

April 1990

## Ordinary High Water Line Determination: Legal Issues

Richard Hamann

Jeff Wade

Follow this and additional works at: <https://scholarship.law.ufl.edu/flr>



Part of the [Law Commons](#)

---

### Recommended Citation

Richard Hamann and Jeff Wade, *Ordinary High Water Line Determination: Legal Issues*, 42 Fla. L. Rev. 323 (1990).

Available at: <https://scholarship.law.ufl.edu/flr/vol42/iss2/2>

This Article is brought to you for free and open access by UF Law Scholarship Repository. It has been accepted for inclusion in Florida Law Review by an authorized editor of UF Law Scholarship Repository. For more information, please contact [jessicaejoseph@law.ufl.edu](mailto:jessicaejoseph@law.ufl.edu).

## ORDINARY HIGH WATER LINE DETERMINATION: LEGAL ISSUES

*Richard Hamann\**

*Jeff Wade\*\**

|                                                                                     |     |
|-------------------------------------------------------------------------------------|-----|
| I. INTRODUCTION . . . . .                                                           | 324 |
| A. <i>Public Trust: The Basis for State Ownership</i> . . . .                       | 327 |
| B. <i>Navigability</i> . . . . .                                                    | 330 |
| C. <i>Navigability of Associated Submerged Lands</i> . . . .                        | 339 |
| II. ORDINARY HIGH WATER LINE . . . . .                                              | 342 |
| A. <i>Introduction</i> . . . . .                                                    | 342 |
| B. <i>Vegetation</i> . . . . .                                                      | 348 |
| C. <i>Dendrochronology</i> . . . . .                                                | 357 |
| D. <i>Soils and Geomorphology, and Marks on Local<br/>        Objects</i> . . . . . | 360 |
| E. <i>Hydrology</i> . . . . .                                                       | 364 |
| F. <i>Corroborative Data</i> . . . . .                                              | 372 |
| G. <i>Relevance of the Meander Line</i> . . . . .                                   | 376 |
| III. EFFECT OF CHANGES IN THE SHORELINE . . . . .                                   | 379 |
| IV. PROCEDURES FOR ESTABLISHING OHWL . . . . .                                      | 389 |
| A. <i>Investigative Procedures</i> . . . . .                                        | 389 |
| B. <i>Evidentiary Considerations</i> . . . . .                                      | 391 |
| C. <i>Evidence of Physical Changes Over Time</i> . . . . .                          | 393 |
| V. CONCLUSION . . . . .                                                             | 396 |

The pond rises and falls, but whether regularly or not, and within what period, nobody knows, though, as usual, many pretend to know . . . . I have observed one rise and a part of two falls, and I expect that a dozen or fifteen years hence the water will again be as low as I have ever known it . . . . The rise and fall of Walden at long intervals serves this use at least; the water standing at this great height for

---

\*Assistant Director, Center for Governmental Responsibility, University of Florida College of Law. B.A. 1971, J.D. 1976, University of Florida.

\*\*Assistant Director, Center for Governmental Responsibility, University of Florida College of Law. B.A., 1972, University of Alabama; M.Ed., 1977, J.D., 1985, University of Florida.

a year or more, though it makes it difficult to walk around it, kills the shrubs and trees which have sprung up about its edge since the last rise, — pitch pines, birches, alders, aspens, and others, — and, falling again, leaves a unobstructed shore . . . . By this fluctuation, the pond asserts its title to a shore, and thus the *shore* is *shorn*, and the trees cannot hold it by right of possession.

Henry David Thoreau  
Naturalist, Philosopher, and Land Surveyor  
in Walden, 1854

## I. INTRODUCTION

Under the public trust doctrine, the State of Florida gained title to the beds of navigable lakes, streams, and tidal waters upon admission to the Union in 1845. These publicly owned submerged lands are perhaps the state's most valuable natural asset. Originally valued primarily as avenues for trade and travel, water supply sources, and conduits for the disposal of wastes, Florida's waterways are now also appreciated for their ecological, recreational, and aesthetic values. Floridians and visitors flock to enjoy the rivers, lakes, bays, and shores of the Sunshine State. Submerged lands, however, comprise some of the most sensitive environments in the state and provide essential habitat for endangered species and other wildlife. Recreational and commercial fisheries depend upon maintaining the integrity of submerged lands. If wetlands are the "soul" of Florida, then submerged lands are surely its lifeblood.

In Florida's earliest environmental battles, advocates fought to protect these aquatic environments from privatization and wholesale destruction. Strong judicial support for the public trust doctrine averted several attempts to divest the public of this resource.<sup>1</sup> As public support for environmental protection has grown, elected officials have steadily increased the protection given to publicly owned submerged lands. The 1968 Constitution codified the public trust doctrine<sup>2</sup> and limited the government's power to dispose of these lands.<sup>3</sup> The title to all submerged lands is now vested in the Governor and Cabinet,

---

1. See, e.g., *State v. Black River Phosphate Co.*, 32 Fla. 82, 13 So. 640 (1893); *State ex rel Ellis v. Gerbing*, 56 Fla. 603, 47 So. 253 (1908); *State ex rel Buford v. City of Tampa*, 88 Fla. 196, 102 So. 336 (1924); *Pembroke v. Peninsular Terminal Co.*, 108 Fla. 46, 146 So. 249 (1933).

2. FLA. CONST. art. X, § 11.

3. *Id.*

as the Trustees of the Internal Improvement Trust Fund.<sup>4</sup> The Trustees' current restrictions on the use of sovereignty submerged lands are highly protective of public trust values. Regulatory protection, which originally only applied to public trust lands, has also increased.

It may be surprising, then, to find that the extent of public ownership of submerged lands remains a hotly contested issue. In general terms, the law is clear: the public trust doctrine vested the state with ownership of the beds of tidal waters below the line of mean high water, and of nontidal, navigable waters below the ordinary high water line (OHWL). The mean high water line (MHWL) is determined by averaging the high tides over a full lunar cycle. The Florida Coastal Mapping Act provides definitive procedures for surveyors to use in fixing the MHWL. However, the criteria established by case law for determining the OHWL are less precise. They require site specific analysis of water's effects on the landscape, as evidenced by such physical indicators as soil, vegetation, and geomorphology. Differences in interpretation of the legal precedent and the physical evidence can lead to widely divergent opinions as to the location of the OHWL.

Beginning in the 1970s, private landowners began asserting ownership of submerged lands. The most notorious dispute involved competing claims to the Peace and Alafia Rivers. Coastal Petroleum Corporation, which held an interest in the state's mineral resources, brought suit alleging that several mining companies had converted phosphate rock deposits underlying the bed of the Peace River.<sup>5</sup> The phosphate companies claimed that the Peace River was not navigable and that the OHWL was waterward of the mined areas.<sup>6</sup> The State of Florida became a party to the suit, and conducted its own OHWL survey. The state determined that the OHWL lay considerably farther landward: half a mile farther in certain places.<sup>7</sup> Before a court could try this dispute, however, other legal issues had to be resolved involving whether Swamp and Overflow Lands patents, the Marketable Record

---

4. FLA. STAT. § 253.12 (1989). *See also* FLA. STAT. § 253.02 (1989) (defining the members of the Internal Improvement Trust Fund Board of Trustees).

5. *Coastal Petroleum Co. v. American Cyanamid Co.*, 454 So. 2d 6, 7 (Fla. 2d D.C.A. 1984).

6. *See* HOLLAND & KNIGHT, *THE PHOSPHATE CONTROVERSY: A PERSPECTIVE* 5-12 (1980).

7. Telephone interview with Jonathan Glogan, Assistant Attorney General, Florida Dep't of Legal Affairs (Nov. 15, 1990). At most locations, the differences in the proposed OHWLs were considerably smaller. *Id.* The ownership of 21 miles of the Peace River and 5 miles of the Alafia River was directly at issue. State Officials feared adverse resolution of the legal issues involved would jeopardize another 6,000 miles of streams and rivers along with as many as 660 lakes. McGinty, *Mobile Lands Mineral Rights*, *CHEMICAL WEEK*, Nov. 11, 1987, at 18.

Title Act, or the doctrine of estoppel by deed had divested the state of title.<sup>8</sup>

In *Coastal Petroleum Co. v. American Cyanamid Co.*,<sup>9</sup> the Florida Supreme Court ruled in favor of the state on all three issues. The state and Mobil Oil Corporation thus proceeded to litigate the OHWL issue. On the eve of trial, however, the parties reached a settlement. The phosphate companies agreed to give the state all of the land it claimed, additional land in the twenty-five year floodplain, and several thousand acres of mined lands for park development.<sup>10</sup> After spending 7.5 million dollars on the litigation, the state had achieved its goals on the Peace and Alafia Rivers, but had not established new precedent on the issue of how to determine the OHWL.<sup>11</sup>

One consequence of the settlement was that the Trustees directed their staff, the Department of Natural Resources (the DNR), to begin developing a rule for making OHWL determinations.<sup>12</sup> After rulemaking was underway, the Board of Professional Land Surveyors adopted a conflicting rule,<sup>13</sup> which was challenged by the Attorney General. A hearing officer held that most parts of the proposed rule were inconsistent with Florida case law and thus were invalid. The First District Court of Appeal has held that the Board of Professional Land Surveyors lack legislative authority to adopt rules for determining the OHWL, and thus has not addressed the issue of whether the proposed rules accurately interpret case law on the subject.<sup>14</sup>

The issue of how to establish the boundaries of publicly owned submerged lands along nontidal waters thus remains subject to a limited number of relatively old Florida decisions. Although OHWLs can only be determined definitively through judicial ruling,<sup>15</sup> DNR

8. See *American Cyanamid*, 454 So. 2d at 9-10.

9. 492 So. 2d 339 (Fla. 1986). See generally Jacobs & Fields, "Save Our Rivers" or "Save Our Property"?, 62 FLA. B.J. 59-62 (1988); Jacobs & Fields, *Sovereignty Lands in Florida: Lost in a Swamp of Ambiguity*, 38 U. FLA. L. REV. 347 (1986); Powell, *Unfinished Business: Protecting Public Rights to State Lands From Being Lost Under Florida's Marketable Record Title Act*, 13 Fla. St. U.L. Rev. 599-632.

10. *Mobile Oil Corp. v. Coastal Petroleum Co.*, No. GCG-82-1689 (Polk County Cir. Ct. 1987) (Stipulation for Settlement and Entry of Consent Final Judgment, on file at Center of Governmental Responsibility, University of Florida College of Law, Gainesville, Florida).

11. Tampa Tribune, Jan. 21, 1987, at 5B col. 5.

12. In October 1988, Proposed Rule Chapters 18-22A, -22B, and -22C were discussed in workshops. A revised draft Chapter 18-22 dated June 21, 1989 was then prepared.

13. Proposed Rule 21HH-6, F.A.C.

14. *The Board of Trustees of the Internal Improvement Trust Fund v. Board of Professional Land Surveyors*, slip op. (Fla. 1st D.C.A. Sept. 13, 1990).

15. *Id.*

staff, landowners, and others routinely must make such determinations. The DNR staff and riparian owners, for example, must determine whether a particular area proposed for development is subject to the Trustees' rules regarding the use of sovereignty submerged lands.<sup>16</sup> Surveyors, attorneys, and other professionals are commonly asked to assist in making such determinations. The purpose of this article is to assist practitioners in interpreting the law of OHWL determinations.<sup>17</sup>

### A. *Public Trust: The Basis for State Ownership*

States derive their ownership of the lands under navigable waters from the English common law doctrine by which the sovereign held title to the beds of navigable and tidal waters in trust for the people.<sup>18</sup> After the American Revolution, each state acquired title to the lands beneath its navigable waters under the public trust doctrine.<sup>19</sup> The federal government held title to any sovereignty lands not within the jurisdictional boundaries of the original states, as well as any lands subsequently acquired from foreign governments.<sup>20</sup> New states joined the Union on an equal footing with the original thirteen states, including "the right and duty of the states to own and hold the lands under navigable waters for the benefit of the people."<sup>21</sup>

In 1819, the United States acquired the territory known as East and West Florida from Spain under the Treaty of Cession.<sup>22</sup> When

---

16. A citizen canoeing on one of the state's streams must determine whether a potential campsite lies below the OHWL, in which case public use may be allowed, or above the line, in which case landing may constitute trespass.

17. The research for this article was supported by a STAR Grant from the Florida Institute of Government and a contract with the Florida Department of Natural Resources for a team of scientists, surveyors, and lawyers to develop a manual to guide surveyors in establishing ordinary high water lines. The authors are grateful for the insight provided by other team members and especially for the assistance provided by David Gibson, Associate Professor, Surveying and Mapping, College of Engineering, University of Florida. Valuable assistance was also provided by David Guest, Jon Glogau, and Monica Reimer of the Florida Department of Legal Affairs, and Terry Wilkison and Doug Thompson of the Bureau of Survey and Mapping, Florida Department of Natural Resources. Copies of the manual are available from the Department of Surveying and Mapping, 346 Weil Hall, University of Florida, Gainesville, Florida 32611.

18. *Shively v. Bowlby*, 152 U.S. 1, 11 (1894).

19. *Martin v. Waddell*, 41 U.S. (16 Pet.) 367, 410-11 (1842); *Broward v. Mabry*, 58 Fla. 398, 407, 50 So. 826, 829 (1909); *State ex rel. Lewis v. Gerbing*, 56 Fla. 603, 608-09, 47 So. 353, 355 (1908).

20. *Shively*, 152 U.S. at 48.

21. *Mabry*, 58 Fla. at 408, 50 So. at 830.

22. Treaty of Amity, Settlement and Limits, Feb. 22, 1819, United States-Spain, art. 2, 8 Stat. 252, 254, T.I.A.S. No. 41, at 4-5 (effective Feb. 29, 1821).

the United States took possession of the area two years later, the public trust doctrine required the government to hold "the lands under the navigable waters, including the shores or spaces between the ordinary high and low water marks and tidelands, for the use and benefit of the state that was to be subsequently formed."<sup>23</sup>

Florida became a state on March 3, 1845 and, under the equal footing doctrine,<sup>24</sup> took title to all sovereignty lands within its jurisdiction except those parcels previously granted to private interests by the Spanish government<sup>25</sup> or conveyed out by the federal government while Florida was still a territory.<sup>26</sup> The sovereign's right of title included the responsibility to hold the lands in the public trust for the benefit of the people, with restrictions on alienation and use of the lands.<sup>27</sup> As the court explained in *State v. Black River Phosphate Co.*:<sup>28</sup>

[A]bduction [of control] is not consistent with the exercise of that trust which requires the government of the state to preserve such waters for the use of the public. The trust devolving upon the state for the use of the public . . . cannot be relinquished by a transfer of the property. The control of the state for the purpose of the trust can never be lost, except as to such parcels as are used in promoting the interests of the public therein, or can be disposed of without any substantial impairment of the public interest in the lands and water remaining.<sup>29</sup>

The doctrine has been incorporated in article X, section 11 of the Florida Constitution, which states that sovereignty lands are "held by the state . . . in trust for all the people" and that "[s]ale of such lands may be authorized by law, but only when in the public interest."<sup>30</sup>

---

23. *Martin v. Busch*, 93 Fla. 535, 562, 112 So. 274, 283 (1927).

24. *Pollard v. Hagan*, 44 U.S. (3 How.) 212, 214 (1845); *Barney v. City of Keokuk*, 94 U.S. 324, 337 (1876).

25. Treaty of Amity, Settlement and Limits, Feb. 22, 1819, United States-Spain, art. 8, 8 Stat. 252, 258, T.I.A.S. No. 41, at 9. Spanish land grants did not ordinarily include submerged lands. *Apalachicola Land & Dev. Co. v. McRae*, 86 Fla. 393, 433-34, 98 So. 505, 518 (1928).

26. *Shively*, 152 U.S. at 49-50.

27. *Hayes v. Bowman*, 91 So. 2d 795, 799 (Fla. 1957); *Broward v. Mabry*, 58 Fla. 398, 408, 50 So. 826, 829 (1909); *State v. Black River Phosphate Co.*, 32 Fla. 82, 100-01, 13 So. 640, 646 (1893).

28. 32 Fla. 82, 13 So. 640 (1893).

29. *Id.* at 99, 13 So. at 645.

30. FLA. CONST. art. X, § 11 (1971); FLA. STAT. § 253.12(2) (1987). See generally F. MALONEY, S. PLAGER & F. BALDWIN, *WATER LAW AND ADMINISTRATION: THE FLORIDA EXPERIENCE* 351-57 (1968); Ansbacher & Knetsch, *The Public Trust Doctrine and Sovereignty*

The public trust doctrine protects the public's interest in submerged lands.<sup>31</sup> Navigation, commerce, fishing, and bathing are among the interests Florida courts have recognized as protected.<sup>32</sup> Decisions from other jurisdictions have further expanded the scope of interests protected by the public trust doctrine.<sup>33</sup> As the Supreme Court of California observed in *Marks v. Whitney*:<sup>34</sup>

Public trust easements [were] traditionally defined in terms of navigation, commerce and fisheries. They have been held to include the right to fish, hunt, bathe, swim, to use for boating and general recreation purposes the navigable waters of the state, and to use the bottom of the navigable waters for anchoring, standing, or other purposes. . . . There is a growing public recognition that one of the most important public uses of the tidelands — a use encompassed within the tidelands trust — is the preservation of those lands in their natural state, so that they may serve as ecological units for scientific study, as open space and as environments which provide food and habitat for birds and marine life, and which favorably affect the scenery and climate of the area.<sup>35</sup>

Despite claims that the state's general regulatory powers are sufficient to safeguard the public's interest in submerged lands,<sup>36</sup> the evolving public trust doctrine offers significantly greater protection.<sup>37</sup>

---

*Lands in Florida: A Legal and Historical Analysis*, 4 J. LAND USE & ENV'T'L L. 337-75 (1989); Maloney & Ausness, *The Use and Legal Significance of the Mean High Water Line in Coastal Boundary Mapping*, 53 N.C.L. REV. 185, 188-95 (1974).

31. Maloney & Ausness, *supra* note 30, at 188.

32. See *White v. Hughes*, 139 Fla. 54, 70-71, 190 So. 446, 453 (1939) (right to bathing recognized); *Broward v. Mabry*, 58 Fla. 398, 407-08, 50 So. 826, 829 (1909) ("The rights of the people . . . relate to navigation, commerce, fishing, bathing and other easements allowed by law."); *Black River*, 32 Fla. at 106, 13 So. at 648 (submerged lands held "for at least the purposes of navigation and fishing and other implied purposes").

33. See, e.g., *National Audubon Soc'y v. Superior Court*, 33 Cal. 3d 419, 435, 658 P.2d 709, 719, 189 Cal. Rptr. 346, 356 (1983) (public trust not limited by reach of tides, but encompasses all navigable lakes and streams); *Borough of Neptune City v. Borough of Avon-by-the-Sea*, 61 N.J. 296, 309, 294 A.2d 47, 54 (1972) (public trust doctrine should not be fixed or static, but should be molded to meet changing conditions and needs of the public it was created to benefit).

34. 6 Cal. 3d 251, 491 P.2d 374, 98 Cal. Rptr. 790 (1971).

35. *Id.* at 259-60, 491 P.2d at 380, 98 Cal. Rptr. at 796.

36. See Lower, *Ownership of Sovereign Lands Beneath Navigable Waters*, 62 FLA. B.J. 19, 22 (July/Aug. 1988); Rosen, *Public and Private Ownership Rights in Lands Under Navigable Waters: The Governmental/Proprietary Distinction*, 34 U. FLA. L. REV. 561, 611-13 (1982); Comment, *Extending the Public Trust Doctrine to Non-Navigable Waters: States Reap Profits at Landowners' Expense*, 18 STETSON L. REV. 493, 504 (1989).

37. Compare 9 FLA. ADMIN. CODE 17-312.015 (1990) (outlining state policy to establish reasonable regulatory programs for the preservation of Florida's wetlands consistent with private



### B. Navigability

Only nontidal waters that are navigable are subject to state ownership under the public trust doctrine.<sup>38</sup> The requirement of navigability raises a host of questions. What is the minimum boat size required to establish navigability? Is navigability in boats essential to establishing state ownership? Must historic use of the waters be shown or is current use sufficient? Is any showing of actual use necessary? Is a showing of recreational use relevant? In general, bodies of water that at the time of statehood in 1845 were used or capable of being used in their ordinary and natural condition for trade or travel by the means common in the local area for waterborne transportation, are deemed navigable.<sup>39</sup> These waters passed to the new state.<sup>40</sup> The applicable test of navigability for determining which lands the state thereby acquired is the federal title test.<sup>41</sup> In *The Daniel Ball*,<sup>42</sup> the Supreme Court held that rivers were navigable in law if they were navigable in fact.<sup>43</sup> As the Court explained in *United States v. Holt State Bank*,<sup>44</sup> the "navigable in fact" test requires that a stream, river, or lake be navigable by customary modes of commercial travel in its natural and ordinary condition.<sup>45</sup> If a water body can be made navigable with "reasonable improvements," it may or may not be considered navigable for bed title purposes. In *United States v. Appalachian Electric Power Co.*,<sup>46</sup> the Supreme Court held that a water body is navigable in law

---

property rights) and 1800 Atlantic Developers v. Department of Env'tl. Reg., 552 So. 2d 946 (Fla. 1st D.C.A. 1989) (examining procedural and substantive difficulties with the general regulatory powers) with 9 FLA. ADMIN. CODE 18-21.001(1) (1990) (insuring maximum benefit and use of sovereignty lands for all citizens of Florida) and Hayes v. Bowman, 91 So. 2d 795 (Fla. 1957) (title to lands under tidal, navigable waters is held in trust for the service of the people).

38. See Phillips Petroleum Co. v. Mississippi, 484 U.S. 469, 479 (1988); Shively v. Bowlby, 152 U.S. 1, 46 (1894); Broward v. Mabry, 58 Fla. 398, 407, 50 So. 826, 829 (1909); see also cases cited *infra* note 41.

39. See *infra* notes 40-136 and accompanying text.

40. See Shively v. Bowlby, 152 U.S. 1, 57-58 (1894); Barney v. City of Keokuk, 94 U.S. 324, 336-38 (1876).

41. See Oregon *ex rel.* State Land Board v. Corvallis Sand & Gravel Co., 429 U.S. 363, 376 (1977); United States v. Utah, 283 U.S. 64, 75 (1931); United States v. Holt State Bank, 270 U.S. 49, 55-56 (1926).

