THE LEGAL IMPLICATIONS OF COASTAL EROSION IN LOUISIANA

The weathering effects of natural forces in the coastal zone contribute to endless alteration of the landscape. The physical causes of this erosion and its ramifications are currently objects of intense scientific inquiry. Science is not the only discipline studying, and reacting to, the severe changes worked by erosive forces in the coastal environment of Louisiana, for in addition to habitat loss, hydrological modification, adverse effects on fisheries, and myriad other physical manifestations, erosion presents significant legal consequences for landholders in the coastal zone. This paper will examine the legal implications of erosion to coastal property owners in Louisiana. First, an exploration of how erosion changes the relationship between an individual private property owner and the state will be undertaken. Later, the relationship between the state government and the federal government as property owners will be examined to illustrate potential changes in legal ownership directly attributable to coastal erosion.

EROSION, STATE WATERBOTTOM OWNERSHIP AND THE PRIVATE PROPERTY OWNER

Ownership of property is an ancient and fundamental legal right in western civilization. In addition to exclusive rights to the surface, private property owners may possess preemptive rights in subsurface minerals and even the airspace above the land. The measure of the property owner's rights is tied to the surface area of his holdings and boundaries established on the surface serve as a convenient method delineating the rights of adjoining property holders.

Just as any person may own property in his individual capacity, the state may own property and exercise all normal proprietary functions over its domain. In the celebrated 1845 case, Pollard's Lessee v. Hagan, the United States Supreme Court determined that each state owned the lands underneath navigable waters within the state. The Court reasoned that because the original 13 states owned the land under their navigable waters, all states subsequently entering the union should take ownership of equivalent waterbottoms because the Constitution promised them "equal footing" at statehood. Because Pollard's Lessee v. Hagan involved only the tidewaters of Mobile Bay, and was further complicated by a deed of cession from the state of Georgia to the United States, the case did not make clear whether the equal footing doctrine gave the states title to the beds of inland navigable waters not affected by the tide. However, subsequent Supreme Court decisions held that the states did in fact own the bottom of inland navigable waters (such as the upper Mississippi). Still later, the Supreme Court decided that state law—rather than federal common law—controlled the disposition of navigable waterbottoms, including what general rules of law would apply when such lands eroded.

Therefore, in Louisiana's coastal wetlands, Louisiana property law dictates the consequences when a private landowner's property erodes under the forces of nature.

Since the state of Louisiana owns the beds of navigable bodies of water, a key inquiry that must be made before the legal consequences of erosion can be determined is whether or not the body of water abutting the private landowner's property is "navigable." Louisiana courts have essentially adopted the federal admiralty definition of navigability. The Daniel Ball, a United States Supreme Court case, defines navigable rivers in the following manner: "Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on waters."

Using this definition, Louisiana courts have determined that historical commercial use or actual present commercial use may adequately demonstrate navigability for property law purposes.

Once navigability has been determined, the legal consequences which result from erosion depend on where the erosion is occurring. Louisiana property law recognizes three distinct types of shoreline: lakeshore; banks of rivers, bayous and streams; and seashore. Similar types of erosion in each of these areas can have widely differing legal consequences for the private property owner.

LAKESHORE EROSION

Article 500 of the Civil Code prevents the riparian landowner from taking any property rights in land exposed by the gradual receding of a lake (dereliction) or in the gradual buildup of sediment on the lakeshore (alluvion). At the same time, Articles 450 and 452 hold that the bottoms of navigable water bodies are public things and incapable of private ownership. Because the courts have ruled that the State owns the bottom of a navigable lake up to the high water mark, Louisiana law, in effect places the private property owner abutting a navigable lake, in a "no win" situation.

If the lake shrinks due to imperceptible natural causes, his property is separated
from the water by a strip of state-owned land. If his shoreline is eroding or his land is subsiding, the state takes title to any land that is inundated by the expanding lake waters.16

It has already been noted that the equal footing doctrine requires that the state be given title to all land under navigable waters when it enters the union. When Louisiana was admitted to the Union in 1812, it was given ownership to all land under navigable waters up to the high water mark. Because Article 500 prevents the state from losing any land to the private riparian landowner, the threshold question of navigability assumes critical importance when assessing the property law implications of shoreline erosion in a coastal lake. If the waterbody was navigable in 1812, Article 500 dictates that the limit of such navigable waters in 1812 is an immutable line in favor of the state.19 That is, irrespective of the waterway's navigability today, the state will always own as much as was navigable in 1812. Furthermore, erosion on lake shorelines serves to increase state land ownership in direct proportion to the decrease in private property ownership.

