

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

Guadalupe Valley Lakes
Report #2 of the Independent Expert Panel

14Nov2019

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 #2 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 #2 focuses on the lakes and river segments between SH 80 and Gonzales CR 143. These segments include Lake Gonzales (which extends from H-4 Dam approximately 10.8 miles upstream to SH 80), M.A. Wade Lake (which extends from the privately-owned M.A. Wade Dam, located approximately 4000 feet upstream of CR 143, upstream to H-4 Dam), and the Guadalupe River from M.A. Wade Dam downstream to 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 (Oct 22 & 23 and Nov 11, 12, & 14).
- 2) Download and initial review of summaries of hydraulic modeling results (Oct 25).
- 3) Receipt & review of available hydraulic models & supplemental model results (Oct 29 – Nov 12).
- 4) Meetings (N/A, accomplished by teleconference).
- 5) Reconnaissance of system (N/A, accomplished by Google Earth).
- 6) Research and report preparation (Nov 05 – Nov 14).

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) was modeled by a third party consultant using the U.S. Army Corps of Engineers Hydrologic Engineering Center River Analysis System (HEC-RAS 2D)¹. This is deemed the most likely failure scenario at the H-4 Dam forming Lake Gonzales 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 Gonzales County Emergency Management Coordinator (EMC). The IEP visited this control center on 11Oct2019.

Pursuant to a 12Nov2019 call with Gonzales County Emergency Management Coordinator (EMC) Jimmy Harless, the IEP is advised that Gonzales County participates in a reverse 911 call system called CODERED. This Alert Emergency Call-Out System enables individuals to sign up to receive emergency notifications on their phones (home and cell) 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

¹ HEC-RAS 2D models with geographic coverage extending from State Highway 80 to Gonzales CR 143 were received by HDR and H-Z on 29Oct2019. 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.

timely life-saving information. Gonzales County does not have a siren-based emergency alert system.

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 and Gonzales County.

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 various time increments 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 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/).

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.
- 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.

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 from SH 80 to Gonzales CR 143:

Lake Gonzales (single gate failure at H-4 Dam)

- 1) Upstream of the H-4 Dam (Lake Gonzales Dam) - The area upstream of the H-4 gates impounding Lake Gonzales extending approximately 550 feet up the eastern portion of the reservoir and approximately 800 feet up the western portion of the reservoir is considered a "PROHIBITED UNSAFE ZONE" and shall be marked by lines 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 Gonzales should be made aware of the possibilities of water levels falling below normal level at rates of up to 0.04 feet per minute and rapidly increasing flow velocities of up to 3 feet per second.

Guadalupe River and M.A. Wade Lake Downstream of H-4 Dam (single gate failure at H-4 Dam)

- 1) Downstream of H-4 Dam - The area upstream of a line approximately 2.4 miles downstream of the H-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) Upstream of M.A. Wade Dam – The area approximately 700 feet upstream of M.A. Wade 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.
- 3) Downstream of H-4 Dam – The area from the PROHIBITED UNSAFE ZONE identified in (1) above to the PROHIBITED UNSAFE ZONE identified in (2) above is considered a “RESTRICTED UNSAFE ZONE” for all activities in the water such as swimming, wading, tubing, etc. See Attachment C.
 - a) Appropriate signage marking this unsafe zone shall be installed therein.
 - 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.
- 4) Downstream of M.A. Wade Dam – The segment of the Guadalupe River (or Lake Wood) from M.A. Wade Dam downstream to Gonzales CR 143 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 designated unsafe zone shall be installed about 200 feet upstream of the Gonzales CR 143 crossing.
 - 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) Participants in activities in, on, or adjacent to M.A. Wade Lake or the Guadalupe River downstream of H-4 Dam should be made aware of the possibilities of water rising 3 to 11 feet above normal level at maximum rates of 0.04 to 1.5 feet per minute, respectively, and rapidly increasing flow velocities exceeding 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.

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 a maximum of 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 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 a maximum of 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 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 or river. 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 all public access locations to explain the PROHIBITED and RESTRICTED UNSAFE ZONES on Lakes Gonzales and M.A. Wade and the Guadalupe River (Lake Wood) as well as information regarding registration for receipt of email and text message alerts from the Gonzales County CODERED system.

