

**Cause Nos. 19-2053-CV & 19-2054-CV**  
**In the District Court of Guadalupe County, Texas**  
**25<sup>th</sup> Judicial District, Honorable Stephen B. Ables, Judge Presiding**

**Guadalupe Valley Lakes**  
**Report #1 of the Independent Expert Panel**

**21Oct2019**

**Background & Introduction**

Pursuant to an Agreed Temporary Injunction (ATI) issued 16Sep2019 by the Honorable Stephen B. Ables, Judge Presiding, for the District Court of Guadalupe County, Texas in the matter of Cause Nos. 19-2053-CV and 19-2054-CV, an Independent Expert Panel (IEP) qualified to render an unbiased opinion on the safety of the Guadalupe Valley Lakes (GVL), given the current condition of the hydroelectric dams, has been assembled to provide a report addressing the following three specific charges:

- 1) **Determination of designated “unsafe zones,” if any, not suitable for activity or recreation on the Guadalupe Valley Lakes (GVL) [ATI, Injunctive Relief (j)].** The IEP has adopted a geographic scope extending from Dunlap dam through FM 1117 and from SH 80 through Gonzales CR 143 [ATI, Injunctive Relief (b)] on the Guadalupe River. Upstream to downstream, this reach of the Guadalupe River includes Dunlap Dam (TP-1), Lake McQueeney, TP-3 Dam, Lake Placid, TP-4 Dam, Meadow Lake, Nolte Dam (TP-5), Lake Gonzales, H-4 Dam, and interspersed segments of the Guadalupe River.
- 2) **If and when “unsafe zones” are identified by the IEP, prescribe safety measures regarding appropriate warnings [ATI, Injunctive Relief (k)].**
- 3) **Consider the circumstances, if any, under which property owners may access the “unsafe zones” and devise a procedure through which property owners may apply to GBRA for such access [ATI, Injunctive Relief (m)].**

In accordance with the ATI, the IEP was assembled as follows:

- 1) On or about 16Sep2019, Defendants designated Samuel K. Vaughn, PE, of HDR Engineering, Inc. (HDR) as an outside independent expert [the Guadalupe-Blanco River Authority (GBRA) Designated Expert] [ATI, Injunctive Relief (e)].
- 2) On or about 16Sep2019, Plaintiffs designated Gregory R. Wine, PE, of Huitt-Zollars, Inc. (H-Z) as an independent expert (the Plaintiff Designated Expert) [ATI, Injunctive Relief (f)].
- 3) After identification and consideration of four (4) potentially qualified candidates willing to serve, the GBRA Designated Expert and the Plaintiff Designated Expert agreed on W. Nim Kidd, MPA, CEM, Chief of the Texas Division of Emergency Management (TDEM), as a third independent expert (the Third Designated Expert) [ATI, Injunctive Relief (g)] on or about 27Sep2019.

The IEP respectfully offers this Report #1 documenting consensus responses to its charges along with the activities and fundamental assumptions leading to the consensus responses. Such responses are provided on the bases of relevant information received from the Defendant, Plaintiff, a third party technical consultant (Black & Veatch, Inc.), HDR and H-Z technical staff, and other sources as well as the experience and professional judgment of each member of the IEP as applied within the time constraints specified in the ATI. Report #1 focuses on the lakes and river segments between Dunlap Dam and FM 1117. Report #2 will be submitted on or before 15Nov2019 and will focus on the lake and river segments between SH 80 and Gonzales CR 143.

The IEP recommendations in this report are provided with the understanding that designated Unsafe Zones shall remain in effect until: a) The gates and dams have been replaced or restored to serviceable conditions; or b) Other actions (e.g., lowering the gates and reservoirs) have sufficiently mitigated the safety risks. Furthermore, the IEP cautions that designation of Unsafe Zones and implementation of prescribed safety measures shall not be viewed as “permanent solutions” resolving dam safety issues and enabling long-term operations of existing facilities deemed unsafe.

### **Activities of the IEP**

Key activities of the IEP (and associated dates of performance) include the following:

- 1) Teleconferences (Sep 16, 17, 18, 19, 20, 23, 24, 25, 26, 27, & 30 and Oct 1, 2, 4, 7, 10, 12, 14, 15, 16, 17, 19, & 21).
- 2) Download and initial review of reference documentation and summaries of hydraulic modeling results (Sep 17 – Oct 1).
- 3) Receipt & review of available hydraulic models and request for & receipt of supplemental model results (Oct 1 – Oct 7).
- 4) Meetings (Oct 7 & 11).
- 5) Reconnaissance of system (Oct 9).
- 6) Research and report preparation (Sep 16 – Oct 21).

### **Fundamental Assumptions**

It is fundamentally understood by the IEP that nowhere in, on, or immediately adjacent to the water is 100% safe. There are inherent risks of property damage, personal injury, and drowning in these areas and these risks may be elevated by rapidly changing flow conditions associated with gate adjustments, flood flow passage, and gate failure. For the purposes of addressing its charges, the IEP has identified some areas of elevated risk as “unsafe zones.”

Populations at risk (PAR) considered by the IEP include: people in the water (swimmers, waders, tubers, etc.), people on the water (boaters, jet skiers, skiers, etc.) and people adjacent to the water (campers, picnickers, residents, etc.).

An instantaneous SINGLE gate failure, which results in a maximum flow of around 11,000 cubic feet per second (cfs) to 13,000 cfs (depending on gate size), was modeled by a third party consultant using the U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS 2D)<sup>1</sup>. This is deemed the most likely failure scenario at each dam based on IEP interpretation of technical evaluations by third-party consultants, not multiple gates at one dam. The IEP's understanding of technical evaluations by third-party consultants further suggests that cascading failures of gates at downstream dams would not be expected in the event of single gate failure at an upstream dam.

Flooding is a fact of life along the Guadalupe River and most residential structures are elevated accordingly to avoid frequent property damage and minimize risks of injury or drowning. Simplified statistical analyses suggest that the instantaneous peak discharge associated with a single upstream gate failure is greater than the 5-yr flood event (20% chance of being equaled or exceeded in any year) and less than the 10-yr flood event (10% chance of being equaled or exceeded in any year). Highway and railroad bridges are typically constructed providing clearance for passage of flood flows in excess of those associated with a 10-yr event.

It is the opinion of the IEP that a “sunny day” gate failure (i.e. a gate failure occurring during non-high-flow periods) is the critical scenario due to gates being in full upright position, elevated population at risk, and no advanced warning of the failure.

GBRA has a Control Panel Operator staffing its Control Center at all times who (in addition to other duties) monitors lake levels as well as sensors on each gate at each dam. When a sensor indicates gate movement, an alarm sounds at the Control Center alerting the Operator. The Control Panel Operator also has real time visual images of the gates at each dam and can remotely pan and zoom the camera around to view the gates and other parts of the dam area. In the event of gate failure or dam breach, the Control Panel Operator immediately calls the Guadalupe County Emergency Management Coordinator (EMC). The IEP visited this control center on 11Oct2019.

Guadalupe County operates and maintains outdoor alarm sirens with continuous coverage along the Guadalupe River from the upstream county line to the downstream county line. The alarm sirens are tested each Saturday and are assumed always available to be sounded to make individuals on the river and lakes as well as residents aware of a high water event and/or other emergency situations (tornados, etc.). The alarms are normally sounded when the flow in the river and lakes exceeds about 10,000 cfs. A single gate failure at any of the GVL dams will result in flows immediately downstream that exceed this threshold. During 15Oct2019 discussions with

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<sup>1</sup> HEC-RAS 2D models with geographic coverage extending from Dunlap Dam to FM 1117 were received by HDR and H-Z on 10Oct2019. The models were generally reviewed by HDR and H-Z personnel under the supervision of the GBRA Designated Expert and the Plaintiff Designated Expert, respectively, and found suitable for use in development of this report.

the Guadalupe County EMC, the IEP was advised that the alarm sirens can be initiated by the County EMC or the County Sheriff's Dispatch upon receipt of notification of an event. If the County EMC is in the office, the alarm can be sounded immediately. The Dispatch can also sound the alarm immediately after communications with the County EMC. In a worst case scenario, the alarm initiation could take up to 30 minutes after occurrence of an event, should the County EMC need to travel to their office to initiate the alarm. The County EMC is in the process of installing technology to initiate the alarm sirens remotely using a cell phone application. It is the IEP's understanding that this enhanced alarm initiation procedure will be in place within 30 days of this report.

In addition, Guadalupe County participates in the Regional Emergency Alert Network (REAN). This Alert Emergency Call-Out System enables individuals to sign up to receive emergency notifications on their phones (home and cell) and pagers and by emails and text messages. Furthermore, the County is covered by the Integrated Public Alert and Warning System (IPAWS). IPAWS is the nation's alert and warning infrastructure which enables officials to provide the public with timely life-saving information.

The IEP is aware of Texas Parks & Wildlife Department general Boating Safety Tips and legal requirements which include the following with respect to Personal Flotation Devices (PFDs):

- 1) Always wear a PFD;
- 2) Children younger than 13 years old must wear a PFD while underway; and
- 3) Personal watercraft operators and passengers must wear a PFD.

It is assumed that the public is similarly aware of such tips and requirements and will act responsibly given the current condition of the hydroelectric dams.

Finally, the IEP assumes that implementation and enforcement activities associated with designated "unsafe zones" and prescribed safety measures will be accomplished through the cooperative efforts of governmental entities including, but not limited to, GBRA, Guadalupe County, and affected cities.

### **Determination and Designation of "Unsafe Zones"**

The IEP adopted Evaluation Criteria for determination and designation of "unsafe zones" with due consideration of readily available information including, but not limited to, the following:

- 1) Summaries of technical information developed by a third-party consultant using HEC-RAS 2D including:
  - a) Increased depth, maximum rate of rise, and time to peak depth at selected locations downstream of a single gate failure.
  - b) Aerial photography based reservoir or river segment maps including color-shaded, maximum velocity contours for each reservoir or river segment in the event of a single gate failure (Attachment A).
  - c) Aerial photography based reservoir or river segment maps including color-shaded, maximum depth times velocity (DV) contours for each reservoir or river segment in the event of a single gate failure.

- 2) Summaries of technical information derived through HDR and H-Z applications of the HEC-RAS 2D models developed by a third party consultant including:
  - a) Aerial photography based reservoir or river segment maps including color-shaded velocity contours immediately before and at 5-minute increments up to 20 minutes after a single gate failure.
  - b) Time series plots of velocity and depth at selected locations downstream of a single gate failure.
- 3) Effective GBRA monitoring and immediate coordination with the County EMC to initiate the County's alert siren system and other emergency notification methods.
- 4) Reference literature including:
  - a) United States Bureau of Reclamation, "RCEM – Reclamation Consequence Estimating Methodology, Guidelines for Estimating Life Loss for Dam Safety Risk Analysis, Interim," U.S. Department of the Interior, July 2015.
  - b) S.N. Jonkman & E. Penning-Rousell, "Human Instability in Flood Flows," Journal of the American Water Resources Association, August 2008.
  - c) National Park Service, "Instream Flows for Recreation: A Handbook on Concepts and Research Methods," U.S. Department of the Interior, January 1993.
  - d) City of New Braunfels, "Guadalupe River Recreation Thresholds," <https://www.nbtexas.org/2326/Guadalupe-River-Info> .
  - e) Texas Parks & Wildlife Department, "Texas River Guide, Information on River Safety," <https://tpwd.texas.gov/landwater/water/habitats/rivers/safety.phtml> .
  - f) Texas Parks & Wildlife Department, "Boating Safety Tips," [https://tpwd.texas.gov/fishboat/boat/safety/safety\\_tips/](https://tpwd.texas.gov/fishboat/boat/safety/safety_tips/) .

The following Evaluation Criteria were applied by the IEP in determining and designating PROHIBITED and RESTRICTED UNSAFE ZONES:

- 1) PROHIBITED UNSAFE ZONE Upstream of Dam & Gates: An Unsafe Zone for All Activities on or in the water (boating, canoeing, jet skiing, swimming, wading, tubing, etc.) extending the distance upstream required to swim at 1 foot per second from the center of the reservoir to safety on the shore with water flowing at simulated maximum velocity based on single gate failure immediately downstream plus 25% to account for recognition of hazardous situation and panic decision-making.
- 2) PROHIBITED UNSAFE ZONE Downstream of Dam & Gates: An Unsafe Zone for All Activities on or in the water (boating, canoeing, jet skiing, swimming, wading, tubing, etc.) extending the distance downstream where the increased depth exceeds four (4) feet and/or the increased velocity of flows exceeds six (6) feet per second within 30 minutes of upstream gate failure.
- 3) RESTRICTED UNSAFE ZONE Downstream of Dam & Gates: An Unsafe Zone for Activities in the water (swimming, wading, tubing, etc.) extending the distance downstream where the increased velocity of flows exceeds four (4) feet per second within 30 minutes of upstream gate failure.

Following is a summary of the IEP recommendations regarding designation of “unsafe zones” and safety measures by reservoir and/or segment of the Guadalupe River:

**Lake McQueeney** (single gate failure at TP-3 Dam)

- 1) Upstream of the TP-3 Dam (Lake McQueeney Dam) - The area approximately 900 feet upstream of the TP-3 Dam and gates impounding Lake McQueeney is considered a PROHIBITED UNSAFE ZONE and shall be marked by a line of buoys and signage. All activities on and in the water shall be prohibited in this zone. See Attachment B.
- 2) Participants in activities in or on Lake McQueeney should be made aware of the possibilities of water levels falling below normal level at rates of up to 0.2 feet per minute and rapidly increasing flow velocities of up to 3 feet per second.

**Lake Placid** (single gate failure at TP-3 Dam or TP-4 Dam)

- 1) Downstream of TP-3 Dam - The area upstream of a line approximately 250 feet downstream of the SH 78 bridge is considered a “PROHIBITED UNSAFE ZONE” and shall be marked by a line of buoys and signage. All activities on and in the water shall be prohibited in this zone. See Attachment B.
- 2) Downstream of TP-3 Dam – The area approximately 300 feet upstream of Son’s Island and downstream of the existing buoys in the vicinity of the SH 78 crossing identified above, is considered a “RESTRICTED UNSAFE ZONE” for all activities in the water such as swimming, wading, tubing, etc. See Attachment C.
  - a) A line of buoys with signage marking this unsafe zone shall be installed approximately 300 feet upstream of Son’s Island.
  - b) A properly fitted Type I or Type III Personal Floatation Device (PFD) shall be worn at all times for all activities on the water in this zone.
- 3) Upstream of TP-4 Dam - The area within approximately 850 feet upstream of the TP-4 Dam impounding Lake Placid is considered a “PROHIBITED UNSAFE ZONE” and shall be marked by a line of buoys and signage. All activities on and in the water shall be prohibited in this zone. See Attachment B.
- 4) Participants in activities in, on, or adjacent to Lake Placid should be made aware of the possibilities of water rising 3 to 7 feet above normal level at maximum rates of 0.05 to 1.9 feet per minute, respectively, and rapidly increasing flow velocities of up to 8 feet per second.
  - a) For Participants adjacent to the water (campers, picnickers, residents, etc.), their awareness of rising water and increasing velocity is of particular importance at locations such as Dam Camp (immediately downstream of the TP-3 Dam) and Son’s Island where overnight camping occurs.
- 5) Participants in activities in or on Lake Placid should be made aware of the possibilities of water levels falling below normal level at rates of up to 0.4 feet per minute and rapidly increasing flow velocities of up to 3 feet per second.