42. 77 U.S. 557 (1870).

43. *Id.* at 563.

44. 270 U.S. 49 (1926).

45. See *id.* at 56; see also United States v. Oregon, 295 U.S. 15, 23 (1935) (reaffirming the navigable in fact test as stated in *Holt*); Oklahoma v. Texas, 258 U.S. 574, 586 (1922) (citing earlier pre-*Holt* cases which show that *Holt's* statement of the navigable-in-fact test was settled law in the United States).

46. 311 U.S. 377 (1940).

if it can be made navigable in fact with "reasonable improvements."<sup>47</sup> Although some confusion in the language of the decision has prompted commentators to suggest that the Court did not intend the "reasonable improvements" concept to apply to bed title questions,<sup>48</sup> this area remains unclear. Finally, natural barriers on a water body will not defeat a finding of navigability if commercial travel can pass the barriers at some time during the year.<sup>49</sup>

The federal title test contains other noteworthy aspects. First, this test determines navigability based on potential use, not actual past use.<sup>50</sup> Second, a water body that is not a link in interstate commerce still may be deemed navigable for bed title purposes if it is a commercially navigable water in its particular locality.<sup>51</sup> Finally, recreational use of boats is evidence of suitability for commercial navigability.<sup>52</sup>

The federal title test had a sweeping effect. The states acquired title to the bed of any water body within their borders that could be used for local travel or trade at the time of statehood.<sup>53</sup> Once title was established, the states were free to create their own definitions of navigability for purposes of creating or avoiding a duty to maintain the acquired lands.<sup>54</sup>

Florida's definition of navigability is similar to the federal definition. An 1889 case, *Bucki v. Cone*,<sup>55</sup> contains the original formulation:

[I]n this country all rivers, without regard to the ebb and flow of the tide, are generally regarded as navigable, as far up as they may be conveniently used at all seasons of the year with vessels, boats, barges, or other water craft, for purposes of commerce, and others are regarded as navigable when so declared by statute. Further than this, what constitutes a navigable river, free to the public, is a question of fact, to be determined by the natural conditions in each case. A

---

47. See *id.* at 407-08.

48. See Davis, *State Ownership of Beds of Inland Waters — A Summary and Reexamination*, 57 NEB. L. REV. 665, 670 & nn.28-29 (1978).

49. See *Holt*, 270 U.S. at 56; *Economy Light & Power Co. v. United States*, 256 U.S. 113, 121-22 (1921).

50. See *Utah v. United States*, 403 U.S. 9, 10 (1971); *Shively v. Bowlby*, 152 U.S. 1, 57 (1894).

51. See *Utah*, 403 U.S. at 10; *United States v. Oregon*, 295 U.S. 1, 14 (1935).

52. See *United States v. Appalachian Elec. Power Co.*, 311 U.S. 377, 416 (1940).

53. See *supra* text accompanying notes 37-52.

54. *Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469, 484-85 (1988); *Oregon ex rel. State Land Board v. Corvallis Sand & Gravel Co.*, 429 U.S. 363, 376-77 (1977).

55. 25 Fla. 1, 6 So. 160 (1889).

stream of sufficient capacity and volume of water to float to market the products of the country will answer the conditions of navigability, . . . whatever the character of the product, or the kind of floatage suited to their conditions . . . [I]t is not essential . . . that the stream should be continuously, at all seasons of the year, in a state suited to such floatage.<sup>56</sup>

The first sentence clearly establishes that rivers are navigable upstream to the point vessels are able to navigate.<sup>57</sup> But *Bucki* does not limit navigability to only these portions of rivers and streams. Lakes or rivers that can be used to "float to market the products of the country" also are navigable even if their navigational capability is periodically lost.<sup>58</sup> The "products of the country" referred to in *Bucki* were saw logs that were floated to saw mills and markets. The same test is applicable, however, "whatever the character of the product."<sup>59</sup> If small boats could have been used to transport people and local products or supplies, this capability supports a finding of navigability.

By not requiring continuous suitability for navigation, *Bucki* is consistent with the federal title test, which holds that natural barriers do not defeat navigability if small scale commercial traffic can pass at some time during the year.<sup>60</sup> *Broward v. Mabry*,<sup>61</sup> a 1909 Florida Supreme Court decision, confirmed *Bucki*'s interpretation in a case determining the title to the bed of Lake Jackson, near Tallahassee.<sup>62</sup> During most of the year, the lake could be traversed only with boats drawing about six inches of water, except in four or five deeper basins separated by "long reaches of shallow water."<sup>63</sup> Much of the area in dispute was grazed by cattle, and corn was planted often on portions of the lake bed. People on foot, on horseback, and in buggies continuously used several fords across the lake. Occasionally, the lake drained into sinkholes, leaving most of the bed, except for the deeper basins, completely dry.<sup>64</sup>

---

56. *Id.* at 18-19, 6 So. at 161-62.

57. *Id.*

58. *Id.*

59. *Id.*

60. *United States v. Holt State Bank*, 270 U.S. 49, 56 (1926).

61. 58 Fla. 398, 50 So. 826 (1909).

62. *Id.* at 409-13, 50 So. at 830-31; *see also* *Broward v. Sledge*, 58 Fla. 414, 50 So. 831 (1909) (similar approach taken on Lake Miccosukie).

63. *Mabry*, 58 Fla. at 405, 50 So. at 829.

64. *Id.* at 405-06, 50 So. at 829.

The court held that an important factor in establishing title was whether a water body was navigable for "useful public purposes,"<sup>65</sup> an issue to be determined by reference to the particular facts of each case. The decision turned on a full appreciation of the public trust doctrine. After closely examining the evidence, the court determined that:

[N]otwithstanding the shallowness of the water in portions and the uses at times made of its bed in places bordering on the shore, the permanency, size, location, character and conditions of the lake are such that in its ordinary state it, or at least a large part of it, may be used for purposes of utility common at least to the people of the community in which it is located . . . .<sup>66</sup>

The court continued:

Capacity for navigation, not usage for that purpose, determines the navigable character of waters with reference to the ownership and uses of the land covered by the water. . . . The products of the community at least in some considerable measure may be transported upon the waters if so desired, and the waters are admittedly of considerable area and useful for general navigation in small boats containing persons engaged in pursuits either of business or pleasure. Whether the lake has been used for commercial purposes or not is immaterial if it may be made useful for any considerable navigation or commercial intercourse between the people of a large area. The fact that the lake goes dry is unimportant if in its ordinary state it is in fact navigable.<sup>67</sup>

This decision illustrates several important aspects of the Florida navigability test. Navigability may be found even if a water body carries purely local traffic.<sup>68</sup> The court affirmed that Florida's test is one of susceptibility for present use, not actual past use.<sup>69</sup> The court further suggested that any water body which could "be made useful" for navigation would be deemed legally navigable.<sup>70</sup> The court held

---

65. *Id.* at 409, 50 So. at 830.

66. *Id.* 411-12, 50 So. at 831.

67. *Id.* at 409-10, 412, 50 So. at 830-31.

68. *Id.*

69. *See id.*

70. *Id.*

that temporary inability of the water body to carry traffic would not defeat a finding of navigability if the water body was ordinarily navigable.<sup>71</sup> Finally, the court noted that the ability of relatively small boats to navigate the water body could support a finding of navigability.<sup>72</sup>

Faced with similar conditions but weaker evidence of utility, the Florida Supreme Court determined that an arm of Lake Iamonia in Leon County was not navigable in *Baker v. State*.<sup>73</sup> *Baker* involved the navigable status of Cromartie Arm, a one-and-one-half-mile-long area associated with Lake Iamonia. The sovereign lands had been leased to the appellee for the construction of a dam and impoundment.<sup>74</sup> The appellee sought to use the leased property for navigation, which could be prohibited if the area was originally non-navigable. The lower court found that Cromartie Arm was part of Lake Iamonia, that it was navigable, and that the appellee was entitled to navigate it.<sup>75</sup> The issue on appeal was whether the appellees had presented sufficient evidence to sustain a finding of navigability.<sup>76</sup>

The *Baker* court found that in its natural state, Cromartie Arm was a grass or button wood prairie, which contained a four-to-ten-foot-wide shallow stream no more than two feet deep, connecting "some pot holes or gator burrows ranging in size from that of Leon County Court Room to an acre."<sup>77</sup> During normal conditions, pushing a flat-bottomed rowboat along the stream was difficult.<sup>78</sup> Except during flood conditions, the stream could be traversed with a poled boat, but not with a "kicker."<sup>79</sup>

The court found no evidence that the Arm was desirable for bathing or fishing, nor that it had ever been used for commercial purposes.<sup>80</sup> Pictures of the area invited its designation as a cow pasture.<sup>81</sup> No evidence was presented as to the quality of the connection between

71. See *id.*; accord *Martin v. Busch*, 93 Fla. 535, 563, 112 So. 274, 283 (1927).

72. See *Mabry*, 58 Fla. at 409-10, 412, 50 So. at 830-31; accord *Lopez v. Smith*, 145 So. 2d 509, 514 (Fla. 2d D.C.A. 1962).

73. 87 So. 2d 497, 498 (Fla. 1956).

74. See 23 Minutes of the Trustees of the Internal Improvement Fund 276 (1941); 30 Minutes of the Trustees of the Internal Improvement Fund 520 (1956); Trustees Lease No. 193, with Mrs. George F. Baker (June 28, 1941 & Dec. 7, 1946).

75. *Baker*, 87 So. 2d at 497.

76. *Id.*

77. *Id.* at 498.

78. *Id.* One witness testified it was necessary to "push, cuss and holler" at the same time to get a row boat up the stream. *Id.*

79. *Id.*

80. *Id.*

81. *Id.*

the Arm and the remainder of Lake Iamonia. Based on these facts, the court reversed the lower court's finding of navigability.<sup>82</sup>

In reaching its decision, the *Baker* court cited *Oklahoma v. Texas*<sup>83</sup> as establishing a test of navigability that required the water body to be used, or susceptible for use, as a highway for commerce "over which trade and travel are or may be conducted in the customary modes of trade and travel on water."<sup>84</sup> The court also relied on *Mabry*<sup>85</sup> for the proposition that a navigable water body is one that may be used for purposes common or useful to the public in the locality.<sup>86</sup> In finding the slough non-navigable, the court emphasized: "It is not shown that it is desirable for navigation purposes, that anyone ever attempted to use it for commercial water transportation or that it is suitable for pleasure boating or that it is desirable for bathing or fishing."<sup>87</sup>

The above-quoted language indicates the *Baker* court's willingness to include recreational boating in the test of navigability. Although commentators<sup>88</sup> and other courts<sup>89</sup> have urged this expansion of the test, the Florida Supreme Court in *Odom v. Deltona Co.*<sup>90</sup> rejected these arguments and stated: "[T]he references to recreational uses are that such uses may be made in bodies of water which are in fact navigable for commercial or travel purposes."<sup>91</sup> Consequently, whether recreational boating activities alone are sufficient to establish navigability remains an undecided issue in Florida. If a water body is capable of supporting recreational boating vessels similar in size and draft to those used for trade and travel in the same area in 1845, this recreational boating should evidence a capacity for commercial use that in turn, may establish navigability.

---

82. *Id.*

83. 258 U.S. 574 (1922).

84. *Baker*, 87 So. 2d at 498 (citing *Oklahoma v. Texas*, 258 U.S. 574, 586 (1922)).

85. 58 Fla. 398, 50 So. 826 (1909).

86. *Baker*, 87 So. 2d at 498.

87. *Id.*

88. Waite, *Pleasure Boating in a Federal Union*, 10 BUFFALO L. REV. 427, 439 (1961); Abrams, *Governmental Expansion of Recreational Water Use Opportunities*, 59 OR. L. REV. 159, 169-71 (1980).

89. See *Silver Blue Lake Apartments, Inc. v. Silver Blue Lake Home Owners Ass'n*, 245 So. 2d 609, 617 (Fla. 1971) (Ervin, C.J., dissenting); see also *Alaska v. Ahtna, Inc.*, 891 F.2d 1401, 1405 (9th Cir. 1989) (since test was whether river was susceptible to use as a highway for commerce at statehood, commercial recreational use could establish navigability); *Luscher v. Reynolds*, 153 Or. 625, 635, 56 P.2d 1158, 1162 (1936) ("A boat used for the transportation of pleasure seeking passengers is, in a legal sense, as much engaged in commerce as is a vessel transporting a shipment of lumber.").

90. 341 So. 2d 977 (Fla. 1977).

91. *Id.* at 986.

If a water body is unable to support navigation without artificial improvements, it may be deemed non-navigable. In *Clement v. Watson*,<sup>92</sup> an opinion authored by Justice Whitfield, the Florida Supreme Court held that a small tidal cove was not navigable despite its attachment to a navigable tidal water.<sup>93</sup> A submerged sandbar ran across the mouth of the cove, and a channel had been dredged through to allow passage of a yacht and small boats. The court cited the general rule that navigable waters below ordinary high water mark are sovereign,<sup>94</sup> but held that:

This does not include lands that do not immediately border on the navigable waters, and that are covered by water not capable of navigation for useful public purposes, such as mud flats, shallow inlets, and lowlands covered more or less by water permanently or at intervals, where the waters thereon are not in their ordinary state useful for public navigation.<sup>95</sup>

Under this interpretation, attaching the small cove to the navigable waters by means of a dredged channel did not convert the cove into a navigable body.<sup>96</sup>

Fifteen years later in *Martin v. Busch*,<sup>97</sup> the same court, in an opinion also written by Justice Whitfield, held that

navigable waters include lakes, rivers, bays, or harbors, and all waters capable of practical navigation for useful purposes, *whether affected by tides or not, and whether the water is navigable or not in all its parts towards the outside lines or elsewhere, or whether the waters are navigable during the entire year or not.*<sup>98</sup>

92. 63 Fla. 109, 58 So. 25 (1912).

93. *Id.* at 111-13, 58 So. at 26-27.

94. *Id.* at 112, 58 So. at 26. The term which has since been developed to define the limits of sovereign ownership of lands beneath tidal waters is "mean high-water line" or "mark." Maloney & Ausness, *supra* note 30, at 205.

95. *Clement*, 63 Fla. at 112, 58 So. at 26.

96. *Id.* at 112-13, 58 So. at 26-27. Although *Clement* held that if a water body is not susceptible of use in its natural, unaltered state, it is considered non-navigable under Florida law, *Broward v. Mabry*, 58 Fla. 398, 50 So. 826 (1909), contained language suggesting that a water body capable of use for commercial traffic with artificial improvements would be considered navigable. *Id.* 58 Fla. at 410-13, 50 So. at 830-31. In *Odom*, the Florida Supreme Court construed the federal title test as one that did not allow for consideration of artificial improvements, and held that "Florida's test for navigability is similar, if not identical, to the federal title test." *Odom*, 341 So. 2d at 988.

97. 93 Fla. 535, 112 So. 274 (1927).

98. *Id.* at 563, 112 So. at 283 (emphasis added).

The court also ruled that the state holds title to the beds of navigable lakes up to the ordinary high water mark, "however shallow the water may be at the outside lines or elsewhere, if the water is in fact a part of the particular lake that is navigable for useful purposes."<sup>99</sup>

In reality, the *Busch* case may not reverse *Clement*. The distinction between the cases appears to be that *Clement* may have involved the Riparian Act of 1856,<sup>100</sup> which conveyed title to private riparian owners out to the navigable channel of "any navigable stream or [b]ay of the [s]ea or [h]arbor," provided the owner made certain permanent improvements.<sup>101</sup> In *Clement*, the owner of the riparian land surrounding a cove had installed a wharf and a dredged channel. Based on the Riparian Act, the land was the "subject of private ownership," because public rights of navigation were not unlawfully impaired.<sup>102</sup> Under these conditions, the Act granted title in the land to the upland owner.<sup>103</sup>

*Clement* was decided in 1912. In 1918, the Florida Supreme Court reiterated its basic position with regard to tidelands. In *Thiesen v. Gulf, F. & A. Ry.*,<sup>104</sup> the court held that the State of Florida held title, up to the high water mark, to the land under waters in which the tide ebbed and flowed, including any "flats and marshes covered with water only at full tide."<sup>105</sup>

In 1924, the court reconsidered non-navigable tidelands in *State ex rel. Buford v. City of Tampa*,<sup>106</sup> and held that they were a special class of sovereignty lands that could be alienated by the legislature under certain circumstances. *City of Tampa* interpreted the Riparian Act of 1856 as providing for alienation of "flats, marshes, and places

99. *Id.* (citing *Illinois Steel Co. v. Bilot*, 109 Wis. 418, 438-39, 85 N.W. 402, 405 (1902)).

100. Riparian Act, ch. 791, 1856 Fla. Laws 25. In its original formulation, the Act applied to land on "any navigable stream or Bay of the Sea or Harbor," and contained language conveying to riparian owners sovereignty lands out to the navigable channel, by operation of law. *Id.* In *State v. Black River Phosphate Co.*, 32 Fla. 82, 13 So. 640 (1893), the Florida Supreme Court ruled that such a conveyance was contrary to the public trust doctrine, and ruled that the Act only authorized transfer when certain improvements were completed. *Id.* at 108-12, 13 So. at 648-49. In 1921, the Act was revised to require permanent improvements before transfer could take place. Act of June 2, 1921, ch. 8537, 1921 Fla. Laws 332. In 1951, the Act was repealed. Act of May 29, 1951, ch. 26776, 1951 Fla. Laws 555.

101. Riparian Act, ch. 791, 1856 Fla. Laws 25.

102. *Clement v. Watson*, 63 Fla. 109, 112, 58 So. 25, 26 (1912).

103. Riparian Act, ch. 791, 1856 Fla. Laws 25.

104. 75 Fla. 28, 78 So. 491 (1918).

105. *Id.* at 62, 78 So. at 502.

106. 88 Fla. 196, 102 So. 336 (1924).



where the tide ebbs and flows, which under the common law was held by the state for the benefit of the general public."<sup>107</sup>

In *Busch*, Justice Whitfield, author of many of the sovereignty land decisions, referred to the critical difference between *Busch* and *Clement* when he noted that there were "no tidelands adjacent to the navigable waters here, as there were in . . . *Clement v. Watson*."<sup>108</sup> *Busch* dealt with the title to lands underlying Lake Okeechobee. The Riparian Act applied only to tidelands and streams, not to lakes.<sup>109</sup> Therefore, under certain circumstances the legislature could alienate tidelands with little or no navigational value, although they still were sovereignty lands. The same did not hold true for marshlands on the outer edges of navigable inland lakes.

In *State of Florida Board of Trustees of the Internal Improvement Trust Fund v. Wakulla Silver Springs Co.*,<sup>110</sup> the court addressed the issue of whether a tidal cove was navigable. The cove or harbor was located on the coast of Key Largo, in a low, flat, wet area densely covered with mangrove. The inlet to the cove was between six inches and one foot deep, except where owners of boats in a nearby subdivision had dredged the inlet for access. The attached basin was shallow; much of it was dry at low tide. Although the cove exchanged waters with the Atlantic Ocean, the court followed *Clement* and found the area non-navigable.<sup>111</sup>

In *Morrill v. Ball*,<sup>112</sup> the lower court found that a part of the Wakulla River just downstream from Wakulla Springs was non-navigable because its use was limited to passage by canoes and other small craft.<sup>113</sup> The area's direct connection to navigable waters and its capability to support the movement of small craft normally would be evidence of navigability. Despite these factors, however, the court found the area too shallow to be deemed navigable.<sup>114</sup> Although the First District Court of Appeal affirmed the lower court's opinion,<sup>115</sup> the decision is viewed as an anomaly.

107. *Id.* at 209, 102 So. at 340.

108. *Busch*, 93 Fla. at 568-69, 112 So. at 285.

109. See *supra* notes 100-01 and accompanying text.

110. 362 So. 2d 706 (Fla. 3d D.C.A. 1978).

111. *Id.* at 710-11. Note that both *Clement* and *Wakulla Silver Springs* are tidal cases and may have limited applicability in nontidal cases.

112. *Morrill v. Ball*, No. 73-401 (Wakulla County Cir. Ct. June 29, 1973).

113. *Id.* at 8.

114. *Id.*

115. *State of Florida Board of Trustees of the Internal Improvement Trust Fund v. Ball*, 300 So. 2d 741, 741 (Fla. 1st D.C.A. 1974).

Another factor affecting the determination of navigability is whether a water body has been meandered. When Florida became a territory, federal surveys were commissioned to subdivide the federal lands and estimate acreage subject to patent. Surveyors attempted to locate and meander any navigable lakes and deep ponds twenty-five acres or larger. Perhaps because the swampy shorelines were dangerous, only about 190 of 30,000 lakes in Florida were actually meandered.<sup>116</sup> In *Odom v. Deltona Co.*,<sup>117</sup> the Florida Supreme Court held that the meandering of a lake in an original state survey was only evidence of navigability and not determinative of the issue.<sup>118</sup> The *Odom* court held meandering created a rebuttable presumption of navigability and that an unmeandered water body was presumed non-navigable.<sup>119</sup>

### C. *Navigability of Associated Submerged Lands*

A potential problem in determining navigability arises when a navigable water body has submerged lands associated with it that may not be part of the water body. Although the public trust doctrine clearly extends sovereignty to the ordinary high water mark of navigable waters despite the intervening presence of extremely shallow areas,<sup>120</sup> non-navigable streams or wetlands may be connected to a navigable water body.<sup>121</sup> The existence of these shallow waters raises the question: Under what circumstances should an area of submerged lands be treated either as part of a connected navigable water body or as a separate water body whose navigability must be assessed independently? Moreover, at what point does a navigable stream become non-navigable?

The navigability of a stream terminates at the point where the circumstances that warranted the finding of navigability are no longer

116. F. MALONEY, S. PLAGER & F. BALDWIN, *supra* note 30, at 40.

117. 341 So. 2d 977 (Fla. 1977).

118. *Id.* at 988.

119. *Id.* at 988-89. The continued validity of the proposition that unmeandered water bodies are presumed non-navigable is unclear. In *Coastal Petroleum Co. v. American Cyanamid Co.*, 492 So. 2d 339 (Fla. 1986), Justice Boyd's dissenting opinion argues that the majority should have accepted the principle that determinations by official surveyors that water bodies were non-navigable should be presumed correct. *Id.* at 346 (Boyd, J., dissenting). Such determinations were, in his view, the reason water bodies were not meandered. *Id.* He thus implies the majority rejected the notion. *Id.* The majority opinion only refers to the principle that meandering creates a presumption of navigability and not to the converse. *Id.* at 342 n.1.