Respectfully Submitted,
Independent Expert Panel



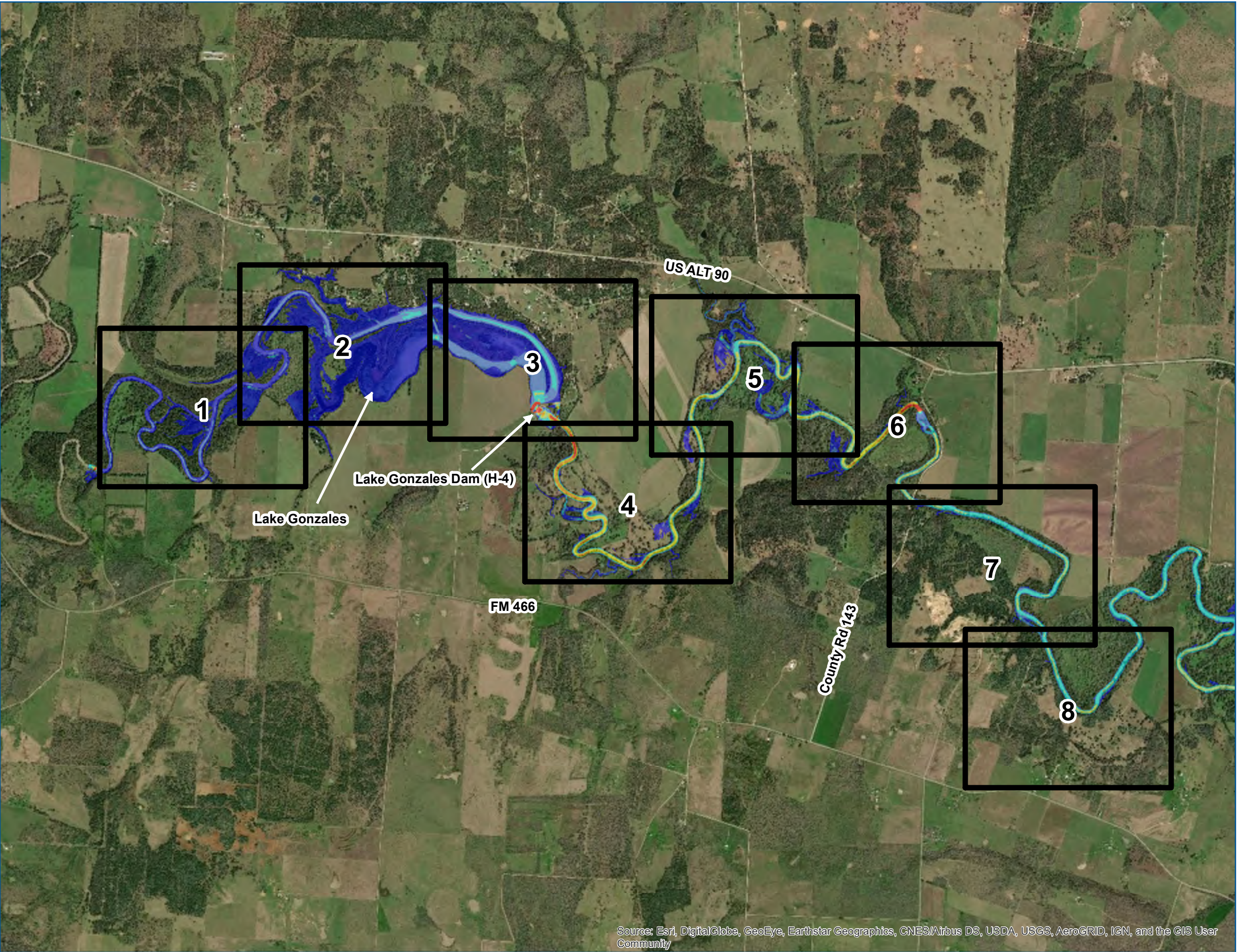
Samuel K. Vaughn, PE
GBRA Designated Expert



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

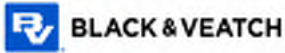
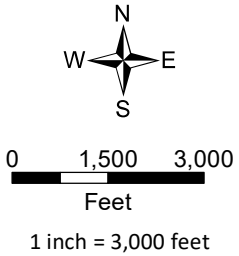