**Meadow Lake** (single gate failure at TP-4 Dam or Nolte Dam)

- 1) Downstream of TP-4 Dam - The segment of the Guadalupe River and Meadow Lake approximately 1050 feet downstream of TP-4 Dam is considered a “PROHIBITED UNSAFE ZONE” and shall be marked by a line of buoys and signage. All activities on and in the water shall be prohibited in this zone. See Attachment B.
- 2) Downstream of TP-4 Dam – The area downstream of the PROHIBITED UNSAFE ZONE and upstream of the river access area in Max Starcke Park (on the left bank approximately 230 feet upstream of Saffold Dam) is considered a “RESTRICTED UNSAFE ZONE” for all activities in the water such as swimming, wading, tubing, etc. See Attachment C.
  - a) A line of buoys and signage marking this unsafe zone shall be installed from the downstream edge of the river access area in Max Starcke Park to the center of the river at a point approximately 450 feet upstream of Saffold Dam and thence, by the shortest distance, to the right bank.
  - b) A properly fitted Type I or Type III Personal Floatation Device (PFD) shall be worn at all times for all activities on the water in this zone.
- 3) Downstream of TP-4 Dam – The area downstream of the river access area in Max Starcke Park and upstream of the Walnut Branch tributary confluence is considered a “PROHIBITED UNSAFE ZONE” and activities on and in the water shall be prohibited. See Attachment B.
  - a) A line of buoys and signage marking the downstream boundary of this unsafe zone shall be installed immediately upstream of the Walnut Branch tributary confluence.
- 4) Downstream of TP-4 Dam – The area downstream of the Walnut Branch tributary confluence and upstream of the GBRA River Annex is considered a “RESTRICTED UNSAFE ZONE” for all activities in the water such as swimming, wading, tubing, etc. See Attachment C.
  - a) A line of buoys with signage marking this unsafe zone shall be installed across Meadow Lake south of the GBRA River Annex.
  - b) A properly fitted Type I or Type III Personal Floatation Device (PFD) shall be worn at all times for all activities on the water in this zone.
- 5) The area within approximately 1250 feet upstream of the Nolte (TP-5) Dam and gates impounding Meadow Lake is considered a “PROHIBITED UNSAFE ZONE” and shall be marked by a line of buoys and signage. All activities on and in the water shall be prohibited in this zone. See Attachment B.
  - a) Observations during the IEP reconnaissance suggest that the existing line of buoys upstream of Nolte (TP-5) Dam is located consistent with this designation.
- 6) Participants in activities in, on, or adjacent to Meadow Lake and the segment of the Guadalupe River between Meadow Lake and TP-4 Dam should be made aware of the possibilities of water rising 3 to 4.7 feet above normal level at maximum rates of 0.1 to 2.7 feet per minute and rapidly increasing flow velocities of up to 7 feet per second.
  - a) Participant awareness is of particular importance at locations immediately downstream of the TP-4 Dam and near Max Starcke Park where Saffold Dam spans the river.

- 7) Participants in activities in or on Meadow Lake should be made aware of the possibilities of water levels falling below normal level at rates of up to 0.6 feet per minute and rapidly increasing flow velocities of up to 3 feet per second.

**Guadalupe River Downstream of Nolte Dam** (single gate failure at Nolte Dam)

- 1) The segment of the Guadalupe River from Nolte (TP-5) Dam downstream to the FM466 crossing is considered a “PROHIBITED UNSAFE ZONE” and all activities in and on the water should be prohibited. See Attachment B.
  - a) A line of buoys and signage marking this designated unsafe zone shall be installed about 200 feet upstream of the FM466 crossing.
- 2) The segment of the Guadalupe River from FM466 downstream to FM1117, is considered a “RESTRICTED UNSAFE ZONE” for all activities in the water such as swimming, wading, tubing, etc. See Attachment C.
  - a) A properly fitted Type I or Type III Personal Floatation Device (PFD) shall be worn at all times for all activities on the water in this zone.
- 3) Participants in activities in, on, or adjacent to the Guadalupe River downstream of Nolte (TP-5) Dam should be made aware of the possibilities of water rising 5.1 to 8.5 feet above normal level at maximum rates of 0.1 to 5.3 feet per minute and rapidly increasing flow velocities of up to 10 feet per second.
- 4) Participant awareness is of particular importance at locations immediately downstream of the Nolte (TP-5) Dam near the park on Nolte Island.

**Safety Measures**

The PROHIBITED UNSAFE ZONES for All Activities on or in the water as designated upstream and downstream of all dams shall be identified by Texas Parks and Wildlife Department (TPWD) recommended Regulatory Markers for Prohibited Areas. PROHIBITED UNSAFE ZONES identified above shall be delineated by White Buoys with a single Orange Band above and below an Orange Crossed Diamond Marking and the words “DANGER” and “OFF LIMITS ALL ACTIVITIES” in black lettering. The buoys shall be anchored at approximately 25 feet on center along the limit lines of all PROHIBITED UNSAFE ZONES, from shoreline to shoreline, both above and below each dam. In addition, floating red placards (6 feet wide by 4 feet tall) at approximately 100 feet on center shall be anchored approximately 25 feet behind the buoys in the PROHIBITED UNSAFE ZONES. The placards shall state, “PROHIBITED AREA - NO ENTRY BY COURT ORDER” in 12-inch white lettering.

The RESTRICTED UNSAFE ZONES for Activities in the water shall be identified by TPWD recommended Regulatory Markers for Restricted Areas. RESTRICTED UNSAFE ZONES identified above shall be delineated by White Buoys with a single Orange Band above and below an Orange Circle and the words “NO SWIMMING” in black lettering. The buoys shall be anchored at approximately 25 feet on center along the limit lines of all RESTRICTED UNSAFE AREAS, from shoreline to shoreline. In addition, floating red placards (6 feet wide by 4 feet tall) at approximately 100 feet on center shall be anchored approximately 25 feet behind the buoys in



the RESTRICTED UNSAFE ZONES. The placards shall state, “RESTRICTED AREA - NO SWIMMING, WADING, OR TUBING BY COURT ORDER” in 12 inch white lettering.

**Access Procedures**

It is the IEP’s understanding that GBRA has application processes in place and may grant access for activities such as construction on the lakes and boat access to Lake McQueeney from the Laguna Marina adjacent to TP-3 Dam. It is recommended that limited boat access and egress within the PROHIBITED UNSAFE ZONES be allowed only by written application request and approval by GBRA-issued permit. A permit for movement through PROHIBITED UNSAFE ZONES shall include provisions granting GBRA, law enforcement, emergency management, and rescue officials as well as the IEP comprehensive immunity from any and all claims in the event of gate failure. A properly fitted Type I or Type III Personal Floatation Device (PFD) shall be worn at all times for all activities on and in the water in this zone. Movement through PROHIBITED UNSAFE ZONES shall be as close to the shoreline as practical. The path of travel through the PROHIBITED UNSAFE ZONE shall be the shortest distance required to exit the zone. Persons traversing through this zone shall have a copy of the permit issued by GBRA in their possession.

In addition, a public information board shall be installed at the public boat ramp at Interstate Highway 10, to explain the PROHIBITED and RESTRICTED UNSAFE ZONES on Lake Placid as well the actions to be taken should the County’s Alert Sirens be sounded. Furthermore, information regarding registration for and receipt of email and text message alerts from the Guadalupe County EMC shall be provided.

Respectfully Submitted,  
Independent Expert Panel



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Samuel K. Vaughn, PE  
GBRA Designated Expert



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Gregory R. Wine, PE, LEED AP  
Plaintiff Designated Expert



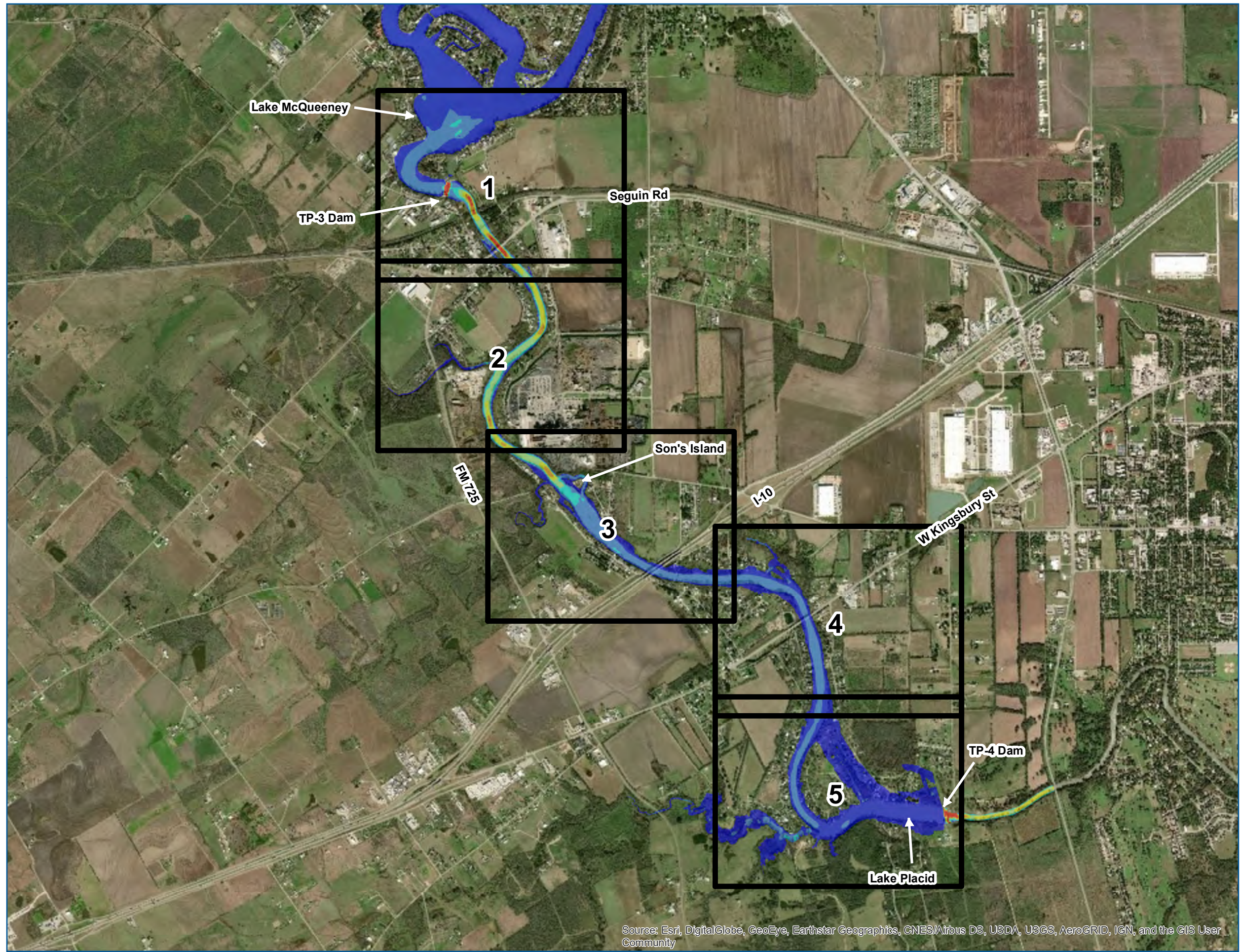
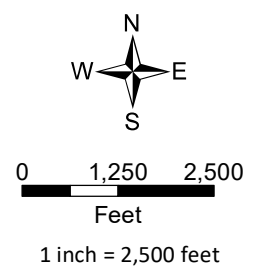
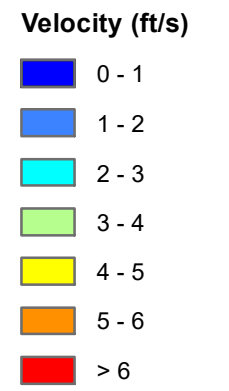
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W. Nim Kidd, MPA, CEM  
Third Designated Expert

# Attachment A

Guadalupe Valley Lakes  
Maximum Velocity Contours  
with Single Gate Failure

**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Overall Map**



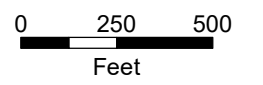
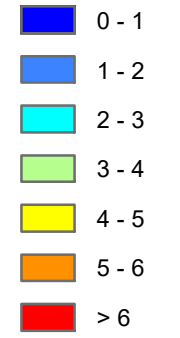
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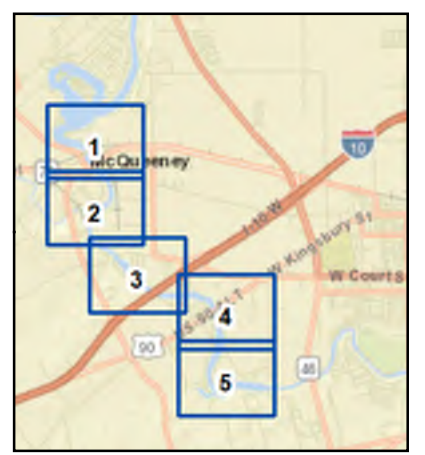
**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Map**

