



## OPINION

### I. Introduction

The fifteen present actions were brought by the plaintiffs, Robert Alost, Allen Ates, Bayou Pierre Wildlife Reserve, L.L.C., Benjamin Franklin Bouser, Joel Braud, Gahagan Land & Timber Company, Charles Garcia, Ralph Ingram, Russell Leach, John Mayher, Roy McManus, Joe and Brenda Morgan, Jack Pace, Adrian Parker, and Allen Solomon (collectively, “plaintiffs”), seeking just compensation from the United States (“government”) for the alleged taking of property as provided for under the Fifth Amendment of the U.S. Constitution.<sup>1</sup> All of the plaintiffs except Mr. Ingram allege that the U.S. Army Corps of Engineers (“Corps”) has caused frequent, intermittent flooding on their lands in Natchitoches Parish, Louisiana, as a result of the Corps’ Red River Waterway Navigation Project (“Project”). The plaintiffs argue that this flooding amounts to the taking of a flowage easement over their lands, and seek compensation. In addition, some of the plaintiffs allege that the Corps has also caused groundwater levels beneath their properties to rise, interfering with their surface agricultural use of their properties, and seek compensation for this interference. Finally, Plaintiff Mr. Ingram contends that the Corps has caused the groundwater levels beneath his property to rise, interfering with his subsurface dirt mining operation between the elevations of 77.0 feet mean sea level (“MSL”) and 96.0 feet MSL.

---

<sup>1</sup> On March 31, 2006, the court granted the government’s motion for summary judgment in a sixteenth action by the plaintiff James R. Fair, Jr., who was not apparently asserting a takings claim.

The court held a one-week trial in Shreveport, Louisiana, from July 24, 2006 through July 27, 2006 on the issue of causation.<sup>2</sup> The court received direct testimony in affidavit form from the individual plaintiff landowners and Randy LaCaze in advance of the trial, and accepted deposition transcripts in lieu of live testimony for the plaintiffs' two expert witnesses, Allen Cox and Lloyd Hoover. The court heard live testimony from the plaintiffs' additional fact witness, Kenneth Guidry. The court also heard live testimony from the government's three expert witnesses, Dr. Michael Harvey, Deborah Hathaway, and Enoch French. In addition, the parties presented sixty-seven exhibits to the court. Based on the evidence presented, for the reasons that follow, the court concludes that the Project did not cause more frequent flooding or groundwater seepage on the plaintiffs' properties, and that Plaintiff Mr. Ingram has failed to establish that any rise in groundwater levels due to the Project has had any adverse impact on his dirt pit mining operation. Accordingly, the plaintiffs have failed to establish liability and judgment on their claims must be granted in favor of the government.<sup>3</sup>

---

<sup>2</sup> The court had previously bifurcated this litigation into a liability, or causation, phase and then a damages phase. See Oct. 6, 2005 Order.

<sup>3</sup> The government had previously filed a motion to dismiss pursuant to RCFC 12(b)(1), arguing that the plaintiffs filed their suits beyond the six-year statute of limitations. 28 U.S.C. § 2501 (2000). The government relied on an expert report submitted by Mr. LaCaze, in which he stated that the "continuing affects" of the Project were known in May, 1995, more than six years before the plaintiffs filed their suits in July 2001 and October 2003. The plaintiffs argued that while they began to see the effects of the Project in May 1995, it did not become evident that the effect was permanent until later. See Fallini v. United States, 56 F.3d 1378, 1382 (Fed. Cir. 1995). The court determined that there was a question of jurisdictional fact to be decided at trial. See March 31, 2006 Order at 7. As set forth below, most of the plaintiffs have stated that

## **II. Background Facts**

### **A. The History of the Project**

The parties stipulated to the following facts regarding the history of the project prior to trial. The Project was authorized as an element of the Flood Control Act of 1968, Pub. L. No. 90-483, amended by Pub. L. No. 94-587, and carried out in accordance with the plans and subject to the conditions recommended in the Chief of Engineers' report contained in House Document No. 304 (90th Cong.). In House Document No. 304, the Project was described as a multi-purpose project with the primary purposes of navigation and bank stabilization and incidental purposes of flood control, recreation, preservation of land in the main valley of the Red River, and hydropower.

The navigation aspect of the Project provided for a nine foot by two hundred foot navigation channel on the Red River extending upriver from its confluence with the Mississippi River. The Red River historically has been used for limited navigation, but prior to the Project, the sharply curving bends in the Red River and the depth of the Red River during parts of the year would not accommodate modern day commercial tows.

The Project re-aligned and stabilized the Red River's channel through the construction of rock revetments and jetties and increased the Red River's depth through the construction

---

the permanent nature of the effects of the Project was not evident until March 2001. The government has not contested this evidence. Indeed, the analyses of the government's own experts on causation extended through 2003. Although the court ultimately concludes that there was no taking of any the plaintiffs' properties, for statute of limitations purposes the plaintiffs have met their burden of demonstrating by a preponderance of the evidence that their claims accrued within six years of filing their suits.

of five locks and dams that maintained pools at elevations that would allow year round navigation.

The Corps, New Orleans District, began studying a plan for Navigation and Bank Stabilization in the 1960s. In March 1966, the New Orleans District issued Volume I of an Interim Report, that showed six locks and dams with the following locations and pool elevations: Lock and Dam No. 1 at approximately River Mile 47 (river miles for planning and design were based on 1967 locations) with a pool elevation of 40.0 feet MSL; Lock and Dam No. 2 at River Mile (“RM”) 70 with a pool elevation of 60.0 feet MSL; Lock and Dam No. 3 at RM 120 with a pool elevation of 95.0 feet MSL; Pool 4 at RM 160 with a pool elevation of 115.0 feet MSL; Pool 5 at RM 180 with a pool elevation of 135.0 feet MSL; and Lock and Dam 6 at RM 210 with a pool elevation of 150.0 feet MSL.

The Project was authorized by Public Law No. 90-483 and approved on August 13, 1968. Preconstruction planning was authorized by Public Law No. 91-439 and approved on October 7, 1970. Initial construction funds for bank stabilization works and channel cutoffs were made available in fiscal year 1973. For its part, the State of Louisiana created the Red River Waterway Commission as the local sponsor of the Project.

In April 1973, the New Orleans District issued a Final Environmental Impact Statement (“FEIS”) for the Project. It included the same illustration of the navigation plan that had been contained in the 1966 Interim Report, with the same Lock and Dam

locations and pool elevations. The FEIS was filed with the Council on Environmental Quality in May 1973.

As part of the design process, the New Orleans District continued to investigate various plans that would achieve the goal of navigation to Shreveport and beyond. These included plans identified as “A” plans, which consisted of six locks and dams, and “B” plans, which consisted of five locks and dams. The two most acceptable plans, both economically and in terms of achieving the necessary navigation pools, were Plan B-3 and Modified Plan B-3 (“Plan B-3M”), both of which consisted of five locks and dams but with differing locations and/or pool elevations.

Under Plan B-3, the locks and dams were configured as follows: Lock and Dam No. 1 at RM 43 with pool elevation of 40.0 feet MSL; Lock and Dam No. 2 at RM 87 with a pool elevation of 60.0 feet MSL; Lock and Dam No. 3 at RM 137 with a pool elevation of 90.0 feet MSL; Lock and Dam No. 4 at RM 195 with a pool elevation of 120.0 feet MSL; and Lock and Dam No. 5 at RM 250 with a pool elevation of 145.0 feet MSL.

Under Plan B-3M, the configuration of the locks and dams was modified as follows: Lock and Dam No. 2's pool elevation was lowered from 60.0 to 58.0 feet MSL; Lock and Dam No. 3's pool elevation was lowered from 95.0 to 87.0 feet MSL; Lock and Dam No. 4's location was moved ten miles downstream to RM 185 and its pool elevation was lowered from 120.0 to 115.0 feet MSL; and Lock and Dam No. 5's location was

moved seven miles downstream to RM 243. This modified plan was identified as the Proposed Project Plan in Supplement No. 1 to the FEIS issued in February 1977.

After objections were raised to Plan B-3M based on its potential impact on surface flooding and groundwater levels by various parties, including landowners, the New Orleans District reviewed alternative locations and pool elevations for the locks and dams to determine whether the adverse effects could be reduced. Public hearings were held in Alexandria, Louisiana, and Shreveport, Louisiana, to discuss alternate locations and pool elevations for Lock and Dam Nos. 2, 3, 4, and 5. One of these alternatives, Plan B-1, was found to decrease the adverse effects on surface flooding and groundwater, particularly in Pool 5, and was ultimately selected as the Project Plan.

Under Plan B-1, the following modifications were made to Plan B-3M: Lock and Dam No. 1's location and pool elevation remained the same, at RM 43 and 40.0 feet MSL, respectively; Lock and Dam No. 2's location remained at RM 87, but its pool elevation was raised from 58.0 to 64.0 feet MSL; Lock and Dam No. 3's location was moved four miles upstream to RM 141 and its pool elevation was raised from 87.0 to 95.0 feet MSL; Lock and Dam No. 4's location was moved twenty-one miles upstream to RM 206 and its pool elevation was raised from 115.0 to 120.0 feet MSL; and Lock and Dam No. 5's location was moved seven miles upstream to RM 250, but its pool elevation remained at 145.0 feet MSL. A General Reevaluation Report recommending Plan B-1 was prepared and issued along with Supplement No. 2 to the FEIS in August 1983, and a Record of

Decision approving Plan B-1 was issued in January 1984. Plan B-1 reflects the locations and pool elevations of the locks and dams as built.

Lock and Dam No. 3, which has been the focus of this case, is located at RM 141, which is just upstream of Colfax, Louisiana, and its pool ("Pool 3") extends approximately 52.3 miles upriver to Lock and Dam No. 4. The normal pool elevation of Pool 3 is 95.0 feet MSL. The lock and dam structure includes a dam with six tainter gates, each of which is sixty feet wide by forty-two feet high.

Under the Regulation Plan for Lock and Dam 3, the pool elevation fluctuates between 88.0 feet MSL and 95.0 feet MSL, depending on the flow in the Red River. There is a hinge pool operation, which involves opening the gates of the dam when river flows are increasing upstream. This decreases the water surface elevation at the lower end of the pool. With hinge pool operation, the dam's gates can be raised to draw the pool elevation down to as low as 88.0 feet MSL when flows in excess of 50,000 cubic feet per second are experienced in the pool.

Although it does not appear in the parties' joint stipulations, it is clear that the parties do not dispute that the Corps raised the normal level of Pool 3 to 95.0 feet MSL, and that this raising was completed in December 1994.

**B. The Plaintiffs' Fact Witnesses**

The court received testimony from the plaintiff-landowners in affidavit form, which can be summarized as follows. Plaintiff Robert A. Alost stated that he owned

approximately 190 acres of land in Natchitoches Parish, Louisiana, at all times relevant to this litigation. This land is situated on Johnson Chute. He also stated that approximately 95 acres of this land is subject to intermittent flooding. He believes that water backs up on the Red River, which then overflows into the Bayou Pierre, a tributary of the Red River, which then overflows into Johnson Chute and onto his land. Although his land was subject to some intermittent flooding before the Project, Mr. Alost claimed that the flooding has been more frequent since 1995, when he believes the Corps raised the pool elevation of Pool 3 to 95.0 feet MSL. However, Mr. Alost stated that he did not become certain that the more frequent flooding would be a “continuing episode” until March 2001, when there was a “big flood.” Alost Aff. at 3.

Plaintiff Allen Ates stated that he was the owner of approximately 80 acres of land located on Bayou Pierre in Natchitoches Parish, Louisiana, at all times relevant to this litigation. According to Mr. Ates, this land is approximately three or four miles from the Red River. Mr. Ates stated that his property has flooded “several” times since 1995, when he believes the pool elevation of Pool 3 was raised to 95.0 feet MSL. Ates Aff. at 4. Before the elevation was raised, he stated that “the water would come up and go right back down but after [the elevation was raised] the water would not go down nearly so fast.” Id. at 3. He did not discuss flooding or groundwater problems with the previous owner when he purchased the property in 1962. Id. at 2, Ates Aff. Ex. 1 at 3. In addition, Mr. Ates stated that following the large flood in March 2001, he discovered that a portion

of his land on the north side of his property was wet most of the time and unusable, which he believes is attributable to the groundwater. Ates Aff. at 3. According to Mr. Ates, there were no wet spots on the property when he purchased it. Id. Mr. Ates also explained his understanding of the difference between elevated groundwater and flooding was “that the groundwater I could walk on the wet ground but when it is flooded you have to swim on it.” Id. at 4. Mr. Ates stated that he believes the raising of the elevation of Pool 3 to 95.0 feet MSL in 1995 caused the flooding and elevated groundwater on his property.

