of being used was the land above the line of the ordinary tides. Therefore, a determination of the meaning of that term became necessary.

As used by the English courts, "ordinary tides" is not a tidal datum, but rather a legal conclusion. It is one thing to observe the tides, but a different thing to determine which of the tides observed are ordinary.[44] As was discussed earlier, due to the various factors which influence the tides, the frequency, range, and height of the tides vary from day to day, month to month, and year to year. Twice a month, when the astronomic forces are working in conjunction with each other, the maximum range, or spring tides occur;[45] the high tide is higher than the average, and the low tide is lower. On the other hand, twice a month the minimum range, or neap tides, occur, because the astronomic forces are working in opposition to each other;[46] the high tide is lower than the average, and the low tide is higher.[47] The point of this discussion is to indicate the difficulty in determining what tides are ordinary. On the one hand, the spring and neap tides are ordinary in that they occur regularly each month or each year. Yet they are not ordinary in the sense that they are the extremes in height, and do not occur as often as the tides in between.

The determination of what constitutes ordinary tides in

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43. A.E. CAREY & F.W. OLIVER, TIDAL LANDS A STUDY OF SHORE PROBLEMS 26 (1918).

44. In this regard, "ordinary" is distinct from "mean", in that the latter refers to a mathematical average. The former is a nontechnical term to describe tides which occur in the regular course of a tidal period.

45. *See* Tison, *supra* note 2, at 7-8.

46. *Id.* at 7.

47. *See* 2 SHALOWITZ 669. "The neap range is usually about 20 percent less than the mean range, and the spring range about 20 percent greater than the mean range."

England was made in *Attorney-General v. Chambers*.[48] There the court stated:

> The same reason that excludes the highest tides of the month (which happen at the springs) excludes the lowest high tides (which happen at the neaps), for the highest or spring tides and the lowest high tides (those at the neaps) happen as often as each other. The medium tides therefore of each quarter of the tidal period afford a criterion which we think may be best adopted.[49]

The result of this decision was a recognition of sovereign ownership of the lands covered and uncovered by the ordinary flux of the tides. By eliminating both the extraordinary highs and the lowest highs, the boundary between upland and tideland was to be "the line of the medium *high* tide between the springs and the neaps,"[50] or the ordinary high-water mark.

This approach differs significantly from that of the civil law. The civil law accepts as the boundary "the extreme limit to which the highest natural tides extend . . ."[51] but in determining that limit, does not include "the highest actual tides, for these may be produced by peculiarities of wind or other temporary or accidental circumstances . . . ."[52]

The American courts were also faced with the decision as to what constitutes "ordinary tides." However, not all courts have agreed upon a common definition. In *Borax Consolidated, Ltd. v. Los Angeles*,[53] the Supreme Court of the United States set forth its interpretation of which tides were to be included in the definition of "ordinary tides." Faced with a boundary dispute

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48. 43 Eng. Rep. 486 (Ch. 1854).

49. *Id.* at 489. Shalowitz explains this decision as follows:

> The Court, therefore, defined the "ordinary tides" . . . as the medium high tides between the springs and the neaps. If spring tides alone were used, a strip of shore to seaward of the spring limit would be covered only twice during the month; the rest of the month it would be uncovered. Conversely, if neap tides alone were used, a strip of shore to landward of the neap limit would be uncovered only twice during the month; the rest of the month it would be covered. Neither one would therefore express any concept of being covered by ordinary tides.

1 SHALOWITZ 92 n.25.

50. 43 Eng. Rep. at 490 (emphasis added).

51. *Id.* at 489.

52. *Id.*

53. 296 U.S. 10 (1935) [hereinafter cited as *Borax*]. This case was recently reviewed and confirmed in Hughes v. Washington, 389 U.S. 290 (1967).

between an upland owner-grantee who had received his land under a federal patent, and a tideland owner-grantee who had received his grant from the state, the Court first held that the extent of the federal grant was a federal question and amenable to federal law. The Court recognized that federal law has adopted the common law standard that the boundary is the ordinary high-water mark. The significance of this decision was that it interpreted "ordinary high water" as "mean high water,"[54] and thereby established a standard by which to judge what is "ordinary." After reviewing the reasoning of the English court in *Chambers supra,* Chief Justice Hughes concluded:

> [W]e perceive no justification for taking neap high tides, or the mean of those tides, as the boundary between upland and tideland, and for thus excluding from the shore the land which is actually covered by the tides most of the time. In order to include the land that is thus covered, it is necessary to take the mean high tide line which . . . is neither the spring tide nor the neap tide, but a mean of *all* the high tides.[55]