W. Nim Kidd, MPA, CEM
Third Designated Expert

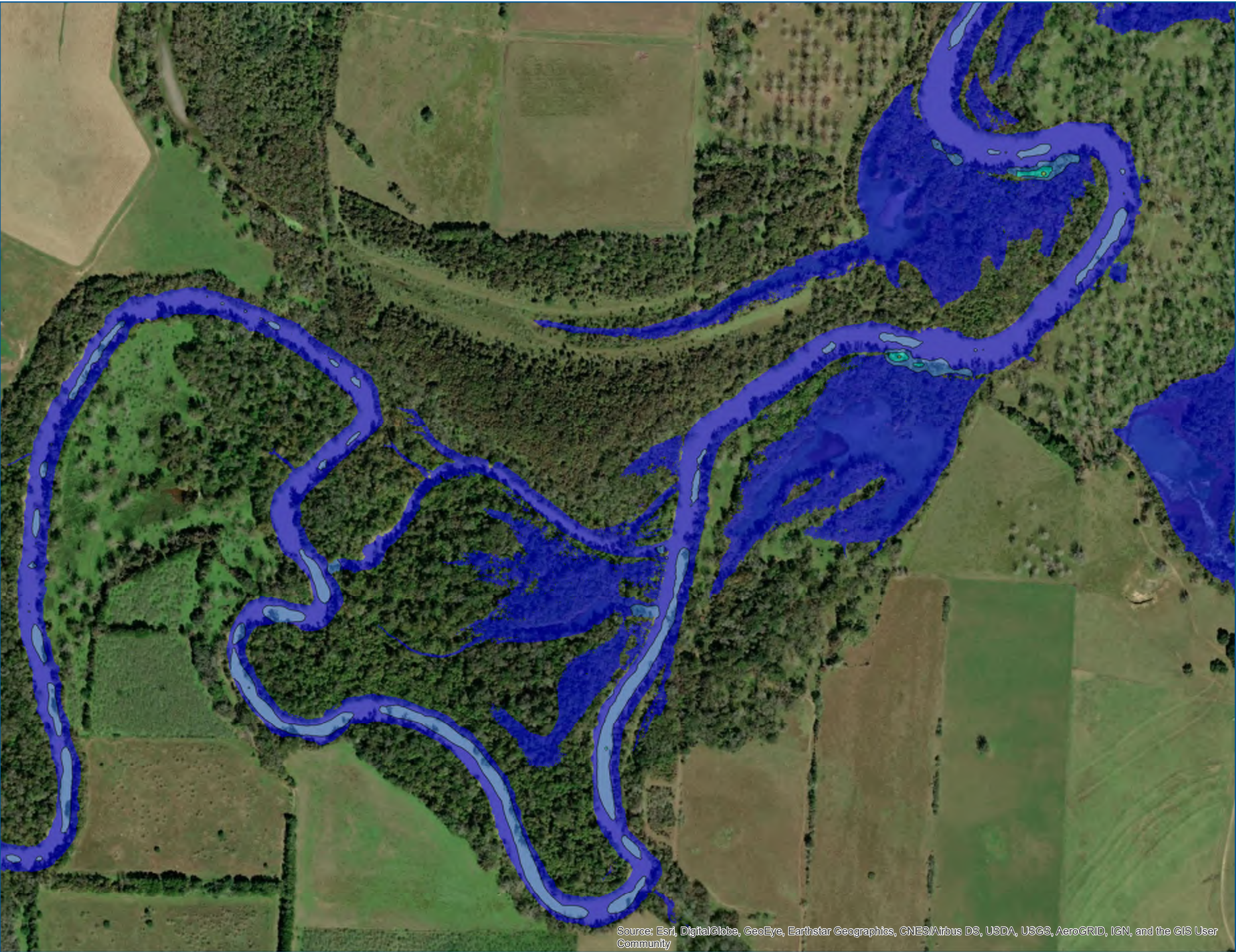


**Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Overall Map**

Velocity (ft/s)



