CLASS VI PERMIT EMERGENCY AND REMEDIAL RESPONSE PLAN

40 CFR 146.94(a)

SHELL U.S. POWER AND GAS
ST. HELENA PARISH SITE

Prepared By:
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Revision No. 0
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1.0 FACILITY INFORMATION

Facility Name: Shell U.S. Power & Gas – St. Helena Parish Site
Two Class VI Injection Wells

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Well Locations: SOTERRA IF 1-1
[redacted]

SOTERRA IT 2-1
[redacted]

In accordance with the requirements of 40 CFR 146.94(a), this Emergency and Remedial Response Plan (ERRP) describes actions that Shell U.S. Power and Gas (Shell) shall take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during the construction, operation, or post-injection site care periods. [1]

If Shell obtains evidence that the injected CO_2 stream and/or associated pressure front may cause an endangerment to a USDW, Shell will perform the following actions:

1. Initiate shutdown plan for the injection well(s).
2. Take all reasonable steps necessary to identify and characterize the nature of any release.
3. Notify the permitting agency (UIC Program Director) of the emergency event within 24 hours.
4. Implement applicable portions of the approved ERRP.

[1] Similar requirements exist in Louisiana Department of Natural Resources (LDNR) rules at LAC 43:XVII.3615.

Where the phrase “initiate shutdown plan” is used, the following protocol will be employed: Shell will immediately cease injection the affected well. However, in some circumstances, Shell will, in consultation with the UIC Program Director, determine whether gradual cessation of injection (using the parameters set forth in the Summary of Requirements of the Class VI permit) is appropriate.

2.0 LOCAL RESOURCES AND INFRASTRUCTURE

The Shell injection wells site is located [redacted] Louisiana, [redacted] The Amite River forms the western boundary and the Tickfaw flows along the eastern boundary of the parish. The population of the parish is 10,920 people, of which 1,018 people live in Greensburg (per the 2020 Census). It is one of the lowest populated parishes in Louisiana and encompasses 409 square miles, with approximately 200,000 acres that are utilized for the timber industry.

Natural Resources in the vicinity of the Shell St Helena Parish Site that may be affected as a result of an emergency event at the project site include:

- Local USDW impacts from groundwater wells.
- Surficial water bodies:
    - Amite River
    - Numerous seasonal creeks and ponds

These freshwater resources, which have been identified as being located within or proximal to the project site, have been determined to be at least 4,000 feet above the proposed subterranean injection reservoir targets. Although there is little likelihood that facility operations at the project site would negatively impact any of these freshwater resources at any point in time during the lifetime of these operations, the protection of these important resources is still considered of paramount importance and will be discussed throughout this ERRP.

Infrastructure in the vicinity of the Shell site that may be affected as a result of an emergency at the project site include:

- Louisiana Highways [redacted] - state highways for traffic in the vicinity of the site.

Resources and infrastructure addressed in this plan are shown in **Figure 1**.

3.0 POTENTIAL RISK SCENARIOS

The following sections details events that could potentially result in an emergency response during three phases of the project:

- During the construction phase of injection and monitor well(s);
- During the injection operation of the facility; and
- During post-injection and site closure operations.

3.1 CONSTRUCTION PHASE

Risks associated with the drilling and completion of the injection and monitoring wells are:

- Loss of drilling fluids to the USDW
- Well control event
- Potential migration of fluids between formations

Safety programs and training will be in place during the drilling and completion of injection and monitoring wells. A detailed Health, Safety, and Environmental (HSE) plan will be developed, along with selected vendors, to meet Occupational Safety and Health Act (OSHA) standards to safely perform the initial phase of project development. Every operator and contractor will have the right, obligation, authority, and responsibility to stop work or any action that is deemed unsafe or could negatively impact the environment.

3.2 INJECTION OPERATION PHASE

Risks associated with the injection operation phase of the project have been identified as follows:

- Loss of Mechanical Integrity of the Injection and Monitoring Wells
- Injection well monitoring equipment failure (*e.g.*, shut-off valve or pressure gauge, *etc*.)
- Potential vertical migration of CO_2 to a USDW (via injection well, monitoring well, artificial penetration, or geological defect)

- Potential lateral migration of CO_2 outside the defined Sequestration Complex and Area of Review (AoR)
- A natural disaster (*e.g.*, earthquake, tornado, hurricane, lightning strike)
- Induced seismic event

3.3 POST INJECTION SITE CARE AND CLOSURE PHASE

Risks associated with the Post Injection Site Care (PISC) and Site Closure, which consists of the monitoring of the CO_2 plume for a duration period set by the permit parameters have been identified as follows:

- Loss of Mechanical Integrity of monitoring wells
- Monitoring equipment failure
- Potential vertical migration of CO_2 to a USDW (through natural or manmade conduits)
- Potential lateral migration of CO_2 outside defined Sequestration Complex or AoR
- A natural disaster (*e.g.*, earthquake, tornado, hurricane, lightning strike)

3.4 DEGREES OF RISK

Response actions will depend on the severity of the event(s) triggering an emergency response. "Emergency events" are categorized and presented in **Table 1.**

Table 1: Degrees of Risk for Emergency Events

Emergency Condition	Definition
Major emergency	Event poses immediate substantial risk to human health, resources, or infrastructure. Emergency actions involving local authorities (evacuation or isolation of areas) should be initiated.
Serious emergency	Event poses potential serious (or significant) near term risk to human health, resources, or infrastructure if conditions worsen or no response actions taken.
Minor emergency	Event poses no immediate risk to human health, resources, or infrastructure.

Monitoring and alarm systems, managed by Shell, will provide notifications of a potential leak of CO_2 or formation fluids out of regulatory zones, from injection wells, and monitoring wells. Alarms will also be set to monitor injection parameters, mechanical well integrity, and the injection system integrity [40 CFR 146.88 (e)(2)]. If data shows that there is leakage from the storage complex or a mechanical well failure, the Shell will follow initial steps to assess the emergency risks as defined above. Secondly, the Shell will follow the actions identified below:

1. Shell will activate the emergency and remedial response protocol consistent with this ERRP and circumstances of the event.

2. The Environmental Protection Agency (EPA) Region 6 Underground Injection Control Program Director (UIC Program Director) will be notified within 24 hours of the event being discovered; and

3. The Louisiana Department of Natural Resources (LDNR) Underground Injection Control Program director (UIC Program Director) will be notified within 24 hours of the event being discovered.

The acting UIC Program Director in authority at the Federal or State level (depending on status of primacy for Class VI programs) may allow the operator to resume injection prior to remediation if the storage operator demonstrates that the injection operation will not endanger USDWs.

4.0 EMERGENCY IDENTIFICATION AND RESPONSE ACTION

Steps to identify and characterize the event will be dependent on the specific issue identified and the severity of the event. The potential risk scenarios are based upon construction, operation, and closure activities associated with the lifetime of the project. The potential risks are identified in **Table 2** and discussed in the following sections. Impact severity is based upon the definitions in **Table 1**. Risk likelihood is based upon experience in well drilling, operation, and maintenance in other classes of injection wells.

Table 2: Potential Risks and Detection

Potential Emergency Event	Location	Phase*	Impact Severity	Likelihood	Detection
4.1 Contamination of USDW with Drilling Fluids	Wellbore	C	Minor	Very Unlikely	Loss of circulation while drilling
4.2 Well Control Event	Well	C	Serious to Major	Very Unlikely	Unexpected changes in well fluid levels occur while drilling. Leakage of Hazardous Gases from Formations
4.3 Injection Well Integrity Failure	Casing, annulus, tubing, or packer	I	Minor	Unlikely	Loss in annulus fluid pressure, tubing pressure, injection rate changes
4.4 Injection Well Monitoring Equipment Failure	Wellhead, downhole gauges	I	Minor to Serious	Unlikely	Failure of one or more parameter monitoring equipment
4.5 Potential Injectate Leakage to a USDW	Well or AoR	I, PI	Minor to Serious	Very Unlikely	Elevated concentrations in monitoring well. Temperature survey vertical profile anomalies.
4.6 Induced Seismicity	Well or AoR	I,	Minor to Serious	Unlikely	Public Seismograph monitoring from the USGS NEIC database
4.7 Natural Disaster	Well or AoR	I, PI	Minor to Major	Unlikely	Local News Updates, Websites/Software that track natural (hurricane) disaster

Note: C = Construction Period, I = Injection Phase and PI = Post Injection Period

4.1 CONTAMINATION OF USDW WITH DRILLING FLUIDS

During the construction phase, there is a low risk of potential drilling fluids contaminating a USDW due to crossflow and losses into the formation. Losses will be monitored during all phases of the drilling of the injection well. The surface hole will be drilled using a water-based mud system to protect the formation above, across, and directly beneath the USDW. Best practice drilling methods and procedures will be employed to limit a potential leakage event. Monitoring parameters such as tank levels, flow rate, and flow pressures will lead to a first detection response should an event occur.

The surface casing will be set into an impermeable layer at depths greater than the lowermost USDW. The surface casing will then be cemented to surface [per 40 CFR 146.86(b)(2)], and the cement integrity will be verified through a cement bond log (CBL) prior to proceeding to the next phase of drilling. This will protect and isolate the USDW's from potential contamination during the deeper drilling phases and the injection operations.

4.1.1 Impact Severity and Risk

The potential risk of contamination of a USDW due to the drilling and construction of the wells is considered low. This is based on the long history and regulatory requirements of setting surface casing safely and using water base mud systems in drilling the surface hole. However, if there is a documented release, the impact would be considered a minor emergency event, as the release will not pose an immediate risk to human health, resources, or infrastructure. At the first detection of a potential event, drilling operations will cease and the situation will be evaluated for an applicable potential response.

4.1.2 Potential Response Actions

In the very unlikely event of a release to a USDW during the drilling operations, for the surface hole (prior to setting the surface casing string and cementing to surface) the following steps will be undertaken:

1. Cease all drilling operations and assess fluid levels in wellbore.
2. Evaluate the drilling parameters, tank levels, and flow lines.
3. Determine amount of potential fluid losses and at what specific depth.

4. Treat mud with lost circulation materials and adjust mud weight to allow for continuation of drilling operations.
5. Check for leaks in casing and at the casing shoe. IF detected squeeze/patch identified defect.
6. Verify integrity of cement with additional CBL run(s), if required.

If a leak is detected in the casing, it will be squeezed with additional cement or patched, cement integrity will then be re-affirmed prior to resuming drilling operations.

Next phase of drilling operations will only commence once the surface casing and cement job shows integrity. The casing shoe of the surface casing will undergo a pressure test to verify the integrity before proceeding to the next phase of drilling.

4.1.3 Response Personnel and Equipment

The personnel responsible for monitoring and detection will be the rig crew, rig chief, and company man. These personnel will notify the project supervisor to initiate the first step of the response plan, which is to immediately cease all drilling operations. The tank levels, and pressure and flow meters will be checked and recalibrated if required.

4.2 WELL CONTROL EVENT

During the construction phase if there is a well control event while drilling, it could potentially allow the movement of formation fluids from one zone to another. This would be a result of the formation pressure being greater than the hydrostatic mud column keeping the well in an overbalanced condition (*i.e.*, a well kick or losses).

4.2.1 Impact Severity and Risk

The severity of this type of event is low if properly and immediately handled but can be considered serious to major if the well gets out of control and presents an impact to human health and infrastructure. The risk of this type of event occurring at the Shell St. Helena Parish Site is considered low, or very unlikely. Local well records detailing drilling, completion, and formation details are available for the area immediately surrounding the injection wells. These have been used to evaluate and design the well construction plans for the injection and monitor wells. The top of overpressure is located at a depth below the base of sequestration complex and is not

expected to be an issue in well planning. Formation pressures will be evaluated during the drilling of the different stages of the injection well as a safety precaution. Therefore a "Best Practices" approach can be applied to the drilling methods and procedures for the project wells. The intermediate casing string (across the injection zone) will be cemented to surface in accordance with 40 CFR 146.86(b)(3).

During drilling, the flow, volume, and pressure of the drilling fluid will be closely monitored as well as fluid tank levels and circulation rates. Mud weight control will also be utilized in order to prevent the movement of fluid or gases across zones and reduce the potential of loss of well control (kick or blowout). Monitoring during drilling will include:

1. Flow sensor
2. Pressure sensor
3. Tank level indicator
4. Tripping displacement practices (as per industry drilling operational procedures)
5. Mud weight control

Controls in place to remediate such an event include the following:

1. Install blowout prevention equipment (BOP)
2. Kill fluid
3. Well control training (as per the drilling company practices and protocols)
4. BOP testing protocol (per manufacturer specifications and state requirements)

These project controls have been demonstrated to be effective for drilling wells in the area.

4.2.2 Response Actions

If a Well Control event occurs, the following response actions will be taken:

1. Cease all drilling operations and assess fluid levels in wellbore.
2. Close the BOP.
3. Secure the rig floor and surrounding rig area.
4. Initiate the Well Control Procedures by certified well control event personnel.
5. Evaluate the drilling parameters.

6. Verify cause of the problem and risk to human health.
7. Adjust mud weight to suppress movement of formation fluid or gases.

4.2.3 Response Personnel and Equipment

In addition to the above steps, if a major event occurs, the site will be evacuated, and emergency response personnel (identified in Section 5.0) will be contacted. The emergency communication plan in Section 6.0 will also be enacted. The cause of the event will only be evaluated after the site has been secured and poses no immediate threat to human health and life.

The initial personnel responsible for monitoring and detection will be the rig crew, driller, rig tool-pusher, and the company man. If a well control event occurs, the personnel will notify the project supervisor to initiate the first step of the response plan, which is to immediately cease all drilling operations. The tank levels, and pressure and flow meters will be checked and recalibrated if required.

4.3 INJECTION WELL INTEGRITY FAILURE

Integrity loss of the injection well during active injection may endanger USDWs. Integrity loss can occur if the following events transpire:

1. Wellhead pressure deviates from specified pressures limits set in the permit;
2. Annulus pressure indicates a loss of external or internal well integrity; or
3. An annual mechanical integrity test (MIT) identifies a loss of mechanical integrity.

Well failure can be a result of either a tubing or packer failure, casing failure, or cement degradation from corrosion/erosion due to CO_2 exposure. Automatic alarm and automatic shutoff systems will be designed and installed to sound if the injection well loses integrity during operation per 40 CFR 146.88(e)(2).

Pursuant to 40 CFR 146.91(c)(3), Shell will notify the UIC Program Director within 24 hours of any triggering of a shut-off system (*i.e.*, down-hole or at the surface).

4.3.1 Impact Severity and Risk

The potential risk of well integrity failure is low. Mechanical integrity of the well will be demonstrated annually using annulus pressure tests (APT) and approved logs (*e.g.* differential temperature survey). Additionally, the annulus system will be continuously monitored to detect for potential loss of integrity. Detection would also be immediate for any changes in pressures or flow rates into the well. Automatic alarm and shutoff systems will be set to sound in the event of loss of integrity, notifying Shell operations personnel immediately. With detection systems in place, the severity and impact of an incident is expected to be minor. Therefore, it is expected that a loss in well integrity will not provide an imminent risk to human health, resources, or infrastructure.

4.3.2 Response Actions

If it is determined that the injection well(s) has experienced a loss of mechanical integrity, either by unexplained deviations observed during continuous monitoring or during annual MIT, Shell will:

1. Immediately cease injection operations to the affected well(s) (if not already triggered by automatic shut off).
2. Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
3. Determine the severity of the event, based on the information available, within 24 hours of notification.

If a loss of mechanical integrity is determined to have occurred, Shell will initiate additional steps identified below:

1. Initiate shutdown plan, which will cut off injection operations to the affected well(s).
2. If contamination is detected, the facility will identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
3. Run well diagnostics to determine point of leak(s).

4. Perform remedial well workover on the well to reestablish Mechanical Integrity (in consultation with the UIC Program Director).

Once a solution, remedy, or course of action has been determined, Shell will:

1. Notify the UIC Program director of the course of action to remediate the well and restore the mechanical integrity.

2. Await verification of remediation plans from the UIC Director to proceed.

3. Restore and demonstrate mechanical integrity to the satisfaction of the UIC Program Director prior to resuming injection operations.

4.3.3 Response Personnel and Equipment

The initial personnel responsible for monitoring well integrity will be site personnel involved with the well operations, the Site Manager, and the facility's Environmental Health and Safety Manager. If well integrity has been lost, additional personnel such as engineering and remediation specialists will be consulted to determine the extent of the problem and establish a remedial path/solution. Equipment involved will likely range from use of wireline investigative tools, pressure testing gauges, and hoses, to potentially replacing failed surface and downhole equipment.

4.4 INJECTION WELL MONITORING EQUIPMENT FAILURE

Shell will install and use continuous recording devices to monitor injection pressure, rate, and volume; the pressure on the annulus between the tubing and the long string casing; the annulus fluid volume added; and the temperature of the CO_2 stream, as required at 40 CFR 146.88(e)(1), 146.89(b), and 146.90(b). The failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure may indicate a problem with the injection well that could endanger USDWs. Monitoring equipment will be tied to an automatic alarm system. These alarm systems will have limits set by Shell for each of the required parameters outlined above. As a limit is approached, Shell will be notified, and in some cases the automatic system may trigger an automatic shutdown. The well alarms and shutdown limits will be periodically evaluated based upon the operating history and the values may be adjusted as deemed appropriate. When an alarm sounds, Shell will evaluate the cause of the alarm/shut down and take appropriate action to protect human health and the environment dependent on the impact severity.

4.4.1 Impact Severity and Risk

The potential risk of failure of one or more monitoring components is dependent on maintenance and calibration of the equipment. Shell will have a routine inspection and calibration schedule designed for all injection well operations. The risk of equipment failure is low. The impact severity is also low as a monitoring equipment failure will not provide an immediate risk to human health, or infrastructure. A failure would halt injection operations for the facility.

4.4.2 Response Actions

If a component of the monitoring system fails, the following response actions will be performed:

1. Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
2. Determine the severity of the event, based on the information available, within 24 hours of notification.

After the initial assessment, Shell will:

1. Initiate shutdown plan and cease injection to the affected well(s).

2. Identify the monitoring equipment that alerted the system.
3. Verify that it is an equipment failure only. IF it is determined that there has been a loss of well integrity, follow procedures in Section 4.3 of this plan as well.
4. Check calibration of the equipment and run a diagnostic on the equipment per manufacturers specifications.
5. Repair and recalibrate the equipment or replace with new equipment of similar or better design.
6. Validate and demonstrate that the equipment is back online and has continuous monitoring capabilities.
7. Resume injection operations once monitoring system has been corrected and fully online.

4.4.3 Response Personnel and Equipment

The personnel responsible for response will be those involved with the well operations, the Site Manager, and the facility's Environmental Health and Safety Manager. Equipment involved will range from pressure gauges, wellhead and line connections, and other computer/digital components.

4.5 POTENTIAL INJECTATE LEAKAGE TO A USDW DURING OPERATIONS

Vertical migration of CO_2 could potentially occur via an injection well, a monitoring well, through defects in the confining zone, or artificial penetrations acting as conduits within the AoR (legacy wells).

Detection of potential movement of CO_2 out of the authorized injection zones will occur through a combination of surface and downhole sensors/gauges set within the in-zone and above confining zone monitoring (ACZM) wells. This strategy is intended as the first detection method by monitoring the saline formations directly above the primary confining zone (Miocene-aged formation) that are not part of the authorized sequestration complex. Unexpected changes in temperature and pressures may then trigger periodic adaptive groundwater sampling of the Miocene formation. See "*E.1 - Testing and Monitoring Plan* " (TMP), which has been submitted

in **Module E** for detection specifics, for an assessment against pre-injection data and other monitoring data on whether there has been loss of containment or not.

