Note

Artificial Additions to Riparian Land: Extending the Doctrine of Accretion

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The banks of rivers are rarely, if ever, immobile. A fast flowing river will create erosion of the banks which will be carried as particles in suspension, while a gentle flow will cause deposition leading to accretion. If the volume of flow decreases, lands will be re-exposed or relicited. Twists and turns in the river channel will cause erosion on one bank and accretion on the other; if the terrain steepens or flattens, river speeds will vary with a concomitant variation in the rate of erosion or accretion. Naturally, innumerable combinations of these factors lead to a myriad of results.

Ownership of losses and additions caused to lands by these natural phenomena is governed by various water rights doctrines including accretion, avulsion, reemergence, and navigability. A further complication arises, however, when the actions of man serve as a catalyst for natural bank movements. Some jurisdictions distinguish between natural and artificially induced losses and gains, while others make no distinction and apply the same doctrine to both types of situations.

Dredging operations by the United States Bureau of Reclamation to re-channel parts of the Colorado River,[1] which is navigable,[2] have already surfaced over 2,700 acres of land between the natural river

1. The Colorado River re-emerges from Lake Mead through Hoover Dam and winds its way over 500 miles to the Gulf of California, forming the western boundary of the State of Arizona. In certain areas along the river, the boundary between Arizona and the States of California and Nevada is set by agreement; thus the middle thread of the river may or may not coincide with the actual boundary. *See* State v. Bonelli Cattle Co., 107 Ariz. 465, 467, 489 P.2d 699, 701 (1971), *modified*, 108 Ariz. —, 495 P.2d 1312 (1972).

2. See text accompanying notes 28-31 *infra*.

bank and the narrower new channel.[3] Future dredging will expose more land. In a recent case of first impression, *State v. Bonelli Cattle Company*,[4] the Supreme Court of Arizona declined to extend the doctrine of accretion to man-made additions to riparian land. Instead it chose to ignore all the reasons underlying the development of the accretion doctrine and adopted, in a cryptic opinion, a distinction between natural and man-made accumulations to riparian land. Portions of the lands exposed by the dredging operations, including the lands involved in *Bonelli*, originally had been dry lands which were then submerged by erosion. The court also declined to apply the doctrine of reemergence[5] to such re-exposed lands. The Arizona court held that title to such surfaced land vests not in the adjacent riparian owner, as the accretion doctrine would require for natural accretions,[6] but in the state, which owns the beds of navigable rivers to the ordinary high water mark.[7]

A supplemental opinion denied rehearing and purported to clarify the definition of the high water mark.[8] In holding that the high water mark to which state ownership extends was fixed by the natural state of the river as it existed in 1938, the court ignored a virtually unanimous body of authority to the contrary,[9] misapplied a federal statute,[10] and rejected a federal decision directly on point dealing with federal lands in Arizona riparian to the same river.[11] The year 1938 was chosen because after that date the operation of Hoover Dam artificially affected the rate of flow of the Colorado River. The court reasoned that since the state at that time owned the river bed up to the then high water mark, artificial alterations in the river by the federal government could not operate to divest the state's title to these lands.

The following discussion will analyze *Bonelli* and its implications. In order to facilitate a full understanding of the case and to evaluate the court's treatment of the problems, it is first necessary to explore in depth the origins of and reasons for the principle that the state holds title to the beds of navigable rivers, the doctrines of accre-

3. Letter from Andrew L. Bettwy, Arizona State Land Commissioner, to *Arizona Law Review*, Dec. 8, 1971, on file in its offices.
4. 107 Ariz. 465, 489 P.2d 699 (1971), *rehearing denied & opinion clarified*, 108 Ariz. —, 495 P.2d 1312 (1972), *rev'g* 11 Ariz. App. 412, 464 P.2d 999 (1970).
5. See text accompanying notes 55-61 *infra*.
6. See text accompanying notes 37-40 *infra*.
7. *See* Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212 (1845).
8. State v. Bonelli Cattle Co., 108 Ariz. —, 495 P.2d 1312 (1972).
9. See text & notes 62-67 *infra*.
10. 43 U.S.C. §§ 1301-1343 (1970) (Submerged Lands Act). See text accompanying notes 32-36, 105-110 *infra*.
11. United States v. Claridge, 416 F.2d 933 (9th Cir. 1969), *cert. denied*, 397 U.S. 961 (1970), *aff'g* 279 F. Supp. 87 (D. Ariz. 1967).

tion, avulsion and re-emergence, and recent extensions of the doctrine of accretion to artificial additions to riparian land. Following analysis of the case, an examination will be made of the impact of *Bonelli* on the existence of vestigial riparian rights in Arizona. Finally, we will investigate some problems of federal jurisdiction inherent in the *Bonelli* situation, which may arise when the river is dredged adjacent to some of the vast stretches of federal and Indian lands that lie within the state and abutt the river,[12] and in the application of the state definition of the high water mark to such lands.

THE COMMON LAW: TITLE TO BEDS OF NAVIGABLE WATERWAYS, ACCRETIONS AND RELICTIONS

Ownership of Beds of Navigable Waterways

Although navigable waterways and the lands submerged beneath them have been the subject of much legal literature,[13] it will be helpful for later discussion to review the basic principles regarding this confusing area of the common law. Aside from rights to the use of water, two elementary interests exist in a navigable waterway: the proprietary interest in the submerged lands, and the sovereign interest in guaranteeing the public right of navigation. The former is said to be burdened by a servitude in favor of the latter under both English and American law.[14]

By the English common law, the situs of the title to the beds of navigable waterways is unrelated to the protection of navigation. The *jus publicum*,[15] a characterization of the public right to navigate and pursue commerce over the water highway, exists over all waterways navigable in fact, whether the beds are held by a private person or by the crown.[16] Because of a complicated historical background, however, a distinction developed between tidal and nontidal waterways when a question as to ownership of the bed of a particular waterway arose. Under this rule the beds of nontidal waterways are presumed to have been conveyed to the adjacent riparians, while the beds of tidal waters are presumed to be vested in the crown. This distinction was based not on the principle that title to beds of naviga-

12. ARIZONA DEPARTMENT OF PLANNING & DEVELOPMENT, U.S. BUREAU OF LAND OWNERSHIP IN ARIZONA (U.S. Geol. Surv. map 1971).

13. *See* 1 H. FARNHAM, WATERS AND WATER RIGHTS § 36, at 165-175 (1904); Fraser, *Title to Soil Under Public Waters—A Question of Fact*, 2 MINN. L. REV. 313 (1918); 1 WATERS AND WATER RIGHTS §§ 35-44, at 179-279 (R. Clark ed. 1967).

14. *See* Fraser, *supra* note 13. *See also* S. REP. No. 133, 83d Cong., 1st Sess., pt. 1, 77-81 (1953).

15. *Id.*

16. *Id. See also* Reece v. Miller, 51 L.J.R. 64 (Magis. Cas. 1882).

ble waterways should be in the crown in order to protect navigation, but upon historical considerations peculiar to England and unrelated to the protection of navigation.[17]

Although utilizing the relatively simple English scheme as a foundation, the United States developed a more complicated system of public and private rights in navigable waters. The Supreme Court of the United States rejected the English distinction between tidal and nontidal waters for situs of title purposes, reasoning that the title to lands submerged beneath all navigable waters should be held by the sovereign in order to protect navigation.[18] This holding and other decisions effected a dedication of the beds of all navigable waterways held by the state to public use.[19] Under this theory, each of the original thirteen colonies had succeeded to the proprietary interest in the beds beneath their navigable waters, tidal and nontidal, formerly held by the English Crown. Upon ratification of the Constitution, however, the new states, while retaining the proprietary interest in the beds, surrendered the dominant sovereign interest in the protection, control, and improvement of navigation to the federal government.[20]

17. It has been demonstrated that the English rule as to ownership of the beds beneath nontidal waters is a presumption which grew out of English history. Fraser, *supra* note 13. Fraser's thesis is that the primitive peoples landing on the shores of England seized whatever land was of value and that presumably such beds were included. Later, during the Anglo-Saxon and Norman periods, grants of the upland from the sovereign expressly included the bed of the adjacent stream. His discussion concludes by noting that the United States had no such history, and argues, therefore, that no such presumption should be indulged in this country. *Id.*

18. Barney v. City of Keokuk, 94 U.S. 324, 338 (1876); *cf.* Donnelly v. United States 228 U.S. 243 (1913). *See also* Martin v. Waddell, 41 U.S. (16 Pet.) 367, 410 (1842); Shively v. Bowlby, 152 U.S. 1, 49 (1894).

19. *See generally* Sax, *The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention*, 68 MICH. L. REV. 473 (1970). Professor Sax explores the question of whether a state may alienate the title to public trust lands, such as a portion of the bed of a navigable waterway, or otherwise change the use to which trust lands are dedicated. On the one hand, if the trusteeship of lands held for the public puts such land wholly beyond the police power of the state, making them inalienable and unchangeable in use, then the public right would be quite an extraordinary one. On the other hand, if land held in trust for the public by the state may be transferred to private use through the exercise of the police power, then the trust imposes no restraint on government beyond that which is implicit in the judicial review of any state action. Professor Sax concludes that the duties imposed on the state lie somewhere between these two extremes. Judicial scrutiny of transactions involving lands held in trust for the public, such as the bed of a navigable watercourse, may be the only efficient means to enforce the state's duty since many administrative and even legislative authorizations of transfers of such land to private interest are not usually subject to public scrutiny. *See* Parks v. Simpson, 242 Miss. 894, 137 So. 2d 136 (1962). *Contra,* Texas Oyster Growers Ass'n v. Odom, 385 S.W.2d 899 (Tex. Ct. Civ. App. 1965). *See also* 1 H. FARNHAM, *supra* note 13, § 36a, at 172-75.