120. *Busch*, 93 Fla. at 563-64, 112 So. at 283.

121. *Baker v. State*, 87 So. 2d 497, 498 (Fla. 1956).

present. One reasonable approach in narrowing this test would be to specify the depth and width of a channel passable by historic watercraft or usable for floating logs. At the point a particular stream channel fell below that capacity, the channel would be unnavigable. Temporary obstructions of the channel, such as logs that would normally have been cleared, should not preclude a finding of navigability. However, if substantial dredging or other improvements were necessary to satisfy the depth and width requirements, a finding of navigability would not lie.

The determination of navigability is even more difficult where there is a degree of physical separation between an area of submerged lands and a navigable lake or river. This phenomenon occurs in many variations. Rivers frequently have extensive sloughs that are separated from the low water channel by berms, with varying degrees of connection through the berms. Many lakes are ringed by similar berm systems that formed as offshore sandbars during storms. Smaller lakes may connect to larger lakes, sometimes comprising long chains of lakes. Extensive wetlands often border lakes and rivers and are connected by small streams and sloughs.

If the submerged area in question is navigable, according to the tests discussed above, then the ordinary high water line extends around it. If the area is not independently navigable, it still may lie within the ordinary high water line. In *Martin v. Busch*,<sup>122</sup> the Florida Supreme Court held that shallow, vegetated areas should be included as navigable "if the water is in fact a part of the particular lake."<sup>123</sup> The case law offers little guidance in determining whether two submerged areas should be considered part of the same water body. Some important considerations should be the depth and width of connecting areas, the difference in elevation between the two submerged areas, the level of usage by local water traffic, and other evidence relating to the purposes of the public trust doctrine.

The *Busch* court supported its decision by citing a Wisconsin Supreme Court case, *Illinois Steel v. Bilot*.<sup>124</sup> The issue in *Bilot* was whether a particular marsh was part of a river or part of a nearby lake. In answering this question, the court considered whether "the water raised and lowered with the lake" and whether "the water on the marsh, so called, was lake water, not river water."<sup>125</sup> In following

---

122. 93 Fla. 535, 112 So. 274 (1927).

123. *Id.* at 564, 112 So. at 283.

124. 109 Wis. 418, 84 N.W. 855, *reh'g denied*, 109 Wis. 430, 85 N.W. 402 (1901).

125. *Illinois Steel*, 109 Wis. at 438, 85 N.W. at 405.

*Bilot*, *Busch* might be interpreted as adopting a rule that, to be considered "part of" a navigable water body, an associated wet area must satisfy two requirements. First, the area must receive water from the navigable water body, and second, its level must rise and fall with the navigable water body.<sup>126</sup>

Recently, the Wisconsin Supreme Court held, in *State v. Trudeau*,<sup>127</sup> that water bodies hydraulically connected to a navigable water body may be considered part of that water body. The issue in *Trudeau* was whether a wetland near Lake Superior was part of the lake despite the fact that an artificial barrier with culverts separated the two areas.<sup>128</sup> Evidence presented in the case indicated that an open water inlet once connected the wetland and the lake. A road had been built between the two water bodies, but culverts running under the road preserved the connection by allowing water to flow both ways between the two areas. Water accumulated in the wetland from both upland sources and the lake.<sup>129</sup> The wetland occasionally was dry but had approximately 1.2 feet of water at the time of trial.<sup>130</sup>

The *Trudeau* court held that actual navigability of the wetland was not necessary to support a finding that it was part of the lake.<sup>131</sup> As long as water naturally flowed to and from both areas, the court held that all parts of the wetland below the OHWM elevation of the navigable water were part of the navigable water body. The erection of artificial barriers between the two areas did not alter the hydraulic connection or change the relationship of the two water bodies.<sup>132</sup>

One proposed approach to the problem of defining which associated water bodies will be included as part of a navigable water body, the "Law of the Sea" test, is analogous to that taken by the United Nations Law of the Sea Conferences when defining international boundaries along coastal areas.<sup>133</sup> If a semicircle whose diameter is a straight line drawn between the headlands of a coastal indentation can be fitted inside the indentation, then the embayment is part of the territory of

126. *Busch*, 93 Fla. at 564, 112 So. at 233.

127. *State v. Trudeau*, 139 Wis. 2d 91, 108-09, 408 N.W.2d 337, 345 (1987).

128. *Id.* at 93, 408 N.W.2d at 338.

129. *Id.* at 99, 408 N.W.2d at 340.

130. *Id.* at 98, 408 N.W.2d at 340.

131. *Id.* at 103, 408 N.W.2d at 342.

132. *Id.* at 109, 408 N.W.2d at 345.

133. CONVENTION ON THE TERRITORIAL SEA AND CONTIGUOUS ZONE, UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA, U.N. Doc. A/Conf. 13/L.52, U.N. Sales No. 58 v.4, vol. III (1958).

the country controlling the headlands.<sup>134</sup> The limit of sovereignty is the line drawn between the headlands. If islands or peninsular areas partially obstruct the mouth of the indentation, the existing open water distances are added to compute the diameter of the projected semicircle.<sup>135</sup> An exception to this test involves what are recognized as historic bays. In these areas, the assertion of rights by one nation and the acquiescence by other nations have created a prescriptive title in the one nation. The Law of the Sea test is not applicable to indentations where the distance between headlands exceeds twenty-four miles.<sup>136</sup>

When used as a means of determining the navigability of adjacent water bodies and wetlands in Florida, the Law of the Sea test has limitations. This test attempts to quantify and legitimize the control that a nation may exert over indentations in its coastline by militarily dominating the headlands of those waters. This basis is irrelevant to questions concerning the navigability of associated water bodies and wetlands in Florida. The Law of the Sea test is based on recognition of control, while the test for associated water bodies is based on the public trust doctrine. The latter test necessarily is concerned with questions that involve the hydrological and biological relationship of a navigable water body to associated wet areas. Reducing the problem to an exercise in geometry, as the Law of the Sea test does, arbitrarily limits state ownership of sovereign lands, contrary to the purposes of the public trust doctrine.

## II. ORDINARY HIGH WATER LINE

### A. Introduction

The criteria used to define the upland boundary of sovereignty submerged lands in Florida depend on whether the area is tidal or nontidal.<sup>137</sup> The landward extent of tidelands is the "mean high-water line" (MHWL), the intersection of the tidal plane of mean high water with the shore.<sup>138</sup> Mean high water is defined as the average height of high tides over a complete tidal cycle of nineteen years.<sup>139</sup>

---

134. CONVENTION ON THE TERRITORIAL SEA AND CONTIGUOUS ZONE, UNITED NATIONS CONFERENCE ON THE LAW OF THE SEA, at 4, U.N. Doc. A/conf. 13/L.52, U.N. Sales No. E.83 v.5 (1983).

135. *Id.* at 5.

136. *Id.*

137. Florida Coastal Mapping Act of 1974, FLA. STAT. §§ 177.25-.40 (1989).

138. *Id.* § 177.27(16).

139. *Id.* § 177.27(15); see Maloney & Ausness, *supra* note 30, at 247 (discussing the 19-year cycle of the Act prior to its enactment); Note, *Florida's Sovereignty Submerged Lands: What Are They, Who Owns Them and Where is the Boundary?*, 1 FLA. ST. U.L. REV. 596, 615-20

On Florida's nontidal navigable lakes and rivers, the boundary between sovereignty submerged lands and private uplands is the "ordinary high-water line" (OHWL) or "ordinary high-water mark" (OHWM).<sup>140</sup> Most modern definitions of OHWL have been derived from the concurrence in *Howard v. Ingersoll*,<sup>141</sup> a United States Supreme Court case in which Justice Curtis wrote:

[The] line is to be found by examining the bed and banks, and ascertaining where the presence and action of water are so common and usual, and so long continued in all ordinary years, as to mark upon the soil of the bed a character distinct from that of the banks, in respect to vegetation, as well as in respect to the nature of the soil itself. Whether this line . . . will be found above or below, or at a middle stage of water, must depend upon the character of the stream.<sup>142</sup>

In contrast to tides, which are regular and periodic, the high water stages of rivers and lakes are unpredictable and variable. Thus, in nontidal waters, the emphasis is on drawing a line that reflects the physical effects of high water stages on the land. This line is determined on a case-by-case basis.<sup>143</sup> In *Houghton v. The C., D. & M.R. Co.*,<sup>144</sup> the Supreme Court of Iowa explained the reasoning behind the nontidal water test: "[I]n determining what belongs to the public we have to determine what properly belongs to the river. Now we think . . . that that only belongs to the river in any proper sense, where its occupancy has been so long continued as to leave a permanent impression of its domain."<sup>145</sup>

In *Tilden v. Smith*,<sup>146</sup> a leading Florida decision defining OHWL, the Florida Supreme Court used language similar to Justice Curtis's concurrence in *Howard*. The *Tilden* court quoted from a Minnesota case<sup>147</sup> that had adopted Justice Curtis's definition:

---

(1973) (19-year time frame includes all possible combinations of tide-influencing lunar and astronomical cycles).

140. *Busch*, 93 Fla. at 563-64, 575-76, 112 So. 283, 287. See generally Maloney, *The Ordinary High Water Mark: Attempts at Settling an Unsettled Boundary Line*, 13 LAND & WATER L. REV. 465 (1978) (noting the unsettled state of the law in using the OHWL as the standard to separate public and private interests in navigable water bodies).

141. 54 U.S. (13 How.) 381 (1851).

142. *Id.* at 427 (Curtis, J., concurring).

143. See *id.* at 428.

144. 47 Iowa 370 (1877).

145. *Id.* at 374.

146. 94 Fla. 502, 113 So. 708 (1927).

147. *Carpenter v. Board of Comm'rs*, 56 Minn. 513, 58 N.W. 295 (1894).

In the case of fresh water rivers and lakes — in which there is no ebb and flow of the tide, but which are subject to irregular and occasional changes of height without fixed quantity or time, except that they are periodical, recurring with the wet or dry seasons of the year — high-water mark, as a line between a riparian owner and the public is to be determined by examining the bed and the banks, and *ascertaining where the presence and action of the water are so common and usual, and so long continued in all ordinary years, as to mark upon the soil of the bed a character distinct from that of the banks, in respect to vegetation, as well as to the nature of the soil itself*. “High water” mark means what its language imports, — a water mark. It is co-ordinate with the limit of the bed of the water, and that only is to be considered the bed which the water occupies sufficiently long and continuously to wrest it from vegetation, and to destroy its value for agricultural purposes. Ordinarily the slope of the bank and the character of its soil are such that the water impresses a distinct character upon the soil as well as upon the vegetation. In some places, however, where the banks are low and flat, the water does not impress on the soil any well defined marks of demarcation between the bed and the banks.

In such cases the effect of the water upon vegetation must be the principal test of determining the location of high-water mark as a line between the riparian owner and the public. It is the point up which the presence and action of the water is so continuous as to destroy the value of the land for agricultural purposes by preventing the growth of vegetation, constituting what may be termed an ordinary agricultural crop.<sup>148</sup>

Under the *Tilden* test, the ordinary high water line is determined by referring to physical indicators of the usual, common, and long-term presence and action of water.<sup>149</sup> In areas where banks are relatively steep, the effect of water on the soil and banks may be the most important factor.<sup>150</sup> In areas of low relief, vegetation may be more determinative.<sup>151</sup> Areas that are subject to flooding of such frequency and duration as to prevent the growth of ordinary agricultural crops are clearly below the OHWL.<sup>152</sup>

---

148. *Tilden*, 94 Fla. at 512-13, 113 So. at 712 (emphasis added in *Tilden*) (quoting *Carpenter*, 56 Minn. at 521-22, 58 N.W. at 297 (*In re Minnetonka Lake Improvement*)).

149. *Id.*

150. *Id.*

151. *Id.*

152. *Id.*

In *Martin v. Busch*,<sup>153</sup> the Florida Supreme Court also addressed determination of the ordinary high water line. The *Busch* court noted the difficulty of making accurate OHWL determinations in Florida's flat, swampy terrain:

In flat territory or because of peculiar conditions, there may be little if any shore to navigable waters, or the elevation may be slight and the water at the outer edges may be shallow and affected by vegetable growth or other conditions, and the line of ordinary high-water mark may be difficult of accurate ascertainment; but . . . the best evidence attainable and the best methods available should be utilized in determining and establishing the line of true ordinary high-water mark. . . . Marks upon the ground or upon local objects that are more or less permanent may be considered in connection with competent testimony and other evidence.<sup>154</sup>

The most important physical indicators of the presence and action of water are its effects on vegetation, soils, geomorphology, and "local objects." Plant communities are particularly sensitive to the amount and frequency of water in an area.<sup>155</sup> The water regime around lakes and rivers dictates which types of plants will grow in those areas. Species that are tolerant of greater frequencies and durations of water presence (hydric species) grow in more flooded areas, while less tolerant (mesic) species typically are found at higher elevations. The transitional zone between hydric and mesic species is the area in which the relative densities and ages of both types of plants indicate the location of the OHWL.<sup>156</sup> Dendrochronology, or the study of tree ring data, also can be important in determining the changes in the water regimes around lakes and rivers.<sup>157</sup>

153. 93 Fla. 535, 112 So. 274 (1927).

154. *Id.* at 564, 112 So. at 283.

155. See D. MEANS, DEVELOPING A METHODOLOGY FOR SURVEYING THE ORDINARY HIGH WATER LINE: IS IT FEASIBLE? 31-32 (1986); Hall, *The Use of Plants as an Aid to Determine the Ordinary High Water Line in Florida*, in DEVELOPMENT OF PROCEDURAL METHODOLOGY TO ENABLE FLORIDA LAND SURVEYORS TO DETERMINE THE ORDINARY HIGH WATER LINE BOUNDARY OF SOVEREIGN LANDS (D. Gibson, principal investigator 1987) [hereinafter OHWL REPORT].

156. D. MEANS, *supra* note 155, at 56-57. A tidelands case, *Dolphin Lane Assocs. v. Town of Southampton*, 72 Misc. 2d 863, 339 N.Y.S.2d 966 (Sup. Ct. 1971), recognized that MHWL could be found within a zone in which two species of marsh grass exhibited different growth responses to the dominant water regime. *Id.* at 885, 339 N.Y.S.2d at 984-85. For a discussion of the vegetation test, see *infra* text accompanying notes 171-256.

157. *Snake River Ranch v. United States*, 395 F. Supp. 886, 896 (D. Wyo. 1975); *Summer-ville v. Scotts Bluff County*, 182 Neb. 311, 154 N.W.2d 517 (1967).



Soils also indicate the change in hydrology between areas that are inundated frequently and those that are submerged less often. At the OHWL, the physical and chemical characteristics of the soils reflect the differing water regimes.<sup>158</sup> To distinguish regularly inundated soils from those that are covered less often, scientists examine particle size, distribution, mottling, stratification, pH, color, and trace elements. In addition, they also consider shelving, erosion, and litter.

The geomorphology of a lake or river is yet another physical indicator of the ordinary high water line.<sup>159</sup> Both types of water bodies are continually reshaping their banks, and the geomorphic features such as terraces, beaches, and scarps that develop over time are helpful in interpreting these boundary changes. Water stains or other "marks upon the ground or upon local objects" such as trees, rocks, or pilings also may be evidence of ordinary high water levels.<sup>160</sup> Aerial photography and government surveys may corroborate the findings of botanists, geomorphologists, soil scientists, and surveyors. Courts also have been willing to accept historical records and the testimony of people with personal knowledge of the characteristics of an area over time.<sup>161</sup>

The water levels of Florida's rivers and lakes vary greatly during a normal year and from year to year.<sup>162</sup> A particular water body may have no distinct marks or it may have numerous marks at varying elevations. Physical evidence of the frequent presence and action of water may be found at different elevations. Determining the ordinary high water line under these circumstances can be difficult.

Physical indicators give land owners, managers, surveyors, and the public ascertainable boundaries related to the purposes of the public trust doctrine. Physical marks show the points where the presence and action of water are so frequent and of such duration that the land is functionally part of the water body. Where physical evidence is inconsistent or absent, however, other evidence of the presence and action of water must be used.

When physical indicators are unclear, several decisions provide guidance in setting boundaries. In *Tilden*, the Florida Supreme Court

158. Reddy & Graetz, *Soil Index for Determination of Ordinary High Water Line*, in OHWL REPORT, *supra* note 155.

159. D. MEANS, *supra* note 155, at 28-31; Schmidt, Campbell & Spencer, *Geologic Methodology for the Determination of OHWL*, in OHWL REPORT, *supra* note 155.

160. *Busch*, 93 Fla. at 564, 112 So. at 283.

161. *See, e.g., Mathews v. McGee*, 358 F.2d 516, 518 (8th Cir. 1966).

162. D. MEANS, *supra* note 155, at 46-47, 54-56; Means, *The Application of Hydrology to the Determination of the Ordinary High Water Line*, in OHWL REPORT, *supra* note 155, at 10-13.

held that ordinary high water does not include the highest annual flows but does include "high water or flood water" that is "part of the regular and usual flow of the stream for a considerable period of each year."<sup>163</sup> In a similar decision, the Supreme Court of Iowa stated the OHWL "is not the line reached by unusual floods, but it is the line to which high water ordinarily reaches."<sup>164</sup>

*Busch* also suggests judicial intent to set the OHWL at a line encompassing high water stages. In *Busch*, the Florida Supreme Court noted that sovereignty submerged lands encompass "the shores or spaces if any between ordinary low water mark and ordinary high water mark, and also all tide lands, viz., lands covered and uncovered by the daily ebb and flow of normal tides."<sup>165</sup> In tidelands, normal high tides cover those lands subject to the public trust.<sup>166</sup> In nontidal lakes and rivers, the public trust should extend analogously to those lands submerged by normal high water stages. Because tidal action is predictable, the boundary in tidal areas can be established by mathematically averaging the high tides.<sup>167</sup> In nontidal areas, one must assess the effect of high water levels on the adjacent lands, primarily by looking for physical evidence of the presence and action of water. When this evidence does not correlate with evidence of high water stages, it fails to establish a "true line of ordinary high water mark."<sup>168</sup> In these cases, hydrologic evidence may be used to corroborate the physical evidence or, if the physical evidence is inconclusive, to help establish the elevation of ordinary high water.

Almost uniformly, courts have held that the OHWL should be based on a correlation between all of these indicators, rather than on one or two. In *South Dakota Wildlife Foundation v. Water Management Board*,<sup>169</sup> the South Dakota Supreme Court rejected a placement of an OHWL that did not encompass all relevant factors. The *South Dakota Wildlife* court expressed the current emphasis on a correlate line:

[U]nder ordinary circumstances, the OHWM will be set at the level where there is a distinct mark which evidences erosion, *and* changes in the character of the soil, *and* destruc-

---

163. *Tilden*, 94 Fla. at 511, 113 So. at 711.

164. *State ex rel. v. Sorenson*, 222 Iowa 1248, 1251, 271 N.W. 234, 236 (1937) (quoting *City of Cedar Rapids v. Marshall*, 199 Iowa 1262, 1264-65, 203 N.W. 932, 933 (1925)).

165. *Busch*, 93 Fla. at 563, 112 So. at 283.

166. *Maloney & Ausness*, *supra* note 30, at 202.

167. *Id.* at 197-98.

168. *Busch*, 93 Fla. at 564, 112 So. at 283.

169. 382 N.W.2d 26 (S.D. 1986).

tion of terrestrial vegetation, which have occurred under the *ordinary* and *continuous* conditions of the lake, disregarding periods of extreme and periodic freshets, and disregarding the highest water mark which does not evidence erosion *and* soil changes *and* destruction of vegetation occasioned under ordinary conditions.<sup>170</sup>

Although the court may have overemphasized correlation in its statement, the weight assigned to a particular determination of OHWL will increase as the degree of correlation increases.

### B. *Vegetation*

Several cases have addressed the relationship between the OHWL and vegetative indicators. In *Borough of Ford City v. United States*,<sup>171</sup> the leading case, the federal government's construction of a dam raised water levels on a river, damaging a city's gravity-flow sewerage system.<sup>172</sup> The question of damages required the court to determine the OHWL before the dam was closed. After approving the general definition of OHWL outlined in *Howard v. Ingersoll*,<sup>173</sup> the *Ford City* court stated:

The vegetation test is useful where there is no clear, natural line impressed on the bank. If there is a clear line, as shown by erosion, and other easily recognized characteristics such as shelving, change in the character of the soil, destruction of terrestrial vegetation, and litter, it determines the line of ordinary high-water. . . . Also a test of the distinct line is the destruction of terrestrial vegetation so these are not really two separate tests but must, of necessity, complement each other.<sup>174</sup>

In *Carpenter v. Board of Commissioners*,<sup>175</sup> the court elaborated:

Ordinarily, the slope of the bank and the character of its soil are such that the water impresses a distinct character on the soil, as well as on the vegetation. In some places, however, where the banks are low and flat, the water does

---

170. *Id.* at 31 (emphasis in original).

171. 345 F.2d 645 (3d Cir.), *cert. denied*, 382 U.S. 902 (1965).

172. *Id.* at 646-47.

173. 54 U.S. (13 How.) 381 (1851).

174. *Ford City*, 345 F.2d at 648 (citations omitted).

175. 56 Minn. 513, 58 N.W. 295 (1894).

not impress on the soil any well-defined line of demarcation between the bed and the banks. In such cases, the effect of the water upon vegetation must be the principal test in determining the location of high water mark, as a line between the riparian owner and the public.<sup>176</sup>

The *Ford City* court recognized the relation between the presence of upland vegetation and usefulness for agricultural purposes by adding that the vegetation test “means not that within such line all vegetation has been destroyed by the water covering the soil but that the soil has been covered by water for sufficient periods of time to destroy its value for agricultural purposes.”<sup>177</sup>

In dicta, the court in *Goose Creek Hunting Club v. United States*<sup>178</sup> noted that cattle grazing on an area constituted an agricultural use.<sup>179</sup> Other courts have not followed this interpretation. The Idaho Supreme Court specifically rejected such an argument in *Heckman Ranches Inc. v. State*.<sup>180</sup> In the leading Florida case, *Tilden v. Smith*,<sup>181</sup> the Florida Supreme Court followed the *Heckman Ranches* rationale by defining the OHWL as: “the point up to which the presence and action of the water is so continuous as to destroy the value of the land for agricultural purposes by preventing the growth of *vegetation, constituting what may be termed an ordinary agricultural crop*.”<sup>182</sup> Therefore, although evidence of agricultural use may be critical in determining OHWL,<sup>183</sup> cattle grazing on the land at some point during the year is not determinative of the line’s location.