The Louisiana Supreme Court in Miami Corp. v. State19 summarized the rule in this manner: "It appears to be the rule that where the forces of nature—subsidence and erosion—have operated on the banks of a navigable body of water, regardless of whether it is a body of fresh water or the sea, or an arm of the sea, the submerged area becomes a portion of the bed and is insusceptible of private ownership."21 Furthermore, "The more fact that a portion of the bed of a navigable body of water may have been formed by the action of natural forces does not change the situation, for the rule is, that when subsidence occurs, the submerged portion becomes a part of the bed or bottom of the navigable body of water in fact, and therefore the property of the state, by virtue of its inherent sovereignty, as a matter of law."22

Under this rule, the determination that a body of water was navigable in 1812 will dictate the legal consequences of erosion in a lake 170 years later.

If the waterbody was not navigable in 1812 a different set of legal consequences occurs. In such a case, the lake bottom is a private thing23 and may be held by the private property owner. Therefore, if subsidence creates a lake on private property after 1812 or enlarges (or shinks) an existing but non-navigable lake, the owner does not lose title to the land. If the lake that was non-navigable in 1812, becomes navigable due to natural forces, the Civil Code and the jurisprudence of Louisiana provide no definite answer as to the ownership of the lake. A literal reading of Article 450 would require that ownership of the bed must go to the state, but this view has been criticized.24

**BANK EROSION OF RIVERS, BAYOUS, AND STREAMS**

Deltaic river systems are much more dynamic than the non-deltaic river system. Rules of law govern the ownership effects of erosion on private property adjacent to rivers, bayous and streams. Navigability is still important, but the "immutable line" concept of lakeshore erosion does not apply in the riverbank erosion situation. Rather, the courts reflect the concept implicit in the Code that navigability and its relationship to property law must reflect the nature of Louisiana's rivers.25 Generally, the courts apply the same navigability test for rivers as for lakes and if a river is deemed navigable, the equal footing doctrine grants title of the bed to the state. But unlike lakes, navigable rivers can rapidly become navigable, while other segments may become non-navigable. Because of this, the concept of navigability as applied to rivers must more accurately reflect the changing nature of Louisiana's rivers.

If a river is determined to be navigable, state law limits the state-owned bed to submergence caused by mean low water as measured on both banks.26 If the river is found to be non-navigable, the bed may be held in private ownership.27

The critical question that governs the Louisiana courts' inquiry into the legal consequences of riverbank erosion is not navigability, but rather the nature of change brought about by erosive forces. If the change is gradual and imperceptible, erosions has one set of legal consequences, but if erosion is sudden and avulsive, another set of consequences arise.

There are four imperceptible changes on navigable rivers that are specifically recognized under Louisiana law: erosion, accretion (or alluviion), derivation and the creation of islands and sandbars. As a general rule, the riparian landowner loses to the state any land that is eroded by a navigable river, but gains from the state any alluviion that is deposited on his bank which his property to accret.28 This rule is best summed up by the Louisiana Supreme Court in *Succession of Delachaise v. Hagnies*.29

"In . . . [a] . . . sense it may be said that rivers give or take away, like chance or fortune. Rivers can give away the owner must bear the loss; if it gives, justice affords him the gain."30

The Louisiana courts have determined that since the Civil Code dictates that the beds of navigable rivers are insusceptible to private ownership, erosion creating new riverbed must work in favor of the state because "once a body of water is found to be navigable, it follows that the bed or bottom must be held to be the property of the state."31

The Civil Code specifically sets out the rules for adoption of alluvion. Article 499 simply states that "the alluviion belongs to the owner of the bank..." However, it must be noted that although the avulvod owners in some may be held in private ownership, Article 499 reserves to the public the right to occupy such banks for necessary purposes (e.g. wharfs, boat landing, drying of nets, etc.).