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**Velocity (ft/s)**



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

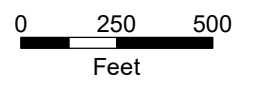


**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Map**

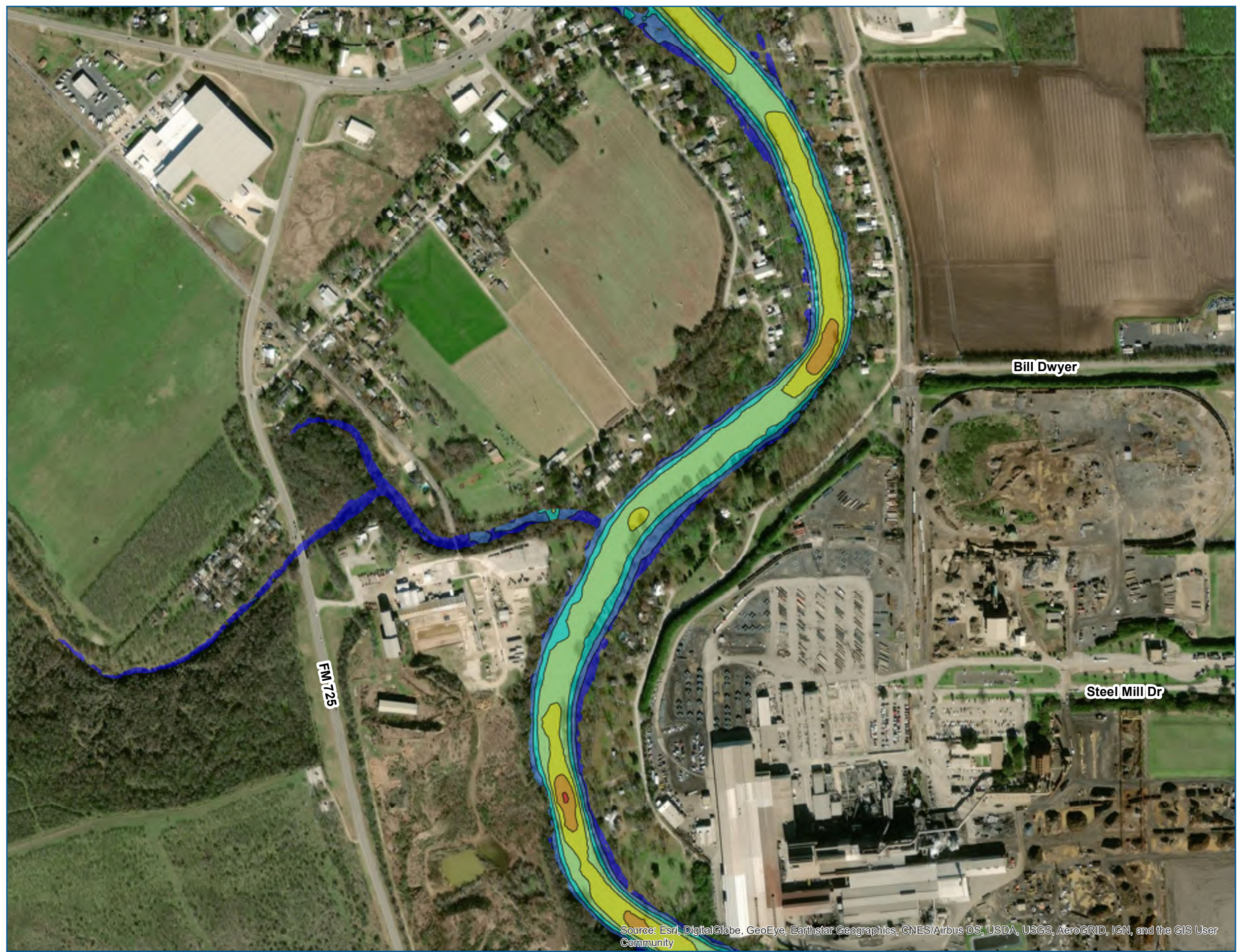
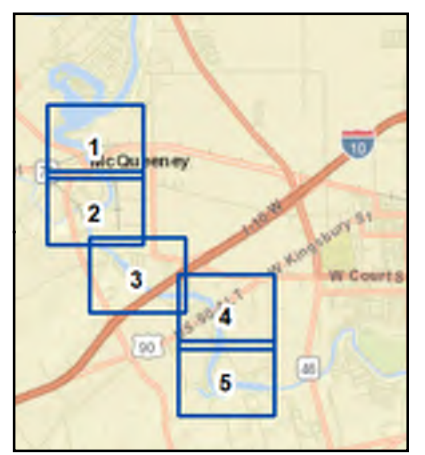
Page 2 of 5

**Velocity (ft/s)**

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

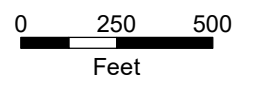


**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Map**

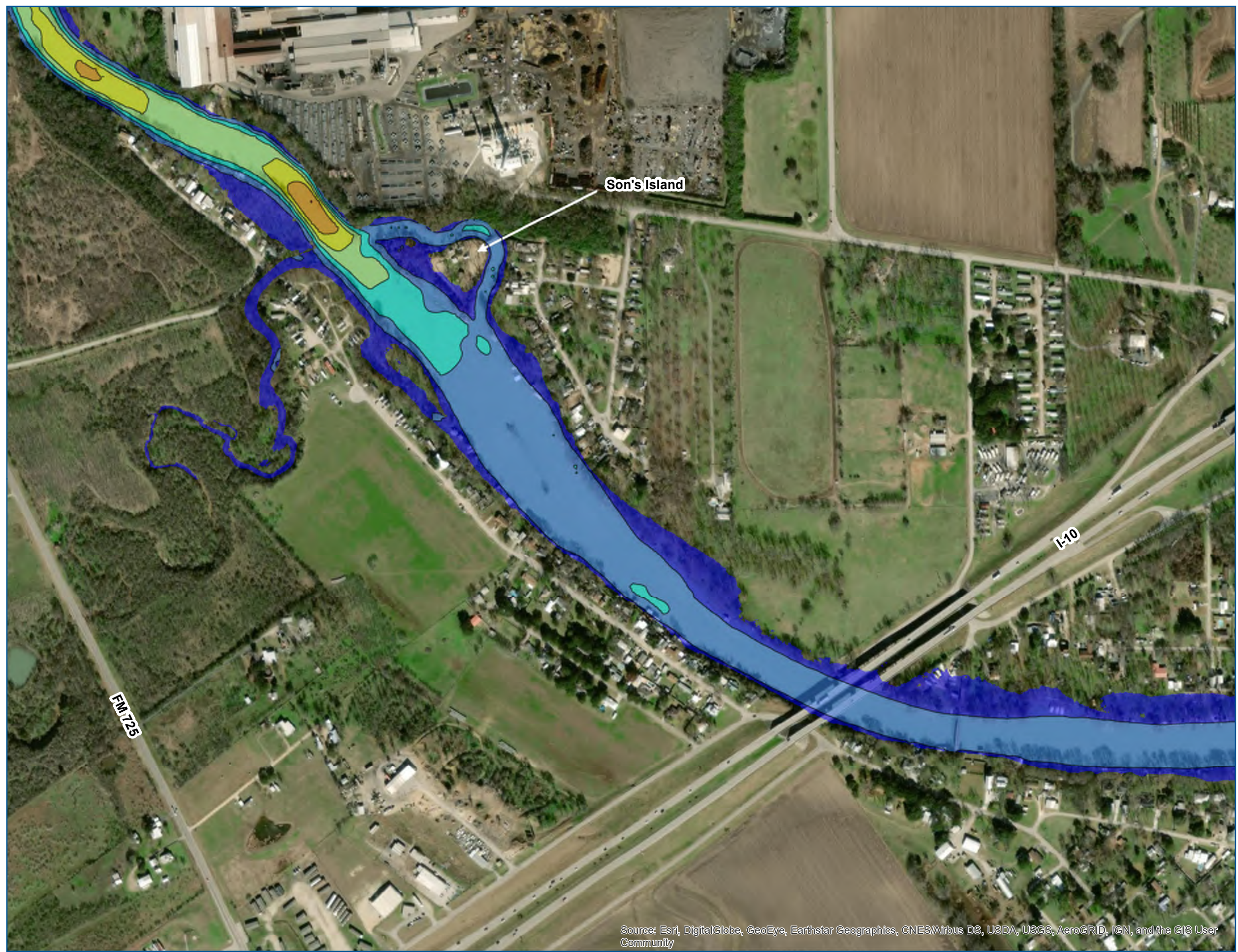
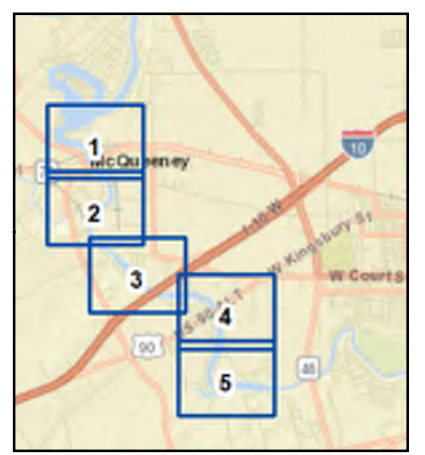
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**Velocity (ft/s)**

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

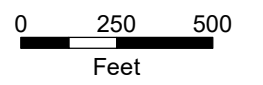


**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Map**

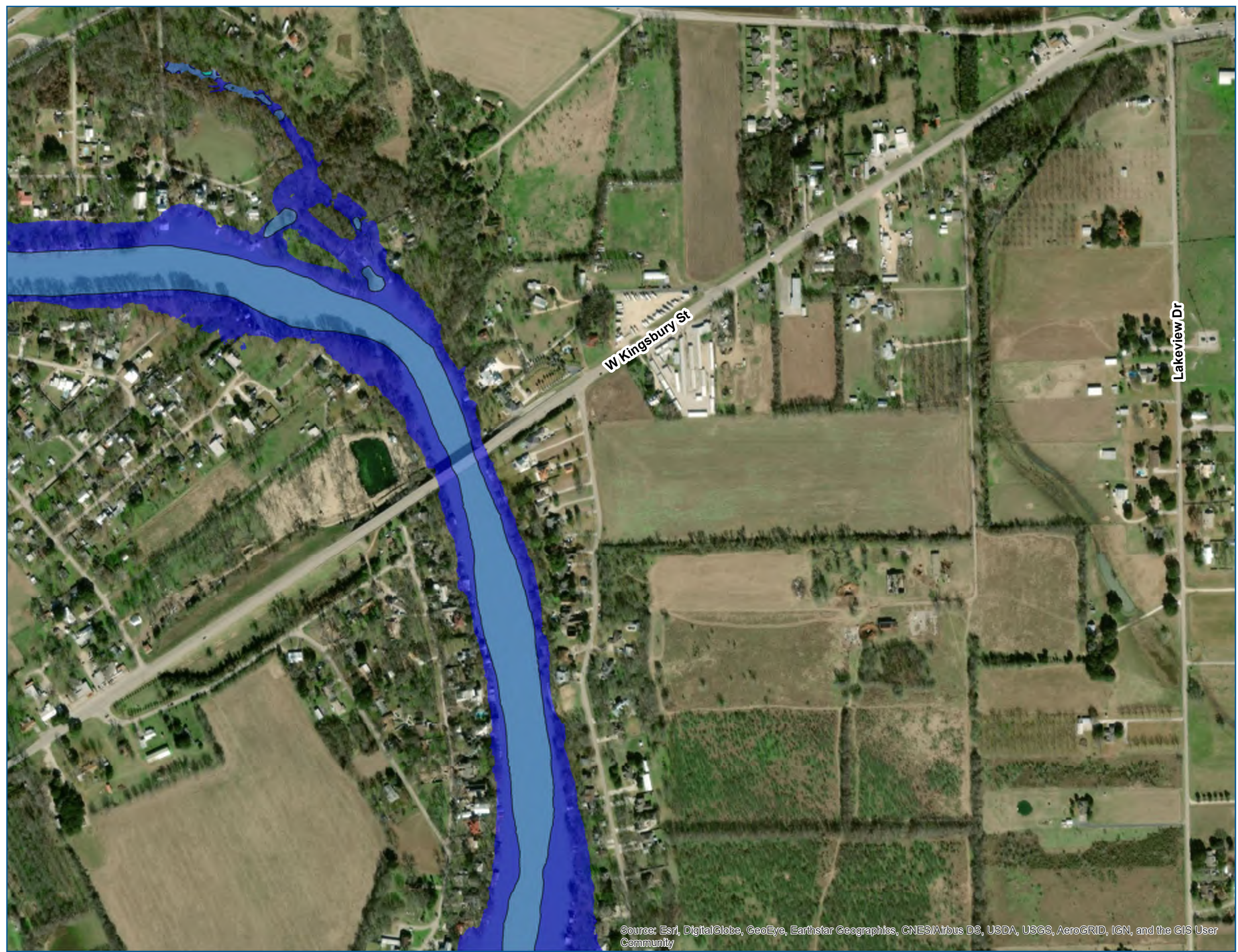
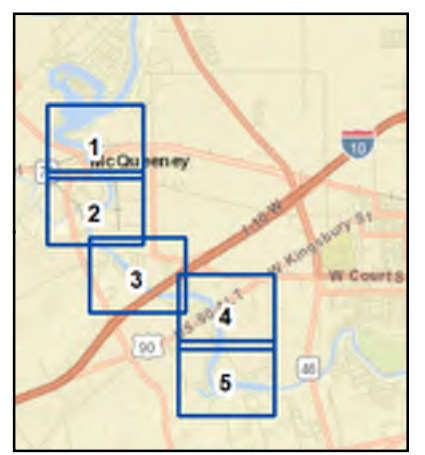
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**Velocity (ft/s)**