In determining what constitutes an agricultural purpose in Florida, the case law provides little guidance.<sup>184</sup> A court could interpret *Tilden* as allowing cultivation of rice or another partially submerged crop to be considered an “ordinary agricultural crop.” However, *Tilden* should

176. *Id.* at 522, 58 N.W. at 297; see also *South Dakota Wildlife Fed’n v. Water Mgmt. Bd.*, 382 N.W.2d 26, 30-31 (S.D. 1986) (discussing the relationship between the OHWM and vegetative indicators).

177. *Ford City*, 345 F.2d at 648.

178. 518 F.2d 579 (Ct. Cl. 1975).

179. *Id.* at 584; accord *Welch v. Browning*, 115 Iowa 690, 87 N.W. 430 (1901).

180. 99 Idaho 793, 799, 589 P.2d 540, 546 (1979).

181. 94 Fla. 502, 113 So. 708 (1927).

182. *Id.* at 512-13, 113 So. at 712 (emphasis added) (quoting *Carpenter*, 56 Minn. at 521-22, 58 N.W. at 297).

183. See *Vanada v. United States*, Case No. 514-71 (unreported trial court opinion), *aff’d*, 206 Ct. Cl. 878 (1975) (in the absence of other reliable indicia, land farmed for 23 years was held to be above OHWL of river).

184. See *supra* text accompanying note 182.

be read in conjunction with other accepted definitions of OHWL, which describe the OHWL as a line below which upland vegetation is absent. The agricultural use test is best characterized as requiring that the area below OHWL be incapable of supporting upland agricultural crops.

As the court noted in *Ford City*,<sup>185</sup> the OHWL is located by reference to a distinct line, and vegetative indicators are used if a clear line is otherwise unavailable. In Florida, a vegetation analysis usually has significant probative value. The vegetation test describes the OHWL as the point at which the dominant water regime creates a line separating submerged and upland species, or a line below which there is an absence of upland vegetation.<sup>186</sup>

The absence of all vegetation clearly is not required. The court in *Martin v. Busch* recognized an important physical fact related to OHWL in Florida:

In flat territory or because of peculiar conditions, there may be little if any shore to navigable waters, or the elevation may be slight and the water at the outer edges may be shallow and affected by vegetable growth or other conditions, and the line of ordinary high water mark may be difficult of accurate ascertainment.<sup>187</sup>

The court recognized that in low relief areas or areas with other special conditions, vegetation, and associated litter may extend onto submerged lands. In these cases, vegetation becomes a more critical factor. Normally, Florida lakes and rivers are characterized by a gradual transition from water-tolerant species near the edge of the water body, to those less tolerant of water on nearby uplands.<sup>188</sup> In many situations, a clear dividing line is not apparent to an untrained observer, necessitating careful analysis of the plant communities. In these situations, the depth and breadth of scientific documentation is important in supporting a particular placement of OHWL based on vegetation.

*United States v. Cameron*,<sup>189</sup> a federal district court case from Florida, illustrates several points regarding the use of vegetation surveys in boundary determinations. A rancher owning land along a lake

---

185. *Ford City*, 345 F.2d at 648.

186. *See id.*

187. *Busch*, 93 Fla. at 564, 112 So. at 283.

188. *See* D. MEANS, *supra* note 155, at 47, 60.

189. 466 F. Supp. 1099 (M.D. Fla. 1978).

connected with the St. Johns River constructed an extensive dike on the low-lying portions of his property.<sup>190</sup> He also installed a pump to remove water from the diked area.<sup>191</sup> The Corps of Engineers charged him with violating the Rivers and Harbors Act, claiming he had constructed the dike below OHWL without a permit.<sup>192</sup> As part of the evidence presented, both parties submitted analyses of the vegetation above the dike and on the exposed land between the dike and the lake.<sup>193</sup>

The government's expert witness limited his investigation to submerged vegetation. He found *eleocharis* (spikebrush) was the dominant species in a significant portion of the area both inside and outside the dike.<sup>194</sup> He testified that *eleocharis*, as well as four other species he identified, live in areas that are inundated over fifty percent of the time.<sup>195</sup> At the site, elevations below two feet were normally inundated fifty to seventy-five percent of the time, and the topography of the area showed that more than one-third of the site was below the two-foot elevation.<sup>196</sup>

The rancher's expert witness examined the site slightly over one year after the government's witness completed his survey,<sup>197</sup> and one year after a pump was installed to drain the land.<sup>198</sup> The expert's analysis focused primarily on the existence of upland vegetation, and he found predominantly upland species on both sides of the dike. According to this witness, the dominant species were bermuda grass and bahia grass, both "transition zone" species that could survive total inundation for no more than two to twelve weeks.<sup>199</sup> He also found that cypress trees on the lakeward side of the dike had not formed new knees, suggesting that these areas had not been inundated for significant lengths of time in recent years.<sup>200</sup> The rancher's expert ultimately concluded that the area on either side of the dike had not been submerged a significant amount of time in recent years.

The *Cameron* court recognized discrepancies in the evidence. After weighing the evidence, the court concluded that the dike was in a

---

190. *Id.* at 1100-01.

191. *Id.* at 1102.

192. *Id.* at 1101.

193. *Id.* at 1106-07.

194. *Id.* at 1106.

195. *Id.*

196. *Id.* at 1108.

197. *Id.* at 1106-07.

198. *Id.* at 1102.

199. *Id.* at 1107.

200. *Id.*

dynamic marshland environment which was experiencing a period of low water. The court attributed the discrepancies in the vegetative analysis to the natural changes in water level that occurred in the year between the two surveys.<sup>201</sup> The court also noted that the rancher's expert witness performed a soil analysis which indicated greater amounts of organic matter in the soil as one moved from the lake to the dike.<sup>202</sup> However, the court seemed to focus on the existence of upland vegetation lakeward of the dike, holding that this evidence precluded any possibility that "such area is so usually covered by water that it is wrested from vegetation and its value for agricultural purposes destroyed."<sup>203</sup>

*Cameron* illustrates the difficulty of reconstructing normal conditions in a disturbed area. Neither the court nor the parties involved acknowledged that construction activities, pumping, and the effects of the dike itself could have drastically altered the water regime in the area. Vegetation and soil analysis conducted at several nearby sites would have allowed a reasonable, and probably more accurate, extrapolation of the OHWL.

The *Cameron* court's willingness to accept evidence of *some* upland vegetation as indicating agricultural usefulness below the level of the dike is significant.<sup>204</sup> Neither party made any attempt to identify the relative densities of upland and submerged species. In this regard, the government's expert witness could have provided more documentary support for his vegetation analysis and improved his credibility if he had included surveys of both submerged and upland species and the degree of dominance of each along several transects in the area.

The courts have not developed standards for determining species dominance in reference to the vegetation test. Because several methods exist for defining "dominance" — including measures of basal area, relative numerical density, and relative cover — any vegetation analysis should include data and discussion of each possible aspect of the definition. Some courts too readily accept an expert witness's opinion although a sufficient explanation of the method used to arrive at the stated conclusion is not provided. In *Hayes v. Arkansas*,<sup>205</sup> for example, a "low bottom" area contained "flood plain vegetation," which included green ash, honey locust, sycamore, silver-leaf maple, and

---

201. *See id.* at 1113.

202. *Id.* at 1114.

203. *Id.*

204. *Id.* The evidence was not completely lacking, but the government failed to carry its burden of proof on the issue of regulatory jurisdiction. *Id.*

205. 496 S.W.2d 372 (Ark. 1973).

black willow, with cottonwood dominating the area.<sup>206</sup> Bermuda grass, rag weed, beggar lice, stinging nettle, and other weeds and grasses not of the "flood plain" type were also present.<sup>207</sup> A botany professor testified that 53.5 percent of the area was "covered with vegetation" and the balance was bare ground.<sup>208</sup> Based on this testimony, along with evidence on the age of the trees and the former use of the land, the court determined that the area was not below OHWL.<sup>209</sup> A similarly loose analysis was accepted by the court in *Heckman Ranches*. In *Heckman Ranches*, an expert witness simply asserted that the vegetation above the line steadily became more dense and below the line, steadily more thin.<sup>210</sup>

The *Cameron* court found that evidence of some upland vegetation indicated the site's agricultural usefulness. Normally, lack of vegetation will indicate an area is below OHWL. However, in at least one case, *Sun Dial Ranch v. May Land Co.*,<sup>211</sup> an area without vegetation was held to be above OHWL because an unusual flood had scoured the area.<sup>212</sup> In another case, *Arkansas Land & Cattle Co. v. Anderson-Tully Co.*,<sup>213</sup> an expert witness testified that several factors could account for the loss of vegetation in an area above OHWL, including sand migration, wind action, and floods.<sup>214</sup>

The presence of upland vegetation may also be used as an indicator of the OHWL. In *Goose Creek*, the area around a non-navigable stream — before being inundated by the waters behind a government dam — was covered with "good grass" during the six-month dry season.<sup>215</sup> A few willows grew alongside the creek, with bitter pecan and overcup oak trees generally beginning from ten to fifty yards from the creek banks. Before total inundation by the dam project, the area had been subject to intermittent flooding during the wet season and often was covered with water for months at a time. Trees were able to survive during this period, and the grass would return each year after the waters receded.<sup>216</sup> The *Goose Creek* court made no reference to sub-

---

206. *Id.* at 374.

207. *Id.*

208. *Id.*

209. *Id.* at 374-75.

210. *Heckman Ranches*, 99 Idaho at 798, 589 P.2d at 545.

211. 61 Or. 205, 119 P. 758 (1912).

212. *Id.* at 217-18, 119 P. 763.

213. 248 Ark. 495, 452 S.W.2d 632 (1970).

214. *Id.* at 507, 452 S.W.2d at 639.

215. *Goose Creek*, 518 F.2d at 581.

216. *Id.*



merged vegetation in the area. On the basis of the upland vegetation described, the court determined that the land was above the OHWL of the stream.<sup>217</sup>

The Iowa Supreme Court addressed the issue of what constitutes upland vegetation in *Welch v. Browning*:<sup>218</sup>

Trees may be included under the general head of vegetation, but trees which grow and flourish best in the immediate vicinity of running streams that are subject to overflow, and which shoot up in places as the water recedes, and which can withstand the effect of water encompassing the lower part of their trunks without injury, and for a longer period than other kinds of trees, should not necessarily be classed as the kind of vegetation to which the law refers as marking the limit of ordinary high water in cases of the character such as the one now on trial, unless the soil on which they grow is adapted to and can be used for agricultural purposes, or so far removed from the effect of ordinary high water as to become permanent.<sup>219</sup>

The decisions are generally consistent with respect to which types of vegetation and trees are considered indicative of upland or submerged land. The courts, however, occasionally have used other factors to override the result dictated by the presence of vegetation alone. The potential variability of — and the need for extensive documentation of — vegetative analysis is illustrated in *Buttrey v. United States*.<sup>220</sup> In *Buttrey*, the Corps of Engineers attempted to assert regulatory jurisdiction over a slough area near a navigable river.<sup>221</sup> Although the Corps claimed to have followed its regulations calling for several methods of determining OHWL, including a vegetation analysis, the court criticized the lack of documentation of most measurements and found several inconsistencies in the Corps's evidence. The court also noted that "[i]f the presence of living grass was the criterion used, the entire slough is covered with grass during parts of the year and that criterion would be variable at best."<sup>222</sup>

---

217. *Id.* at 584.

218. 115 Iowa 690, 87 N.W. 430 (1901).

219. *Id.* at 693, 87 N.W. at 431.

220. 573 F. Supp. 283 (E.D. La. 1983).

221. *Id.* at 287.

222. *Id.* at 300.

Although its concern is with regulatory jurisdiction under a somewhat different standard,<sup>223</sup> the Florida Department of Environmental Regulation's (the DER) list of plant indicators<sup>224</sup> also provides some guidance in the creation of a procedure for determining whether an area should be considered submerged, upland, or part of the transition zone. However, one may only use this line, which is created under the DER's vegetative index, for regulatory purposes. The vegetative index line has no significance with respect to sovereign ownership of lands that are located under navigable waters.<sup>225</sup>

Where the vegetation analysis lacks depth and documentation, a court may deem other characteristics of the land more determinative. In *Heckman Ranches*, the state's expert witness testified as to placement of the OHWL on a river, based on a visual inspection of several criteria.<sup>226</sup> The record contains no evidence of extensive documentation, and the witness testified that he "casually identified the plant species that were growing" as he walked down the approximate high water line.<sup>227</sup> His observation resulted in this testimony: "[T]he rocks above the line I picked had a deposition of lichen and mosses on them interspersed with the sand and finer material and perennial plants that I would consider to be of a terrestrial upland variety."<sup>228</sup> There was also evidence of fairly severe scouring action by high waters. The court found that the area between the appellant's riparian land and a state-owned island was below OHWL.<sup>229</sup> The court, however, appeared to base its decision less on the presence of certain types of vegetation than on the evidence of scouring action and the fact that floods in that area made agricultural use impossible.<sup>230</sup>

An important factor in evaluating many plant species is the ability of the species to colonize recently created upland.<sup>231</sup> This aspect of the vegetation analysis was emphasized in *Snake River Ranch v. United*

223. See FLA. STAT. § 403.913(2) (1989) (focusing on the "landward extent of the waters" of the state).

224. See 6 FLA. ADMIN. CODE 17-3.022 (1990).

225. FLA. STAT. § 403.817(5) (1989).

226. *Heckman Ranches*, 99 Idaho at 798, 589 P.2d at 545.

227. *Id.*

228. *Id.*

229. *Id.* at 799, 589 P.2d at 546.

230. *Id.*

231. Many upland species of trees cannot tolerate prolonged periods of inundation. These trees will flourish in both up and low land during periods of low water. However, during periods of high water, the trees below a certain elevation will die due to inundation. The area above that elevation is considered upland. VOLUME A, ORDINARY HIGH WATER LINE PRIMER 158 (1st ed. 1989).

*States*.<sup>232</sup> The issue in *Snake River* was the age and origin of lands between the thread of a river and the surveyed meander line.<sup>233</sup> The court took notice of the fact that the disputed area was covered exclusively with cottonwood, a pioneer species that germinates readily on land that has been disturbed.<sup>234</sup> The average age of five discrete stands of cottonwood corresponded with the end of a period of high flood peaks. These flood peaks probably established the disputed lands.<sup>235</sup> No other evidence of vegetation or tree growth contradicted this finding.<sup>236</sup>

Similarly, in *United States v. Wilson*,<sup>237</sup> the issue was whether disputed lands had formed as accretions or were the result of avulsive movements of a river.<sup>238</sup> The court recognized that willows are the first vegetation to appear as sandbars are formed, because this species can withstand frequent inundation.<sup>239</sup> Cottonwoods need slightly higher and drier land to establish themselves.<sup>240</sup> The court examined early survey maps of the area and concluded that the presence of willow trees on one sandbar indicated that the sandbar had only recently formed at the time the map was made.<sup>241</sup>

The analysis of vegetation and land formations in these cases was summarized by the courts in *Anderson-Tully Co. v. Walls*<sup>242</sup> and *McGee v. Matthews*,<sup>243</sup> both of which dealt with the age and origin of lands on rivers. Vegetation, usually willow and cottonwood at first, will begin to grow only after alluvial deposits rise high enough to remain out of water for substantial periods of time.<sup>244</sup> According to the forestry experts who testified in the *Walls* case, if the tops of these trees remain above the water during periods of high flow, they will survive and reproduce.<sup>245</sup> River bank vegetation develops in three overlapping

232. 395 F. Supp. 886 (D. Wyo. 1975), *aff'd*, 542 F.2d 555 (10th Cir. 1976).

233. *Id.* at 888.

234. *Id.* at 896.

235. *Id.*

236. *See id.*

237. 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd* 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

238. *Id.* at 68.

239. *Id.* at 76.

240. *Id.*

241. *Id.* at 75-76.

242. 266 F. Supp. 804, 809 (N.D. Miss. 1967).

243. 241 F. Supp. 300, 303 (E.D. Ark. 1965), *aff'd*, 358 F.2d 516 (8th Cir. 1966).

244. *Walls*, 266 F. Supp. at 809.

245. *Id.*

stages of biological succession.<sup>246</sup> First, the pioneer forest species, such as willow and cottonwood establish themselves. These trees mature in fifty to seventy years, and allow secondary species such as pecan, ash, mulberry, hackberry, elm, and sycamore to take root.<sup>247</sup> When the secondary species mature and begin to die, tertiary or climax species such as oak, hickory, and gum begin to develop.<sup>248</sup> The overlapping nature of this process often results in the coexistence of many older specimens of pioneer species with pockets of secondary and a few tertiary species.<sup>249</sup> Disease, lightning, logging, and other mortality factors may create conditions harmful to any one of the three types of species, thereby promoting the others.<sup>250</sup>

In *McGee*, the court faced the issue of whether a particular site on the Arkansas River was formed by accretion or avulsion.<sup>251</sup> The plaintiff contended that the land was accretive, and introduced records of logging done on the site in 1963.<sup>252</sup> The forester on site at the time of the logging then testified that the oldest trees cut were forty-two years old and that there was no indication that any trees had been cut in 1941 or 1942.<sup>253</sup> Of the 6363 trees cut, ninety-three percent were cottonwood, five percent were willow, and approximately two percent were sycamore.<sup>254</sup> Had all the mature timber been cut in 1941, the predominant growth in 1963 would have been secondary species such as hackberry and elm.<sup>255</sup> Because the large majority of timber cut in 1963 was of the pioneer species, the court concluded that the land in question was newly formed.<sup>256</sup>

### C. *Dendrochronology*

The sizes, ages, and species of trees present in an area are important factors in determining the historic OHWL. Tree elevations are considered primary evidence in locating OHWLs because they are among the most permanent expressions of upland growth.<sup>257</sup> In

---

246. *Id.*

247. *Id.*

248. *Id.*

249. *Id.*

250. *Id.* at 810.

251. *McGee*, 241 F. Supp. at 302.

252. *Id.*

253. *Id.*

254. *Id.*

255. *Id.* at 303.

256. *Id.* at 302-03.

257. *Lindberg v. Department of Nat'l Resources*, 381 N.W.2d 494, 495 (Minn. Ct. App. 1986).

*Lindberg v. Department of Natural Resources*,<sup>258</sup> an expert used the elevations of twenty to twenty-five hardwoods, with diameters from .7 to 2.5 feet, to corroborate other indicators of OHWL on a lake in Minnesota.<sup>259</sup> In *Tilden v. Smith*,<sup>260</sup> the Supreme Court of Florida considered evidence that twenty-year-old orange trees had been killed by inundation from Lake Johns indicated that the waters of the lake had risen above the OHWL.<sup>261</sup>

In determining the source and age of disputed lands along Wyoming's Snake River, the court in *Snake River Ranch v. United States*<sup>262</sup> accepted the average age of several stands of cottonwood trees as evidence of the age of the land in question. The court also compared the ages of the oldest cottonwood trees on that land to the oldest tree in the survey, located just upland of an eighty-two-year-old meander line, and found this comparison indicated the disputed land was of recent origin.<sup>263</sup> Similarly, the court in *United States v. Wilson*<sup>264</sup> heard testimony that an area described as "new bar land" along the Missouri River in 1915 had small willows and cottonwoods no more than one and one-half inches in diameter.<sup>265</sup> This testimony was persuasive on the issue of the origin and age of the land in question.<sup>266</sup>

In *South Dakota Wildlife Federation v. Water Management Board*,<sup>267</sup> a recent case dealing with the OHWL on a lake system, the Supreme Court of South Dakota was petitioned to reinstate the OHWL determination of a state water management board.<sup>268</sup> After several hearings with conflicting testimony, the water management board set the line at 1787 feet mean sea level (MSL).<sup>269</sup> On appeal, the circuit court reversed the board and set the line at 1,799.3 feet MSL.<sup>270</sup> The state supreme court interpreted the applicable state statute<sup>271</sup> and

258. 381 N.W.2d 494 (Minn. Ct. App. 1986).

259. *Id.* at 495.

260. 94 Fla. 502, 113 So. 708 (1927).

261. *Id.* at 506, 113 So. at 710.

262. 395 F. Supp. 886 (D. Wyo. 1975), *aff'd*, 542 F.2d 555 (10th Cir. 1976).

263. *Id.* at 896.

264. 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd* 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

265. *Id.* at 83.

266. *Id.* at 84.

267. 382 N.W.2d 26 (S.D. 1986).

268. *Id.* at 27.

269. *Id.* at 28-29.

270. *Id.* at 29.

271. *Id.* at 30. The South Dakota Code defined the OHWM, at the time of the events at bar, as

other accepted definitions of OHWL as requiring a distinct mark caused by erosion, changes in soil character, and destruction of terrestrial vegetation occurring under ordinary and continuous conditions.<sup>272</sup> Narrowing the test used in *Borough of Ford City v. United States*,<sup>273</sup> the court held that if a single distinct mark that satisfied these evidentiary requirements did not exist or if there was conflicting evidence on the placement of the line, then the OHWL was to be set “where significant, major, and substantial terrestrial vegetation ends.”<sup>274</sup>

Because the evidence presented in *South Dakota Wildlife* was conflicting, the court reinstated the board’s recommendation of 1787 feet MSL. The court based its decision in part on the presence of several sixty- to eighty-year-old cottonwood, elm, ash, and oak trees about one and one-half feet in diameter located as far down as the 1788-foot level.<sup>275</sup> A strong dissent in the case argued that, at the 1787-foot level chosen by the board, there was neither a distinct line nor any other easily recognized characteristic, as required by the applicable statute.<sup>276</sup> The dissent also interpreted the statute to require a line based on at least one of three indicators: (1) erosion lines, (2) destruction of terrestrial vegetation, or (3) some other easily recognized characteristic.<sup>277</sup> At the 1787-foot level, only a slight change in vegetation was visible.<sup>278</sup> However, just twelve feet higher — at the 1799-foot level — many distinct erosion lines, as well as a dramatic difference in the soils, provided the evidence required by the statute.<sup>279</sup> Surveys showed that older oak trees grew only above the 1799-foot level.<sup>280</sup> Established lines of eighty-year-old trees were found between 1796 and 1797 feet MSL, while between 1788 and 1796 feet MSL only random tree growth occurred.<sup>281</sup> Only very small trees and shrubs

---

the high level reached by the waters of a lake under ordinary and continuous conditions, unaffected by periods of extreme and periodic freshets. The ordinary high water mark is indicated by the continuous presence and action of water which leave a distinct mark either by erosion, destruction of terrestrial vegetation, or some other easily recognized characteristic.