Robert W. Pierson, a representative of the plaintiff Bayou Pierre Wildlife Preserve (“BPWP”), stated that BPWP purchased a 672-acre tract of land (“Gahagan tract”) from Gahagan Land & Timber Company (“Gahagan Co.”) in April 2000 and purchased another 221-acre tract (“Levy tract”) from Helen Levy and family in April 2001. According to Mr. Pierson, at the time that BPWP purchased the Gahagan tract, Mr. Pierson was aware that the seller was engaged in litigation involving damages allegedly caused by raising the level of Pool 3 from 87.0 to 95.0 feet MSL. Mr. Pierson stated that BPWP’s property is bound by the Bayou Pierre on the south side, and bound by the Boggy Bayou and Three League Bayou on the north side. Mr. Pierson stated that at the time BPWP purchased the Gahagan tract, he “was familiar with this property and knew that it flooded from time-to-time.” Pierson Aff. at 4. He stated that following the purchase, the Gahagan tract flooded in February and March 2001, December 2001, March 2002, and April 2002. Id.

In addition, Mr. Pierson stated that a crossing over a pond was damaged in 2004. Id. Mr. Pierson stated that since the level of Pool 3 was raised to 95.0 feet MSL, “the overflow is more frequent” and “the water remains on the flooded property longer than it did when the river was lower.” Id. at 5. With regard to the Levy tract, Mr. Pierson stated that flooding occurs over all but one of the 221 acres and that when the land flooded in March 2001, the water stayed over the property for about three weeks. Id. Mr. Pierson stated that to his knowledge, flooding only occurs when there is flooding of Pool 3. Finally, Mr. Pierson stated that he believed that the elevation of Pool 3 was the cause of the flooding: “Pool 3 will much more readily and quickly accept the drainage from Bayou Pierre when the Pool is at 87 feet as opposed to the Pool being 95-98 feet.” Id. at 6.

Plaintiff Benjamin Franklin Bouser stated that he owned an 80-acre tract of land in Natchitoches Parish, Louisiana, from March 22, 1982 to July 20, 2000, when he sold it to Plaintiff Jack Pace. Mr. Bouser stated that the property flooded “a couple of times” between March 1982 and December 1994, when the level of Pool 3 was raised to 95.0 feet MSL, although he “saw the property actually flooded only on one occasion” during this period. Bouser Aff. at 3. He also stated that prior to early 1995, he had no problem renting the property to farmers, but in 1997 he was unable to continue to rent the property for growing soy beans. He stated he then rented the property to George Conley for pasture purposes for two years, until there was a “big flood” and all of the grass was

killed. Id. Mr. Bouser stated that at this time he was no longer able to rent the property to tenants and therefore he sold it to Mr. Pace for less than he paid for it in 1982. Mr. Bouser stated that in general, floods occurred in the spring, in February, March, April and possibly May. Id. at 4. Mr. Bouser stated that when the water level in Pool 3 is high, water over flows onto his property. Finally, Mr. Bouser identified the date of “the big flood, when Jack Pace’s house went under water,” which he believed occurred in 1997, as the date of taking. Id.

Plaintiff Joel Braud stated that he owns two tracts of land, of approximately 16 and 143 acres in Natchitoches Parish, Louisiana, which he purchased in 1993. Mr. Braud stated that in 1995 or 1996 he began to experience more frequent flooding on both tracts of land, but he was not immediately aware of the cause. According to Mr. Braud, there were two types of flooding: water back-flowing from the Red River onto his property, and prolonged flooding from rain water that would not drain. He described the former as flooding when it is not raining and it has not been a rainy season. He described the latter as occurring when rain water cannot drain fast enough. Mr. Braud stated that when he purchased the property, he was aware that it flooded from time to time, but after the level of Pool 3 was raised to 95.0 feet MSL, the flooding “has increased three or four times a year and the duration of that flooding lasts longer.” Braud Aff. at 4. He also indicated when doing digging work with bulldozers, groundwater was encountered at a level that had not been experienced in the past. Finally, Mr. Braud identified March 2001 as the

time that he “probably recognized, for sure, that [his] property was being adversely impacted by the level of Red River.” Braud Aff. at 5.

Allen T. Conlay, a representative and owner of Plaintiff Gahagan Co., stated that Gahagan Co. owned the 672-acre Gahagan tract, which was sold to the plaintiff BPWP in the year 2000. Mr. Conlay also stated that he personally leased the 221-acre Levy tract from the Levys for approximately six to eleven years, and that the Levy tract was sold in the year 2002. Mr. Conlay stated that both tracts flooded prior to 1995, but “not nearly as bad nor as frequent” as it was after 1995. Conlay Aff. at 3. He explained, “[t]he land really did not flood from heavy rains but it would overflow because the water was high in Red River and it could not easily flow out through Bayou Pierre and into the river and back up water would be the problem.” Id. at 4. “These water overflows usually occurred in the spring of the year.” Id. at 5. Mr. Conlay also relied on records prepared by a family member, Wiley Butler, who is a Cooperative Observer for the National Weather Service, which state that floods occurred on the property in 1998, in January, February, March, and December of 2001, and March and April of 2002. Mr. Conlay finally identified January of 1998 as the date of taking, because that was when he “was certain these overflows of water were caused by high water in the Red River, Pool 3.” Id. at 6.

Plaintiff Charles Garcia stated that he owns two tracts of land, one consisting of 32.88 acres and another consisting of 40 acres, located near Johnson Chute in Natchitoches Parish, Louisiana. Mr. Garcia stated that there is another bayou on his

property named Middle Bayou, which flows into Johnson Chute, which flows into Bayou Pierre and into the Red River. Mr. Garcia stated that the “bayous stay full now bank to bank and they did not use [sic] to be that way.” Garcia Aff. at 2. Mr. Garcia stated that when he purchased the property in 1996, he knew it was in a flood zone, but he had visited the property on a regular basis before that and only recalled it flooding twice prior to 1995. Id. at 2-3. He stated that he believed that the flooding after 1995 was caused by water backing up from the Red River because he could tell the difference between flooding from heavy rainfall and back up from the Red River. “In heavy rainfall, the water does not hang around it just runs off but when it backs up it hangs around and covers that land for days sometimes.” Id. at 3. According to Mr. Garcia, “[w]hen the flooding occurs from high water in Red River, the water flows in the opposite direction, from Red River, backing up.” Id. at 4. Although Mr. Garcia stated that he “knew there had become a real difference in the water level . . . [because] the drain off would not drain off” in 1998 or 1999, he identified the March 2001 flood as the date of taking. Id. He stated “with absolute certainty that after the water was raised in Red River there is more frequent flooding and the water stays on the land longer.” Id. at 5. He also stated that he has some “wet spots” on his property “which [he] think[s] is from the ground water.” Id. at 6.

Plaintiff Ralph C. Ingram, Jr., both individually and on behalf of Cedar Grove Limited Partnership (“Cedar Grove”), stated that Cedar Grove acquired approximately

106 acres of land in Natchitoches Parish, Louisiana in 1993. Beginning in 1994, this property was used as a “commercial dirt pit.” Ingram Aff. at 2. Mr. Ingram stated that the ground water at this property has become elevated, such that the portion of his dirt pit below 96.0 feet MSL has become too wet to excavate dirt. Mr. Ingram stated that if the elevation of Pool 3 had not been raised to 95.0 feet MSL, he would have been able to excavate dirt down to a depth of 77.0 feet MSL. Mr. Ingram also stated that the Corps knew that groundwater problems would result from the Project. He relied on a 1965 geological survey by M.S. Bedinger and Robert A. Pettijohn that indicated that the Project might change groundwater flow patterns, and a 1995 Geotechnical Testing Laboratory, Inc. report on groundwater conditions in Grant Parish, Louisiana, finding a high water level condition during the period of observation. Mr. Ingram stated that the findings of these reports, as well as the report of his expert, Lloyd Hoover, were consistent with his experience. Mr. Ingram also stated that an engineer from the Corps, Vicksburg District, visited local sites to observe groundwater problems and “confirmed” the problems were caused by the Project, but did not indicate how this unnamed engineer confirmed the cause of the groundwater problems. Ingram Aff. at 4. Mr. Ingram also stated: “With regards to ‘taking,’ I first became fully aware and certain that the ground water intrusion was caused by raising the pool level, Pool 3, to 95 feet MSL, as indicated by letter to Ken Guidry on June 17, 1996, above referenced.” Ingram Aff. at 3.

Plaintiff Russell L. Leach stated that he owns 203.85 acres of land on Johnson Chute in Natchitoches Parish, Louisiana, which he purchased on December 12, 1994, and that he leases approximately 50 additional acres from William A. Tharpe. Mr. Leach stated that approximately 60 acres of land are affected by water overflow from the Bayou Pierre, which borders his land, and that approximately 10 acres are unusable for raising cattle or producing hay. He has “experienced floods almost every year, on more than one occasion” since Pool 3 was raised to 95.0 feet MSL, generally in the spring months. Leach Aff. at 3. He indicated that he believes “[t]here is absolutely no question but that the flooding would occur when the water was backing up from Red River through Bayou Pierre.” Id. In addition, he stated he has “some areas where the water seeps out of the ground.” Id. at 4.

Plaintiff John J. Mayher stated that he and his brother-in-law purchased approximately 320 acres of land on Johnson Chute in Natchitoches Parish, Louisiana, in 1993. Mr. Mayher stated that he was assured by an engineer at the Corps prior to purchasing the property that it would not suffer any adverse impacts from the Project, as reflected in exhibits 39 and 40 attached to his affidavit. However, Mr. Mayher stated that he experienced more frequent flooding of longer duration after the elevation of Pool 3 was raised to 95.0 feet MSL. He identified two types of flooding: overflow of water back-flowing from the Red River into Bayou Pierre and Johnson Chute, and flooding when rainfall is unable to drain into Johnson Chute. He stated that an engineer from the

Corps visited his property in 1997 and observed the flood conditions on the property, but insisted that they were caused by heavy rain up to 250 miles from Mr. Mayher's property. Mr. Mayher disputed the claim that the flooding was caused by rainfall, pointing out that when the water level of a body of water, like a bathtub, is raised, a small amount of rainfall will cause it to overflow, where the same amount of rainfall would not cause an overflow before the level was raised. He explained that the level of Johnson Chute was low prior to the elevation of Pool 3, but after, the water level was at the top of the bank and any rise in the level of water resulted in overflow, approximately one to three times per year. In addition to the overflow flooding, Mr. Mayher also indicated that he believed that "groundwater, in conjunction with the water overflow" contributed to the flooding. Mayher Aff. at 7. Finally, Mr. Mayher identified March 2001 as the date of taking.

Plaintiff Royce McManus stated that he purchased approximately 200 acres of land contiguous to the Red River in Natchitoches Parish, Louisiana, in 1996. According to Mr. McManus, there was no discussion of prior flooding when he purchased the property, but there were no flood control structures on the property at the time. Mr. McManus stated that from 1997 to 2005 he experienced four floods. He also claimed to have lost land due to erosion until the year 2000, when the Corps placed some dikes on his property.<sup>4</sup> In addition, Mr. McManus stated that beginning in 1997, half of a 69 acre tract

---

<sup>4</sup> Mr. McManus does not put forward any other evidence or make any other claims regarding erosion.

generally stays wet, which he believes is attributable to elevated groundwater caused by the raised elevation of Pool 3. Mr. McManus stated that as far as he knew, the people from whom he purchased the property did not experience any of these problems. Finally, Mr. McManus assigned March 2001, when there was a large flood, as the date of taking.

Plaintiff Joe Morgan stated that he and his wife own three tracts of land, consisting of 49.4 acres, 2.86 acres, and 287 acres on or near Bayou Pierre in Natchitoches Parish, Louisiana. They purchased these tracts in June 1994, April 1995, and October 1999, respectively. Mr. Morgan stated that approximately five acres of the 49.4 acre tract have been “totally lost” as a result of intermittent overflow. Morgan Aff. at 2. This small piece of property stays wet six to eight months out of the year. Morgan Aff. at 5. With regard to the 287 acre tract, Mr. Morgan stated that since Pool 3 was raised to 95.0 feet MSL, approximately 90 acres are subject overflow two or three times per year for a duration of two weeks and approximately 30 acres of land that are inaccessible when these overflows occur. Mr. Morgan also stated that during the last four years, land in the northeast corner of the tract has been eroding at a rate of one-eighth acre per year. In addition, Mr. Morgan stated he has experienced seepage of groundwater to the surface in some areas, and has had to repair roads four times in the past three years. Also with regard to the 287 acre tract, Mr. Morgan stated that at the time he purchased the tract he was aware that the sellers were involved in litigation regarding damages from the Project and that they reserved any rights or claims they might have. Mr. Morgan stated that when

he purchased the tracts he was aware that “there was some degree of flooding on the properties,” but he did not expect the flooding to be as frequent or as long in duration as he has experienced. Morgan Aff. at 4. Finally, Mr. Morgan identified the high water event in the spring of 2001 as the date of taking, as that was when he became convinced that the flooding and groundwater problems were caused by raising the level of Pool 3 and that they would continue experiencing the problems.