If anomalies of an indicator parameter(s) in groundwater sample(s) or other evidence of CO_2 leakage into a USDW are detected during any groundwater sampling event, these will be investigated to assess whether they are related to project operations/performance.

4.5.1 Impact Severity and Risk

Significant monitoring controls are in place to reduce the potential risk of CO_2 leakage to a USDW. In the injection wells, all casing strings will be cemented to surface [40 CFR 146.86(b)(2)], with the surface casing set below the lowermost USDW. Additionally, all long string casings will be cemented to surface. The cement used across each of the identified injection zones (Frio, Wilcox, and Lower Tuscaloosa) will be comprised of a CO_2 resistant cement. There are no faults or fractures within the delineated AoR that could act as conduits, which reduces the potential for vertical migration. Additionally, legacy wells (artificial penetrations) located within the expected plume radius have been evaluated for corrective action plans (see "*Area of Review and Corrective Action Plan*" submitted in **Module B)**. Other legacy wells are located even further away and are less likely to be risks as they are outside the delineated AoR.

4.5.2 Response Actions

If leakage of the CO_2 towards the USDW is detected through a legacy or monitoring well, the following initial steps will be performed:

1. Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
2. Determine the severity of the event, based on the information available, within 24 hours of notification.

After the initial assessment, Shell will:

1. Initiate a shutdown plan and cease injection to the affected well(s).
2. Identify the point of potential leakage. Potential sources to be checked are:
    a. Injection Wells

b. Monitoring Wells

c. Legacy Wells within the AoR

3. Initiate the sampling program for the above confining zone monitoring well (ACZM well) to confirm leakage out of authorized zone.
4. Adaptive sampling of groundwater from the local USDW, if downhole pressure and temperature limits are exceeded in a monitoring well.
5. If the presence of indicator parameters is confirmed, Shell will develop (in consultation with the UIC Program Director) a case-specific work plan to:
    - Install additional groundwater monitoring points near the affected groundwater well(s) to delineate the extent of impact as required; and
    - Remediate unacceptable impacts to the affected USDW.
6. Within 24 hours of a release into the USDW, Shell will notify the local health authority, place a notice in a newspaper of general circulation, and notify adjacent landowners.
7. Arrange for an alternate potable water supply, if the USDW was being utilized and evidence indicates that constituents exceed drinking water standards.
8. Proceed with efforts to assess remediation needs for USDW to mitigate any unsafe conditions, using concepts developed for risk assessment, remedial alternative analysis, and remedial action plans as needed.
9. Continue (if necessary) groundwater remediation and monitoring on an adaptive basis (frequency to be determined by Shell and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.

4.5.3 Response Personnel and Equipment

The responsible parties will be the site personnel involved with the well operations, the Site Manager, and the facility's Environmental Health and Safety Manager. Additionally, as needed, the project manager, technical consultants, remediation experts, and local health authority will be engaged.

Equipment involved will be dependent on the details of the leak and outcome of its assessment. This could range from workover rigs, additional cement, gauges, hoes, pipes, pumps, *etc*.

4.6 INDUCED SEISMICITY

Based on the project operating conditions, the very low risk of natural seismicity, and the absence of faults within the AoR, it is highly unlikely that injection operations would ever induce a seismic event within a 6-mile radius from the wellhead. Therefore, this portion of the response plan is developed for any detectable seismic event with an epicenter within a 6-mile radius of the injection well(s).

To monitor the area for seismicity, information from the USGS Earthquake Hazards Program will be periodically reviewed. In the event of a detected seismic event within a 6-mile radius of the injection site, data from the USGS Earthquake Hazards Program will be immediately accessed, reviewed and the recorded depth and epicenter location will be compared to this project's operating parameters.

A site-specific, real-time plan to monitor, assess, control, and mitigate the risks associated with induced seismicity during and after fluid injection will then be necessary. The framework of the risk-based mitigation plan should be based on a traffic light system (TLS) (See **Figure 2** from *Templeton et al, 2022*), which can provide clear and direct actions to take in response to given situations according to predetermined criteria.

4.7 NATURAL DISASTER

Well problems (integrity loss, leakage, or malfunction) may arise as a result of a natural disaster affecting the normal operation of the injection well. An earthquake may disturb surface and/or subsurface facilities; and weather-related disasters (*e.g.*, tornado, hurricane, flooding, severe storms, forest fire, freezes, or lightning strike) may affect operations of the surface and monitoring facilities. Note that the Shell St. Helena Parish Site is located in one of the lowest seismic risk areas for the United States. Any known or possible major faults or fractures are outside the AoR and have been evaluated for pressure induced stability changes which indicates reactivation due to injection activities is highly unlikely. In accordance routine sequestration operations will be performed at low injection rates and injection pressures will remain at /or below 90% of the formation fracture gradients. Therefore, a natural or induced seismic event is highly unlikely. Detailed information on the seismicity of Louisiana and the local area is contained within the "*Project Narrative Rep*ort: *Section 2.5 - Seismicity*" submitted in **Module A**.

A potential natural disaster related to severe weather (tornadoes, flooding, freezing, forest fire, storms) could have an impact on the normal operation and access to the injection and monitoring wells.

4.7.1 Impact Severity and Risk

The impact severity may range from minor to a major event for all natural disaster events. The severity of the resulting event will be dependent on the type, and cause of the natural disaster. Potential severity may limit access to the injection wells in a safe and secure manner for personnel.

St. Helena Parish has a Hazard Mitigation Plan developed in 2021 (**Appendix 1**) which outlines the potential / risk for natural disasters such as: flooding, strong storms (hail, lightning, wind), tornadoes, cyclones/hurricanes, wildfires, winter weather (freezes). Since 1965, the report shows that the prominent natural disasters to occur for the Parish are related to cyclones and severe strong storms. **Table 3** identifies the probability of natural disasters of concern for St. Helena Parish:

Table 3: Natural Disasters and Potential Risks in St. Helena Parish

HAZARD	Probability		
	St. Helena Parish (unincorporated)	Greensburg	Montpelier
Flooding	17%	7%	7%
Thunderstorm (Hail)	40%	40%	40%
Thunderstorm (Lightning)	<1%	<1%	<1%
Thunderstorm (Wind)	100%	100%	100%
Tornadoes	40%	40%	40%
Tropical Cyclones	36%	36%	36%
Wildfires	<1%	<1%	<1%
Winter Weather (freeze)	10%	10%	10%

Ref: Table 2-3: Probability of Future Hazard Reoccurrence (page 4) of the St. Helena Parish Hazard Mitigation Plan 2021

4.7.2 Response Actions

Regardless of the level of severity, the following initial responses will be taken:

1. Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
2. Determine the severity of the event (minor, serious, or major), based on the information available, within 24 hours of notification.
3. Evaluate and determine if access to the injection wells at a risk to personnel safety.

Once a severity level has been determined, additional response actions will be taken. See the following subsections.

4.7.2.1 Major or Serious Emergency

1. Initiate the shutdown plan and cease injection to the well(s).
2. Check for additional hazardous conditions that may have resulted from the natural disaster.
3. Determine the accessibility to the injection well(s) and monitor well(s).

4. Perform safety checks for all personnel regarding hazards.
    a. If the site poses an immediate threat to human life or safety, evacuate the site to pre-determined muster points. Contact emergency personnel if warranted (911). Wait until the immediate threat has passed to evaluate damage and develop remedial procedures with UIC Director and local response personnel.
    b. If the site is accessible safely, secure the injection well(s)/monitor well(s) and the surrounding area. Evaluate the damage to the well(s) and to the environment and develop a procedure to remediate with the UIC Director.
    c. If contamination or potential for endangerment is detected, identify, and implement appropriate remedial actions (in consultation with the UIC Program Director), if the site conditions are safe for personnel.
5. Notify local health authority and first responders if the event and conditions pose a threat to the safety of the community.

Once a solution, remedy, or course of action has been determined, Shell will:

1. Notify the UIC Program Director regarding when injection can be expected to resume.
2. Will restore and demonstrate mechanical integrity to the satisfaction of the UIC Program Director prior to resuming injection operations.

4.7.2.2 Minor Emergency

1. Conduct assessment to determine whether there has been a loss of mechanical integrity because of a natural disaster.
2. If there has been a loss of mechanical integrity, initiate shutdown plan and follow steps outlined in Section 4.3.1 of this plan.

Once a solution, remedy, or course of action has been determined, Shell will:

1. Notify the UIC Program Director regarding when injection can be expected to resume.
2. Will restore and demonstrate mechanical integrity to the satisfaction of the UIC Program Director prior to resuming injection operations.

4.7.3 Response Personnel and Equipment

Response personnel will be dependent on severity of the event. At a minimum (minor event level) the following will be contacted:

- Injection well operator on duty
- Facility Manager
- All facility personnel
- Project Manager
- Remediation contractors

If the event is serious to major, response personnel may also include:

- Local/State police
- Fire Department
- Federal Response Personnel
- Disaster specific response teams

A listing of all potential response personnel for the public is contained in the following section.

5.0 OVERALL RESPONSE PERSONNEL AND EQUIPMENT

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP.

Site personnel to be notified (not listed in order of notification):

1. Project Engineer(s)
2. Site Safety Manager(s)
3. Environmental Manager(s)
4. Site Manager
5. Site Superintendent

A site-specific emergency contact list will be developed and maintained during the life of the project. Shell will provide the current site-specific emergency contact list in **Table 4** to the UIC Program Director.

Table 4: Contact Information for Key Local, State, and Other Authorities

Agency	Authority or Location	Phone Number
Local Police	Greensburg Police Department	911 or (225) 222-4312
Local Fire	St Helena Parish Fire Department	911 or (225) 222-4723
Local Hospital	St Helena Parish Hospital and Nursing Home	911 or (225) 222-6111
Sheriff	St Helena Parish Sheriff's Office	911 or (225) 222-4549
State Police	Louisiana State Police (Troop L)	911 or (985) 893-6252
State Emergency Management Agency	GOHSEP (Governor's Office of Homeland Security and Emergency Management)	(225) 925-7525
Environmental Services Contractor	Vendor to be determined	--
LDNR UIC Program Director	Baton Rouge, Louisiana	(225) 342-5569
EPA Region 6 UIC Class VI Director	Dallas, Texas	(214) 665-7150
EPA National Response Center (24 hours)	--	(800) 424-8802
Louisiana State Geological Survey	Baton Rouge, Louisiana	(225) 578-5320

Equipment needed in the event of an emergency and remedial response will vary, depending on the triggering of the emergency event. Response actions (cessation of injection, well shut-in, and evacuation) will generally not require specialized equipment to implement. Where specialized equipment (such as a drilling rig or logging equipment) is required, Shell shall be responsible for its procurement.

6.0 EMERGENCY COMMUNICATIONS PLAN

Shell will communicate to the public about any event that requires an emergency response. This will ensure that the public understands what happened and whether there are any environmental or safety implications. The amount of information, timing, and communications method(s) will be appropriate to the event, its severity, whether any impacts to drinking water or other environmental resources occurred, any impacts to the surrounding community, and their awareness of the event.

Shell will describe what happened, when it occurred, any impacts to the environment or other local resources, how the event was investigated, what responses were taken, and the status of the response. For responses that occur over the long-term (*e.g.*, ongoing cleanups), Shell will provide periodic updates on the progress of the response action(s).

Shell will also communicate with entities who may need to be informed about or act in response to the event, including local water systems, CO_2 source(s) and pipeline operators, landowners, and Regional Response Teams (as part of the National Response Team). Additional agencies will be contacted if affected.

An emergency contact list will be maintained for the lifetime of the project (Construction, Operation, and Closure). The contact list will be comprised of all facility management and essential personnel that will be activated in case of an event. One person will be designated by the facility to handle all points of communication with the public.

Prior to commencement of CO_2 injection operations, Shell will notify the adjacent landowners to the sequestration project site. The notification will provide information regarding the nature of operations, potential risks, and the response plans. The notification will also contain a contact list for the St. Helena Parish project.

7.0 PLAN REVIEW PROCESS

This ERRP shall be reviewed:

- At least once every five (5) years following its approval by the permitting agency;
- Within one (1) year of any AOR re-evaluation;
- Within one (1) year following any significant changes to the injection process or the injection facility, or an emergency event; or
- As required by the permitting agency.

If the review indicates that no amendments to the ERRP are necessary, Shell will provide the permitting agency with the documentation supporting the "no amendment necessary" determination.

If the review indicates that amendments to the ERRP are necessary, amendments shall be made and submitted to the permitting agency within a reasonable timeframe to be agreed upon with all affected parties and authorized regulatory bodies following an event that initiates the ERRP review procedure.

8.0 STAFF TRAINING AND EXERCISE PROCEDURES

Shell will develop a training plan (with manual) for all facility employees. The manual will be developed in alignment with standards set forth by OSHA. Training will be provided to all personnel that will be involved with the injection wells, the monitoring wells, the monitoring systems, and the surface facility systems. Training will be periodic and completed an annual basis (at a minimum). Drill procedures will be developed with and updated along with project status and targeted to all personnel and guests that will be onsite during any phase of project operations.

All personnel will be required to wear personal protective equipment (PPE) for the project site. The minimum PPE that will be required while onsite will apply to all personnel, contractors, and visitors: It will consist of the following:

- Hard hats
- Safety glasses
- Protective footwear (safety boots)

The specific training, required PPE, and exercise plan will be finalized once the project is ready to be online. All personnel will be trained prior to all operations commencing at the St. Helena Parish site. Personnel will also have intermittent re-training and refresher courses over the life of the project. Some roles will require annual, or semi-annual, updates to their training program (to be identified per roles once established).

REFFERENCES

Templeton, D. C., M. Schoenball, C. E. Layland-Bachmann, W. Foxall, Y. Guglielmi, K. A. Kroll, J. A. Burghardt, R. Dilmore, and J. A. White, 2022, A Project Lifetime Approach to the Management of Induced Seismicity Risk at Geologic Carbon Storage Sites, Seismol. Res. Lett. XX, 1–10, doi: 10.1785/0220210284

Figures

THIS FIGURE HAS BEEN SUBMITTED CONFIDENTIAL BUSINESS

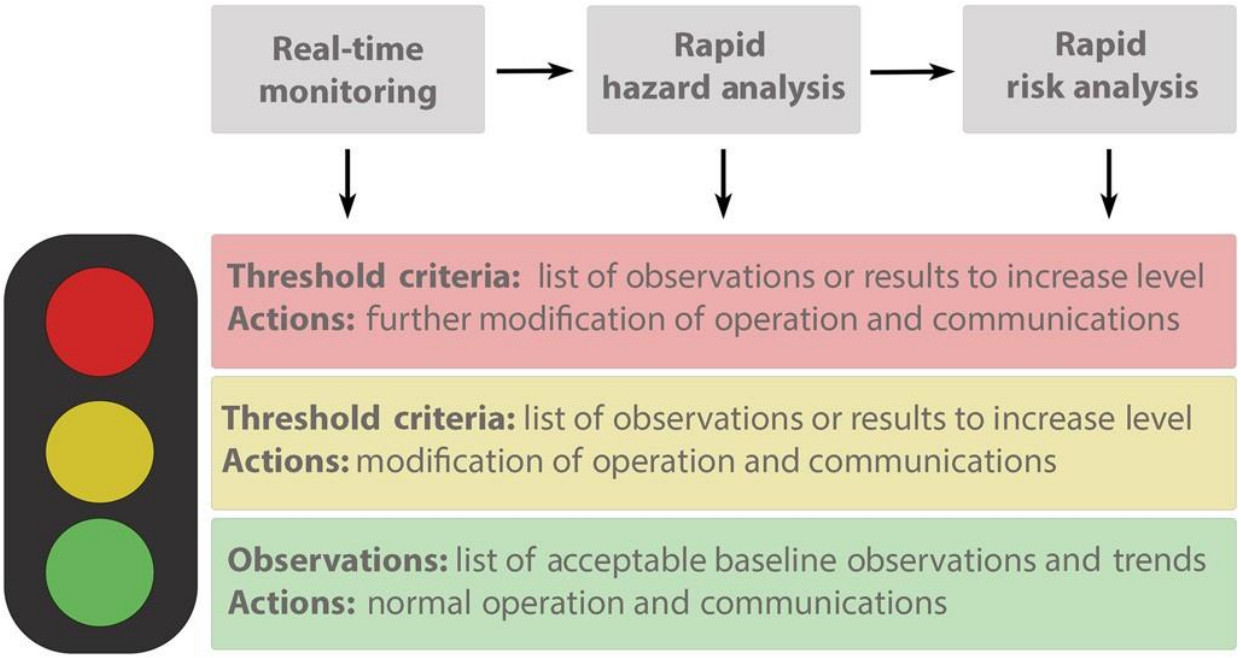
SHELL US GAS & POWER, LLC

FIGURE 1: Locations of Resources and Infrastructure near the St. Helena Parish Site

ST. HELENA PARISH, LOUISIANA

GEODETIC DATUM: NAD27 SP LA S PROJECTION: LAMBERS CONFORMAL CONIC GRID UNITS: FEET		SCALE INFO: (IF APPLICABLE)	
DATE: 11/22/2022	PROJECT NAME: 220017SEL	BY: GKS CHECK BY: SHELL	SHEET 1 OF 1

Geostock Sandia



Example adaptive traffic light system. Real time seismic, hydraulic, and operational monitoring can either directly increase the response level or indirectly help inform rapid hazard and risk analyses that may prompt a change in response level due to updated results. The color version of this figure is available only in the electronic edition.

Figure 2 Induced Seismic Risk Traffic Light System (from Templeton et al., 2022)

Appendix 1

St Helena Parish
2021 Hazard Mitigation Plan

St. Helena Parish

Multi-Jurisdiction Hazard Mitigation Plan Update

2021

ST HELENA PARISH
MULTI-JURISDICTIONAL
HAZARD MITIGATION PLAN UPDATE

Prepared for:

St Helena Parish

Prepared by:

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ACKNOWLEDGMENTS

This 2021 St Helena Parish Hazard Mitigation Plan Update was coordinated by the St Helena Parish Hazard Mitigation Plan Update Steering Committee, in collaboration with community stakeholders and the general public. The participating jurisdictions are made up of the following communities:

Unincorporated St Helena Parish
Town of Greensburg
Village of Montpelier

Special thanks is directed to all of those who assisted in contributing their expertise and feedback on this document, especially the St Helena Parish Office of Homeland Security and Emergency Management. These combined efforts have made this project possible. The St Helena Parish Steering Committee consists of the following individuals, who are credited in the creation of this document:

Roderick Matthews	St Helena Parish Police Jury
Toni Melton	St Helena Parish Police Jury
Albert Franklin	St Helena Parish Police Jury
Teresa Boyd	St Helena Parish Police Jury
Sharonda Brown	St Helena Parish Police Jury
Frank Johnson	St Helena Parish Police Jury
Paula McNabb	Town of Greensburg
Kenneth Giardinia	Village of Montpelier
Donald Langston	Town of Greensburg
Kenny Smith	Pine Grove VFD District 2

The 2021 St Helena Parish Hazard Mitigation Plan Update was written by the Stephenson Disaster Management Institute, Louisiana State University. Further comments should be directed to the St Helena Parish Office of Homeland Security and Emergency Preparedness: 17911 LA-43, Greensburg, LA 70441.

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Contents

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1. Introduction

Hazard Mitigation is defined as sustained actions taken to reduce or eliminate long-term risk from hazards and their effects. Hazard Mitigation Planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies that would lessen the impacts are determined, prioritized, and implemented.

In that regard, this plan (a) documents the St Helena Parish Hazard Mitigation Plan Update (HMPU) process; (b) identifies natural hazards and risks within the parish; and (c) identifies the parish's hazard mitigation strategy to make St Helena Parish less vulnerable and more disaster resilient. It also includes mitigation project scoping to further identify scopes of work, funding sources, and implementation timing requirements of proposed selected mitigation projects. Information in the plan will be used to help guide and coordinate mitigation and local policy decisions affecting future land use.

