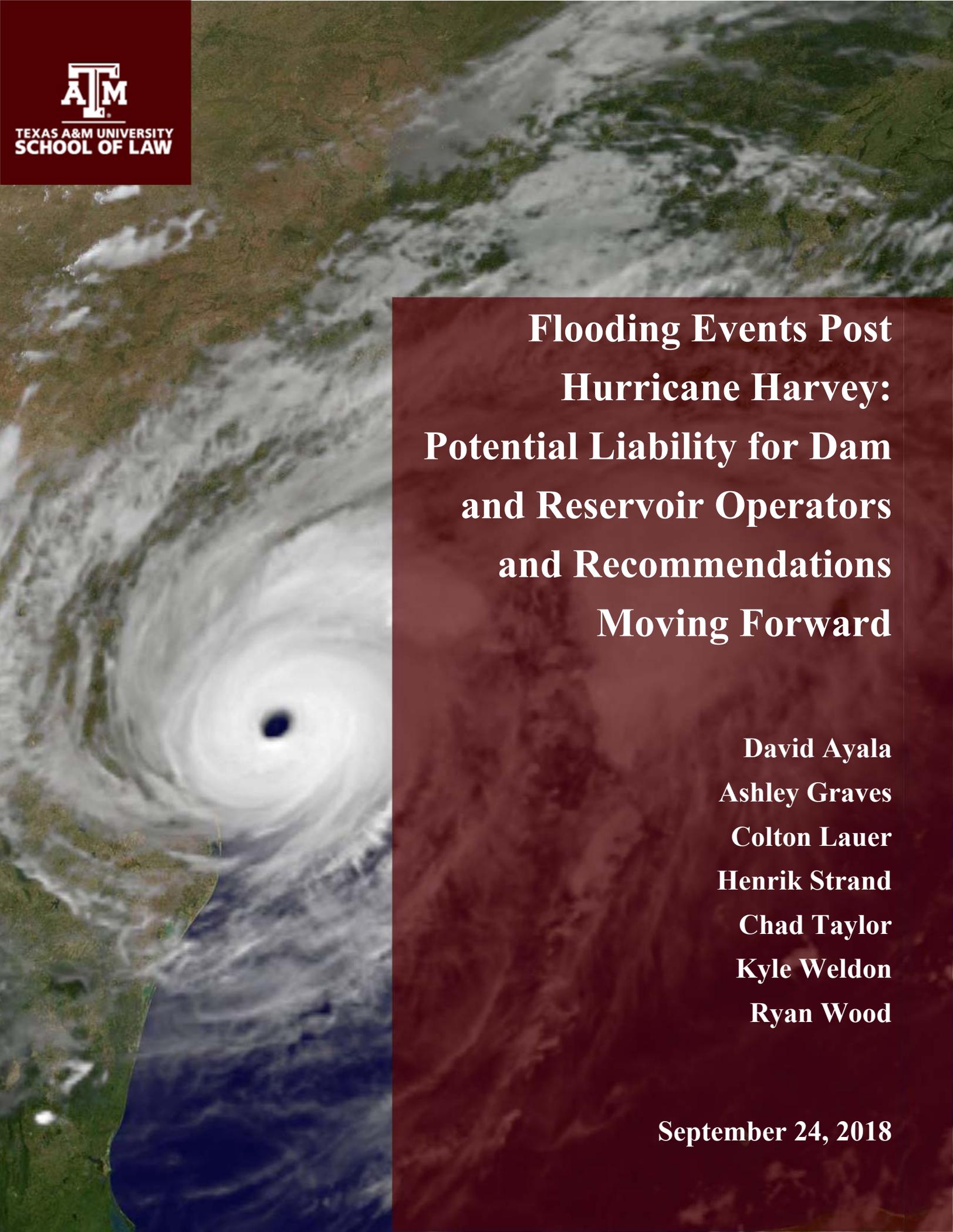




TEXAS A&M UNIVERSITY
SCHOOL OF LAW

A satellite image of a hurricane, likely Hurricane Harvey, showing a clear eye and swirling cloud patterns over the Gulf of Mexico. The image is partially obscured by a dark red overlay on the right side.

**Flooding Events Post
Hurricane Harvey:
Potential Liability for Dam
and Reservoir Operators
and Recommendations
Moving Forward**

**David Ayala
Ashley Graves
Colton Lauer
Henrik Strand
Chad Taylor
Kyle Weldon
Ryan Wood**

September 24, 2018

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For all inquiries, please contact:
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I. EXECUTIVE SUMMARY

When Hurricane Harvey hit the Texas coast as a category 4 hurricane on August 25, 2017, it resulted in \$125 billion in damage, rivaling only Hurricane Katrina in the amount of damage caused. It also resulted in the deaths of 88 people and destroyed or damaged 135,000 homes. Much of that devastation was the result of flooding. The storm dumped over 27 trillion gallons of rain over Texas in a matter of days. Some parts of Houston received over 50 inches of rainfall.

The potential liability that dam and reservoir operators may face for decisions they make during storm and flooding events has now become a major concern for Texas citizens and its elected officials. Law suits have now been instituted against the federal government for its operation of two flood control reservoirs, as well as against the San Jacinto River Authority for its operation of a water supply reservoir. Moreover, the issues and concerns have been placed on the agenda of a number of committees preparing for the 2019 Texas legislative session.

This report reviews current dam and reservoir operations in Texas and examines the potential liability that such operators may face for actions and decisions taken in response to storm and flooding events. In Section III, the report reviews dam gate operations and differentiates between water supply reservoirs and flood control reservoirs. It also considers pre-release options and explains why such actions are disfavored and not recommended.

In Section IV, the report evaluates liabilities and defenses applicable to dam and reservoir operators. It explains how governmental immunity can limit the exposure of state and federally-run facilities to claims seeking monetary damages. It also discusses how such entities could be subject to claims of inverse condemnation, which generally are not subject to governmental immunity, under Texas law as well as under the Fifth Amendment to the U.S. Constitution. In addition, the Section discusses negligence and nuisance claims and concludes that plaintiffs asserting either or both of these claims will have difficulty presenting successful arguments for flooding-related damage and harm against operators who act reasonably in the face of storm-related precipitation.

Finally, Section V offers recommendations that dam and reservoir operators might pursue in order to engage and educate the public and thereby reduce the potential for disputes and litigation. Specifically, the report highlights the need for expanded

community outreach efforts to engage with municipalities, private land owners, and the business community in flood-prone neighborhoods both below and above a dam. It also recommends implementation of proactive flood notification procedures as a way of reaching and alerting as many people as possible of potential and imminent flooding events. Finally, the report proposes implementation of a dispute prevention and minimization mechanism and offers recommendations for the design and execution of such a program.

The report is the work product of students enrolled in the Natural Resources Systems Capstone Seminar at Texas A&M University School of Law under the supervision of Gabriel Eckstein, Professor of Law and Director of the TAMU Law Program in Natural Resources Systems, and Howard S. Slobodin, Adjunct Professor of Law and General Counsel of the Trinity River Authority of Texas.

II. HURRICANE HARVEY

Hurricane Harvey made landfall as a category 4 hurricane on August 25, 2017.¹ It was the first category 3 or higher hurricane to make landfall in the United States since Hurricane Wilma in 2005.² It is estimated to have caused about \$125 billion in damage rivaling only Hurricane Katrina in the amount of damage caused. With Harvey, an estimated 13 million people were affected and nearly 135,000 homes were damaged or destroyed.³ The storm dumped over 27 trillion gallons of rain over Texas. Some parts of Houston received over 50 inches of rainfall.⁴ According to Texas officials, Hurricane Harvey was responsible for 88 deaths.⁵

Hurricane Harvey brought into focus potential liability that dam and reservoir operators may face for decisions they make during flooding events. Following the hurricane, several law suits were instituted against the federal government for its

¹ Nicole Chavez, Eric Levenson & Steve Almasy, *Powerful Hurricane Harvey Makes Landfall in Texas*, CNN (Aug. 25, 2017), <https://www.cnn.com/2017/08/25/us/hurricane-harvey/index.html>.

² *Id.*

³ Eric S. Blake & David A. Zelinsky, *National Hurricane Center Tropical Cyclone Report: Hurricane Harvey*, NATIONAL HURRICANE CENTER (Jan. 23, 2018), https://www.nhc.noaa.gov/data/tcr/AL092017_Harvey.pdf.

⁴ *Id.*

⁵ Giulia Afiune, *State Says Harvey's Death Toll Has Reached 88*, THE TEXAS TRIBUNE (2017), <https://www.texastribune.org/2017/10/13/harveys-death-toll-reaches-93-people/>.

operation of two flood control reservoirs, as well as against the San Jacinto River Authority for its operation of a water supply reservoir. This report addresses that potential liability as it applies to all reservoir operators in Texas, and recommends actions that can be taken to mitigate liability in similar circumstances.

III. TEXAS DAM GATE OPERATIONS

A. Recommended and Common Practices

1. *The Role of the Texas Commission on Environmental Quality (TCEQ)*

The Texas Commission on Environmental Quality (TCEQ) requires that dam operators create and follow gate operating procedures.⁶ Although TCEQ reviews those procedures, it does not approve them.⁷ TCEQ also does not circulate model gate operations manuals or procedures, nor does TCEQ actively work with dam owners and operators to formulate these manuals or procedures. TCEQ's guidelines are very broad, but provide that: (1) manuals must be written by engineering firms; (2) normal pool levels be designated and maintained; (3) water levels and flows be monitored; (4) weather, rainfall, and other meteorological information be monitored; and, (5) that step-by-step gate operating procedures be professionally formulated, clearly explained, and closely followed by dam personnel.⁸ Furthermore, monitoring of the dam should increase according to the risks posed by the size of the reservoir and the severity of weather events.⁹

2. *Water-Supply Reservoirs vs. Flood Control Reservoirs*

Water-supply reservoirs are designed and planned to impound and then supply water. Accordingly, they are required to maintain conservation pools at a certain

⁶ *Guidelines for Operation and Maintenance of Dams in Texas*, TCEQ DAM SAFETY SECTION https://www.tceq.texas.gov/assets/public/comm_exec/pubs/gi/gi357/toc_intro.pdf (last visited March 3, 2018).