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

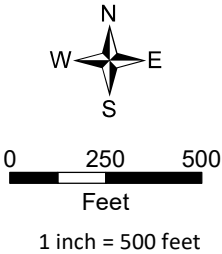


**Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map**

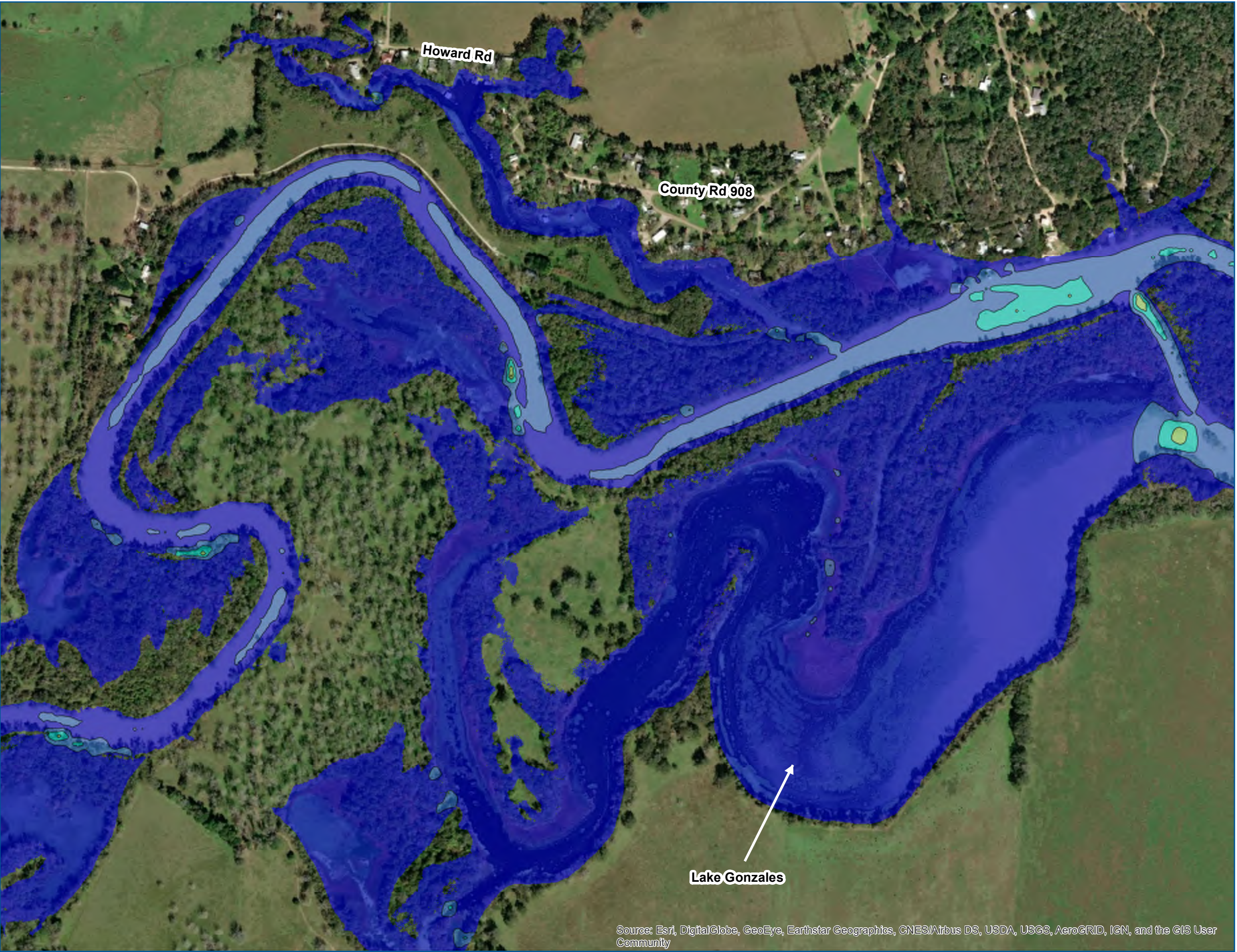
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Velocity (ft/s)

- 0 - 1
- 1 - 2
- 2 - 3
- 3 - 4
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- 5 - 6
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