Dereliction, the imperceptible drying up or retreat of a navigable river, is treated similarly to accretion. Ownership of newly exposed land belongs to the riparian,32 subject to the Code provision which reserves some uses of the exposed bank to the public.33

Ownership of newly formed islands and sandbars is controlled by Article 505. If an island or sandbar arises in the channel of a navigable river, ownership goes to the state. However, if a sandbar does not arise independently in the channel, but rather grows out from the shore, it is treated as an accretion and ownership goes to the riparian.34 Litigation over the ownership of sandbars invariably turns on which side can prove how the sandbar was created.35 If erosive forces cause a sudden, or avulsive change, the legal implications are quite different from those of imperceptible changes. The general rule with avulsive changes, as directed by the Civil Code, is that the state will exchange ownership of the old bed for ownership of the new bed.36 If a river suddenly changes course, abandoning its original bed and inundating the land of a former riparian, the state takes ownership of the new bed and the landowner (who now has a river running across his former riparian estate) takes the original lands by adverse possession.37 In *the Louisiana Court of Appeal* expressed the rule this way:

"[W]hen a river changes its course and for this purpose appropriates private property for its new bed, the lawmaker, out of a spirit of justice and fairness, has wisely ordained, in effect, that the owner of the appropriated land shall be compensated for his loss by becoming owner of the abandoned bed."38

The court makes it clear that even though the original bed may still be navigable, the bed that loses its navigability goes into private ownership.39 However, the Code provides that if the river ever resumes its original channel, all parties shall retrace their former lands.40

If an avulsive action of a river cuts off riparian land and creates an island, the Civil Code indicates that the ownership of the island does not change.41 This provision works in conjunction with Article 504 which provides
for the exchange of bed ownership when a river changes course to insure predictable legal consequences in the wake of an avulsive change.

**SEASHORE EROSION**

The legal effects of erosion along the seashore are similar to those of erosion along a lakeshore except that navigability is of little importance. The Submerged Lands Act granted Louisiana paramount rights to the seabed from the mean ordinary low tide line seaward to the three mile territorial limit. Civil Code Article 450, in addition to recognizing ownership of the territorial seabed, grants the state ownership of the seashore.

Seashore is defined in the Code as "the space of land over which the waters of the sea-spread in the highest tide during the winter season." This definition has been interpreted to require more than mere tidal influence to demonstrate that waters are actually part of the sea. In this regard, the courts have held limited "seashore" to the actual coast and "arms of the sea." Working with this definition and the guidance of the Code, Louisiana courts have held that ownership of any seashore that erodes to become sea bottom is transferred to the state. Moreover, any accretions along the seashore are property of the state. The littoral owner is placed in a "no win" situation similar to that of the lakeshore landowner: if his land is eroding, he loses ownership to the state; if his land is accreting, he becomes separated from the ocean by a strip of state-owned land.

**Reclamation Process**

The potentially immense value of oil beneath a landowner's property is generally calculated on the basis of surface land ownership. Erosion, and subsequent transfer of ownership to the state, may mean significant losses in future royalty revenue to a property owner whose land is eroding. In an effort to address this problem, the state legislature—acting in 1978 to create a process by which a property owner can reclaim lands lost to the state by erosion. The Louisiana Constitution provides that:

"The legislature shall neither alienate nor authorize the alienation of the bed of a navigable water body, except for purposes of reclamation by the riparian owner to recover land lost through erosion." (emphasis added)

The legislature exercised the option granted to them in the Constitution and provided a mechanism whereby a property owner can earn back land he has lost to erosion and thereby protect potential oil revenue. The landowner must apply to the Department of Natural Resources (DNR) and provide them with a professional survey showing the exact extent of the land claimed to be lost by erosion. DNR will review the application and seek the input of the Attorney General, the Department of Transportation and Development, the Department of Wildlife and Fisheries, and any other state agency or local government who may have an interest in the reclaimed area. If all parties consent to the application, the landowner will be given a two year permit to reclaim the land. The gravity of the coastal erosion problem is highlighted by the fact that the statute specifically encourages coastal landowners to reclaim lands out to the baseline decreed by the United States Supreme Court in the 1975 Tidelands decision.

**STATE WATERBOTTOM OWNERSHIP AND THE FEDERAL GOVERNMENT**

Although the state generally inherits a considerable degree of property in the private landowner when erosion destroys private lands, when state lands are being eroded, the state's legal post is significantly proven to be inferior to the federal government's paramount rights.