The St Helena Parish Hazard Mitigation Plan is a multi-jurisdictional plan that includes the following jurisdictions which participated in the planning process:

- St Helena Parish
- Town of Greensburg
- Village of Montpelier

The Federal Emergency Management Agency (FEMA), now under the Department of Homeland Security, has made reducing losses from natural disasters one of its primary goals. The Hazard Mitigation Plan (HMP) and subsequent implementation of recommended projects, measures, and policies is the primary means to achieving these goals. Mitigation planning and project implementation has become even more significant in a post-Katrina/Rita, Gustav/Ike, and Laura/Delta environment in south Louisiana.

This Hazard Mitigation Plan is a comprehensive plan for disaster resiliency in St Helena Parish. The parish is subject to natural hazards that threaten life and health and have caused extensive property damage. To better understand these hazards and their impacts on people and property, and to identify ways to reduce those impacts, the parish's Office of Homeland Security and Emergency Preparedness undertook this Natural Hazards Mitigation Plan. "Hazard mitigation" does not mean that all hazards are stopped or prevented. It does not suggest complete elimination of the damage or disruption caused by such incidents. Natural forces are powerful and most natural hazards are well beyond our ability to control. Mitigation does not mean quick fixes. It is a long-term approach to reduce hazard vulnerability. As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event.

Every community faces different hazards, and every community has different resources and interests to bring to bear on its problems. Because there are many ways to deal with natural hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to correct these shortcomings and produce a program of activities that will best mitigate the impact of local hazards and meet other local needs. A well-prepared plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and programs, preventing conflicts and reducing the costs of implementing each individual activity.

Under the Disaster Mitigation Act of 2000 (42 USC 5165), a mitigation plan is a requirement for Federal mitigation funds. Therefore, a mitigation plan will both guide the best use of mitigation funding and meet the prerequisite for obtaining such funds from FEMA. FEMA also recognizes plans through its Community Rating System (CRS), a program that reduces flood insurance premiums in participating communities. This program is further described in Section Three: Capability Assessment.

This plan identifies activities that can be undertaken by both the public and the private sectors to reduce safety hazards, health hazards, and property damage caused by natural hazards. It fulfills the Federal mitigation planning requirements, qualifies for CRS credit, and provides St Helena Parish and its communities with a blueprint for reducing the impacts of these natural hazards on people and property.

Geography and Population

Geography

This plan will identify cost effective and environmentally sound mitigation strategies that will reduce or eliminate long-term risk to human life and property from natural hazards. Implementation of this plan can reduce the enormous cost of disasters to property owners and all levels of government. Mitigation strategies often include protecting critical community facilities, reducing exposure to liability and minimizing community disruption. Land development planning, adoption of building codes, elevation of homes, and acquisition and relocation of homes away from floodplains are just a few examples of mitigation strategies.

St. Helena Parish, commonly referred to as one of the Florida Parishes, is located in the southeasterly part of the State of Louisiana. It occupies the land area bordered by the 31 degree North Latitude (which is the southern boundary line of the State of Mississippi), the parish of Tangipahoa to the east, the parish of Livingston to the south, and the parishes of East Baton Rouge and East Feliciana to the west, as well as the Amite River, which separates the last two parishes from St. Helena.

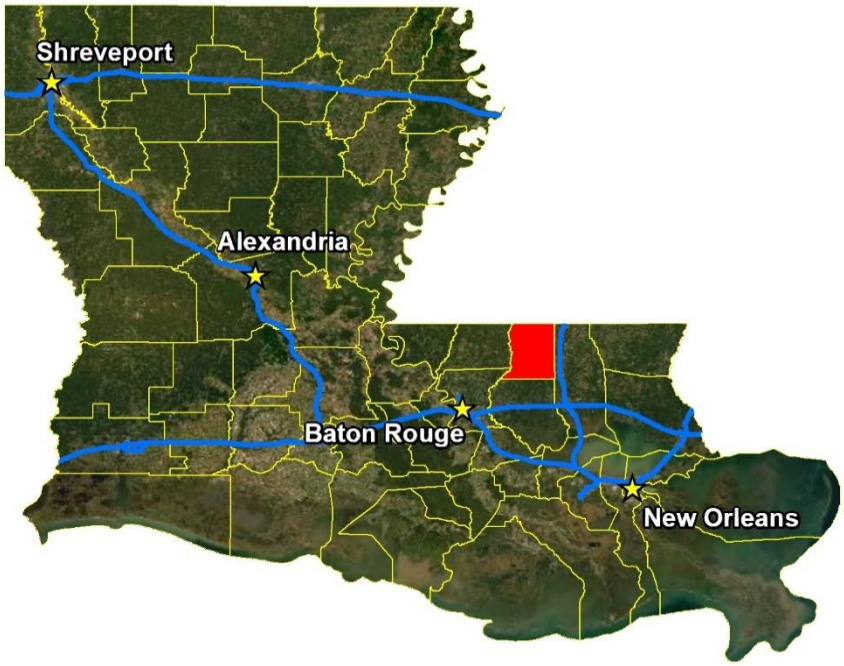

Figure 1-1: St. Helena Parish

Figure 1-2: St. Helena Parish and its Jurisdictions

St. Helena Parish provides the perfect balance between urban and rural lifestyles. Its location near the state capital at Baton Rouge and the Greater New Orleans Metropolitan Area enables residents to experience easy access to services of state government and one of America's most colorful cities. Yet the parish's rural, country like atmosphere provides unlimited opportunities to enjoy outdoor activities and recreational pursuits. Of all the resources of St. Helena Parish the most remarkable is the proud spirit of the population. They are hardworking people with an agricultural background who have learned to respect the natural resources such as the land and the water. The great transportation corridors link them to nearby urban areas giving great advantage of their location while being ever mindful of the effect of growth on their rural values.

The topographical landscape of the parish consists of rolling terrain covered by slash pine and hardwood forests approximately 50 to 80 feet above sea level. The western border of the parish is the Amite River and the Tickfaw River, another small river which empties into Lake Maurepas, drains the eastern portion of the parish. There are also a variety of streams, bayous and swales.

St. Helena Parish lies in the region commonly known as "high terraces". Pliocene fluvial sediments of the Citronelle Formation underlie the high terraces. Regionally, they consist largely of variegated and mottled, poorly sorted, fine to very coarse grained, sandy gravel, gravelly sand, sand, and minor beds of silt, clay, and mud. Typically, individual beds have limited vertical and lateral extent. The sand within the Citronelle Formation consists of quartzarenites to sublitharenites that completely lack feldspar. Within the area of this feature, the Citronelle Formation is about 300 to 350 feet (91 to 107 meters) thick.

Field investigations have found that the Citronelle Formation within the area of St. Helena Parish consists of poorly sorted, fine- to coarse-grained sand overlying laminated clays and silts. The sand is 30 to 40 feet (9 to 12 meters) thick and consists of deeply weathered, reddish brown, fine to very coarse-grained, moderately well sorted sand. In outcrops, the sand can be both massive and cross-bedded.

St Helena Parish is located in Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) Region 9 (*Figure 1-3*).

Figure 1-3: Louisiana Homeland Security Regions

Population

The population of St Helena Parish is estimated at 10,132 (2019 estimate) with a population percent change from April 1, 2010 – July 1, 2019 of -9.60%.

Table 1-1: St Helena Parish Population
(Source: US Census)

	2010 Census	2013 Estimate	2018 Estimate	2019 Estimates	Percent Change 2010 -2019
Total Population	11,203	10,851	10,262	10,132	-9.60%
Population Density (Pop/Sq. Mi.)	27.4	-------	-------	-------	-------
Total Households	4,130	4,130	3,871	3,857	-6.27%
Persons Per Household	-------	-------	2.65	2.63	-------

Economy

Health Care and Social Assistance is the largest employment base in St. Helena Parish. It is followed closely by the Retail Trade and then Manufacturing industries. These three economic sectors constitute nearly 73% of parish wide employment. The table on the next page further explores the business patterns within St. Helena Parish.

Table 1-2: St Helena Parish Business Patterns
(Source: US Census, CBP)

Business Description	Number of Establishments	Number of Employees	Annual Payroll ($1,000)
Retail Trade	24	227	4,287
Manufacturing	4	280	14,057
Health Care and Social Assistance	15	375	11,054
Mining, Quarrying, Oil and Gas Extraction	6	49	2,928
Transportation and Warehousing	9	64	3,167
Construction	11	44	1,282
Real Estate and Rental and Leasing	3	20	113
Other Services (except Public Administration)	17	63	1,914
Accommodation and Food Services	3	6	109
Financial and Insurance	8	31	895
Professional, Scientific, and Technical Services	9	23	1,237
Educational Services	3	18	255

Hazard Mitigation

To fully understand hazard mitigation efforts in St Helena Parish and throughout Louisiana, it is first crucial to understand how hazard mitigation relates to the broader concept of emergency management. In the early 1980s, the newly-created Federal Emergency Management Agency (FEMA) was charged with developing a structure for how the federal, state, and local governments would respond to disasters. FEMA developed the *four phases of emergency management*, an approach which can be applied to all disasters. The four phases are as follows:

- **Hazard Mitigation**—described by FEMA and the Disaster Mitigation Act of 2000 (DMA 2000) as "any sustained action taken to reduce or eliminate long-term risk to life and property from a hazard event." The goal of mitigation is to save lives and reduce property damage. Besides significantly aiding in the obviously desirous goal of saving human lives, mitigation can reduce the enormous cost of disasters to property owners and all levels of government. In addition, mitigation can protect critical community facilities and minimize community disruption, helping communities return to usual daily living in the aftermath of disaster. Examples of mitigation involve a range of activities and actions including the following: land-use planning, adoption and enforcement of building codes, and construction projects (e.g., flood proofing homes through elevation, or acquisition or relocation away from floodplains).

- **Emergency Preparedness**—includes plans and preparations made to save lives and property and to facilitate response operations in advance of a disaster event.

- **Disaster Response**—includes actions taken to provide emergency assistance, save lives, minimize property damage, and speed recovery immediately following a disaster.

- **Disaster Recovery**—includes actions taken to return to a normal or improved operating condition following a disaster.

Figure 1-4 illustrates the basic relationship between these phases of emergency management. While hazard mitigation may occur both before and after a disaster event, it is significantly more effective when implemented before an event occurs. This is one of the key elements of this plan and its overall strategy: reduce risk before disaster strikes in order to minimize the need for post-disaster response and recovery.

As *Figure 1-4* demonstrates, mitigation relies on updating in the wake of disaster. This can give the appearance that mitigation is only reactive rather than proactive. In reality, post-disaster revision is a vital component of improving mitigation. Each hazardous event affords an opportunity to reduce the consequences of future occurrences.

Unfortunately, this cycle can be painful for a community. For instance, the risks of disasters that could create catastrophic incidents in Louisiana were thought to be relatively well-understood prior to 2005. However, the impact of the 2005 hurricane season on the Gulf Coast region of the United States prompted a new level of planning and engagement related to disaster response, recovery, and hazard mitigation. Hurricanes Katrina and Rita hit three weeks apart and together caused astonishing damage to human life and to property. The two storms highlighted a hurricane season that spawned 28 storms—unparalleled in American history. The 2005 hurricane season confirmed Louisiana's extreme exposure to natural disasters and both the positive effects and the concerns resulting from engineered flood-protection solutions.

Figure 1-4: The Four Phases of Emergency Management and their Relation to Future Hazard Mitigation (Source: Louisiana State Hazard Mitigation Plan 2014)

The catastrophic events of 2005 had profound impacts on emergency management and hazard mitigation throughout Louisiana. As detailed later in this document, significant funding has been made available to the State of Louisiana and its parishes for the purpose of hazard mitigation planning. The storms also raised awareness of the importance of hazard mitigation among decision-makers and the general population, which has been particularly important since natural hazards will likely be increasing in frequency, magnitude, and impact in the coming years due to climate change.

General Strategy

During the last update to the Louisiana State Hazard Mitigation Plan, the State Hazard Mitigation Team (SHMT) began a long-term effort to better integrate key components of all plans with hazard mitigation implications in Louisiana to ensure that the programs, policies, recommendations, and implementation strategies are internally consistent. As each of these documents has been adopted by various agencies within the state, the SHMT has worked to incorporate this information into the decision process.

Part of the ongoing integration process is that the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) encourages the parishes and the local communities with independent hazard mitigation plans to utilize the same plan format and methodologies as the State Hazard Mitigation Plan in order to create continuity of information from local to state mitigation plans and programs.

The 2021 St Helena Parish Hazard Mitigation Plan (HMP) maintains much of the information from the 2015 plan version, but it now incorporates the order and methodologies of the 2019 Louisiana State Hazard Mitigation Plan.

The sections in the 2015 St Helena Parish HMP were as follows:

- Section One Introduction
- Section Two Hazard Identification and Risk Assessment
- Section Three Capability Assessment
- Section Four Mitigation Strategy
- Appendix A Planning Process
- Appendix B Plan Maintenance
- Appendix C Parish Critical Facilities
- Appendix D Plan Adoption
- Appendix E State Required Worksheets

This plan update also coheres with the Plain Writing Act of 2010, which requires federal agencies to use clear communication that is accessible, consistent, understandable, and useful to the public. While the State of Louisiana and its political subdivisions are not required to meet such standards, the Act aligns with best practices in hazard mitigation. Since successful hazard mitigation relies on full implementation and cooperation at all levels of government and community, a successful hazard mitigation plan must also be easily used at all of these levels. Nevertheless, the St Helena Parish Hazard Mitigation Steering Committee recognized the benefits from the successful analysis and mitigation planning executed in previous plan updates, as well as improvements to be made in the 2021 update. This plan update remains coherent with those documents, retaining language and content when needed, deleting it when appropriate, and augmenting it when constructive.

2021 Plan Update

This 2021 plan update proceeds with the previous goals of the St Helena Parish Hazard Mitigation Plan. The current goals are as follows:

Goal 1: Identify and pursue preventative measures that will reduce future damages from hazards.

Goal 2: Enhance public awareness and understanding of disaster preparedness.

Goal 3: Reduce repetitive flood losses in the parish.

Goal 4: Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.

This plan update makes a number of textual changes throughout, but the most obvious changes are data related and structural edits. First, the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information's (NCEI) Storm Events Database was used in the analysis, which provides historical hazard data from 1950 to 2020. The steering committee was also instrumental in providing detailed data where appropriate to more accurately reflect hazard impacts on the parish and jurisdictions. Furthermore, all of the sections were updated to reflect the most current information and the most current vision of the plan update. The most significant changes are the newly developed hazard profiles and risk assessments, as well as the removal of much repetition between sections from the previous plan updates.

The 2021 plan update is organized in the same format as the 2015 update, with one minor change to this 2021 update as outlined below:

- Section One Introduction
- Section Two Hazard Identification and Parish-wide Risk Assessment
- Section Three Capability Assessment
- Section Four Mitigation Strategies
- Appendix A Planning Process
- Appendix B Plan Maintenance
- Appendix C Critical Facilities
- Appendix D Plan Adoption
- Appendix E State Required Worksheets

Table 1-3: 2021 Plan Update Crosswalk

2015 Update	2021 Update
Section 1: Introduction	Section 1: Introduction
Section 2: Hazard Identification and Risk Assessment	Section 2: Hazard Identification and Risk Assessment
Section 3: Capability Assessment	Section 3: Capability Assessment
Section 4: Mitigation Strategy	Section 4: Mitigation Strategy
Appendix A: Planning Process	Appendix A: Planning Process
Appendix B: Plan Maintenance	Appendix B: Plan Maintenance
Appendix C: Essential Facilities	Appendix C: Critical Facilities
Appendix D: Plan Adoptions	Appendix D: Plan Adoptions
Appendix E: State Required Worksheets	Appendix E: State Required Worksheets

Despite numerous changes in this plan update, the plan remains consistent in its emphasis on the types of hazards that pose the most risk to loss of life, injury, and property in St Helena Parish and its communities. The extent of this risk is dictated primarily by its geographic location. Most significantly, St Helena Parish remains at high risk of water inundation from various sources, including flooding and tropical cyclone activity. The entire parish is also at high risk of damages from high winds and wind-borne debris. The 2015 flooding events, along with the 2020 hurricane season were both felt heavily in all parts of St Helena Parish. Other hazards threaten the parish and/or its communities, although not to such great degrees and not in such widespread ways. In all cases, the relative social vulnerability of areas threatened

and affected plays a significant role in how governmental agencies and their partners (local, parish, state and federal) prepare for and respond to disasters.

Mitigation efforts related to particular hazards are highly individualized by jurisdiction. Flexibility in response and planning is essential. The most important step forward to improve hazard management capability is to improve coordination and information sharing between the various levels of government regarding hazards.

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2. Hazard Identification and Parish-Wide Risk Assessment

This section assesses the various hazard risks that St. Helena Parish faces in order to identify a strategy for mitigation. Having identified the categories of hazards, emergencies, disasters, and catastrophes, this section details the major climatological and natural/human-influenced hazards by (1) defining them, (2) explaining how they are measured, (3) describing their geographic extent, (4) surveying their previous occurrences, and (5) evaluating their future likelihood of occurrences.

The table below provides an overview of the hazards that had been previously profiled in the St. Helena Parish Hazard Mitigation Plan published in 2015, as well as the hazards that were identified in the state's 2019 Hazard Mitigation Plan that were considered to be of high or medium risk for the parish by the state. Those hazards identified as high or medium risk by the state or previously identified as a risk by the parish, have been determined to provide a risk to the parish and will be profiled in this section.

Table 2-1: Hazard Profile Summary.

Hazard	Profiled in Previous Plan	Considered Medium or High Risk in the State's HM Plan	Profiled in the 2021 Update
Flooding	X	X	X
Thunderstorms (Hail, Lightning, & Wind)	X	X	X
Tornadoes	X	X	X
Tropical Cyclones	X	X	X
Wildfires			X
Winter Weather			X

Prevalent Hazards to the Community

While many of the hazards identified in *Table 2-1* occur in the parish, their occurrence was not merited for further study by the planning committee. The determination was made to focus attention and resources on the most prevalent hazards, which include the hazards previously profiled, along with thunderstorms.

The following hazards have been selected to be included in this risk assessment:

a) Flooding
b) Thunderstorms (Hail, Lightning, & Wind)
c) Tornadoes
d) Tropical Cyclones
e) Wildfires
f) Winter Weather

For analysis purposes, the impact of the critical and prevalent hazards is summarized as follows:

- Flooding from rivers and waterways, rain storms, tropical cyclones, and hurricanes in the following forms:
    a) Riverine
    b) Stormwater
    c) Surge
    d) Backwater flooding (as the result of river flooding)
- High wind damage most commonly resulting from hurricanes, thunderstorms, and tornadoes
- Property damage resulting from all profiled natural hazards

The potential destructive power of tropical cyclones was determined to be the most prevalent hazard to the parish. Fourteen of the nineteen disaster declarations St. Helena Parish has received resulted from tropical cyclones, which validates this as the most significant hazard. Therefore, the issue of hurricanes will serve as the main focus during the mitigation planning process. Hurricanes present risks for the potential for flooding, primarily resulting from storm surge, and high wind speeds. While storm surge is considered the hazard with the most destructive potential, it is not applicable to the St. Helena Parish planning area; As such, the risk assessment will assess flooding not related to storm surge as well. Flooding can also occur from non-hurricane events, as flash floods are a common occurrence due to heavy rainfall.

Hurricanes, tropical storms, and heavy storms are fairly common occurrences, and resultant wind damage is of utmost concern. Damage from high winds can include roof damage, destruction of homes and commercial buildings, downed trees and power lines, and damage and disruption to services caused by heavy debris. A wind map for St. Helena Parish is included in the hurricane risk assessment.