⁷ *Id.*

⁸ *Id.*

⁹ *Instrumentation and Monitoring Guidelines*, TCEQ DAM SAFETY SECTION https://www.tceq.texas.gov/assets/public/comm_exec/pubs/gi/gi357/chapter6.pdf (last visited March 3, 2018).

elevation to ensure a consistently available water supply, especially during drought. By their nature, water supply reservoirs do not provide effective flood storage.¹⁰

Maintenance of conservation pool level at a certain elevation is common practice for many water supply reservoirs.¹¹ The purpose of maintaining a consistent pool level within a designated minimum and maximum range is to ensure that water deliveries may always be accomplished, even during times of shortage. Even though maintaining a prescribed conservation pool level decreases potential flood storage space, the practice is common and is considered an industry standard.¹²

In contrast, water in a flood control reservoir is maintained well below the reservoir's capacity. Some flood control structures contain no water absent significant precipitation. This allows operators to impound high flows during times of heavy rainfall to mitigate downstream flooding. Water is then slowly released in order to reduce the level in the reservoir in preparation for the next flood event.

B. Pre-Release

Pre-release, or the practice of discharging stored water downstream to lower the reservoir's pool level in preparation of an anticipated flood, is a discretionary measure and not one required in the TCEQ guidelines or common dam operation practices.¹³ One concern related to pre-release pertains to the location of rainfall in relation to the released water. If significant rainfall occurs both downstream and in the area of a reservoir, pre-releasing water would fill the downstream river channel and exacerbate flooding. Since weather forecasting beyond a few days has a

¹⁰ *Lake Conroe – A Water Supply Reservoir*, SAN JACINTO RIVER AUTHORITY, <http://www.sjra.net/about/facts/water-supply-reservoir/> (Accessed February 7th, 2018).

¹¹ *Id.*

¹² *Texas Lakes and Reservoirs*, TEXAS WATER DEVELOPMENT BOARD, <http://www.twdb.texas.gov/surfacewater/rivers/reservoirs/index.asp>; *Monitored Water Supply Reservoirs*, WATER DATA FOR TEXAS, <https://waterdatafortexas.org/reservoirs/statewide> (last visited February 7th, 2018). Various major water supply reservoirs in Texas—such as Lake Conroe, Lake Ray Hubbard, Lake Arlington, and Eagle Mountain Lake—maintain a conservation pool level with little flood storage space.

¹³ *Bennet v. Tarrant Regional Water District No. 1*, 891 S.W. 2d 441, 451 (Tex. App. -- Fort Worth 1995, writ denied).

significant margin of error, TCEQ generally discourages the practice of pre-release from water supply reservoirs in preparation for a heavy rain event.¹⁴

For example, when the San Jacinto River Authority (“SJRA”) inquired into whether Lake Conroe should lower its levels before the predicted landfall of Hurricane Harvey, TCEQ expressly discouraged the practice and cited the risk of exacerbated downstream flooding, inaccuracy of meteorological predictions, and infeasibility of safely releasing enough water to make a difference as reasons why pre-releasing was an inadvisable method of flood control.¹⁵

Another concern with pre-release is drought. The hydrologic history of Texas is replete with cycles of droughts and floods of varying durations and intensity. Water supply reservoirs are designed to provide critically needed freshwater resources during times of drought. Pre-releasing water in anticipation of heavy rainfall could subject a water supply reservoir to the possibility of not being able to refill before a drought sets in. This could lead to a scenario where pre-release increased both flooding and exacerbated water supply shortages during drought.

Therefore, although pre-release is a discretionary decision for dam operators, in most cases, it is an ill-advised option.

IV. LIABILITIES & DEFENSES

A. Governmental Immunity

Governmental immunity is a common law defense granted to subdivisions of a State.¹⁶ These subdivisions derive their governmental immunity from the State’s broader sovereign immunity.¹⁷ Governmental immunity protects state subdivision against claims brought against it seeking monetary damages.¹⁸ State subdivisions

¹⁴ TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, Pre-Release from Reservoirs (2017), <http://www.sjra.net/wp-content/uploads/2015/01/Lake-Conroe-Prerelease-letter.pdf>.

¹⁵ TCEQ Dam Safety Section, *Letter Regarding Pre-Release from Reservoirs*, TEXAS CENTER FOR ENVIRONMENTAL QUALITY (April 24, 2017).

¹⁶ *City of Houston v. Williams*, 353 S.W.3d 128, 134 (Tex. 2011) (citing *City of Galveston v. State*, 217 S.W.3d 466, 469 (Tex.2007))

¹⁷ *Id.* (citing *Tooke v. City of Mexia*, 197 S.W.3d 325, 331 (Tex.2006))

¹⁸ *Id.* at 332

are immune from both suit and liability.¹⁹ In order to bring a suit against the state or one of its subdivisions, a plaintiff must show that the Texas legislature has expressly waived immunity.²⁰ Even if they can prove a waiver of immunity from suit, the State or subdivision may still enjoy immunity for any liability that is found against it.²¹ The Texas Tort Claims Act lists all subdivisions under the State of Texas for the purposes of governmental immunity.²²

Under the Texas Tort Claims Act there are only three acts that the legislature has waived immunity. (1) “Any property damage, personally injury, or death caused by the wrongful act, omission, or negligence caused by a government employee operating a motor driven vehicle or motor driven piece of equipment”, (2) “personal injury caused by the condition or use of tangible personal property” and (3) “personal injury or death caused by the condition or use of real property.”²³

There are exceptions to governmental immunity. In Texas, the courts have stated that immunity cannot be used as a defense to valid inverse condemnation claims, which arise under the provisions of the federal and Texas Constitutions.²⁴

Some parties attempt to bypass the state’s immunity by seeking injunctive relief or equitable remedies. Governmental immunity does not stop a plaintiff from seeking such remedies. However, plaintiffs cannot use these remedies as a way to gain monetary relief against the state or one of its subdivisions.²⁵

B. Inverse Condemnation Under Texas Law

A plaintiff, depending on where his or her property is located in relation to a reservoir’s dam may potentially establish an inverse condemnation cause of action

¹⁹ *General Services Com'n v. Little-Tex Insulation Co., Inc.*, 39 S.W.3d 591, 598 (Tex. 2001)

²⁰ *City of Houston v. Williams*, 353 S.W.3d 128, 134 (Tex. 2011) (citing *Fed. Sign v. Tex. S. Univ.*, 951 S.W.2d 401, 405 (Tex.1997) (superseded by statute on other grounds))

²¹ *City of Houston v. Williams*, 353 S.W.3d 128, 134 (Tex. 2011)

²² TEX. CIV. PRAC. & REM. CODE ANN. § 101.001(3)(B) (West, Westlaw through the end of the 2017 Reg. and First Called Sess. of the 85th Legis.)

²³ TEX. CIV. PRAC. & REM. CODE ANN. § 101.021 (West, Westlaw through the end of the 2017 Reg. and First Called Sess. of the 85th Legis.)

²⁴ *General Services Com'n v. Little-Tex Insulation Co., Inc.*, 39 S.W.3d 591, 598 (Tex. 2001) (citing *Steele v. City of Houston*, 603 S.W.2d 786, 791 (Tex.1980); *State v. Biggar*, 848 S.W.2d 291, 295 (Tex.App.—Austin 1993))

²⁵ *Tex. Nat. Res. Conservation Comm'n v. IT-Davy*, 74 S.W.3d 849,856 (Tex. 2002)

against the dam operator for flooding events related to releases from the dam. Someone with property immediately below the dam could potentially prove all the elements of inverse condemnation—intent, causation, and a taking that was for public use. The Texas Constitution requires governmental entities to pay adequate compensation when private property is taken for or applied to public use.²⁶ To establish that a “taking” has occurred under inverse condemnation is a question of law,²⁷ and a landowner must prove: (1) the governmental entity “acted intentionally in the exercise of its lawful authority; (2) the act resulted in the taking, damaging, or destroying of property; and (3) the act was for public use.”²⁸ In general, sovereign immunity protects the government from liability, but, for takings claims, sovereign immunity provides no protection.²⁹

1. Intent

To sustain a claim for inverse condemnation under the Texas takings clause a plaintiff must prove that the taking resulted from the government’s performance of an intentional act, which includes “affirmative conduct” and “specificity.”³⁰ The relevant question for determining intent is not “whether the government intended to damage property,” nor is it “whether it merely intended to take an action that accidentally resulted in such damage.”³¹ Rather, the Texas Supreme Court has held the government must “(1) know[] that a specific act is causing identifiable harm; or (2) know[] that the specific property damage is substantially certain to result from an authorized government action—that is, that the damage is ‘necessarily an incident to, or necessarily a consequential result of’ the government’s action.”³² Furthermore, looking specifically at flood related takings, “recurrence is a probative factor in determining the extent of the taking and whether it is necessarily incident to authorized government activity, and therefore substantially certain to

²⁶ TEX. CONST. art. I, § 17(a).