Relying on Pollard's Lessee v. Hagan, the states always assumed that the equal footing doctrine applied to lands beneath the three-mile territorial sea. With the advent of practical offshore drilling technology in the late 1940's and the subsequent discovery of huge oil reserves on the Outer Continental Shelf, the states looked forward to lucrative oil revenue from production in the territorial sea. This scenario was shattered in 1947 by the United States Supreme Court in United States v. California. This decision held that the United States maintained paramount rights in the land seaward of the low water mark. The outcry from coastal states convinced Congress that remedial action was necessary. A political solution was forged in 1953 with the passage of the Submerged Lands Act. This act effectively transferred the Supreme Court's United States v. California decision by deeding title to the seabed, for the width of the territorial sea, to the adjacent coastal state.

In an effort to maximize its territorial ownership, Louisiana became embroiled in a cumbersome series of Supreme Court cases against the United States. This litigation culminated in 1969 with United States v. Louisiana, where the court decided two questions of critical importance for understanding the legal implications of coastal erosion. First, the Court decided that international law must be applied to determine Louisiana's coastline. The net effect of this decision was to minimize Louisiana's offshore claims. Second, and more important, the Court declared Louisiana's coastline to be ambulatory. This means Louisiana's baseline (from which the territorial sea is measured) can move landward as the coast erodes, depriving Louisiana of substantial offshore oil revenue. This fact is made clear in the June, 1981 decree where the Supreme Court implies that if the coastline recedes due to erosive forces, the United States would have the right to seek a more favorable boundary with the state in court.

**CONCLUSION**

When a Louisiana private property owner's lands are subject to erosion, he is placed in an adversarial position with the state. If the private property abuts a navigable river, the riparian loses to the state any property which erodes, but gains ownership of any alluvium that builds up along his river bank. If the private property abuts a navigable lake or the coastline, the littoral owner is placed in a "no win" situation. Any portion of his land which erodes is lost to the state and ownership of any new land created by his property line and the water vests in the state, cutting the littoral owners off from the water by a strip of state-owned land. However, state law generally allows the private landowner to reclaim any land lost to erosion.

When the state's coastline is subjected to erosion, the state is placed in an adversarial position with the federal government. As erosion forces the coastline seaward, the territorial sea theoretically moves a corresponding distance landward. Unlike the private landowner, the federal government does not give the state a chance to reclain lands lost to erosion. As a result, Louisiana may ultimately lose valuable offshore mineral rights to the federal government if the courts are ever asked to recompute the state's coastline which is based on measurement of the territorial sea.

**FOOTNOTES**

7. The Court's reasoning in Pollard's Lessee v. Kagan was that because the lands under navigable waters were not specifically granted to the United States by the Constitution, they were thereby reserved to the original states. The Court then concluded that Article IV, Section 3 of the Constitution (which controls the formation of new states and Article I, Section 8, clause 16, which was interpreted by the Court at that time to prevent federal control over lands other than the District of Columbia and military reservations) read together, demanded that newly created states be admitted on the same terms ("equal footing") as the original states. Therefore all states own the land under their navigable waters. See also, La. Civ. Code Ann. art. 450 (1932).


10. See generally, YIANNOPOULAS, LOUISIANA CIVIL LAW TREATISE, §42 (2d ed. 1980).

11. 77 U.S. (10 Wall.) 557 (1870).

12. Id., at 563.


15. The threshold question of whether or not a body of water is a lake or a river is generally dictated by the physical characteristics of that water body, which the Courts will examine on a case by case basis. Some factors the Court looks to are: size of the water body, source of its water (is it primarily drainage or river flow?), presence or absence of current, flow within well-defined banks, amount of sediment load carried by the water. See, Slatery v. Arkansas Natural Gas, 138 La. 783, 70 So. 806 (1916); Amerada Petroleum Corp. v. State Mineral Board, 293 La. 473, 14 So. 2d 61 (1943); State v. Placid Oil Co., 200 So. 2d 154 (La. 1974).

16. Riparian refers to those things related to, or located on, the bank of a natural watercourse.


19. See, Yianopoulos, supra, note 10. As can be imagined, the proof problems in establishing what was navigable in 1811 are enormous. Most, if not all waterbottoms were surveyed at that time. Although the burden of proving navigability rests with the state, it is a task of such insurmountable magnitude as to nullify state claims to newly inundated lands.