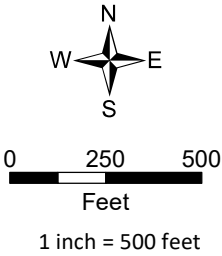


Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map

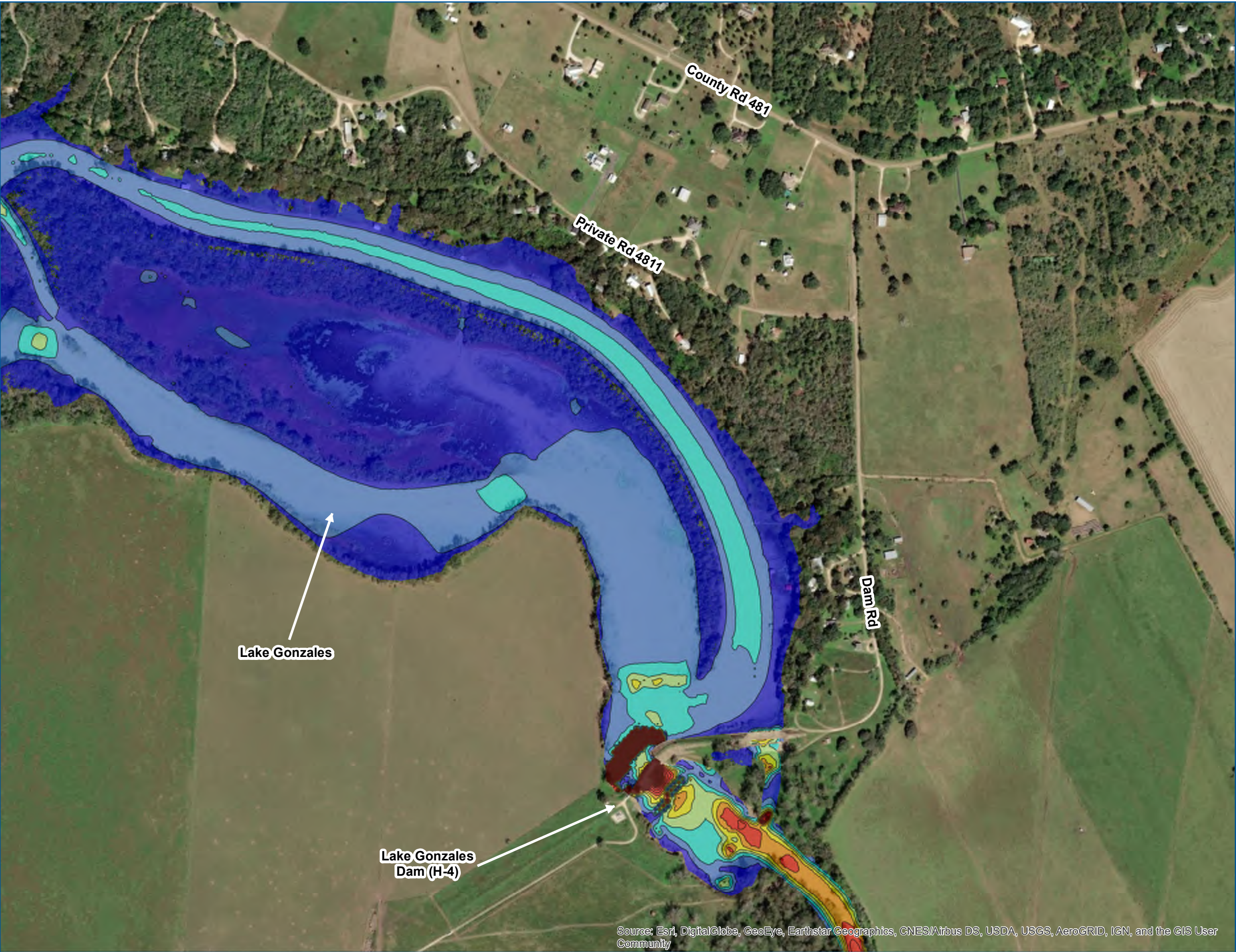
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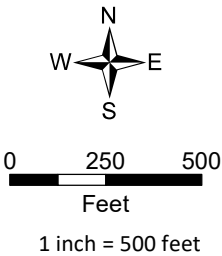
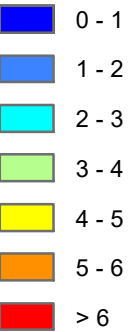
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**Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map**

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Velocity (ft/s)

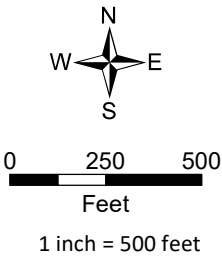
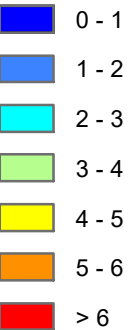


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Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map

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Velocity (ft/s)