Plaintiff Jack Pace stated that he acquired a 57.55 acre tract of land near Powhattan, Louisiana, in 1978. According to Mr. Pace, the first flood following his purchase of the property was in 1990, and it did not flood again until after the level of Pool 3 was raised. At that time, Mr. Pace stated that the property would flood intermittently more frequently, with another large flood in March, 2001. Mr. Pace stated that when his property flooded in 1990, the water receded in three or four days, but after the level of Pool 3 was raised, flood waters stay on the property much longer, leaving it saturated. In addition, Mr. Pace stated that since the level of Pool 3 was raised, the standing water in Bayou Pierre also rose. Mr. Pace also identified March 2001 as the date of taking, because that was when he concluded that all of the problems on his property were caused by the elevation of Pool 3. Mr. Pace stated that he sold his property in 2004.

Plaintiff Adrian Parker stated that he purchased 144 acres of land lying south and east of Bayou Pierre in Natchitoches, Louisiana, in 1986. Mr. Parker stated that in April 1995 and in January 1998 he experienced flooding on his property. He stated he was

suspicious that the flooding was caused by the Project, and his suspicions were confirmed by a letter dated July 2001 from the Corps to Congressman Jim McCreary that stated that high water flow events had occurred in almost every year since Pool 3 was established at an elevation of 95.0 feet MSL. Mr. Parker identified July 2001 as the date of taking approximately 110 of his 144 acres of land.

Plaintiff Allen J. Solomon stated that he owns two tracts of land consisting of 375 acres and 600 acres in Natchitoches Parish, Louisiana. Mr. Solomon stated that he was granted an “Act of Servitude” in 1981 and thereafter suffered bank erosion problems during the construction of the project. Solomon Aff. at 3. However, it was not until after the level of Pool 3 was raised to 95.0 feet MSL that he began “having water overflow on [his] property from Red River with much increased frequency.” Solomon Aff. at 3. On the 375 acre tract, Mr. Solomon stated that he experienced at least one water overflow per year that lasted from ten days to two weeks on 200 acres of the tract after the level of Pool 3 was raised. With regard to the 600 acre tract, Mr. Solomon stated that while approximately 500 acres are affected, 300 acres are wet “almost the year round” due to “ground water seepage.” Id. at 5. Mr. Solomon stated that he noticed the ground water seepage in 1996, but did not conclude that this was going to continue until January 1998.

Mr. LaCaze, the plaintiffs’ expert on valuation, also submitted an affidavit as a factual witness for this trial on causation. Mr. LaCaze stated that the landowners began to experience problems with flooding and elevated groundwater in May, 1995, but it was

later when they realized that the problems were permanent. He stated he believed that the overflow and groundwater problems were caused by raising the level of Pool 3 because before Pool 3 was raised, people in Natchitoches had no problem installing in-ground swimming pools, but in recent times, the groundwater is encountered only four to five feet below the surface of the ground. In addition, he stated that the frequency and duration of flooding increased after Pool 3 was raised.

The plaintiffs also submitted transcripts of the depositions of Joe Dan Smith and Burke Torrey in lieu of their live testimonies. Mr. Smith testified regarding the Project's design. He explained that Pool 3, unlike the other pools in the project, was designed with a hinging aspect to allow for lowering the stage, or elevation, of the pool during certain times of the year and certain flow conditions on the Red River. Smith Dep. at 27. Mr. Smith stated that because there are gauges in the Red River upstream of Pool 3, the Corps is able to determine when a large flow due to heavy rain is approaching and adjust the level of Pool 3 to reduce the amount of flooding. Smith Dep. at 28. Mr. Smith stated that the reason Pool 3 was designed with this feature was to reduce the amount of flowage easements that would have to be purchased from landowners adjacent to the Red River. Id. However, he also stated that the hinge aspect of Pool 3 only affects the stage of the Red River in the lower or southern half of Pool 3. Smith Dep. at 46-47.

Mr. Smith also testified regarding the Corps' requests to the Red River Waterway Commission to acquire flowage easements from local landowners. He stated that in

general, the Corps based its requests on the expected pool elevation in conjunction with the level of the ordinary high water mark. The elevation of the ordinary high water mark along the Red River “increases as you go upstream.” Smith Dep. at 40. Mr. Smith stated, however, that the Corps did not only request flowage easements for lands where the ordinary high water mark was below the pool’s post-project elevation; it also requested such easements “if land higher than the ordinary high water line was flooded more post-project than it was pre-project, or if it was subject to more inundation post-project than pre-project . . . .” Smith Dep. at 41. Despite this, Mr. Smith stated that no flowage easements were acquired for lands adjacent to the tributaries of the Red River because “we determined that it was not necessary on the tributaries.” Smith Dep. at 42.

Mr. Torrey, a lawyer in the real estate division of the Corps’ Vicksburg district, also testified regarding the Corps’ requests for the Red River Waterway Commission to acquire flowage easements. Mr. Torrey stated that it was the responsibility of his department to ensure that all property interests were acquired for lands that would be affected by the Project before construction began. Torrey Dep. at 18. He explained that the civil engineering department would make the determination of which lands would be affected, and would then submit that information to the real estate division in the form of land elevations below which land would need to be acquired. Torrey Dep. at 16-17. Included in these elevations would be a freeboard above the flow line of the Red River, which would give the Corps some leeway for river level fluctuations. Torrey Dep. at 17.

The real estate division would then pass along the request to the Red River Waterway Commission. Id. Mr. Torrey testified regarding a letter he wrote in 1998 indicating that flowage easements were not acquired for lands along the tributaries above 98.0 feet MSL, but that there were studies underway to determine whether these lands were affected. Torrey Dep. at 23-25. Mr. Torrey explained that the particular studies to which he referred in the letter were never completed and no further flowage easements were purchased. Torrey Dep. at 25. However, he also indicated that other studies conducted by the civil engineering department subsequent to the letter did clearly reveal that the landowners adjacent to the tributaries would not suffer adverse impacts from the Project. Torrey Dep. at 26. Moreover, Mr. Torrey did not recall any complaints from landowners adjacent to the tributaries near Pool 3 after the level was raised to 95.0 feet MSL. Torrey Dep. at 28.

At trial, the plaintiffs called Kenneth Guidry, the executive director of the Red River Waterway Commission. Mr. Guidry testified that the Red River Waterway Commission acquired flowage easements for the lower or southern portion of Pool 3, up to approximately twenty-five miles from Lock and Dam No. 3, but not for the properties located in the upper or northern portion, such as those of the plaintiffs. Tr. 36-37. He stated that the Corps instructed the Red River Waterway Commission to acquire rights along the Red River up to the 95.0 foot MSL Pool 3 stage plus three feet of freeboard, to the extent that such elevation was higher than the ordinary high water mark. Tr. 32, 38-

40. In addition, he stated the Red River Waterway Commission would acquire rights if the elevation of the Red River was above the ordinary high water mark at a particular location. Tr. 144. However, there were some landowners whose land elevations were below the level of the Red River, but whose properties were protected from overflow by a levee in the vicinity; the Red River Waterway Commission did not initially purchase flowage easements for these properties. Tr. 144-45. Moving from downstream to upstream, the elevation of the ordinary high water mark increased. Tr. 143. According to Mr. Guidry, the ordinary high water mark was close to 98.0 feet MSL at Mr. Ingram's property, which was the furthest downstream of the properties at issue in this trial. Tr. 143-44. Mr. Ingram's property was close to the mid-point of Pool 3, and therefore the Red River Waterway Commission did acquire a flowage easement from Mr. Ingram for some of his lands. Tr. 39-40, 144. In addition, Mr. Guidry testified that there were a "handful" of complaints by landowners near Pool 3 who indicated that their land was subject to seepage from elevated groundwater after the Project. Tr. 148-49. He stated that the Red River Waterway Commission began to investigate these complaints, but once lawsuits were filed the investigations were never completed. Tr. 145-46.<sup>5</sup>

### **III. Discussion**

As the statements of the plaintiffs' fact witnesses reveal, there are two types of

---

<sup>5</sup> At the conclusion of the plaintiffs' case, the government moved for a directed verdict. The court denied the motion on the basis that the plaintiffs had presented a sufficient scintilla of evidence to support their claims. Tr. 150-55.

flooding at issue in this litigation. First, all of the plaintiffs except Mr. Ingram claim that the Project has caused overflow flooding from the Red River at an increased frequency and longer duration than before. Second, the plaintiffs Mr. Alost, Mr. Ates, Mr. Garcia, Mr. Mayher, Mr. Leach, Mr. Pace, Mr. Bouser, Mr. Ingram, Mr. McManus, Mr. Morgan, and Mr. Solomon claim that the Project has caused elevated groundwater levels, which results in seepage to the surface and drainage problems.<sup>6</sup> The court heard expert testimony on causation with regard to both types of claims. Each will be examined in turn.

#### **A. Overflow Flooding**

The only expert testimony the court heard on whether the Project has caused overflow flooding of greater frequency and longer duration was that of the government's expert, Dr. Michael D. Harvey. Dr. Harvey is a fluvial geomorphologist and a hydrologist with a specialty in hydraulics. Tr. 158-60. He has a bachelor of science degree in soil and water engineering, a master of science degree in soils and hydrology, and a doctor of philosophy in fluvial geomorphology. Tr. 158. According to his curriculum vitae, he has published 122 articles and books pertaining to geomorphology, hydrology, and

---

<sup>6</sup> At the Pre-Trial Conference, the court granted the government's motion to strike references to groundwater claims that the plaintiffs "may have" in the affidavits of the plaintiffs Mr. Bouser, Mr. Braud, BPWP, Gahagan Co., Mr. Morgan, and Mr. Parker. The plaintiffs Mr. Braud, BPWP, Gahagan Co., and Mr. Parker, had not previously alleged groundwater problems, and therefore the government's expert had not examined their properties. However, as demonstrated below, the government's expert's conclusions were broad enough to encompass these plaintiffs' properties.

hydraulics. Tr. 161; Def.'s Ex. 210 App. A at 4-20. He was accepted without objection as an expert in geomorphology, hydrology, and hydraulics, with particular expertise in river mechanics. Tr. 173-74.

Dr. Harvey provided some historical and river mechanical background, explaining that the Red River is a meandering river that has changed channels and courses over the years; indeed, the channel of the Bayou Pierre tributary is a former channel of the Red River, and is therefore quite deep. Tr. 179-82. Dr. Harvey also explained that from at least the time that European settlers came to North America until 1873, the Red River was blocked by the "Great Raft," a naturally occurring blockage made up of logs and other debris. Tr. 183, 189. It was during this time that the Bayou Pierre's channel was created, and alluvial floodplain deposits were made all along the Red River's floodplain. Tr. 180-84.

These alluvial floodplain deposits, which are simply deposited by the running water of a river during overbank flooding, Tr. 178, 180-81, make up the soils underlying many of the plaintiffs' properties today. Tr. 181, 231. These types of soils are clays and silts, which tend to drain poorly. Tr. 181, 231. In addition, during the Great Raft era a lake, Spanish Lake, existed in the vicinity of the properties of Mr. Mayher, Mr. Braud, Mr. Garcia, and Mr. Alost, which resulted in the deposit of even more clayey soils in this area. Tr. 184-85, 229-30. On the other hand, the soils of the river channel, where the properties of Mr. McManus, Mr. Ingram, and Mr. Solomon are located, are generally

made up of sands and gravels, which drain well. Tr. 232. However, there were some portions of these properties that were more clayey and poorly draining, particularly in swales, or low spots, on the properties. Tr. 232, 242-43. Thus Dr. Harvey explained, the lands immediately adjacent to the Red River, including the riverbed, should permit water to travel through them fairly easily, with the exception of some clayey swales. Tr. 232, 242-43. See also Def.'s Ex. 210, Fig. 3. Dr. Harvey also addressed the historical influence of the Red River on the Bayou Pierre tributary, explaining that both pre-Project and post-Project, heavy flow on the Red River, i.e., flood conditions, would cause back-water flooding into the Bayou Pierre. Tr. 197. Dr. Harvey also explained that flood conditions on the Pool 3 portion of the Red River, both pre- and post-Project, would be caused by high flows upstream, which are ordinarily caused by runoff from heavy rainfall. Tr. 259. Dr. Harvey's report also revealed that the flow of the Red River historically has fluctuated seasonally, with high flow events generally occurring in the spring and winter. See Def.'s Ex. 210, Fig. 18.