20. Supra, note 18.

21. Id., at 322.

22. Id., at 323.


24. See, La. Civ. Code Ann. art. 506. See also, La. Civ. Code Ann. arts. 499-505. See, YIANNOPOULAS, supra, note 10. This criticism is lent indirect support by the Supreme Court's recent decision in Kaiser Aetna v. United States, 444 U.S. 164 (1979). In that case, the Court held that a non-navigable pond that was artificially connected to the sea could not be ruled open to public navigation without paying its private owners compensation under the Eminent Domain Clause of the Fifth Amendment to the United States Constitution. The courts in Louisiana may be willing to extend this rule and require the state to compensate a private landowner if the state takes title to the bed of a formerly non-navigable lake on the landowner's property.


28. See, Esso Standard Oil v. Jones, 233 La. 915, 98 So. 2d 216 (1957), State v. Capdeville, supra, note 14. It should be noted in this situation that land loss experience by one landowner will be accompanied by a deposition of alluvion and a corresponding gain to some other landowner, usually on the opposite bank. Therefore, although the state stands to gain greatly from erosion of private property, the laws of nature dictate that the state's waterbottom holdings remain relatively constant. However, this is not accurate when both banks of a navigable river are eroding. In that case, the state's gain is absolute.


30. Id., at 716.


35. Id.

36. See, Butler v. State, 244 So. 2d 888 (La. App. 1971), writ denied 246 So. 2d 680 (1971). Before accurate survey records were kept, the burden of proving how a sandbar evolved was immense. With modern scientific mapping and satellite observation technique, proof problems will be minimized in the future.


38. 172 So. 824 (La. App. 1937).

39. Id., at 829.

40. Louisiana courts are apparently disposed to grant all the former beds—including sandbars attached to land—to the landowner whose property is now inundated by the river, See, Stephens v. Drake, 134 So. 2d 674 (1961). The court apparently decides that Article 504 overrules Article 499 when the two come into conflict.


43. U.S.C.A. §§1301 et seq. See text accompanying notes 34 to 63, infra.


45. An "arm of the sea" is generally considered any body of water immediately adjacent to, or directly connected with the sea. See, Burns v. Salinovich, 154 La. 495, 97 So. 748 (1923) citing Morgan v. Negovich, 40 La. Ann. 246, 3 So. 156 (1887) with approval. It must be noted that Lake Pontchartrain has always been held to be an arm of the sea.


48. Littoral refers to those things related to or located near the coastline.

49. If the eroded lands are presently subject to a lease, the state will take ownership of those lands subject to any existing leases. The legislature has provided that the landowner will not lose any presently valid lease. See La. Rev. Stat. Ann. §9:1151. This limits the landowner's loss to royalty revenue derived from a discovery of minerals subsequent to his loss of the land due to erosion.

50. 1978 La. Acts, 645
51. La. CONST. art 9, §7
52. La. Rev. Stat. Ann. §46:1702. This statute specifically gives the landowner the right to recover all oil, gas and mineral rights in addition to the actual land surface.

53. Although the statute is not precisely clear, Sections (D) and (N) of La. Rev. Stat. Ann. §46:1703 would appear to give each one of these agencies and local governments veto power over the proposed reclamation.

54. The state loses relative to the federal government both when state land and any private landowner's property is eroded. The reason is that the baseline, or coastline, from which the three mile territorial sea (the bottom of which belongs to the state) is computed, is measured from the points of land that extend farthest into the Gulf of Mexico, be they privately owned or state owned. If state lands erode, the baseline (and therefore territorial sea) moves landward. Similarly, when private lands erode, even though the state gains ownership of the new bottom, the baseline moves landward and the states gain from the private landowner is offset by its loss to the federal government.