Assuming the finality of the *Bonelli* decision, the land claimed by Arizona may be subject to the public trust doctrine and require judicial surveillance of the use to which such land is put. It is arguable that the subject land and other lands similarly obtained must be put to a use which corresponds to the trusteeship, namely promotion of navigation, fishing, and recreation. See text accompanying note 134 *infra.*

20. Gibbons v. Ogden, 22 U.S. (9 Wheat.) 1 (1824); The Daniel Ball, 77 U.S. (10 Wall.) 557 (1871); First Iowa Hydro-Elec. Co-op. v. Federal Power Comm'n, 328 U.S. 152 (1946); U.S. CONST. art. I, § 8. *See also* Arizona v. California, 283 U.S. 423 (1931).

The states may exercise sovereign control over their navigable waters only where not inconsistent with the federal servitude. The American *jus publicum*, therefore, is protected both by the federal and state navigational servitudes no matter who holds title to the bed.[21]

As new states were forged out of the federal territories after the formation of the Union, title to the lands beneath navigable waters in those areas passed from the federal government to the respective states under the equal footing doctrine.[22] Since the original states hold title to the beds of their navigable waters, the same situation must obtain in the new states, otherwise their footing would not be equal. In like manner, the new states were also granted sovereign power over their navigable waters subject to the dominant federal control.

The opportunity thus existed for the states to adopt a presumption that title to the beds of navigable waterways, tidal as well as nontidal, remained in the state unless an express grant to a private party could be shown.[23] Many American jurisdictions, however, chose the view that the English presumption as to nontidal beds was to be applied as a rule of law or as a rule of construction of grants.[24] The rule in these states is that a grant of land bounded by nontidal water—even where the body is navigable—includes the bed to the middle thread.[25] The Supreme Court of the United States has assented to this view, saying that it is for the states to determine whether to surrender their rights to the riparian owners on nontidal navigable waterways.[26] In the absence of such an election by the state, the presumption arises that it retains title to the beds of all navigable waterways unless an express conveyance is shown.

The problem, then, is what constitutes "navigable" water such that the presumption attaches to the bed. There are three definitions of navigability in the United States, depending upon the situation to which the term is applied. The first, which is beyond the scope of this discussion, is a very broad definition[27] applied to determine the

21. *See* Fraser, *supra* note 13.

22. Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212, 222-23, 228-30 (1845) (Alabama became titleholder of lands submerged beneath navigable waters located therein upon statehood, and, therefore, federal grant after statehood of reclaimed lands was of no effect).

23. Barney v. City of Keokuk, 94 U.S. 324, 338 (1876). *See also* United States v. Oregon, 295 U.S. 1, 14 (1935).

24. *See* note 17 *supra*.

25. Archer v. Greenville Sand & Gravel Co., 233 U.S. 60 (1914) (applying Mississippi law); Buttenuth v. St. Louis Bridge Co., 123 Ill. 535, 537, 17 N.E. 439, 445 (1888) (dictum); Strange v. Spaulding, 17 Ky. L. Rptr. 305, 29 S.W. 137 (Ky. App. 1895); Krumweide v. Rose, 177 Neb. 570, 129 N.W.2d 491(1964); Mariner v. Shulte, 13 Wis. 775 (1861).

26. Barney v. City of Keokuk, 94 U.S. 324, 338 (1876).

27. *E.g.*, United States v. Appalachian Elec. Power Co., 311 U.S. 377 (1940).

reach of the commerce clause and federal power over waters.[28] The second is used to determine the existence or nonexistence of a public right of use analogous to the *jus publicum*. For example, suppose *X* owns land through which a stream runs. *X* also owns the bed. The stream at places is only a few inches deep. May *Y* canoe over *X*'s stream freely or would *Y* be a trespasser? A majority of jurisdictions hold that *Y* has the right of passage.[29]

The third and narrowest definition of navigability, the one which has most relevance to this analysis, is applied to determine whether the state presumptively holds title to the bed of the watercourse. The presumption attaches if the body of water in question was being used as a highway at or around the time of the admission of the particular state to the Union.[30] It is the bed of this type of navigable waterway which is presumptively held by the state. Arizona, for example, was admitted to the Union in 1912. Around that time the Colorado River was being used as a highway by rivercraft from Yuma on the Mexican border to just below the present site of Hoover Dam. The bed of this stretch of the river, therefore, is held by the state in trust for its people in the absence of the showing of an express grant of a portion of the bed.[31]

The Effect of the Submerged Lands Act

In order to clear up the controversy surrounding conflicting state and federal claim of ownership of the coastal tidelands, Congress passed the Submerged Lands Act in 1953.[32] The Act amounted to

28. *See* materials cited at note 20 *supra*.

29. *E.g.*, People v. Mack, Civil No. 12936 (Cal. App., Sept. 15, 1971), 3 BNA ENV. REP. CAS. 1391 (1971); Day v. Armstrong, 362 P.2d 137 (Wyo. 1961); *cf.* State v. Red River Valley Co., 51 N.M. 207, 182 P.2d 421 (1945). *See also* Muench v. Public Serv. Comm'n, 261 Wis. 492, 53 N.W.2d 514 (1952). *But see* Hartman v. Tresise, 36 Colo. 146, 84 P.2d 685 (1905).

30. Utah v. United States, 403 U.S. 9, 11 (1971) (the waterway need not have been used for *commercial gain* under the test); *see* Teclaff & Teclaff, *Saving the Land-Water Edge From Recreation, For Recreation*, 14 ARIZ. L. REV. 39, 43-48 (1972). *Id.*

31. Arizona v. California, 283 U.S. 423, 453 (1931).

32. 43 U.S.C. §§ 1301-1343 (1970).

> (a) It is determined and declared to be in the public interest that (1) title to and ownership of the lands beneath navigable water within the boundaries of the respective States, and the natural resources within such lands and waters, and (2) the right and power to manage, administer, lease and develop, and use the said lands and natural resources . . . are, subject to the provisions hereof, recognized, confirmed, established and vested in . . . the respective States . . . .
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> (d) Nothing in this chapter shall affect the use, development, improvement or control by or under the constitutional authority of the United States of said lands and waters for the purposes of navigation or flood control or the production of power, or be construed as the release or relinquishment of any of the rights of the United States arising under the constitutional authority of Congress to regulate or improve navigation, or to provide flood control, or the production of power.

Id. § 1311.

a federal quit-claim of all lands submerged beneath navigable waters within state boundaries. This included both inland waters and coastal waters within the seaward boundaries of the states. It renounced federal claims of ownership of, *inter alia*,

> all lands . . . covered by non-tidal waters that were navigable under the laws of the United States at the time such state became a member of the Union, or acquired sovereignty over such lands and waters thereafter, up to the ordinary high water mark as heretofore or hereafter modified by accretion, erosion, and reliction . . . .[33] and] all filled in, made or reclaimed lands which formerly were lands beneath navigable waters, as herein above defined . . . .[34]

The Act expressly declares that it is to have no effect on private claims to such lands based upon the laws of the United States.[35] It merely confirmed the existing case law holding that, as between the state and federal governments, the title to the beds of nontidal navigable waters is *not* in the federal government. This leaves the states the presumption that, as between the state and a private party, the former holds title.[36]

The Act also implicitly confirms existing case law with respect to claims to intervening accumulation to riparian land based upon the accretion doctrine since the state presumptively holds title to beds "as heretofore or hereafter modified by accretion, erosion, and reliction." Thus, under the Act as well as under accretion law, the state's title follows the navigable water and is not a fixed parcel of land.

Doctrines of Accretion, Avulsion and Reemergence

1. *Accretion.* Accretion is the gradual and imperceptible accumulation of land by natural causes out of the sea or other body of water.[37] Accreted land is of two kinds, one by *alluvion* and one by *dereliction.* Alluvion is land added by the deposition of silt and debris out of the water.[38] Derelicted or relicted land is land added by the recession of the water leaving a portion of the bed dry.[39] Both

33. *Id.* § 1301(a)(1).
34. *Id.* § 1301(a)(3).
35. *Id.* § 1315.
36. *See* S. REP. No. 133, 83d Cong., 1st Sess., pt. 1, at 6-8, 65, 77-81 (1953). "The purpose of this legislation is to write the law for the future as the Supreme Court [of the United States] believed it to be in the past—that the States . . . own and have proprietary use of all lands under navigable waters within their territorial jurisdiction . . . subject only to the governmental powers delegated to the United States by the Constitution." *Id.* at 8.
37. Nebraska v. Iowa, 143 U.S. 359 (1892).
38. United States v. Claridge, 416 F.2d 933 (9th Cir. 1969), *cert. denied*, 397 U.S. 961 (1970), *aff'g* 279 F. Supp. 87 (D. Ariz. 1967).
39. Fontenelle v. Omaha Tribe of Nebraska, 298 F. Supp. 855 (D. Neb. 1969), *aff'd*, 430 F.2d 143 (8th Cir. 1970).

are governed by the same principles:[40] title to accreted land is awarded to the upland owner irrespective of who owns the bed.