St. Helena Parish is also susceptible to tornadoes. Tornadoes can spawn from tropical cyclones or severe weather systems that pass-through St. Helena Parish. High winds produced by tornadoes have the potential to destroy residential and commercial buildings, as well as create wind-borne objects from the debris produced by the destruction of the natural and human environment, such as building materials and trees.

Previous Occurrences

On the next page, *Table 2-2* summarizes federal disaster declarations for St. Helena Parish since 1965. Information includes names, dates, and types of disaster.

Table 2-2: St. Helena Parish Major Disaster Declarations.

Disaster Number	Year	Declaration
208	9/10/1965	Tropical Cyclone – Hurricane Betsy
3031	2/22/1977	Drought and Freezing
833	6/16/1989	Severe Storm, Tornadoes
956	8/26/1992	Tropical Cyclone – Hurricane Andrew
1380	6/11/2001	Tropical Cyclone – Tropical Storm Allison
1437	10/3/2002	Tropical Cyclone – Hurricane Lili
1548	9/15/2004	Tropical Cyclone – Hurricane Ivan
1603	8/29/2005	Tropical Cyclone – Hurricane Katrina
1607	9/24/2005	Tropical Cyclone – Hurricane Rita
1168	11/2/2006	Severe Storm, Flood
1786	9/2/2008	Tropical Cyclone – Hurricane Gustav
4080	8/29/2012	Tropical Cyclone – Hurricane Isaac
4236	3/13/2016	Severe Storms, Flood
3392	10/6/2017	Tropical Cyclone – Tropical Storm Nate
4458	8/27/2019	Tropical Cyclone – Hurricane Barry
4484	3/24/2020	COVID-19 Pandemic
3527	6/7/2020	Tropical Cyclone – Tropical Storm Cristobal
3538	8/23/2020	Tropical Cyclone – Tropical Storms Laura and Marco
4559	8/28/2020	Tropical Cyclone – Hurricane Laura

Probability of Future Hazard Events

The probability of a hazard event occurring in St. Helena Parish is estimated in the table on the following page. The percent chance of an event happening during any given year was calculated by posting past events and dividing by the time period. Unless otherwise indicated, the time period used to access probability followed the method used in the State of Louisiana's most current Hazard Mitigation Plan. The primary source for historical data used throughout the plan is the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information's (NCEI) Storm Events Database, which provides historical hazard data from 1950 to 2020. In staying consistent with the state plan, the Storm Events Database was evaluated for the last thirty years (1990 – 2020) to determine future probability of a hazard occurring. While the 30-year record used by the State was adopted for the purpose of determining the overall probability, in order to assist with determining estimated losses, unless otherwise stated, the full 70-year record was used when Hazus wasn't available to determine losses. This full record was used to provide a more extensive record to determine losses. All assessed damages were adjusted for inflation to reflect the equivalent amount of damages with the value of the U.S. dollar today.

The following table shows the annual probability for each hazard occurring across the parish:

Table 2-3: Probability of Future Hazard Reoccurrence.

Hazard	Probability		
	St. Helena Parish (Unincorporated)	Greensburg	Montpelier
Flooding	17%	7%	7%
Thunderstorms - Hail	40%	40%	40%
Thunderstorms - Lightning	<1%	<1%	<1%
Thunderstorms - Winds	100%	100%	100%
Tornadoes	40%	40%	40%
Tropical Cyclones	36%	36%	36%
Wildfires	<1%	<1%	<1%
Winter Weather	10%	10%	10%

As shown in the table above, thunderstorm winds have the highest annual chance of occurrence (100%). This is followed by tornadoes and hailstorms (40%), tropical cyclones (36%), flooding for the unincorporated area of St. Helena Parish (17%), Winter Weather (10%), and flooding for the incorporated areas of Greensburg and Montpelier (7%). Lightning and wildfires have the lowest annual chance of occurrence at less than 1%.

Inventory of Assets for the Entire Parish

As part of the Risk Assessment, the planning team identified essential facilities throughout the parish. Several methods were used to assist in identifying all essential facilities, including field data collected by the Louisiana Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) on critical infrastructure from a previous hazard mitigation project.

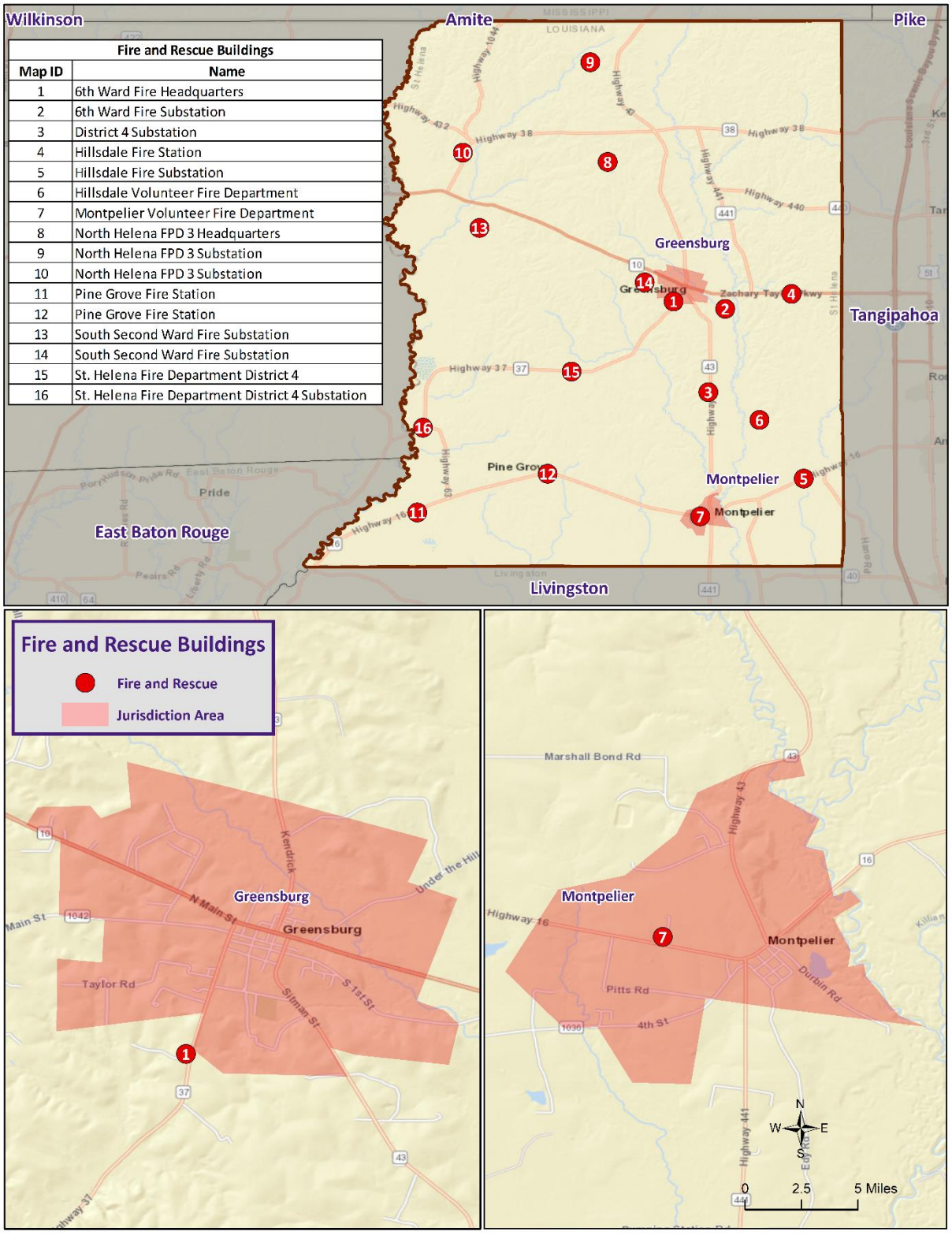
Within the entire planning area, there is an estimated value of $780,551,000 in structures throughout the parish. The table below provides the total estimated value for each type of structure by occupancy.

Table 2-4: Estimated Total of Potential Losses throughout St. Helena Parish.

Occupancy	St. Helena Parish	Unincorporated Area	Greensburg	Montpelier
Agricultural	$3,114,000	$3,114,000	$0	$0
Commercial	$72,062,000	$55,036,000	$15,814,000	$1,212,000
Government	$15,029,000	$11,903,000	$2,714,000	$412,000
Industrial	$21,830,000	$21,738,000	$92,000	$0
Religion	$24,318,000	$20,793,000	$2,415,000	$1,110,000
Residential	$638,319,000	$571,489,000	$44,415,000	$22,415,000
Education	$5,879,000	$5,364,000	$515,000	$0
Total	**$780,551,000**	**$689,437,000**	**$65,965,000**	**$25,149,000**

Critical Facilities of the Parish

The following figures show the locations and names of the essential facilities within the parish:



Fire and Rescue Buildings	
Map ID	Name
1	6th Ward Fire Headquarters
2	6th Ward Fire Substation
3	District 4 Substation
4	Hillsdale Fire Station
5	Hillsdale Fire Substation
6	Hillsdale Volunteer Fire Department
7	Montpelier Volunteer Fire Department
8	North Helena FPD 3 Headquarters
9	North Helena FPD 3 Substation
10	North Helena FPD 3 Substation
11	Pine Grove Fire Station
12	Pine Grove Fire Station
13	South Second Ward Fire Substation
14	South Second Ward Fire Substation
15	St. Helena Fire Department District 4
16	St. Helena Fire Department District 4 Substation

Figure 2-1: Fire and Rescue Facilities in St. Helena Parish.

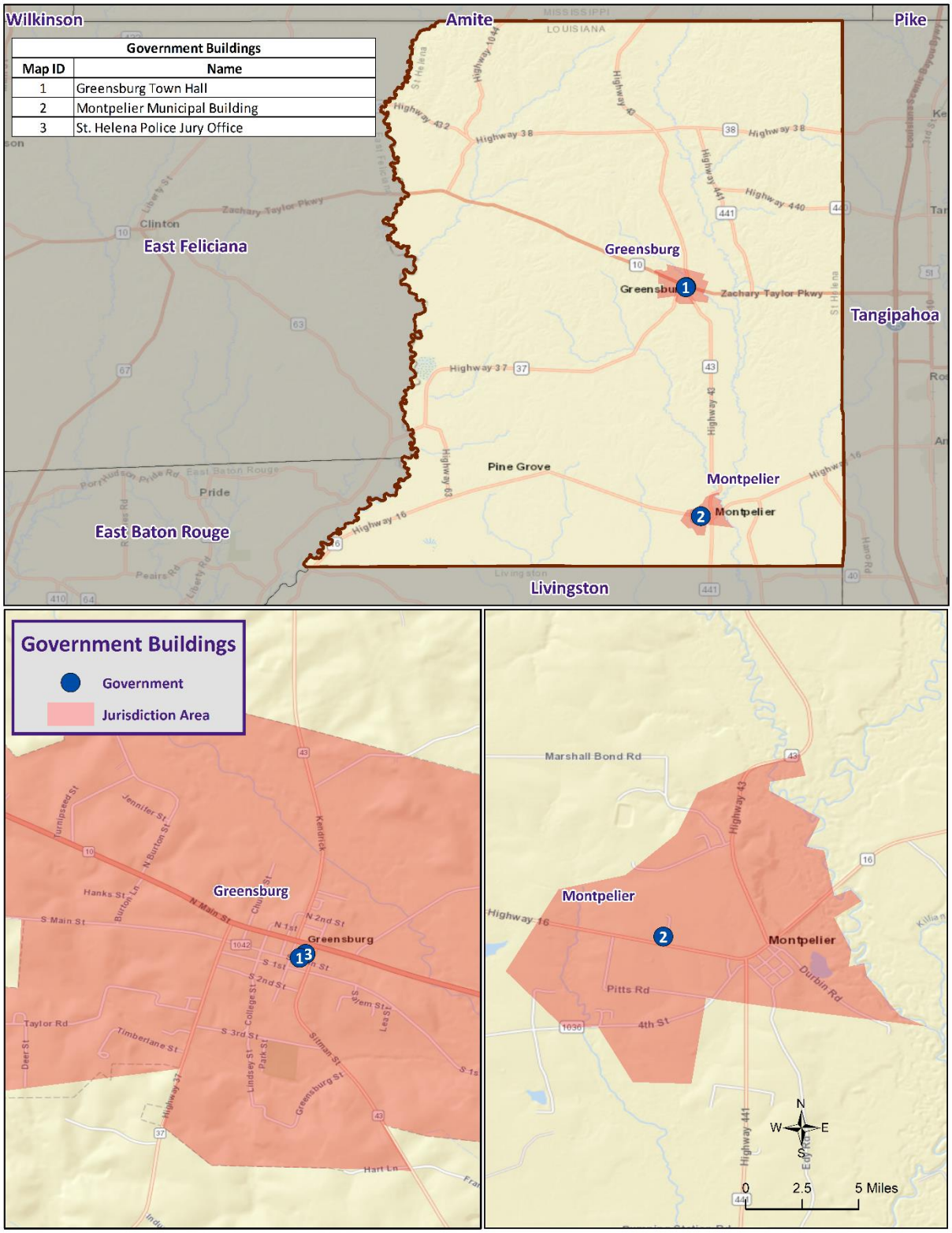


Figure 2-2: Government Buildings in St. Helena Parish.

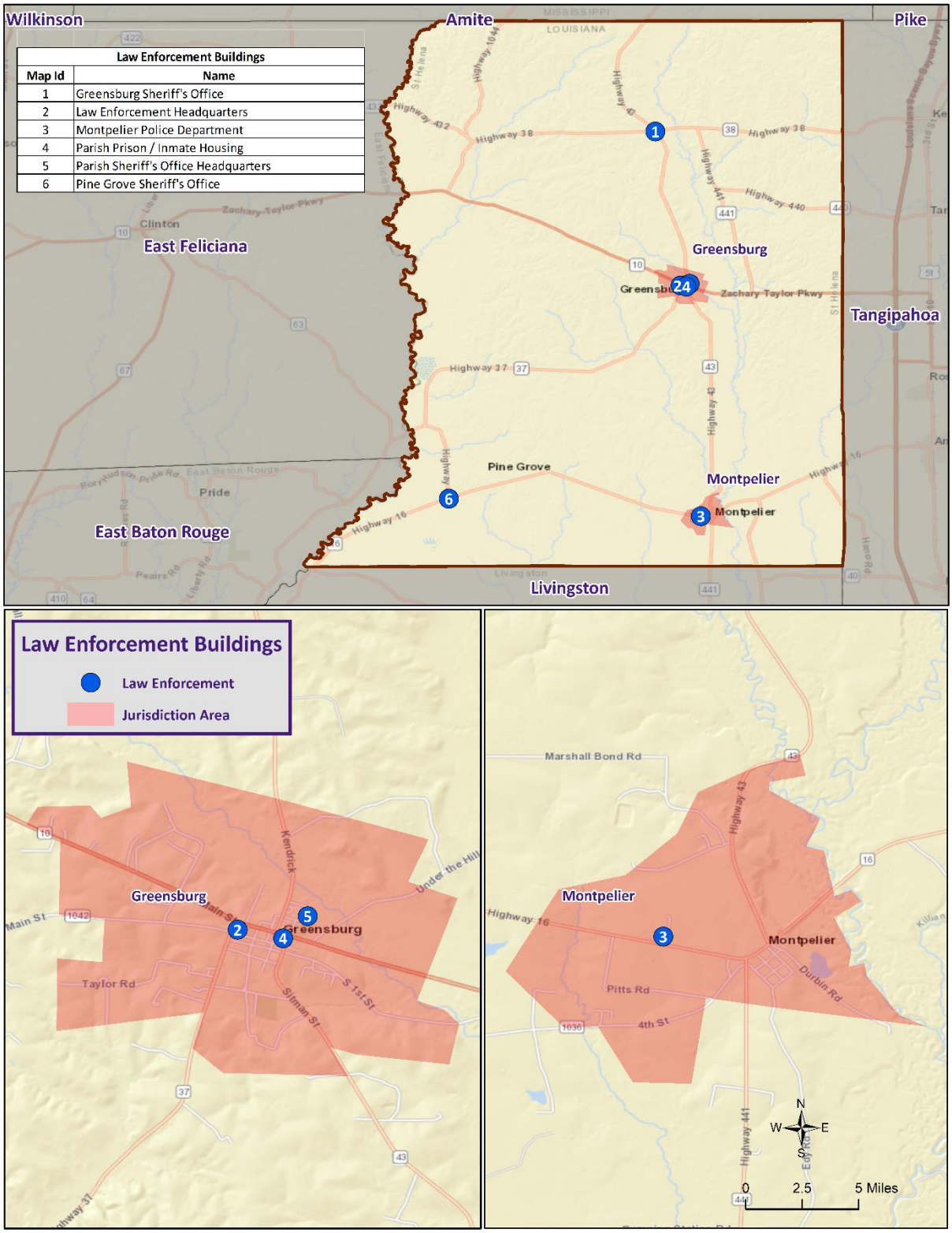


Figure 2-3: Law Enforcement in St. Helena Parish.

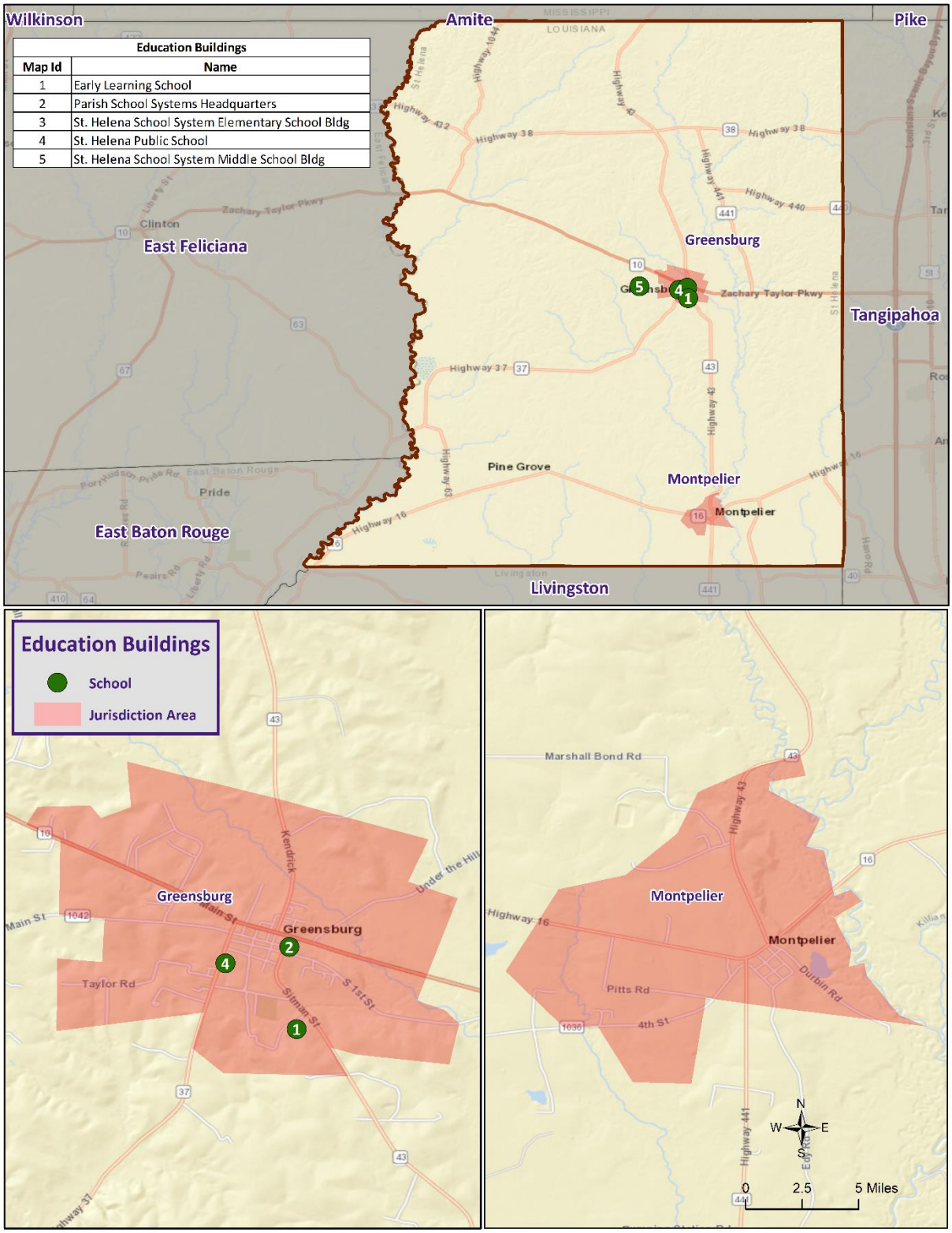


Figure 2-4: Educational Facilities in St. Helena Parish.