55. supra, note 6
56. 332 U.S. 19 (1947)
57. supra, note 43
58. United States v. Louisiana, 339 U.S. 699 (1950) (applies U.S. v. California rule to Louisiana); United States v. Louisiana, 354 U.S. 516 (1957) (Louisiana attempts to litigate its territorial sea, but Supreme Court rules that Alabama, Florida, Mississippi and Texas are necessary parties and must be joined); United States v. Louisiana, et al., 363 U.S. 1 (May 1960) (Supreme Court rejects Louisiana's claim to a nine mile territorial sea and grants only three miles); United States v. Louisiana, et al., 364 U.S. 502 (Dec. 1960) (Final decree defining coastline at ordinary low water); United States v. Louisiana, 382 U.S. 288 (1965) (Supplemental decree setting ambulatory coastline and ordering an accounting of offshore oil funds); United States v. Louisiana, et al., 399 U.S. 155 (1967) (Court rejects Texas' attempt to use artificial jetties to enlarge its territorial sea); United States v. Louisiana, 394 U.S. 11 (1969), See text accompanying notes 54-56; United States v. Louisiana, 420 U.S. 529 (1975) (Court overrules Louisiana's objections to special master's report); United States v. Louisiana, et al., 422 U.S. 13 (1975) (Court supercedes 1965 baseline it had established and orders an accounting of oil revenue); United States v. Louisiana, the U.S., 49 U.S. L.W. 4825 (1981) (Final decree setting ambulatory coastline and territorial sea; Court orders a final accounting due December 1, 1981.)

59. The Constitution vests original jurisdiction in the Supreme Court when a state sues the United States directly. In such cases, the Supreme Court is the trial court of first instance. Because of the time-consuming nature of such cases, the Court will generally appoint a special master to hear the case and make recommendations to it. Of course, the Court is free to disregard the findings of the special master.

60. 394 U.S. 11 (1969)
61. For example, Louisiana has claimed that Breton and Chandelour islands define the baseline of Louisiana and that the territorial sea must be measured out three miles from their shore. International law disapproves such a claim, granting a coastal state only a 3 mile ring around islands that are greater than 3 miles offshore. See, Quist and Ellis, Louisiana Tidelands Past and Future, 21 Loy. L. Rev. 417, at 326.
63. Id., at 4825

This article was written by Paul Hribenick for the Conference on Coastal Erosion and Wetlands Modification in Louisiana. The conference was sponsored by the Louisiana Universities Marine Consortium (LUMCON), Donald F. Boesch, Executive Director. Information on the conference can be obtained by writing: LUMCON Marine Research and Education Center, Star Route Box 541 (Cocodrie), Chauvin, La. 70344.

ATCHAFALAYA BASIN UPDATE

The long-standing debate over the future of Louisiana's unique Atchafalaya Basin (see LCL #34 and LCL #40) is apparently headed to a happy conclusion. In November, Governor David C. Treen announced that a plan has been developed to solve the Atchafalaya Basin controversy. The Governor's new land management proposal for the Atchafalaya Basin, which is supported by all the major interests in the basin issue, is a revised version of a proposal submitted to the federal government on November 7, 1980.
The Governor listed the four basic elements of his new plan as being: 1) A donation by DOW Chemical of over 40,000 acres of land in and around the basin; 2) Willing vendors selling 48,000 plus acres to the state on an appraised value; 3) A tightening of the A-7 Easement language, which is the basic flood control and non-conversion easement. With the A-7, the landowners would agree that major industrial, residential, and agricultural development in the basin would have to be approved by Congress, and non-major activities would have to be approved by the Corps of Engineers; 4) The state would agree to share the costs with the federal government. The Governor said that he will try to negotiate an agreement in which the state will pay between 10 and 15 percent of the costs.

"To accomplish the objectives of flood control, to be able to meet the legitimate objectives of private ownership, and yet to be able to preserve 240,000 acres, or more for public access and to put it under a good management program, is a legacy that will live forever," The Governor said.

Governor Treen said that he will not ask the Corps of substitute his new plan for the old plan until the willing vendors have committed to sell a sufficient amount of land; the state and federal governments agree on a level of cost sharing; and the state legislature appropriates funds to cover the state's sharing commitment.

The Governor also commented that, "This is going to preserve not only for ourselves, but for all posterity a large segment of the basin, at least 40 percent of it, for public access."

The Atchafalaya Basin Study Area includes 593,000 acres between the East and West Guide levees from Highway 190 to Morgan City. It includes 243,000 acres of Bottom Hardwoods and 162,000 acres of Cypress-Tupelo. It is also a productive area for oil, gas, agriculture, timber and recreational uses.