Dr. Harvey also testified regarding the pre-Project ordinary high water mark along the Red River. The ordinary high water mark, Dr. Harvey testified, is the point on the riverbank below which is legally considered the bed of the river.<sup>7</sup> Tr. 203. The Red River at Lock and Dam No. 3, which is the furthest downstream point of Pool 3, had an

---

<sup>7</sup> The bed of a navigable river is subject to the federal government's navigational servitude. Therefore, the ordinary high water mark also usually defines the limit of the government's ability to flood land for navigation purposes without paying compensation. United States v. Kansas City Life Ins. Co., 339 U.S. 799, 805 (1950).

ordinary high water mark of 85.0 feet MSL. Tr. 205. Upstream near Mr. Ingram's property the ordinary high water mark was approximately 98.0 feet MSL. Tr. 205-206. Further upstream at the U.S. Geological Survey's river gauge at Grand Ecore, the ordinary high water mark was 102.0 feet MSL.<sup>8</sup> Tr. 206. At the mouth of the Bayou Pierre, which is approximately twelve miles upstream of the Grand Ecore gauge, the ordinary high water mark was 104.0 feet MSL. Tr. 206. These ordinary high water marks are not the points at which the river overflows. At the location of the Grand Ecore gauge, the Red River reaches "bank full" stage, the stage at which overbank flooding begins to occur, at 110.0 feet MSL. Tr. 220. At the mouth of and along the Bayou Pierre, the "bank full" stage is 108.0 to 110.0 feet MSL. Tr. 272. Therefore, Dr. Harvey explained, whether pre-Project or post-Project, the plaintiffs' properties would only flood from overflow during high flow flood conditions that exceeded 108 to 110 feet MSL. Tr. 220.

Dr. Harvey described the changes made by the Project, explaining that the Corps constructed Lock and Dam 3, raised the level of the Pool 3 section of the Red River to 95.0 feet MSL, and shortened the channel of the Red River by thirty miles. Tr. 201, 207. Shortening the channel involved straightening the channel by cutting off some of the bends in the river. Tr. 201. Straightening the river by definition steepened the river. Tr.

---

<sup>8</sup> The U.S. Geological Survey has gauges on the Red River at Shreveport, Coushatta, Grand Ecore, and Alexandria, Louisiana. Tr. 215.

213. This had the effect of increasing the velocity of the water moving through the river channel. Tr. 213. As discussed below, Dr. Harvey determined that by shortening and straightening the channel, the Project actually improved flood control in the vicinity of the plaintiffs' properties.

By examining the annual peak stages of the Red River as recorded at the Grand Ecore gauge from 1943 to 2003, Dr. Harvey determined that the flood elevations were similar pre- and post-Project.<sup>9</sup> Tr. 253-55; Def.'s Ex. 210, Fig. 16. The peak flow of the Red River in almost every year exceeded 95.0 feet MSL.<sup>10</sup> Id. As Dr. Harvey's graph illustrated, the peak stages of the Red River fluctuate historically, ranging from a low of approximately 93 feet MSL in 1978 to a high of approximately 120 feet MSL in 1945. Def.'s Ex. 210, Fig. 16. Moreover, historically these higher annual peak flows tended to come in groups, such as from 1972 to 1975 and 1988 to 1991, when the peak flows averaged 106 feet MSL and 110 feet MSL respectively. Id. The graph did reveal that from 1992 to 1996, the Red River's peak stage stayed below 105.0 feet MSL, whereas from 1997 to 1999 and 2001 to 2002, the peak stage met or exceeded that level. Id.

Dr. Harvey also examined data on the peak stages of the Bayou Pierre from gauges located upstream of the plaintiffs' properties, at Lake End and Powhatten. Tr. 275. Lake

---

<sup>9</sup> Dr. Harvey testified that prior to 1940, the bed of the Red River, and therefore the capacity of the channel, was not stabilized because it was still responding to the removal of the Great Raft in 1873. Tr. 194-95.

<sup>10</sup> Dr. Harvey explained that in order to arrive at the mean sea level elevations, one could simply add 75 feet to the numbers depicted in Figure 16. Tr. 254.

End is approximately 20 miles from the Bayou Pierre's confluence with the Red River, and Powhatten is approximately 12 to 15 miles from the confluence. Id. A graph of the data from the Lake End gauge from 1981 to 2003 showed the annual peak flows of the Bayou Pierre consistently increasing over time, with even higher flows in the post-Project period. Tr. 276. Dr. Harvey testified that the elevation of the Red River would not have any effect on the flow of the Bayou Pierre coming from upstream. Tr. 276. Dr. Harvey hypothesized that the general upward trend in peak flows on the Bayou Pierre may be attributable to the urbanization of Shreveport. This urbanization increases the amount of impermeable concrete in the area, which increases rainfall runoff. Tr. 277. In addition, Dr. Harvey testified that the post-Project period was a wetter than average period. Tr. 276.

For these reasons, Dr. Harvey did not dispute the plaintiffs' claims that their land flooded from overflow more frequently after the level of the Red River was raised in December 1994. Tr. 252, 377-78. Indeed, Dr. Harvey testified that all of the plaintiffs' observations regarding floods in the post-Project period were consistent with his analysis. Tr. 355-77. Because flooding is dependent on the elevation of the land, and neither the Bayou Pierre nor the Red River is at overbank flood stage under 108.0 feet MSL, the plaintiffs would not have experienced overbank flooding from 1992 to 1996, when the peak annual discharges stayed below 105.0 feet MSL. See Tr. 220, 272, Def.'s Ex. 210, Fig. 16. However, the plaintiffs would have experienced overbank flooding in the post-

Project period, when the annual peak discharges exceeded 108.0 feet MSL in 1997, 1998, 2001, and 2002. Def.'s Ex. 210, Fig. 16. Dr. Harvey noted that most of the plaintiffs mentioned the pre-Project 1990 flood and complained of post-Project floods in 1997, 1998, March 2001, and December 2001 to January 2002, all of which were times when the stage of the Red River far exceeded 95.0 feet MSL. Tr. 224-25. He therefore focused on determining whether the Project played a role in causing or exacerbating these post-Project floods.

In analyzing whether the Project influenced the post-Project floods, Dr. Harvey examined whether the Project caused the floods to be more frequent, whether the Project increased the extent of flooding, and whether the Project increased the duration of the floods compared to pre-Project conditions. In his analysis, Dr. Harvey relied on a computer model, HEC-RAS, that is commonly used in the field to predict both in-channel river flows and overbank river flows during flood conditions. Tr. 279-82. He inputted data on the elevations of the lands in the vicinity of Pool 3 from measurements taken with state-of-the-art, accurate airborne laser technology, called "LIDAR." Tr. 236-37. He also inputted the U.S. Geological Survey's stage-discharge rating curves, which show the relationship between the height of the water surface and the amount of flow, based on the flow data from the Red River pre- and post-Project. Tr. 261. These two curves were constructed by taking measurements at the Red River pre-Project and post-Project, and as a result are slightly different. Tr. 261-62; see Def.'s Ex. 210, Fig. 20. As a test, Dr.

Harvey used the model to predict the flooding that would result during the March 2001 post-Project flood, and compared the model's output to a satellite photo of the area at the time of the peak of the flood. Tr. 327-29. The two images were almost identical. See Def.'s Ex. 210, Fig. 31.

Satisfied that the model accurately predicted flooding on the Red River, Dr. Harvey used the model to predict the amount of flooding from the 1990 flood if the Project had been in place, and the amount of flooding in 1997, 1998, March 2001, and December 2001 if the Project had not been in place. Tr. 332-33. The model predicted that the 1990 flood would not have flooded to as high an elevation, i.e., to as great an extent, had the Project been in place. Tr. 330; Def.'s Ex. 210, Fig. 33. It also predicted that the river would have flooded to an even greater extent than it actually did if the Project had not been in place in 1997, 1998, March 2001, and December 2001. Tr. 331-33. Def's Ex. 210, Figs. 34-37. However, Dr. Harvey admitted that given the magnitude of the flood flow in 1990, probably only Mr. Pace and Mr. Bouser would have experienced less flooding in 1990 had the Project been in place. Tr. 332.

In explaining the model's outputs, Dr. Harvey pointed to the stage-discharge rating curves for pre- and post-Project conditions at the Grand Ecore gauge. Graphed together, the two curves intersect at a flow volume of 75,000 cubic feet per second ("cfs"), which translates to a stage elevation of 99.0 feet MSL. Tr. 218-19; Def.'s Ex. 210, Fig. 23. The graph shows that for flow volumes above 75,000 cfs, the post-Project curve is at a lower

elevation than the pre-Project curve. Def.'s Ex. 210, Fig. 23. For context, Dr. Harvey explained that at 75,000 cfs both pre- and post-Project, the Red River would be well within bank, at 99.0 feet MSL (the top of the bank at Grand Ecore is at an elevation of 110.0 feet MSL). Tr. 219-20. Therefore, during high flow events, i.e., flood conditions, the stage of the Red River is actually lower post-Project than it was pre-Project. This means that the flood reaches a lower elevation and smaller surface area outside its banks.<sup>11</sup> Tr. 316-17. Dr. Harvey testified that as a consequence, one would expect fewer or less frequent overbank floods in the post-Project period. Tr. 321-22. As further evidence of this phenomena, Dr. Harvey pointed out that actual monitoring data showed that the peak discharge of the 1990 flood was 193,900 cfs at an elevation of 115.8 feet MSL, while the peak discharge of the March 2001 flood was 200,300 cfs at an elevation of 114.5 feet MSL. Tr. 256-57; Def.'s Ex. 210, Table 3. Thus, the March 2001 flood was less extensive even though there was a greater discharge than the 1990 flood.

On cross-examination, the plaintiffs challenged Dr. Harvey's contention that there is less extensive flooding post-Project by asking Dr. Harvey to explain how increasing the level of Pool 3 could possibly result in less frequent overbank floods. Plaintiffs' counsel asked Dr. Harvey to explain why raising Pool 3 to 95.0 feet MSL was not analogous to

---

<sup>11</sup> Dr. Harvey explained that for flow volumes below 75,000 cfs the stage of the Red River is at higher elevations than it would have been for these volumes of flows before the Project. However, he explained that because the Red River is well within bank at these volumes both pre- and post-Project, this post-Project increase in elevation does not result in an increase in overbank flooding. Tr. 219-20.

filling a glass of water almost to the top, where adding additional water will cause the glass to overflow easier than if the glass was only half full. Tr. 430. Dr. Harvey explained that the plaintiffs' water glass analogy was not applicable to a river. He explained that although Pool 3 is referred to as a "pool," it is not a stagnant body of water, but is rather a moving sheet of water. Water flows through the system; the river doesn't fill up like a glass or a bathtub would. Tr. 430. Indeed, Dr. Harvey testified that from the Red River's average flow of 15,000 to 20,000 cfs, Tr. 217, the flow could increase to 30,000 or 40,000 cfs without changing the 95 foot MSL elevation of Pool 3. Tr. 248. In addition, Dr. Harvey explained that neither the Red River nor the Bayou Pierre is at a flood stage at 95.0 feet MSL, and at this stage water from the Bayou Pierre can empty into the Red River without a problem. Tr. 433. The level of the water in Pool 3 must reach 108-110 feet MSL, i.e., the elevation of the river banks, before overbank flooding occurs.<sup>12</sup> Tr. 220, 251. The plaintiffs also questioned Dr. Harvey as to whether the properties would flood less frequently if the stage of Pool 3 was maintained at 87.0 feet MSL, as had been considered by the Corps during the planning stages. Dr. Harvey pointed out that the Project was not constructed with a Pool 3 elevation of 87.0 feet MSL, and therefore that elevation was irrelevant to whether there was more frequent or extensive flooding post-Project as compared to pre-Project. Tr. 429. Dr. Harvey also

---

<sup>12</sup> And, as Dr. Harvey explained, at the flood stage level the straightening and shortening of the Red River's channel as part of the Project has in fact resulted in lessening the extent of flooding despite the raising of Pool 3 to 95.0 feet MSL.

stated that the stage of the Red River during the four floods of which the plaintiffs complain was so high that they would have experienced flooding whether the post-Project elevation of Pool 3 was 87.0 feet MSL or 95.0 feet MSL. Tr. 445-46.

Dr. Harvey also testified that the Project did not create flooding of any greater duration than would have occurred had the Project not been in place. Dr. Harvey did not dispute the plaintiffs' observations that the floods the plaintiffs experienced after the Project were of longer duration than before, however he explained that the longer duration was not caused by the Project. Indeed, Dr. Harvey produced a hydrograph depicting the levels and durations of the 1990, 1997, 1998, March 2001, and December 2001 floods on the Red River at the mouth of the Bayou Pierre. The graph demonstrated that the 1990 flood peaked very quickly, while the post-Project floods took longer to peak and therefore the peaks were of longer duration. Tr. 335-38; Def.'s Ex. 210, Fig. 38. In particular, Dr. Harvey noted that in 1990, the stage of the Red River was above 115 feet MSL for just under ten days, while in 2001, the stage of the Red River was above 115 feet MSL for slightly longer, about twelve days. Tr. 336-37; Def.'s Ex. 210, Fig. 38. Dr. Harvey stated that these peaks were dependent on the volume of flows coming down the Red River, and were not influenced by the Project. Tr. 337-38. Dr. Harvey also explained that in the old Spanish Lake lowlands area, the land stays flooded longer because of the effect of Interstate 49, which was built in the 1980s. Tr. 324. Because the Interstate is built up on an embankment, it traps water in the Spanish Lake area such that

the area fills with water quickly and retains water longer than other areas. Tr. 323-26. Dr. Harvey testified that this affects the properties of Mr. Mayher, Mr. Braud, and Mr. Garcia. Tr. 324.