Thus, in announcing the federal rule, the Court relied to some extent upon the definition of mean high tide given by the Coast and Geodetic Survey, which uses the mean of all the high tides.[56] It would seem that this is the most practical formula, since the Survey computations and publications include all the high tides, and those figures are the ones relied on by surveyors.[57] Furthermore, aside from eliminating complexities, it would appear that the result of the application of the federal formula would not differ significantly from that reached under the English rule, since those tides eliminated by the latter do not occur as often as those used, and probably balance each other mathematically.[58]

In its attempt to define the "ordinary tides," California has reached a different result, although it is not entirely clear what was intended by the divergence.[59] Section 830 of the Civil Code

54. *See* Tison, *supra* note 2, at 10. For the federal courts, at least, this ambiguous legal term was given a technically precise definition.

55. 296 U.S. at 26 (emphasis added).

56. *Id.* at 26-27.

57. *See* Karo, *supra* note 1, at 28.

58. The elimination of a few figures, some lower and some higher, than an average figure would probably not change that average significantly if they were included.

59. California has not followed the lead of the federal courts which have interpreted the term "ordinary" as "mean". *See* notes 44 and 54 *supra.*

provides: "Except where the grant under which the land is held indicates a different intent, the owner of the upland, when it borders on tidewater, takes to ordinary high-water mark . . . ."[60] The first case involving a judicial interpretation of the term was *Teschemacher v. Thompson*,[61] and it is the language of this case upon which the California rule is based.

> The limit of the monthly Spring tides is, in one sense, the usual high water mark; for, as often as those tides occur, to that limit the flow extends. But it is not the limit to which we refer when we speak of "usual" or "ordinary" high water mark. By that designation we mean the limit reached by the neap tides; that is, those tides which happen between the full and change of the moon, twice in every twenty-four hours.[62]

By thus restricting "ordinary" tides to the neap tides, and excluding the monthly spring tides, it would appear that the court did not intend for *all* the tides to be included. If that was the case, then truly the California rule is different from the federal rule. But it is not really clear what the court meant to include when it used the term "neap," and on this basis the decision has been criticized. Shalowitz states that the decision is

> . . . scientifically inaccurate in its reference to spring and neap tides. The court refers to "monthly spring tides," when spring tides occur twice a month at the full and change of the moon; and it uses the word "neap," not in its accepted technical sense as those tides which occur twice a month when the moon is in its first and third quarters, but in some ambiguous sense to designate a plurality of tides between full and change. . . . The court apparently thought . . . that all tides are either spring or neap; that the springs occur but once a month; and that all other tides are neap tides and differ but little among themselves, making them the "usual" or "ordinary" tides.[63]

As the criticism points out, the *Teschemacher* decision could stand for either one of two propositions. First, the "ordinary tides" include only those neap tides which occur twice a month when the moon is in its first and third quarters; second, the "ordinary tides" include all of the tides, inaccurately called

60. CAL. CIV. CODE § 830 (West 1954).
61. 18 Cal. 11 (1861).
62. *Id.* at 21.
63. 1 SHALOWITZ 93.

"neaps," which occur between full and change of the moon, except for the spring tides.

In *Ward v. Mulford*,[64] the court seems to have adopted the second interpretation. Citing *Teschemacher*, the court spoke of "the neap or ordinary tides, which occur twice every twenty-four hours."[65] Similarly, in *Eichelberger v. Mills Land and Water Company*,[66] the court again cited *Teschemacher* in fixing a boundary at the high-water mark at ordinary or neap tides.[67] The same result was reached in a number of other subsequent cases.[68]

Therefore, it seems reasonable to conclude from a fair reading of the *Teschemacher* decision and the interpretation given it by subsequent cases that the court meant the true California rule to include all tides except the monthly spring tides in determining what the "ordinary tides" are, and furthermore, that the use of the word "neap" was not intended in its restrictive technical sense as the twice a month tides during the first and third quarters of the moon. Indeed, until the district court decision in *Kent*, it does not appear that any appellate court decision in California has adopted that restrictive interpretation.

Before moving on to a discussion of that aspect of the *Kent* case, a review of the various attempts to define "ordinary" (discussed above) may be helpful. The English rule as established by *Chambers* excludes both the springs and the neaps (in the technical sense); all other tides are ordinary. The federal rule as enunciated by the *Borax* case used all of the tides, including the springs and the neaps. The California rule, based on *Teschemacher*, included all tides except the springs, using the word "neap" to mean "ordinary."