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

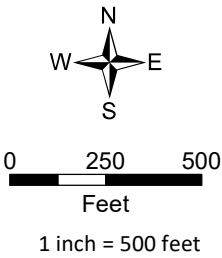


**Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map**

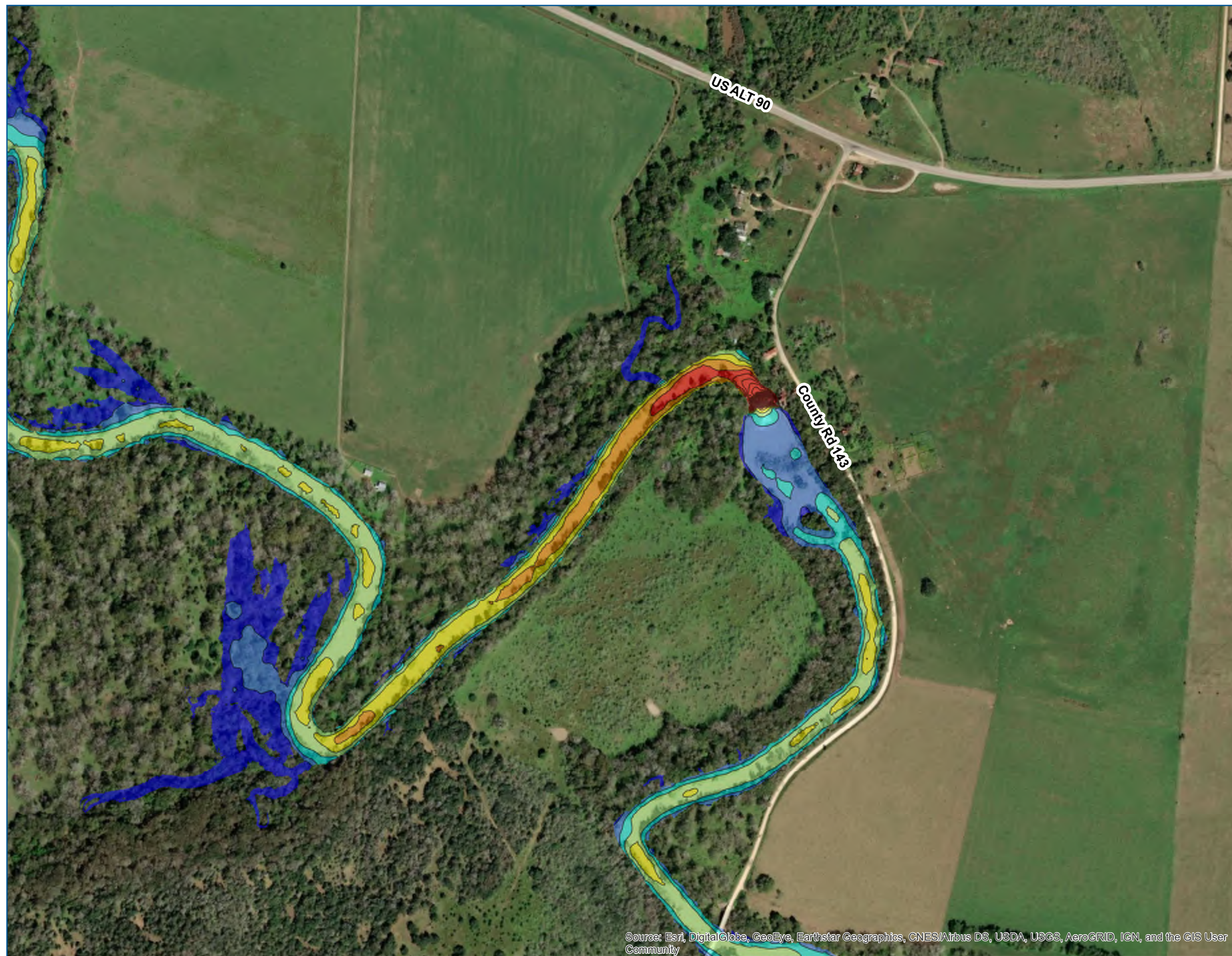
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Velocity (ft/s)