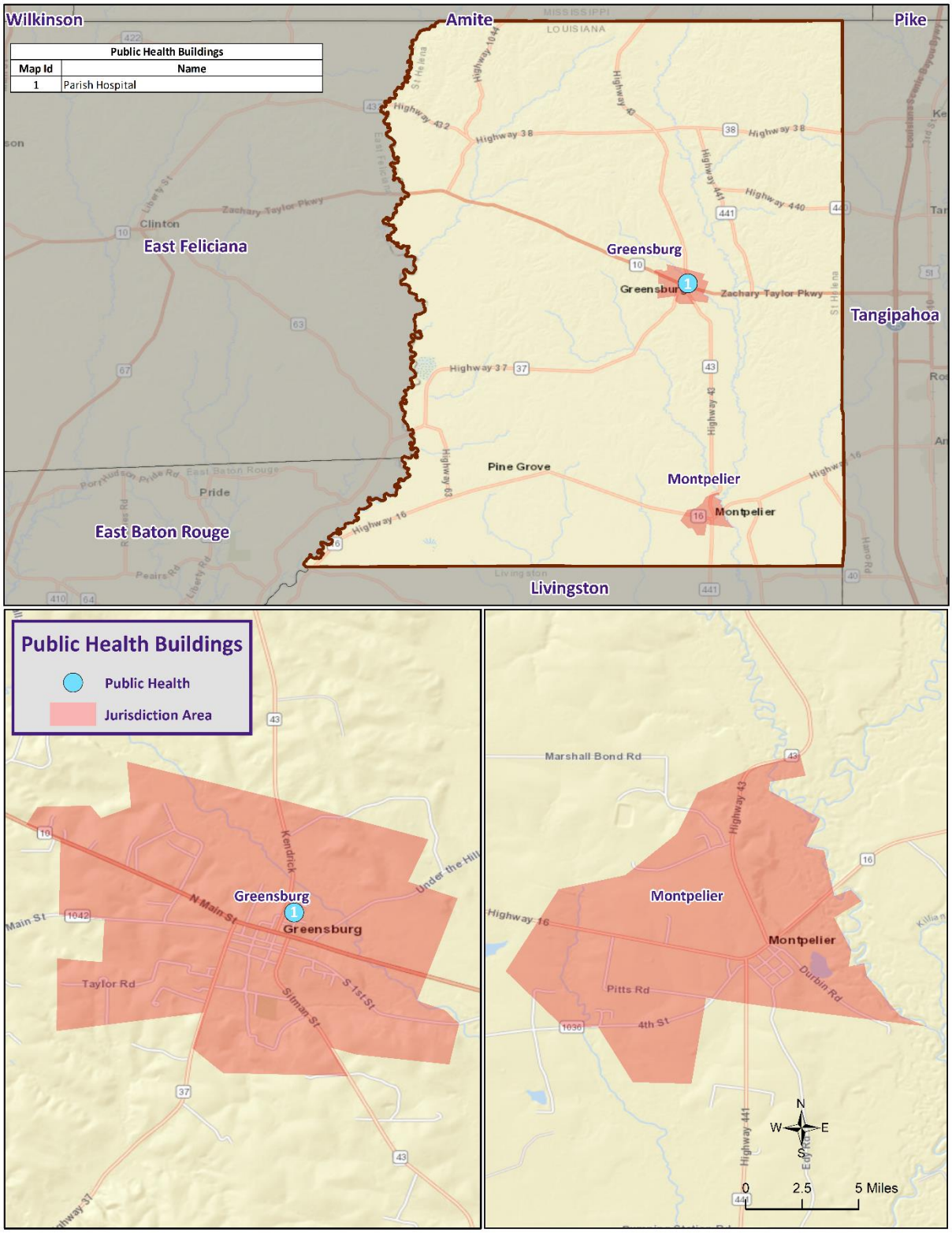


Figure 2-5: Public Health Facilities in St. Helena Parish.

Assessing Vulnerability Overview

The purpose of assessing vulnerability is to quantify and/or qualify exposure and determine how various threats and hazards impact life, property, the environment, and critical operations in St. Helena Parish. Vulnerability can be defined as the manifestation of the inherent states of the system (e.g., physical, technical, organizational, cultural) that can be exploited to adversely affect (cause harm or damage to) that system. For example, identifying areas in the parish that suffer disproportional damages from flooding compared with other areas, or overall exposure of an entire town to flooding. Identifying and understanding vulnerability to each threat and hazard provides a strong foundation for developing and pursuing mitigation actions.

The Vulnerability Assessment section for each hazard builds upon the information provided in the Risk Assessment by assessing the potential impact and amount of damage that each hazard has on the parish and each jurisdiction location. To complete the assessment, best available data were collected from a variety of sources, including local, state, and federal agencies, and multiple analyses were performed qualitatively and quantitatively. The estimates provided in the Vulnerability Assessment should be used to understand relative risk from each hazard and the potential losses that may be incurred; however, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning specific hazards and their effects on the built environment, as well as incomplete datasets from approximations and simplifications that are necessary to provide a meaningful and complete analysis. Further, most datasets used in this assessment contain relatively short periods of records, which increases the uncertainty of any statistically-based analysis.

Quantitative Methodology

The quantitative methodology consists of utilizing a detailed GIS-based approach informed through the development of comprehensive hazard and infrastructure databases. This data-centric approach forms the foundation for our quantitative vulnerability assessment. GIS technology allowed for the identification and analysis of potentially at-risk community assets such as people and infrastructure. This analysis was completed for hazards that can be spatially defined in a meaningful manner (i.e., hazards with an official and scientifically determined geographic extent) and for which GIS data were readily available.

Qualitative Methodology

The qualitative assessment relies less on technology, but more on historical and anecdotal data regarding expected hazard impacts. The qualitative assessment completed for St. Helena Parish is based on the Priority Risk Index (PRI). The purpose of the PRI is to prioritize all potential hazards, and then group them into three categories of high, moderate, or low risk to identify and prioritize mitigation opportunities. The PRI is a good practice to use when prioritizing hazards because it provides a standardized numerical value for hazards to be compared. PRI scores were calculated using five categories:

- Probability
- Impact
- Spatial Extent
- Warning Time
- Duration

Each degree of risk is assigned a value (1-4) and a weighting factor. To calculate the Risk Factor for a given hazard, the assigned risk value for each category is multiplied by the weighted factor, and the sum of all six categories is totaled together to determine the final Risk Factor. The highest possible Risk Factor is 4.0.

Risk Factor = [(Probability * 0.25) + (Impact * 0.25) + (Spatial Extent * 0.20) + (Warning Time *0.15) + (Duration * 0.15)]

Priority Risk Index and Hazard Risk

Hazard risk is determined by calculating the Risk Factor for each hazard impacting St. Helena Parish. A summary of the PRI is found in the following table. The conclusions drawn from the qualitative and quantitative assessments are fitted into three categories based on High, Moderate, or Low designations. Hazards identified as high risk have risk factors of 2.5 or greater. Risk Factors ranging from 2.0 to 2.4 are deemed moderate risk hazards. Hazards with Risk Factors less than 2.0 are considered low risk.

Table 2-5: Summary of the Priority Risk Index.

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	25%
	Possible	Between 1 and 10% annual probability	2	
	Likely	Between 10 and 100% probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	25%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than a week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self-explanatory	1	15%
	12 to 24 hours	Self-explanatory	2	
	6 to 12 hours	Self-explanatory	3	
	Less than 6 hours	Self-explanatory	4	
Duration	Less than 6 hours	Self-explanatory	1	15%
	Less than 24 hours	Self-explanatory	2	
	Less than one week	Self-explanatory	3	
	More than one week	Self-explanatory	4	

Table 2-6: Associated Risk Factor with PRI Value Range.

Risk Factor	PRI Range
High Risk	2.5 to 4.0
Moderate Risk	2.0 to 2.4
Low Risk	0 to 1.9

Table 2-7: Risk Assessment for St. Helena Parish.

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	Overall Risk
Flooding	3	4	3	4	3	**3.4**
Thunderstorms - Hail	3	2	3	3	1	**2.45**
Thunderstorms - Lightning	3	2	2	3	1	**2.25**
Thunderstorms - Winds	4	2	3	3	1	**2.7**
Tornadoes	1	3	2	4	3	**2.45**
Tropical Cyclones	3	4	4	1	4	**3.3**
Wildfires	3	4	4	1	2	**3.0**
Winter Weather	1	3	4	1	2	**2.25**

Future Development Trends

St. Helena Parish experienced a decline in overall population from the years 2000 to 2019, falling from a population of 10,525 in in 2000 to 10,411 in 2019. However, the incorporated areas of Greensburg and Montpelier experienced a population growth during this same time period with Montpelier experiencing the largest increase in population from 2010 to 2019 (28.9% overall), followed by the incorporated area of Greensburg (9.7% overall). The unincorporated area of the parish experienced a decline in population during this period falling from a population of 10,219 residents in 2010 to 9,280 in the year 2019.

Table 2-8: Population Growth Rate for St. Helena Parish.

Total Population	St. Helena Parish	Unincorporated Area	Greensburg	Montpelier
1-Apr-00	10,525	9,780	531	214
1-Apr-10	11,203	10,219	718	266
1-Jul-19	10,411	9,280	788	343
Population Growth between 2000 – 2010	6.4%	4.5%	35.2%	24.3%
Average Annual Growth Rate between 2000 – 2010	0.6%	0.4%	3.5%	2.4%
Population Growth between 2010 – 2019	-7.1%	-9.2%	9.7%	28.9%
Average Annual Growth Rate between 2010 – 2019	-0.8%	-1.0%	1.1%	3.2%

There was a rise in housing trends from the years 2010 to 2019 with housing units increasing from 5,150 in 2010 to 5,273 in 2019. The incorporated area of Montpelier experienced the largest increase in housing units during this time with an overall increase of 9.4%, followed by the unincorporated area of the parish at 2.5. The incorporated area of Greensburg is the only incorporated area to experience a decline in housing units during this time period falling from 301 units in 2010 to 295 units in 2019. The future population and number of buildings can be estimated using U.S. Census Bureau housing and population data. The following table shows population and housing unit estimates from 2000 to 2019:

Table 2-9: Housing Growth Rate for St. Helena Parish.

Total Housing Units	St. Helena Parish	Unincorporated Area	Greensburg	Montpelier
1-Apr-00	5,034	4,648	275	111
1-Apr-10	5,150	4,721	301	128
1-Jul-19	5,273	4,838	295	140
Housing Growth between 2000 – 2010	2.3%	1.6%	9.5%	15.3%
Average Annual Growth Rate between 2000 – 2010	0.2%	0.2%	0.9%	1.5%
Housing Growth between 2010 – 2019	2.4%	2.5%	-2.0%	9.4%
Average Annual Growth Rate between 2010 – 2019	0.3%	0.3%	-0.2%	1.0%

Future Hazard Impacts

Hazard impacts were estimated for five years and ten years in the future (2025 and 2030). Yearly population and housing growth rates were applied to parish inventory assets for composite flood and tropical cyclones. Based on a review of available information, it is assumed that population and housing units will grow within St. Helena Parish from the present until 2030. A summary of estimated future impacts is shown in the table below. Dollar values are expressed in future costs and assume an annual rate of inflation of 1.02%.

Table 2-10: Estimated Future Impacts, 2018-2028.
(Source: Hazus, US Census Bureau)

Hazard / Impact	Total in Parish (2018)	Hazard Area (2018)	Hazard Area (2025)	Hazard Area (2030)
Flood Damage				
Structures	5,273	2,576	2,595	2,608
Value of Structures	$780,551,000	$381,392,142.64	$412,346,044.76	$435,982,484
# of People	10,421	5,087	5,123	5,148
Tropical Cyclone				
Structures	5,273	5,273	5,310	5,337
Value of Structures	$780,551,000	$780,551,000	$843,900,756.20	$892,274,711
# of People	10,411	10,411	10,484	10,537

Housing numbers have generally increased slightly since the last update to the St. Helena Parish Hazard Mitigation Plan, although the population has generally decreased throughout the parish. Initiatives such as active floodplain management have regulated the development of flood prone areas to continue supporting and encouraging safer communities within St. Helena Parish. Enforcement of building codes for all new development is an additional step taken by the parish in its effort to decrease its vulnerability and increase the resiliency of the parish against natural hazards. While there has been very little development that has occurred since the last update in 2015, The development that has occurred has not in any knowing way altered the jurisdiction's vulnerability to natural hazards.

Land Use

The St. Helena Parish Land Use table is provided on the below. Residential, commercial, and industrial areas account for only 6% of the parish's land use. Forest land is the largest category, accounting for 164,641 acres (63%) of parish land. At 53,847 acres, wetland areas account for 21% of parish lands, while 25,261 acres of agricultural areas account for 10% of parish lands. The parish also consists of 2,258 acres of open water areas, accounting for 1% of all parish lands.

Table 2-11: St. Helena Parish Land Use.
(Source: USGS Land Use Map)

Land Use	Acres	Percentage
Agricultural Land, Cropland, and Pasture	25,261	10%
Wetlands	53,847	21%
Forest Land (Not including forested wetlands)	164,641	63%
Urban/Development	16,048	6%
Water	2,258	1%

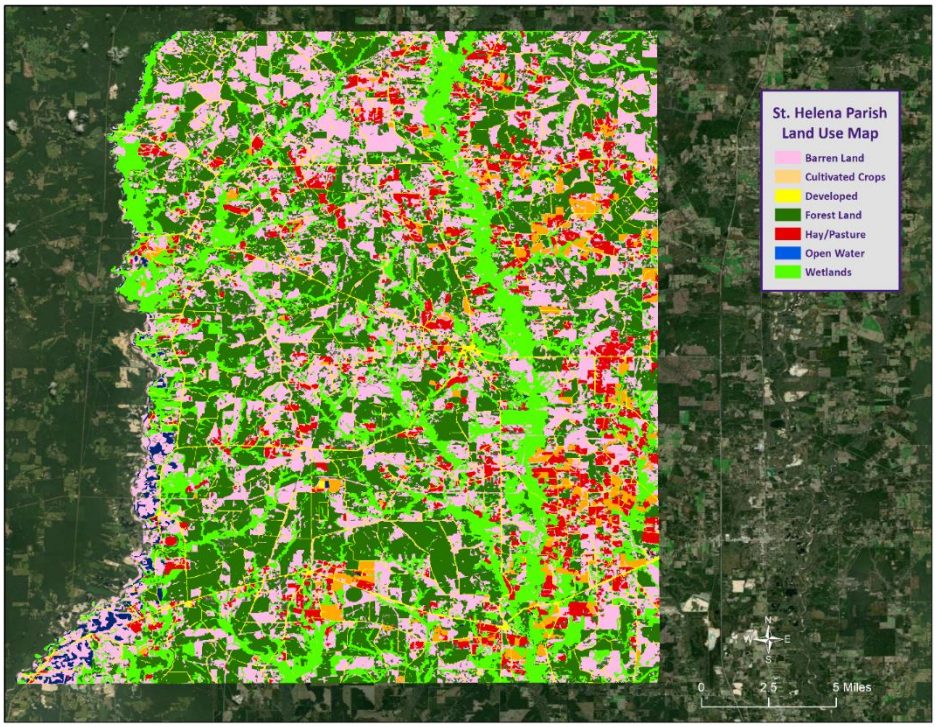


Figure 2-6: St. Helena Parish Land Use Map.
(Source: USGS Land Use Map)

Hazard Identification

Flooding

A flood is the overflow of water onto land that is usually not inundated. The National Flood Insurance Program defines a flood as:

> A general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties from overflow of inland or tidal waves, unusual and rapid accumulation or runoff of surface waters from any source, mudflow, or collapse or subsidence of land along the shore of a lake or similar body of water as a result of erosion or undermining caused by waves or currents of water exceeding anticipated cyclical levels that result in a flood as defined above.

Factors influencing the type and severity of flooding include natural variables such as precipitation, topography, vegetation, soil texture, and seasonality, as well as anthropogenic factors such as urbanization (extent of impervious surfaces), land use (agricultural and forestry tend to remove native vegetation and accelerate soil erosion), and the presence of flood-control structures such as levees and dams.

Excess precipitation, produced from thunderstorms or hurricanes, is often the major initiating condition for flooding, and Louisiana can have high rainfall totals at any time of day or year. During the cooler months, slow-moving frontal weather systems produce heavy rainfalls, while the summer and autumn seasons produce major precipitation in isolated thunderstorm events (often on warm afternoons) that may lead to localized flooding. During these warmer seasons, floods are overwhelmingly of the flash flood variety, as opposed to the slower-developing river floods caused by heavy stream flow during the cooler months.

In cooler months, particularly in the spring, Louisiana is in peak season for severe thunderstorms. The fronts that cause these thunderstorms often stall while passing over the state, occasionally producing rainfall totals exceeding ten inches within a period of a few days. Since soil tends to be nearly saturated at this time (due to relatively low overall evaporation rates), spring typically becomes the period of maximum stream flow across the state. Together, these characteristics increase the potential for high water, with low-lying, poorly drained areas being particularly susceptible to flooding during these months.

In Louisiana, six specific types of flooding are of main concern: riverine, flash, ponding, backwater, urban, and coastal.

- **Riverine flooding** occurs along a river or smaller stream. It is the result of runoff from heavy rainfall or intensive snow or ice melt. The speed with which riverine flood levels rise and fall depends not only on the amount of rainfall, but even more on the capacity of the river itself, as well as the shape and land cover of its drainage basin. The smaller the river, the faster that water levels rise and fall. Thus, the Mississippi River levels rise and fall slowly due to its large capacity. Generally, elongated and intensely-developed drainage basins will reach faster peak discharges and faster falls than circular-shaped and forested basins of the same area.
- **Flash flooding** occurs when locally intense precipitation inundates an area in a short amount of time, resulting in local stream flow and drainage capacity being overwhelmed.
- **Ponding** occurs when concave areas (e.g., parking lots, roads, and clay-lined natural low areas) collect water and are unable to drain.

- **Backwater flooding** occurs when water slowly rises from a normally unexpected direction where protection has not been provided. A model example is the flooding that occurred in LaPlace during Hurricane Isaac in 2012. Although the town was protected by a levee on the side facing the Mississippi River, floodwaters from Lake Maurepas and Lake Pontchartrain crept into the community on the side of town opposite the Mississippi River.
- **Urban flooding** is similar to flash flooding but is specific to urbanized areas. It takes place when storm water drainage systems cannot keep pace with heavy precipitation, and water accumulates on the surface. Most urban flooding is caused by slow-moving thunderstorms or torrential rainfall.
- **Coastal flooding** can appear similar to any of the other flood types, depending on its cause. It occurs when normally dry coastal land is flooded by seawater, but may be caused by direct inundation (when the sea level exceeds the elevation of the land), overtopping of a natural or artificial barrier, or the breaching of a natural or artificial barrier (i.e., when the barrier is broken down by the sea water). Coastal flooding is typically caused by storm surge, tsunamis, or gradual sea level rise.