This background material is helpful in analyzing the district court decision in *Kent*. The court was correct in pointing out that the trial court had mistakenly applied the federal rule rather

64. 32 Cal. 365 (1867).

65. *Id.* at 370.

66. 9 Cal. App. 628, 100 P. 117 (1908).

67. *Id.* at 640.

68. Otey v. Carmel Sanitary District, 219 Cal. 310, 26 P.2d 308 (1933); City of Oakland v. E.K. Wood Lumber Co., 211 Cal. 16, 292 P. 1076 (1930); F.A. Hihn Co. v. City of Santa Cruz, 170 Cal. 436, 150 P. 62 (1915); Bolsa Land Co. v. Vaqueros Major Oil Company, Ltd., 25 Cal. App. 2d 75, 76 P.2d 519 (1938); J.W. Forgeus v. County of Santa Cruz, 24 Cal. App. 193, 140 P. 1092 (1914).

than the California rule in defining ordinary tides. But in restating the California rule, the court said that only "the average of all high neap tides"[69] were to be used, and defined neap tides as "those occurring when the moon is in its first and third quarters . . . ,"[70] thus adopting the technical definition of neap tides. There is no doubt that that is the correct technical definition of neap tides. But in so construing the California rule, the court clearly was in error. The authority cited by the court was to the line of cases beginning with *Teschemacher* and discussed above.[71] There is no basis for the belief by the court that those cases support the view it took in *Kent.*

Assuming for the purposes of discussion that the *Kent* decision was an inaccurate statement of the California rule correctly stated by *Teschemacher,* the questions arise, is there any legitimate reason for maintaining a rule distinct from the federal rule? Is there a valid difference, or are there any significant consequences? As was mentioned in connection with the *Borax* case above, the Coast and Geodetic Survey definition of mean high tide includes the average height of all the high waters;[72] thus all the tides are used when computing the height of ordinary high water. These computations in their published form lend themselves to easy reference when attempting to ascertain the vertical component requisite to boundary determinations. Under the California rule, however, the ordinary high water datum must be recomputed, excluding the monthly spring tides. Thus, it would appear that the federal rule is much easier to apply, since the data is readily available. Furthermore, from a mathematical standpoint, the addition of the tidal measurements that would result from the inclusion of the monthly spring tides would not significantly change the average of the other tides. The ultimate tidal datum would, for all intent and purposes, be the same. It is suggested, therefore, that California could adopt the federal rule and achieve uniformity without significantly changing present boundary lines.[73]

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69. 242 Cal. App. 2d at 161, 51 Cal. Rptr. at 219.

70. *Id.*

71. *See* cases cited notes 64-68 *supra* and accompanying text.

72. Marmer, *Tidal Datum Planes*, COAST AND GEODETIC SURVEY SPECIAL PUBLICATION No. 135, 76 (1951).

73. It appears that, either by error or design, the Second District Court of Appeals has already moved in that direction. In Swarzwald v. Cooley, 39 Cal. App. 2d 306, 103 P.2d 580 (1940), the court used the average of all the high tides to determine the plane of

II. The Fluctuating Shoreline

The boundary problem in *Kent,* however, involved much more than a misapplication of the California rule concerning the computation of ordinary or mean high water. This determination provides just one of the two necessary engineering components. The second, or horizontal, component consists of a horizontal line drawn from the elevation of the first component, the tidal datum, to a position of intersection with the beach (see Fig. 1). This point of intersection is the tidal boundary. Obviously, this horizontal component is dependent upon the establishment of the vertical component; it will not change unless the height of the tidal datum itself changes, and, as has already been discussed, for all practical purposes the tidal datum does not change except over a long period of years. Consequently, the horizontal component does not change either. But, the point where that line strikes the beach can change, due to the movement of the beach itself. In that event, the location of the tidal boundary is dependent upon the reasons for and characterizations of that movement.