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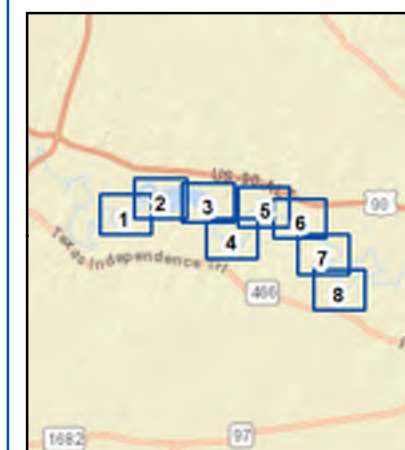
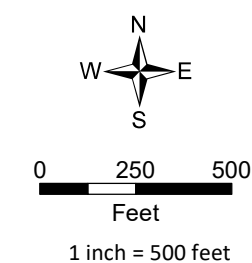
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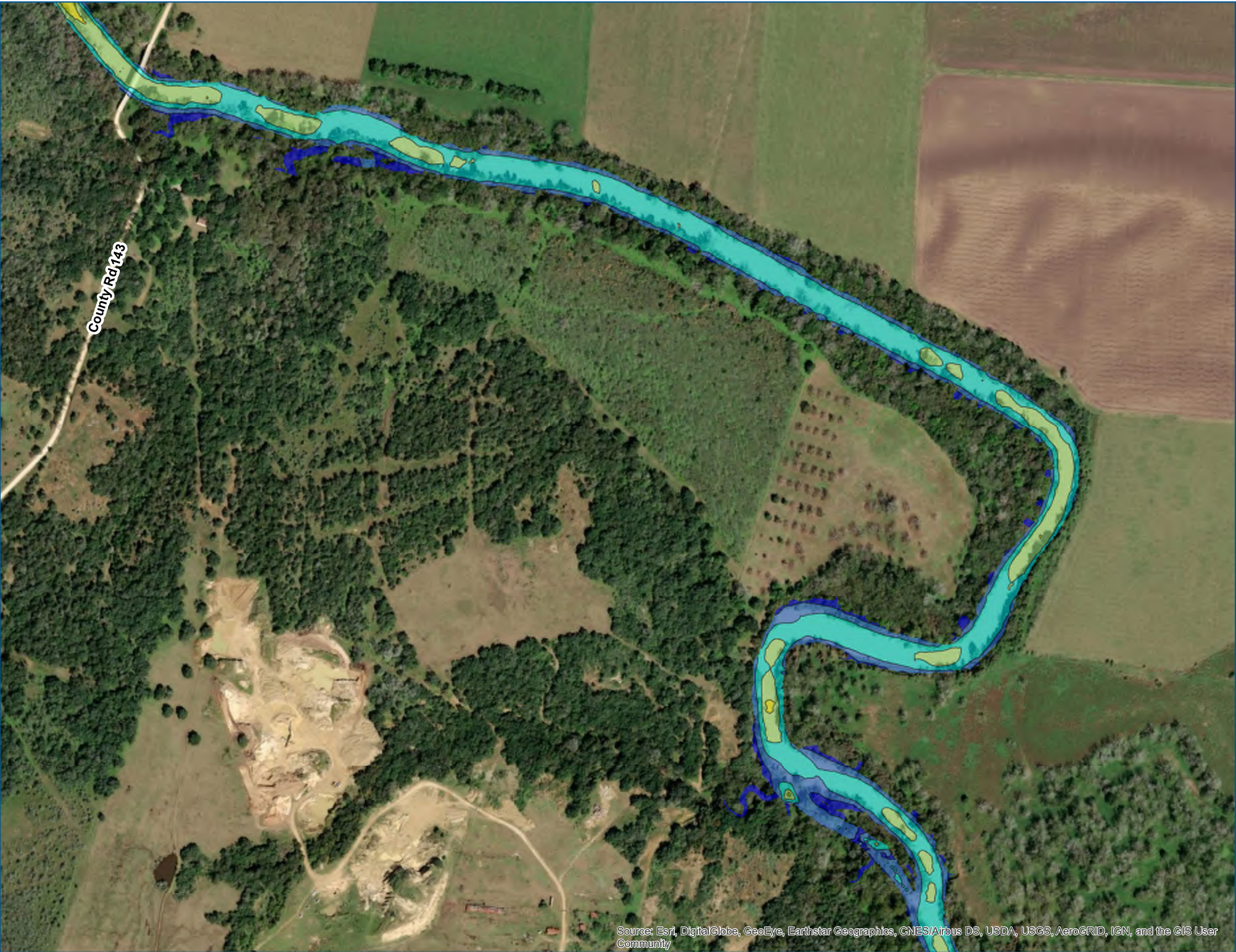


Lake Gonzales Dam (H-4) Dam Failure (1 Gate) Velocity Map

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Velocity (ft/s)



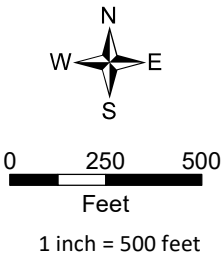


Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map

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Velocity (ft/s)