Historically, in St. Helena Parish, all types except for coastal flooding have been observed. For purposes of this assessment, ponding, flash flood, and urban flooding are considered to be flooding as a result of storm water from heavy precipitation thunderstorms

Based on stream gauge levels and precipitation forecasts, the National Weather Service (NWS) posts flood statements, watches, and warnings. The NWS issues the following weather statements with regard to flooding:

- **Flood Categories**
  - Minor Flooding: Minimal or no property damage, but possibly some public threat.
  - Moderate Flooding: Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations.
  - Major Flooding: Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.
  - Record Flooding: Flooding which equals or exceeds the highest stage or discharge at a given site during the period of record keeping.

- **Flood Warning**
  - Issued along larger streams when there is a serious threat to life or property.

- **Flood Watch**
  - Issued when current and developing hydrometeorological conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.

Floods are measured mainly by probability of occurrence. A 10-year flood event, for example, is an event of small magnitude (in terms of stream flow or precipitation) but with a relatively high annual probability of recurrence (10%). A 100-year flood event is larger in magnitude, but it has a smaller chance of recurrence (1%). A 500-year flood is significantly larger than both a 100-year event and a 10-year event, but it has a lower probability than both to occur in any given year (0.2%). It is important to understand that an X-year flood event does not mean an event of that magnitude occurs only once in X years. Instead, it means that on average, we can expect a flood event of that magnitude to occur once every X years.

Given that such statistical probability terms are inherently difficult for the general population to understand, the Association of State Floodplain Managers (ASFPM) promotes the use of more tangible expressions of flood probability. As such, the ASFPM also expresses the 100-year flood event as having a 25% chance of occurring over the life of a 30-year mortgage.

It is essential to understand that the magnitude of an X-year flood event for a particular area depends on the source of flooding and the area's location. The size of a specific flood event is defined through historic data of precipitation, flow, and discharge rates. Consequently, different 100-year flood events can have very different impacts. The 100-year flood event in two separate locations have the same likelihood to occur, but they do not necessarily have the same magnitude. For example, a 100-year event for the Mississippi River means something completely different in terms of discharge values (ft^3/s) than for the Amite River. Not only are the magnitudes of 100-year events different between rivers, they can be different along any given river. A 100-year event upstream is different from one downstream due to the change of river characteristics (volume, discharge, and topography). As a result, the definition of what constitutes a 100-year flood event is specific to each location, river, and time, since floodplain and river characteristics change over time. Finally, it is important to note that each flood event is unique. Two hypothetical events at the same location, given the same magnitude of stream flow, may still produce substantially different impacts if there were different antecedent moisture characteristics, different times of day of occurrence (which indicates the population's probable activities at the flood's onset), or other characteristic differences.

The 100-year flood event is of particular significance since it is the regulatory standard that determines the obligation (or lack thereof) to purchase flood insurance. Flood insurance premiums are set depending on the flood zone, as modeled by National Flood Insurance Program (NFIP) Rate Maps. The NFIP and FEMA suggest insurance rates based on Special Flood Hazard Areas (SFHAs), as diagrammed in *Figure 2-7*.

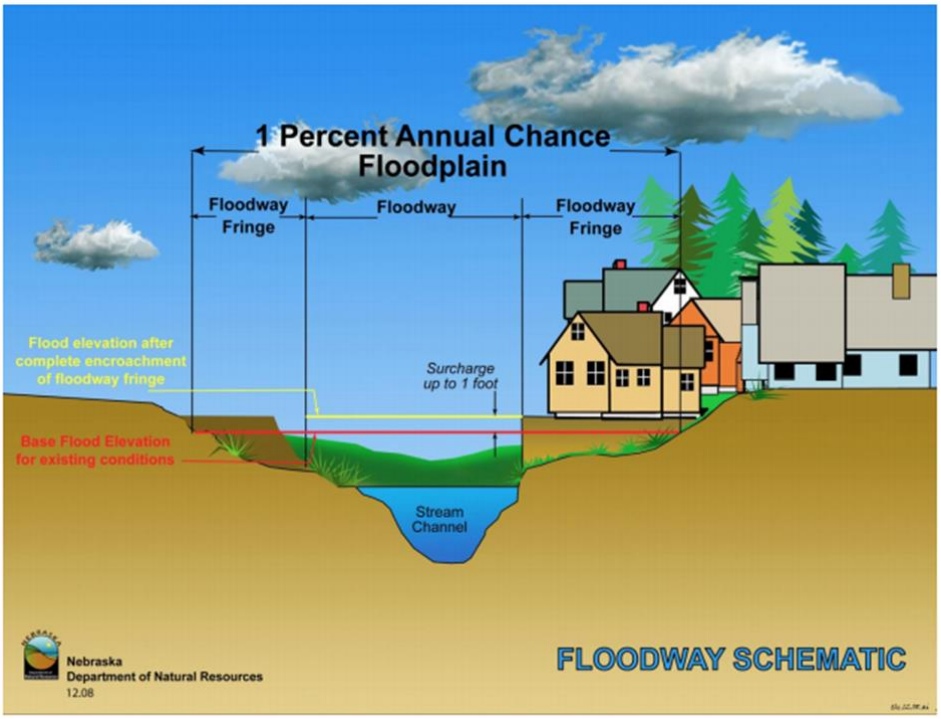


Figure 2-7: Schematic of 100-year Floodplain. The Special Flood Hazard Area (SFHA) extends to the end of the floodway fringe.
(Source: Nebraska Department of Natural Resources)

A SFHA is the land area covered by the floodwaters of the base flood (red line in *Figure 2-7*), where the NFIP's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies.

Property Damage

The depth and velocity of flood waters are the major variables in determining property damage. Flood velocity is important because the faster water moves, the more pressure it puts on a structure and the more it will erode stream banks and scour the earth around a building's foundation. In some situations, deep and fast moving waters can push a building off its foundation. Structural damage can also be caused by the weight of standing water (hydrostatic pressure).

Another threat to property from a flood is called "soaking". When soaked, many materials change their composition or shape. Wet wood will swell, and if dried too quickly, will crack, split, or warp. Plywood can come apart and gypsum wallboard can deteriorate if it is bumped before it has time to completely dry. The longer these materials are saturated, the more moisture, sediment, and pollutants they absorb.

Soaking can also cause extensive damage to household goods. Wooden furniture may become warped, making it unusable, while other furnishings such as books, carpeting, mattresses, and upholstery usually are not salvageable. Electrical appliances and gasoline engines will flood, making them worthless until they are professionally dried and cleaned.

Many buildings that have succumbed to flood waters may look sound and unharmed after a flood, but water has the potential to cause severe property damage. Any structure that experiences a flood should be stripped, cleaned, and allowed to dry before being reconstructed. This can be an extremely expensive and time consuming effort.

Repetitive Loss Properties

Repetitive loss structures are structures covered by a contract for flood insurance made available under the NFIP that:

a. Have incurred flood-related damage on two occasions, in which the cost of the repair, on average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
b. At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Severe repetitive loss (SRL) is defined by the Flood Insurance Reform Act of 2004 and updated in the Biggert-Waters Flood Insurance Reform Act of 2012. For a property to be designated SRL, the following criteria must be met:

a. It is covered under a contract for flood insurance made available under the NFIP; and
b. It has incurred flood related damage –
    1) For which four or more separate claims payments have been made under flood insurance coverage with the amount of each claim exceeding $5,000 and with the cumulative amount of such claims payments exceeding $20,000; or
    2) For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

Figures regarding repetitive loss structures for St. Helena Parish are provided in the table below:

Table 2-12: Repetitive Loss Structures for St. Helena Parish.

Jurisdiction	Number of Structures	Residential	Commercial	Government	Total Claims	Total Claims Paid	Average Claim Paid
St. Helena Parish (Unincorporated)	0	0	0	0	0	$0	$0
Greensburg	2	2	0	0	4	$27,338	$6,835
Montpelier	0	0	0	0	0	$0	$0
Total	**2**	**2**	**0**	**0**	**4**	**$27,338**	**$6,835**

Both repetitive loss structures were geocoded in order to provide an overview of where the repetitive loss structures are located throughout the parish. *Figure 2-8* shows the approximate location of the structures, while *Figure 2-9* shows where the highest concentration of repetitive loss structures are located. Through the repetitive loss map, it is clear the primary concentrated area of repetitive loss structures is focused in the incorporated area of Greensburg.

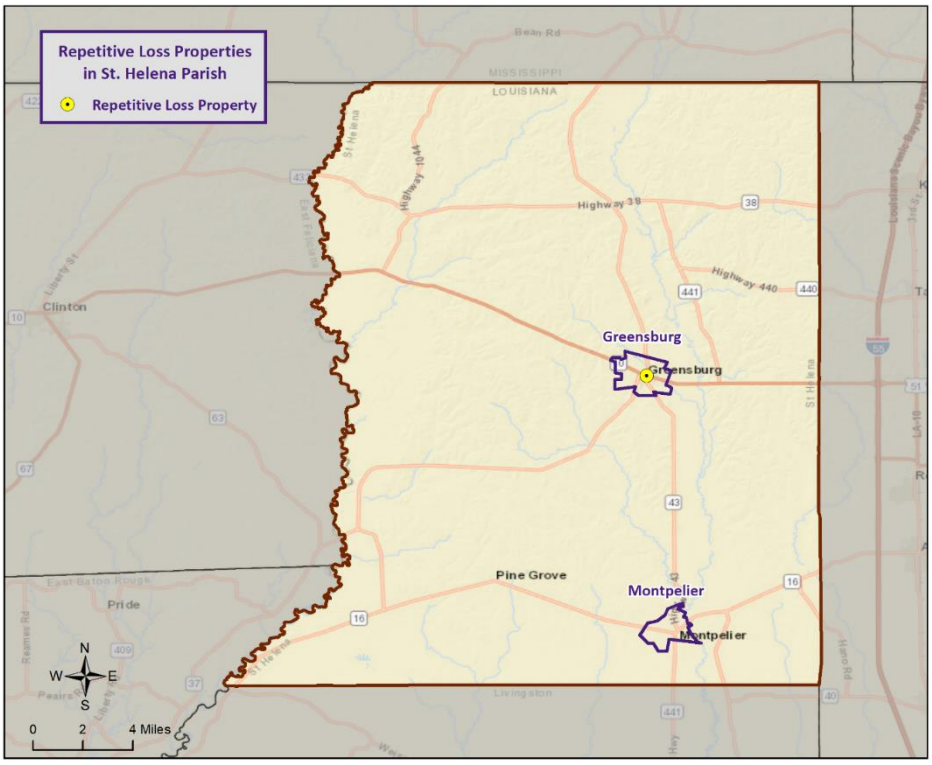


Figure 2-8: Repetitive Loss Properties in St. Helena Parish.

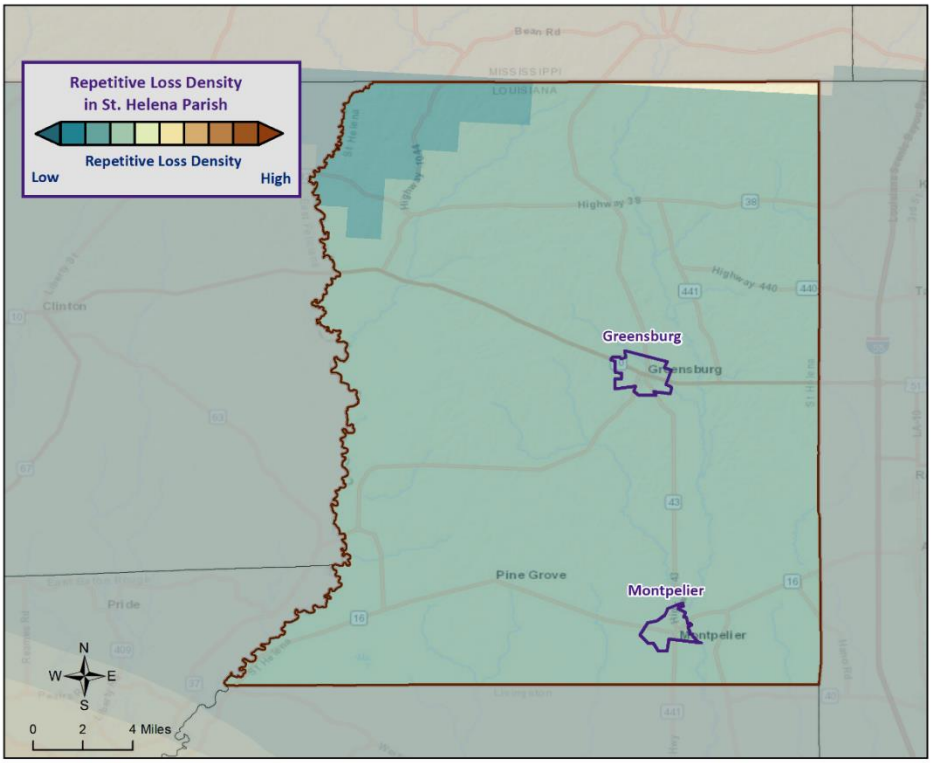


Figure 2-9: Repetitive Loss Property Densities in St. Helena Parish.

National Flood Insurance Program

Flood insurance statistics indicate that St. Helena Parish has 116 flood insurance policies with the NFIP, with total annual premiums of $104,002. St. Helena Parish and the jurisdictions of Greensburg and Montpelier are all participants in the NFIP. St. Helena Parish and all of its jurisdictions will continue to adopt and enforce floodplain management requirements, including regulating new construction Special Flood Hazard Areas, and will continue to monitor activities including local requests for new map updates. Flood insurance statistics and additional NFIP participation details for St. Helena Parish and its jurisdictions is provided in the tables to follow.

Table 2-13: Summary of NFIP Policies for St. Helena Parish.

Location	No. of Insured Structures	Total Insurance Coverage Value	Annual Premiums Paid
St. Helena Parish (Unincorporated Area)	108	$30,489,500	$99,460
Greensburg	5	$1,244,200	$3,376
Montpelier	3	$595,000	$1,166
Total	**116**	**$32,328,700**	**$104,002**

Table 2-14: Summary of Community Flood Maps for St. Helena Parish.

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Date Joined the NFIP	Tribal
220161#	St. Helena Parish	-	9/27/1991	4/2/2013	9/27/1991	No
220330#	Greensburg	2/7/1975	4/1/1980	4/2/2013	4/1/1980	No
220300#	Montpelier	11/12/1976	3/20/1979	4/2/2013	3/20/1979	No

According to the Community Rating System (CRS) list of eligible communities dated April 1, 2021, St. Helena Parish and the incorporated areas of Greensburg and Montpelier do not participate in the program.

Threat to People

Just as with property damage, depth and velocity are major factors in determining the threat posed to people by flooding. It takes very little depth or velocity for flood waters to become dangerous. A car will float in less than two feet of moving water, and can be swept downstream into deeper waters, trapping passengers within the vehicle. Victims of floods have often put themselves in perilous situations by entering flood waters that they believe to be safe, or by ignoring travel advisories.

Major health concerns are also associated with floods. Flood waters can transport materials such as dirt, oil, animal waste, and chemicals (e.g., farm, lawn, and industrial) that may cause illnesses of various degrees when coming in contact with humans. Flood waters can also infiltrate sewer lines and inundate wastewater treatment plants, causing sewage to backup and creating a breeding ground for dangerous bacteria. This infiltration may also cause water supplies to become contaminated and undrinkable.

Flooding in St. Helena Parish

By definition, flooding is caused when an area receives more water than the drainage system can convey. The following is a synopsis of the types of flooding that St. Helena Parish experiences.

Flash Floods: Flash floods are characterized by a rapid rise in water level, high velocity, and large amounts of debris. They are capable of uprooting trees, undermining buildings and bridges, and scouring new channels. Major factors in flash flooding are the high intensity and short duration of rainfall, as well as the steepness of watershed and stream gradients.

Local Drainage or High Groundwater Levels: Locally heavy precipitation may produce flooding in areas other than delineated floodplains or along recognizable drainage channels. If local conditions cannot accommodate intense precipitation through a combination of infiltration and surface runoff, water may accumulate and cause flooding problems.

Backwater Flooding: Backwater flooding is normally associated with riverine flooding and connotes minimal velocity. All low-lying areas are at risk. A heavy rainfall event coupled with a swollen river, canal, bayou, or marsh hinders drainage outflow, causing backwater flooding to the same areas susceptible to storm surge.

Riverine Flooding: Riverine flooding, by definition, is river-based. Most of the riverine flooding problems occur when a river crests at flood stage levels, causing extensive flooding in low-lying areas.

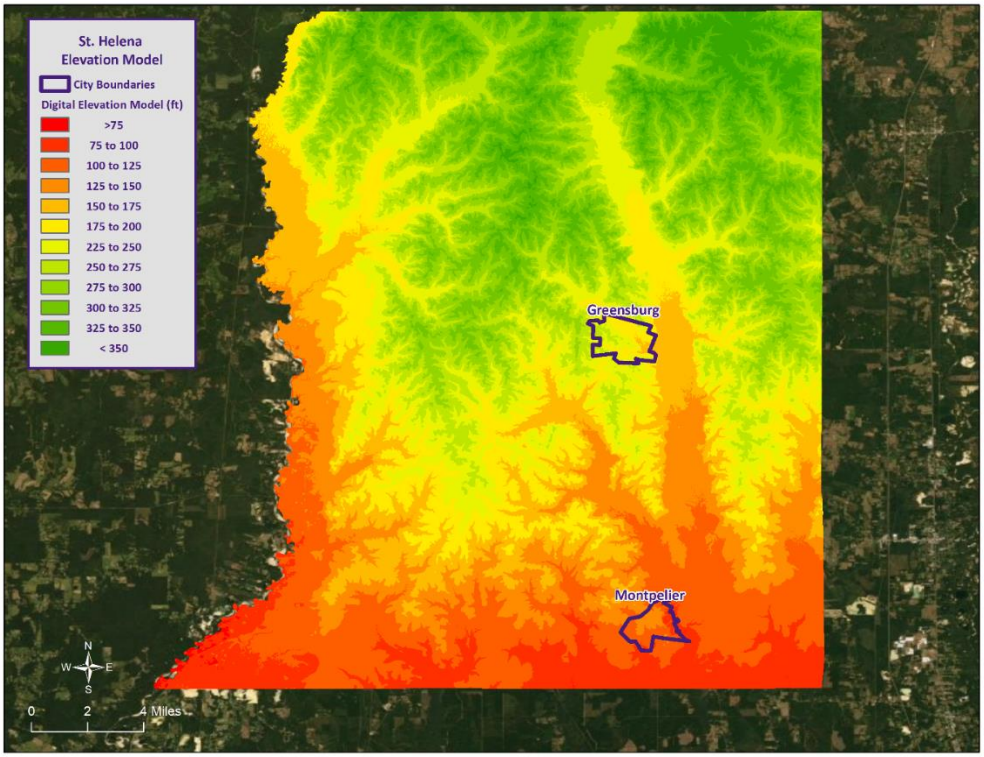


Figure 2-10: Elevation throughout St. Helena Parish.