The trial court in *Kent* characterized the fluctuations of the beach as natural erosion and accretion. The district court found error in that characterization upon the following basis:

> [A]ddition to the land is accretion (and loss of land is deliction), only when the changes are gradual and imperceptible . . . , or "by little and little, by small and imperceptible degrees" . . . . The evidence here is that the beach is some 80 feet wider in summer than in winter. If these changes be constant, in offsetting pairs occurring annually, they can hardly be gradual and imperceptible, and thus cannot meet the definitions of natural accretion and deliction.[74]

The crucial aspect of this argument is the hypothesis that a continuous but self-neutralizing fluctuation is neither gradual nor imperceptible and therefore neither accretion nor deliction; or, put another way, that it is neither accretion nor deliction because it is neither gradual nor imperceptible. Yet, as a practical

ordinary high water. *Id.* at 313, *citing* H.A. Marmer, *supra* note 72. There is no evidence from the case that a federal patent was involved, nor any evidence that the court thought the case called for the application of the federal rule. It appears that the court was trying to apply state law, and adopted the use of the federal position for that purpose.

74. 242 Cal. App. 2d at 160, 51 Cal. Rptr. at 218-19 (citations omitted).

matter, the movement of the beach would not have been visible to an observor, except over a period of days.[75] Furthermore, the fact that the movement was "constant" and in "offsetting pairs" should have no bearing upon whether the movement was "gradual" and "imperceptible." There is no logic which compels that conclusion.

Shalowitz defines accretion as "[t]he gradual and imperceptible accumulation of land by natural causes . . . . This may result from a deposit of alluvion upon the shore, or by a recession of the water from the shore. Accretion is the act, while alluvion is the deposit itself."[76] Erosion is "the gradual and imperceptible washing away of the land along the sea by natural causes."[77] Avulsion is defined as "the loss of lands bordering on the seashore by sudden or violent action of the elements, perceptible while in progress."[78] As a general rule, when the shoreline is shifted suddenly or by artificial means, the boundary lines remain as they were before the shift. When the change occurs gradually by erosion, accretion, or reliction, the boundary lines shift with the shore.[79] The theory underlying these rules is that "[w]hen the land conveyed is bounded by water, it may well be regarded as the expectancy of both grantor and grantee that it should continue to be so bounded."[80] Furthermore, "[n]atural justice requires that such accretions should belong to the upland owner so that he will not be shut off from the water."[81] Blackstone laid down the common law rule, and part of the rationale, in the following passage:

> And as to lands gained from the sea, either by *alluvion* . . . or by *dereliction* . . . the law is held to be, that if the gain be by little and little, by small and imperceptible degrees, it shall go to the owner of the land adjoining. For *de minimus non curat lex*; and, besides, these owners being often losers by the breaking in of the sea, . . . this possible gain is therefore a reciprocal consideration for such possible charge or loss. But,

75. At the rate of 80 feet every six months, the actual change per day would amount to only 5.26 inches, if the change were uniform.

76. 1 SHALOWITZ 279.

77. *Id.* at 288.

78. *Id.* at 281.

79. *See* 3 AMERICAN LAW OF PROPERTY § 12.113, at 434-35 (A.J. Casner ed. 1952) (footnotes omitted).

80. *Id.* at § 15.27, at 857.

81. *Id.* at § 15.27, at 858-59 (footnotes omitted).

> if the alluvion . . . be sudden and considerable, in this case it belongs to the king: for, as . . . owner of the soil while it is covered with water, it is but reasonable he should have the soil, when the water has left it dry.[82]

What would seem to be controlling, then, is the issue of time; over how long a period of time must the change be "gradual and imperceptible" in order to be classed as an accretion rather than an avulsion? The common law test of that time element was laid down in *County of St. Clair v. Lovingston*,[83] when the Supreme Court said: "The test as to what is gradual and imperceptible . . . is, that though the witnesses may see from time to time that progress has been made, they could not perceive it while the process was going on."[84] In *Jefferis v. East Omaha Land Co.*,[85] the Court confirmed that principle and added its view that by English law additions formed "so slowly that its progress cannot be perceived"[86] were classed as accretions. On the other hand, the California case of *Bohn v. Albertson*[87] set forth as the test of an avulsion "[a] sudden or violent action of the elements, perceptible while in progress."[88]

Based on these definitions and tests, it is difficult to see how the beach movement in *Kent* could technically be classified as anything but accretions and erosions, notwithstanding the continuity and predictability[89] of the fluctuations. As a result of

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82. 2 W. BLACKSTONE, COMMENTARIES ON THE LAWS OF ENGLAND 261-62 (1766). This has had wide acceptance in this country. *See* County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46 (1874); Dana v. The Jackson Street Wharf Co., 31 Cal. 118 (1866).

CAL. CIV. CODE § 1014 (West 1954), provides that "[w]here, from natural causes, land forms by imperceptible degrees upon the bank of a river or stream, navigable or not navigable, either by accumulation of material or by recession of the stream, such land belongs to the owner of the bank . . . ."