The doctrine of accretion is based on several rationales. One derives from the Roman theory of accession—where a cow produces offspring or a tree produces fruit, the owner of the cow or the tree becomes the owner of the calf or the apple.[41] So the owner of riparian land owns accreted lands. Another rationale given is that where a body of water is a boundary between landowners or political entities, that body should remain the boundary.[42] Thus the legal boundary moves with gradual changes in the location of the water. The middle thread of the Colorado River, for example, is the boundary between California and Arizona. In some areas the action of the water erodes the west bank while depositing alluvion on the east bank, causing the river channel to move gradually westward. The boundary between the two states follows the movement of the channel. Where the shoreline is the boundary between the upland and the state-owned bed, accretion or erosion can cause the upland to gain or lose ground since the legal boundary follows the shoreline.

A third rationale is that where land is gained from a body of water by "little . . . and imperceptible degrees, it shall go to the owner of the land adjoining [for] *de minimis non curat lex.*"[43] This magical incantation, "the law does not care for trifling matters," appears to have been an addition by English courts adopting the accretion doctrine. The adoption of the de minimis concept set the stage for a legal distinction between gradual changes and sudden changes

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40. *Id.* at 858.

41. R. SOHM, THE INSTITUTES 323 (J. Ledlie transl. 3d ed. 1907):

> Accession is the name given to a thing which, having previously existed as an independent thing, has passed into an integral part of another thing. . . . A thing which becomes an accession ceases to have an independent existence. . . . As soon . . . as a thing becomes an accession, all former right of ownership in it are destroyed, because its existence as an independent thing is destroyed. . . .
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> . . . [Examples of accession:] 'alluvio,' . . . the accretion by which a public river, in an imperceptible manner, enlarges a plot of land; 'avulsio,' . . . the accretion by which a public river enlarges a plot of land in a perceptible manner [inures to the riparian]; . . . 'alveus derelictus,' . . . the derelict bed of a public river which has changed its channel (the bed, which thus becomes free, becomes the property of the riparian owners on each side as an accession, the middle bed forming the boundary); 'insula nata,' . . . a term applied when part of a public river becomes free, the rule in such a case being the same as with an alveus derelictus.

See also Manry v. Robinson, 122 Tex. 213, 56 S.W.2d 435 (1932); R. LEE, THE ELEMENTS OF ROMAN LAW 132 (4th ed. 1956).

42. *E.g.*, Anderson-Tully Co. v. Tingle, 166 F.2d 224, 227-28 (5th Cir. 1948), *cert. denied*, 335 U.S. 816 (1948); Mecca Land & Exploration Co. v. Schlecht, 4 F.2d 256 (D. Ariz. 1925); Mood v. Banchero, 67 Wash. 2d 835, 410 P.2d 776 (1966). *See* Annot., 41 A.L.R. 382 (1926).

43. 2 W. BLACKSTONE, COMMENTARIES *262; *see* BLACK'S LAW DICTIONARY 482 (4th ed. 1951).

along waterways.[44] No such distinction was drawn in Roman law.[45]

Another reason given for the accretion doctrine is what has been called the "productivity theory,"[46] which holds that the law as a matter of policy should favor productive uses of lands. Since the riparian owner is in a better position than the state or a stranger to utilize accreted land, the courts declare title to be in him. Giving the upland owner accreted land as it is formed allows him to put it to immediate use instead of having title pass through the sovereign.[47]

A fifth justification is compensation. Since the riparian owner is subject to losing land by *erosion*, he ought to benefit from any addition.[48] Nor should he be cut off from the stream. Therefore, the final and perhaps most important reason for the doctrine is to preserve the riparian character of the upland. The quality of being riparian, especially to navigable water, is a valuable asset and is part and parcel of the ownership of such land.[49] By requiring that the

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44. 2 W. BLACKSTONE, COMMENTARIES *262.

45. See note 41 *supra*. *See also* State v. Bonelli Cattle Co., 107 Ariz. 465, 469, 489 P.2d 699, 703 (Lockwood, J., dissenting). The de minimus theory deals not with de minimus *quantities* of land but with de minimus *increments* to land such that the increments are gradual and imperceptible. The test was stated by the Supreme Court of the United States: "The test as to what is gradual and imperceptible in the sense of the rule 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." County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46, 68 (1874). Most cases dealing with accreted land involve more than de minimus amounts of land. For example, the swift and wild meandering of the Missouri River has caused large areas of accreted land in weeks or months. *See* Beck, *The Wandering Missouri River: A Study in Accretion Law*, 43 N.D. L. REV. 429 (1967).

46. *See* Beck, *supra* note 45. *Cf.* Jefferis v. Eastern Omaha Land Co., 134 U.S. 178, 191 (1890); Banks v. Ogden, 69 U.S. (2 Wall.) 57, 67 (1864); Adams v. Frothingham, 3 Mass. 352 (1807); Gifford v. Yarborough, 130 Eng. Rep. 1023, 1024 (C.P. 1828).

47. *Cf.* Gifford v. Yarborough, 130 Eng. Rep. 1023, 1024 (C.P. 1828). *See also* Beck, *supra* note 45.

48. *E.g.*, County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46, 69 (1874); United States v. 11,993.32 Acres of Land, 116 F. Supp. 671, 678 (D.N.D. 1953); Hall v. Brannan Sand & Gravel Co., 158 Colo. 201, 204, 405 P.2d 749, 750 (1965); Burke v. Commonwealth, 283 Mass. 63, 186 N.E. 277 (1933).

49. *E.g.*, Hughes v. Washington, 389 U.S. 290, 294 (1967); Philadelphia Co. v. Stimson, 223 U.S. 605, 624 (1912); *see* Merryman v. Goins, 190 Okla. 442, 444, 124 P.2d 729, 731 (1942) (adjoining riparian owners to maintain same proportion of riparian land in accreted lands as they had in pre-accretion situation). The Minnesota court has expressed this view of the accretion doctrine:

> But it seems to us that the [accretion] rule rests upon a much broader principle, and has a much more important purpose in view, *viz.* to preserve the fundamental riparian right—on which all others depend, and which often constitutes the principle value of land—of *access to the water.*
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> The incalculable mischiefs that would follow if a riparian owner is liable to be cut off from access to the water, and another owner sandwiched in between him and it, whenever the waterline had been changed by accretions or relictions, are self-evident, and have been frequently animadverted on by the courts. [Emphasis Added.]

Lamprey v. State, 52 Minn. 181, 197, 53 N.W. 1139, 1142 (1893). There appears to be no logical reason for reaching a contrary result where an intervening third party causes changes in the river. The riparian owner is subject to the whim of the federal government in the exercise of the navigation servitude as much as he is subject to the wanderings of the river. *See* materials cited at note 77 *infra*.

upland owner suffer the burden of erosion and by giving him the benefit of accretion, riparianness is maintained. All of the rationales are somewhat interrelated, and many of the earlier opinions contain references to most if not all of them.[50]

2. *Avulsion.* Whereas accretion is the gradual and imperceptible[51] addition of land, avulsion is the "rapid, easily perceived, and sometimes violent, shifts of land incident to floods, storms or channel breakthroughs."[52] In contrast to erosion or accretion, avulsive shifts do not result in changes in legal boundaries. The avulsion doctrine stabilizes the location of titles even though the river or ocean may swallow some lands and resurface others.[53] For instance, *A* and *B* are riparian owners on opposite sides of a river. Due to a flood the river takes a new course running through the middle of *A*'s parcel. The old bed which is now dry remains the boundary between parcel *A* and parcel *B* even though *B* is no longer riparian to the new channel. In other words, the courts have chosen the policy that where there is a fortuitous *sudden* change in the location of the river bed, the riparian right of one is extinguished by the fee ownership of land by another. If the state owns the bed of the river in the example, the state retains title to the old bed. *A* holds title to the new bed since the river is now running over his land. If the river were the

50. *See, e.g.,* County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46 (1874); Adams v. Frothingham, 3 Mass. 352 (1807); State *ex rel.* McKay v. Sause, 217 Ore. 52, 342 P.2d 803 (1959).

51. *See* note 45 *supra.*

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

53. *Id. See* Nebraska v. Iowa, 143 U.S. 965 (1965).

Blackstone said that the doctrine of avulsion would also apply if there were a sudden loss of land by a riparian owner and a sudden increment of land across the river or downstream: "he shall have what the river has left in any other place, as a recompense for this sudden loss." 2 W. BLACKSTONE, COMMENTARIES *262, 263. It has been widely held, however, that where the loss of one's land is visible and sudden, unless there is the deposit of the identical land somewhere else (which is physically impossible since land loses its identity in the collodial suspension of the river) the land added downstream or across the river is still presumed to be accreted. In Nebraska v. Iowa, 143 U.S. 359 (1892), for example, the court noted that large parts of the river bank involved fell into the river, disintegrated, and were deposited downstream, and stated:

> But it has been held by this court that the general law of accretion is applicable to land on the Mississippi River; and that being so, although the changes on the Missouri River are greater and more rapid than on the Mississippi, the difference does not constitute such a difference in principle as to render inapplicable to the Missouri River the general rule of law. . . .
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> . . . There is, no matter how rapid the process of subtraction or addiiton, no detachment of earth from the one side and the deposit of the same on the other.

Id. at 367, 369. *See also,* Jefferis v. East Omaha Land Co., 134 U.S. 178 (1890).

Another example of the operation of the avulsion doctrine is where *C* owns land with an ocrean-front. While the shore is above sea-level, the land behind the shore is dry but just below sea-level. A storm causes the ocean to wash away the shore and submerges *C*'s land. *C* does not lose title.

least bit navigable, however, *A*'s title would be burdened with the navigation easement.