S.D. CODIFIED LAWS ANN. § 43-17-20(2) (1983).

272. *South Dakota Wildlife*, 382 N.W.2d at 31.

273. 345 F.2d 645, 648, *cert. denied*, 382 U.S. 902 (1965).

274. *South Dakota Wildlife*, 382 N.W.2d at 31 (emphasis added).

275. *Id.* at 28.

276. *Id.* at 32 (Wuest, J., dissenting).

277. *Id.* at 33.

278. *Id.*

279. *Id.* at 34.

280. *Id.*

281. *Id.*

existed below the 1787-foot level.<sup>282</sup> In addition, the remains of trails once used by settlers at the time of statehood followed a line at the 1799-foot level.<sup>283</sup> The majority, however, was unwilling to accept an historic OHWL. Although a distinct, correlate line was visible at 1799 feet MSL, water had not reached that elevation in approximately eighty-five years.<sup>284</sup>

In *Summerville v. Scotts Bluff County*,<sup>285</sup> the court considered whether an island in Nebraska's North Platte River existed in 1877 as a permanent, separate body of land.<sup>286</sup> In 1935, a survey of the area indicated the presence of several cottonwood trees over fifty years old.<sup>287</sup> In 1966, a forester examining core samples found a seventy-seven-year-old cottonwood on the island.<sup>288</sup> By subtracting the ages of the trees from the year in which they were dated, the court calculated that only a few cottonwoods had begun to grow in the area sometime between 1882 and 1889, five to twelve years after the original survey.<sup>289</sup> One interpretation of the data is that an island existed in 1877 and that the trees established themselves sometime later. In the face of contradictory evidence, however, the court found that "there was not even persuasive evidence that there was a shifting sandbar in the location at that time [1877]."<sup>290</sup>

#### D. Soils, Geomorphology, and Marks on Local Objects

The presence and action of water often creates soils with consistencies, mineral compositions, and levels of organic matter that differ from the soils of adjacent uplands. Escarpments, terraces, benches, and other geomorphological features are the result of water shaping

---

282. *Id.*

283. *Id.*

284. *Id.* at 28.

285. 182 Neb. 311, 154 N.W.2d 517 (1967).

286. *Id.* at 316, 154 N.W.2d at 521.

287. *Id.* at 318, 154 N.W.2d at 522.

288. *Id.*

289. *Id.*

290. *Id.* at 319, 154 N.W.2d at 522. For other cases accepting evidence of tree growth in determinations of the age and source of lands, see *Anderson-Tully Co. v. Franklin*, 307 F. Supp. 539 (N.D. Miss. 1969); *Anderson-Tully Co. v. Walls*, 266 F. Supp. 804 (N.D. Miss. 1967); *United States v. Walton*, 266 F. Supp. 257 (D. Wyo. 1967); *McGee v. Matthews*, 241 F. Supp. 300 (E.D. Ark. 1965), *aff'd*, 358 F.2d 516 (8th Cir. 1966); *Mather v. State*, 200 N.W.2d 498 (Iowa 1972); *Arkansas Land & Cattle Co. v. Anderson-Tully Co.*, 248 Ark. 495, 452 S.W.2d 632 (1970); *Martin v. Busch*, 93 Fla. 535, 560, 112 So. 274, 282 (1927) (cypress trees on shore of lake accepted as indicating "line at which the water of the lake usually stood before affected by the drainage operations of the [s]tate").

the landscape. In addition, water can leave stains or other marks on trees, rocks, or other local objects. The analysis of such physical evidence is an important factor in determining the OHWL.

Florida courts recognize the evidentiary value of soils, geomorphology, and water marks, but their decisions also illustrate the inherent problems in determining OHWL based on such evidence. The court in *Martin v. Busch*<sup>291</sup> noted that, among other indicators, “[m]arks upon the ground or upon local objects that are more or less permanent” may be considered in determining the location of the OHWL.<sup>292</sup> In *Busch*, the “marks and monuments still in existence” included the more pronounced slope and change of soils at the margin of the lake,<sup>293</sup> and a line of cypress trees.<sup>294</sup> Although the court did not discuss the nature of the “marks on local objects,” presumably this reference is to the water stains and changes in the growth of lichens and mosses often seen on trees, rocks, pilings, and bridges.<sup>295</sup>

The court in *Tilden v. Smith*<sup>296</sup> addressed a problem often found in Florida and described as follows:

Ordinarily the slope of the bank and the character of its soil are such that the water impresses a distinct character upon the soil as well as upon the vegetation. In some places, however, where the banks are low and flat, the water does not impress on the soil any well defined line of demarcation between the bed and the banks.<sup>297</sup>

In such cases, analysis of vegetation may play a more determinative role in establishing an OHWL.

Soils analysis was an important factor in determining OHWL in *United States v. Cameron*.<sup>298</sup> The issue was whether a dike had been built below the OHWL on a lake connected with the St. Johns River.<sup>299</sup>

291. 93 Fla. 535, 112 So. 274 (1927).

292. *Id.* at 564, 112 So. at 283.

293. *Id.* at 559-60, 112 So. at 282 (testimony of state engineer).

294. *Id.*

295. *Id.* at 564, 112 So. at 283. For an illustration of water marks on trees, see J. Davis, Establishment of Mean High Water Lines in Florida Lakes, Figures 3, 4 (1973) (Publication No. 24, Water Resources Research Center, University of Florida). For a case illustrating the use of stains on boulders, together with vegetation and geomorphology, to establish the OHWL of a lake, see *Lindberg*, 381 N.W.2d at 495.

296. 94 Fla. 502, 113 So. 708 (1927).

297. *Id.* at 513, 113 So. at 712 (quoting *Carpenter*, 56 Minn. at 521-22, 58 N.W. at 297).

298. 466 F. Supp. 1099 (M.D. Fla. 1978).

299. *Id.* at 1101.



One expert, relying on a soil analysis he had performed, testified that the organic content of the soil increased as one moved from the present water line upland toward the dike.<sup>300</sup> The expert's soil analysis — the only analysis performed — revealed no clear line.<sup>301</sup> The expert concluded that upland plants populated the area lakeward of the dike because when these types of plants populate an area, an organic layer slowly builds up in the soil as a result of plant decay. Areas with submerged plants contain "subground layers of organic soil."<sup>302</sup> Therefore, the soil analysis indicated the presence of upland, rather than submerged, plants.

The court in *Trustee of the Internal Improvement Trust Fund v. Nowak*<sup>303</sup> accepted an even more succinct soils analysis and conclusion. *Nowak* concerned approximately 98.5 acres of low land jutting into Florida's Banana River. One disputed issue was whether the land existed at the time of an early government survey.<sup>304</sup> A geologist testified that, based on an unspecified number of soil samples, he believed the land "had not been permanently under water in 1859 or at any time thereafter."<sup>305</sup> He did not indicate what soil factors he analyzed or from where he took his soil samples. Therefore, where soils data are corroborative in nature, the degree of documentation the court requires may not be as high. In *Arkansas Land & Cattle Co. v. Anderson-Tully Co.*,<sup>306</sup> however, the court discounted the corroborative testimony of a geologist who had taken only four post-hole samplings over a fairly large, disputed area.<sup>307</sup>

*Borough of Ford City v. United States*<sup>308</sup> suggests that evidence of a line impressed in the soil along a river may be determinative of the OHWL. The court stated: "If there is a clear line, as shown by erosion, and other easily recognized characteristics such as shelving, change in the character of the soil, destruction of terrestrial vegetation, and litter, it determines the line of ordinary high-water."<sup>309</sup> The case of *South Dakota Wildlife Federation v. Water Management Board*,<sup>310</sup> discussed above, illustrates the dangers of such a simplistic

---

300. *Id.* at 1107.

301. *Id.*

302. *Id.*

303. 401 F.2d 708 (5th Cir. 1968).

304. *See id.* at 711-12.

305. *Id.* at 712.

306. 248 Ark. 495, 452 S.W.2d 632 (1970).

307. *Id.* at 504 n.4, 452 S.W.2d at 638 n.4.

308. 345 F.2d 645, 648 (3d Cir. 1965).

309. *Id.*

310. 382 N.W.2d 26 (S.D. 1986).

approach. In *South Dakota Wildlife*, the primary high water mark indicators on a lake system included well-defined erosion lines and dramatic changes in soil characteristics. The majority opinion, however, stressed the presence of vegetative indicators, such as eighty-year-old trees below the mark, indicated by erosion and soils analysis. Based on this evidence, the court established the OHWL some twelve feet below the line indicated by erosion and soils analysis.<sup>311</sup> The court interpreted *Ford City* as requiring a distinct line that evidences the simultaneous occurrence of erosion, change in soil, and destruction of terrestrial vegetation, all taking place under ordinary and continuous conditions.<sup>312</sup> Because water levels in the lake had not reached the line evidenced by erosion and soil changes for over eighty-five years, the *Ford City* test was not met.

*Heckman Ranches, Inc. v. State*<sup>313</sup> suggests that a combination of compatible indicators will be accepted as establishing an OHWL line, even though these same factors individually might not be sufficiently probative.<sup>314</sup> In *Heckman Ranches*, an expert witness justified his placement of the OHWL on several factors, including a faint and intermittent visible escarpment, the presence of rocks and gravel covered by lichens and moss, and the relative composition of soils on either side of the line. The court concluded that the sand with finer material supporting perennial plants was above the line, while the sand with gravel and large boulders was below the line because it was not suitable for agriculture.<sup>315</sup>

The court in *Snake River Ranch v. United States*<sup>316</sup> also accepted evidence of the consistency of soil materials as indicating land above the OHWL.<sup>317</sup> Experts attributed very high percentages of fine materials on the upland to wind deposits and sedimentation over a long period of time. Land inundated by the river as recently as twenty-one years prior to the litigation also contained significant, though lesser, percentages of fine material — “enough to sustain tree growth.”<sup>318</sup> Samples from cobble bars in the channel of the river, however, contained very little fine-grained material.<sup>319</sup> The court in *United States*

---

311. *Id.* at 31.

312. *Id.*

313. 99 Idaho 793, 589 P.2d 540 (1979).

314. *See id.* at 798-99, 589 P.2d at 545-46.

315. *Id.*

316. 395 F. Supp. 886 (D. Wyo. 1975), *aff'd* 542 F.2d 555 (10th Cir. 1976).

317. *Id.* at 896.

318. *Id.*

319. *Id.*

*v. Walton*<sup>320</sup> made similar findings. In *Walton*, experts characterized upland, accretive soil as alluvial and supportive of fairly large trees.<sup>321</sup> In contrast, the swiftly flowing riverbed contained cobbles and boulders up to eighteen inches in diameter.<sup>322</sup>

In deciding whether land had accreted to the shoreline above the OHWL of the Missouri River, the court in *United States v. Wilson*<sup>323</sup> heard evidence on whether the land was accretive or avulsive.<sup>324</sup> Soils analysis indicated that soils in that area had a "heterogeneous character."<sup>325</sup> This fact indicated the land was avulsive because accreted lands are usually heterogenous in composition. In light of other evidence, and using its own analysis of the term "accretion," the court characterized the soils data as consistent with the theory that the river had simply moved at different speeds and piled up accretive soils of differing quality over time.<sup>326</sup> On appeal, the court in the *Wilson* case discussed additional soils data on silt and clay relevant to the determination of whether the area was accretive or avulsive in nature.<sup>327</sup>

### E. Hydrology

Hydrologic data can be very useful in establishing an OHWL. In many cases no clear line is impressed in the soil or readily apparent from the vegetation. Marks on local objects may be found at several inconsistent elevations. Evidence of the presence and action of water may be present at different elevations. Some elevations may correspond to low water conditions. Extreme floods or wave action may leave other evidence. Neither correspond to ordinary high water.

Although an ordinary high water line must be determined primarily by reference to physical evidence of the presence and action of water — water marks, soils, vegetation, and geomorphology — this evidence often is inconsistent or unclear. Stage duration data can be invaluable in locating the true line of ordinary high water in these cases.

320. 266 F. Supp. 257 (D. Wyo. 1967).

321. *Id.* at 261-62.

322. *Id.* at 262.

323. 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd*, 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

324. *Id.* at 91.

325. *See id.*

326. *Id.*

327. On appeal, the *Wilson* parties were cast as *Omaha Indian Tribe, Treaty of 1854 with the United States v. Wilson*, 575 F.2d 620, 643 n.48 (8th Cir. 1978).

Hydrologic data generally does not replace physical evidence. The courts have rejected attempts to establish OHWLs at a particular stage (e.g., the elevation that is exceeded fifty percent of the time) without reference to the effects of flooding on the landscape — i.e., soils, vegetation, and agricultural use.<sup>328</sup> The courts allow the use of hydrologic data to establish an OHWL only where physical evidence is lacking or inconsistent.<sup>329</sup> Hydrologic data is most often used to corroborate physical evidence of the OHWL.

The use of hydrologic data raises the question: What stage constitutes ordinary high water? The answer appears to be that ordinary high water is, as the term implies, the elevation that high water stages normally reach. This level is higher than low or average stages but does not include extremely high water stages that occur so infrequently or are of such short duration that the water level has little permanent effect on the landscape or on the usefulness of the area for agricultural crops.

Both major Florida Supreme Court decisions support this view. In *Martin v. Busch*,<sup>330</sup> the court noted a parallel between those lands that are below the OHWL and those lands that are “covered and uncovered by the daily ebb and flow of normal tides.”<sup>331</sup> The court defined sovereignty submerged lands as including “the shores or spaces, if any, between ordinary low water mark and ordinary high-water mark.”<sup>332</sup> Thus, the OHWL is clearly above low water stages and corresponds to a high water stage. Although nontidal waters do not experience daily fluctuations between high and low stages, they do fluctuate over longer periods of time. High water that occurs with regular, if not predictable, frequency appears to be ordinary high water. As stated in *Tilden v. Smith*,<sup>333</sup> ordinary high water includes “high water or flood water” that is “part of the regular and usual flow of the stream for a considerable period of each year.”<sup>334</sup>

---

328. See e.g., *Willis v. United States*, 50 F. Supp. 99, 101 (S.D. W. Va. 1943); *Kelley's Creek & Northwestern R.R. v. United States*, 100 Ct. Cl. 396 (1943); *State v. McDonald Lumber Co.*, 118 N.W.2d 152 (Wis. 1962).

329. See, e.g., *United States v. Cameron*, 466 F. Supp. 1099 (M.D. Fla. 1978).

330. 93 Fla. 535, 112 So. 274 (1927).

331. *Id.* at 562, 112 So. at 283.

332. *Id.* At the time, there was no distinctly different test for tidal and nontidal waters. Eight years after the *Busch* decision, the United States Supreme Court established a precise methodology for determining boundaries in tidal areas. See *Borax Consol. Ltd. v. City of Los Angeles*, 296 U.S. 10, 26-27 (1935); see also Florida Coastal Mapping Act of 1974, FLA. STAT. §§ 177.25-40 (1989) (Florida law governing tidal boundaries); Maloney & Ausness, *supra* note 30, at 202-06 (discussing the *Borax* decision).

333. 94 Fla. 502, 113 So. 708 (1927).

334. *Id.* at 511, 113 So. at 711.

Other courts have recognized a distinction between the OHWL and lines created by either extreme floods or low water flows. These courts describe OHWL as,

a natural physical characteristic placed upon the lands by the action of the river. It is placed there, as the name implies, from the ordinary flow of the river and does not extend to the peak flow or flood stage so as to include overflow on the flood plain, nor is it confined to the lowest stages of the river flow.<sup>335</sup>

In *State ex rel. Connor v. Sorensen*,<sup>336</sup> the Supreme Court of Iowa stated the OHWL "is not the line reached by unusual floods, but it is the line to which high water ordinarily reaches."<sup>337</sup> The Supreme Court of Arizona adopted a similar test in *Arizona v. Bonelli*:<sup>338</sup> "The high water mark, therefore, may be defined as the line to which high water ordinarily reaches, and is not the line reached by the water in unusual floods."<sup>339</sup>

Whether courts characterize water stages as "floods" or not, however, is probably less important than correlating these stages with effects on the land. In ruling that an area covered by annual floods will not be considered necessarily above the OHWL, one court stated that the OHWL

is the line to which high water ordinarily reaches. This concept excludes unusual flood waters. The parties, however, disagree on whether seasonal high waters should be considered when determining the ordinary high water line. As a matter of law, this court will not exclude the wet season high flows. Evidence whether the presence and action of the seasonal high waters is so continuous as to destroy the value of the land for agricultural purposes will be permitted.<sup>340</sup>

335. *United States v. Claridge*, 279 F. Supp. 87, 91 (D. Ariz. 1967), *aff'd*, 416 F.2d 933, 934 (9th Cir. 1969), *cert. denied*, 397 U.S. 961 (1970).

336. 222 Iowa 1248, 271 N.W. 234 (1937).

337. *Id.* at 1251, 271 N.W. at 236 (citing *City of Cedar Rapids v. Marshall*, 199 Iowa 1262, 1264-65, 203 N.W. 932, 933 (1925)).

338. 108 Ariz. 258, 495 P.2d 1312 (1972).

339. *Id.* at 1314 (quoting *State v. Sorensen*, 222 Iowa 1248, 271 N.W. 234 (1937)).

340. *Mobil Oil Corp. v. Coastal Petroleum Co.*, No. TCA 79-1082, Slip op. at 5 (N.D. Fla. Jan. 27, 1982).

High waters potentially may affect OHWL depending on their action and duration in an area. In *Heckman Ranches v. State*,<sup>341</sup> the Idaho Supreme Court stated that periodic inundation of land will probably place the OHWL above that area if the inundation is severe enough to destroy the agricultural value of the soil.<sup>342</sup> The *Heckman Ranches* case involved an "island" separated from appellant's adjacent upland property by a channel that periodically formed during high water, an average of 31.7 days per year.<sup>343</sup> Appellant claimed title to the island and challenged the trial court's placement of OHWL on the river in that area.<sup>344</sup> The court reviewed evidence related to the location of the line, including the effect of high water on the vegetation and the agricultural use of the area. One expert testified:

Merely flooding [the land] would not destroy it . . . again the water action itself, the type of inundation has a considerable influence on the destruction of value for agriculture . . . . Wave action in quiet bodies of water will destroy the value of land for agricultural purposes. Current in and along and adjacent to rivers will do the same thing . . . . Generally speaking, the inundation of land by — that has a good stand of well established perennial plants for a short period of time wouldn't be harmed, but where the same land might be subjected to severe water action through the force of wind or through the current, then the soil could be deprived of its value for agriculture.<sup>345</sup>

The court held that on the particular facts and circumstances of the case, the OHWL was properly placed upland of the "island."<sup>346</sup> The opinion emphasized the site-specific analysis necessary in these cases.<sup>347</sup> Although the intermediate strip of land was inundated only a small percentage of time, the court held that the land was below ordinary high water mark based on the composition of the soil and the erosive action of the river.<sup>348</sup>

---

341. 99 Idaho 793, 589 P.2d 540 (1979).

342. *Id.* at 545-46.

343. *Id.* at 542.

344. *Id.*

345. *Id.* at 545-46.

346. *Id.* at 546.

347. *Id.*

348. *Id.* Conversely, in *Vanada v. United States*, Case No. 514-71 (Ct. Cl. 1974), winter flood conditions on the Ohio River were recognized as contributing to the fertility of the land, increasing its value for agricultural purposes, and justifying an OHWL placement waterward of that area. *Id.* at 23.

The *Heckman Ranches* case involved a river that exhibited particularly erosive characteristics. Few Florida water bodies exhibit these characteristics, but the length and nature of an inundation always has the potential to affect OHWL location. Thus, hydrologic data may be used to help determine whether a particular water mark is located above or below the level to which high waters ordinarily rise and remain for a considerable period of time. Every effort should be made, however, to correlate hydrologic data with evidence of the effects of water on vegetation, agricultural use, soils, and geomorphology.

Courts have been reluctant to accept hydrologic data based on averaging techniques that fail to account for site-specific conditions. In *United States v. Cameron*,<sup>349</sup> a federal case dealing with Florida's St. Johns River, the court considered whether a dike had been placed below the OHWL of a lake connected with the St. Johns River.<sup>350</sup> The Corps of Engineers was attempting to prove that two-thirds of the disputed land normally was inundated approximately half of the time. In accepting the use of hydrologic data, the court stated: "[F]or a body of water whose levels fluctuate considerably with changes in climate, accurate water stage and elevation data may provide the most suitable method for determining the ordinary high water mark."<sup>351</sup> The court, however, also engaged in a detailed analysis of water survey data presented by the Corps.

The Corps created a "water stage profile" by examining stage-duration curves from 1943-1973 at points 5.9 miles south and 26.1 miles north of the site in question.<sup>352</sup> Two "exceedance frequency curves" were constructed in order to indicate the water "elevation by river mile that is obtained either 25% or 50% of the time measured."<sup>353</sup> The profile showed that at the gauge 5.9 miles south of the site, river elevations equalled or exceeded 2.3 feet MSL at least fifty percent of the time measured.<sup>354</sup> Based on the profile line, the Corps's expert witness testified that the variation in water level between that gauge station and the site in question was no more than .1 to .2 feet.<sup>355</sup> According to the Corps's topographic map, two-thirds of the area enclosed by the dike was at an elevation of 2.1 feet or less.<sup>356</sup> After

---

349. 466 F. Supp. 1099 (M.D. Fla. 1978).

350. *Id.* at 1112.

351. *Id.*

352. *Id.* at 1107-08.

353. *Id.* at 1108.

354. *Id.* at 1107-08.

355. *Id.* at 1108.