²⁷ *Bennett v. Tarrant County Water Control and Improvement Dist.*, 894 S.W.2d 441, 448 (Tex. App.—Fort Worth 1995, writ denied).

²⁸ *City of El Paso v. Ramirez*, 349 S.W.3d 181, 186 (Tex. App.—El Paso 2011, no pet.) (citing *Gen. Servs. Comm’n v. Little-Tex Insulation Co., Inc.*, 39 S.W.3d 591, 598 (Tex. 2001)).

²⁹ *Harris Cty. Flood Control Dist. v. Kerr*, 499 S.W.3d 793, 799 (Tex. 2016).

³⁰ *Id.* at 799-800.

³¹ *City of Dallas v. Jennings*, 142 S.W.3d 310, 313 (Tex. 2004).

³² *Id.*

occur.”³³ No bright-line rule has been judicially adopted for how often floods must take place to be deemed sufficient recurrent to support liability.

In *City of Dallas v. Jennings*, the plaintiffs sued the City of Dallas (the “City”) when their home was flooded with raw sewage after the City’s Water Department had dislodged a clogged sewer main.³⁴ The homeowners claimed that the City had unconstitutionally “taken” their property by flooding the home.³⁵ The Supreme Court of Texas disagreed, holding that there was (1) “no evidence that the City knew. . . that any flooding damage would occur” from its actions, and (2) there was no “evidence that the act of unclogging was substantially certain to lead to such damage.”³⁶ Because the City did not possess the “knowledge required to establish an intentional taking,” the plaintiffs failed to sustain their inverse condemnation claim.³⁷

In contrast, the Supreme Court of Texas, in *Tarrant Regional Water District v. Gragg*, held that flood damage to the landowner’s property was the result of the government’s intentional act.³⁸ In *Gragg*, the Tarrant Regional Water District (“TRWD”) owned and operated the Richland-Chambers Reservoir, a water supply reservoir completed in 1987.³⁹ The plaintiff was the owner of a ranch that was situated on the Trinity River below the dam that suffered alleged damage from flood events after the reservoir was completed.⁴⁰ Even though the property was known to flood before the construction of the reservoir, the plaintiff provided evidence of numerous flood events as well as proof “that the TRWD’s releases actually resulted in unnatural surges of water.”⁴¹ The Court held that a taking under the Texas Constitution did occur, characterizing TRWD’s actions in constructing the reservoir and then releasing water from the reservoir’s floodgates as affirmative,

³³ *Tarrant Reg’l Water Dist. v. Gragg*, 151 S.W.3d 546, 555 (Tex. 2004).

³⁴ *Jennings*, 142 S.W.3d at 312.

³⁵ *Id.* at 313.

³⁶ *Id.* at 315.

³⁷ *Id.* at 313.

³⁸ *Gragg*, 151 S.W.3d at 550.

³⁹ *Id.*

⁴⁰ *Id.* (“[T]he District’s records show hundreds of releases in an amount sufficient to cause flooding at the Gragg Ranch even if there were no other water in the Trinity River.”).

⁴¹ *Id.* at 555.

and further concluding that the damage to the plaintiff's property "was the inevitable result of the reservoir's construction and of its operation as intended."⁴²

The knowledge of the governmental entity is at the core of this element. If a government actor knows with "substantial certainty" that certain damage will result from their actions, the government actor will likely satisfy this element.⁴³

2. Causation: Taking, Damage, or Destruction

The second inverse condemnation element requires that private property be "intentionally taken, damaged or destroyed" by the government entity's actions.⁴⁴ To prove this element, a plaintiff must show "that the government's actions. . . [were] the proximate cause of the alleged taking."⁴⁵ The Texas Supreme Court has defined the "taking, damage, or destruction" element for inverse condemnation "as physical appropriation or invasion of property, or unreasonable interference with a landowner's right to use and enjoy the property."⁴⁶

Looking first at the actual physical interference or invasion of private property, courts have provided some analysis on what constitutes such a "taking." In *Bennett v. Tarrant County Water Control and Improvement District*, the Fort Worth Court of Appeals held that flood events—four in a twenty-year period—in flowage easements owned by a water district did not constitute a taking.⁴⁷ In contrast, the Supreme Court of Texas, in *Gragg*, found that a reservoir that caused "exacerbated flood events" was in fact a "taking" of the plaintiff's property that was affected by the release of water from the reservoir.⁴⁸

Analyzing the causation requirement of the "taking element," the Beaumont Court of Appeals in *Wickham v. San Jacinto River Authority* found that, because SJRA

⁴² *Id.* at 550.

⁴³ Jennings, 142 S.W.3d at 313.

⁴⁴ Golden Harvest Co. v. City of Dallas, 942 S.W.2d 682, 688 (Tex. App.—Tyler 1997, writ denied).

⁴⁵ Brandywood Hous., Ltd. v. Tex. DOT, 74 S.W.3d 421, 426 (Tex. App.—Houston [1st Dist.] 2001, pet. denied).

⁴⁶ Wickham v. San Jacinto River Auth., 979 S.W.2d 876, 883 (Tex. App.—Beaumont 1998, pet. denied) (citing *DuPuy v. City of Waco*, 396 S.W.2d 103, 108-09 (Tex. 1965)).

⁴⁷ Bennett, 894 S.W.2d at 448.

⁴⁸ Gragg, 151 S.W.3d at 554-55.

“never released more water than was entering the San Jacinto River. . . it [was] clear that the water being released from Lake Conroe was flowing directly into the San Jacinto River, not directly onto appellants’ property.”⁴⁹ After the water flowed out of the dam’s floodgates, it “went downstream and mixed into other tributaries which apparently overflowed their banks resulting in flooding.”⁵⁰ The Court held that it was speculative to assume that the water coming out of the reservoir was in fact the same water that flooded the plaintiff’s property. Therefore, the court held that this did not satisfy the requisite proximate causation needed for a “taking,” negating the inverse condemnation claim.⁵¹

Likewise, the Beaumont Court of Appeals affirmed its *Wickham* decision in *Sabine River Authority v. Hughes*.⁵² Under similar heavy rainfall situations, the Sabine River Authority (“SRA”) was sued for inverse condemnation by property owners who claimed that their property was flooded as a result of releases from a dam operated by SRA.⁵³ Paralleling the approach taken by SJRA in *Wickham*, SRA provided evidence that the flow of water into the reservoir was more than twice the amount of water it released from the dam.⁵⁴ Combining the fact that SRA “never released more water than was entering the reservoir via rainfall,” with evidence “that the water being released from the reservoir was not flowing directly onto appellee’s property but into the Sabine River,” the Court held that there was sufficient evidence to negate the “taking” element.⁵⁵

Clearly the proximity of the property to the reservoir is important to succeed on this element. For example, a plaintiff who lives several hundred yards from the dam may have a stronger claim under this element than a plaintiff who lives several river miles downstream. If a plaintiff can proximately show that the water released from the dam was the same water that flooded the property (compared with water from an intervening stream or other rainfall) he or she may be able to meet this element.

⁴⁹ *Wickham*, 979 S.W.2d at 883.

⁵⁰ *Id.*

⁵¹ *Id.*

⁵² *Sabine River Auth. of Tex. v. Hughes*, 92 S.W.3d 640 (Tex. App.—Beaumont 2002, pet. granted).

⁵³ *Id.*

⁵⁴ *Id.* (“385,000 cubic feet per second (“cfs”) compared with 117,644 (cfs)”).

⁵⁵ *Id.* at 642.

3. For Public Use

The Texas Supreme Court has held that the public use element is met “if an injury results from either the construction of public works *or their subsequent maintenance and operation.*”⁵⁶ Even though an exhaustive list of public uses does not exist, the Texas Tort Claims Act provides examples of functions that may be performed by the government “in the interest of the general public, or for public use.”⁵⁷ Importantly, dams and reservoirs are included in this list.⁵⁸ Additionally, at least one Texas court has found that the “public use” element is satisfied when “the overflow water from a dam used for water supply caused damage to land.”⁵⁹

In its Amended Motion to Dismiss a lawsuit stemming from Hurricane Harvey flooding, SJRA has argued that the holding in *Wickham* supports a finding that flooding from water supply reservoirs is not “for a public purpose.”⁶⁰ In *Wickham* the Court stated that “[n]either Lake Conroe nor its Dam was designed to function as a flood control facility, but simply exists to maintain a level of water so as to supply its customers with a previously contracted amount of water.”⁶¹ In their Motion to Dismiss, SJRA emphasized that the Court’s agreement that Lake Conroe was designed to supply water, and not to control flooding, prevents the finding of a public use when flooding occurs. However, it is important to note that *Wickham* held that an inverse condemnation claim could not be supported because the plaintiffs were unable to prove that the “taking” element was satisfied, not because the plaintiffs failed to establish the public purpose element.⁶² The Court did not have to discuss this element as the “taking” element negated the claim. Therefore, it may be too soon to assume that flooding from a water supply reservoir can never be considered a “public use.”

⁵⁶ Kerr, 499 S.W.3d at 801 (citing *City of Tyler v. Likes*, 962 S.W.2d 489, 505 (Tex. 1997) (emphasis added)).

⁵⁷ Golden Harvest Co., 942 S.W.2d at 689 (citing TEX. CIV. PRAC. & REM. CODE ANN. § 101.0215 (West, Westlaw through the end of the 2017 Reg. and First Called Sess. of the 85th Legis.)).