The digital elevation model (DEM) in the figure above for St. Helena Parish is instructive in visualizing where the low-lying and high-risk areas are for the parish. Elevations in the parish range from approximately 65 feet to over 350 feet. The highest elevations in the parish are approximately 362 feet in the northern portion of the parish. These higher elevations are located in the northern section of the parish while the lower elevations dominate the southern portions of the parish. The incorporated area of Greensburg has an average elevation of approximately 220 feet, while the incorporated area of Montpelier has an average elevation of approximately 121 feet.

Location

St. Helena Parish has experienced significant flooding in its history and can expect more in the future. St. Helena Parish is susceptible to several different types of flooding due to its geographical location, including riverine and flash flooding. Worst-case scenarios for flooding in the unincorporated areas of St. Helena Parish and the incorporated areas of Greensburg and Montpelier is four to six feet of flooding. The next two pages contain maps that show the areas within each jurisdiction that are at increased risk of flooding.

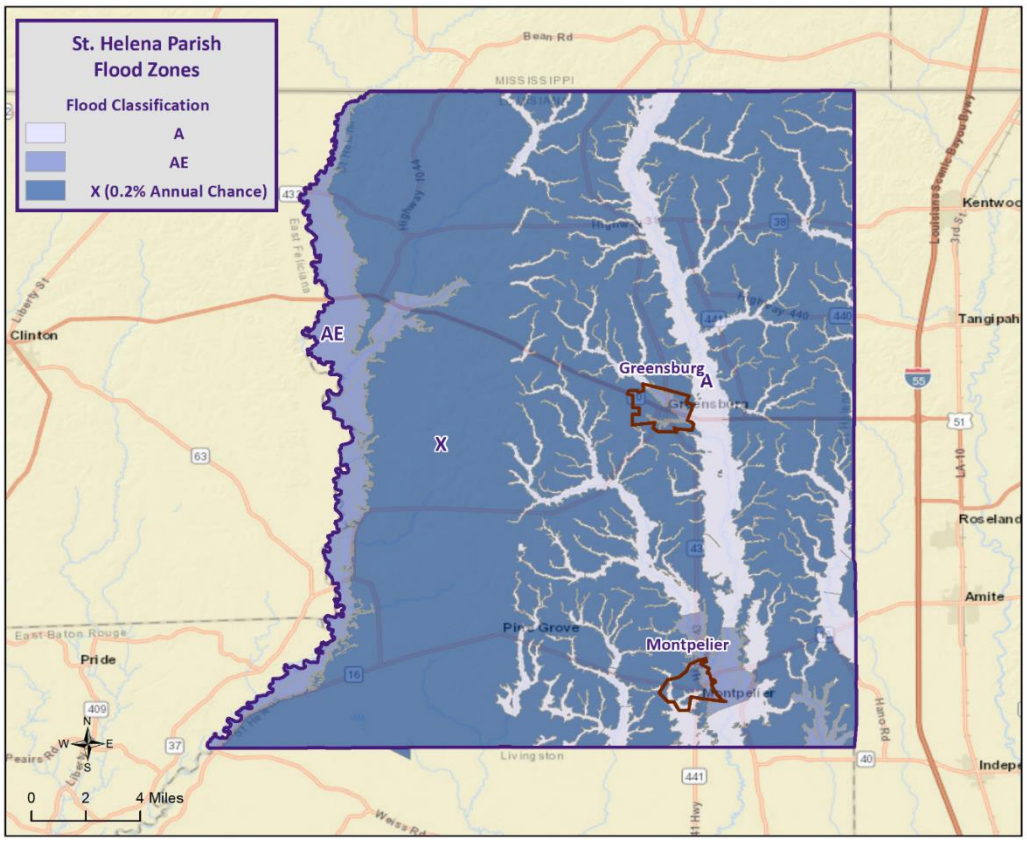


Figure 2-11: St. Helena Parish Areas within the Flood Zones.

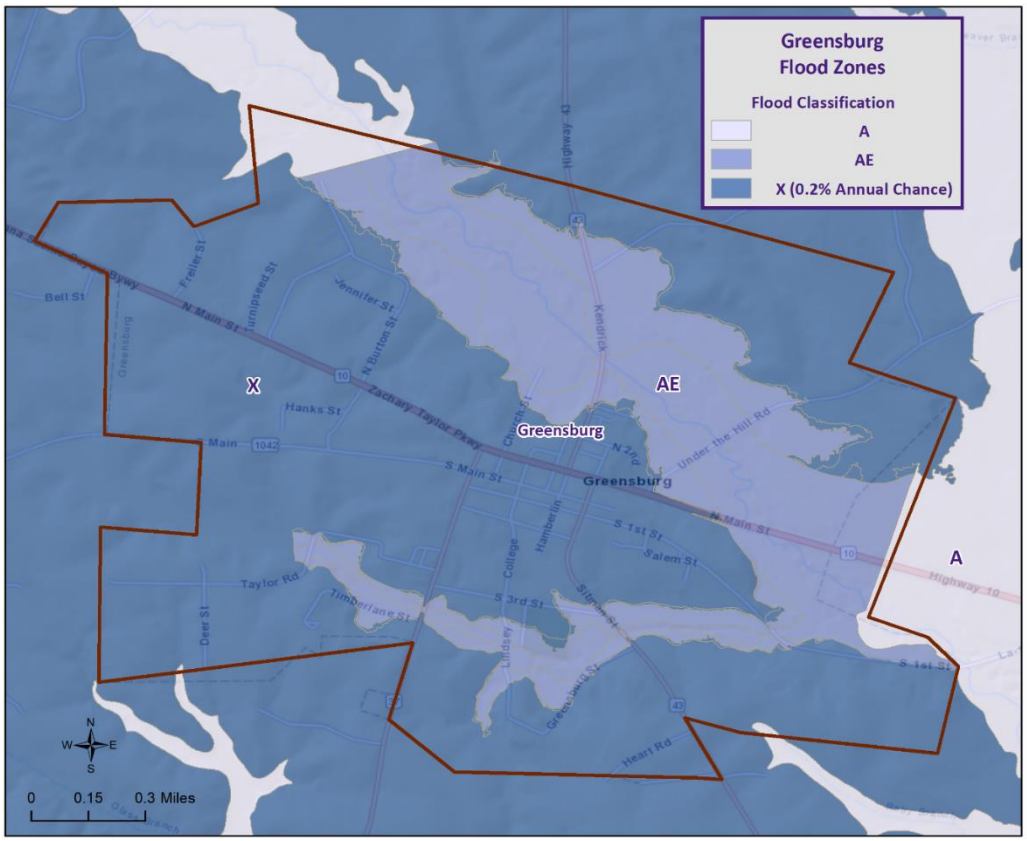


Figure 2-12: Greensburg Areas within the Flood Zones.

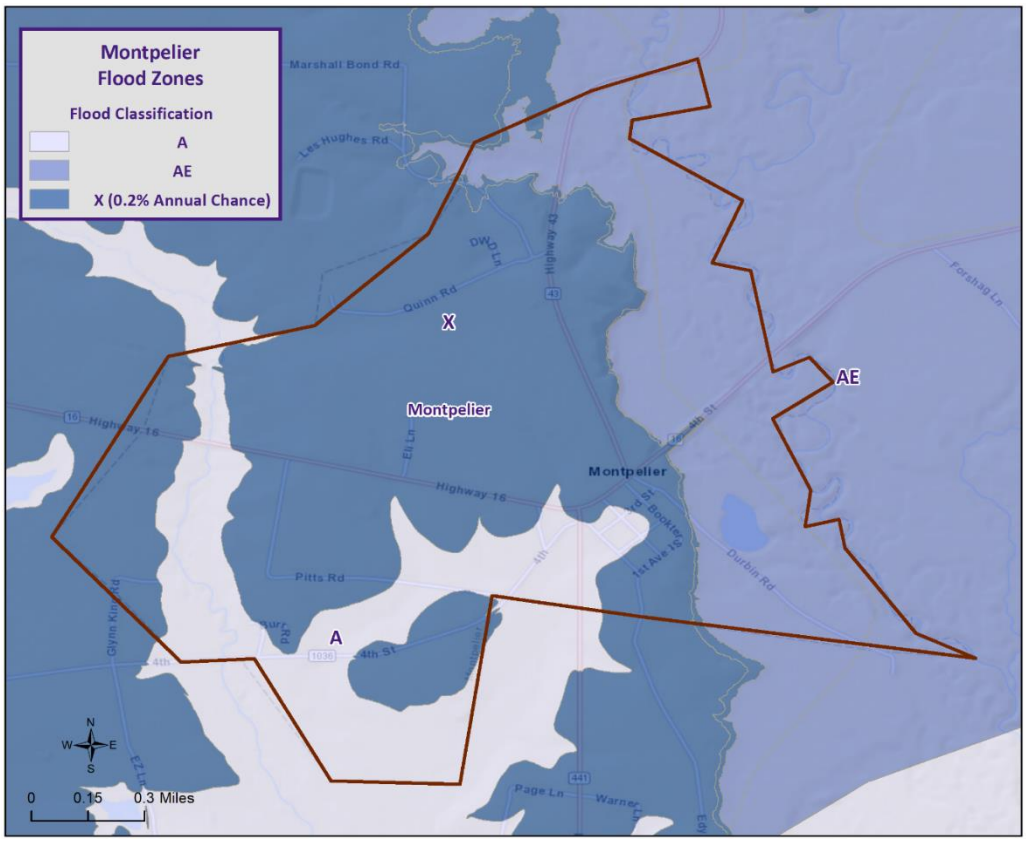


Figure 2-13: Montpelier Areas within the Flood Zones.

Previous Occurrences / Extents

Historically, there have been five flooding events that have caused significant flooding in St. Helena Parish and its jurisdictions between 1990 and 2020. The next page contains a brief synopsis of the flooding events which have occurred since the last St. Helena Parish HMP Update in 2015.

Table 2-15: Historical Floods in St. Helena Parish with Locations since the 2015 St. Helena Parish HMP Update.

Date	Extents	Type of Flooding	Estimated Damages	Location
March 10, 2016	An estimated 6 to 10 inches of rain fell across the parish flooding 61 homes and 46 roadways.	Flash Flood	$600,000	PARISHWIDE
August 12, 2016	Sixteen to 20 inches of rain fell over a two day period leading to widespread flash flooding in St. Helena Parish. Sixteen to twenty inches of rainfall over a 2 day period led to widespread flash flooding in St. Helena Parish. As water drained into area rivers, rapid rises and record flooding occurred along the Amite and Tickfaw Rivers. As floodwaters rose, numerous high water rescues were necessary across the parish. Road closures due to high water were common and over 400 homes and businesses suffered various degrees of damage. A section of Louisiana Highway 10 near the Coleman Town community was overtopped with some of the road washed out. In Greensburg, flood waters rose high enough to enter the parish hospital. Two fatalities are attributed to the flash flooding. A 54 year old man drowned when his truck was submerged after being swept off a road east of Greensburg Friday afternoon. A 44 year old woman drowned when her vehicle was swept off Hwy 1045 near Montpelier Friday night.	Riverine and Flash Flooding	$22,600,000	PARISHWIDE

Frequency / Probability

The NCEI Storm Events Database identified five flooding events within the St. Helena Parish planning area since 1990. The table below shows the probability and return frequency for each jurisdiction.

Table 2-16: Annual Flood Probabilities for St. Helena Parish.

Jurisdiction	Annual Probability	Return Frequency
St. Helena Parish (Unincorporated)	17%	1 event every 5 years
Greensburg	7%	1 event every 12 to 13 years
Montpelier	7%	1 event every 12 to 13 years

Based on historical record, the overall flooding probability for the entire St. Helena Parish Planning area is 17% with five events occurring over a 30-year period.

Estimated Potential Losses

Using the Hazus Flood Model, the 100-year flood scenario, along with the Parish DFIRM, was analyzed to determine losses from this worst-case scenario. *Table 2-17* shows the total economic losses that would result from this occurrence.

Table 2-17: Estimated Losses in St. Helena Parish from a 100-year Flood Event. (Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Flood Event
St. Helena Parish (Unincorporated Area)	$267,755,000
Greensburg	$3,290,000
Montpelier	$1,751,000
Total	**$272,796,000**

The Hazus Flood model also provides a breakdown for seven primary sectors (Hazus occupancy) throughout the parish. The losses for St. Helena Parish by sector are listed in the following tables:

Table 2-18: Estimated 100-year Flood Losses for St. Helena Parish by Sector. (Source: Hazus)

St. Helena Parish (Unincorporated)	Estimated Total Losses from 100-Year Flood Event
Agricultural	$1,030,000
Commercial	$26,820,000
Government	$4,521,000
Industrial	$1,510,000
Religious / Non-Profit	$4,691,000
Residential	$228,205,000
Schools	$978,000
Total	**$267,755,000**

Table 2-19: Estimated 100-year Flood Losses for Greensburg by Sector. (Source: Hazus)

Greensburg	Estimated Total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$1,013,000
Government	$124,000
Industrial	$4,000
Religious / Non-Profit	$981,000
Residential	$1,154,000
Schools	$14,000
Total	**$3,290,000**

Table 2-20: Estimated 100-year Flood Losses for Montpelier by Sector. (Source: Hazus)

Montpelier	Estimated Total Losses from 100-Year Flood Event
Agricultural	$0
Commercial	$145,000
Government	$36,000
Industrial	$0
Religious / Non-Profit	$112,000
Residential	$1,458,000
Schools	$0
Total	**$1,751,000**

Threat to People

The total population within the parish that is susceptible to a flood hazard is shown in the table below:

Table 2-21: Vulnerable Populations Susceptible to a 100-year Flood Event. (Source: Hazus)

Number of People Exposed to Flood Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
St. Helena Parish (Unincorporated)	10,219	5,061	49.5%
Greensburg	718	316	44%
Montpelier	266	97	36.5%
Total	**11,203**	**5,474**	**48.9%**

The Hazus flood model was also extrapolated to provide an overview of vulnerable populations throughout the jurisdictions in the following tables:

Table 2-22: Vulnerable Populations Susceptible to a 100-year Flood Event in St. Helena Parish. (Source: Hazus)

St. Helena Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	5,061	49.5%
Persons Under 5 Years	377	7.4%
Persons Under 18 Years	872	17.2%
Persons 65 Years and Over	714	14.1%
White	2,274	44.9%
Minority	2,787	55.1%

Table 2-23: Vulnerable Populations Susceptible to a 100-year Flood Event in Greensburg. (Source: Hazus)

Greensburg		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	316	44.0%
Persons Under 5 Years	22	6.8%
Persons Under 18 Years	50	15.7%
Persons 65 Years and Over	66	20.8%
White	157	49.6%
Minority	159	50.4%

Table 2-24: Vulnerable Populations Susceptible to a 100-year Flood Event in Montpelier. (Source: Hazus)

Montpelier		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	97	36.5%
Persons Under 5 Years	5	5.6%
Persons Under 18 Years	18	18.4%
Persons 65 Years and Over	17	17.7%
White	44	45.1%
Minority	53	54.9%

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality buildings that are susceptible to flooding due to proximity within the 100-year floodplain.

Thunderstorms

The term "thunderstorm" is usually used as a catch-all term for several kinds of storms. Here "thunderstorm" is defined to include any precipitation event in which thunder is heard or lightning is seen. Thunderstorms are often accompanied by heavy rain and strong winds and, depending on conditions, occasionally by hail or snow. Thunderstorms form when humid air masses are heated, which causes them to become convectively unstable and therefore rise. Upon rising, the air masses' water vapor condenses into liquid water and/or deposits directly into ice when they rise sufficiently to cool to the dew-point temperature.

Thunderstorms are classified into four main types (single-cell, multicell, squall line, and supercell), depending on the degree of atmospheric instability, the change in wind speed with height (called wind shear), and the degree to which the storm's internal dynamics are coordinated with those of adjacent storms. There is no such interaction for single-cell thunderstorms, but there is significant interaction with clusters of adjacent thunderstorms in multicell thunderstorms and with a linear "chain" of adjacent storms in squall line thunderstorms. Though supercell storms have no significant interactions with other storms, they have very well-organized and self-sustaining internal dynamics, which allows them to be the longest-lived and most severe of all thunderstorms.

The life of a thunderstorm proceeds through three stages: the developing (or cumulus) stage, the mature stage, and the dissipation stage. During the developing stage, the unstable air mass is lifted as an updraft into the atmosphere. This sudden lift rapidly cools the moisture in the air mass, releasing latent heat as condensation and/or deposition occurs, and warming the surrounding environment, thus making it less dense than the surrounding air. This process intensifies the updraft and creates a localized lateral rush of air from all directions into the area beneath the thunderstorm to feed continued updrafts. At the mature stage, the rising air is accompanied by downdrafts caused by the shear of falling rain (if melted completely), or hail, freezing rain, sleet, or snow (if not melted completely). The dissipation stage is characterized by the dominating presence of the downdraft as the hot surface that gave the updrafts their buoyancy is cooled by precipitation. During the dissipation stage, the moisture in the air mass largely empties out.

The Storm Prediction Center in conjunction with the National Weather Service (NWS) have the ability to issue advisory messages based on forecasts and observations. The following are the advisory messages that may be issued with definitions of each:

- *Severe Thunderstorm Watch*: Issued to alert people to the possibility of a severe thunderstorm developing in the area. Expected time frame for these storms is three to six hours.
- *Severe Thunderstorm Warning*: Issued when severe thunderstorms are imminent. This warning is highly localized and covers parts of one to several counties (parishes).

A variety of hazards might be produced by thunderstorms, including lightning, hail, tornadoes or waterspouts, flash floods, and high-speed winds called downbursts. Nevertheless, given all of these criteria, the National Oceanic and Atmospheric Administration (NOAA) characterizes a thunderstorm as severe when it produces one or more of the following:

- Hail of 1 inch in diameter or larger
- Wind gusts to 58 mph or greater
- One or more tornadoes

Tornadoes and flooding hazards have been profiled within this report; therefore, for the purpose of thunderstorms, the sub hazards of hail, high winds, and lightning will be profiled.

Thunderstorms occur throughout Louisiana at all times of the year, although the types and severity of those storms vary greatly, depending on a wide variety of atmospheric conditions. Thunderstorms generally occur more frequently during the late spring and early summer when extreme variations exist between ground surface temperatures and upper atmospheric temperatures.

Hazard Description

Hailstorms

Hailstorms are severe thunderstorms in which balls or chunks of ice fall along with rain. Hail develops in the upper atmosphere initially as ice crystals that are bounced about by high-velocity updraft winds. The ice crystals grow through deposition of water vapor onto their surface, fall partially to a level in the cloud where the temperature exceeds the freezing point, melt partially, get caught in another updraft whereupon re-freezing and deposition grows another concentric layer of ice, and fall after developing enough weight, sometimes after several trips up and down the cloud. The size of hailstones varies depending on the severity and size of the thunderstorm. Higher surface temperatures generally mean stronger updrafts, which allows more massive hailstones to be supported by updrafts, leaving them suspended longer. This longer time means larger hailstone sizes. The tables on the next page display the TORRO Hailstorm Intensity Scale along with a spectrum of hailstone diameters and their everyday equivalents.

Table 2-25: TORRO Hailstorm Intensity Scale.