New land abutting a waterway is presumed to be accretive rather than avulsive.[54] Since an avulsive change would certainly be noticed at or shortly after the time of the sudden natural phenomenon, witnesses would be available to testify to the occurrence. Such would not be the case where the gradual accretive process has occurred. Thus, in the absence of such proof, a change is presumed to be accretive.

3. *Reemergence.* Where a landowner loses acreage to a navigable river by erosion, title to this acreage is transferred by law from him to the state or owner of the bed. If the river were to move in the other direction and replace that same acreage with accreted land, the landowner would obtain title by the doctrine of accretion. If the river moved by an avulsive shift rather than by slow and imperceptible accretive movements, some jurisdictions recognize the "doctrine of reemergence," and hold that the title to such land re-vests in its former owner.[55] In *Mulry v. Norton*,[56] for example, plaintiffs had lost littoral land to the sea. Later, land began accreting to defendants' adjacent land as well as to plaintiffs' land. The Massachusetts court declared that title to the lost land re-vested in the plaintiffs:

> It is not, however, every disappearance of land by erosion or submergence that destroys the title of the true owner or suffices to enable another to acquire it. . . . Land lost by submergence may be gained by reliction, and its disappearance by erosion may be returned by accretion, upon which the ownership temporarily lost will be regained. When portions of the mainland have been gradually encroached upon by the ocean, so that navigable channels have extended thereover, the people, by virtue of their sovereignty, having authority over public highways, undoubtedly succeed to the control of such channels and the ownership of the land under them in case of permanent acquisition by the sea. It is equally true, however, that *when the water disappears from the land*, either by its gradual retirement therefrom or the elevation of the land *by avulsion* or accretion, *or even the exclusion of the water by artificial means*, that its proprietorship returns

54. *E.g.*, Hall v. Brannan Sand & Gravel Co., 158 Colo. 201, 214, 405 P.2d 749, 750 (1965).

55. Herron v. Choctaw & Chickasaw Nations, 228 F.2d 830 (10th Cir. 1956); Klais v. Danowski, 373 Mich. 262, 129 N.W.2d 414 (1964); Mulry v. Norton, 100 N.Y. 424, 3 N.E. 581 (1885); Hunzicker v. Kleeden, 161 Okla. 102, 17 P.2d 384 (1932). *See also* Beaver v. United States, 350 F.2d 4 (9th Cir. 1965), *cert. denied*, 383 U.S. 937 (1966) (recognizing rule); *In re* City of Buffalo, 206 N.Y. 319, 99 N.E. 850 (1912) (recognizing rule); Annot., 41 A.L.R. 382 (1926).

56. 100 N.Y. 424, 3 N.E. 581 (1885).

> to the original riparian owners. . . . Neither does the lapse of time during which the submergence continues bar the right of such owner to enter upon the land reclaimed, and assert his proprietorship. . . .[57] [Emphasis added.]

This rationale has been followed in other jurisdictions[58] and reason seems to commend it. Since the advance of the water divested the title of the upland owner to the state in order to guarantee full public enjoyment of the watercourse,[59] when the water recedes from the land, there is no longer a public benefit to be protected. Consequently, the state has no need for the title. That the cause of the recession of the waters is "artificial" or man-made should be of no effect. Title should re-vest in the former owner unless the land was created as part of a navigational project of which it is a necessary and integral part,[60] or unless the artificial addition is caused by the upland owner without government approval.[61]

Accretions Caused in Part or in Whole by the Works of Man

There are basically three types of "unnatural" land accumulations along a waterway. The first is distinguishable from natural accretion only because man has interfered with the currents of the waterway, thus causing an accretion where otherwise there would be none. For example, where a state builds a dike and a city dumps debris into a river to protect a harbor,[62] or the federal government builds a dam,[63] or a third party builds a revetment to protect a right-of-way,[64] these actions affect the currents and the rate of flow of the water and cause *"artificial accretions."* The accretions are in fact natural; only the cause—an upstream dam, for example—is artificial. The general rule is that accretions of this kind inure to the upland owner.[65] The rea-

57. *Id.* at 434, 3 N.E. at 584-85.
58. Herron v. Choctaw & Chickasaw Nations, 228 F.2d 830 (10th Cir. 1956) (applying Oklahoma law); Hunzicker v. Kleeden, 161 Okla. 102, 17 P.2d 384 (1932).
59. See text & note 18 *supra*. *Cf.* cases cited in note 29 *supra*.
60. *See* Michaelson v. Silver Beach Imp. Ass'n, 342 Mass. 251, 173 N.E.2d 273 (1961).
61. *See* Burns v. Forbes, 412 F.2d 995 (3d Cir. 1969).
62. County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46 (1874).
63. United States v. Claridge, 416 F.2d 933 (9th Cir. 1969), *cert. denied*, 397 U.S. 961 (1970); Beaver v. United States, 350 F.2d 4, 11 (9th Cir. 1965), *cert. denied*, 383 U.S. 937 (1966). *See also* Solomon v. Sioux City, 243 Iowa 634, 51 N.W. 2d 472 (1952). In *Solomon* the federal government built a series of dikes and jetties which caused an artificial reliction of the river and slowed the current. Within 2 to 3 years the upland had been extended by over 300 feet of relicted and accreted land. Title was held to be in the upland owner and not in the city as grantee of the state and owner of the bed.
64. Littlefield v. Nelson, 246 F.2d 956 (10th Cir. 1957).
65. *E.g.*, County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46, 69 (1874); Abbot Kinney Co. v. City of Los Angeles, 340 P.2d 14, 19-21 (Cal. App.), *vacated*, 53 Cal. 2d 52, 346 P.2d 385 (1959); *see* Krimlofski v. Matters, 174 Neb. 774, 119 N.W.2d 501 (1963). *See also* cases cited in note 62 *supra*.

son for this rule, as stated by the United States Supreme Court, is that "the proximate cause was the deposits made by the water. The law looks no further. Whether the flow of the water was natural or affected by artificial means is immaterial."[66] The vast majority of courts place no reliance on the distinction between artificial and natural causes which affect the flow of the water, looking to the speed of change and not the source.[67]

A second type of unnatural addition to riparian land may occur where a human agency has caused land to appear out of the water by what may be termed *direct action.* Thus by filling or by partial relocation of the waters at the point of the disputed parcel, otherwise natural accretions attach to that land. The human agency has therefore caused a natural accretion by means both artificial and direct, a *point-induced accretion.* For instance, riparian owners have been held to acquire title to land where garbage deposits next to the riparian by third persons accelerated accretion to their riparian land.[68] In another situation the Corps of Engineers rechanneled the Mississippi river causing most of the river water to flow through the new channel, although there was still an intermittent flow in the old channel.[69] A reliction occurred in the old channel because of the diversion of most of the water, and alluvion attached to this land because of the intermittently sluggish flow. Plaintiff was a stakeholder seeking a declaration as to whom it should pay royalties for oil well production on this land. The Louisiana court held that the riparian owner, not the state as owner of the bed, held title to the subject land. The court reasoned that there is no distinction between accreted lands caused "primarily" or "partly" by the works of man.[70] Similar results have been reached in other jurisdictions.[71]

66. County of St. Clair v. Lovingston, 90 U.S. (23 Wall.) 46, 69 (1874).

67. *See generally* Annot., 134 A.L.R. 467 (1941). *See also* Adams v. Frothingham, 3 Mass. 352 (1807). *But see* Patton v. City of Wilmington, 169 Cal. 521, 147 P. 141 (1915).

68. Nordale v. Waxberg, 84 F. Supp. 1004, 1005 (D. Alas. 1949), *aff'd,* 182 F.2d 1022 (9th Cir. 1950). On the other hand, the upland owner was denied title to accreted land where he dumped oyster shells into the water fronting his land causing an increase in the rate of accretion. Lorino v. Crawford Packing Co., 142 Tex. 51, 175 S.W.2d 410 (1943). *See also* City of Los Angeles v. Anderson, 206 Cal. 662, 275 P. 789 (1929) (accretions caused partly by dike and partly by portions of the dike sliding into water providing abundance of alluvial material in local waters held vested in the grantee of the state as the owner of the tideland and not in the upland owner); Carpenter v. City of Santa Monica, 63 Cal. App. 2d 772, 789, 147 P.2d 964, 972 (1944) (construction of dike and dumping of materials into waters caused accretions which remained vested in the state's grantee and did not vest in the upland owner); Los Angeles Athletic Club v. City of Santa Monica, 63 Cal. App. 2d 795, 147 P.2d 976 (1944).

69. Esso Standard Oil Co. v. Jones, 233 La. 915, 98 So. 2d 236 (1957), *aff'd on rehearing,* 233 La. 940, 98 So. 2d 244 (1957).

70. *Id.* at 934, 98 So. 2d at 241.

71. *E.g.,* Sieck v. Godsey, 254 Iowa 624, 118 N.W.2d 555 (1962); *see* Krumweide v. Rose, 177 Neb. 570, 129 N.W.2d 491 (1964). *But see* cases cited in note 68 *supra.*

The third category of unnatural additions to riparian land, which probably includes the *Bonelli* dredging situation,[72] embraces land created at the waters' edge by direct filling or dredging, rather than by a man-induced accretive process—"artificial accretion" or "point-induced accretion." This *reclamation* is neither alluvion nor dereliction since it is created by the action of man rather than nature, and since its formation is neither gradual nor imperceptible. Ordinarily, a riparian or littoral owner cannot acquire title to land which he created by filling in the publicly owned bed of a navigable water-course.[73] Where the reclamation of land by filling or dredging of the adjacent submerged land is expressly permitted by statute, however, it is generally held that, so long as the public rights with respect to navigation and commerce are not substantially impaired, filled land created by a riparian proprietor belongs to him as part of the upland.[74]

Where the state or its grantee as the owner of the bed has filled in the submerged land, it is generally held that the state retains title to such reclaimed land even though it may eliminate the riparian character of the upland.[75] In some jurisdictions, however, it is required that the reclaimed land be an integral part of a navigational project for this result to obtain.[76] This requirement—referred to as the navigational purpose rule—is preferable since littoral or riparian rights are already subject to being extinguished without compensation in numerous other ways.[77] The rule is illustrated by *Michaelson v.*

72. *Compare* State v. Gill, 259 Ala. 177, 66 So. 2d 141 (1953), *with* State v. Bonelli Cattle Co., 107 Ariz. 465, 489 P.2d 699 (1971).