⁵⁸ *Id.*

⁵⁹ *City of Waco v. Rook*, 55 S.W.2d 649 (Tex. Civ. App.—Waco 1932, writ dism’d).

⁶⁰ Defendant San Jacinto River Authority’s Amended Motion to Dismiss & Plea to the Jurisdiction at 13, *Ogletree v. Tex. Water Dev. Bd.*, No. 2017-65309 (334th Dist. Ct., Harris County, Tex. Dec. 12, 2017).

⁶¹ *Wickham*, 979 S.W.2d at 878.

⁶² *Id.* 884.

In *Golden Harvest Company*, the Court of Appeals in Tyler, TX held “that evidence that the release of water was necessary to protect the Dam [of a water supply reservoir] on occasions in question raised a fact issue as to “public use,” as require for a taking.”⁶³ In this case, the City of Dallas owned and operated Lake Ray Hubbard, with the primary purpose of providing water for Dallas and the surrounding cities.⁶⁴ After three separate heavy rainfall events between May 1989 and April 1991, the City released “more water from Lake Ray Hubbard than normal, admittedly flooding Golden Harvest’s property, causing extensive damage.”⁶⁵ Even though the Court did not provide a clear answer on whether this flooding was the result of a “public use,” the Court did believe that there was sufficient evidence regarding this element to remand the issue back to the trial court.⁶⁶

Of the three elements, “public use” may be the easiest one to prove. Reservoirs that are operated to either (1) provide flood control for surrounding areas, or (2) provide water supply for the citizens of Texas are both likely to be considered public works that are operated in the interest of the general public.

C. Fifth Amendment Takings Claims

The Fifth Amendment, as applied to the states by the Fourteenth Amendment,⁶⁷ prohibits any governmental taking of land without just compensation.⁶⁸ When analyzing whether government actions rose to the level of a taking, courts make fact-based inquiries about the specific event.⁶⁹ Specifically, for flooding, a plaintiff must establish that he has a “protectable property interest under state law,”⁷⁰ backed by “reasonable-investment backed expectations,”⁷¹ that the flooding event was

⁶³ *Golden Harvest Co.*, 942 S.W.2d at 689-90.

⁶⁴ *Id.* at 684.

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ *Chicago, B. & Q.R. Co. v. Chicago*, 166 U.S. 226 (1897).

⁶⁸ U.S. CONST. amend. V.

⁶⁹ *St. Bernard Parish Gov’t v. United States*, 121 Fed. Cl. 687, 718-19 (Fed. Cl. 2015) (“Whether a compensable taking has occurred requires the court to resolve ‘a question of law based on factual underpinnings.’”) (citing *Wyatt v. United States*, 271 F.3d 1090, 1096 (Fed. Cir. 2001)).

⁷⁰ *Id.* at 719.

⁷¹ *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003, 1034 (1992) (Kennedy, J., Concurring).

foreseeable and directly caused by the government actions, and that the flooding was frequent and severe.⁷² Temporary government-induced flooding is not *per se* exempt from takings liability.⁷³ However, the flooding must be “inevitably recurring” due to the actions of the government.⁷⁴

1. Protected Property Interest

Potential plaintiffs have a protected property interest in their land as landowners within the State of Texas. Therefore, even though plaintiffs probably do not have a successful takings claim for the flooding of their property, plaintiffs could have protected property rights as owners of real property. However, as a threshold element to prove a takings claim, a plaintiff must establish the existence of a property right,⁷⁵ which can be shown by looking at the law of the state in which the alleged taking took place.⁷⁶

2. Reasonable Investment-Backed Expectations

Even though plaintiffs may have a justiciable interest in private property supporting a claim for the recovery of flood damages as owners of real property, plaintiffs must also establish that the property owners’ rights in the property were backed by reasonable investment-backed expectations.⁷⁷ This may be difficult in certain circumstances, because land that floods downstream of a dam is likely within a flood plain, which would flood notwithstanding the presence of an upstream dam, and thus the reasonable investment-backed expectations of owners with regard to its use would be appropriately limited.

Typically, reasonable investment-backed expectations are relevant when an owner’s use of property is restricted by governmental regulations, giving rise to a regulatory takings claim.⁷⁸ However, reasonable-investment backed opportunities

⁷² Ark. Game & Fish Comm’n v. United States, 133 S. Ct. 511, 522-23 (2012).

⁷³ *Id.* at 522.

⁷⁴ United States v. Cress, 243 U.S. 316, 328 (1917).

⁷⁵ See Phillips v. Wash. Legal Found., 524 U.S. 156, 164 (1998).

⁷⁶ Bd. of Regents of State Colls. v. Roth, 408 U.S. 564, 577 (1972).

⁷⁷ Ark. Game & Fish, 133 S. Ct. at 522.

⁷⁸ See Lucas, 505 U.S. at 1034 (Kennedy, J., concurring) (“Property is bought and sold, investments are made, subject to the State’s power to regulate.”)

must also be shown with respect to flooding claims.⁷⁹ Relevant to this inquiry is knowledge of any prior flooding, location of the property, and the severity of the events in question.⁸⁰

Because this is a newer element for takings cases regarding flooding, as it was explicitly added to this inquiry in 2012, the *St. Bernard Parish* case (“MR-GO litigation”) is the first case to really analyze this element. In *St. Bernard*, the government was sued over flooding damages during Hurricanes Katrina, Gustav, Rita, and Ike that were allegedly exacerbated by the Army Corps of Engineers’ negligent maintenance and operation of the Mississippi River-Gulf Outlet (“MR-GO”).⁸¹ Even though the property owners’ investment-backed expectations were somewhat diminished by the location of property within the Mississippi River flood plain, the Army Corps had represented to the plaintiffs that the properties were protected. Additionally, the hurricane protection plan was not changed after the 1960s, even though the canal continued to degenerate the landscape, increasing the hurricane danger.⁸² Furthermore, the subsequent flooding was more severe than any previous flooding that had occurred in this part of the floodplain.⁸³

3. Direct Cause of Flooding

For a governmental entity to be liable for a takings claim under the U.S. Constitution due to flooding from a dam, the flooding must be “the direct result of the structure.”⁸⁴ If the injuries to the land are “indirect and consequential . . . no implied obligation on the part of the government can arise.”⁸⁵ Furthermore, the plaintiffs must show that the land would be subject to “inevitably recurring” flooding because of the government’s actions.⁸⁶ In other words, “[o]ne flooding does not constitute a taking.”⁸⁷ For a taking to occur, “it is not necessary that the

⁷⁹ Ark. Game & Fish, 133 S. Ct. at 522.

⁸⁰ *St. Bernard Parish*, 121 Fed. Cl. at 719-20.

⁸¹ *Id.* at 690-92.

⁸² *Id.* at 720.

⁸³ *Id.*; see also Ark. Game & Fish, 133 S. Ct. at 522 (describing the downstream flooding that occurred on plaintiff’s game reservation as more severe than the comparable levels of flooding before the government releasing of water from the dam).

⁸⁴ *Sanguinetti*, 264 U.S. at 149.

⁸⁵ *Id.* at 150.

⁸⁶ *Cress*, 243 U.S. at 328.

⁸⁷ *B Amusement Co.*, 180 F. Supp. at 389.

government intend to invade the property owners' rights, as long as the invasion that occurred was 'the foreseeable or predictable result' of the government's actions."⁸⁸

Courts tend to find a federal constitutional taking for flooding caused by government dams when the government's actions deviated from the professional plans that they had put in place.⁸⁹ For example, in *Arkansas Fish and Game v. United States*, the Army Corps deviated from its water control plan, causing foreseeable damage to the hardwood forest in the downstream nature preserve.⁹⁰ In contrast, in *St. Bernard Parish*, the Army Corps did not modify or deviate from its original hurricane flood control plan even after the MR-GO channel became twice as wide as expected due to increased erosion.⁹¹ Since the plan assumed a channel width of 600 feet., when the channel was expanding at a rate of 15 feet per year due to erosion, the resulting authorized width and depth of the channel was exceeded, and, in part, made the catastrophic flooding in New Orleans foreseeable.⁹²

Plaintiffs seeking relief under the U.S. Constitution must also prove that the damage to their property was the result of an "inevitably recurring" flooding event caused by the government operation of the dam.⁹³ In *Heartwig v. United States*, a series of downstream plaintiffs sued the Army Corps for operation of a series of water supply dams in Wyoming.⁹⁴ The plaintiffs were unsuccessful in showing that the flooding was the product of an inevitably recurring flooding event because the flooding that year was an anomaly that could not be traced directly to the government's operation

⁸⁸ Ark. Game & Fish, 736 F.3d at 1372 (Fed. Cir. 2013) (citing *Moden v. United States*, 404 F.3d 1335, 1343 (Fed. Cir. 2005)).

⁸⁹ See Ark. Game & Fish, 736 F.3d at 1372-73; *St. Bernard Parish*, 121 Fed. Cl. 729-738 (describing the lack of changes to the Army Corps plan, even after increased erosion and failed flood control gates exacerbated the risk to communities around New Orleans).

⁹⁰ Ark. Game & Fish, 736 F.3d at 1373 ("Engineers could have foreseen that the series of deviations approved during the 1990s would lead to substantially increased flooding of the Management Area and, ultimately, to the loss of large numbers of trees there.").

⁹¹ *St. Bernard Parish*, 121 Fed. Cl. at 721-22, 729-31.

⁹² *Id.* at 722 ("The Army Corps' policy was to allow bank erosion of the MR-GO to continue unabated. . . . Consequently, by 2004, one year prior to Hurricane Katrina, the majority of the banks of the MR-GO were unprotectable.").