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

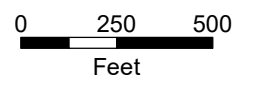


**McQueeney Dam (TP-3)  
Dam Failure (1 Gate)  
Velocity Map**

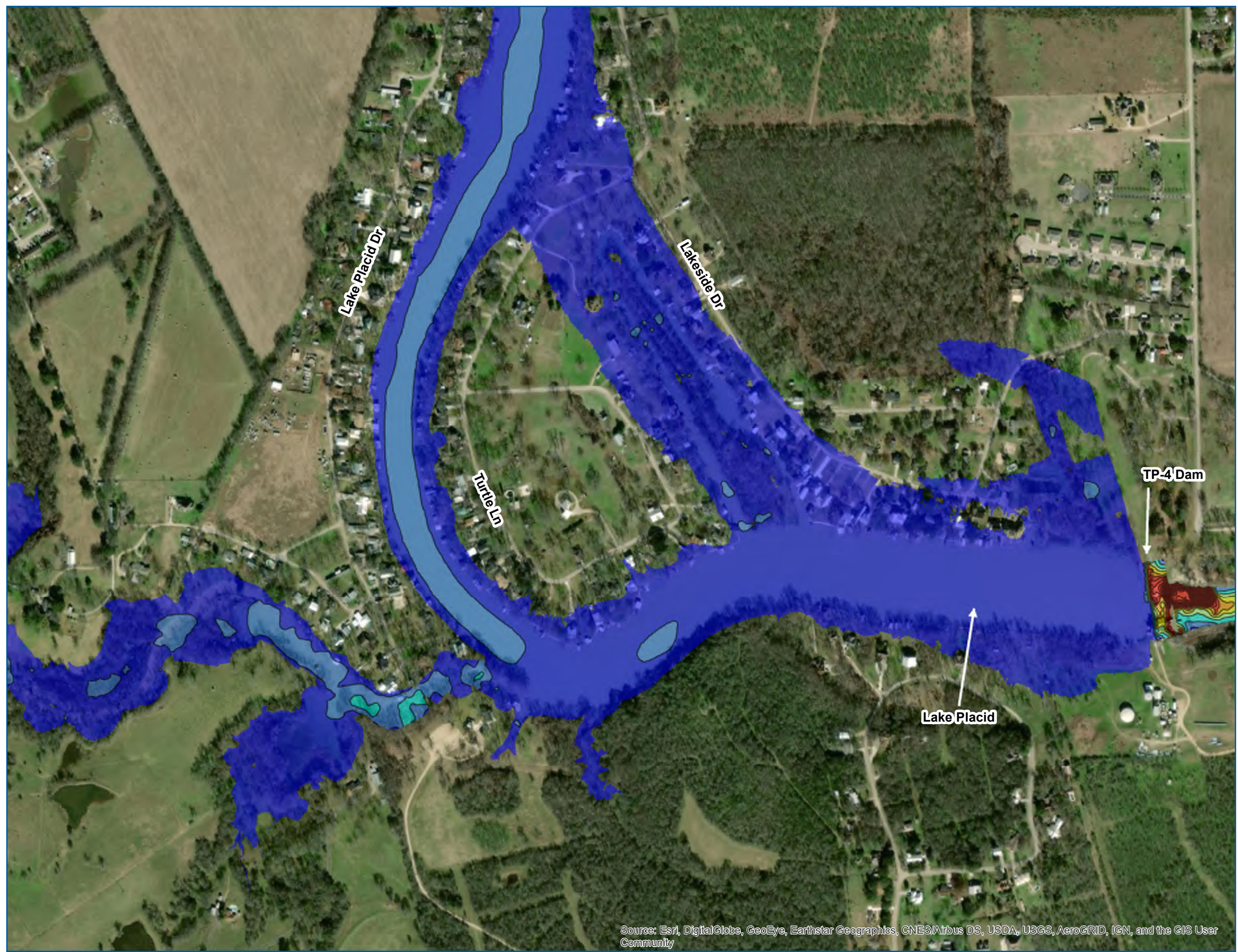
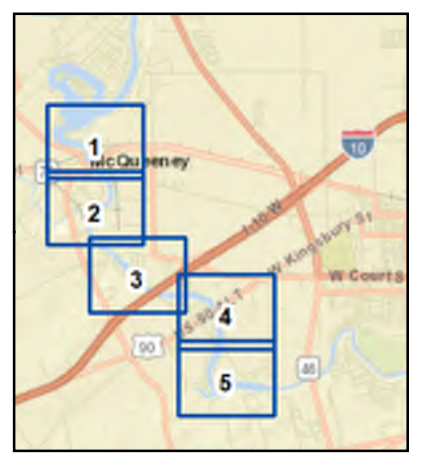
Page 5 of 5

**Velocity (ft/s)**

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6



1 inch = 500 feet



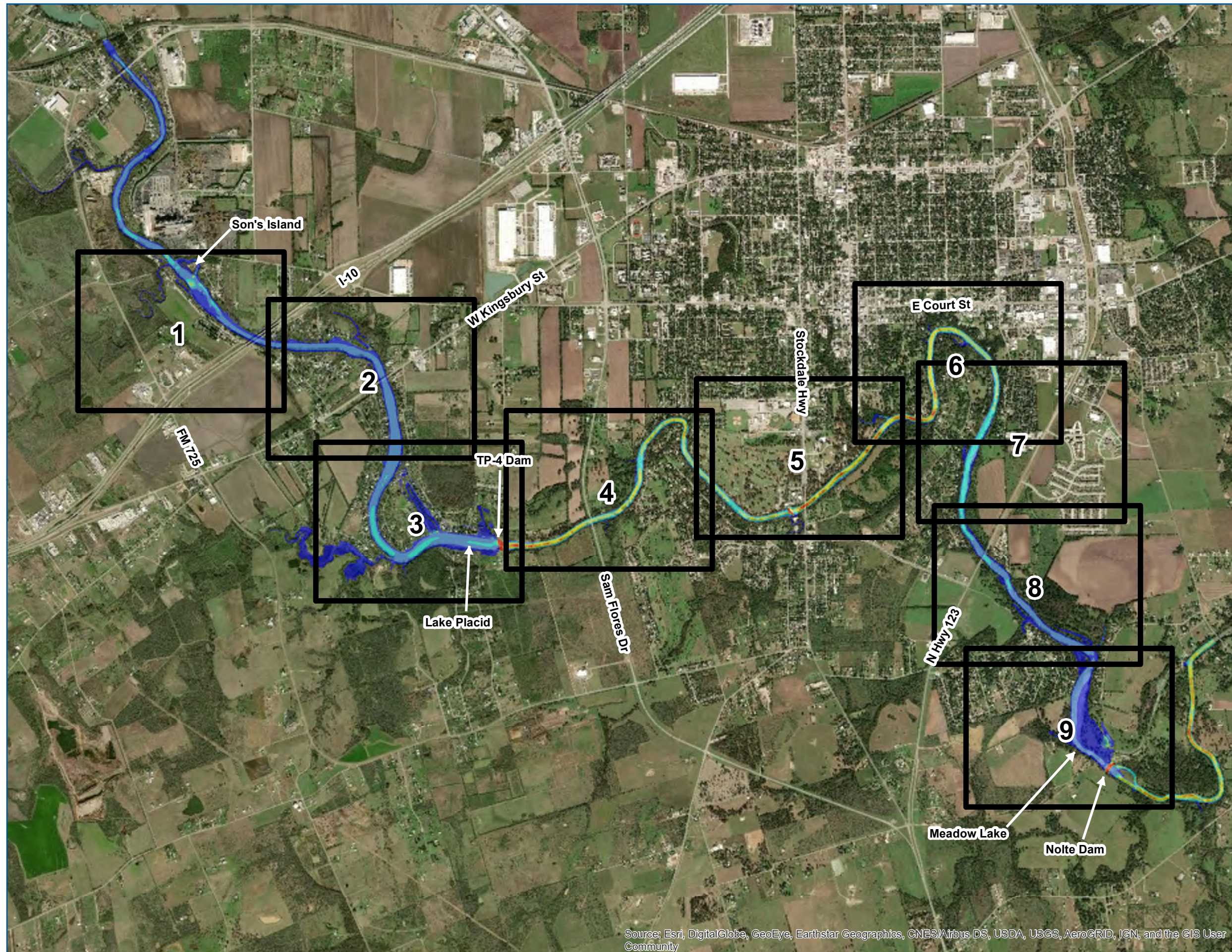
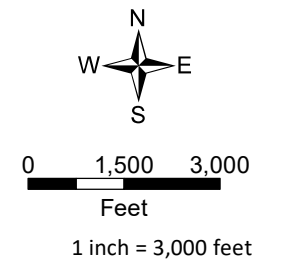
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Overall Map**

**Velocity (ft/s)**

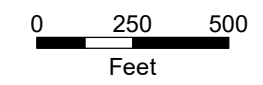
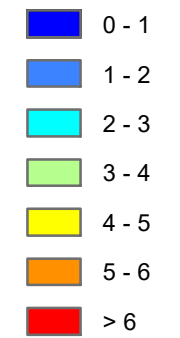


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

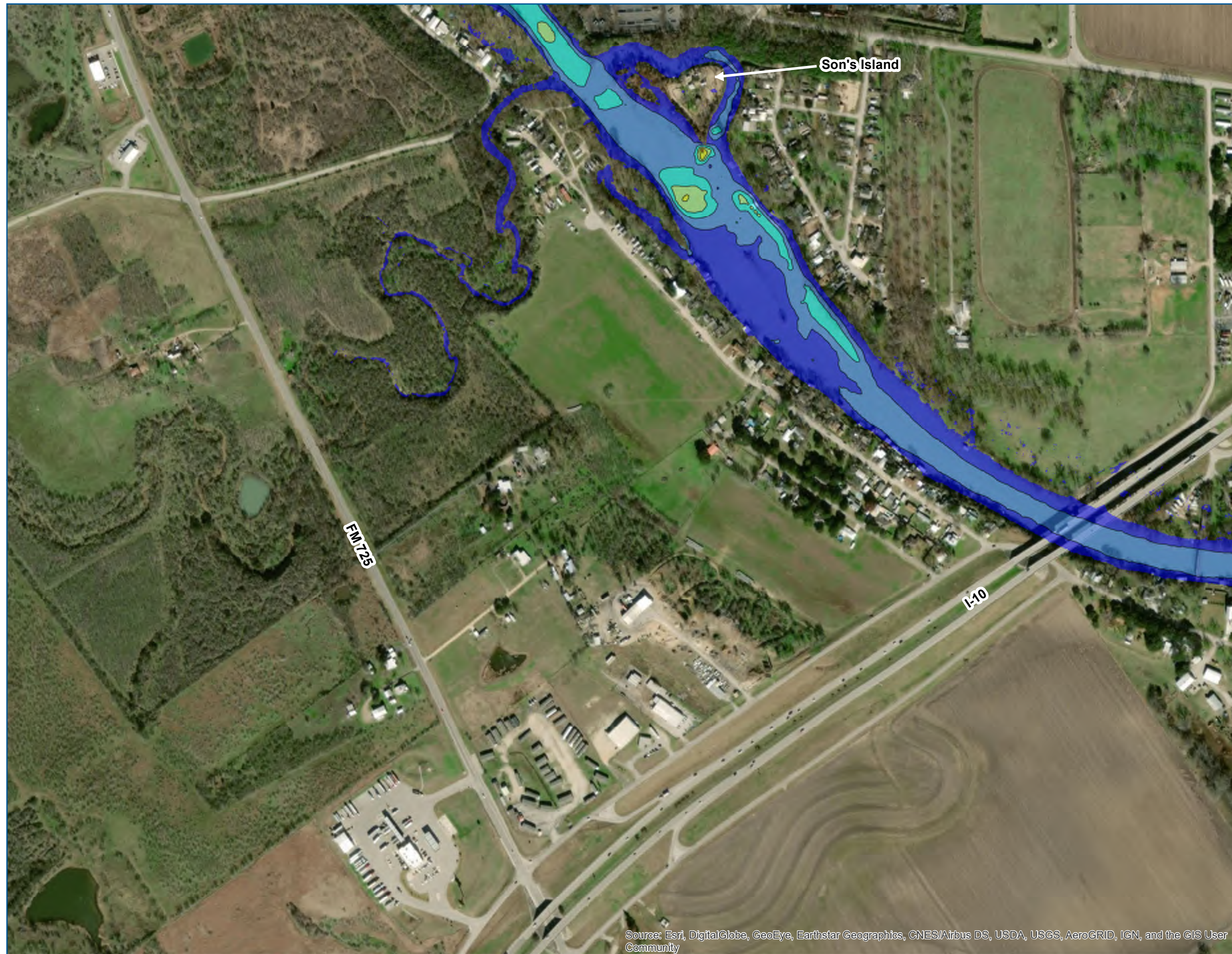
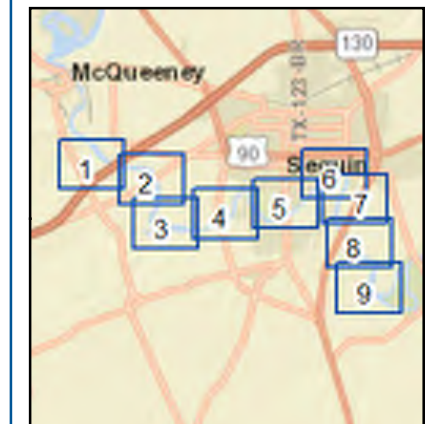
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 1 of 9

**Velocity (ft/s)**



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

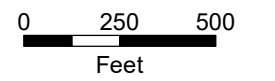
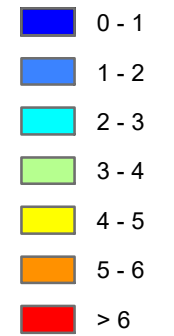




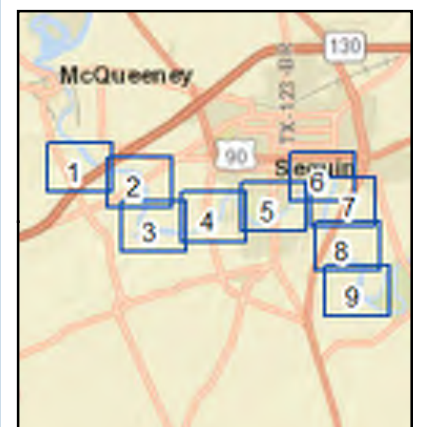
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 2 of 9

**Velocity (ft/s)**



1 inch = 500 feet

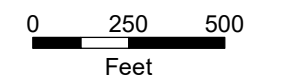
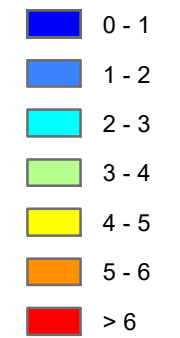