Based on the foregoing, Dr. Harvey concluded that the Project did not cause more frequent or extensive flooding or flooding of a longer duration on the Alost, Ates, BPWP, Bouser, Braud, Gahagan Co., Garcia, Leach, Mayher, McManus, Morgan, Pace, Parker, and Solomon properties.<sup>13</sup> Tr. 377-78. Dr. Harvey concluded that the increased flooding experienced by these plaintiffs in the post-Project period was caused by more rain in a wetter period, which is consistent with the historical record of wetter and dryer periods over the years. Tr. 378. Indeed, as discussed above, Dr. Harvey testified that the increased velocity from straightening the channel allowed greater volumes of flow during flood events to pass through the river without overflowing the banks of the Red River. Tr. 213, 220. He therefore concluded that contrary to the plaintiffs' claims, the Project actually caused a slight and incidental flood control benefit. Tr. 218.

In light of Dr. Harvey's uncontradicted expert testimony, the court finds that the

---

<sup>13</sup> Dr. Harvey also specifically examined Mr. Parker's property and concluded from the LIDAR data of the elevations on that land that it would not have flooded in 1992 or 1995. Tr. 335-36. Dr. Harvey also examined Mr. Alost's property and concluded that while he was too far away from the Red River, at fifteen miles, to be affected by the Project, unique circumstances on that property made it likely to have persistent wet conditions. Tr. 338-39. In particular, Dr. Harvey pointed to a right-angle bend in the Mallard Bayou at the confluence with the Little River on Mr. Alost's property, which he stated was likely man-made sometime between 1988 and 2005. Tr. 341-42. This right-angle bend caused backwater pooling just upstream. *Id.* Dr. Harvey also pointed to two man-made dams near Mr. Alost's property that may be subject to water seepage underneath. Tr. 349-50.

Project was not the cause of the more frequent flooding or flooding of longer duration on the plaintiffs' properties. A plaintiff seeking to establish a government taking of an easement by flooding must demonstrate not only that the flooding is intermittent, frequent, and inevitably recurring, Barnes v. United States, 538 F.2d 865, 870 (Ct. Cl. 1975), it must also demonstrate that there was a "governmental act, the natural and probable consequences of which effect such an enduring invasion of plaintiffs' property as to satisfy all other elements of a compensable taking." Id. at 871. See also Cooper v. United States, 37 Fed. Cl. 28, 36 (1996). In other words, "[p]laintiffs bear the burden of demonstrating by a preponderance of the evidence, i.e., that degree of proof which is more probable than not, that the operation of the [Project] was the direct and proximate cause of the prolonged flooding of their property." Hendricks v. United States, 14 Cl. Ct. 143, 148 (1997). Moreover, a "landowner [is] not entitled to recover for a Fifth Amendment taking where the intermittent flooding of his land was not increased in elevation, frequency, and duration as a result of the government's project." Bistline v. United States, 640 F.2d 1270, 1275 (Ct. Cl. 1981). In other words, the plaintiffs must demonstrate by a preponderance of the evidence that the Project directly and proximately caused more frequent flooding or flooding of a longer duration than that which occurred prior to the Project.

Here, the only evidence the plaintiffs presented with regard to the cause of the overflow flooding on their land was lay testimony, both their own and others'. The court

finds that this testimony is entitled to little weight. “Causation of flooding is a complex issue which must be addressed by experts.” Hendricks, 14 Cl. Ct. at 149; see also Herriman v. United States, 8 Cl. Ct. 411, 420 (1985). In contrast, the court finds that Dr. Harvey’s expert opinion testimony is reliable, probative, and persuasive on the issue of causation. Moreover, the plaintiffs’ affidavits are vague and generalized descriptions of the conditions on their land that simply allege that there have been more floods after the Project and that they believe the increased flooding is caused by the Project.<sup>14</sup> However, eight of the plaintiffs only owned their land for one or two years prior to the Project, and therefore their observations of conditions before and after the Project are entitled to little weight. Dr. Harvey provided data on the flow of the Red River dating back to 1943 and used a reliable computer model to demonstrate that the floods in 1997, 1998, March 2001, and December 2001 would have been worse had the Project not been in place. Based on Dr. Harvey’s uncontroverted expert testimony, the court finds that the Project did not cause more frequent flooding or flooding of a longer duration on the plaintiffs’ properties.<sup>15</sup> In such circumstances, the plaintiffs have failed to establish a taking by

---

<sup>14</sup> The court agrees with the government that this type of post hoc ergo propter hoc reasoning is not sufficient to establish causation. Baskett v. United States, 8 Cl. Ct. 201, 210 (1985) (citing Loesch v. United States, 645 F.2d 905, 914 (Ct. Cl. 1981)).

<sup>15</sup> The court also agrees with Dr. Harvey that any previous Project plans to maintain the level of Pool 3 at 87 feet MSL are irrelevant. In this Fifth Amendment takings case, the plaintiffs claim that the government has taken easements to periodically flood their lands. Rather than condemning the lands that it planned to flood, the plaintiffs allege that the government has caused their lands to flood more frequently and for longer without paying for the right to do so. In such circumstances, the relevant issue is whether the plaintiffs’ lands flood more frequently or

overflow flooding.

## **B. Elevated Groundwater**

The court also heard expert testimony and record evidence with regard to the cause of drainage and seepage problems, which the plaintiffs Mr. Alost, Mr. Ates, Mr. Garcia, Mr. Mayher, Mr. Leach, Mr. Pace, Mr. Bouser, Mr. Ingram, Mr. McManus, Mr. Morgan, and Mr. Solomon claim also amounted to takings of their properties. Allen Cox was offered by the plaintiffs as a hydrology expert on this issue. In response, Deborah Hathaway was offered by the government as an expert in water resource engineering and groundwater-surface water interaction. With regard to the Project's impact on Mr. Ingram's property and his commercial dirt mining operation, the plaintiff also offered Lloyd Hoover as an expert in soils. The government offered Enoch French as its expert on soils and civil engineering.

The plaintiffs, with the agreement of the government and the court, submitted Mr. Cox's deposition in lieu of live testimony at trial because following a stroke, Mr. Cox had become incompetent to testify. See Pre-Trial Order 6-7. Mr. Cox, the plaintiffs' expert in hydrology, did not actually have a degree in hydrology, but in addition to his bachelor of science and master of science degrees in Agricultural Engineering, he obtained a Certificate of Training in flood plain hydrology from the Hydrologic Engineering Center

---

for longer than they did before the Project, not whether the plaintiffs' lands flood more frequently than they would have under some alternative Project design. It is for this reason that the plaintiffs' arguments regarding a Corps obligation to build levees on the Bayou Pierre, or to undertake other flood control measures, are also irrelevant in this takings action.

in Davis, California, and worked as a hydraulics engineer for several years. Cox Dep. at 30-31, Ex. 3. Mr. Cox stated his opinion that the Project caused groundwater levels to rise to a level that interfered with the plaintiffs' uses of their properties. Cox Report, Pl.'s Ex. 17A ex. 2 (hereinafter "Cox Report"). Mr. Cox relied on three studies as the basis for his opinion and stated that he agreed with their findings and conclusions: a 1965 Corps study by M.S. Bedinger and Robert A. Pettijohn on the possible effects of the Project in the Red River Basin, Cox Report Ex. A; a 1995 study of groundwater conditions in Grant Parish, near Colfax, Louisiana, by the Geotechnical Testing Laboratory, Inc., Cox Report Ex. D; and a 2005 report by Mr. Lloyd Hoover of Maxim Technologies, Inc. on the groundwater conditions on Mr. Ingram's property, Cox Report Ex. E.

The 1965 Corps study, which was prepared in conjunction with other studies for the Project, examined the possible effects of the Project all along the Red River valley. In general, the study stated that "[t]he predominant effect of the navigation features on ground water will be a rise in water levels attended by a redistribution of ground-water flow pattern." Cox Report Ex. A at 4. The authors of the study used groundwater observation well data from the U.S. Geological Survey ("USGS") to determine the level and flow of the groundwater in the Red River valley and used an "electrical resistance network analog" to predict the change in groundwater level and flow post-Project. *Id.* at 17. Based on these measurements and calculations, the authors prepared groundwater elevation contour maps depicting the groundwater before and after the Project. The

authors also relied on other studies indicating that groundwater levels should be at a depth of more than five feet below the land surface in order to prevent interference with agricultural uses of property. Id. at 11. The authors concluded:

The change in ground-water level at the river will equal the change in river stage. With distance from the river, the change will decrease because of increased evapotranspiration and because of increased ground-water discharge to tributary streams. Generally, the effect of the change in river stage will be negligible beyond 8 or 10 miles from the river.

Id. at 9.

The contour maps depicted in the 1965 study for Natchitoches Parish actually predict no significant change in groundwater levels based on the Project as proposed at that time. On each map, there are two types of lines: solid lines, which depict groundwater flow pre-Project, and dotted lines, which depict estimated groundwater flow post-Project. Each line is assigned a number representing the average groundwater elevation, which is expressed in multiples of five. See, e.g., Id. at Fig. 3 sheet 7 (“Contour interval is 5 feet.”). In the areas north of the city of Natchitoches, the contour maps depict a groundwater level of 110.0 feet MSL both before and after the Project, although the directions of some of the flows were depicted as changing. Id. at Fig. 3 sheet 7, 8. In the area near and south of the city of Natchitoches, the contour map does show some changes in groundwater levels for groundwater adjacent to the Red River, with one flow on the west side of the river straightening and rising from 90.0 feet MSL to 95.0 feet MSL, and one flow on the east side of the river rising from 90.0 feet MSL to

100.0 feet MSL. Id. at Fig. 3 sheet 9. Both of these flows appeared to be within three miles of the Red River. Id. With respect to Lock and Dam No. 3, the study concluded that surface land areas in the meander belt of the Red River were at an elevation of 100.0 feet MSL for approximately 16 miles upstream from the Lock and Dam, and were at higher elevations beyond 16 miles from the Lock and Dam.<sup>16</sup> Id. at 12. Raising the level of the Red River to 95.0 feet MSL would therefore increase the area of land for which groundwater would be within five feet of the surface from less than one square mile to approximately five square miles. Id.

This 1965 Corps study forms the main basis for Mr. Cox's opinion that the Project caused the groundwater to rise to a level that interfered with the plaintiffs' uses of their properties. Relying on this study, Mr. Cox stated that raising the level of Pool 3 to 95.0 feet MSL would cause groundwater levels to rise for lands up to eight miles from the Red River. Cox Dep., Pl.'s Ex. 17A at 44. Mr. Cox admitted that he was not sure where the plaintiffs' properties were located, but that he thought that most of them were within eight miles of the Red River. Id. at 47. Although Mr. Cox stated his opinion that the plaintiffs have suffered "adverse impacts" such as "major ground water problems directly attributable to raising the elevation, Pool 3," Cox Report at 3, he admitted that he would not be able to know what land would be affected without knowing what the surface

---

<sup>16</sup> As discussed above, the plaintiffs' properties are located more than twenty-five miles upstream of Lock and Dam No. 3 and therefore the land surface would be at elevations higher than 100.0 feet MSL. Tr. 36-37.

elevation was. Cox Dep., Pl.'s Ex. 17A at 85-86. However, he did not know the land surface elevations of the plaintiffs' properties. Id. at 85-86, 88.

Mr. Cox apparently based his opinion on his interpretation of the 1965 study's contour maps as predicting a five foot difference in groundwater levels at the plaintiffs' properties, or that the groundwater would be within five feet of the surface at the plaintiffs' properties. Id. at 83-85, 87. This appears to be a misreading of the maps.

While the maps do state that "Contour interval is 5 feet," the court interprets the statement to reflect the fact that all groundwater elevations on the maps are expressed in multiples of five, i.e., 100, 110, 115, etc. The maps do not state that groundwater is within five feet of the surface at the plaintiffs' properties. At his deposition Mr. Cox agreed that the effects of the raised river stage on groundwater levels would decrease gradually as one moved farther away from the river, until the effects reached zero, approximately eight miles from the river. Id. at 89-90. Mr. Cox also relied on the 1965 study for his opinion that groundwater must rise to within five feet of the land surface to affect agricultural uses. See id. Thus he agreed that in areas where the land surface was above 100 feet MSL, raising Pool 3 to 95.0 feet MSL would not have an impact. See id. at 107. However, he stated he did not know the surface elevations of the plaintiffs' properties. Id. at 89-90.