73. *E.g.*, Burns v. Forbes, 412 F.2d 995 (3d Cir. 1969); McDowell v. Trustees of Int'l Imp. Fund, 90 So. 2d 715 (Fla. 1956); Carli v. Stillwater Street R. Transfer Co., 28 Minn. 373, 10 N.W. 205 (1881); State *ex rel.* McKay v. Sause, 217 Ore. 52, 89-90, 342 P.2d 803, 821-22 (1959) (dictum).

74. *E.g.*, Holland v. Ft. Pierce Financing & Constr. Co., 157 Fla. 649, 27 So. 2d 76 (1946); Miller v. Mendenhall, 43 Minn. 95, 44 N.W. 1141 (1890) (statute fixing harbor line); Allen v. Allen, 19 R.I. 114, 32 A. 166 (1895) (permit); Gough v. Bell, 22 N.J.L. 441 (1850), *aff'd on rehearing*, 23 N.J.L. 624 (1852) (local common law).

75. *E.g.*, United States v. California, 381 U.S. 139, 177 (1965).

76. Michaelson v. Silver Beach Imp. Ass'n, 342 Mass. 251, 173 N.E.2d 273 (1961).

77. *See* Morreale, *Federal Power in Western Waters: The Navigation Power and the Rule of No Compensation*, 3 NAT. RES. J. 1 (1963); Comment, *The State Navigation Servitude*, 4 LAND & WATER L. REV. 521 (1969); Note, *The Public Right of Navigation and the Rule of No Compensation*, 44 NOTRE DAME LAW. 236 (1968). *But see* United States v. 8,968.06 Acres of Land, 326 F. Supp. 546 (S.D. Tex. 1971), *rev'g* 318 F. Supp. 698 (S.D. Tex. 1970); Pub. L. No. 91-611, § 111, 84 Stat. 1818 (1971) (River and Harbor Act of 1970). The Act is a legislative reversal of United States v. Rands, 389 U.S. 121 (1967). *Rands* held that riparian owners need not be compensated for the value of their land due to its proximity to water where the parcel was being condemned. The Act provides that, where the federal government condemns real property

> in connection with any improvement of rivers, harbors, canals, or waterways of the United States, and in all condemnation proceedings by the United States to acquire lands or easements for such improvements, the compensation to be paid for real property taken . . . above the normal high water mark of the navigable waters of the United States shall be the fair market value . . . based upon all the uses to which such real property may be put, including its

Silver Beach Improvement Association[77a] in which the Massachusetts department of public works authorized creation of a beach fronting on plaintiff's littoral land. The beach was created by dredging and pumping sand from the floor of the harbor in connection with a harbor improvement project. Plaintiff sought to enjoin defendant's use of the beach for public purposes and claimed title to the beach. An injunction was granted and title to the land surfaced by the operation was held to be in the plaintiff. The court reasoned that although the dredging and resultant beach were incident to a navigational project authorized by the legislature and financed by the public, the placing of the dredged material in front of *this particular upland* had no such navigational purpose. The dredged material could have been placed elsewhere. The court stated that to create a public playground as was done here, the state must resort to the welfare power and to the use of eminent domain. Because there was no substantial connection between the reclamation of the land interposed between the upland and the ocean, and the improvement of navigation, the littoral rights of the upland could not be taken without compensation. Other courts have reached the same result on the grounds that the upland owner had taken no part in creating the addition.[78]

A dredging case decided by the Alabama court is exemplary of third-party reclamation by dredging in the main channel and is remarkably similar to the *Bonelli* situation.[79] In order to gain access to the dock of an ammunition dump, the United States Government dredged a channel in Mobile Bay and cast the dredged material along the shoreline, including the portion owned by the plaintiff. This strip of dredged land cut off plaintiff's access to the bay. He received no compensation and could not have successfully demanded it of the federal government.[80] The Alabama court denied the state's claim to the new land, holding that the title was in the plaintiff as the upland owner. The court noted that although the federal government had the

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highest and best use, *any of which may be dependent upon access to or utilization of such navigable waters.* In cases of partial takings of real property, no depreciation in the value of any remaining real property shall be recognized . . . .

Pub. L. No. 91-611, § 111, 84 Stat. 1818 (1971). [Emphasis added.] The definition of "navigable" waters used in the Act is presumably the commerce clause definition. *See* notes 27-31 and accompanying text *supra.* What effect the Act will have on state condemnation proceedings remains to be seen. Absent a direct taking of real property, however, the federal and state navigational servitudes may burden the riparian with non-compensable injury.

77a. 342 Mass. 251, 173 N.E.2d 273 (1961).

78. Harrison County v. Guice, 244 Miss. 95, 140 So. 2d 838 (1962). *See* text & note 73 *supra.*

79. Sate v. Gill, 259 Ala. 177, 66 So. 2d 141 (1953).

80. U.S. CONST. art. I, § 8. *See* materials cited note 77 *supra; cf.* United States v. Twin City Power Co., 350 U.S. 222 (1956).

implied sanction of the state as owner of the bed to dredge the channel,[81] that sanction was for the improvement of navigation and commerce, and not for the purpose of raising the bed above sea level. Noting the actual physical deposit of the dredged material in front of the upland, the court stated:

> It is obvious that we do not have in the case at bar an accretion by any slow or imperceptible processes. It has been suggested that the speeded up, artificial accretion, such as we have in the present case could well be called 'streamlined accretion' or perhaps a reclamation.
>
> . . . [W]here there is what we have termed a streamlined accretion . . . title to such made-land is conferred upon the upland owner, subject only to the paramount rights of the United States and the State in aid of navigation. We understand that the title to the bed or bottom beneath navigable waters is in the state, *but this is a title to the bed as a bed.* . . . The state still owns the title to the bed beneath navigable water, but the made-land being added to the property of the riparin or littoral owner becomes his property.[82] [Emphasis added.]

Thus the navigational purpose rule was reaffirmed. The new land had no substantial connection with the navigational project since navigation was not aided by placing the dredged material in front of this particular upland, and the new land was not needed as a part of the project.

ANALYSIS OF BONELLI

The River's Changing Path

Because the Colorado River was navigable in fact when the United States acquired sovereignty over it, its bed was not ordinary federal land but was held in trust for the people of the states which would be formed bordering the river.[83] Bonelli's predecessor in interest obtained a federal patent for the east one-half of a section of land[84] in

81. 259 Ala. at 183, 66 So. 2d at 145.

82. *Id. See also* Adams v. Roberson, 97 Kan. 198, 155 P. 22 (1916); *cf.* Gillihan v. Cieloha, 74 Ore. 462, 145 P. 1061 (1915) (in absence of claim by state, upcast bed of navigable waterway inures to upland). *See also* Burns v. Forbes, 412 F.2d 997 (3d Cir. 1969) (holding that the doctrine of accretion does not extend to lands dredged by the upland owner without permission of governmental owner of bed; and indicating by dictum that the doctrine of accretion extends to third party's accretions artificially created by dredging and title to such land would inure to the upland).

83. Pollard's Lessee v. Hagan, 44 U.S. (3 How.) 212 (1845). *But see* United States v. City of Anchorage, 437 F.2d 1081 (9th Cir. 1971) (federal patent of lands submerged beneath navigable waters issued to railroad 50 years before statehood was a valid conveyance).

84. E ½, Sec. 3, T 19 N, R 22 W, G&SRM. This parcel is located just north of the Fort Mohave Indian Reservation where the States of Arizona, California and Nevada converge.

1910, two years before Arizona's statehood. A United States Geological Survey Map dated 1902-03 showed the Colorado River approximately one-quarter of a mile west of this section. The river, however, moved steadily eastward from that time and it was not known at the trial whether the subject parcel was riparian at the time of the grant. If in fact the parcel was riparian at the time of the conveyance, the presumption would be that the federal grant of the upland did not include a grant of the adjoining river bed unless expressly made.[85] If such a grant could have been shown, the *Bonelli* situation would never have arisen because the upland and the bed would have been held under one title and there would have been no boundary present to move with the later encroachment of the river. Since there was no showing of such a grant, the federal government retained title to the adjacent bed.