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

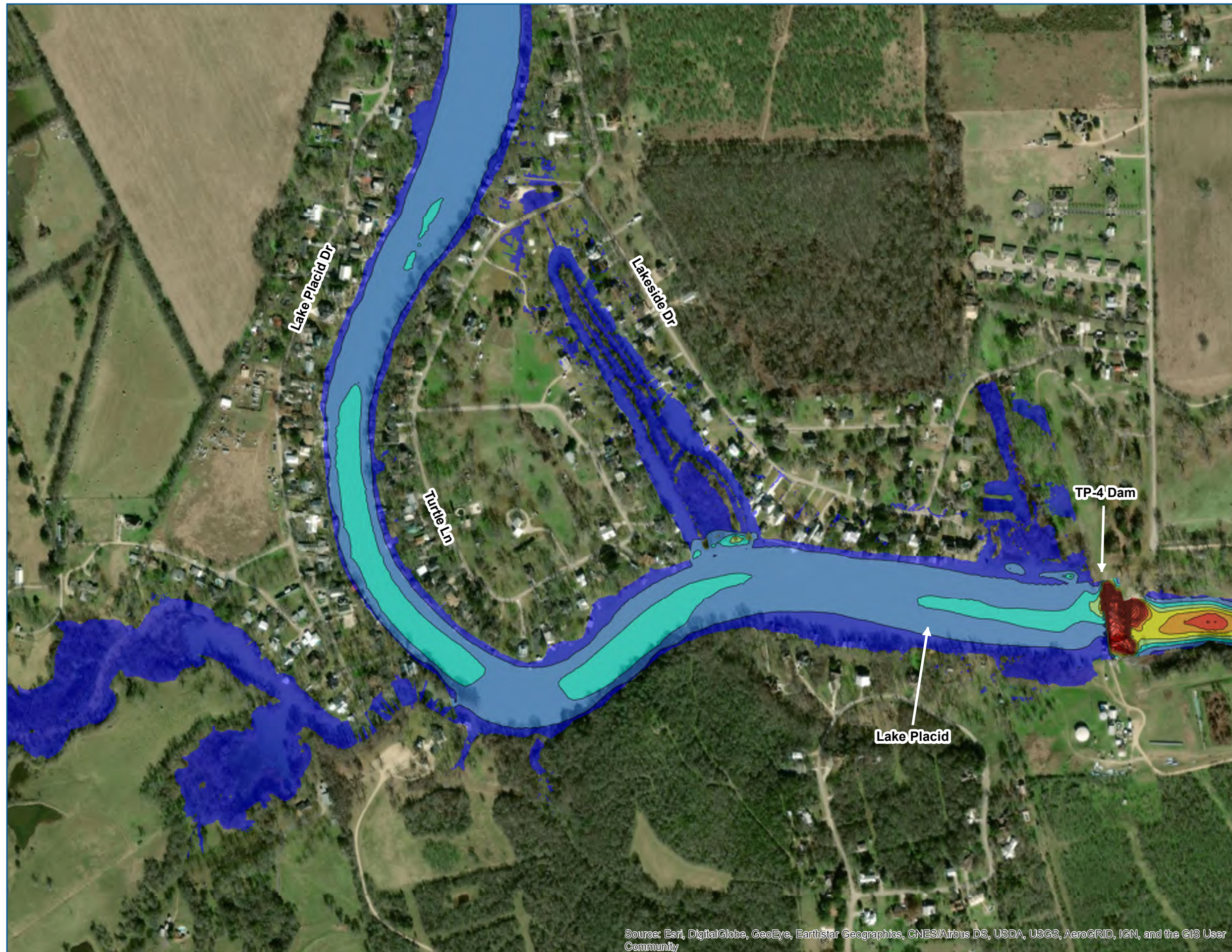
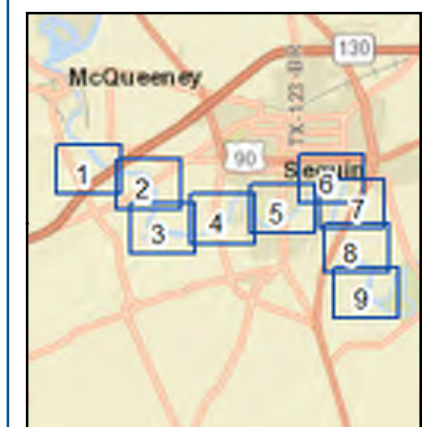
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 3 of 9

**Velocity (ft/s)**



1 inch = 500 feet



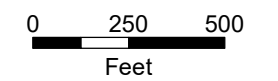
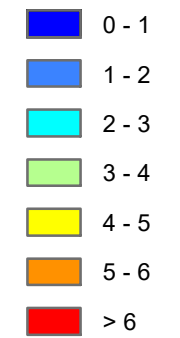
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



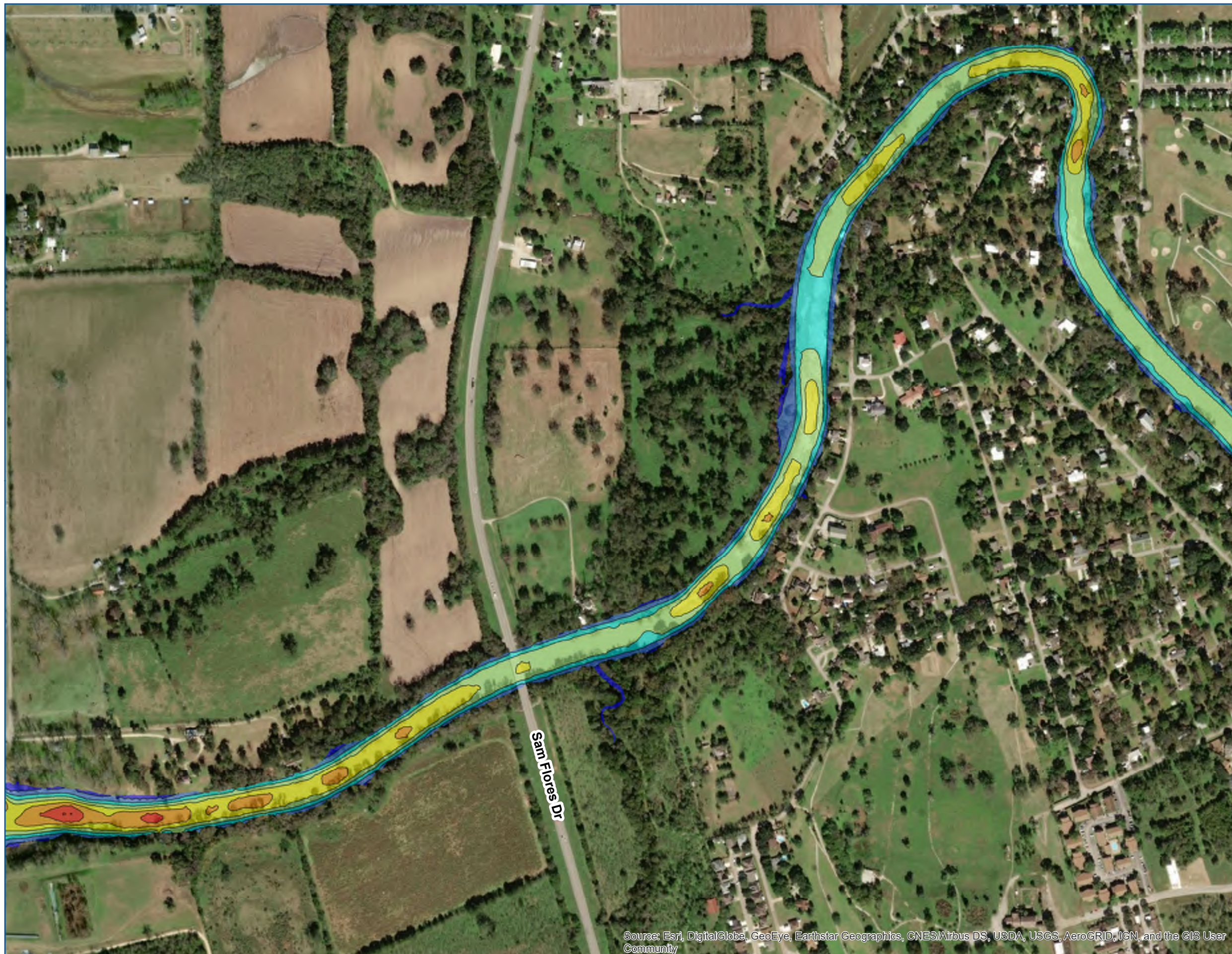
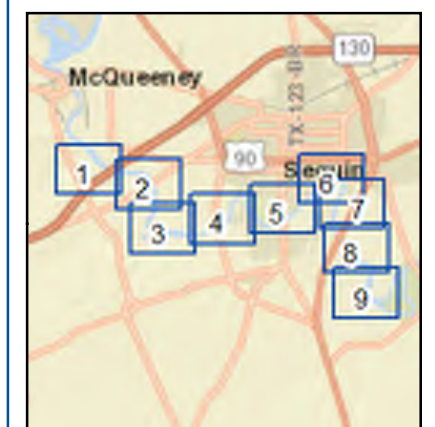
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 4 of 9

**Velocity (ft/s)**



1 inch = 500 feet

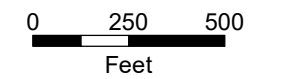
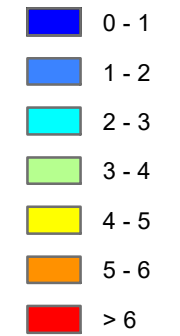


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

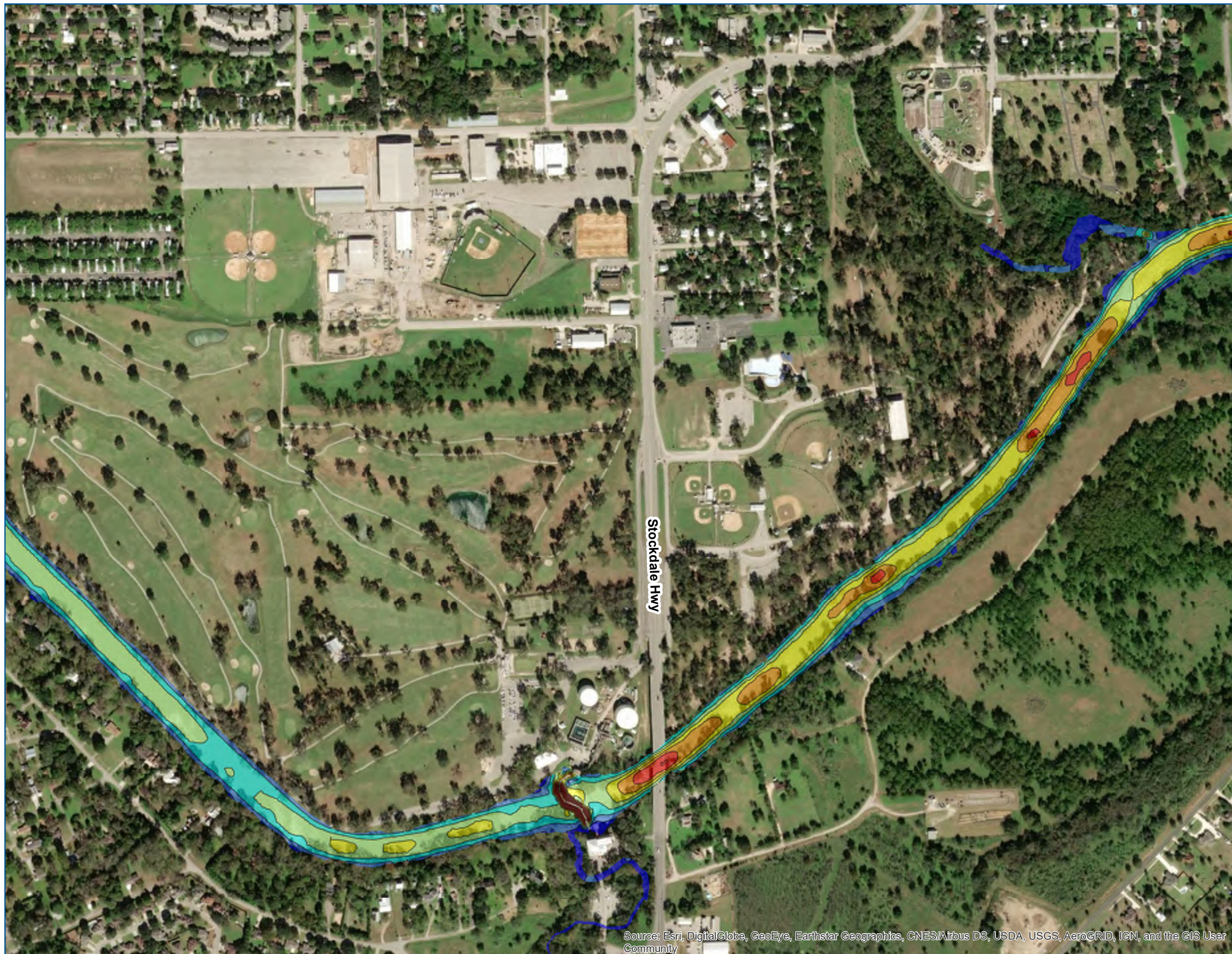
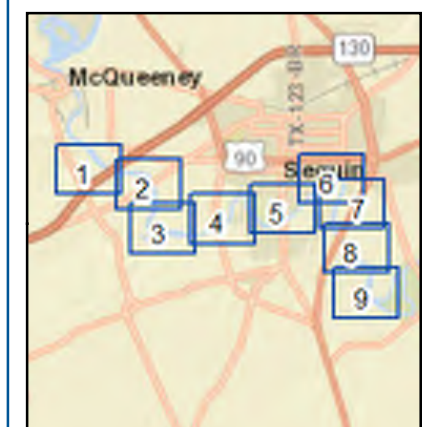
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 5 of 9

**Velocity (ft/s)**



1 inch = 500 feet

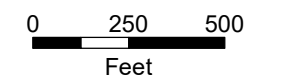
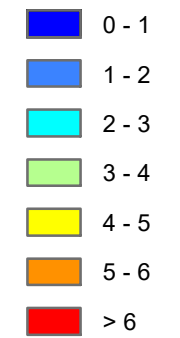


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

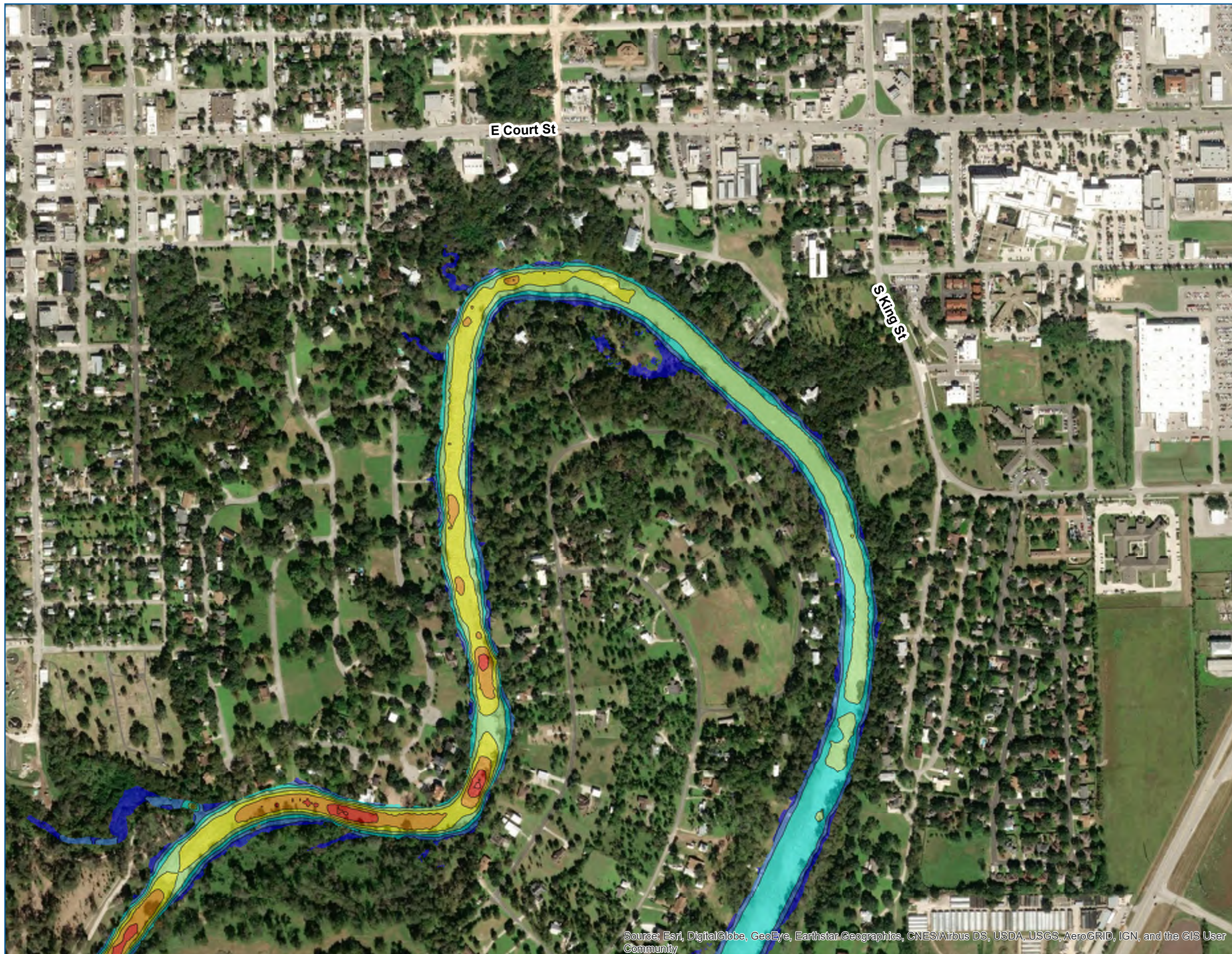
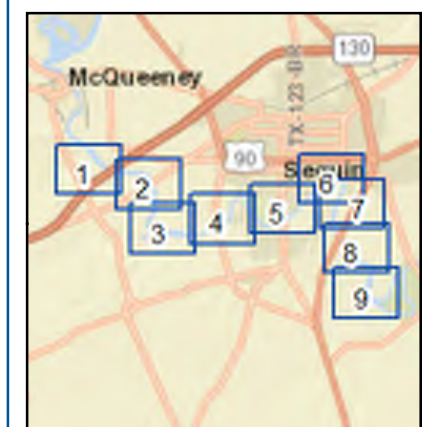
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