⁹³ See *Heartwig*, 485 F.2d at 620.

⁹⁴ *Id.* at 617.

of the dams.⁹⁵In *St. Bernard Parish*, however, unlike in previous cases,⁹⁶ the plaintiffs proved that the flooding caused by MR-GO would recur every time there was a major storm. Because the plaintiffs showed that the flood occurred not only in Katrina, but also in Rita, Gustav, and Ike, the plaintiffs successfully showed that the flooding was inevitably recurring, even though it was intermittent.⁹⁷

4. Frequency and Length

To determine whether the governmental interference with property is substantial, the plaintiff must show that the governmental interference created a significant economic impact on the property interest.⁹⁸ In the context of temporary takings, under the U.S. Constitution the plaintiff must further establish the severity of the government's interference with the use and enjoyment of the property.⁹⁹

In *St. Bernard Parish*, the plaintiffs met this element because of the severe flooding during Katrina and Rita, which kept home and businesses owners off of their property for weeks or even months.¹⁰⁰ In *Arkansas Game*, the focus was on the repeated and consistent flooding events. The commission repeatedly complained to the Army Corps each year about the damage the flooding was doing to the young oak trees within the reserve, which was slowly turned into a "headwater swamp."¹⁰¹

⁹⁵ *Id.* at 620 ("Even if the court assumes *arguendo* that it was the authorized and proper conduct of the defendant's agents which caused the flood to be worse than it otherwise would have been, as the plaintiffs allege, this is not equivalent to contending that it is a continuing condition that will inevitably lead to future floods which would not otherwise occur.").

⁹⁶ *See, e.g.*, *Fromme v. United States*, 412 F.2d 1192, 1197 (Ct. Cl. 1969) (no taking when flooding due to levee would occur every fifteen years, on average); *Singleton v. United States*, 6 Cl. Ct. 156, 163 (Cl. Ct. 1984) (no taking when flood would occur once every 100 years); *Baird v. United States*, 5 Cl. Ct. 324, 329 (Cl. Ct. 1984) (no taking when likelihood of flooding was once every 120-130 years); *Bryant v. United States*, 216 Ct. Cl. 409, 410 (Ct. Cl. 1978) (no taking when flood interval was 30 years); *but see Barnes v. United States*, 538 F.2d 865, 478-79 (Ct. Cl. 1976) (taking when land for agricultural use was flooded intermittently five out of six years and predicted to continue); *King v. United States*, 427 F.2d 767, 769 (Ct. Cl. 1970) (flooding that was previously intermittent was now occurring annually as a result of the dam project).

⁹⁷ *St. Bernard Parish*, 121 Fed. Cl. at 739; *see also Ark. Game & Fish*, 133 S. Ct. at 519 ("[G]overnment-induced flooding of limited duration may be compensable.").

⁹⁸ *Penn Central Transp. Co. v. New York City*, 438 U.S. 104, 124 (1978).

⁹⁹ *Ark. Game & Fish*, 133 S. Ct. at 522.

¹⁰⁰ *St. Bernard Parish*, 121 Fed. Cl. at 746.

¹⁰¹ *Ark. Game & Fish*, 133 S. Ct. at 523 (citing *Arkansas Game & Fish Comm'n v. United States*, 87 Fed. Cl. 594, 610 (2009)).

5. Conclusion

Ultimately, to sustain a Fifth Amendment takings claim, a potential plaintiff has a substantial number of elements to prove—a protected property interest, reasonable investment-backed expectations, that the direct cause of the taking was flooding, and that the flooding was frequent and long enough to incur takings liability. Therefore, unless hurricanes were to become so frequent and severe as to incur flooding damage on a regular basis, it is unlikely that plaintiffs will be able to assert any Fifth Amendment takings claims against government entities.

D. Negligence

To maintain a claim for negligence, a plaintiff must prove that a government entity owed a duty to them, that the entity breached that duty, that breach caused the flooding damage on their land, and they sustained actual damage from that flooding. However, Texas law does not generally grant property owners the right to keep floodwaters from their properties, especially floodwaters resulting from a hurricane as severe as Hurricane Harvey.¹⁰² In fact, *Benavides v. Gonzalez* and other Texas authorities do not recognize liability based on flooding prompted by extreme precipitation or from government-released floodwaters during and after a hurricane.¹⁰³ Flooding like that caused by Hurricane Harvey was a 2000-year flood event; therefore, these events likely exceed what the court in *Wickham* believed to be a reasonable event to hold a reservoir operator liable for.

Furthermore, if the dam operations mitigate the flooding effects of a hurricane, it is unlikely that a court could find that a dam operator acted negligently because they in fact caused less damage than what could have occurred had the dam not been there. Moreover, it is unlikely a dam operator would be the cause of the flooding

¹⁰² See *Benavides v. Gonzalez*, 396 S.W.2d 512, 514 (Tex. App. 1965) (finding that “[u]nprecedented rainfall or Act of God is uniformly recognized” as a defense for allegedly unlawful diversions of water); *Ford Motor Co. v. Dallas Power & Light Co.*, 499 F.2d 400, 413 (5th Cir. 1974) (noting that a reservoir operator “did not create the flood” that caused the damage, and finding liability only for a failure to warn downstream owners).

¹⁰³ *Id.*; E.g. *Sabine River Auth. of Texas v. Hughes*, 92 S.W.3d 640, 642 (Tex. App. 2002) (finding no intentional act of the government from extreme precipitation); *Wickham v. San Jacinto River Auth.*, 979 S.W.2d 876, 880-81 (Tex. App. 1998) (describing an allegation of flooding based on a rainfall event exceeding the 100-year frequency) (citing *DuPuy v. City of Waco*, 396 S.W.2d 103, 108-09 (Tex. 1965)).

damage to potential plaintiffs' properties. In *Ford Motor Company. Dallas Power & Light Company*, the court found that the operator of a non-flood prevention reservoir was not the cause of the flooding damage during an extreme rainfall event.¹⁰⁴ Likewise, dam operators in Texas during Hurricane Harvey found themselves in an extreme rainfall situation and will almost certainly be found to not be the cause of the damages that potential plaintiff may claim. Therefore, without clear causation caused by negligent actions, dam operators should feel relatively secure that they can defeat a negligence claim brought after a hurricane.

E. Nuisance

Generally, if the release of water from a reservoir or flood control dam is reasonable, then an entity will not be held liable for nuisance, even if it is an intentional release.

1. Statute of Limitations

Any plaintiff that wishes to bring a nuisance claim must do so within two years of the event,¹⁰⁵ and the accrual of a nuisance claim depends on whether the alleged nuisance is "permanent" or "temporary."

A permanent nuisance is one that is "constant and continuous" and one in which the "injury constantly and regularly occurs."¹⁰⁶ If it is a permanent nuisance, then the nuisance claim "accrues when the injury *first* occurs or is discovered."¹⁰⁷ Alternatively, a temporary nuisance is considered temporary if it "is liable to occur only at long intervals," if it is "occasional, intermittent or recurrent," or if it is "sporadic and contingent upon some irregular force such as rain."¹⁰⁸ If it is a temporary nuisance, then the nuisance claim "accrues *anew* upon each injury."¹⁰⁹

¹⁰⁴ *Ford Motor Co. v. Dallas Power & Light Co.*, 499 F.2d 400, 413 (5th Cir. 1974).

¹⁰⁵ TEX. CIV. PRAC. & REM. CODE § 16.003.

¹⁰⁶ *Schneider National Carriers, Inc. v. Bates*, 147 S.W.3d 264, 272 (Tex. 2004).

¹⁰⁷ *Id.* at 270.

¹⁰⁸ *Id.* at 272.

¹⁰⁹ *Id.* at 270.

2. Classification of a Nuisance

In general, a nuisance is a condition that substantially interferes with the use and enjoyment of land by causing unreasonable discomfort or annoyance to persons of ordinary sensibilities attempting to use and enjoy it.¹¹⁰ The Supreme Court of Texas has acknowledged that there are three classifications of nuisance: (1) “negligent invasion of another’s interests;” (2) “intentional invasion of another’s interest;” or, (3) other conduct that makes a person culpable because the action is “out of place in its surroundings” and invades another’s interests, essentially a “catch-all” category.¹¹¹ As a rule, a plaintiff will not have a case for actionable nuisance unless the “facts of the case bring it within one of [these] three classifications.”¹¹²

There are three categories of nuisance: intentional, negligent, or abnormal. An invasion is intentional if the person: (1) acts for the purpose of causing it; or, (2) knows that “it is resulting or is substantially certain to result from his [or her] conduct.”¹¹³ If the invasion is intentional, then liability for the invasion depends on whether the invasion is unreasonable.¹¹⁴ Alternatively, if the invasion is not intentional, the liability of the person who “harmfully interfere[ed] with the flow of surface water depends on whether [that person] has been negligent, reckless, or abnormally dangerous.”¹¹⁵

Furthermore, it is unlikely that a governmental entity would be held liable for nuisance based on a single, isolated incident. For example, in *Wickham v. San Jacinto River Authority*, there was an extraordinary rain event over four days in 1994 in the Montgomery County, Texas area that led to widespread flooding of the plaintiff’s property.¹¹⁶ The Beaumont Court of Appeals noted that a water supply reservoir, and its associated dam, is not inherently a nuisance, and then held that there was no support for “holding that a single, temporary event can support a claim

¹¹⁰ *Wickham*, 979 S.W.2d at 880; *Warwick Towers Council of Co-Owners ex rel. St. Paul Fire & Marine Ins. v. Paul Warwick, L.P.*, 298 S.W.3d 436, 444 (Tex. App.–Houston [14th Dist.] 2009); *Bible Baptist Church v. City of Cleburne*, 848 S.W.2d 826 (Tex. App.–Waco 1993, writ denied).