Upon admission to the Union in 1912, the State of Arizona succeeded the federal government to the title of the bed of the Colorado River and held it in trust for the people of the state. The area in controversy in *Bonelli,* however, was not at that time part of that bed. It was then dry land owned by Bonelli's predecessor. It was generally agreed at trial that between 1903 and 1938 the river in this area gradually eroded its east bank and deposited alluvion on its west bank, resulting in the submergence by erosion of the disputed acreage and leaving dry approximately 60 acres in the southeast corner of the parcel.[86] As the river crept eastward, the boundary between the upland and the state-owned bed also moved mechanically eastward with this gradual encroachment, transferring the title to lands which had become a part of the bed from the riparian to the state.[87]

The operation of Hoover Dam beginning in 1938 reduced the flow of water in the Colorado. Local currents were affected, and the river stopped its eastward encroachment in the *Bonelli* area. Damming of the river may also have prevented or inhibited a possible subsequent reversal of direction of encroachment which would have accreted land on the east bank rather than eroding it. By the great weight of authority however, the operation of the dam has no legal effect on the doctrine of accretion and the latter remains in full force.[88] While the dam, like any other man-made obstruction, may affect the

85. *See* Fraser, *supra* note 13.
86. 107 Ariz. 465, 467, 489 P.2d 699, 701 (1971).
87. Even if the title had not been so transferred and the riparian had remained the owner of the submerged land, the public right of navigation would have been guaranteed through federal or state enforcement of the *jus publicum. See* text & note 21 *supra. See also* cases cited at note 29 *supra.*
88. *E.g.,* Beaver v. United States, 350 F.2d 4, 11 (9th Cir. 1965), *cert. denied,* 383 U.S. 937 (1966); *see* cases cited in notes 62-71 and accompanying text *supra.*

flow and currents of the river, the benefit of accretion and the detriment of erosion still fall where chance would have them.

Ownership of the Resurfaced Land

In 1955 *Bonelli* acquired a deed to the subject half-section which, with the exception of the 60 acres in the southeast corner, was at that time covered by water. Since submergence by erosion of navigable water extinguishes title in the upland, the deed could not have conveyed the fee to that portion of the parcel covered by the river. The state owned it rather than the grantor. The grantor did, however, possess an interest in the lost land if the doctrine of reemergence were to be followed.[89] This interest might be labeled an "expectancy" where the title would re-vest should the land be reexposed. In describing the submerged land, the deed presumably conveyed whatever interest the grantor possessed. This, therefore, would provide the basis for a claim to the land later re-exposed in 1960.

Some 10 years after the land was re-exposed by the federal dredging project, Bonelli brought this action to quiet title.[90] The suit was successful[91] in the trial and intermediate appellate courts, but met with reversal in the Supreme Court of Arizona. The plaintiff's argument that the doctrine of reemergence should apply to the exposed land was obliquely dismissed by the court: "We believe . . . that the dredging of the river is an engineering relocation of the waters . . . by artificial means and is not a true case of withdrawal or retrogression."[92] Under the doctrine of reemergence, however, neither the rate of accumulation nor the causative force should be considered;[93] the restoration of lost land may be gradual or sudden, natural or man-induced. Since title to land lost by erosion passes to the state, ostensibly to facilitate the protection of public rights in navigable waters,[94] when the land is left dry and no longer connected with that interest,

89. *See* text & notes 55-61 *supra.*

90. The quiet title action was brought as a preliminary step in the plaintiff's plans for the development of a river resort area on the parcel. Telephone interview with Elmer C. Coker, Attorney for Plaintiff, State v. Bonelli Cattle Co., 107 Ariz. 465, 489 P.2d 699 (1971), *rehearing denied, & opinion clarified,* 108 Ariz. —, 495 P.2d 1312 (April 13, 1972), *rev'g* 11 Ariz. App. 412, 464 P.2d 999 (1970), Phoenix, Ariz., Jan. 24, 1972.

91. Both the trial court and the Arizona Court of Appeals held for the plaintiff. 11 Ariz. App. 412, 464 P.2d 999 (1970).

92. 107 Ariz. at 468, 489 P.2d at 702.

93. *See* Mulry v. Norton, 100 N.Y. 424, 3 N.E. 581 (1885); text accompanying notes 55-58 *supra.*

94. *Cf.* Barney v. City of Keokuk, 94 U.S. 324, 338 (1876):

> In order that the passage ways of commerce and navigation might be subject to public authority and control, title to land under water and to the shore below ordinary high water mark . . . [should be] vested in the [sovereign] for public use and benefit.

it should be restored to the upland no matter what the cause of resurfacing.[95]

The *Bonelli* plaintiff's second argument that the exposed land should be considered an "artificial accretion" to his upland was summarily rejected by the court, which observed that the addition of land in this case was neither gradual and imperceptible nor the result of natural causes.[96] A thorough analysis of this issue requires full consideration of both the theoretical and factual aspects of the situation presented. The dredging process undoubtedly affected the flow and currents of the river and produced three separate effects. The first two effects are closely linked. The dredging probably raised a great deal of sediment facilitating local alluvion deposition contemporaneously with the reliction of the waters caused by the deepening and narrowing of the channel. Third, spoil dredged from the river bed was deposited toward the banks of the river adding appreciably to the land accumulation. The three processes in concert thus brought about the disputed dry acreage. By the mechanics of the accretion doctrine, the alluvion deposition and reliction were presumptively gradual and imperceptible,[97] notwithstanding the human works in the river.[98] The

95. The upland owner may not, of course, reclaim any part of the bed without governmental permission.

96. 107 Ariz. at 468, 489 P.2d at 702. The cases cited by the court in support of the holding on this issue seem to have little relation to the *Bonelli* situation. Wilemon v. City & County of Dallas Levee Improvement Dist., 264 S.W.2d 543 (Tex. Civ. App. 1953), *cert. denied*, 348 U.S. 829 (1954), involved a plaintiff whose land had abutted a navigable river where the district had cut an entirely new channel away from plaintiff's land and had removed the waters completely from the old bed. Neither the question of reemergence nor of preservation of riparian access was involved and plaintiff's claim to the dried river bed was denied. Ray v. State, 153 S.W.2d 660 (Tex. Civ. App. 1941), involved the same type of total relocation of the waters of the navigable Trinity River. In that case, however, the state's title in the old bed was retained on the ground that the old bed was part of a navigation and river control project and might be needed for flood control.

State v. Aucoin, 206 La. 787, 20 So. 2d 136 (1944), is distinguishable in that the case involved the question of artificial relictions to land abutting a lake, and by Louisiana law the doctrine of accretion does not apply to lands abutting a lake. LA. CIV. CODE ANN. art. 509-10 (West 1952).

Padgett v. Central & S. Fla. Flood Control Dist., 178 So. 2d 900 (Fla. 1965), may also be distinguished from *Bonelli*. Although the Florida court declared that "[t]he doctrine of reliction . . . is applicable to additions created by recession of waters from natural causes; it does not apply to land reclaimed by drainage operations of governmental agencies," *id.* at 904, the court relied strongly on the ground that the plaintiff's predecessor's grant and plaintiff's deed contained a reservation in the state, declaring that the state could carry out such reclamation and retain title to the bed, and thus plaintiff had notice and could not complain.

97. *See* note 53 *supra*.

98. *See* text & notes 62-71 *supra*. A rather tenuous argument may be made that the accumulation of the land involved in *Bonelli* would qualify as gradual and imperceptible. If the dredging operation took place over a period of 6 months, for example, the exposure of a half-section of land would proceed at the rate of about 0.12 inches per minute. Arguably, this rate may qualify as imperceptible. The outcome, of course, should not depend on a matter as mechanical as this. See Beck, *supra* note 45 for a discussion of cases of natural accretions of large amounts of land which have occurred in months or even weeks. *See also* Esso Standard Oil Co. v. Jones,

load-by-load dumping of spoil dredged from the river bottom was, of course, easily perceptible, which would seem to enable the state to carry its burden of overcoming the presumption. An impasse in the application of the mechanical rules develops, however, since it is impossible to separate the spoil from the accretions and relictions over the physical area of the disputed land. No one can say with any measure of certainty that a certain cubic yard is attributable to reliction; this cubic yard to alluvion, or that to spoil.

Consideration of the theories behind the accretion doctrine supports awarding the new land to the riparian. By the theory of accession, the upland owner has a right to accreted lands similar to that of the owner of a tree to its fruit.[99] That some third party has "fertilized" the growth should be of no effect. Under the productivity concept, the upland owner is in a better position than the state to utilize the new land.[100] The compensation rationale reasons that since the upland is subject to loss by erosion, it should gain by accretion. A compensation theory might similarly be formulated for man-made or man-caused additions: since lands riparian to navigable water may suffer noncompensable losses and injuries[101] or be deprived of their riparian character altogether by federal or state exercise of the navigational servitude,[102] surfaced land should inure where it is not needed as an integral part of the navigational project.[103] The state, for instance, might show that, due to varying releases of water through Hoover Dam, the land disputed in *Bonelli* is needed to carry periodic over-flow of the river.[104] Or it might show that the land is needed for a dike or similar river-control project. Absent such a demonstration, however, the new land should vest in the upland owner to preserve his riparian status.

The riparian owner has no control over *natural* forces which might cause intervening lands between his land and the river and which, if not held by the riparian, would extinguish the riparian status of his land. The accretion doctrine guarantees maintenance of his riparian status by automatically awarding him the ownership of such intervening lands. Similarly, because of the federal and state navigational servitudes, the riparian has no control over the *governmental* forces which may cause such intervening lands. Where land cast up in the

233 La. 915, 98 So. 2d 236 (1957), *aff'd on rehearing*, 233 La. 940, 98 So. 2d 244 (1957).

99. See note 41 *supra*.

100. See text & note 42 *supra*.

101. See note 77 *supra*.

102. *Id.*

103. *See* Michaelson v. Silver Beach Imp. Ass'n, 342 Mass. 251, 173 N.E.2d 273 (1961).

104. *See* Ray v. State, 153 S.W.2d 660 (Tex. Civ. App. 1941). *See also* note 96 *supra*.

exercise of the servitude is not needed to further navigation, accretion theory should provide a disposition.