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**Velocity (ft/s)**



1 inch = 500 feet

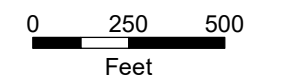


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

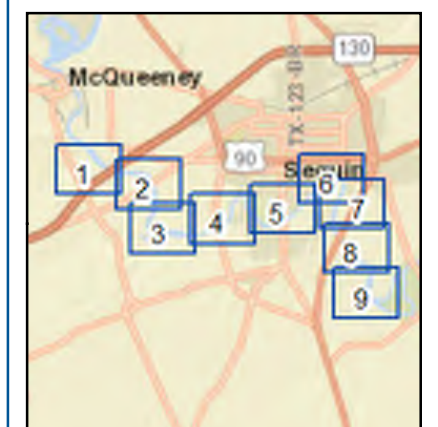
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

Page 7 of 9

**Velocity (ft/s)**



1 inch = 500 feet



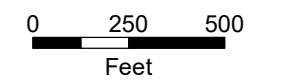
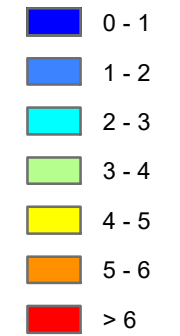
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



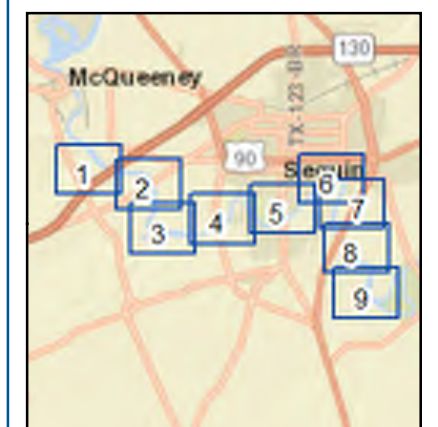
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

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**Velocity (ft/s)**



1 inch = 500 feet

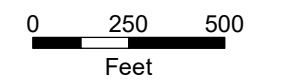
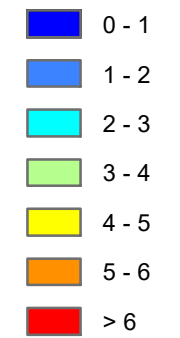


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

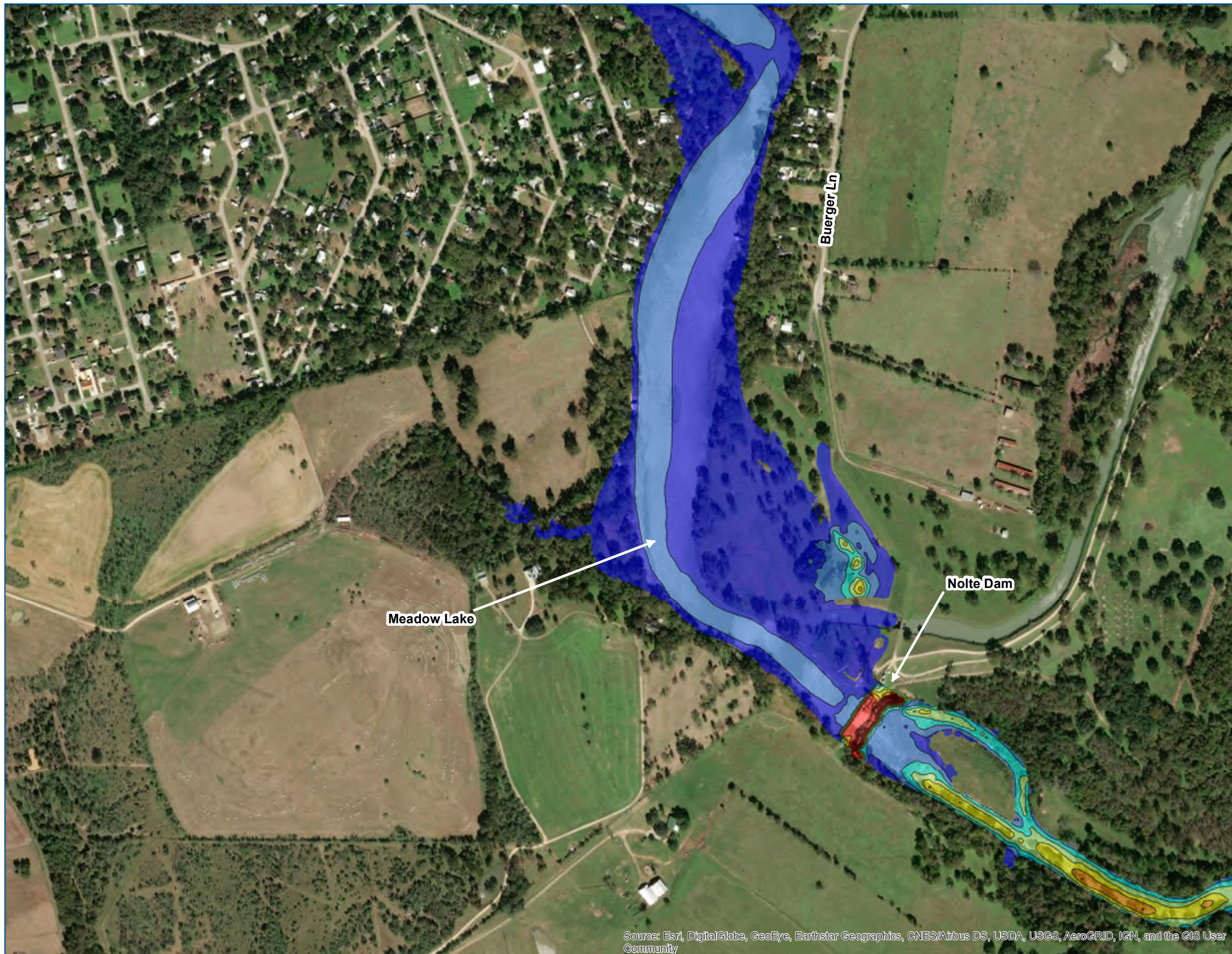
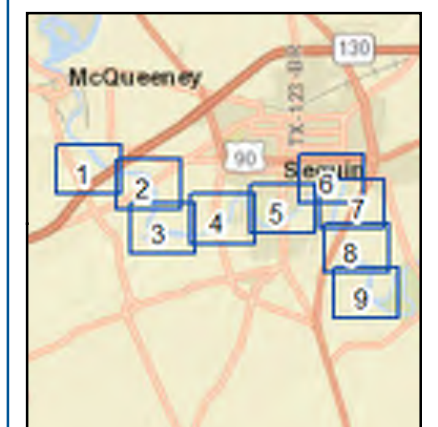
**Placid Dam (TP-4)  
Dam Failure (1 Gate)  
Velocity Map**

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**Velocity (ft/s)**



1 inch = 500 feet

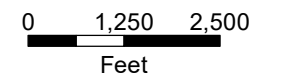
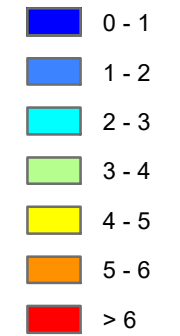


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

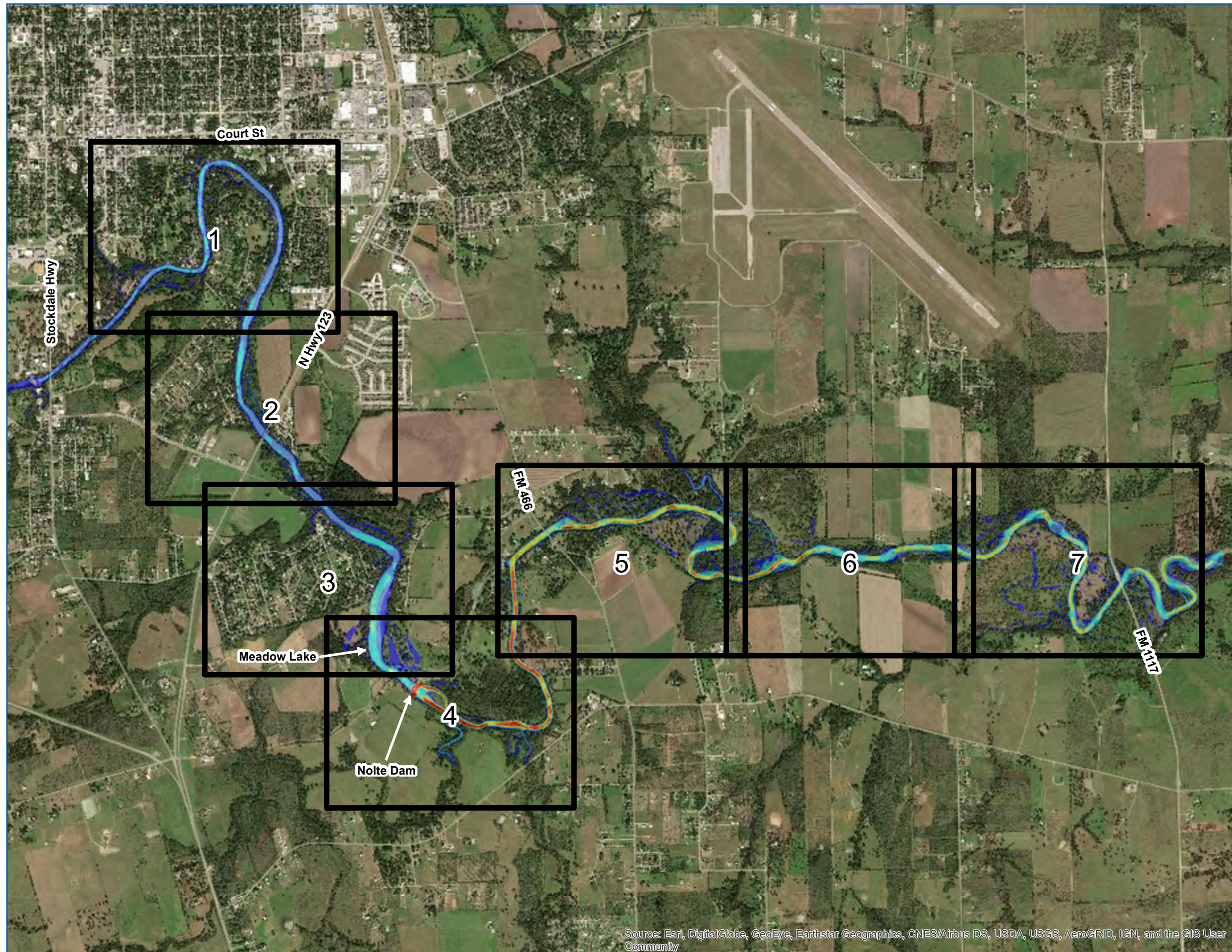


**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Overall Map**

**Velocity (ft/s)**



1 inch = 2,500 feet

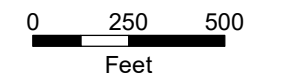
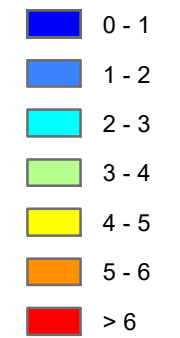


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

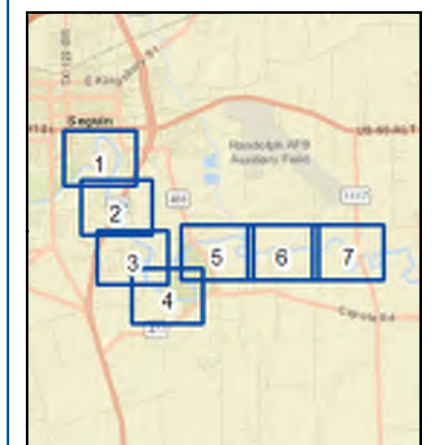
**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Map**

Page 1 of 7

**Velocity (ft/s)**



1 inch = 500 feet

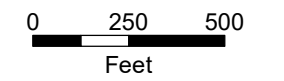


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

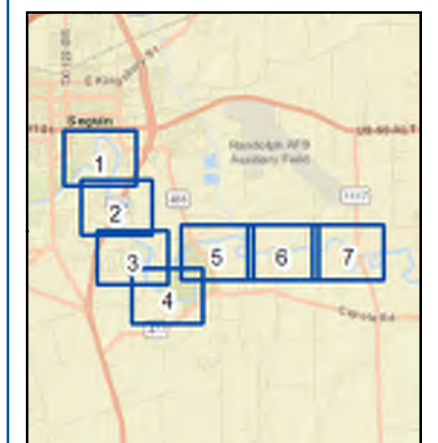
**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Map**

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**Velocity (ft/s)**



1 inch = 500 feet

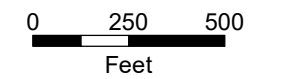
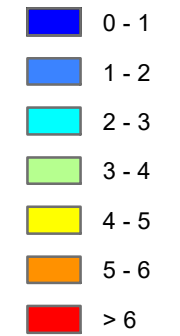