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- 1 - 2
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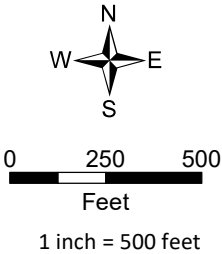


Lake Gonzales Dam (H-4)
Dam Failure (1 Gate)
Velocity Map

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Velocity (ft/s)

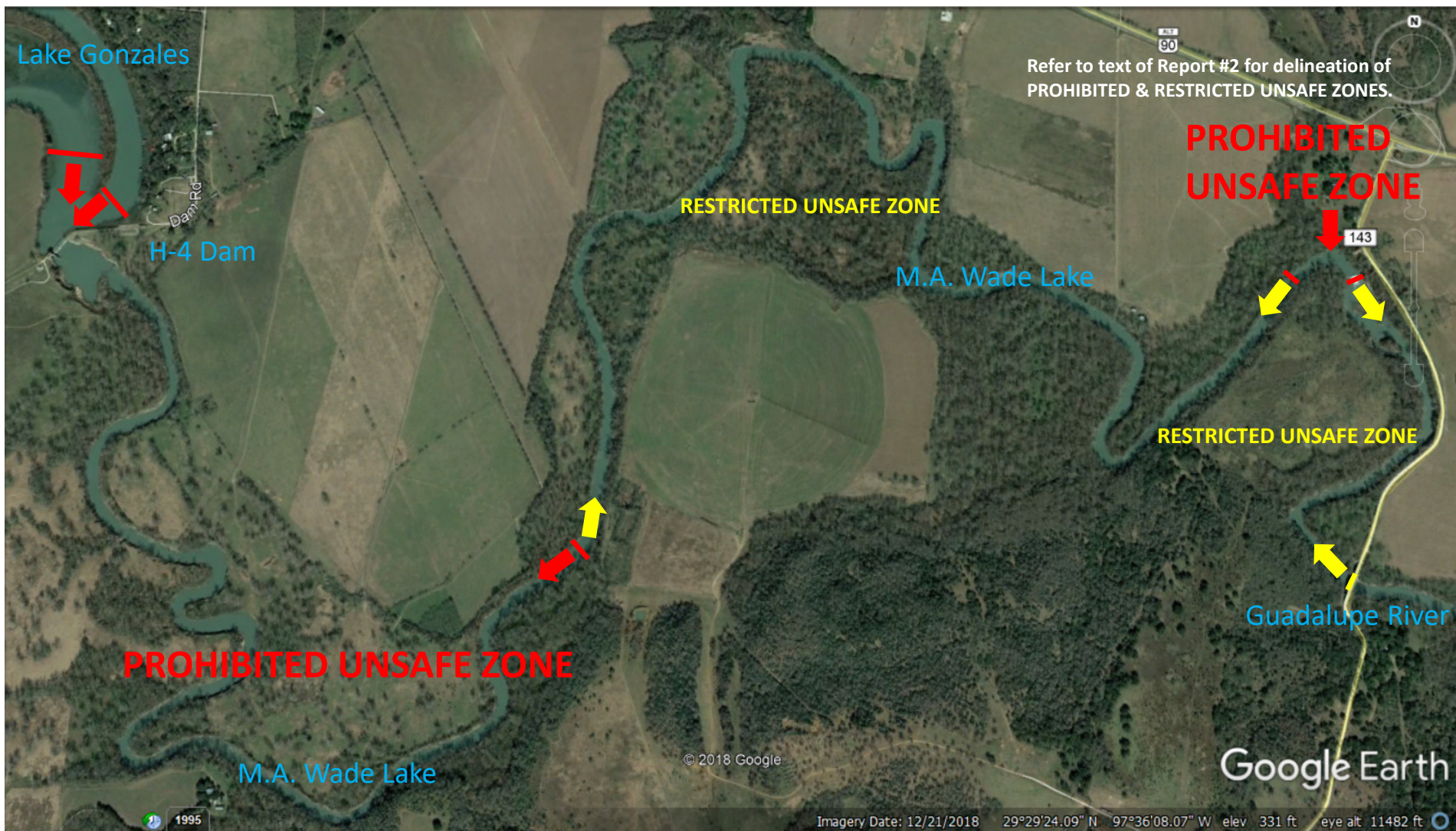
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Attachment B

Guadalupe Valley Lakes PROHIBITED UNSAFE ZONES



Attachment C

Guadalupe Valley Lakes RESTRICTED UNSAFE ZONES