The High Water Mark

In clarifying the definition of "high water mark" in the supplemental opinion to *Bonelli*, the Supreme Court of Arizona held that "subsequent artificial control of the river could not deprive Arizona of property rights in the bed [of the Colorado River] which were constitutionally vested prior to the completion of the Hoover Dam in 1938" and that consequently the high water mark *as it existed in 1938* is the line of demarcation between the upland owner's property and the state-owned bed.[105] Although citing no authority in direct support of its holding, the court referred to the Submerged Lands Act[106] for the proposition that the state owns the beds beneath navigable waters to the high water mark as it existed in 1938. The Act is more logically construed, however, to support a result contrary to that reached in the *Bonelli* supplemental opinion.

The Act specifically adopts the concept of the changing river bed by declaring that the state holds title to lands submerged beneath nontidal navigable waters within their boundaries "as heretofore or hereafter modified by accretion, erosion, and reliction."[107] Presumably, when they enacted the Submerged Lands Act the members of Congress knew of the common law of accretion, including the case of *County of St. Clair v. Lovingston*,[108] decided by the Supreme Court of the United States in the 19th century. That case held that man-made obstructions and interferences in a navigable waterway have no effect on the operation of the doctrine of accretion, and that "whether the flow was affected by artificial means is immaterial" to the vesting of accretions in the riparian owner. Thus the Act may be construed simply to confirm existing case law regarding the beds of nontidal navigable waterways: the state holds the bed as a bed; the state loses title to lands made dry by accretion, while the riparian loses title to lands submerged by erosion, regardless of artificial or natural causes. Similarly, while quit-claiming federal interests in lands reclaimed from navigable waters,[109] the Act has no effect on private claims to such

105. 108 Ariz. —, —, 495 P.2d 1312, 1313-14 (1972).
106. 43 U.S.C. §§ 1301-1343 (1970).
107. *Id.* § 1301(a)(1).
108. 90 U.S. (23 Wall.) 46, 69 (1894).
109. 43 U.S.C. §§ 1301(a)(3), 1311 (1970), said to be a "saving clause providing that nothing in [the Act] shall affect such rights, if any, as may have been previously acquired under any law of the United States [in] lands subject to this resolution." S. REP. No. 133, 83d Cong., 1st Sess., pt. 1, at 13 (1953).

lands.[110] The Supreme Court of Arizona, therefore, may look to the Submerged Lands Act solely for the proposition that the state presumptively holds title to the beds of navigable waterways to the *current* high water mark. The Act leaves the individual state to decide whether reclamations are to be treated as accretions, rather than declaring that reclamations must remain in the state.

The *Bonelli* definition of the high water mark is as far-reaching as it is unique. The operation of Hoover Dam since 1938 has reduced and slowed the flow of the river. This undoubtedly facilitated alluvion deposition and reliction downstream. If the hypothesis is accepted that the width of the river has merely diminished while the middle thread of the river has remained geographically constant, the result of the holding that such accretions do not vest in the riparians is that the state owns a corridor of lands, extending from the dam to the Mexican border, intervening between the riparians and the river, thus leaving no private persons riparian to the Colorado River in Arizona. The inequity to the riparians is equally manifest as the effect on stability of title.

Alternatively, there are probably areas along the river which have been submerged by erosion since 1938. If the high water mark of 1938 is controlling, the state does not hold title to such lands—the private adjacent owner does. This, of course, is inconsistent with virtually unanimous case law.[111] It may be argued that the court has dealt with this contingency in their enigmatic statement that while 1938 was the date at which the boundary was set, "evidence of the river's condition thereafter may be illuminating."[112] If this is an attempt to provide that lands submerged since the operation of the dam still vest in the state, while at the same time denying the riparians accretions, the court is perverting the common law. There is no authority for such a position and there is certainly no reason in support of it. On the other hand, if the statement may be regarded as extraneous, there is little escape from the result that lands submerged after the beginning of operation of the dam do not vest in the state since, as the court reasons, "artificial control of the river could not divest" the upland owner of his property rights.[113]

The result of this interpretation of the court's definition of the high water mark is that the bed of the river is a mosaic, predom-

110. See text accompanying notes 32-36 *supra*. *See also* Arizona v. California, 381 U.S. 139, 177 (1965).
111. *See* text & notes 37-54 *supra*.
112. 108 Ariz. at —, 495 P.2d at 1314.
113. *Id.*

inantly state held but interspersed with privately-held parcels. Similarly, the lands abutting the river are held by the state in places where the 1938 high water mark extends higher than the current high water mark, while they are privately held in other places where the 1938 high water mark coincides with the current high water mark. This is, of course, inconsistent with the accretion doctrine's purpose of providing stability of status—the state should maintain proprietary control over the bed, while the riparian should remain riparian. The riparian should obtain the benefit of accretion and suffer the burden of erosion. In holding otherwise in the supplemental opinion, the Arizona court has misconstrued or distorted the common law, or has failed to articulate the underlying rationale for its decision.

The Effect on Riparian Rights in Arizona

The *Bonelli* decisions cast doubt upon the existence of vestigial riparian rights in Arizona. Though the riparian *usufructory* right was expressly abrogated by the state constitution and the doctrine of prior appropriation substituted in its stead,[114] both policy and legal reasons exist for confirming the retention of those riparian rights not essential to the efficient administration of the appropriation system. One such right which could easily have survived the adoption of the appropriation doctrine is the right of access to navigable waters.[115] If access is maintained, other riparian benefits such as fishery, recreation and the right of accretions should logically follow since they are dependent upon access.

Since Chief Justice Struckmeyer, writing for the *Bonelli* majority, failed to remark upon or consider the loss of riparian status of the plaintiff, it might be inferred that no such vestigial riparian rights are recognized by the court. It is hoped that no such implication was intended. Such a conclusion, however, is difficult to avoid; if the riparian status held any significance for the justices in the majority, its loss presumably would have been weighed against the interest of the state in retaining the exposed bed. In other words, the result may not have been different, but the manner of arriving at that result may have been.

Instead of weighing the competing interests, the court merely de-

114. ARIZ. CONST. art. 17, §§ 1, 2.

115. *E.g.*, Shepherd v. Couer d'Alene Lumber Co., 16 Idaho 293, 101 P. 591 (1909); *cf.* Hutchinson v. Watson Slough Ditch Co., 16 Idaho 484, 101 P. 1059 (1909); State v. Red River Valley Co., 51 N.M. 207, 182 P.2d 421 (1945) (those riparian rights not conflicting with appropriation doctrine are in full force as part of the common law of New Mexico). *See also* Note, *Riparian Rights in Appropriation States*, 9 WYO. L.J. 130 (1955).

nied the plaintiff's claim to the reexposed land by blandly distinguishing the dredging operation from water-caused alluvion deposition and natural reliction. Though the inference of nonrecognition is possible, the court should speak directly to the issue of whether or not vestigial riparian rights are recognized in Arizona. The existence of such rights has at least one vocal friend on the court in Justice Lockwood.[116] Her lengthy dissenting opinion in *Bonelli* distinguished the riparian *use* right from other common law riparian rights and concluded that the latter survived the abrogation of the former.

The tenor of Arizona judiciary on such rights is difficult to ascertain. The riparian right to natural accretions has been upheld by the Arizona Court of Appeals,[117] and the doctrine of accretion has been applied by the Supreme Court of Arizona to confirm jurisdiction over a criminal act.[118] These decisions, however, provide little insight into the Arizona judicial view of the right of access. The court of appeals rested on the theories of compensation and boundary, while the high court merely cited the mechanical boundary rule.

The case of *Brasher v. Gibson*[119] at first impression seems to preclude any recognition of the right of access. There the court stated that no riparian rights were recognized at all in the state, and denied a right of access and use to a landowner who had become riparian to a *man-made* lake. The court, however, cited cases from *riparian* jurisdictions which hold the same result, thus relegating the pronouncement to dictum.

The ominous void in *Bonelli* should be filled by an express judicial affirmation of the riparian right of access to navigable waters. Statutes in derogation of the common law should be strictly construed.[120] It is inconceivable that in adopting the appropriation doctrine the Arizona constitutional convention sought to deny the common law right of a riparian in Yuma, for instance, to wharf out into the river to provide mooring for rivercraft. Since the section of the state constitution purporting to abolish riparian rights is contained in the water *use* article, it should be limited to the abolition of the riparian usufructory right only. The right of access is not inconsistent with the appropriation system.[121]

116. State v. Bonelli Cattle Co., 107 Ariz. 465, 469-72, 489 P.2d 699, 703-06 (1971) (Lockwood, J., dissenting).
117. State v. Gunther & Shirley Co., 5 Ariz. App. 77, 423 P.2d 352 (1967).
118. State v. Jacobs, 93 Ariz. 336, 380 P.2d 998 (1963).
119. 101 Ariz. 326, 419 P.2d 505 (1966).
120. Richardson v. Ainsa, 11 Ariz. 359, 95 P. 103 (1908).
121. *See* note 115 *supra; cf.* United States v. River Rouge Improvement Co., 269 U.S. 411 (1926).

APPLICATION OF FEDERAL LAW

Since the *Bonelli* parcel is federally patented land, grounds may exist for invoking federal jurisdiction and law over the issues involved in that case. In *United States v. Washington*[122] the Ninth Circuit held that when title is in or derived from the federal government, the question of ownership of accretions is to be determined by federal law. That case dealt with accretions to federally held upland. State law denied any right to accretions, and the state claimed the new land. The court awarded the disputed land to the federal government as the owner of the upland.