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

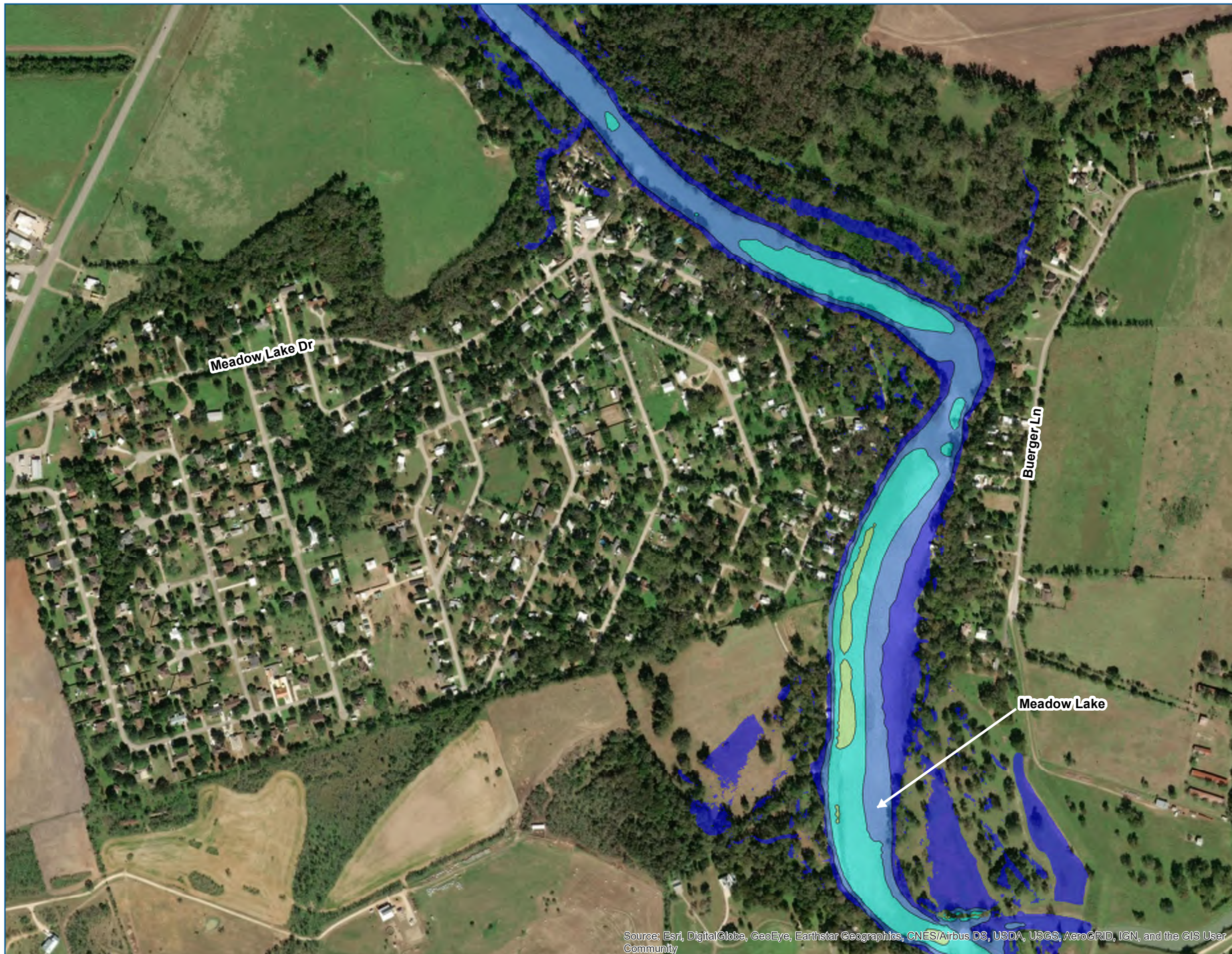
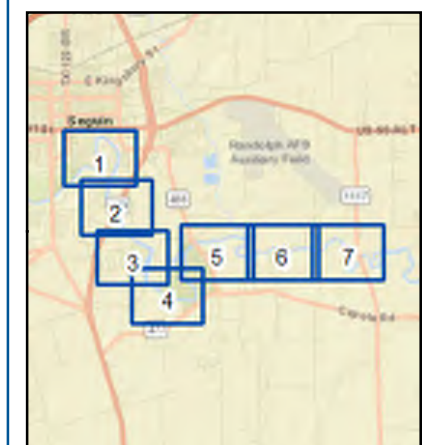
**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Map**

Page 3 of 7

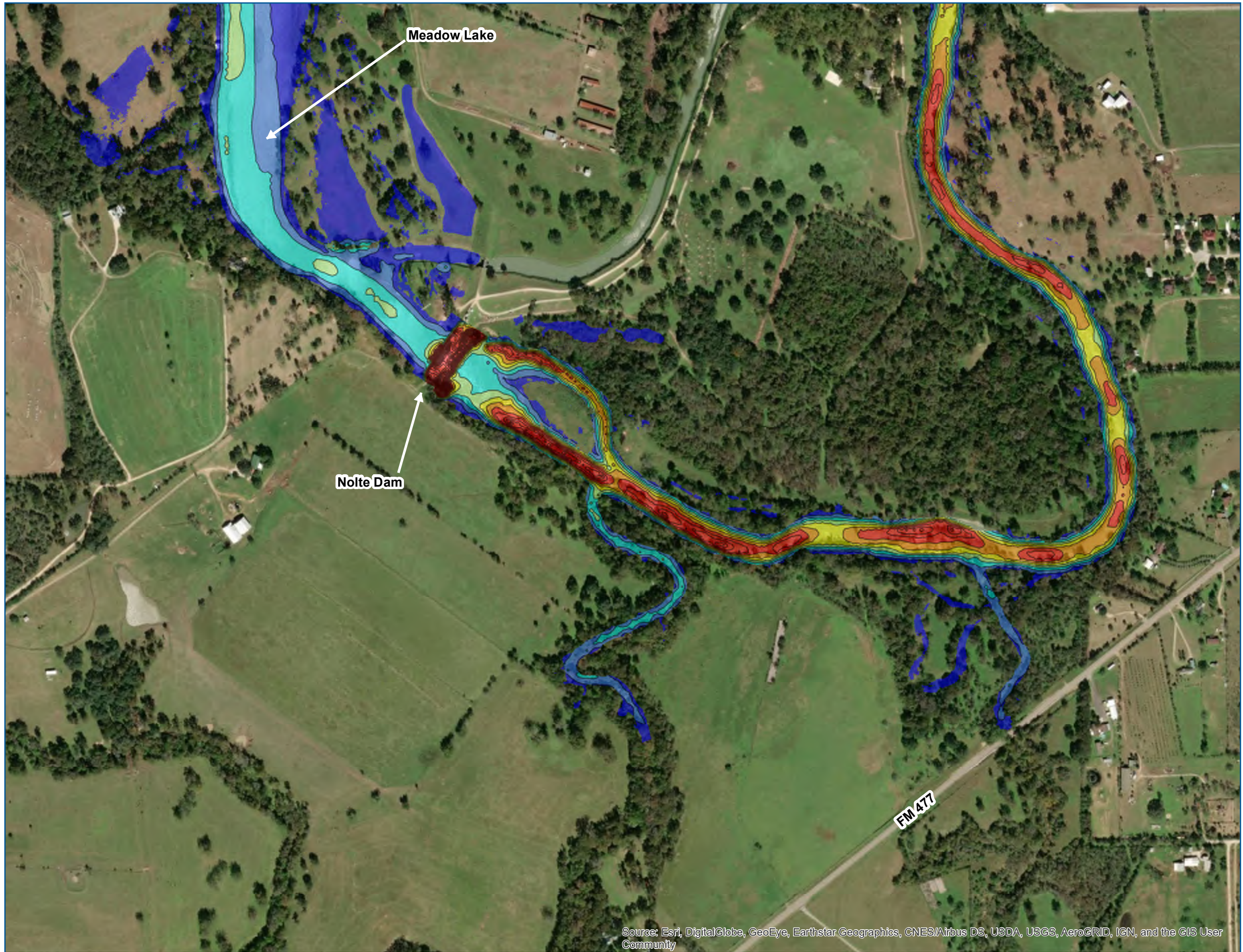
**Velocity (ft/s)**



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

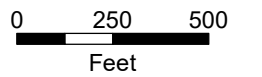


**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Map**

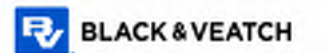
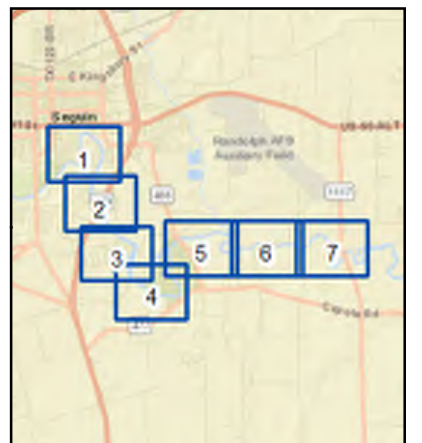
Page 4 of 7

**Velocity (ft/s)**

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
- 4 - 5
- 5 - 6
- > 6



1 inch = 500 feet

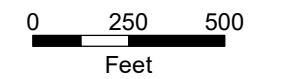


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

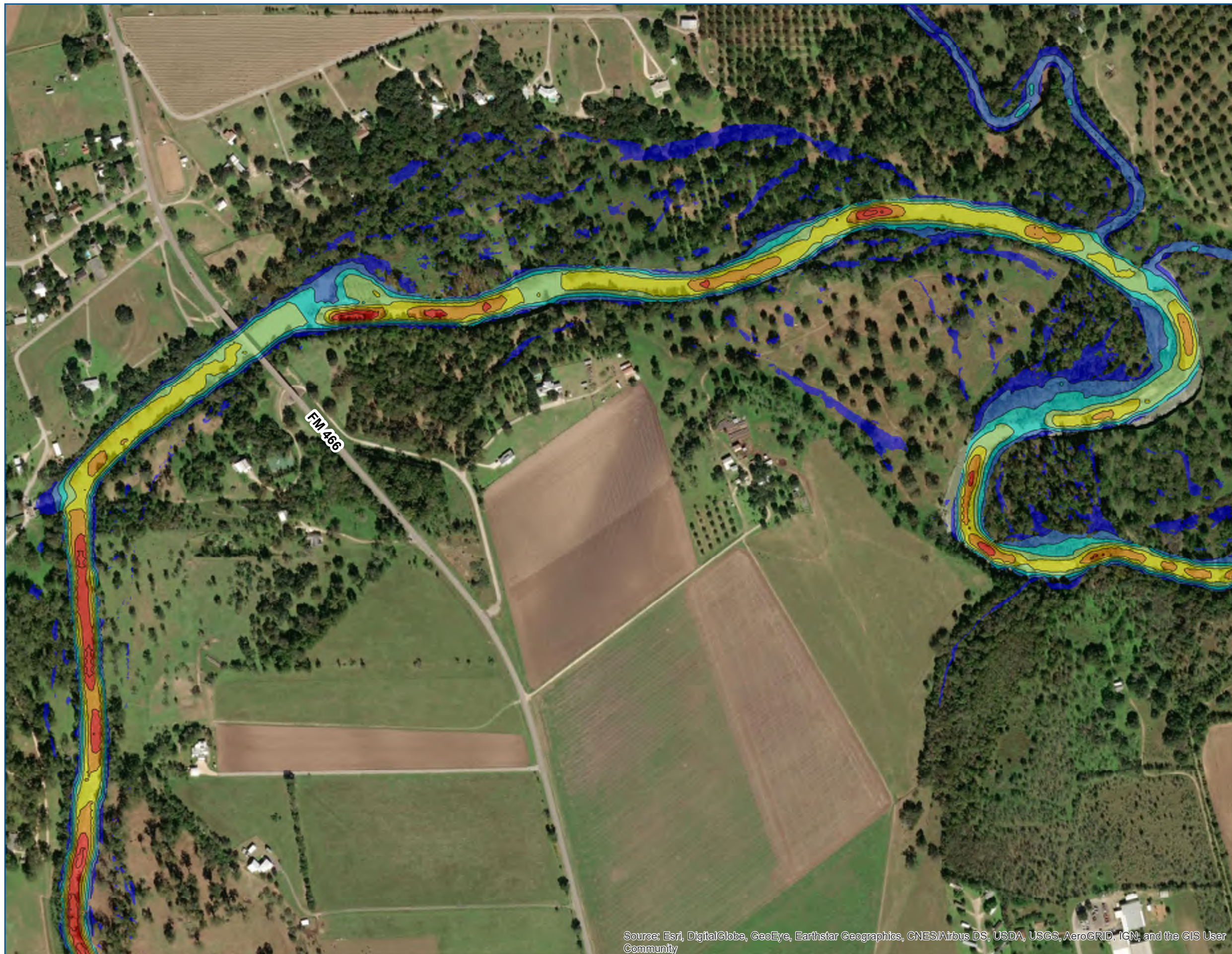
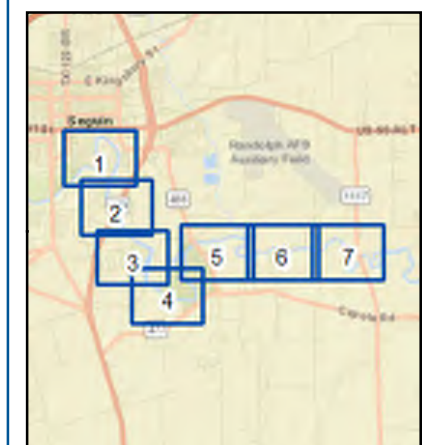
# Nolte Dam Dam Failure (1 Gate) Velocity Map

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## Velocity (ft/s)



1 inch = 500 feet



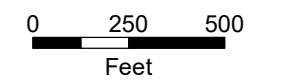
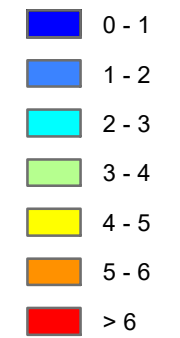
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