356. *Id.*

taking into account the differences in elevation between the gauge station and the site, the Corps argued that two-thirds of this property also must have been inundated fifty percent of the time measured.<sup>357</sup>

The *Cameron* court heard extensive criticism of the Corps's methods, including the fact the Corps had not taken into account tidal fluctuations affecting one gauge station.<sup>358</sup> The landowner pointed out that significant environmental changes, including extensive development, channel deepening, and bridge construction had all contributed to a lowering of water levels, but these factors had not been included in the Corps's analysis.<sup>359</sup> The Corps's incorrect assumption that the thirty-two-mile channel between the gauge stations was uniform in slope only compounded these weaknesses.<sup>360</sup> The court accepted in principle the potential validity of stage duration data, but pointed out that statistical evidence can be misleading.<sup>361</sup> Because the Corps failed to counter the landowner's criticisms, the court rejected the Corps's evidence as "too methodologically and empirically unsound to be useful."<sup>362</sup>

While stressing the inaccuracies in the Corps's survey, the landowner's expert witness suggested that a methodologically sound way to interpolate water stages at the site in question could be devised. The expert suggested placing water gauges at a number of temporary benchmarks between the permanent gauge stations and then taking simultaneous readings from all of the gauges. He echoed the concern of most courts, however, when he stressed the "need for precision in making an interpolation [of stage duration data], because a slight difference in estimated elevation could affect a large quantity of land."<sup>363</sup>

*Miller v. United States*<sup>364</sup> provides another example of the accepted use of average water level data. In *Miller*, one issue was whether government dams had caused higher water levels that damaged plaintiffs' riparian property.<sup>365</sup> The appellate court took judicial notice of recorded lake levels during the period in question and evaluated plain-

---

357. *Id.*

358. *Id.* at 1109-10.

359. *Id.*

360. *Id.*

361. *Id.* at 1114.

362. *Id.*

363. *Id.* at 1110.

364. 583 F.2d 857 (6th Cir. 1978).

365. *Id.* at 862.



tiff's claims in light of long-range historical fluctuations.<sup>366</sup> The court then remanded the case to the trial court for further factual development, including consideration of recent studies that suggested the net effect of artificial factors on the lake was to lower rather than to raise water levels.<sup>367</sup>

Most courts, including those in Florida, have specifically rejected hydrologic data as the sole method for determining the OHWL. In *State v. McDonald Lumber Co.*,<sup>368</sup> the Wisconsin Supreme Court examined a contour line that indicated the OHWL was based on the average of high water levels of the Great Lakes from 1860-1959.<sup>369</sup> Relying on *Diana Shooting Club v. Husting*<sup>370</sup> for a definition of OHWL that emphasized a distinct mark, the court held that a line based on average water levels failed to meet the necessary burden of proof.

The court in *Willis v. United States* rejected a method of determining OHWL that was based on an analysis of river stage data over a fifty-year period.<sup>371</sup> A government dam project had partially inundated plaintiff's riparian property. In determining damages, the location of the OHWL was a major issue.<sup>372</sup> The court rejected this averaging technique, reasoning that it was flawed because the determination of the line would "vary according to the period of time and frequency of occurrence arbitrarily selected by the individual analyst."<sup>373</sup> The court believed the method could be useful in deciding engineering problems, but that it was "utterly unreliable as a means of determining the respective rights of the United States and the riparian property owner."<sup>374</sup> The court in *Kelley's Creek & Northwestern Railroad v. United States*<sup>375</sup> also rejected the use of an averaging method on the same river as "wholly without value."<sup>376</sup>

In *Alaska Department of Natural Resources v. Pankratz*,<sup>377</sup> the Alaska Supreme Court heard expert testimony based on United States Geological Survey records regarding the rate of flow of a river a few

366. *Id.* at 864.

367. *Id.* at 864 n.22.

368. 18 Wis. 2d 173, 118 N.W.2d 152 (1962).

369. *Id.* at 176-77, 118 N.W.2d at 154.

370. 156 Wis. 261, 272, 145 N.W. 816, 820 (1914).

371. 50 F. Supp. 99, 101 (S.D. W.Va. 1943).

372. *Id.*

373. *Id.*

374. *Id.*

375. 100 Ct. Cl. 396 (1943).

376. *Id.* at 406.

377. 538 P.2d 984 (Alaska 1975).

miles upstream of the area in question.<sup>378</sup> The expert averaged the data and established a mean high water mark within one foot of the actual line.<sup>379</sup> On cross-examination, the expert admitted that survey records could not be used to determine actual OHWL at a particular site on the river.<sup>380</sup> As in *Cameron*, the court found that unexplained factors such as the "backwater" effect caused by the flow of one river into another precluded any conclusions based on survey data.<sup>381</sup>

In *Buttrey v. United States*,<sup>382</sup> the Corps of Engineers attempted to use the averaging method to establish regulatory jurisdiction over a slough near a navigable river.<sup>383</sup> Hydrologic survey data indicated that at a gauge station 4.3 miles downstream from the site in question, the water elevation had exceeded ten feet for an average of 141 days per year.<sup>384</sup> The Corps offered this data as proof of an OHWL of ten feet MSL at the disputed area. The court found that data was not determinative, primarily because the relevant location was 4.3 miles upstream, where water levels were lower. Moreover, the plaintiff introduced computations which covered a forty-three-year period and yielded lower figures.<sup>385</sup>

No court has decided a case under Florida law relying solely on water survey data to determine OHWL. On at least two occasions, the Florida Supreme Court specifically has required evidence of a distinct line determined by reference to physical indicators. In *Tilden*, the court referred to a line "determined by examining the bed and banks, and ascertaining where the presence and action of the water . . . mark upon the soil of the bed a character distinct from that of the banks, . . . ."<sup>386</sup> The *Busch* court defined OHWL by reference to "[m]arks upon the ground or upon local objects that are more or less permanent . . . ."<sup>387</sup> In another case, *State v. Florida National Properties*,<sup>388</sup> the Florida Supreme Court invalidated a statute that required the use of one or more specified methods to fix the boundary line

---

378. *Id.* at 990.

379. *Id.*

380. *Id.*

381. *Id.*

382. 573 F. Supp. 283 (E.D. La. 1983).

383. *Id.* at 287.

384. *Id.* at 298.

385. *Id.* at 298-99.

386. *Tilden*, 94 Fla. at 512-13, 113 So. at 712 (emphasis added in *Tilden*) (quoting *Carpenter*, 56 Minn. at 521-22, 58 N.W. at 297).

387. *Busch*, 93 Fla. at 564, 112 So. at 283.

388. 338 So. 2d 13 (Fla. 1976).

separating state sovereignty lands from private riparian land.<sup>389</sup> Two of the methods required water levels averaging.<sup>390</sup> However, the court invalidated the statute, not because it legitimized the use of averaging methods, but because establishing a fixed line would deprive the riparian owner of rights to lands gained by future accretion or reliction. This result would violate the due process clause of the fourteenth amendment.<sup>391</sup> Because all of the methods permitted by the statute would be used to determine a fixed line, the court held the statute as a whole was unconstitutional.<sup>392</sup>

In summary, the concept of ordinary high water line as developed by the courts emphasizes the use of physical evidence of the presence and action of water. The purpose of the test is to determine at what point the effect of water on the landscape is so dominant that a particular area is effectively part of the navigable waters. Hydrologic data may show how frequently and for what duration an area is inundated, but this information does not show the effects of the presence and action of water. Thus, hydrologic studies are primarily useful in corroborating physical evidence of the effect of water on soils, vegetation, geomorphology, or local objects. Hydrologic data may show, for example, that a particular mark resulted from a high stage of water rather than from floods of short duration or rare frequency. Hydrologic data also may show that a particular mark resulted from low water conditions and is not good evidence of ordinary high water. Finally, hydrologic evidence may be useful in determining whether an area of submerged lands is part of a connected navigable water body or is independent. Hydrologic data alone can be used to establish an ordinary high water line only if physical evidence is unclear or inconsistent.

#### F. *Corroborative Data*

Several other types of data have played supportive roles and occasionally have been decisive factors in a court's analysis of the OHWL. Courts often use aerial photography and photogrammetry<sup>393</sup> to establish the overall condition of an area or to determine the historic OHWL. In *United States v. Walton*,<sup>394</sup> the district court found, after superim-

---

389. *Id.* at 18. The court found section 253.151 of the Florida Statutes to be unconstitutional. *Id.* The legislature repealed the statute eight years later. See 1983 Fla. Laws, ch. 83-214, § 4.

390. FLA. STAT. § 253.151(3)(a)-(b) (1975).

391. *Florida Nat'l Properties*, 338 So. 2d at 17-18.

392. *Id.*

393. See D. MEANS, *supra* note 155, at 26.

394. 266 F. Supp. 257 (D. Wyo. 1967).

posing meander lines over aerial photographs of a river, that the meander did not define adequately the sinuosities of the river's main channel.<sup>395</sup> The appellate court acknowledged that some of the aerial photographs indicated ordinary high water escarpments in the disputed area.<sup>396</sup> The court in *United States v. Wilson*<sup>397</sup> accepted a fifty-two-year-old aerial photo mosaic as evidence of historic river channels that had developed as the river progressed.<sup>398</sup> In *Snake River Ranch v. United States*,<sup>399</sup> aerial photos taken over approximately forty years demonstrated significant shifts and braids in the main channel of the river.<sup>400</sup>

In *United States v. Cameron*,<sup>401</sup> the court accepted both aerial and ground photographs as evidence of the extent to which a lake had intruded upon the land in question.<sup>402</sup> Aerial photos taken at different times of the year from 1948-1973 revealed a history of fluctuations in water level.<sup>403</sup> The parties presented ground photos to document eyewitness testimony regarding conditions in the area.<sup>404</sup> In *Anderson-Tully Co. v. Walls*,<sup>405</sup> the court accepted ground-level photos as evidence of the biological succession of plant species in typical forests, and aerial photos as evidence of accretive build-up on the river.<sup>406</sup> The opinion in *South Dakota Wildlife Federation v. Water Management Board*<sup>407</sup> included ground photos that indicated the presence of two older cottonwood trees growing below a clearly defined erosion line.<sup>408</sup>

In *Mather v. State*,<sup>409</sup> the court accepted aerial photos as evidence of an island's existence.<sup>410</sup> In *Anderson-Tully Co. v. Franklin*,<sup>411</sup> the

---

395. *Id.* at 261.

396. 415 F.2d 121, 124 (10th Cir. 1969).

397. 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd*, 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

398. *Id.* at 83.

399. 395 F. Supp. 886 (D. Wyo. 1975), *aff'd*, 542 F.2d 555 (10th Cir. 1976).

400. *Id.* at 895.

401. 466 F. Supp. 1099 (M.D. Fla. 1978).

402. *Id.* at 1103-06, 1112.

403. *Id.* at 1105.

404. *Id.* at 1103-04.

405. 266 F. Supp. 804, 809 (N.D. Miss. 1967).

406. *Id.*

407. 382 N.W.2d 26 (S.D. 1986).

408. *Id.* at 36-37.

409. 200 N.W.2d 498 (Iowa 1972).

410. *Id.* at 502.

411. 307 F. Supp. 539 (N.D. Miss. 1969).

parties used aerial photos and mosaics to show the natural meandering of the Mississippi River.<sup>412</sup> Aerial photos illustrated movement of a river channel in *Dartmouth v. Rose*,<sup>413</sup> while in *Nielsen v. Strattucker*,<sup>414</sup> they indicated the accretive formation of sandbars on the Missouri River.<sup>415</sup>

The decision in *State v. Bishop*<sup>416</sup> illustrates one of the potential problems in the use of photographic evidence. The state attempted to prove the existence of mean high water in a tidal area by introducing black and white reproductions of two-color aerial photos with superimposed lines that purported to indicate the separate growth lines of two species of tidal vegetation.<sup>417</sup> The court criticized the photos' lack of tonal variation, from which an independent vegetation assessment could be made, and assigned very little probative value to the evidence.<sup>418</sup>

Topographic maps, plats, and surveys also may aid in the location of present as well as historic OHWL. Topographic maps were used in conjunction with water survey data to indicate OHWL in *Cameron*.<sup>419</sup> The court rejected this OHWL due to deficiencies in the water survey data. In *United States v. Wilson*, the court accepted topographic cross-sections showing the slope and gradient of the site in question, which were used to prove that a river had slowly migrated through the area.<sup>420</sup> The court in *Wilson* also accepted original survey maps to indicate the movement of the river and the existence of several parcels of land.<sup>421</sup> A potential problem with all older maps was raised when one party alleged that the maps corresponding to the 1912 survey had been "doctored" or had been done by someone other than the indicated surveyor.<sup>422</sup> However, the court accepted the documents as authentic based on its own examination of the evidence.<sup>423</sup>

412. *Id.* at 543.

413. 257 Iowa 533, 538, 133 N.W.2d 687, 690 (1965).

414. 325 N.W.2d 391 (Iowa 1982).

415. *Id.* at 394.

416. 75 Misc. 2d 787, 348 N.Y.S.2d 990 (N.Y. Sup. Ct. 1973), *rev'd*, 46 A.D.2d 654, 359 N.Y.S.2d 817 (N.Y. App. Div. 1974).

417. *Id.* at 792-93, 348 N.Y.S.2d at 996.

418. *Id.* at 793, 348 N.Y.S.2d at 996.

419. *Cameron*, 466 F. Supp. at 1107-08.

420. *Wilson*, 433 F. Supp. at 84.

421. *Id.* at 74-81.

422. *Id.* at 81.

423. *Id.*

In *Omaha Indian Tribe, Treaty of 1854 with the United States v. Wilson*,<sup>424</sup> the issue was whether the shifting of the Missouri River had altered plaintiff's boundary.<sup>425</sup> To determine the rate and degree of movement of the river, the court closely examined several older maps as well as an 1867 survey.<sup>426</sup> To determine the main channel of the Mississippi River between 1861 and 1874, the court in *Arkansas Land & Cattle Co. v. Anderson-Tully Co.*<sup>427</sup> analyzed three river pilots' maps, from 1841, 1862, and 1872, as well as a reconnaissance map made in 1874.<sup>428</sup> Courts also have accepted topographic and survey maps as evidence in several other cases.<sup>429</sup>

In several cases courts have accepted eyewitness testimony and field notes as evidence of historic conditions on a river or lake. In *Tilden v. Smith*,<sup>430</sup> the Florida Supreme Court reviewed testimony from several eyewitnesses concerning historic water levels on Lake Johns.<sup>431</sup> In determining whether a permanent island was in existence in 1877, the Nebraska Supreme Court in *Summerville v. Scotts Bluff County*<sup>432</sup> placed more emphasis on eyewitness testimony than on a surveyor's 1935 field notes about the existence of sandbars on the North Platte River.<sup>433</sup> One issue in *United States v. Wilson*,<sup>434</sup> decided in 1977, involved the character of a river between 1912 and 1923.<sup>435</sup> Disinterested eyewitnesses who had crossed the area on horseback in 1916 and 1919 provided the only clear picture regarding conditions at those times.<sup>436</sup>

---

424. 575 F.2d 620 (8th Cir. 1978).

425. *Id.* at 623.

426. *Id.* at 640-41.

427. 248 Ark. 495, 452 S.W.2d 632 (1970).

428. *Id.* at 501-02, 452 S.W.2d at 636.

429. See *Trustee of the Internal Improvement Fund v. Nowak*, 401 F.2d 708 (5th Cir. 1968); *Snake River Ranch v. United States*, 395 F. Supp. 886 (D. Wyo. 1975), *aff'd*, 542 F.2d 555 (10th Cir. 1976); *Anderson-Tully Co. v. Franklin*, 307 F. Supp. 539 (N.D. Miss. 1969); *Nielsen v. Stratbucker*, 325 N.W.2d 391 (Iowa 1982); *State v. Matzen*, 197 Neb. 592, 250 N.W.2d 232 (1977); *Mather v. State*, 200 N.W.2d 498 (Iowa 1972).

430. 94 Fla. 502, 113 So. 708 (1927).

431. *Id.* at 507-08, 113 So. at 710.

432. 182 Neb. 311, 154 N.W.2d 517 (1967).

433. *Id.* at 319, 154 N.W. 2d at 522.

434. 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd*, 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

435. *Id.* at 83-84.

436. *Id.*

In *Anderson-Tully Co. v. Franklin*,<sup>437</sup> a pilot who had worked on the Mississippi River from 1924 to 1965 provided similar eyewitness evidence concerning the flow of the river.<sup>438</sup> In *Cameron*, the court accepted testimony from one eyewitness who had fished the lake in question at least once a week between 1960 and 1971.<sup>439</sup> His testimony, added to that of a Corps of Engineers permit officer who also had seen the property on several occasions since 1960, indicated relatively high water levels. The court ultimately rejected this testimony as an indicator of the lake's OHWL.<sup>440</sup> Courts also have considered other corroborative indicators such as evidence of trails that were created by early settlers of the area at a level indicative of historic OHWL on a lake system,<sup>441</sup> and historic letters from the Omaha Indian Reservation Agency Superintendent describing certain land allotments along the Missouri River as having been "washed away."<sup>442</sup>

### G. *Relevance of the Meander Line*

In cases where a meander line has been run along or around a navigable water body, questions may arise regarding its significance in designating the boundary between riparian and sovereign lands. Generally, if the line has not been expressly designated as one of the calls of the boundary line, it is used only to delineate more clearly the amount of land being disposed of in a transaction. The owner of the tract holds title down to the ordinary high water line.<sup>443</sup> Florida's Second District Court of Appeal articulated the two primary exceptions to this rule in *Lopez v. Smith*: "[A] meander line may constitute a boundary where so intended or where the discrepancies between the meander line and the ordinary high water line leave an excess of unsurveyed land so great as to clearly and palpably indicate fraud or mistake."<sup>444</sup>

*Martin v. Busch*<sup>445</sup> illustrates the rare situation in which a meander line was intended to specifically designate the boundary between up-

437. 307 F. Supp. 539 (N.D. Miss. 1969).

438. *Id.* at 543.

439. *Cameron*, 466 F. Supp. at 1103.

440. *Id.* at 1112-13.

441. *South Dakota Wildlife*, 382 N.W.2d at 34.

442. *Wilson*, 433 F. Supp. at 81-82.

443. See *Hardin v. Jordan*, 140 U.S. 371, 383-84 (1891); *Lord v. Curry*, 71 Fla. 68, 78, 71 So. 21, 24 (1916) (reaffirming *Producers' Oil Co. v. Hanzen*, 238 U.S. 325, 339 (1915)).

444. 145 So. 2d 509, 515 (Fla. 2d D.C.A. 1962) (citations omitted).

445. 93 Fla. 535, 112 So. 274 (1927).

lands and a lake bottom.<sup>446</sup> In 1905, the State of Florida commissioned an official survey of the lands around Lake Okeechobee. The resulting meander line was to "run substantially along the high-water mark of said lake."<sup>447</sup> The Supreme Court of Florida used this language, as well as evidence concerning the location of OHWL, in holding that the meander line and the OHWL were concurrent and that the lands below the line were sovereign and unalienable.<sup>448</sup> This exception, however, will be applicable only in rare cases.

The court in *Snake River Ranch v. United States*<sup>449</sup> explained that the second exception

is to be applied with great caution and only when the error in the survey is substantial, wholly unexplainable and evidences fraud. The mere failure of the surveyor to delineate the precise boundary of a water monument or to show all of the sinuosities of a channel is not gross error or fraud.<sup>450</sup>

In *Snake River*, the court found that a 900-foot discrepancy between the meander line and the bank of the river was not sufficient to constitute gross error or fraud.<sup>451</sup> In *United States v. Walton*,<sup>452</sup> the court considered a discrepancy of 2500 feet between the river and the meander as evidence of gross error.<sup>453</sup> The *Walton* court held that the edge of the river did not exist near the indicated meander line at the time of the survey. The court further concluded that the owners of land abutting the meander line had no riparian right to the land omitted from the survey.<sup>454</sup> In these cases, although the ordinary high water mark will be properly located just upland of the water body, the boundary between uplands and sovereign lands may be the meander line.

The meander line also may be considered as an alternative to the OHWL when no information is available on the location of the OHWL. In *Trustees of the Internal Improvement Fund v. Wetstone*,<sup>455</sup> the court deemed the state duty-bound to establish the boundary between

---

446. *Id.* at 565, 112 So. at 284.

447. *Id.* at 559, 112 So. at 282.

448. *Id.* at 562-63, 112 So. at 283.

449. 395 F. Supp. 886 (D. Wyo. 1975), *aff'd*, 542 F.2d 555 (10th Cir. 1976).

450. *Id.* at 900.

451. *Id.* at 901.

452. 266 F. Supp. 257 (D. Wyo. 1967).

453. *Id.* at 265.

454. *Id.*

455. 222 So. 2d 10 (Fla. 1969).



sovereign and private lands on an island.<sup>456</sup> The area was extremely flat and covered with dense mangrove. Surveyors could not accurately locate the mean high water line, and potential horizontal errors ranged from several hundred feet to a quarter mile.<sup>457</sup> When the state offered no evidence at trial, the court relied on the only other boundary line available — the meander line.<sup>458</sup>

The land surrounding Utah's Great Salt Lake is extremely flat also, with no measurable vegetative or soil indicators. In *Utah v. United States*,<sup>459</sup> the parties stipulated that the OHWL was the legal measure of sovereign lands.<sup>460</sup> Under the circumstances, however, the United States Supreme Court accepted a Special Master's recommendation that the meander line be designated the boundary.<sup>461</sup>

The dissent in *Wetstone* pointed out the major flaws in the majority's reliance on the meander line as a boundary.<sup>462</sup> First, the meander line may have almost no true relationship to the banks or shore of the water body.<sup>463</sup> This fact may result from mistakes in the survey, or changes in the water body since the survey, some of which may have been caused by artificial factors.<sup>464</sup> If the meander line lies below present OHWL, it represents a potential loss of state lands.<sup>465</sup> If it lies upland, the owner's riparian rights may be lost.

In *State v. Florida National Properties, Inc.*,<sup>466</sup> the Supreme Court of Florida held that attempts to freeze the boundary between private land and sovereign land under navigable waters can effect an unconstitutional taking of private property without just compensation.<sup>467</sup> Because meander lines are permanent and do not reflect changes in water level or land forms, they freeze riparian boundaries. Therefore, recognition of a meander line as OHWL may cause the unconstitutional denial of a riparian owner's rights to relicted or accreted lands. Under the public trust doctrine and Florida Constitution,<sup>468</sup> sovereign lands

456. *Id.* at 13.