¹¹¹ *City of Tyler v. Likes*, 962 S.W.2d 489, 503 (Tex. 1997).

¹¹² *Bible Baptist Church v. City of Cleburne*, 848 S.W.2d 826, 829 (Tex. App.–Waco 1993, writ denied).

¹¹³ *Id.*

¹¹⁴ *Id.*

¹¹⁵ *City of Princeton v. Abbott*, 792 S.W.2d 161, 166 (Tex. App.–Dallas 1990, writ denied).

¹¹⁶ *Wickham*, 979 S.W.2d at 880.

for nuisance” as the “invasion of rights must be inherent in the condition itself beyond arising from negligent or improper use.”¹¹⁷ Thus, the court limited the “catch-all” category to only those things which are inherently a nuisance and found that the SJRA was not liable for nuisance.¹¹⁸

3. “Coming to the Nuisance”

If a plaintiff were to sue for nuisance, a governmental entity could argue that the plaintiffs’ actions in moving near the dam or waterway constituted “coming to a nuisance,” a factor that the court may consider in judging whether the governmental entity acted reasonably.¹¹⁹ Generally, if “a person moves into the vicinity of a nuisance by purchasing or leasing property in the area,” that does not bar a plaintiff from bringing a claim for nuisance and seeking damages or another remedy because “coming to the nuisance” is only a qualified defense.¹²⁰ However, even though “coming to a nuisance” is “not an absolute defense or estoppel, this factor, among others, is relevant in determining whether the defendant’s use of his property is unreasonable and if so, whether the complainant is entitled to relief.”¹²¹ Therefore, if an entity can show that the plaintiff came to the nuisance, this information could be used to support the fact that the entity acted reasonably.

4. Conclusion

Ultimately, a plaintiff has two years to bring a claim for nuisance. However, even if a plaintiff chose to do so, it would be difficult for a plaintiff to recover under the theory that a release of water constituted a nuisance because, even if it was an intentional release, the question the court would consider was whether the entity acted reasonably.

¹¹⁷ *Id.*

¹¹⁸ *Id.*

¹¹⁹ 42 A.L.R. 3d 344 § 2.

¹²⁰ *Id.*

¹²¹ *Id.*

V. RECOMMENDATIONS

A. Community Outreach

Community outreach would be best accomplished by informing the public surrounding dam areas about dam operations and flood risks, while offering help in terms of mitigating the risks through obtaining Community Rating System (CRS) credits for dam safety.¹²² Generally, dam operators do not participate in significant outreach efforts, but active dialogue with a community can mitigate future claims,¹²³ because potential litigants would have more successful alternatives to seek relief in the event of a natural disaster.

The CRS's main objective is to protect lives and health.¹²⁴ CRS credit is available for both state and local dam safety programs, and CRS is part of the National Flood Insurance Program (NFIP). The CRS program provides discounts of up to 45% off flood insurance premiums when communities go beyond the NFIP's minimum standards for floodplain management. To obtain CRS classification, communities apply for a CRS classification and are then given credit points that reflect the impact of their activities in reducing flood losses, insurance rating, and promoting the awareness of flood insurance.¹²⁵ The following is the link to the CRS application: https://www.fema.gov/media-library-data/20130726-1908-25045-7011/crs_quick_check_ff_086_0_35_omb_1660_0022_edition_2013.xls. Because most dam operators pride themselves on operating their dams in a safe and efficient

¹²² “Water district board adopts community-based flood outreach plan”, Marty Grimes, April 16, 2015; <https://www.valleywater.org/news-events/news-releases/water-district-board-adopts-community-based-flood-outreach-plan>; NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM; https://www.fema.gov/media-library-data/20130726-1755-25045-2620/crs_credit_dam_safety.pdf

¹²³ Iowa Flood Response Toolkit, particularly Section 2 – Before the Flood: IV. Public Awareness and Outreach; https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=14&cad=rja&uact=8&ved=0ahUKEwjryan5v3ZAhVtUN8KHSnpDRQ4ChAWCDswAw&url=http%3A%2F%2Fwww.iowadnr.gov%2FPortals%2Fidnr%2Fuploads%2Fwater%2Ffloodplain%2FFlood%2520Response.pdf&usg=AOvVaw26rsGeXqvO1_IV-Pbaa3Dv.

¹²⁴ NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM; https://www.fema.gov/media-library-data/20130726-1755-25045-2620/crs_credit_dam_safety.pdf.

¹²⁵ *Id.* The Insurance Services Office's ISO/CRS Specialist review the community's program and verifies the CRS credit.

manner, these dam operators would undoubtedly be good candidates for applying for these credits in conjunction with the community.

The idea of combining community outreach/education with alternative methods of recovering damages was successfully accomplished by the Santa Clara Valley Water District Board of Directors (Board). In conjunction with educating the community about flood risks and the methods of disseminating the warnings of flooding events, the Board decided it would help communities earn points in the Federal Emergency Management Agency's CRS. As explained by the Board:

[P]articipating communities earn points for all of the flood risk reduction activities and are rated on a scale in 500-point increments. Each 500 points qualifies the community for an additional 5 percent discount in flood insurance rates for their residents and businesses. The points that the water district earns through its flood protection activities are applied to any of the county's communities that participate in the CRS program.¹²⁶

Additionally, the Board found that the water district's CRS points saved Santa Clara \$2.6 million in flood insurance premiums.¹²⁷ The water district earned CRS points through efforts such as media campaigns, a mailer to residents of flood hazard areas, extensive information on flood protection available on its website, stream maintenance programs, trash removal, and sandbag programs.

The methods of creating a safer environment that is ready for flooding events vary greatly, but more dialogue between the community and dam operators should be the main goal. Posting content such as the operating procedures and tips on what to do in the flood event on dam operators' websites is a good start, but to effectively convince the community to work in conjunction with dam operators to obtain flood insurance, dam operators must make efforts to be available to the community. The open dialogue between the community and dam operators will help the community voice their concerns while, vitally, offering an opportunity for dam operators to

¹²⁶ "Water district board adopts community-based flood outreach plan", Marty Grimes, April 16, 2015; <https://www.valleywater.org/news-events/news-releases/water-district-board-adopts-community-based-flood-outreach-plan>.

¹²⁷ *Id.*

educate the community about the operations that are helping the surrounding area during flooding events.

In conclusion, satisfying the criteria for the application and future additional credits are relatively inexpensive compared to the potential costs of future litigation from surrounding property owners. The CRS program is a win-win program for dam operators and surrounding property owners because it reduces liability for dam operators while offering the property owners a cheaper and more reliable alternative to recover damages they sustain during flood events. The CRS Application/Quick Check is available at the following link: <https://www.fema.gov/media-library/assets/documents/31255>.

B. Flood Notification Procedures

Proactive examples of flood notification by river authorities exist in Texas, and are worthy of emulation and support. The San Jacinto River Authority (“SJRA”) provides public notice any time the gates at Lake Conroe are changed, not only when the releases reach a certain level.¹²⁸ Beyond the general notification of local emergency offices during flood operations, the Brazos River Authority and the Lower Colorado River Authority (“LCRA”) both offer free services that notify subscribers when water levels reach a certain stage.¹²⁹ While not a substitute for National Weather Service or local emergency management warnings, the LCRA’s Flood Operations Notification Service (“FONS”), for example, provides notice to all subscribers via a phone call, text, and/or email when flood operations have begun at an LCRA dam. Additionally, the Brazos River Authority’s “WaterAlert” service gives hourly or daily updates by text or email when river gages reach a certain level in a location pre-selected by the subscriber.¹³⁰

¹²⁸ Telephone Interview with Jace Houston, General Manager of the San Jacinto River Authority (Feb. 21, 2018).

¹²⁹ *Streamflow Alerts Now Available by Text and Email*, BRAZOS RIVER AUTHORITY, (last visited Mar. 18, 2018), <https://www.brazos.org/About-Us/News/Current-News/ArticleID/17>; *LCRA Flood Operations Notification Service (FONS)*, LOWER COLORADO RIVER AUTHORITY, (last visited Mar. 18, 2018), <https://www.lcra.org/water/floods/floodgate-operations-notification-system/Pages/default.aspx>.

¹³⁰ *Streamflow Alerts Now Available by Text and Email*, BRAZOS RIVER AUTHORITY, (last visited Mar. 18, 2018), <https://www.brazos.org/About-Us/News/Current-News/ArticleID/17>; *LCRA Flood Operations Notification Service (FONS)*, LOWER COLORADO RIVER AUTHORITY, (last visited Mar. 18, 2018), <https://www.lcra.org/water/floods/floodgate-operations-notification-system/Pages/default.aspx>.

Even though the implementation of a FONS or “WaterAlert” type of notification procedure would not provide dam operators with any additional immunity from a lawsuit resulting from a flooding event, such a program, if mirroring one of the alert systems already utilized by other river authorities, might help provide residents surrounding dams with additional information (and time to prepare their property) in the event of flooding.

C. Dispute System Design: Improving Communication and Stopping Potential Litigation Before It Happens

Dispute system design (“DSD”) refers to the way organizations can create procedures that help address stakeholders’ underlying interests without having them resort to litigation.¹³¹ Early on, most work was focused on disputes between management and unions, but this work has now been expanded to a more general theory for resolving disputes.¹³² For government organizations, DSD can be used to provide a progressive continuum of approaches depending on the seriousness of the complaints and the risk of legal action.¹³³ Certainly, this process is not without difficulty and would require government organizations to do further work to assess if a DSD procedure would be viable in this setting but we believe that it is worth exploring.