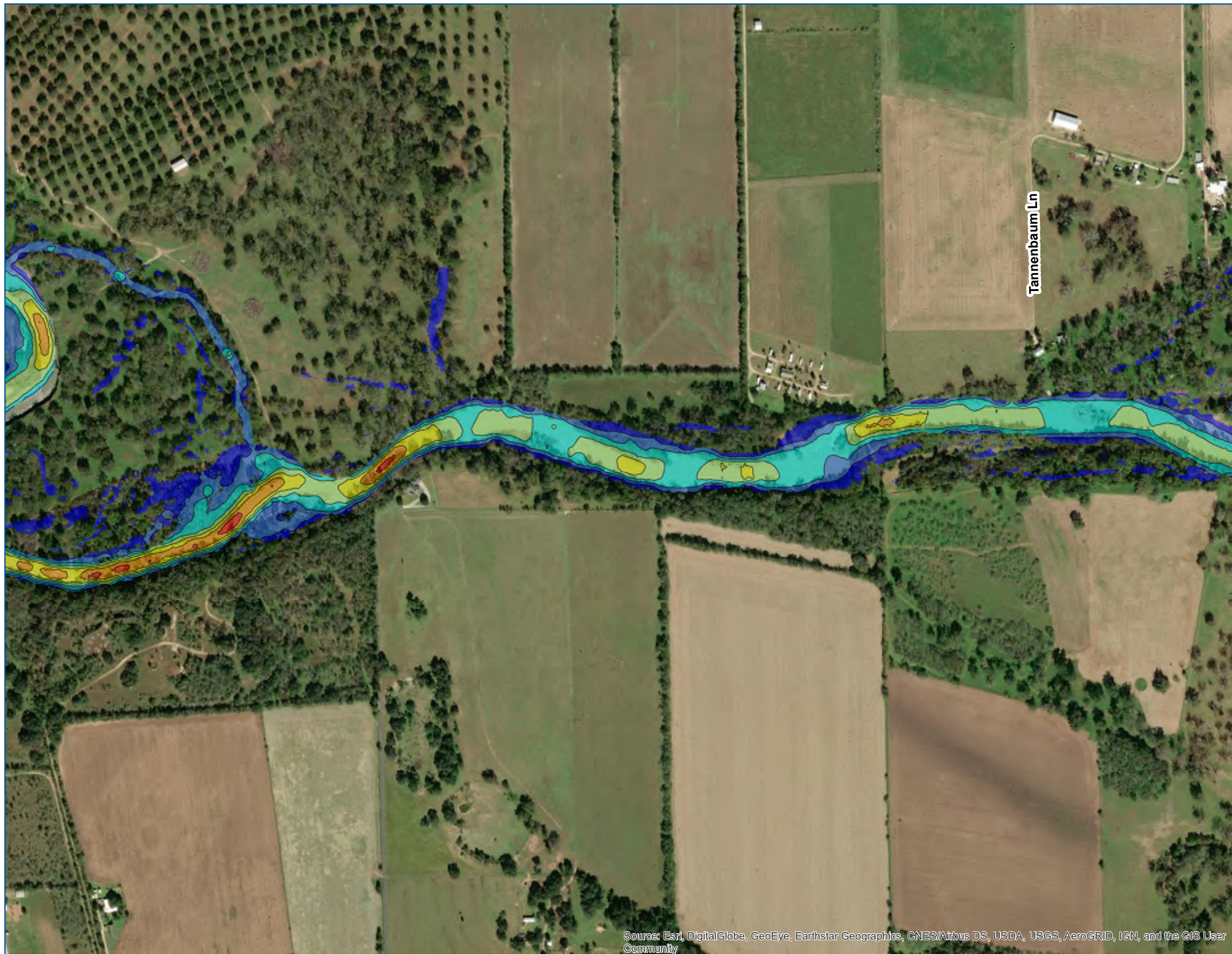
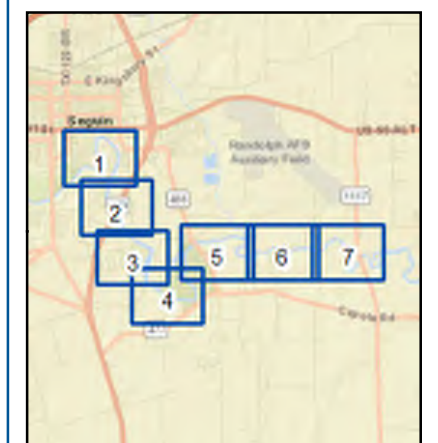
**Nolte Dam  
Dam Failure (1 Gate)  
Velocity Map**

Page 6 of 7

**Velocity (ft/s)**



1 inch = 500 feet

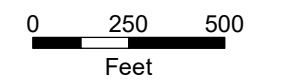


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

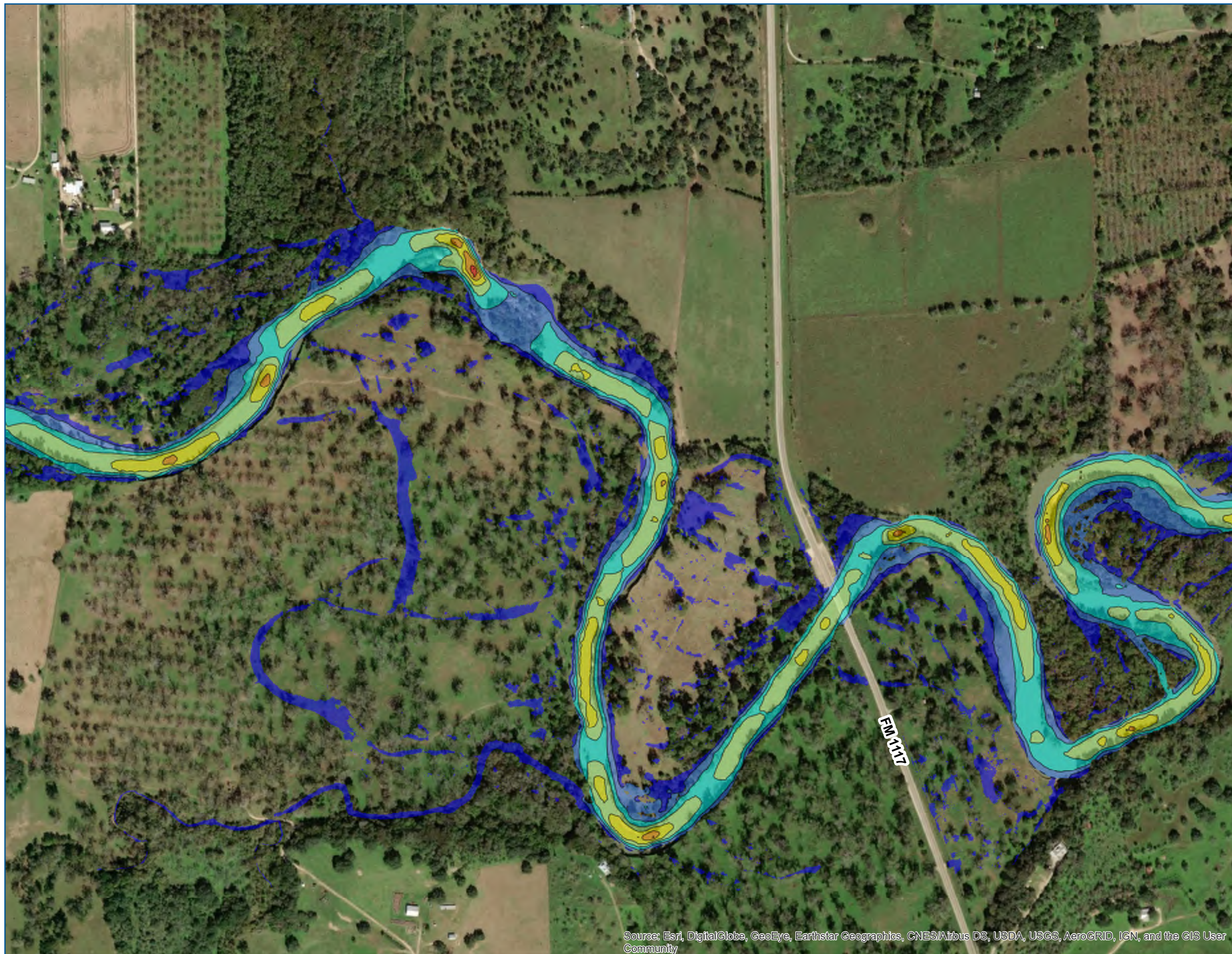
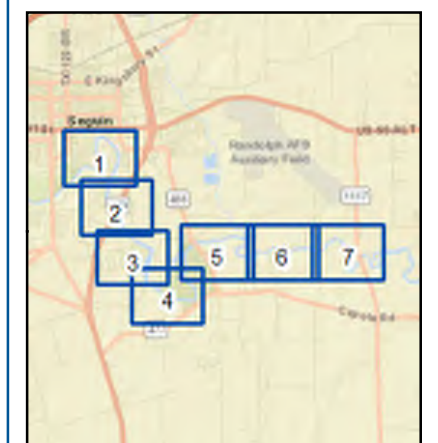
# Nolte Dam Dam Failure (1 Gate) Velocity Map

Page 7 of 7

## Velocity (ft/s)



1 inch = 500 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

# Attachment B

Guadalupe Valley Lakes  
PROHIBITED UNSAFE ZONES



Lake McQueeney

Refer to text of Report #1 for delineation of PROHIBITED & RESTRICTED UNSAFE ZONES.

TP-3 Dam

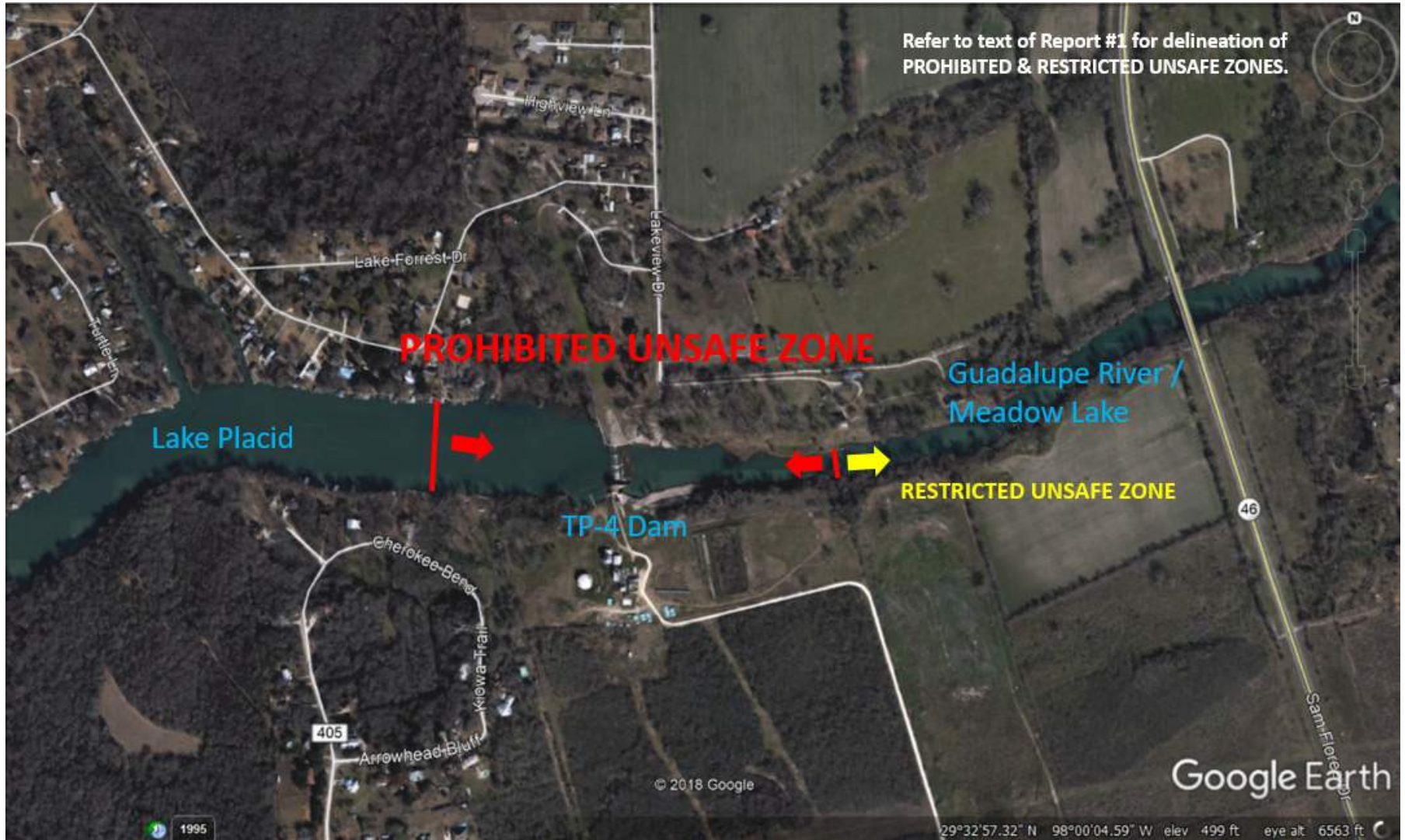
**PROHIBITED UNSAFE ZONE**

**RESTRICTED UNSAFE ZONE**

Lake Placid

Google Earth

29°35'39.32" N 98°02'38.84" W elev 566 ft eye alt 6563 ft



Refer to text of Report #1 for delineation of PROHIBITED & RESTRICTED UNSAFE ZONES.

**PROHIBITED UNSAFE ZONE**

Guadalupe River / Meadow Lake

Lake Placid

TP-4 Dam

**RESTRICTED UNSAFE ZONE**

Google Earth



**PROHIBITED UNSAFE ZONE**

**Meadow Lake**  
**RESTRICTED UNSAFE ZONE**

**Guadalupe River /**  
**Meadow Lake**  
**RESTRICTED**  
**UNSAFE ZONE**

Refer to text of Report #1 for delineation of  
PROHIBITED & RESTRICTED UNSAFE ZONES.

Google Earth

29°33'00.55" N 97°57'57.34" W elev. 501 ft eye alt. 6563 ft



# Attachment C

## Guadalupe Valley Lakes RESTRICTED UNSAFE ZONES





**PROHIBITED UNSAFE ZONE**

Refer to text of Report #1 for delineation of PROHIBITED & RESTRICTED UNSAFE ZONES.

**RESTRICTED UNSAFE ZONE**

Lake Placid

Google Earth

1995

© 2018 Google

29°34'56.43" N 98°01'37.07" W elev 542 ft eye alt 10378 ft



Refer to text of Report #1 for delineation of  
**PROHIBITED & RESTRICTED UNSAFE ZONES**

**RESTRICTED UNSAFE ZONE**

**PROHIBITED UNSAFE ZONE**

Meadow Lake

Google Earth

© 2018 Google

29°33'47.07" N 97°56'59.03" W elev 546 ft eye alt 6337 ft

1995





Refer to text of Report #1 for delineation of PROHIBITED & RESTRICTED UNSAFE ZONES.

Guadalupe River

RESTRICTED UNSAFE ZONE

PROHIBITED UNSAFE ZONE

Google Earth

Imagery Date: 12/21/2018 29°32'10.82" N 97°53'51.18" W elev. 445 ft. eye alt. 15463 ft.