Mr. Cox also relied on a 1995 study by Geotechnical Laboratories, Inc. that was commissioned by the RRWC. Described as a "preliminary geotechnical investigation,"

the study involved taking 25 exploratory borings and observing subsurface stratigraphy and groundwater conditions at the time of exploration. Cox Report Ex. D at 1. All of these borings were taken on the north/east side of the river, in Grant Parish near Lock and Dam No. 3 and Colfax, Louisiana. Id. at 2. With regard to groundwater conditions, the report stated:

Groundwater was observed from the ground surface to a depth of 13 feet within the duration of monitoring and depth of exploration. Where seepage was encountered during drilling operations, the depth of encounter was generally beyond five feet below the ground surface. However, within 24 to 48 hours after exploration, the water level generally rose to within five feet of the ground surface. Such conditions are compatible with the fine-grained consistency of the substrata and generally reflect a high water level condition for the period of observation. The subsurface water regime is subject to change with variations in climatic conditions and possibly flow levels within the adjacent waterway. It is not possible to predict future groundwater fluctuations based upon single, short-term observations. Long-term monitoring of groundwater conditions with respect to river flow levels and precipitation rates will be required to evaluate correlations between the various influences.

Id. at 4 (emphasis added).

The report went on to include:

Groundwater conditions revealed by the test borings indicate a relatively high water condition, the source of which is undefined at this time. While the possibility exists the near surface water may be attributed to recent level of the Red River, some consideration must be given to poor drainage characteristics within the low-lying land mass. . . . Poor surface drainage will severely restrict removal of shallow excess water. High humidity and/or reoccurring rainfall severely reduces evaporation rates. Presently available information indicates each of these factors are contributing to high ground water within the vicinity of the study.

Id. at 5 (emphasis added).

Notwithstanding the inconclusive nature of this report, Mr. Cox, as a part of his expert report, made a handwritten notation stating “[t]his proves [the 1965 study]’s piezometric contours were correct” where the report notes that groundwater rose to within five feet of the surface within 24 to 48 hours of making the borings. Id. at 4. However, Mr. Cox provided no analysis or explanation for this conclusion. Mr. Cox made another handwritten note stating “I concur with [Geotechnical Laboratories, Inc.]’s findings and conclusions.” Id. at 7. At his deposition, Mr. Cox admitted that the Geotechnical Laboratories report might not be applicable to the plaintiffs’ properties because Grant Parish and Colfax, Louisiana, are mostly on the east side of the river, and the plaintiffs’ properties are on the west side, and a hydrologist would not be able to take data from the east side of the river and apply it to the west side. Cox Dep., Pl.’s Ex. 17A at 50-51. Mr. Cox also admitted that he did not know the surface elevations of the lands where Geotechnical Laboratories took their borings, noting that they could have been taken below elevations of 95.0 feet. Id. at 53, 106-107. However, he assumed that the borings were taken on lands at elevations between 95.0 feet MSL and 100.0 feet MSL. Id. at 107. He apparently assumed this because one would not see groundwater within five feet of the surface if the land surface elevation was above 100.0 feet MSL: “Q. Okay. Do you know of places where [the land surface elevation] could be over 100 feet MSL that still have water within several feet of the – A. That still have water? No, I don’t think there would be.” Id.

Finally, Mr. Cox relied on a 2005 report by Lloyd Hoover of Maxim Technologies, Inc. Mr. Hoover took five borings, studied subsurface conditions on Mr. Ingram's property, and determined the engineering properties of the materials encountered. Hoover Report, Pl.'s Ex. 18A Ex. 2 at 4. He then used this information to calculate the amount of subsurface material suitable for mining that was affected by the raising of Pool 3. In a June 7, 2005 letter to Mr. Ingram, Mr. Hoover indicated that in his study, he assumed that all material above 96.0 feet MSL could be mined and that the mean low pool stage was approximately 77 feet MSL. Cox Report Ex. E at 6. In his deposition Mr. Hoover stated that these figures were given to him by Mr. Ingram. Hoover Dep., Pl.'s Ex. 18A at 21-22.<sup>17</sup> In his report, Mr. Hoover stated that groundwater was encountered in all five borings at depths ranging from two to four feet below the surface. Hoover Report, Pl.'s Ex. 18A Ex. 2 at 5. Although his report included all the boring logs, none of these logs provided the surface elevation where the borings were taken. See id. at 8-12. However, Mr. Hoover stated in his deposition that he believed the surface elevation was 101.0 feet MSL. Hoover Dep., Pl.'s Ex. 18A at 23-24.

As part of his report, Mr. Cox made a handwritten notation in Mr. Hoover's report, where Mr. Hoover stated that he encountered groundwater at a depth of two to four feet, that "[t]his finding help[s] prove that the [1965 study's] piezometric maps were correct."

---

<sup>17</sup> The plaintiff Mr. Ingram, with the agreement of the government and the court, also submitted the deposition of Mr. Hoover in lieu of live testimony because Mr. Hoover was not available for trial. See Pre-Trial Order.

Cox Report Ex. E at 5. In his deposition Mr. Cox stated that he thought that Mr. Hoover's borings were taken at land surface elevations of 96.0 feet MSL. Cox Dep., Pl.'s Ex. 17A at 62. This was based on his interpretation of Mr. Hoover's assumption that materials above 96.0 feet MSL could be mined in the June 7, 2005 letter to Mr. Ingram. Id. at 62-64. Mr. Cox was unable to find any information on surface elevations in Mr. Hoover's report. Id. at 64-66. Mr. Cox did state that even before the Project, the only time that Mr. Ingram would be able to mine dry dirt down to an elevation of 77.0 feet MSL would be when there is almost no water in the river. Id. at 115-117.

The government offered Deborah Hathaway, a hydrologist with a specialty in groundwater, as an expert in water resource engineering and groundwater-surface water interaction. Ms. Hathaway has a master of science degree in civil engineering, with a particular focus on hydrology and water resources, and is a Certified Professional Hydrologist with a specialty in groundwater from the American Institute of Hydrology. Tr. 448; Def.'s Ex. 210, App. B at 1. She has published approximately thirty-one articles related to hydrology, including some articles on groundwater and groundwater-surface water interaction. Def.'s Ex. 210, App. B at 7-9. She was accepted as an expert without objection. Tr. 465-66.

Ms. Hathaway reviewed the groundwater conditions in the vicinity of Pool 3, evaluated whether there was a change in groundwater elevation corresponding to the raising of Pool 3, and evaluated whether such a change, if found, was caused by the

raising of Pool 3 to 95.0 feet MSL. Tr. 466. Like Mr. Cox, she reviewed the 1965 study, but she interpreted the study differently. She stated that the study gave important background information, such as the conclusion that groundwater levels within five feet of the surface would interfere with agriculture, the fact that there is an upland terrace of impermeable soils to the west of the Red River, and the fact that the average groundwater level in the vicinity of the plaintiffs' properties was 110.0 feet MSL in 1965. Tr. 469-72. She did not dispute this information. However, unlike Mr. Cox, she interpreted the study as predicting almost no change in groundwater levels more than a couple of miles from the Red River. Tr. 475. Ms. Hathaway also reviewed numerous other pre-Project studies that were conducted subsequent to 1965, using more advanced modeling technologies, that also predicted that there would be little change in groundwater levels more than one mile from the Red River and that there would be little impact on crop yields in most areas because the groundwater would be more than five feet beneath the surface. Tr. 476-85. However, Ms. Hathaway stated her opinion that these pre-Project predictions were not very relevant to determining whether the Project in fact caused groundwater levels to rise, because now there is actual post-Project data to review. Tr. 485.

Ms. Hathaway also reviewed the Geotechnical Laboratories report and the Hoover report and determined that neither contained useful data for determining whether the Project caused groundwater levels to rise to a level that would interfere with the plaintiffs' uses of their properties. The Geotechnical Laboratories report did not specify

the location, elevation, or date of the data and the Hoover report did not specify the surface elevations where the borings were taken. Tr. 486-87, 491-92. Moreover, Ms. Hathaway explained, taking isolated borings and observing the water level at the time is not the proper way to measure groundwater elevations because the levels change over the course of the year. Tr. 491. The groundwater levels in the Red River alluvium fluctuate between five and fifteen feet over the course of a year. Id. “If I have one measurement during a year, I don’t know if that measurement was taken at the peak, at the bottom, at the middle. It just doesn’t mean anything to me, particularly if I don’t know the land surface elevation . . . .” Id. For this reason, the USGS has detailed procedures for taking measurements, including allowing the water to settle in the well and measuring several times a year. Tr. 489-91. Indeed, the USGS maintains many monitoring wells in the Red River valley and has groundwater data going back to the 1960s. Tr. 492-93. Some of these wells are quite close to some of the plaintiffs’ properties. Tr. 494.

Ms. Hathaway testified that the most accurate method for determining whether the Project has caused seepage or drainage problems from elevated groundwater on any of the plaintiffs’ properties is to study the data from the USGS monitoring wells. Therefore, Ms. Hathaway selected twenty-four wells in the vicinity of the plaintiffs’ properties to examine. Tr. 502-503. The wells were chosen based on screening criteria to obtain the most relevant data set. Tr. 501-502; Def.’s Ex. 210 at 83-84. She then examined the data from these wells for several years before and after December 1994, when the level of

Pool 3 was raised to 95.0 feet MSL. Tr. 502. This data set amounted to approximately 5,000 groundwater measurements. Tr. 503; Def.'s Ex. 210 at 85. This data was plotted on hydrographs for each of the twenty-four wells examined for the years 1984 to 2000. See Def.'s Ex. 210, Fig. F-2. In general, Ms. Hathaway stated that these hydrographs showed that at all the wells, groundwater levels fluctuated seasonally. Tr. 505; Def.'s Ex. 210, Fig. F-2. In addition, for all 13 of the wells located farther than two miles from the river, there was no rise in groundwater elevations corresponding in time to the raising of Pool 3. Def.'s Ex. 210 at 84. However, groundwater elevations did rise in wells less than two miles from the river. Id. at 85.

In particular, the hydrographs for the four wells near the Old Spanish Lake lowlands, near the Alost, Braud, Mayher, and Garcia properties, exhibited no change in groundwater levels corresponding to the Project and demonstrated that the groundwater levels in this area ranged from 110 to 120 feet MSL, at times within five feet of the land surface, both pre- and post-Project. Tr. 512-13; Def.'s Ex. 210, Fig. F-2(a). The hydrographs for five wells farther southeast, near the city of Natchitoches, also showed no change in groundwater levels, and demonstrated that groundwater levels in this area ranged from 100 to 115 feet MSL both pre- and post-Project. Tr. 514-15; Def.'s Ex. 210, Fig. F-2(b). At one of these wells, NA-474P, the groundwater was within five feet of the land surface during the wet seasons both pre- and post-Project. Def.'s Ex. 210, Fig. F-2(b).

The hydrographs for four wells south of Natchitoches also showed no change in groundwater levels; at these locations the groundwater elevations ranged from 90 to approximately 105 feet MSL both pre- and post-Project. Tr. 519; Def.'s Ex. 210, Fig. F-2(c). The groundwater levels were within five feet of the land surface during the wet season at two of these wells both pre- and post-Project. Def.'s Ex. 210, Fig. F-2(c). The hydrographs for the seven wells within two miles of the Red River did show a rise in groundwater elevations, however only one showed a marked rise after 1994, when Pool 3 was raised to 95.0 feet MSL. Def.'s Ex. 210, Fig. F-2(d), (e). The one well that did see a marked rise was farther south than any of the plaintiffs' properties. Tr. 523. None of these groundwater levels are generally within five feet of the land surface. Tr. 522, 524. The hydrographs for four other wells in the vicinity were not complete, but generally showed a gradual rise in groundwater levels over the course of the pre-Project period. Def.'s Ex. 210, Fig. F-2(f). Based on her review of these data, Ms. Hathaway concluded that in general, raising the Red River did not have an effect on groundwater levels more than two miles from the Red River, but likely did have some effect less than two miles from the Red River. Def.'s Ex. 210 at 84-85.

Ms. Hathaway explained that distance from the Red River makes a difference because the farther away a property is from the Red River, the higher is its elevation. To the west and south of most of the plaintiffs' properties, there are uplands at an elevation of 130 to 200 feet MSL made up of impermeable soils. Tr. 530, 693. The land slopes

down from these uplands toward the river, which is the lowest point in the valley. Tr. 531. Water runoff from the impermeable uplands flows downhill to the more permeable lowlands, where it is incorporated into the groundwater. In this “recharge” area, the groundwater continues to flow downhill and into tributaries such as the Bayou Pierre until it is “discharged” into the Red River. Tr. 531-32. Ms. Hathaway stated that this downhill “recharge” would be the dominant force on the groundwater levels in this area. Tr. 535, 540-41, 693-94. In her opinion, it is physically impossible for the raising of the Red River to 95.0 feet MSL to have any effect on the level of groundwater that is already at gradients higher than 95.0 feet MSL. Tr. 541. Essentially, she stated that water doesn’t flow up hill. See Tr. 964. However, she did state that she would expect groundwater levels near the Red River that were below 95.0 feet MSL before the Project to rise to 95.0 feet MSL after the Project. Tr. 540, 693.