This Section will outline the questions that need to be answered in order to design a system that will work for government organizations, including the overall goal of the system, the stakeholders within the system, the ability of DSD to work within the culture of government organizations, the structure of the system, the resources

¹³¹ See Nancy A. Welsh, *Class Action-Barring Mandatory Pre-Dispute Consumer Arbitration Clauses: An Example of (and Opportunity for) Dispute System Design?*, 13 U. ST. THOMAS L.J. 381, 386 (2017) (citing WILLIAM L. URY, JEANNE M. BRETT & STEPHEN B. GOLDBERG, *GETTING DISPUTES RESOLVED: DESIGNING SYSTEMS TO CUT THE COSTS OF CONFLICT* (1988)).

¹³² *Id.* at 386-91.

¹³³ See *id.* at 387 (discussing a continuum of DSD approaches which start with preventative measures, such as consensus building, and end with imposed agreements through binding arbitration); see also Nancy A. Welsh & Barbara Gray, *Searching for a Sense of Control: The Challenge Presented by Community Conflicts over Concentrated Animal Feeding Operations*, 10 PENN. ST. ENVTL. L. REV. 295, 316 (2002) (recommending a continuum of processes for local governments permitting CAFOs starting with public informational meetings and ending with formal mediation).

needed to implement the system, and how government organizations would be accountable to the process.¹³⁴

1. Goals of the Process

a) What do the System's Decision-Makers Seek to Accomplish?

In the context of DSD, the goals of government organizations would be primarily to avoid litigation surrounding releases of water through the dam. But this is likely only one underlying goal of the dispute system design process. To create more trust in government organizations from both upstream and downstream communities, these communities need to believe that the managing government organization's decisions to release water are procedurally just and thus will lead to a substantively just result.¹³⁵ Therefore, government organizations implementing DSD should not only seek to avoid formal disputes through the DSD process, but also seek to broadly inform community members to help all stakeholders feel that disputes are managed in a procedurally fair way. The DSD process can also seek to build community support through consensus building among this different stakeholder groups. Therefore, while the DSD can certainly reduce the number of formal disputes that arise in the event of flooding, it can also help inform communities and build consensus between upstream and downstream stakeholders.

b) Which Types of Conflicts Does the System Seek to Address?

The type of conflict for the system to address is a choice for the government organization to make if it chooses to use a DSD approach to flooding conflicts. However, the DSD process can encompass all types of conflicts that government organizations may have: from the single phone complaint to a formal lawsuit. Therefore, if this process is adopted it can be a comprehensive system that can

¹³⁴ This system is adapted from the framework laid out in Welsh's 2017 article cited above, but is adapted from Amsler, Martinez, and Smith's DSD structural framework. See Lisa Blomgren Amsler et al., *Christina Merchant and the State of Dispute System Design*, 33 CONFLICT RESOL. Q. S7, S18-19 (2015).

¹³⁵ See Nancy A. Welsh & Barbara Gray, *Searching for a Sense of Control: The Challenge Presented by Community Conflicts over Concentrated Animal Feeding Operations*, 10 PENN. ST. ENVTL. L. REV. 295, 303 (2002) (citing E. ALLEN LIND & TOM R. TYLER, *THE SOCIAL PSYCHOLOGY OF PROCEDURAL JUSTICE* (1988)) (explaining how in community conflicts, fair procedures will lead to a belief of fair results).

address all community complaints addressed at a particular government organization.

The beauty of the DSD process is that it can be tailored to any potential conflicts that may occur. Since this is just an outline of some of the issues that would need to be addressed the dispute system that would come out of this process may be more narrowly tailored to address specific concerns. Because each system can be designed to fit the needs of the agency that is implementing the procedure, this process is by no means fixed and should be tailored to what the government organization believes is best.

2. Stakeholders

a) Who are the Stakeholders?

If the dispute system is designed to resolve tensions around flooding, there are probably three broad categories of stakeholders: upstream landowners, downstream landowners, and governmental entities. Upstream landowners could be broken down into shoreline property owners and those who reside in the towns around a releasing reservoir. Downstream landowners could be divided into property owners directly below the dam and landowners further downstream. Governmental entities could include river authorities, county land use and emergency officials, and even local or state governments. Each one of these groups may have distinct interests and concerns with flooding related to the dam. By giving each one of these distinct groups a voice and letting them voice their concerns, dam operators may be able to find innovative solutions that would not be on the table if only one group was present.

b) Interest Representation

Certainly, private landowners do not want to be flooded. However, even though this is not possible, it is an interest that needs to be considered and maybe modified to the concept that landowners want the least amount of flooding damage possible. But just stopping there, other causes and interests of the parties are not accounted for. Counties want to know where flowage easements are on property, so they can tell property owners when they apply for building permits; cities want to know the best ways to inform their citizens of flooding events during emergencies; and, dam operators want to be as open as possible with its procedures to present a good image to the communities around the lake and the river.

One way to address all of these concerns and make sure all parties know the diverse interests at play would be to have what community groups call “thick participation.”¹³⁶ Thick participation primarily involves small group planning charrettes, or online platforms to engage deliberately with interested stakeholders.¹³⁷ Common characteristics of thick participation meetings include proactive recruitment, small-group meetings, ordered discussions, issue framing, and action planning.¹³⁸ While these programs require much more work to set up than traditional public meetings, studies have shown they are much more effective at making stakeholders believe their opinions matter, a key consideration for government entities in this instance.¹³⁹ Even though online tools can also be helpful, the best outcomes for thick participation occur in face-to-face meetings.¹⁴⁰

To create a meeting where all interests are represented, dam operators would have to target particular individuals in each community that were willing to be a representative of the community at a roundtable meeting. Sometimes incentives have been given to get people to be involved such as child care, dinner, or transportation services.¹⁴¹ The communication in these interest meetings would also need to be deliberative, giving each party a chance to speak in-depth about their issues to foster more meaningful dialogue.¹⁴² This meeting would also be an opportunity for dam operators to explain their gate procedures in-depth, giving all parties the information they need to understand why the dam operates the way it does. In this meeting, dam operators could explore other potential ways to disseminate the information, either by electronic means, video, infographics, or

¹³⁶ Matt Leighninger & Tina Nabatchi, *How Can We Quantify Democracy?*, 22 DISP. RESOL. MAG. 24, 24-25 (2015).

¹³⁷ Lisa Blomgren Amsler & Tina Nabatchi, *Public Engagement and Decision-Making: Moving Minnesota Forward to Dialogue and Deliberation*, 42 MITCHELL HAMLIN L. REV. 1629, 1658 (2016). The programs discussed in this article were Engagement HQ, MetroQest, and Zilino.

¹³⁸ *Id.*

¹³⁹ Matt Leighninger & Tina Nabatchi, *How Can We Quantify Democracy?*, 22 DISP. RESOL. MAG. 24, 26 (2015).

¹⁴⁰ Lisa Blomgren Amsler & Tina Nabatchi, *Public Engagement and Decision-Making: Moving Minnesota Forward to Dialogue and Deliberation*, 42 MITCHELL HAMLIN L. REV. 1629, 1660 (2016).

¹⁴¹ Lisa Blomgren Amsler & Tina Nabatchi, *Public Engagement and Decision-Making: Moving Minnesota Forward to Dialogue and Deliberation*, 42 MITCHELL HAMLIN L. REV. 1629, 1664 (2016).

¹⁴² *Id.* at 1665.

other ways to allow communities to easily digest the information. Additionally, if dam operators do not want to run the meeting itself they could use a trusted third-party facilitator to run the meeting, which may establish even more trust within the stakeholder groups.

Certainly, this is an intensive process that would require careful planning and work by dam operators. However, by getting all interest groups around one table to discuss the issues at play in this case would make the resulting system so much more inclusive and make all stakeholder groups feel as if they are important. The meeting would also have the added benefit of allowing each stakeholder group to see the other competing interests at play and the way dam operator needs to balance all of these competing interests. Seeing how strained dam operators are in the middle of these disputes may give some stakeholders perspective that could be helpful in designing the system that works best for the community.

3. Context and Culture

a) How does the Context of the Dispute System Design Affect its Viability and Success?

Only the dam operators can truly answer whether the DSD process is viable and successful. In a flooding context, it may be impossible to satisfy landowners since it is their homes and businesses that are damaged. However, the only way to really see if a comprehensive dispute system would work is to have some early interest meetings with all the stakeholders. These types of plans have been successful in land use discussions in the past, ranging from permitting of Concentrated Animal Feeding Operations¹⁴³ to agricultural planning in Israel.¹⁴⁴

b) What Aspects of Culture (Organizational, Social, National, or other) Affect the Workings of the System?

The distrust of the government by some stakeholder communities will be a significant hurdle. However, these groups are the most important to engage with to

¹⁴³ See Nancy A. Welsh & Barbara Gray, *Searching for a Sense of Control: The Challenge Presented by Community Conflicts over Concentrated Animal Feeding Operations*, 10 PENN. ST. ENVTL. L. REV. 295, 316-321 (2002).