The California Supreme Court subsequently declared that this section was not meant to abrogate the common law in regard to accretions upon the seashore, and recognized title to such accretions in the upland owner. Strand Improvement Co. v. City of Long Beach, 173 Cal. 765, 772-73, 161 P. 975, 978 (1916); *see also* Carpenter v. City of Santa Monica, 63 Cal. App. 2d 772, 147 P.2d 964 (1944).

83. 90 U.S. (23 Wall.) 46 (1874).

84. *Id.* at 68.

85. 134 U.S. 178 (1890).

86. *Id.* at 193.

87. 107 Cal. App. 2d 738, 238 P.2d 128 (1951).

88. *Id.* at 748, 238 P.2d at 135, *citing* Schwartzstein v. B.B. Bathing Park, 203 App. Div. 700, 197 N.Y.S. 490, 492 (1922).

89. As a matter of fact, the district court was not convinced by the evidence that the

that determination, it would necessarily follow that, as the beach or shoreline fluctuates, so too does the borderline marking ownership.

But a decision to the effect that the seasonal fluctuations of the beach were by accretion and erosion would not necessarily solve all the problems presented in this controversy. True, the boundary line between upland and tideland would be marked by the point of intersection of the horizontal line of ordinary high water with the beach, described as the ordinary high-water mark. But that mark would fluctuate seaward and landward as the beach itself moved. Thus, ownership of that eighty foot strip of land would change correspondingly; in the winter, the state would own it, and in the summer the company would own it. The parties would never be able to make permanent use of any portion of that strip, because at some time during the year, the adverse party would own it. This would preclude the erection of any kind of permanent structure on the strip. And if oil or other mineral deposits should be discovered there, it is difficult to say who would have the mineral rights. Presumably, one of the parties could drill for oil for part of the year, but when the ordinary high-water mark passed him by, he would have to relinquish his rights to the other party, who would then have the ownership of the land. If there are any policy reasons in favor of permanence of boundaries, allowing adjoining landowners full knowledge of the extent of their ownership, a finding of accretion and erosion as in this case would surely create a conflict.

Aside from that conclusion, it is interesting to note an inconsistency in the reasoning of the district court. On the one hand, the court ruled that no accretion had occurred, and therefore that the upland owner could not claim ownership to that portion of the beach which was in existence in the summer but not in winter, a strip of land varying in width up to eighty feet. On the other hand, in its attempt to fix a boundary, the court was called upon to suggest some means by which to ascertain where the horizontal component intersected the beach. The answer given was to compute the average line of the shore

extent of the movement was predictable. It was acknowledged that the fluctuations occurred annually, but whether or not the fluctuations amounted to eighty feet every year was left to be decided upon retrial.

by taking into consideration the seasonal movements of the sand. Presumably, if the computation is possible (and there is strong doubt that it is, as will be discussed *infra*), this average line of the shore will lie somewhere between the two extreme limits of this eighty foot strip. Therefore, the upland owner *will* acquire ownership of that portion of the beach between the average line and the extreme landward limit of the eighty foot strip, ownership which was denied him by the non-application of the laws of accretion. What the court took away with one hand is given back with the other, to the extent of approximately one half.

Having rejected the accretion-erosion concept as a method of determining the location of the boundary, the court proposed a novel means to resolve the issue. The court directed the parties to attempt to determine the average line of the shore against which the ordinary high-water datum could be applied.[90] This would create a fictional but stable shoreline, which would at least create a fixed boundary and thus avoid the impracticability of constantly changing ownership of the fluctuating strip of sand. But this solution is open to criticism on several grounds.

The most immediate objection is the difficulty in determining that average. There are no published figures which detail the extent and amount of beach erosion and accretion. If there were maps available that showed the position of the shoreline at regular intervals during the year for a significant number of years, it would be possible to make a comparison between them to ascertain the extent of the movement as well as the frequency and duration. In a declaration prepared by the State Lands Commission,[91] the executive officer declared that the "average line of the shore" concept is dependent upon adequate records to analyze the history of the shoreline.[92] He states that an insufficient number of maps are available, and those that are available are derived from different sources, which inhibits their use for the purposes of comparison. They show generally the position of the shore at various yearly intervals, while what is needed here is a series of maps on a monthly or perhaps even weekly basis, for a long period.

90. 242 Cal. App. 2d at 161, 51 Cal. Rptr. at 219.