Ms. Hathaway did admit that raising the Red River would cause the level of the Bayou Pierre to rise to the same level close to their confluence, and that the groundwater near the Bayou Pierre would accordingly equilibrate to that level. Tr. 688-89. However, this raised level of the Bayou Pierre would still only be 95.0 feet MSL during normal flows. Id. Ms. Hathaway stated that maintaining the Bayou Pierre at this level would not interfere with the draining from upland areas because there is sufficient gradient to drive the water down to the level of the Bayou Pierre. Tr. 694; Def.’s Ex. 210 at 87.

Ms. Hathaway went on to find for each of the plaintiffs that raising the Red River

to 95.0 feet MSL would not cause any surface problems from groundwater. She examined the LIDAR data to determine the surface elevations for the plaintiffs' properties and combined that data with her analysis that raising the Red River would not cause any groundwater to rise higher than 95.0 feet MSL. Mr. Alost's property is located approximately ten miles from the Red River and ranges in elevation from 110 to 200 feet MSL; Ms. Hathaway concluded that groundwater levels of 95.0 feet would not be within five feet of the surface, and therefore any groundwater problems experienced on this property were not caused by the Project's raising of Pool 3 to 95.0 feet MSL. Tr. 549; Def.'s Ex. 210 at 86.

Mr. Ates' property is adjacent to the Bayou Pierre approximately five miles from the Red River, in the Old Spanish Lake lowlands. Tr. 551; Def.'s Ex. 210 at 87. Land surface elevations range from 108 to 114 feet MSL, and groundwater elevations at a nearby well ranged from 100 to 105 feet MSL. Id. Ms. Hathaway concluded the Project would not affect groundwater levels at this property, Tr. 552, and that even if it did, it would only cause groundwater to rise to 95.0 feet MSL, which would be ten to thirteen feet beneath the land surface and would not interfere with surface agricultural use, Tr. 553.

Mr. Garcia's property is also located in the Old Spanish Lake lowlands, at surface elevations from 110 to 115 feet MSL. Tr. 554; Def.'s Ex. 210 at 87. Groundwater levels at three wells near Mr. Garcia's property fluctuate between 105 and 110 feet MSL, but

did not change after the Project. Tr. 555; Def.'s Ex. 210 at 87. These groundwater levels are within five feet of the surface in the spring or winter of most years, so Ms. Hathaway opined that the property may suffer from seepage problems in some areas. Tr. 606-607; Def.'s Ex. 210 at 87. However, again she concluded that this was not caused by the Project because it is not physically possible for a Red River elevation of 95.0 feet MSL to cause groundwater levels to rise to 105 to 110 feet MSL. Tr. 608.

Mr. Mayher's property is also in the Old Spanish Lake lowlands, and is adjacent to Johnson Chute. Tr. 608; Def.'s Ex. 210 at 88. Land surface elevations range from 105 to 110 feet MSL, except for one small portion adjacent to Johnson Chute that is at 100 feet MSL. Tr. 609; Def.'s Ex. 210 at 88. Ms. Hathaway concluded that Pool 3's elevation of 95.0 feet MSL would not cause problems on most of the property because groundwater levels would have to be at an elevation of 100 feet MSL. Tr. 610. Moreover, Ms. Hathaway pointed out that both pre-Project and post-Project, "high groundwater conditions have occurred throughout the entire period of record, and they commonly occur during the winter and spring. There is no reason why conditions at this property would be any different." Tr. 610.

Mr. Leach's property is near the confluence of the Bayou Pierre and Johnson Chute, with surface elevations of the lowermost portions ranging from 108 to 112 feet MSL. Tr. 611; Def.'s Ex. 210 at 88. In order for groundwater problems to occur on this property, the groundwater levels would have to be 103 to 107 feet MSL. Tr. 615. In Ms.

Hathaway's opinion, a Red River stage of 95.0 feet MSL would not cause such groundwater levels. Id. However, Ms. Hathaway did acknowledge that there are 180 foot MSL uplands in the southern portion of Mr. Leach's property, and that the interface of uplands and lowlands may cause seepage in that area. Tr. 612-13; Def.'s Ex. 210 at 88.

Mr. Pace's (and Mr. Bouser's former) property is approximately six to seven miles from the Red River, at surface elevations ranging from 112 to 115 feet MSL. Tr. 616; Def.'s Ex. 210 at 89. At well NA-426, which is so close to this property that the groundwater levels would be about the same, groundwater levels in the post-Project period have ranged from 102 to 105 feet MSL. Tr. 617-18. Because groundwater levels exceed 95.0 feet MSL they would not be affected by raising Pool 3. In addition, because groundwater levels were ten feet below the land surface, Ms. Hathaway concluded that groundwater did not cause seepage problems on a regular basis on this property. Id.

Mr. McManus' eastern parcel, the sixty-nine acre tract for which he claims groundwater problems, is adjacent to the Red River. Ms. Hathaway stated that in general, she would expect that within a mile of the Red River, the groundwater levels would be similar to the stage of the river. Tr. 619. She also explained that the groundwater levels underlying properties adjacent to the Red River would fluctuate with the seasonal stage of the Red River. Tr. 621. However, for the properties close to the Red River, just as with the other properties, the groundwater elevation would have to generally be within five feet of the land surface in order to generally interfere with agricultural use. Tr. 621.

While Ms. Hathaway stated that she would expect groundwater to be at 95.0 feet MSL at Mr. McManus' property, this would not be high enough to cause problems because surface elevations on his property range from 105 to 115 feet MSL. Tr. 624; Def.'s Ex. 210 at 92.

The Morgans' property is adjacent to the Red River on the west side at surface elevations ranging from 110 to 120 feet MSL. Tr. 624-25. Ms. Hathaway stated that groundwater would be around 95.0 feet MSL this close to the river, fifteen to twenty feet below the surface, which would not be high enough to cause interference with surface use. Tr. 625-26. Ms. Hathaway again discussed fluctuations in the groundwater levels at properties adjacent to the Red River: "[I]t wouldn't surprise me in the pre-project period to see a fluctuation of 12 feet or in the post-project period to see a fluctuation. If the stage fluctuates, the groundwater will fluctuate." Tr. 628.

Mr. Solomon's property is adjacent to the Red River at surface elevations ranging from 105 to 108 feet MSL. Tr. 628-29; Def.'s Ex. 210 at 92. Ms. Hathaway stated that the groundwater generally would be eight to ten feet below the surface, which would not be high enough to cause interference with surface use. Tr. 630-31.

Finally, Mr. Ingram's property is adjacent to the Red River at surface elevations ranging from 100 to 110 feet MSL. Tr. 631-32; Def.'s Ex. 210 at 90. Ms. Hathaway stated that she would expect Mr. Ingram to encounter groundwater in his dirt pit at an elevation of 95.0 feet MSL. Tr. 633. Ms. Hathaway did observe water ponded in the

bottom of a pit at an elevation of 100 feet MSL, but she stated her opinion that this ponded water was not groundwater because the elevation of the Red River was only 95 feet MSL at the time. Tr. 636. Instead, she suggested that rainfall may pond in the dirt pits. Id. Ms. Hathaway also testified that she observed a dirt pit on a neighboring property where dirt was being mined from below the groundwater level. Id.

Ms. Hathaway also disputed Mr. Ingram's claim that the average low groundwater level was 77 feet MSL at his property. Because the groundwater level would always be similar to the stage of the Red River at Mr. Ingram's property, Ms. Hathaway pointed to the historical data on the stage of the Red River at Grand Ecore. This data demonstrated that the stage of the Red River only averaged below 80 feet MSL in three or four months out of thirty-five years before the Project. Tr. 695; Def.'s Ex. 210, Fig. F-2(k). Moreover, this same data demonstrated that the average monthly stage of the Red River at Grand Ecore before the Project was on average approximately 90 or 91 feet MSL. Tr. 695; Def.'s Ex. 210, Fig. F-2(k). Because Mr. Ingram's property is several miles downstream from Grand Ecore, the pre-Project average stage at his property may vary by one or two feet, and therefore may be approximately 88 or 89 feet MSL.<sup>18</sup> Tr. 716-18.

On cross-examination, the plaintiffs' counsel questioned Ms. Hathaway regarding the ability of groundwater underlying property to eventually reach the surface, much like

---

<sup>18</sup> Based on this analysis, while Ms. Hathaway challenged Mr. Ingram's claim that Mr. Ingram's dirt mining operation was adversely affected by raising Pool 3 to 95.0 feet MSL, she stated that she would defer to Mr. French's opinion on the issue. Tr. 673.

a sponge sitting in water will eventually get wet throughout. Ms. Hathaway did admit that “capillarity” is a process observed in science, such as when water on the bottom of a sponge spreads to the surface of the sponge over time. Tr. 708-709. She did not, however, go on to state that groundwater at any elevation would reach the land surface in all instances. As Ms. Hathaway repeatedly explained, whether the groundwater causes an impact on the land surface depends on both the groundwater elevation and the land surface elevation.

With regard to the plaintiff Mr. Ingram’s claim, the government also offered Enoch French as an expert in civil engineering and land surveying with particular knowledge of dirt mining operations. He has a bachelor of science degree in civil engineering from Louisiana Tech University and is a licensed civil engineer and land surveyor. Tr. 720; Def.’s Ex. 208 at 004066. He was accepted as a expert without objection. Tr. 730. Mr. French evaluated Mr. Ingram’s property as a dirt pit and reviewed the Hoover report. Tr. 730. Mr. French visited Mr. Ingram’s property and took a test boring approximately 1100 feet from the Red River at a surface elevation of 106 feet MSL, with the bottom of the boring at an elevation of 93 feet MSL. Tr. 731-33. There was no standing groundwater in the boring either at the time he took the boring, or when he returned twenty days later. Tr. 733. Hurricane Rita had even passed through the area in the interim. Tr. 749.

Mr. French also attempted to find the borings that Mr. Hoover had taken for his

report, but there were no markers at the locations that Mr. Ingram identified. Tr. 737-38. Mr. French stated that Mr. Hoover's report was the only one he'd ever seen without a boring location map. Tr. 738. In the locations that Mr. Ingram identified as the boring locations, the surface elevation ranged from 99 to 106 feet MSL, although Mr. Hoover has stated he thought the elevation was 101 feet MSL. Tr. 739. Mr. French therefore concluded that the data taken from the borings for the Hoover report was not useful, because the locations and surface elevations were unknown. Tr. 739.

Mr. French stated that even before the Project, Mr. Ingram would not have been able to mine dry dirt down to an elevation of 77 feet MSL in the short periods of time the groundwater might have been that low, because it takes so long to mine down to that level. Tr. 740-41. Indeed, in his report Mr. French stated that based on the rate at which Mr. Ingram has been mining and selling dirt, it would take Mr. Ingram twenty-eight years to mine from the surface of his property down to 96.0 feet MSL, the portion of his property Mr. Ingram admits is not affected by the Project. French Report, Def.'s Ex. 208 at 7. Mr. French also testified that although it is more expensive, it is possible to do wet mining: a dirt mine operator can remove saturated dirt, stockpile it next to the pit, and then allow the water to run out of the dirt pile prior to use. Tr. 745-46. In addition, Mr. French stated that for some uses, dampness in the dirt is actually desirable. Tr. 744. Based on the foregoing, Mr. French concluded that Mr. Ingram is able to mine dirt well below an elevation of 96 feet MSL when Pool 3 is at an elevation of 95.0 feet MSL. Tr.

744, 747. In sum, the thrust of Mr. French's testimony and expert report was that he did not observe anything at Mr. Ingram's property to suggest that Mr. Ingram would not be able to successfully mine all of the available materials from the site, even with the Project in place. Importantly, Mr. Hoover, Mr. Ingram's expert, admitted in his deposition that he did not dispute anything in Mr. French's report. Hoover Dep., Pl.'s Ex. 18A at 64.

**1. Conclusions Applicable to All Plaintiffs with Groundwater Claims**

As a threshold matter, the government has moved to strike the report and expert opinion of Mr. Cox, on the basis his report does not conform to the requirements of Rule 26(a)(2)(B) of the Rules of the United States Court of Federal Claims ("RCFC") and his opinion is not admissible under Fed. R. Evid. 702 and Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 589 (1993). While it is true that RCFC 26(a)(2) requires expert reports to contain the basis and reasons for opinions to be expressed, the goal of this rule is disclosure of the all the opinions and analysis to be presented at trial. While Mr. Cox's three page report plus handwritten notations on attached documents is conclusory and lacking in any detailed analysis, his deposition testimony did not differ materially from it. In such circumstances, any lack of conformance with RCFC 26(a)(2) is harmless, and accordingly the court will consider Mr. Cox's report. See RCFC 37(c)(1).

The government is also correct that in order to be admissible under Fed. R. Evid. 702 and Daubert, expert testimony must be both relevant and reliable. Daubert, 509 U.S.

at 589. The government argues that Mr. Cox's testimony is not reliable under Daubert because he did not conduct any independent analysis, only reviewed a 1965 study that was conducted prior to the final design decision for the Project, and did not review USGS monitoring well data that was available online.