¹⁴⁴ Sanda Kaufman, Connie Ozawa, & Deborah Shmueli, *Multiparty Negotiations in the Public Sphere*, in THE NEGOTIATOR'S DESK REFERENCE 417 (Year?)

really find out what their main concerns are, especially if they are likely to have the most valid claims in a formal court of law. Other parties may also have conflicts with each other than need to be overcome, if, for example some counties had disputes with their neighbors this should be addressed before any meetings. Dam operators are often also major employers in the region and their presence as not only a dam operator but as an employer also needs to be accounted for when going into the discussions. Counties that have a large amount of dam operation employees may be more pro-dam operators than counties without many dam operation employees.

c) What are the Norms of Communication and Conflict Management?

4. Processes and Structure

Dam operators should probably create a dialogue that will build relationships among diverse stakeholder groups, dispel stereotypes, openly explore issues and enrich the entire community's understanding of the vital role the dam plays within the community. To achieve this dialogue, the first process should likely be to hold interest meetings as described above. These will give dam operators a good perspective on the types of programs that interest groups could be interested in.

Additionally, dam operators could use listening groups to elicit more interests from stakeholder groups. In these meetings, participants are asked vague, general questions and the parties spend time listening to each other's responses. This can be achieved with or without third-party neutrals but could be a good way to uncover more underlying interests and issues before jumping to solutions.

After dam operators have done enough public outreach to assess the most pressing issues that stakeholders have identified, dam operators could pose some potential measures to either mitigate flooding or resolve disputes after flooding. One potential solution to try out novel ideas are practical cooperation projects. In these projects, a small test group is identified in the interest meetings for a new potential solution to a flooding issue. This solution could be as simple as a new notification procedure or as complex as a particular flood prevention device. The test group would then be able to see if the work done by the stakeholders had any difference at all and whether the program should be implemented on a larger scale. Using practical cooperation projects can be especially helpful when the conflict is protracted and intractable. The key to these projects is the knowledge gained from

creating the test program and the perception that the dam operator is trying to make the system better, however they can.

However, a dam operator decides to implement these strategies, it will need to make clear that this process is a “bargaining free zone,” meaning that this does not mean dam operator will be able to change its actual operating procedures. This is important to message once different solutions have been suggested so that the public does not believe that the dam operator is fundamentally changing. The dam operator will still have to operate the dam according to the procedures outlined in its gate-operating manual, but these mitigating projects are a way for the dam operator to show it is trying to help local stakeholders who have been affected in any way they can. Even if one of the projects is a simple community cleanup of the downstream communities severely affected by a flood, or a new website that simply explains the gate operating procedures, or a webcam of the dam that people can access from a smartphone app, the perception that the dam operator is trying to mitigate should go a long way.

Finally, the dam operator needs to use this opportunity to think of itself as a learning organization when it comes to dispute resolution. While the dam operator may play a mediator role between different groups of landowners, it may need to play a facilitating role between county planners and organizers. Understanding that each project to help the community deal with flooding events is a learning experience so successful programs can be promoted, and failures can be learned from. In this way, not matter what programs come out of the interest meetings they will be successful because they will be used to help learn for future events.

5. If there is More Than One Process, are they Linked or Integrated?

Once some projects become more apparent as potential options, dam operators and the other interest groups should determine whether these different programs should be linked together. When dealing with multiparty negotiations, many times issues between parties will be linked, such as here the difficulty of determining where a flowage easement is on their property could be affected by the records the county keeps, which could then affect the perception of the dam operator. Understanding the linkages between these different issues may help when designing the dispute system.

The linkages can also help once the dispute system is in place. While some dispute mitigation strategies, such as webcams, will likely be singular projects, other

strategies, like potentially increased contact with county planning officials when permitting developments or increased contact with citizens during emergencies may be linked. Recognizing these links may be helpful to build ties between communities and dam operators and between different stakeholders whether there is a current emergency or not.

6. Incentives and Disincentives for Using the System?

The dispute system needs to be easy to use for everyone involved. This may mean an online portal where people can lodge questions in addition to a traditional telephone line. It may mean that a dam operator would have to provide some small incentives for attending interest meetings to get the best people to attend, or to at least help make it open to all who are chosen. The system should be easy to access regardless of socioeconomic status. Since cell phone ownership is high even among less affluent communities, the services should be available on smartphones and not just on computers to allow more people to access the programs. Giving out T-shirts for community clean up days after storms or hosting a community BBQ could also create incentives for people within different communities to engage with dam operators in a more continual and friendly manner.

All of these suggestions are merely options for mitigation strategies and would need the support of focused interest groups, but when those groups are developing potential solutions, the ease of use by the greatest number of social groups should be a critical design consideration.

7. What is the System's Interaction with the Formal Legal System?

This is another place where the development will have to take place during the interest meetings, but the process may always end with litigation if all else fails. Hopefully, using more community-oriented mitigation and dispute systems will help dissuade people from using formal processes. If it does get to the point where a group is clearly upset and does not feel like the dam operator has done enough to help their community, the dam operator should be ready to reach out and suggest a more formal mediation process in lieu of litigation. To be ready for this eventuality, a dam operator may want to have some prominent members of the community ready to step in as mediators if a formal dispute is likely to arise. Even if these mediators are from a certain community group, as they would likely be, this does not mean

they can serve good mediative functions, so long as they are respected outside of their community groups.¹⁴⁵

Indeed, a dam operator would in best case scenarios avoid any forays into more formal legalistic procedures, but having a mediation option open if any community group ever feels disadvantaged could help avoid a prolonged lawsuit and save all parties time, money, and effort.

8. Resources

a) What Financial Resources Support the System?

Who is going to pay for this is really the hardest question to answer. Creating interest groups that have thick participation and include all relevant stakeholder groups will not be easy. All government entities are always managing limited funds and designing an entire dispute system will cost money and resources. However, the alternative of not having a system and having to litigate takings claims will cost even more and will not leave the community in a better place. Flooding events have been more common in southeast Texas over the last five years, and if they continue to be more common, having systems in place to handle potential disputes will significantly reduce the chance that a dam operator is sued in the future, especially if the design of the system includes all stakeholders and is deliberately established.

b) What Human Resources Support the System?

This is another open-ended question that would need to be decided by the interest groups themselves. Sometimes separate standing committees, composed of community leaders, government officials, and other stakeholders who will take over the process.¹⁴⁶ Other times this process may be taken on by the primary organization. The roles could also be split up by the different interest groups which could take on various portions of the dispute system and mitigations strategies.

¹⁴⁵ Sean F. Nolon, *Second Best Practices: Addressing Mediation's Definitional Problems in Environmental Siting Disputes*, 49 IDAHO L. REV. 69, 78 (2012) (arguing that while community members may not be the ideal mediators they can serve effectively as quasi-mediators).

¹⁴⁶ Sanda Kaufman, Connie Ozawa, & Deborah Shmueli, *Multiparty Negotiations in the Public Sphere*, in THE NEGOTIATOR'S DESK REFERENCE 417 (Year?) (describing the West Eugene Collaborative that helped resolve disputes surrounding a new coastal transportation corridor)

Whatever is decided, it is important that all the actors work together to create a cohesive system that all parties feel a connection to.

9. Success, Accountability, and Learning

a) How Transparent is the System?

If a dispute system is going to be successful, it must be transparent and accountable. One of the biggest problems with many local governance disputes is the lack of trust in the process.¹⁴⁷ If the dispute system is not transparent, then some citizens may think that the process is not procedurally fair, creating more problems for the dam operator. One way to become more transparent is to find some easy way to add webinars or infographics explaining frequently asked questions such as why flooding happens at the top of the lake more frequently than near the dam or why water cannot be held back indefinitely, or why the water level is always maintained at a certain height. Another easy way could be a webcam that is always showing the spillway of the dam as a way of creating transparency. Whatever the dam operator decides to do, creating a more transparent process will help stakeholders believe the system is procedurally fair and that the dam operator is not playing favorites amongst various stakeholder groups.

b) Does the System Include Monitoring, Learning, and Evaluation Components?

For the system to be successful it must have some learning built into the system. One way of promoting learning is to use the practical cooperation projects discussed above, but the interest groups could simply meet twice a year to discuss whether the improvements are helping at all. To really assess the projects, however, all parties need to be able to give their opinion of the project, because the project may still be successful if some communities do not like it, but others do. Certainly, each project needs to be assessed individually as well to make sure it is really this project that is creating the success or failure. The more accurately the dam operator develops learning and evaluation systems, the more any dispute project would help other river authorities and dam operators within Texas and around the country.

¹⁴⁷ Cf. See Nancy A. Welsh & Barbara Gray, *Searching for a Sense of Control: The Challenge Presented by Community Conflicts over Concentrated Animal Feeding Operations*, 10 PENN. ST. ENVTL. L. REV. 295, 303 (2002) (describing the importance of procedural fairness in citizen procedures).

10. Is the System Successful?

Finally, the question that is the most important and the hardest to answer. Certainly, it will not be clear right away whether the system was successful. For problems that are as prolonged and systemic as periodic flooding events it will take years to really assess the viability of the dispute system a dam operator could put in place. This may give some planners cold feet because of the uncertainty of a dispute system project but consider the alternative of doing nothing. If flooding events keep happening, the likelihood of formal legal claims increases as landowners become increasingly upset that dam operators are, in their view, do nothing year after year. While dam operators may very well prevail in a lawsuit, the cost of litigation alone could be similar to the cost of a multi-year dispute system implementation, without the added benefit of helping the local communities and presenting the dam operator in a positive light to the areas affected by flooding. A dam operator may also take a middle of the road approach, taking mild community outreach actions, supporting interest meetings, and becoming more transparent without developing a formal dispute system. This could also be a viable option depending on the budget and time constraints of the dam operator, which no doubt is very tight. In sum, while flooding may never go away, hopefully the litigation surrounding it can with the help of dispute system designs.



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