91. Plaintiff's Petition for Hearing, Appendix II, People v. William Kent Estate Co., 242 Cal. App. 2d 156, 51 Cal. Rptr. 215 (1966).

92. *Id.* at 1.

The only possible method, then, to obtain this average is to observe and record the beach movements periodically throughout the year, and on a yearly basis. The time and expense involved are virtually insurmountable barriers, precluding any practical application of this method as a solution to the problem. It is doubtful that an average line of the shore could ever be determined; lacking that, no boundary could ever be fixed, since there is no stable point where the horizontal component will strike the beach.

However, assuming that this average shoreline could be determined, the boundary thus resulting is still subject to criticism. Since the boundary would be stable, and located somewhere in the middle of the eighty foot strip, for that portion of the year that the line of *actual* high tide (the line where the then-existing plane of ordinary high-water intersects the beach) is seaward of the boundary line, the upland owner is deprived of his littoral rights to the sea. That portion of the beach would, practically-speaking, be upland; it is not tideland by the common law and long-accepted definition in this country because not covered by the ordinary flux and reflux of the sea, and is landward of the then-existing ordinary high-water mark. By the same token, for that portion of the year when the then-existing ordinary high-water mark is landward of the boundary, the upland owner's property *is* covered by the flux and reflux of the sea, and is, practically-speaking, tidelands which the state does not own.

For all these reasons, but primarily due to the impossibility of ascertaining the average line of the shore, the solution proposed by the district court is unsatisfactory. Other solutions are available should the court decide to reject the ordinary high-water mark as the method of determining boundary lines in cases of this type.[93] One such proposal would be to grant joint ownership of the strip to both the upland owner and the state. But this solution would nevertheless be a restriction upon each of the joint owners, and the use to which they could put their land. Such a restriction is inconsistent with the desire of the upland owner to make exclusive use of the land for his own purposes, which purposes, in all likelihood, conflict directly with the nature

93. However, since the ordinary high-water mark is a statutory declaration (*see* note 60 *supra*), the legislature is the proper authority to make this decision.

of the interest held by the state. It must be recognized that, at least, on the surface, the state is suing here to protect the rights of the public to free use and passage over and along the tidelands. This restriction would affect that interest as significantly as that of the upland owner. For the same reasons, the granting of easements across the strip of beach would also be less than satisfactory.

If the concept of the ordinary high-water mark as determinative of tidal boundaries is retained, there are two other possibilities not considered by the district court, both of which will establish a stable and readily ascertainable boundary without hindering the full enjoyment of the land. The first possibility is to adopt as the boundary the ordinary high-water mark as it exists when erosion has had its maximum effect, when that mark is at its extreme landward migration. It would be characterized by permanence and stability, and would be readily ascertainable. Both the state and the upland owner would know the exact nature and extent of their ownerships, and could make full use of their land. In effect, it would give ownership of the entire eighty foot strip to the state. The most glaring difficulty with this solution, however, is that for most of the year the upland owner is not a littoral owner. The water would be in contact with his land for only a short period of time when erosion is at its maximum and accretion is about to begin. This could seriously jeopardize the use and value of the remainder of the land. The other solution is the opposite extreme; adopt as the boundary the ordinary high-water mark as it exists when accretion is at its maximum. This solution provides a readily ascertainable boundary with the same stability and permanence as in the prior proposal. The result would be to recognize ownership of the eighty foot strip in the upland owner. Additionally, the littoral rights of the upland would be completely protected, since the water would always be in contact with some part of the land.

III. Conclusion

Which one of these solutions would best suit the needs of the law would depend upon which one of two public policies is deemed the most important by the legislature or the judiciary. Balanced against the public policy favoring private ownership (including littoral rights) of land is the public trust in the

tidelands held by the state incident to its ownership. A determination of which one of these policies is most important will point the direction to either one of the two proposed solutions.

The *Kent* decision, and the facts giving rise to the controversy, illustrate the problems that can result when trying to determine the location of a tidal boundary. Although the selection of a particular tidal datum to use as the vertical component does not present any great difficulty, problems do arise when trying to determine which of the monthly tides are to be used in computing that datum. The uniform acceptance of the federal standard would eliminate this confusion. Furthermore, although the beach movement in *Kent* may have been extreme, the situation serves to illustrate that the acceptance of a uniform standard for the ordinary high-water mark will not by itself eliminate tidal boundary questions.[94]

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94. Since the district court remanded for a new trial, the courts are still faced with these problems; it will be interesting to see how the problems are ultimately resolved.