457. *Id.* at 11.

458. *See id.* at 14.

459. 420 U.S. 304 (1975), *aff'd*, 425 U.S. 948 (1976).

460. *See id.* at 305.

461. *Id.* at 304.

462. *Wetstone*, 222 So. 2d at 14-19 (Ervin, J., dissenting).

463. *Id.* at 17.

464. *Id.* at 18.

465. *Id.*

466. 338 So. 2d 13 (Fla. 1976).

467. *Id.* at 18.

468. FLA. CONST. art. X, § 11 (1970).

may not be alienated unless this alienation is in the public interest. Therefore, a court may not recognize a meander line lying below OHWL when loss of sovereign land is not in the public interest.

### III. EFFECT OF CHANGES IN THE SHORELINE

The ordinary high water line is ambulatory;<sup>469</sup> the boundary between sovereign lands and uplands shifts in response to long-term changes in water levels. The lands bordering inland navigable rivers are known as riparian, while those bordering lakes are properly termed littoral. "Riparian," however, is often used in reference to either.<sup>470</sup> Owners of these lands have various riparian rights, including the right of access, the right to an unobstructed view, and the right to natural additions to the land formed by accretion or reliction.<sup>471</sup>

The shorelines and banks of navigable inland waters may remain fairly constant over time, or they may shift in response to changing meteorological conditions, actions of private owners, actions of governmental agencies, high-impact meteorological events, and other less noticeable causes. Depending in part on the characterization of the shift, the OHWL may or may not shift also. To determine placement of the line, surveyors must be aware of the types of shoreline shifts and understand the legal analysis accompanying each type.<sup>472</sup>

Accretion is the gradual addition of soil to the shore of a riparian owner's land.<sup>473</sup> Accretion can be caused by the normal functioning of a lake or river, or may result from floods, hurricanes, and other processes that leave alluvion along the shores or banks of a water body. Human projects also may cause accretion. These include jetties, bulkheads, wharfs, docks, and any other structures that tend to slow the flow of water, causing it to deposit its sediment. The reverse of accretion is erosion, the gradual and imperceptible wearing away of land on the border of a water body. Natural or artificial factors also can cause erosion.<sup>474</sup>

Reliction occurs when gradually falling water levels reveal land formerly submerged under the waters of a river or lake.<sup>475</sup> An example of natural reliction is the lowering of water levels on a lake as a result

---

469. See *Florida Nat'l Properties*, 338 So. 2d at 19.

470. J. GRIMES, CLARK ON THE LAW OF SURVEYING AND BOUNDARIES 738 (1976).

471. *Id.* at 749, 783, 787.

472. *Id.* at 845.

473. *Id.* at 772.

474. *Id.* at 791.

475. *Id.* at 787.

of long-term reductions in rainfall. If drainage activities lower the water level of a lake, the reliction is considered artificial. Submergence is the reverse of reliction and happens when formerly dry land bordering a water body is covered gradually with water. The terms "submergence" and "erosion" sometimes are used interchangeably.

Avulsion is either a sudden and perceptible change in the channel of a stream, or the removal or relocation of a large quantity of soil from the land of one owner to the land of another.<sup>476</sup> Events in the natural world do not always fit neatly into one of these categories. Determining whether the dynamics and pace of an occurrence are avulsive or more like one of the other processes often is confusing.

Florida law in these situations is based on both tidal and nontidal cases.<sup>477</sup> Consequently, although the general law is fairly well settled, the application of these doctrines is subject to varying interpretations. Florida follows the common law with respect to natural accretions. Title to accreted land vests in the owners of abutting uplands, and the boundary shifts accordingly.<sup>478</sup> However, the accretion must form its first attachment on the riparian owner's land.<sup>479</sup> If it begins building from the bed of the water body, the accretion is sovereign land, even if it subsequently attaches itself to the upland owner's land.<sup>480</sup>

One Florida court has distinguished tidal from nontidal accretion, holding that in tidal waters the owner to whose land the accretion originally attaches may claim lateral extensions without restriction.<sup>481</sup> In nontidal cases, the riparian owner may claim title to accretion that forms directly in front of his land, but not to lateral accretions in front of an adjoining landowner's property.<sup>482</sup> Equitable principles govern the determination of who owns these accretions.<sup>483</sup>

However, artificial accretions caused by the riparian owner to whose lands they attach do not vest in that owner. Rather, these accretions become sovereign land and do not affect the OHWL.<sup>484</sup>

476. *Oregon ex rel. State Land Bd. v. Corvallis Sand & Gravel Co.*, 429 U.S. 363, 367 (1977).

477. *Broward v. Mabry*, 58 Fla. 398, 408-09, 50 So. 826, 830 (1909); *Municipal Liquidators, Inc. v. Tench*, 153 So. 2d 728, 730 (Fla. 2d D.C.A. 1963); *Mexico Beach Corp. v. St. Joe Paper Co.*, 97 So. 2d 708, 710 (1st D.C.A. 1957), *cert. denied*, 101 So. 2d 817 (Fla. 1958).

478. *Trustees of the Internal Improvement Fund v. Sutton*, 206 So. 2d 272, 274 (Fla. 3d D.C.A. 1968).

479. *Siesta Properties v. Hart*, 122 So. 2d 218, 221 (Fla. 2d D.C.A. 1960).

480. *Id.*

481. *Ford v. Turner*, 142 So. 2d 335, 341 (Fla. 2d D.C.A. 1962).

482. *See Lake Conway Shores Homeowners' Ass'n v. Driscoll*, 476 So. 2d 1306, 1308 (Fla. 5th D.C.A. 1985); *Gillilan v. Knighton*, 420 So. 2d 924 (Fla. 2d D.C.A. 1982).

483. *Ford*, 142 So. 2d at 341.

484. F. MALONEY, S. PLAGER & F. BALDWIN, *supra* note 30, at 389.

Normally, title to artificial accretions caused by third persons vests in the riparian owner.<sup>485</sup>

When the state causes artificial accretion, title may also belong to the upland owner. In *Board of Trustees v. Medeira Beach Nominee, Inc.*,<sup>486</sup> the court held that under *St. Clair County v. Lovington*,<sup>487</sup> a private littoral owner holds title to land unintentionally formed by accretion resulting from a city's acts.<sup>488</sup> Rejecting the analogy to *Martin v. Busch*,<sup>489</sup> in which sovereign lands intentionally uncovered by governmental activity nevertheless remained sovereign, the *Medeira Beach* court stated that even if a governmental body intentionally caused the accretion, the court would not vest title in the state.<sup>490</sup> The court also held that Florida Statutes section 161.051, which provided that the artificial accretions would "remain the property of the state if not previously conveyed,"<sup>491</sup> could not be applied retroactively.

In *Sand Key Associates Ltd. v. Board of Trustees*,<sup>492</sup> the court held that section 161.051 did not affect the littoral landowner's right to accretions to its property caused by a state jetty project in which the landowner did not participate.<sup>493</sup> The court explained that it was unclear whether the statute applied to all upland owners' accreted property or only to the upland owner who participated in improving the property. To the extent the statute applied to upland owners who neither participated in nor contributed to the improvement, the court deemed the statute in derogation of the common law and therefore subject to strict construction.<sup>494</sup> The court subsequently held that Florida Statutes section 161.051 applied only to the upland owner of the improved property.<sup>495</sup> To clarify the application of the statute, the court certified a question to the Florida Supreme Court concerning the ambiguous portion of the statute.

On review, the Florida Supreme Court held that section 161.051, which gives the state title to accretions caused by state projects,

---

485. See *St. Clair County v. Lovington*, 90 U.S. (23 Wall.) 46 (1874).

486. 272 So. 2d 209 (Fla. 2d D.C.A. 1973).

487. *Lovington*, 90 U.S. at 46.

488. *Medeira Beach*, 272 So. 2d at 212.

489. 93 Fla. 535, 112 So. 274 (1927).

490. *Medeira Beach*, 272 So. 2d at 212.

491. FLA. STAT. § 161.051 (1965).

492. 458 So. 2d 369 (Fla. 2d D.C.A. 1984).

493. *Id.* at 371.

494. *Id.*

495. *Id.*

applied only to upland owners who participated in the state project.<sup>496</sup> Therefore, a nonparticipating upland waterfront owner could claim title to the accretions.<sup>497</sup> As a result of this decision, riparian owners may claim ownership of valuable accreted land caused by taxpayer-financed state projects.

In reaching this conclusion, the court refused to accept the Board of Trustees' arguments supporting state ownership.<sup>498</sup> The Board's first argument was that all artificially caused accretions are sovereignty lands owned by the state, whereas natural accretions may accrue to the upland landowner.<sup>499</sup> The court rejected the distinction between artificial and natural accretions, holding that in both cases the littoral owner would take title so long as he did not participate in any projects that caused artificial accretions to his land.<sup>500</sup>

In a strong dissent, Justice Ehrlich pointed out that in *Busch*,<sup>501</sup> the court specifically addressed the situation with regard to governmental projects: "The doctrine of reliction is applicable where from *natural causes* water recedes by imperceptible degrees, and *does not apply where land is reclaimed by governmental agencies as by drainage operations*."<sup>502</sup> In his dissent, Justice Ehrlich cited several Florida cases supporting and following *Busch*.<sup>503</sup> He argued that if the state could cause water to recede for a public purpose and still retain title in the exposed bed, "then when the state to serve a public purpose causes sovereign lands to become accreted by construction of a jetty, title to these lands, too, should remain in the state."<sup>504</sup>

The Trustees also asserted that, regardless of how the common law might have been interpreted, Florida Statutes section 161.051 established an exception in favor of the state in artificial accretion

496. Board of Trustees of the Internal Improvement Trust Fund v. Sand Key Assocs., Ltd., 512 So. 2d 934 (Fla. 1987).

497. *Id.* at 941.

498. *Id.* at 935.

499. *Id.*

500. *Id.* at 938.

501. *Busch*, 93 Fla. at 535, 112 So. at 274.

502. *Sand Key*, 512 So. 2d at 944 (Ehrlich, J., dissenting) (emphasis added in *Sand Key*) (citing *Busch*, 93 Fla. at 574, 112 So. at 287).

503. See *id.* at 946; State v. Florida Nat'l Properties, Inc., 338 So. 2d 13 (Fla. 1976); State v. Contemporary Land Sales, Inc., 400 So. 2d 488 (Fla. 5th D.C.A. 1981); Board of Trustees v. Medeira Beach Nominee, Inc., 272 So. 2d 209 (Fla. 2d D.C.A. 1973); Padgett v. Central & S. Fla. Flood Control Dist., 178 So. 2d 900 (Fla. 2d D.C.A. 1965); Conoley v. Naetzker, 137 So. 2d 6 (Fla. 2d D.C.A. 1962).

504. *Sand Key*, 512 So. 2d at 946 (Ehrlich, J., dissenting).

cases.<sup>505</sup> Essentially, the Trustees claimed that this section placed the ownership of and responsibility for the maintenance of coastal works and improvements in the entity that constructed the project. The pertinent language of section 161.051 reads: "No grant under this section shall affect title of the state to any lands below the mean high water mark, and *any additions or accretions to the upland* caused by erection of such works or improvements shall remain the property of the state. . . ."<sup>506</sup> The court interpreted this sentence as only applying to property owners who caused or participated in the project.<sup>507</sup>

In his dissent, Justice Ehrlich agreed with the majority that a portion of section 161.051 codifies existing common law principles.<sup>508</sup> However, he asserted that the applicable common law rule, thus codified, provided that when the state exposed sovereign land for a public purpose, the state retained ownership of that land.<sup>509</sup> The dissent also argued that the majority opinion disregarded the plain meaning of section 161.051 by applying the statute only to the participating landowner's land rather than to all accretions.<sup>510</sup>

Finally, the majority rejected the Trustees' assertion that *Busch* controlled the disposition of the case.<sup>511</sup> The court found that the *Busch* holding dealt with a boundary dispute, not the ownership of lands exposed by state projects.<sup>512</sup> The dissent disagreed, emphasizing that the relevant portion of the *Busch* holding required that title remain in the state where the state's own action caused the accretion.<sup>513</sup> Justice Ehrlich argued that: "Any other holding would lead to the absurd result that a state sponsored and approved project, undertaken to create a public benefit, would divest the state of its sovereignty lands and grant a private landowner a windfall at the expense of the public."<sup>514</sup>

The cases construing section 161.051 address accretions resulting from coastal construction, and these holdings may not apply to artificial reliction of navigable inland waters. In the case of coastal property, the riparian owner is subject to loss by erosion.<sup>515</sup> The common law

---

505. *Id.* at 935.

506. FLA. STAT. § 161.051 (1965).

507. *Sand Key*, 512 So. 2d at 939.

508. *Id.* at 942 (citing *Busch*, 93 Fla. 535, 112 So. at 274).

509. *See Busch*, 93 Fla. at 563-64, 112 So. at 283.

510. *Sand Key*, 512 So. 2d at 947 (Ehrlich, J., dissenting).

511. *Id.* at 939.

512. *Id.* at 940-41.

513. *Id.* at 946 (Ehrlich, J., dissenting).

514. *Id.*

515. *See Kruse v. Grokap, Inc.*, 349 So. 2d 788, 789 (Fla. 2d D.C.A. 1977).

balanced this vulnerability by granting the owner rights to accretions. These equitable considerations do not exist in the case of artificial relictions. If the state artificially raises water levels above natural levels, it may be liable for the taking of a flowage easement. If water levels are artificially lowered, it would be inequitable for the riparian owner to acquire sovereign land. In both cases, the public would lose.

While natural reliction vests title to the uncovered lands in the upland owner and shifts the OHWL accordingly,<sup>516</sup> a different rule applies to artificial reliction. In *Busch*,<sup>517</sup> the Florida Supreme Court held that the state could retain title to sovereign lands formerly under Lake Okeechobee but exposed by drainage operations of the state.<sup>518</sup> In *Padgett v. Central & Southern Florida Flood Control District*,<sup>519</sup> the court reaffirmed this ruling when it held that a flood control district had not interfered with the plaintiff's riparian rights of access by constructing a levee on land formerly underneath Lake Okeechobee but uncovered by state drainage operations.<sup>520</sup> Finally, in *State v. Contemporary Land Sales*,<sup>521</sup> the court held that even when the state uncovers sovereign lands in the process of regulating water levels rather than for reclamation purposes, the state retains title.<sup>522</sup> Of course, a landowner cannot claim title to sovereign lands uncovered by artificial reliction caused by the landowner since to do so would permit expansion of private property lines at will.

Large groundwater withdrawals over a period of many years may affect the water levels of lakes. This process could create problems. If these withdrawals are characterized as artificial reliction by private interests, the lowered water level should not lower the OHWL. To the extent that governmental agencies analyze and permit the withdrawals, however, these agencies may have acquiesced to a lower OHWL. If decreases are characterized as artificial relictions by governmental agencies, the *Padgett*<sup>523</sup> and *Contemporary Land Sales*<sup>524</sup> holdings may vest title to the exposed land in the state. Both cases,

516. *Busch*, 93 Fla. 535, 112 So. at 274; *Padgett v. Central & S. Fla. Flood Control Dist.*, 178 So. 2d 900 (Fla. 2d D.C.A. 1965); *Mexico Beach Corp. v. St. Joe Paper Co.*, 97 So. 2d 708 (Fla. 1st D.C.A. 1957).

517. *Busch*, 93 Fla. at 574, 112 So. at 287.

518. *Id.* at 574, 112 So. at 287.

519. 178 So. 2d 900 (Fla. 1965).

520. *Id.* at 905.

521. 400 So. 2d 488 (Fla. 5th D.C.A. 1981).

522. *Id.* at 494.

523. *Padgett*, 178 So. 2d at 904.

524. *Contemporary Land Sales*, 400 So. 2d at 492.

however, dealt with purposeful efforts by the state; an unintended and indirect lowering of water levels might not fall within the doctrine. In 1982, a Florida federal district court examined this issue in *Mobil Oil Corp. v. Coastal Petroleum Co.*<sup>525</sup> In a pretrial order the court ruled that a party may prove artificial reliction has occurred without proving deliberate acts were performed with the intent to alter OHWL.<sup>526</sup> Thus, an unintended lowering of water levels would be treated as artificial, and the OHWL would remain unaffected. A court may have difficulty, however, determining whether, and to what extent, lower water levels are the result of artificial reliction.

Riparian and littoral owners may claim title to natural increases in the land abutting navigable waters, but they also must bear the loss from erosion or slowly rising water levels.<sup>527</sup> Eroded or submerged areas become sovereign land, and a corresponding shift in OHWL results.<sup>528</sup> On the other hand, avulsion — “rapid, easily perceived, and sometimes violent, shifts of land incident to floods, storms or channel breakthroughs”<sup>529</sup> — does not change legal boundary lines.<sup>530</sup>

Determining whether a particular change is gradual enough to be accretion, reliction, or erosion, or sudden enough to be avulsion is a problem. An avulsive event will not change existing boundaries. Avulsion requires the process to “be perceptible when it takes place. 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.”<sup>531</sup> Generally, the chancellor or finder of fact decides.<sup>532</sup>

In *Kissinger v. Adams*,<sup>533</sup> the court examined the question of whether land had been rapidly altered or slowly eroded.<sup>534</sup> Historically, Kissinger’s lots had lain between Adams’s lots and the Gulf of Mexico. At the time of trial, some land existed on sections of the area formerly occupied by Kissinger’s lots, and the issue concerned which of two

525. TCA 79-10872 (N.D. Fla. Jan. 27, 1982) (pretrial order establishing definitions for trial).

526. *Id.* at 7.

527. *Municipal Liquidators, Inc. v. Tench*, 153 So. 2d 728, 730-31 (Fla. 2d D.C.A. 1963).

528. *Id.*

529. *Bauman v. Choctaw-Chickasaw Nations*, 333 F.2d 785, 789 (10th Cir. 1964), *cert. denied*, 379 U.S. 965 (1965).

530. *See Bryant v. Peppe*, 238 So. 2d 836 (Fla. 1970).

531. *Philadelphia Co. v. Stimson*, 223 U.S. 605, 624 (1912) (quoting *Lovington*, 90 U.S. (23 Wall.) at 68).

532. *See generally Ford v. Turner*, 142 So. 2d 335 (Fla. 2d D.C.A. 1962).

533. 466 So. 2d 1250 (Fla. 2d D.C.A. 1985).

534. *Id.* at 1251-52.



events had occurred: (1) Kissinger's lots had slowly eroded away entirely, or (2) two hurricanes had quickly and radically altered the land in question.<sup>535</sup> In the first instance, Kissinger's former lands would be sovereignty submerged lands, and Adams's lots would be littoral.<sup>536</sup> Thus, the land in question would constitute an addition to Adams's land.<sup>537</sup> In the second case, the losses would be characterized as avulsive, and the land in question would be deemed either part of Kissinger's original lots or alluvion that built up within the unchanged lot lines, with Kissinger retaining title.<sup>538</sup>

Florida law presumes erosion over avulsion.<sup>539</sup> The party alleging avulsion must bear the burden of proof.<sup>540</sup> In an effort to meet this burden, Kissinger introduced evidence and testimony that hurricanes occurring in 1950 and 1953 substantially altered the area, but he failed to present specific evidence of the resulting changes to the property in question.<sup>541</sup> Adams offered testimony from a nearby resident that the disputed area was "always under water"<sup>542</sup> between 1946 and the mid-1950s. The court accepted a 1953 survey, though "not up to par"<sup>543</sup> by today's standards, which took into account the nineteen-year tidal cycle and placed the mean high water line above Kissinger's lot line.<sup>544</sup>

Although Adams's witness testified about a less-than-ten-year period, the trial judge held that this testimony and the survey were sufficient to establish Florida's presumption of erosion.<sup>545</sup> While Kissinger produced some evidence to overcome the presumption, he presented no evidence of avulsion prior to 1949.<sup>546</sup> The court deemed the evidence of hurricanes occurring after 1949 insufficient to overcome the presumption of erosion created by Adams's evidence. Therefore,

535. *Id.*

536. *Id.* at 1251; see *Schulz v. Dania*, 156 So. 2d 520, 521 (Fla. 2d D.C.A. 1963).

537. *Kissinger*, 466 So. 2d at 1252; *Schulz*, 156 So. 2d at 522; *Ford*, 142 So. 2d at 341 (upholding the rule that a slow and gradual buildup is accretion and belongs to the land to which it attaches).

538. *Kissinger*, 466 So. 2d at 1251-52.

539. *Id.* at 1251; see *Municipal Liquidators Inc. v. Tench*, 153 So. 2d 728, 731 (2d D.C.A.) (erosion or accretion is presumed over avulsion and where there is erosion title belongs to the land to which it attaches), *cert. denied*, 157 So. 2d 817 (Fla. 1963).

540. *Tench*, 153 So. 2d at 731.

541. *Kissinger*, 466 So. 2d at 1251-52.

542. *Id.* at 1251.

543. *Id.*

544. *Id.*

545. *Id.*

546. *Id.* at 1252.

title to accretions caused by groins<sup>547</sup> installed during the mid to late 1950s vested in Adams.<sup>548</sup>

Other cases illustrate similar difficulties in establishing avulsion. In *Forman v. Florida Land Holding Corp.*,<sup>549</sup> the plaintiff attempted to prove that his lot had shifted 650 feet across a sound.<sup>550</sup> Although several experts offered testimony supporting a theory of avulsion, the court found that hurricanes and storms had not caused an avulsion, but had slowly eroded away and submerged the lot, thereby creating sovereign land.<sup>551</sup>

Changes caused by avulsion do not affect boundary lines. If avulsion causes land to move to a formerly submerged location, that soil probably becomes the property of the owner of the former bed. In *Siesta Properties v. Hart*,<sup>552</sup> a hurricane tore away a large section of land formerly attached to the plaintiff's island and shifted it to the bed of a navigable tidal pass separating the plaintiff's and the defendant's islands.<sup>553</sup> Both parties claimed the land, but the district court characterized the occurrence as avulsion and refused to allow the plaintiff to expand the boundaries beyond former lot lines.<sup>554</sup> The court also refused to permit the defendant to claim the land as an accretion because accretions must begin attachment on the claimant's land, and in this case the build-up of soil began in the pass.<sup>555</sup> Therefore, the court ruled that the boundary lines did not change, and title to the soil deposited in the tidal pass vested in the state.<sup>556</sup> The plaintiff in *Siesta Properties* referred to several nontidal cases involving avulsions in rivers to support its argument that land may be reclaimed if the owner can trace it to another location as a result of avulsion.<sup>557</sup> The court disagreed, however, and noted that in no case cited had the former owner successfully traced and reclaimed the avulsed land.<sup>558</sup>

---

547. A groin is defined as "a rigid structure built out from a shore to protect the shore from erosion, to trap sand, or to direct a current for scouring a channel." WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 538 (1988).