A later case, *Hughes v. Washington*,[123] dealt with the same state law denying littoral owners any accretions. This upland had been federally patented to the plaintiff's predecessor-in-interest before Washington's statehood. The Supreme Court of the United States, citing *United States v. Washington* with approval, held that what rights are conveyed by, and

> the extent of ownership under a . . . federal grant [are] governed by federal law. This is as true whether doubt as to any boundary is based on a broad question as to the general definition of the shoreline *or on a particularized problem relating to the ownership of accretion.*[124] [Emphasis added.]

The disputed land was awarded to the upland owner by operation of the accretion doctrine. It is apparent then, that the issue as to the ownership of post-Hoover Dam accretions is a matter of federal law and that the *Bonelli* definition of the high water mark is inapplicable to the land disputed in that case, other federally patented lands, Indian lands, and federally held lands.[125]

The issue of ownership of reclamations, however, may or may not be a matter of federal law where federally held or federally granted lands are involved. It is possible that *Hughes* and *Washinton* could be limited to their facts so that federal law is applicable only to "natural" or water-borne additions to such lands. This limitation would leave the disposition of reclamations to the determination of state law.[126] The cases might easily be read, however, to include recla-

122. 294 F.2d 830 (9th Cir. 1961), *cert. denied*, 369 U.S. 817 (1962).
123. 389 U.S. 291 (1967).
124. *Id.* at 292.
125. *See* United States v. Claridge, 416 F.2d 933 (9th Cir. 1969), *cert. denied*, 397 U.S. 961 (1970), *aff'g* 279 F. Supp. 87 (D. Ariz. 1967); Beaver v. United States, 350 F.2d 4 (9th Cir. 1965), *cert. denied*, 383 U.S. 937 (1966).
126. *See* Barney v. City of Keokuk, 94 U.S. 324, 337 (1876):
> It is generally conceded that the riparian title attaches to subsequent ac-

mations as "streamlined accretions."[127] Since the *Bonelli* parcel is federally patented land, the rights inherent in the grant, including those regarding the addition of lands by "artificial means" and reclamation-created changes in the boundary between the upland and the water, could arguably be governed by federal law.[128]

Although the federal rule may not be readily ascertained, it is very possible that the federal courts would adopt the navigational purpose rule.[129] If this were not so, every time the federal government dredged the Colorado River adjacent to federal and Indian lands situated in Arizona, it would be cutting off riparian access of those lands. Though the federal courts might give weight to the Arizona decision, it is possible that they would reach a different result. Citing the federal and state power over navigation, the *Hughes* Court stated that although the right of access to water is "subject to considerable control by the neighboring owner of the tideland, . . . this is insufficient reason to leave these valuable rights at the mercy of natural phenomena which may in no way affect the interests of the tideland owner."[130] This statement embodies the spirit of the navigational purpose rule. Since the upland owner is subject to losing his access to water and other riparian benefits by, and is therefore at the mercy of, federal or state exercise of navigation powers, when land upcast by artificial means is not needed for a navigational purpose, title should go to the upland by the doctrine of accretion.

ALTERNATIVE RESOLUTIONS

The *Bonelli* result on the reclamation issue will cause many stretches of land along the Colorado River to lose their riparian character. The state will gain a corridor of valuable riparian bottom-land

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cretions . . . effected by gradual and imperceptible operation of natural causes. But whether it attaches to land reclaimed by artificial means from the bed of the river . . . is a question which each state decides for itself.

That case, however, involved neither federally held upland nor federally granted upland. *See* Borax Consol. v. City of Los Angeles, 296 U.S. 10 (1935) (meaning of phrase "mean high tides" present in post-statehood federal grant determined under federal, not state law).

127. State v. Gill, 259 Ala. 177, 183, 66 So. 2d 141, 145 (1953); *see* text & notes 79-82 *supra.*

128. *Compare* Barney v. City of Keokuk, 94 U.S. 324 (1876), *with* Hughes v. Washington, 389 U.S. 291 (1967), *and* United States v. Washington, 294 F.2d 830 (9th Cir. 1961).

129. *See* text & notes 76-82 *supra. See also* 43 U.S.C. §§ 1301-1343, 1301(a)(3), 1311 (1970), amounting to a federal quit-claim of reclamations. Indian lands, however, are exempted from the effect of the act. *Id.* § 1313.

130. 389 U.S. at 294. *Cf.* Burns v. Forbes, 412 F.2d 997 (3d Cir. 1969) (dictum that reclamations caused by a third person having no connection with the upland owner inure to upland title).

exposed by the dredging operations of the Bureau of Reclamation at no expense to the state. On the other hand, had the result gone the other way, the riparians along the river in many cases would have been granted a bonus of large acreages of that same valuable land without any effort or expenditure on their part. Either result is arguably inequitable.

There are three alternatives which would better protect the riparians and simultaneously safeguard the state's interest in the reclaimed lands. One alternative, which could be judicially imposed, is to require the state to compensate the riparian for his loss of access to the waters. The right of access is a valuable property right deriving from the natural location of land.[131] The reclamation of state land intervening between the riparian and the new water mark in effect transfers this property right to the state land. That the state holds the technical fee to the soil under the river does not support such a transfer, for that soil itself was subject to the access easement in favor of the riparian land. Neither does the navigation servitude support the transfer since the improvement of navigation in no way requires it. Thus access is destroyed by ownership of the intervening land and is transferred to state land which previously had no appurtenant right of access. The state therefore could be required either to compensate the riparian for this loss or to renounce its interest in the new land and allow the riparian to take it.[132]

A second alternative, which could also be judicially imposed, is to allow a right of easement across the intervening state land. Such a result was reached in *Commercial Waterway District No. 1 v. Permanente Cement Co.*, where the Washington court allowed a littoral right of easement across the intervening bed cast up by channel dredging carried out by the state's grantee.[133]

A third alternative is one which will protect all the interest involved in a more equitable manner. The legislature could provide that the riparians be given the right to purchase the exposed river-bot-

131. *E.g.*, Norwalk v. Podmore, 86 Conn. 658, 86 A. 582 (1913); Lyon v. Fishmonger's Co., 1 App. Cas. 662 (H.L. 1876).

132. *See*, Note, *Access and Reclamation*, 32 YALE L.J. 1 (1922). *See also* Marshall v. Ulleswater Steam Navigation Co., L.R. 7 Q.B. 166 (1871).

133. 61 Wash. 2d 509, 379 P.2d 178 (1963). *See also* Melbourne Harbour Trust Comm'rs v. Colonial Sugar Refining Co. Ltd., [1925] Vict. L.R. 384, 438-39, 462-64 (Austl. 1925). The easement, while technically preserving access, would cause problems for the riparians as well as the state. For example, a private person may have built a hotel along the river only to have the federal government dredge the river with the resultant intervening reclamation between the riparian and the river. The state might use the parcel for an incompatible project, and the easement would then mean very little.

tom which interposes itself between the upland and the new channel. A reasonable price could be set which should be the fair market value of the land less the value attributable to its proximity to the river, since the original parcel was riparian prior to the dredging. If a particular riparian values the right of access, he should be permitted to purchase as much of the frontage as he desires up to the limit of his original shoreline. A reasonable time limit could be set within which to notify the state of an intent to purchase. Failure to exercise the option within the specified time period would confirm title in the state.

The proceeds from such sales could be deposited in a fund established to promote the broad purposes of the public trust from which the lands came—namely the promotion of public use and enjoyment of navigable waters. This promotion might take the form of state navigational improvement, state parks along the river where the state owns the upland, docks, marinas, and other facilities. This "transformation" of trust property no longer essential to protect the rights of navigation and public enjoyment, would be consistent with the purpose of the formation of the trust.[134] Such a solution would protect all the interests, to greater or lesser degrees, instead of causing a boon on the one hand and an irretrievable loss on the other.

CONCLUSION

The problems faced by the *Bonelli* court were formidable and deserved more written explication than they received. The holding regarding post-Hoover Dam accretions and the definition of the high water mark must be reconsidered either by the Supreme Court of Arizona or, in the case of lands vested in or *derived from* the federal government, by the federal courts. Allowing the 1938 high water mark to delineate the boundary between the state-owned bed and the uplands does violence to the accretion doctrine and hundreds of years of common law. Practically, the decision will cause confusion and hardship among landholders within Arizona along the Colorado River. Because the lands involved in *Bonelli* had previously been held by the upland owner and were then lost to the river by erosion, re-exposure of the lost acreage should result in an award to the upland owner by the doctrine of re-emergence. The cause of the re-exposure should be of no effect.

The broader holding regarding the reclamation issue failed to consider the certain loss of riparian status due to forces wholly be-

134. *See generally* Sax, *supra* note 19.

yond the control of the upland owner. This omission perhaps forbodes the untimely demise of the riparian right of access to navigable waters in Arizona. That such a right exists should be judicially affirmed and its loss weighed against other considerations presented in the reclamation issue involved in *Bonelli*. Once this vestigial riparian right is established, traditional accretion theory, as supplemented by the navigational purpose rule, provides ample support for an award of reclaimed land to the upland. Such a result may be reached by federal courts in dealing with lands in or derived from the federal government.

Finally, in the absence of judicial action a solution should be sought that will protect all of the interested parties involved in the reclamation problem. It is proposed that by giving the riparian the right to purchase intervening reclamations and by setting up a fund derived from such sales to promote the purpose of public use and enjoyment of navigable waters, the legislature could effect a more equitable result than the one fashioned by the court.