The court agrees with the government that Mr. Cox's testimony is not particularly probative for these reasons, among others, but the court will admit the testimony. Rule 702 provides that an expert may testify in the form of an opinion if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the expert applied the principles and methods reliably to the facts of the case. Daubert also provides several factors to determine whether expert testimony is admissible: (1) whether the expert's theory or technique can be tested; (2) whether the expert's theory or technique has been subjected to peer review; (3) what the rate of error for the theory or technique is; and (4) whether the theory or technique is generally accepted in the scientific community. 509 U.S. at 593-595. Mr. Cox's technique, to review one pre-Project study from 1965 and compare its predictions to post-Project borings for which locations and surface elevations are not known when years' worth of groundwater data is available, does not appear to satisfy these standards for reliability. Nevertheless, because the court, not a jury, is acting as the trier of fact in this case and is able to evaluate whether the testimony is probative on the issue of causation, the court

will admit Mr. Cox's opinion. However, because of its significant deficiencies, the court has accorded the opinion little weight.

## **2. Conclusions Applicable to Plaintiffs Whose Properties are Located More than Two Miles from the Red River**

Based on the evidence presented, the court finds that the Project did not cause groundwater levels to rise at the properties of plaintiffs located more than two miles from the Red River.<sup>19</sup> The only evidence presented by the plaintiffs was vague lay testimony that the plaintiffs have experienced some seepage and drainage problems that they believe are caused by the Project, and the expert opinion of Mr. Cox. The plaintiffs did not submit any actual data on the groundwater levels at their properties after the Project. As discussed above, lay testimony is entitled to little weight in determining causation. Also as discussed above, Mr. Cox's opinion is entitled to little weight because he relied solely upon the predictions in a 1965 study, rather than actual groundwater data that was readily available. Moreover, Mr. Cox misinterpreted the 1965 study, claiming that it predicted that groundwater levels would rise high enough to interfere with surface agricultural use within eight to ten miles of the Red River. In fact, the study predicted almost no change in groundwater levels in the vicinity of the plaintiffs' properties. Even if the study had predicted a change, the predictions were based on a Project design that was not adopted.

---

<sup>19</sup> To be sure, some of these individuals may experience seepage and drainage problems, but the evidence established that these problems were caused by other factors such as location (e.g., within the Old Spanish Lake lowlands), soil composition, etc. and that these conditions existed both pre- and post-Project.

The evidence presented by the plaintiffs is therefore not sufficient to establish that the Project caused groundwater levels to rise for lands farther than two miles from the Red River.

Moreover, the government's evidence established that the Project did not cause groundwater levels to rise farther than two miles from the Red River. The court was persuaded by the expert testimony of Ms. Hathaway, which the court found to be thorough and reliable. Ms. Hathaway examined approximately 5,000 measurements of actual groundwater data and detailed LIDAR measurements of land surface elevations at the plaintiffs' properties. The hydrographs of the well data presented by Ms. Hathaway clearly showed that the Project did not cause any change in groundwater levels beyond two miles from the Red River. Moreover, Ms. Hathaway demonstrated that each of the plaintiffs' properties at this distance from the Red River were at high enough elevations that a rise in the Red River from 90 to 95 feet MSL would not affect the groundwater. As she explained, the plaintiffs at this distance were in a "recharge" area, where the groundwater is flowing from upland areas downhill toward the Red River. This is the dominant force on the groundwater in this area, and the level of the Red River would not have an impact on groundwater upgradient. Thus, the court concludes with respect to the plaintiffs Mr. Alost, Mr. Ates, Mr. Garcia, Mr. Mayher, Mr. Leach, Mr. Pace, and Mr. Bouser that there is no evidence that the Project had any impact on groundwater levels at

their properties. As such these plaintiffs have failed to establish any taking of property based on the Project's impact on groundwater elevations.

### **3. Conclusions Applicable to Plaintiffs Whose Properties are Located Within Two Miles of the Red River**

The court also finds that to the extent that the Project did cause groundwater levels to rise within two miles of the Red River, in the vicinity of the properties of Mr. Ingram, Mr. McManus, Mr. Morgan, and Mr. Solomon, the groundwater did not rise high enough to interfere with surface use of the properties. It is well established that a taking occurs when a government action causes groundwater levels to rise and destroy surface agricultural use. United States v. Kansas City Life Ins. Co., 339 U.S. 799, 810 (1950); Barnes v. United States, 538 F.2d 865, 872 (Ct. Cl. 1976). The evidence of both parties established that in order to experience significant interference with surface agricultural use, the groundwater elevation must be within five feet of the land surface.

However, the only evidence the plaintiffs presented with regard to causation was lay testimony that seepage and drainage problems have occurred and the expert opinion of Mr. Cox, neither of which, as discussed above, are particularly probative of causation. The plaintiffs did not submit any data on the groundwater levels at their particular properties before or after Pool 3 was raised to 95.0 feet MSL and thus did not show that they did not experience seepage or drainage problems with pre-Project groundwater levels. Without this critical information, the plaintiffs' and Mr. Cox's views on causation

are unsubstantiated. It is impossible to know whether the Project caused groundwater seepage and drainage problems without evidence of pre-Project conditions.

Indeed, Ms. Hathaway's testimony established that the Project, which would only cause groundwater levels to rise to 95.0 feet MSL under normal conditions, would not interfere with their surface agricultural uses because of the land surface elevations at the plaintiffs' properties. Ms. Hathaway testified that she would expect groundwater levels to rise to 95.0 feet MSL at the properties adjacent to the Red River. However, she also testified that, based on the undisputed LIDAR data, none of the surfaces of the plaintiffs' properties were within five feet of 95.0 feet MSL and therefore none of the plaintiffs would experience groundwater interference with surface agricultural use under normal flow conditions on the Red River. Indeed, the plaintiffs' expert, Mr. Cox, admitted that for any properties with a land surface elevation over 100 feet MSL, there would not be groundwater within five feet of the surface caused by the Project. The only plaintiff whose property did have areas that were at 100 feet MSL was Mr. Ingram, but he does not claim any interference with any surface use.

Nor is there evidence of groundwater interference with surface use for properties close to the Red River when Ms. Hathaway's testimony is considered in conjunction with Dr. Harvey's testimony. While Ms. Hathaway limited her testimony to possible interference with surface use when Pool 3 is at 95.0 feet MSL, Dr. Harvey did testify that the raised elevation of Pool 3 did cause higher levels on the Red River for flows up to

75,000 cfs, or 99.0 feet MSL, compared to pre-Project conditions. Ms. Hathaway testified that the groundwater at properties within one mile of the Red River would be similar to the level of the Red River. Read together, the two experts' opinions suggest that groundwater elevations at these properties could reach 99.0 feet MSL more often post-Project than pre-Project. If 99 feet MSL was within five feet of the surface at any of the plaintiffs' properties, then raising the level of Pool 3 to 95.0 feet MSL might have caused at least some increased groundwater interference with surface use. However, it is clear from the evidence presented that even at 99 feet MSL, the groundwater is not within five feet of the surface elevation of the plaintiffs' properties: the lowest point on Mr. McManus' property was 105.0 feet MSL; the lowest point on Mr. Morgan's property was 110.0 feet MSL; and the lowest point on Mr. Solomon's property was 105.0 feet MSL.<sup>20</sup>

Given the uncontradicted data presented by Ms. Hathaway and Dr. Harvey, the court can only conclude that the groundwater seepage and drainage problems allegedly experienced by the plaintiffs after the Project were due to rain or other flood events that are not related to the Project. In view of these findings, the court concludes that the Project did not cause interference with Mr. McManus', Mr. Morgan's, or Mr. Solomon's surface uses of their properties. Accordingly, none of these plaintiffs has established a taking of property based on the Project's impact on groundwater elevations.

---

<sup>20</sup> The lowest point on Mr. Ingram's property is 100 feet MSL, but, as discussed below, he does not complain of any interference with surface use. The alleged impact of the Project on Mr. Ingram's property is addressed separately.

#### 4. Conclusions Applicable to Mr. Ingram

Unlike the other plaintiffs, Mr. Ingram only claims that a rise in groundwater levels has interfered with his subsurface use of his property, namely his dirt mining operation. Groundwater interference with subsurface mining may be the basis for a compensable taking. Tri-State Materials Corp. v. United States, 550 F.2d 1, 9 (Ct. Cl. 1977) (“Governmental action creating a blockage of drainage is a compensable taking.”). Mr. Ingram claims that the rise in groundwater on his property has made it prohibitively difficult and expensive to mine dirt between the elevations of 77.0 and 96.0 feet MSL because the dirt is now wet at those elevations. However, the evidence presented by Mr. Ingram fails to establish such a causal connection.

The only evidence Mr. Ingram presented on the depth to which he was able mine dry dirt prior to the Project is his own affidavit. In it he stated that he was able to mine dry dirt down to an elevation of 77 feet MSL. Neither Mr. Cox nor Mr. Hoover examined this claim; they merely assumed it to be true in their reports. Indeed, the government’s evidence established that this claim was not correct: the groundwater levels at Mr. Ingram’s property would have only reached that low level in three months out of thirty-five years, and this would not have been long enough to actually mine down to that elevation. Moreover, the evidence established that the average level of the groundwater at Mr. Ingram’s property would have been approximately 89 feet MSL prior to the project, and that the ordinary high water mark of the Red River at Mr. Ingram’s property was approximately 98 feet MSL.

Based on Ms. Hathaway's testimony that the groundwater levels at Mr. Ingram's property will equilibrate with the level of the Red River, Mr. Ingram's property would have experienced groundwater at 98 feet MSL at various times even prior to the Project. Because the ordinary high water mark was 98 feet MSL, Mr. Ingram could not form an expectation that he would be able mine dry dirt below 98 feet MSL prior to the raising of Pool 3. In addition, Mr. Ingram purchased the property in 1993, and did not start mining dirt until 1994. There is no evidence that Mr. Ingram determined to what depth he could mine in 1994, the one year before the level of the Red River was raised to 95.0 feet MSL. For all of these reasons, Mr. Ingram's claim that he was able to mine dry dirt at elevations between 77.0 and 96.0 feet MSL prior to the Project, but is now unable to, is not supported by the evidence.<sup>21</sup>

Moreover, Mr. Ingram has not presented any reliable evidence of the groundwater levels on his property before and after the Project. He presented no actual data on the groundwater level on his property prior to the project. With regard to groundwater levels after the Project, as Ms. Hathaway testified, the single borings taken by Mr. Hoover were not a reliable method of measuring groundwater because the groundwater was not

---

<sup>21</sup> In addition, the government presented evidence that another property owner near Mr. Ingram was mining saturated dirt, that mining damp dirt may actually be desirable, and that mining saturated dirt was merely more expensive than mining dry dirt. Mr. Ingram did not dispute this evidence. In contrast, in Tri-State Materials, the plaintiff alleged that the extent of the impairment on its mining operation was "total." 550 F.2d at 3. Although the court in Tri-State Materials did not decide the extent of impairment necessary to amount to a compensable taking, *id.*, Mr. Ingram failed to prove that there would be any real interference with his ability to mine subsurface materials because of the Project.

allowed to settle for a sufficient period of time, and because the measurements were not taken seasonally. In contrast, Mr. French's test borings, which were properly constructed, suggested that the Project was not causing groundwater to seep into the mine pits. Mr. French's test boring did not show the presence of groundwater over a twenty day period, during which Hurricane Rita passed through the area. In such circumstances, Mr. Ingram has failed to even establish that there has been a change in groundwater levels at his dirt pit or that there has been a change in the amount of dry dirt available for mining on his property.<sup>22</sup> Therefore, Mr. Ingram has not demonstrated by a preponderance of the evidence that the Project has interfered with his subsurface mining use of his property and therefore he has failed to establish any taking of property.

### **CONCLUSION**

For all the foregoing reasons, the court finds that (1) the Project did not cause surface overflow flooding on any of the plaintiffs' properties; (2) the Project did not cause groundwater levels to rise on properties farther than two miles from the Red River, those of Mr. Alost, Mr. Ates, Mr. Garcia, Mr. Mayher, Mr. Leach, Mr. Pace, and Mr. Bouser ; (3) the Project did not cause interference with surface use on any of the properties within two miles from the Red River, those of Mr. McManus, Mr. Morgan, and Mr. Solomon; and (4) Mr. Ingram did not establish that the Project caused interference with his subsurface use of his property. Accordingly, the plaintiffs have failed to

---

<sup>22</sup> As noted above, Mr. French presented evidence to establish that it is possible to mine materials even when they are wet, Tr. 745-46, and Mr. Ingram's expert, Mr. Hoover, concurred, Hoover Dep., Pl.'s Ex. 18A at 64.

establish that the government has taken any of their respective properties and the Clerk is directed to enter judgment for the government with prejudice on all of the plaintiffs' claims. Each party is to bear its own costs.

**IT IS SO ORDERED.**

s/Nancy B. Firestone  
NANCY B. FIRESTONE  
Judge\_

---