548. *Kissinger*, 466 So. 2d at 1252.

549. 121 So. 2d 784 (Fla. 1960).

550. *Id.* at 786.

551. *Id.* at 787.

552. 122 So. 2d 218 (Fla. 2d D.C.A. 1960).

553. *Id.* at 220.

554. *Id.* at 222.

555. *Id.* at 221.

556. *Id.* at 224; see also *Bryant v. Peppe*, 238 So. 2d 836 (Fla. 1970) (holding sudden avulsion of disputed parcel of originally sovereignty lands did not give landowners greater title than they had to the water bottom before it emerged as dry land).

557. *Siesta Properties*, 122 So. 2d at 222.

558. *Id.*

In riverine situations, an avulsion often occurs when a sudden shift in the channel of a stream cuts off land but the land remains identifiable as a parcel that existed prior to the shift and that never became part of the river bed.<sup>559</sup> As long as identifiable land remains between the old channel and the new channel, the fact that the shift took place over several years should not defeat a finding that it was avulsive.<sup>560</sup> Although litigants have urged that the rapid caving in of sections of a river bank also is avulsive,<sup>561</sup> courts have rejected this view,<sup>562</sup> except in unusual cases where identifiable land visibly is torn from one bank and carried downstream to another location.<sup>563</sup> The court in *United States v. Wilson*<sup>564</sup> also refused to accept the argument that a sudden shift in the thalweg<sup>565</sup> without any reference to river banks or other land forms, was an avulsion.

In Florida, though occasional floods may cause avulsions, the possibility is remote, given the state's flat topography. Except when affected by extremely heavy rains and winds associated with hurricanes or extraordinary seasonal floods, most of Florida's inland lakes and rivers do not have sufficient waves or currents to cause an avulsion. Thus, the presumption in favor of accretion and erosion over avulsion seems justified. Florida courts presume that, even where the process of change is perceptible, natural accretion and reliction have occurred, and the OHWL has shifted. The OHWL also will shift where natural erosion and submergence have occurred. However, where the

559. *United States v. Wilson*, 433 F. Supp. 67 (N.D. Iowa 1977), *vacated*, 575 F.2d 620 (8th Cir. 1978), *vacated and remanded*, 442 U.S. 653 (1979), *vacated and remanded*, 614 F.2d 1153 (8th Cir. 1980), *judgment entered*, 523 F. Supp. 874 (N.D. Iowa 1981), *rev'd*, 707 F.2d 304 (8th Cir. 1982), *judgment entered*, 578 F. Supp. 1191 (N.D. Iowa 1984), *cert. denied*, 465 U.S. 1025, 1101 (1984).

560. *Davis v. Anderson-Tully Co.*, 252 F.2d 681, 685 (8th Cir. 1918).

561. *St. Louis v. Rutz*, 138 U.S. 226 (1891).

562. *Oklahoma v. Texas*, 260 U.S. 606 (1923); *Nebraska v. Iowa*, 143 U.S. 359 (1892); *Peterson v. Morton*, 465 F. Supp. 986, 998 (D. Nev. 1979).

563. *Omaha Indian Tribe, Treaty of 1854 with the United States v. Wilson*, 575 F.2d 620, 635 n.37 (8th Cir. 1978). *See Nebraska v. Iowa*, 143 U.S. 359, 369 (1891) (characterizing the rapid caving in of the Missouri River banks as erosive, not avulsive, the Court stated, "while the disappearance, by reason of this process, of a mass of bank may be sudden and obvious, there is no transfer of such a solid body of earth to the opposite shore, or anything like an instantaneous and visible creation of a bank on that shore[,]," implying that such an event might be characterized as avulsive); *see also Peterson v. Morton*, 465 F. Supp. 986, 998 n.8 (D. Nev. 1979) (quoting *Nebraska*, 143 U.S. at 369-70).

564. *Wilson*, 433 F. Supp. at 90.

565. A thalweg is "a line following the lowest part of a valley whether under water or not." WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 3367 (1971).

owner has caused artificial accretions and relictions to riparian land, the OHWL will not change. If third persons not under the riparian owner's control cause these changes, title to the artificial accretion probably will vest in the owner. If state action creates shifts, title will not vest in an upland owner who participated in the project, but possibly may vest in remote, nonparticipating riparian owners who experience accretions to their land. When acts by third persons or purposeful water control activities of the state cause artificial relictions, the OHWL does not change.

#### IV. PROCEDURES FOR ESTABLISHING OHWL

##### A. *Investigative Procedures*

The physical evidence of OHWL is a primary concern in establishing the line. Nevertheless, the methodology used to ascertain and evaluate indicators becomes important if the placement of an OHWL is challenged in court. The case law suggests approaches to use in attempting to locate the line.

Whether the focus is on the OHWL as of statehood or at present, an accurate determination of the OHWL should involve an assessment of relatively undisturbed areas along the water body. In *Heckman Ranches v. State*,<sup>566</sup> the court accepted the findings of an expert who started his determination of OHWL in an undisturbed area upstream of the land in question and, analyzing a variety of factors, continued down to and through the disputed area.<sup>567</sup> In *Borough of Ford City v. United States*,<sup>568</sup> the court noted that the character of the bank or shore is an important consideration in determining OHWL. The court stated that if determining the line at the site in question is difficult, other sites along the same water body should be examined.<sup>569</sup> The *Ford City* court cited *Diana Shooting Club v. Husting*,<sup>570</sup> for this same proposition: "If it is difficult to ascertain the line of ordinary high-water at [a] site, recourse may be had to other sites along the same stream to determine the line."<sup>571</sup>

---

566. 99 Idaho 793, 589 P.2d 540 (1979).

567. *Id.* at 797-98, 590 P.2d at 544-46.

568. 345 F.2d 645 (3d Cir.), *cert. denied*, 382 U.S. 902 (1965).

569. *Id.*; see also *Department of Natural Resources v. Pankratz*, 538 P.2d 984, 989 (Alaska 1975) (if the high water mark cannot be found from the multiple factors including shelving, change in the character of the soil, and absence of litter, then the court may use the "vegetation test" or the point where terrestrial vegetation will not grow).

570. 145 N.W. 816, 820 (Wis. 1914).

571. *Ford City*, 345 F.2d at 648 (citing *Diana Shooting Club*, 145 N.W. at 820).

These decisions may allow a certain degree of extrapolation of data in extending the OHWL across a disturbed area. However, courts are not likely to allow extensions of the line based on transect data retrieved at points along the water body that are too widely spaced. The court in *Vanada v. United States*<sup>572</sup> rejected this approach, which ignores site-specific conditions. In *Vanada*, the Corps of Engineers' survey team members collected data from other sites along the Ohio River but did not visit the area in question until landowners complained about the placement of the line.<sup>573</sup> The Corps had collected original data from sites four to five miles apart, then plotted these results on a profile worksheet to generate a relatively straight, smooth profile line representing the OHWL along the river.<sup>574</sup> In connection with the construction of a lock and dam, the Corps then filed a declaration of taking that incorporated the statistically derived line as the OHWL.<sup>575</sup>

Plaintiffs argued, and the court agreed, that the OHWL determination in that area ignored the site-specific fact that plaintiffs had successfully farmed the disputed acreage for at least twenty-three years.<sup>576</sup> One aspect of the vegetation test involves determining an area's usefulness for farming.<sup>577</sup> The court noted that each winter, flood waters deposited debris, as well as sediment, silt, and fertile soil, on the disputed land.<sup>578</sup> The effect was that the river nurtured, rather than harmed, the agricultural value of the land.<sup>579</sup>

Similarly, in *Buttrey v. United States*,<sup>580</sup> the trial court closely scrutinized an assertion by the Corps of Engineers that a slough near a navigable river was below the OHWL of the river.<sup>581</sup> The Corps measured actual water levels of the river at 1.2 miles distant from the disputed site, as well as the actual water levels and OHWL of the slough in question and another nearby slough.<sup>582</sup> From distilling these measurements and averaging several OHWL indicators in the slough, the Corps asserted that the slough was below the OHWL of the river in that area.<sup>583</sup> By recognizing contrary factual findings and

---

572. No. 514-71 (Ct. Cl. filed Nov. 21, 1974), *aff'd*, 206 Ct. Cl. 878 (1975).

573. *Id.* at 26-27, 28-29.

574. *Id.* at 28-29.

575. *Id.* at 2.

576. *Id.* at 6.

577. *Id.* at 33-35.

578. *Id.* at 23.

579. *Id.*

580. 573 F. Supp. 233 (E.D. La. 1983).

581. *Id.* at 294, 297-300.

582. *Id.* at 299.

583. *Id.* at 294, 299-300.

other physical evidence, the court pointed out that the various extrapolations were defective.<sup>584</sup> The court characterized the averaging technique as having "questionable validity,"<sup>585</sup> and refused to accept the asserted OHWL because "the Corps failed to determine the river's OHWM by surveying the river itself at mile 17.9."<sup>586</sup>

### B. *Evidentiary Considerations*

In obtaining and analyzing the data on which an ordinary high water line determination is based, the surveyor should observe several evidentiary rules. The most important of these is to record detailed descriptions of the procedures used and the findings made under every relevant category of evidence.<sup>587</sup> Generally, these will be regarded as the business records of the surveyor. If they are professionally handled and stored, the court will accord them significant evidentiary value.<sup>588</sup>

A surveyor also should use photographs to substantiate the physical data retrieved and to place it in context.<sup>589</sup> In some situations, color photography may be better suited to explaining the data. In all cases, however, the purpose of the photograph is to illustrate more clearly the findings, and to relate them to other indicators, as well as the surrounding conditions. The surveyor should take all pictures at specifically identifiable points in the survey area.<sup>590</sup>

If possible, aerial photographs should show important geological features, evidence of former water levels, current vegetation lines, and the placement of transect lines. On-site photographs should indicate transect paths and all relevant data gathered within transect boundaries. This data includes types and relative densities of plant species and the locations of trees that have evidentiary value because of their species, ages, or growth patterns. Photographs of trenches should reveal all pinch outs, scarps, and their relative locations, as well as the character of the soils in each area. In all cases, the surveyor should take simultaneous notes describing the scene and carefully match them to each photograph. The captioned photos then should be correlated with all other data collected at that location.

---

584. *Id.* at 299-300.

585. *Id.* at 300.

586. *Id.*

587. J. BRISCOE, *SURVEYING THE COURTROOM: A LAND EXPERT'S GUIDE TO EVIDENCE AND CIVIL PROCEDURE* 42-44 (1984).

588. *Id.*

589. C. BROWN, W. ROBILLARD & D. WILSON, *EVIDENCE AND PROCEDURES FOR BOUNDARY LOCATION* 276-77 (1981).

590. *Id.*; see also J. BRISCOE, *supra* note 587, at 23.

The surveyor should have the expertise to accurately identify and evaluate important plant indicators and normally will not need to take samples of vegetation. However, in situations where litigation is anticipated, vegetative samples from identifiable points on the transect may help substantiate the surveyor's placement of OHWL. If the surveyor makes tree corings, after preparation and analysis, they should be photographed and preserved, if possible. Preservation of soil samples as evidence probably is less important. After chemical analysis and documentation, these samples lose most of their evidentiary value. The surveyor's field analysis of most physical characteristics of soils and sands probably will be sufficient. Where litigation is anticipated, however, samples should be taken, labeled, carefully matched to photographs of the area, and then correlated with all other data collected at that location.

The surveyor should accurately identify data derived from sources other than the physical conditions on site and should record sources of hydrological data, surveys, maps, and plats. The surveyor also should note any evidence of distortion or tampering. Historical data collected from witnesses should include the identity of the witness and establish the basis of the witness's statements. If the witness is aged or sick, an affidavit should be taken to preserve the testimony for anticipated litigation.

The courts will examine the qualifications and impartiality of lay or expert witnesses. The qualifications of experts, and the depth and quality of the data supporting their conclusions are critical factors in any case involving the determination of OHWL. Florida requires the "best evidence attainable and the best methods available . . . in establishing the line of true ordinary high-water mark."<sup>591</sup> *Vanada v. United States*<sup>592</sup> illustrates the high level of competence, as to both the data and the surveyor, that federal courts — and courts in general — may require. In *Vanada*, the United States Corps of Engineers determined the OHWL on sections of the Ohio River.<sup>593</sup> The survey was conducted by three individuals employed by the Corps. The record does not indicate that the individuals possessed any special qualifications for this assignment. For example, none were botanists. The survey team received one afternoon of instruction in the criteria they were to consider in determining where the OHWL was located on random

---

591. *Busch*, 93 Fla. at 564, 112 So. at 283.

592. Case No. 514-71 (unreported trial court opinion), *aff'd*, 206 Ct. Cl. 878 (1975).

593. *Id.* at 2.

points they selected about every four or five miles along the river. The resulting ordinary high water line determination was rejected by the court.<sup>594</sup>

### C. *Evidence of Physical Changes Over Time*

In 1845, the state took title to navigable lakes and rivers up to the OHWL under the equal footing doctrine. The 1845 OHWL was evidenced by the same physical indicators used to determine OHWL today. If there are long-term changes in the water regime of a water body, the indicators will shift over time to reflect the new line. Indications of the previous line will become fainter and more difficult to determine.

Under the doctrine of reliction, naturally occurring drops in water level vest title to the uncovered land in the riparian owner, and the OHWL changes accordingly. Privately caused drops in the water level, or artificial reliction, do not alter the location of OHWL; nor does lowering of water levels through governmental drainage operations. Given the history of large scale drainage operations and groundwater withdrawals in Florida, high water line indicators probably will be lower in many cases than in 1845. Natural meteorological fluctuations may offset or aggravate the situation regarding lowered OHWL levels.

If an 1845 line could be located and the effects of all artificial and natural reliction since that time could be assessed, the OHWL indicating the true boundary between state-owned and privately-owned lands would be obtained by disregarding changes caused by artificial reliction, while considering changes caused by natural fluctuation in water level. However, in using this approach, several practical difficulties exist.

An initial problem arises in determining the extent to which a lake or river has been affected by drainage operations or by naturally occurring drops in water level since 1845. Historical documents, contracts, government records, local flood control district documents, and eyewitness testimony may aid in determining whether artificial drainage patterns have affected an area and to what extent. Meteorological data and historical records may indicate the effect of natural fluctuations in the water regime of an area. However, detecting the occurrence and effects of changes in water level becomes more difficult over time. A related problem that remains unaddressed by case law is whether the lowering of a lake level due to extensive groundwater withdrawal constitutes an artificial reliction. Generally, reliction caused by unintentional acts still may be deemed artificial.

---

594. *Id.* at 28.



If the evidence suggests two lines at different elevations, and the lower line reflects natural reliction of a sufficient duration to form reliable physical indicators, then OHWL probably lies at the lower elevation. If, on the other hand, the indicators have shifted to lower levels as a result of human activities, and competent, though fainter data supports the higher line, this line will mark the truer OHWL.

The consideration of natural fluctuations in water levels is also problematic because the OHWL indicators produced by these water level changes may be misleading. Over time, a water body may experience several natural rises and falls in water level, all of which might have varying degrees of influence on the indicators by which OHWL is determined. The durations of a water body's natural level fluctuations will correspondingly influence the OHWL indicators. A short-term, seasonal drop in the water level of a lake will change OHWL indicators only minimally compared to the evidence formed as a result of long-term water level changes. Thus, evidence of early growth of pioneer upland plant species and light escarpments are less likely to indicate OHWL than older climax forest species and deep escarpments or significant, correlated beach "pinch outs" at higher elevations. Similarly, the presence of water and some opportunistic submerged plant species alone, in an area otherwise populated with old, well established upland species, does not justify locating OHWL on the landward edge of that area. Generally, absent evidence of artificial reliction, a high water line indicated by older species and more pronounced and consistent data will be given preference as a true OHWL.

OHWL indicators also can be misleading if they result from unusually high, short-term energy levels rather than long-term, sustained water levels. A stalled hurricane provides the most obvious example. This phenomenon can produce three or four days of sustained high winds and waves that affect one side of a large lake. Scarps, pinch outs, and sediment winnowing in that area probably would suggest an OHWL higher than normal. Conversely, if the lake experienced much lower-than-normal water levels prior to the hurricane, resulting geomorphological indicators could indicate an abnormally low OHWL. Surveyors, then, should exercise caution in relying on merely one or two OHWL indicators or on too few sampling sites. The truer OHWL should be located where several correlated factors consistently indicate the natural presence of water for long periods of time.

In practical terms, searching for evidence of drainage operations in an area may be difficult. The varying physical data associated with an historic OHWL also may be faint or impossible to correlate consistently at any one elevation. These difficulties require adherence to several rules for determining a realistic time period within which OHWL data should be sought. First, the surveyor should consider all

potential OHWL locations supportable by consistent, correlated data. The fact that one location has somewhat stronger data may or may not be significant, given the history of the area. For example, consistent data may indicate a sixty-year-old high water line. However, if evidence reveals another line at a higher elevation, and the reliction was artificial, the true OHWL may be at the higher location. This example illustrates the need for a sufficient number of sampling transects to permit accurate assessments of as many lines as may be supported by consistent data. The depth of the trenches should be sufficient to reach any older, long-buried evidence of true OHWL. If possible, the surveyor should record the absolute and relative ages of the data.

Although sometimes difficult to assess, the surveyor should seek historical evidence of the existence and effect of artificial and natural reliction. If documents indicate the installation of a water level control structure with an automatic bleed-off at a particular elevation, the OHWL may be at a different elevation. Eyewitness accounts may alert the surveyor to conditions resulting from past artificial or natural reliction. Flood control and water management district records also may supply valuable information on the source and extent of water control activity in an area. The surveyor must analyze this information in conjunction with consistent evidence of high water level locations to determine which line reflects ordinary and natural conditions on the water body. The most reliable historic evidence will be from the recent past, including meteorological data over the past thirty years. However, a more in-depth analysis of OHWL also should include any consistent, verifiable data from historic periods as far back as practicably available.

As a final rule, given the uncertain nature of OHWL, a surveyor should be aware of potential liability for OHWL placement. Presently, an OHWL is legally recognized only after litigation and a definitive court ruling. Teams of experts may participate in this litigation, bringing years of training and expertise to the task of collecting and analyzing evidence. The surveyor alone normally will not have the time or training to accumulate and analyze the data to a degree that would satisfy a court. Although utilizing only one methodology may approximate the findings of an expert team, this approach normally will not provide adequate evidence. This problem would be remedied if lawmakers enacted legislation providing for the adoption of a replicable methodology. However, unless such legislation is enacted, a surveyor's determination of OHWL is not definitive.

In almost all cases, unless the surveyor has accumulated irrefutable evidence supporting placement, the surveyor's assessment should take the form of a "recommended" or "safe" ordinary high water line. At

the outset, the client must understand the limitations of the survey. Armed with this understanding, the client then can decide whether to accept the estimate or employ a team of experts for a more accurate and more legally defensible survey. The advantages to this conservative approach are threefold. First, by recommending a fairly conservative line placement and disclaiming the legal certainty of this estimate, the surveyor avoids potential liability. Second, this approach is more efficient and therefore less costly to the client. While owners and developers normally seek guarantees of project boundaries, an accurately assessed OHWL that can withstand all legal challenges is rare. Where the surveyor simply suggests a "recommended" line that includes a significant margin of error, projects landward of that line can proceed on schedule and without litigation. Finally, a conservative "recommended" line ensures protection of the values for which submerged lands are held in trust.

## V. CONCLUSION

The boundary between privately owned uplands or wetlands and publicly owned lands submerged beneath navigable, nontidal waters is the ordinary high water line (OHWL). The OHWL is a physical mark impressed on the shoreline where the action of water has been so frequent or continuous that it has marked a distinct transition between the upland and submerged environments.

The law governing OHWL placement, although well settled, may be difficult to apply in Florida's wet, low-relief landscape where transitions between uplands and submerged lands are not easily recognizable. Judicial interpretation of the legal principles often turns on case-specific, factual considerations. Although current litigation may clarify the legal principles, boundary disputes must be settled more expeditiously than the present system allows.

The development of a methodology usable by trained surveyors offers useful boundaries for owners, purchasers, and the state. However, no surveyor should expect to be able to use any methodology to unequivocally establish the OHWL. Only the courts can establish an uncontestable OHWL. Without litigation, the client may achieve greater certainty by using a team of experienced specialists to gather, analyze, and compare data from as many sources as possible. A surveyor's best approach may be to establish a "safe" line above which disputes with the state are unlikely. The surveyor also should learn to identify situations where other professional assistance is needed to interpret complex or conflicting evidence.

Further guidance on the law of ordinary high water line determinations is ultimately needed. The judicial resolution of some ongoing

controversies over OHWL placement could settle a few issues. The legislature should consider legislation authorizing the adoption of rules that incorporate a more definitive procedure for establishing OHWLs. The Trustees already may have such authority. Certainly, the Trustees have authority to settle boundary disputes and a Trustees rule at least could establish the conditions under which the Trustees will agree not to contest an OHWL survey. Such a rule would go far toward giving landowners the certainty they desire. The rule that the DNR proposed in 1988<sup>595</sup> was generally consistent with the existing case law and should be resurrected as a starting point for the adoption of any rule. Other proposals that have been made, such as the rule adopted by the Board of Professional Land Surveyors<sup>596</sup> and the one proposed by the Governor's Ordinary High Water Line Committee<sup>597</sup> would constrict severely the boundaries of the public trust. Landowners' advocates will probably attempt to use any efforts at legislative reform or rulemaking to adopt the substance of the latter proposals. Extraordinary vigilance is necessary to ensure that efforts to clarify the methodology are not used as a subterfuge to divest the people of their public trust and natural heritage in submerged lands.

---

595. *See supra* note 12.

596. *See supra* note 13.

597. GOVERNOR'S ORDINARY HIGH WATER LINE COMMITTEE, PROPOSED ORDINARY HIGH WATER RULE (Dec. 11, 1989).