Intensity Category		Hail Diameter (mm)	Probable Kinetic Energy	Typical Damage Impacts
H0	Hard Hail	5	0 - 20	No damage
H1	Potentially Damaging	5 - 15	>20	Slight general damage to plant, crops
H2	Significant	10 - 20	>100	Significant damage to fruit, crops, vegetation
H3	Severe	20 - 30	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25 - 40	>500	Widespread glass damage, vehicle body work
H5	Destructive	30 - 50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40 - 60		Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50 - 75		Severe roof damage, risk of serious injuries
H8	Destructive	60 - 90		Severe damage to aircraft bodywork
H9	Super Hailstorms	75 - 100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100		Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Table 2-26: Spectrum of Hailstone Diameters and their Everyday Description. (Source: National Weather Service)

Spectrum of Hailstone Diameters	
Hail Diameter Size	**Description**
1/4”	Pea
1/2”	Plain M&M
3/4”	Penny
7/8”	Nickle
1” (severe)	Quarter
1 1/4”	Half Dollar
1 1/2”	Ping Pong Ball / Walnut
1 3/4”	Golf Ball
2”	Hen Egg / Lime
2 1/2"	Tennis Ball
2 3/4"	Baseball
3”	Teacup / Large Apple
4”	Softball
4 1/2"	Grapefruit
4 3/4” – 5”	Computer CD-DVD

Hailstorms can cause widespread damage to homes and other structures, automobiles, and crops. While the damage to individual structures or vehicles is often minor, the cumulative cost to communities, especially across large metropolitan areas, can be quite significant. Hailstorms can also be devastating to crops. Thus, the severity of hailstorms depends on the size of the hailstones, the length of time the storm lasts, and where it occurs.

Hail rarely causes loss of life, although large hailstones can cause bodily injury.

High Winds

In general, high winds can occur in a number of different ways, within and without thunderstorms. The Federal Emergency Management Agency (FEMA) distinguishes these as shown in *Table 2-27*.

Table 2-27: High Winds Categorized by Source, Frequency, and Duration.
(Source: Making Critical Facilities Safe from High Wind, FEMA)

High Winds Categories			
High Wind Type	**Description**	**Relative Frequency in Louisiana**	**Relative Maximum Duration in Louisiana**
Straight-line Winds	Wind blowing in straight line; usually associated with intense low-pressure area	High	Few-minutes – 1 day
Downslope Winds	Wind blowing down the slope of a mountain; associated with temperature and pressure gradients	N/A	N/A
Thunderstorm Winds	Wind blowing due to thunderstorms, and thus associated with temperature and pressure gradients	High (especially in the spring and summer	~Few minutes – several hours
Downbursts	Sudden wind blowing down due to downdraft in a thunderstorm; spreads out horizontally at the ground, possibly forming horizontal vortex rings around the downdraft	Medium-to-High (~5% of all thunderstorms)	~15 – 20 minutes
Northeaster (nor'easter) Winds	Wind blowing due to cyclonic storm off the east coast of North America; associated with temperature and pressure gradients between the Atlantic and land	N/A	N/A
Hurricane Winds	Wind blowing in spirals, converging with increasing speed toward eye; associated with temperature and pressure gradients between the Atlantic and Gulf and land	Low-to-Medium	Several days
Tornado Winds	Violently rotating column of air from base of a thunderstorm to the ground with rapidly decreasing winds at greater distances from center; associated with extreme temperature gradient	Low-to-Medium	Few minutes – few hours

The only high winds of present concern are thunderstorm winds and downbursts. Straight-line winds are common but are a relatively insignificant hazard (on land) compared to other high winds. Downslope winds are common in the mountainous areas of the United States but relatively insignificant in Louisiana. Nor'easters are cyclonic events that have at most a peripheral effect on Louisiana, and none associated with high winds. Winds associated with hurricanes and tornadoes will be considered in their respective sections.

Table 2-28 presents the Beaufort Wind Scale, first developed in 1805 by Sir Francis Beaufort, which aids in determining relative force and wind speed based on the appearance of wind effects.

Table 2-28: Beaufort Wind Scale.
(Source: NOAA's SPC)

Beaufort Wind Scale			
Force	**Wind (MPH)**	**WMO Classification**	**Appearance of Wind Effects on Land**
			Calm, smoke rises vertically
1	1-3	Light Air	Smoke drift indicates wind direction, still wind vanes
2	4-7	Light Breeze	Wind felt on face, leaves rustle, vanes begin to move
3	8-12	Gentle Breeze	Leaves and small twigs constantly moving, light flags extended
4	13-17	Moderate Breeze	Dust, leaves, and loose paper lifted, small tree branches move
5	18-24	Fresh Breeze	Small trees in leaf begin to sway
6	25-30	Strong Breeze	Larger tree branches moving, whistling in wires
7	31-38	Near Gale	Whole trees moving, resistance felt walking against wind
8	39-46	Gale	Twigs breaking off trees, generally impedes progress
9	47-54	Strong Gale	Slight structural damage occurs, slate blows off roofs
10	55-63	Storm	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	54-73	Violent Storm	
12	74+	Hurricane	

Major damage directly caused by thunderstorm winds is relatively rare, while minor damage is common and pervasive, and most noticeable when it contributes to power outages. These power outages can have major negative impacts such as increased tendency for traffic accidents, loss of revenue for businesses, increased vulnerability to fire, food spoilage, and other losses that might be sustained by a loss of power.

Power outages may pose a health risk for those requiring electric medical equipment and/or air conditioning.

Lightning

Lightning is a natural electrical discharge in the atmosphere that is a by-product of thunderstorms. Every thunderstorm produces lightning. There are three primary types of lightning: intra-cloud, cloud-to-ground, and cloud-to-cloud. Cloud-to-ground lightning has the potential to cause the most damage to property and crops, while also posing as a health risk to the populace in the area of the strike.

Damage caused by lightning is usually to homes or businesses. These strikes have the ability to damage electrical equipment inside the home or business and can also ignite a fire that could destroy homes or crops.

Lightning continues to be one of the top three storm-related killers in the United States per FEMA, but it also has the ability to cause negative long-term health effects to the individual that is struck. The following table outlines the lightning activity level that is a measurement of lightning activity.

Table 2-29: Lightning Activity Level (LAL) Grids.

LAL	Cloud and Storm Development	Lightning Strikes/15 Min
1	No thunderstorms.	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent.	>25
6	Similar to LAL 3 except thunderstorms are dry	

Hazard Profile

Hailstorms

Location

Hailstorms are a meteorological phenomenon that can occur anywhere. Therefore, the entire planning area for St. Helena Parish and its jurisdictions are equally at risk for hailstorms. The worst-case scenario for hailstorms is hail up to a 1.75" diameter.

Previous Occurrences / Extents

Historically, there have been 12 hail incidents in St. Helena Parish. Hailstorm diameters have ranged from 0.75 inch to 1.75 inches per the National Climatic Data Center since 1990. The most frequently recorded hail sizes have been 1.75 inches in diameter. There have been no significant hailstorm events in St. Helena Parish since the 2015 St. Helena Parish HMP update.

Frequency

Hailstorms occur frequently within St. Helena Parish with an annual chance of occurrence calculated at 40% based on the records for the past 30 years (1990-2020). *Figure 2-14* displays the density of hail storm events in St. Helena Parish, while *Figure 2-15* provides an overview of hailstorm size based on location.

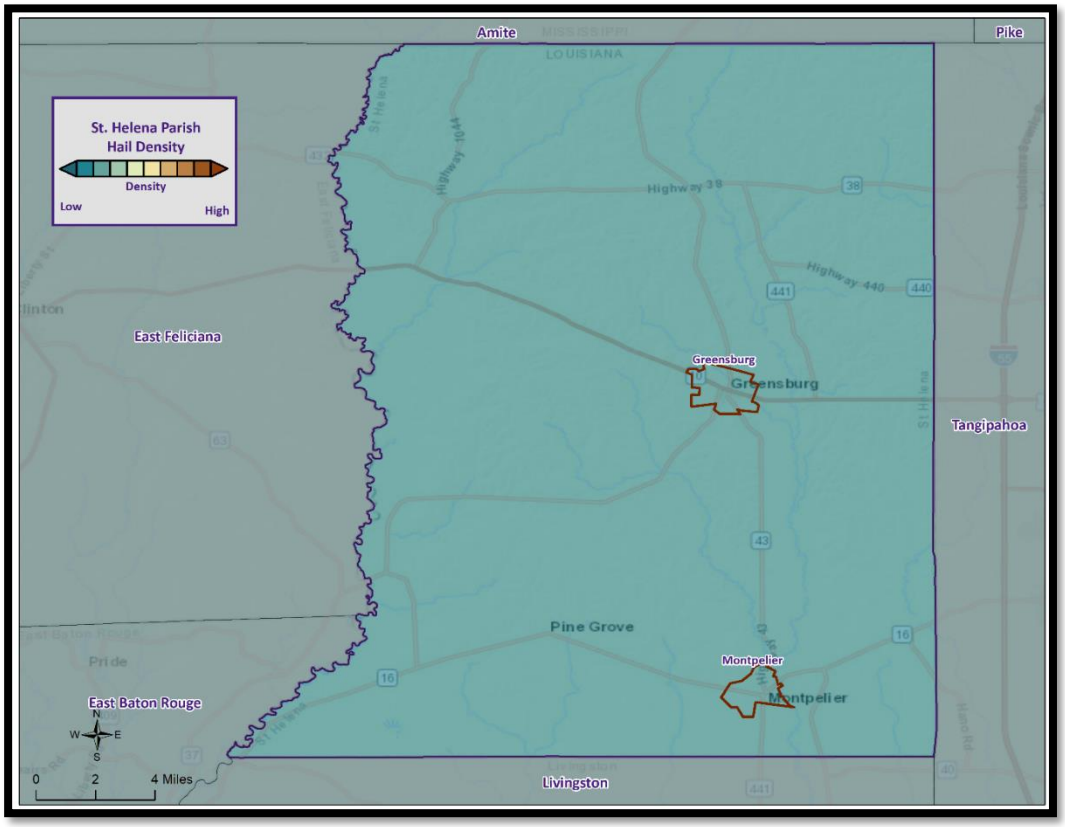


Figure 2-14: Density of Hailstorms by Diameter from 1950-2020.

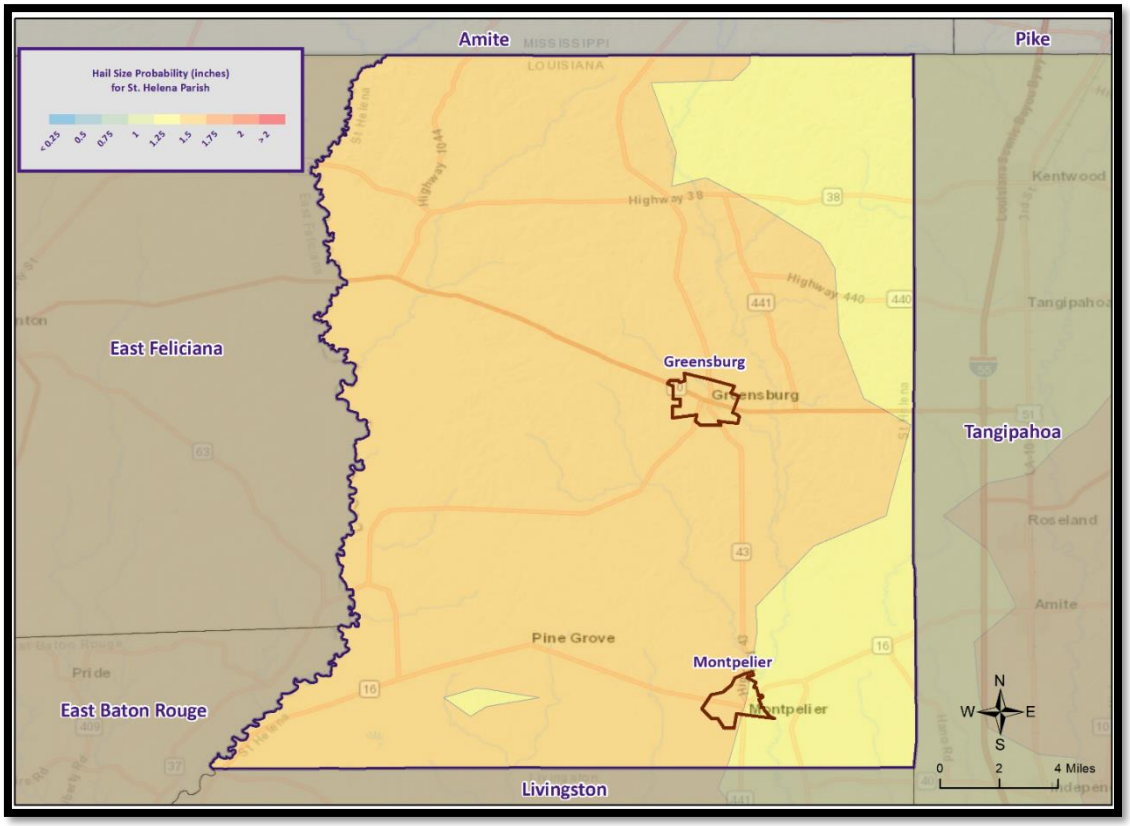


Figure 2-15: Hail Size Probability in Inches for St. Helena Parish.

Estimated Potential Losses

Since 1990, there have been 12 significant hail events that have resulted in property damages according to NCEI Storm Events Database. The total property damages associated with those storms have totaled approximately $4,000. To estimate the potential losses of a hailstorm event on an annual basis, the total damages recorded for wind events was divided by the total number of years of available wind data in the NCEI Storm Events Database (1990 - 2020). This provides an annual estimated potential loss of $133 and $333 per event. The following table provides an estimate of potential property losses for St. Helena Parish:

Table 2-30: Estimated Annual Losses for the St. Helena Parish Planning Area Resulting from Hailstorms.

Estimated Potential Annual Losses from Hailstorms		
Unincorporated Area	**Greensburg**	**Montpelier**
$122	$9	$3

There have been no reported injuries or fatalities as a result of a hail events over the 30-year record.

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality buildings that are susceptible to hailstorms.

High Winds

Location

Because high winds are a meteorological phenomenon that can occur anywhere, the entire planning area for St. Helena Parish is equally at risk from high winds. The worst-case scenario for thunderstorm high wind is wind speeds of approximately 69 mph.

Previous Occurrences / Extents

Historically, there have been 58 thunderstorm high wind events in St. Helena Parish. High winds have ranged from 50 mph to 85 mph per the National Climatic Data Center since 1990. The most frequently recorded high wind speed has been 50 mph. Since the last update, there have been six high wind events in St. Helena Parish. *Table 2-31* provides an overview of the high wind speeds which impacted the St. Helena Parish Planning area since the 2015 St. Helena Parish HMP update.

Table 2-31: Previous Occurrences for Thunderstorm High Wind Events since the 2015 Hazard Mitigation Plan Update.
(Source: NCEI Storm Events Database)

Location	Date	Recorded Wind Speeds (mph)	Property Damage	Crop Damage
MONTPELIER	April 30, 2017	63	$0	$0
GREENSBURG	April 14, 2018	57	$0	$0
GEORGEVILLE	April 14, 2018	63	$0	$0
DENNIS MILLS	June 8, 2018	80	$75,000	$0
GREENSBURG	November 1, 2018	69	$0	$0
GEORGEVILLE	April 7,2019	85	$25,000	$0

Frequency

High winds are a common occurrence within St. Helena Parish and its jurisdictions with an annual chance of occurrence calculated at 100% based on the records for the past 30 years (1990-2020). *Figure 2-16* displays the thunderstorm wind speed probability for St. Helena Parish and its jurisdictions.

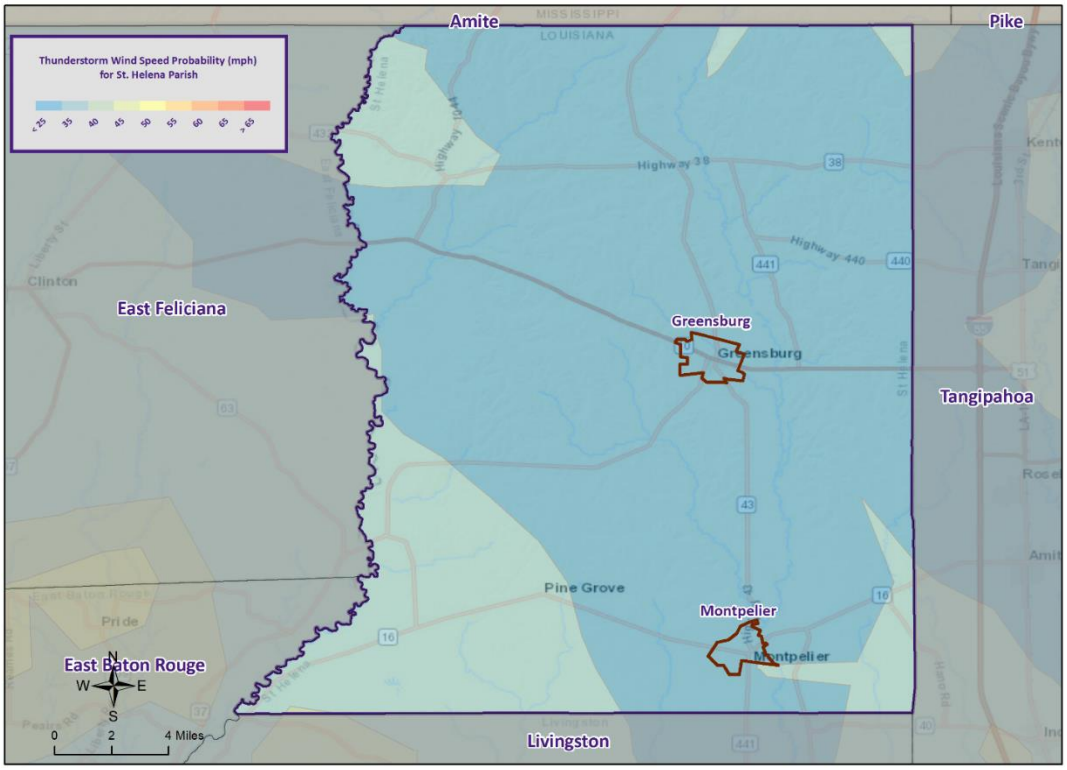


Figure 2-16: Thunderstorm High Wind Speed Probability in Miles Per Hour for St. Helena Parish.

Estimated Potential Losses

Since 1990, there have been 58 significant wind events that have resulted in property damages according to NCEI Storm Events Database. The total property damages associated with those storms have totaled approximately $184,350. To estimate the potential losses of a wind event on an annual basis, the total damages recorded for wind events was divided by the total number of years of available wind data in the NCEI Storm Events Database (1990 - 2020). This provides an annual estimated potential loss of $6,145 and $3,178 per event. The following table provides an estimate of potential property losses for St. Helena Parish:

Table 2-32: Estimated Annual Losses for the St. Helena Parish Planning Area Resulting from High Winds.

Estimated Potential Annual Losses from High Winds		
Unincorporated Area	**Greensburg**	**Montpelier**
$5,605	$394	$146

There have been no injuries or fatalities as a result of a thunderstorm high wind event over the 30-year record.

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality buildings that are susceptible to thunderstorm high winds.

Lightning

Location

Like hail and high winds, lightning is a meteorological phenomenon that can occur anywhere within the St. Helena Parish planning area. The worst-case scenario for lightning events is a lightning activity level of 4 which is approximately 16 to 25 lightning strikes every 15 minutes.

Previous Occurrences / Extent

Historically, there has been no significant lightning events in St. Helena Parish and its jurisdictions between the years 1990 and 2020.

Frequency

Lightning can strike anywhere and is produced by every thunderstorm, so the chance of lightning occurring in St. Helena Parish is high. However, lightning that meets the definition that is used by the NCEI Storm Events Database that results in damages to property and injury or death to people is a less likely event. St. Helena Parish experienced no significant lightning events between the years 1990 and 2020 resulting in a less than 1% annual chance of occurrence.

Estimated Potential Losses

Since 1990, there have been no significant lightning events that have resulted in property damages, loss of life, or injuries according to NCEI Storm Events Database.

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality building exposure to lightning hazards.

Tornadoes

Tornadoes (also called twisters and cyclones) are rapidly rotating funnels of wind extending between storm clouds and the ground. For their size, tornadoes are the most severe storms, and 70% of the world's reported tornadoes occur within the continental United States, making them one of the most significant hazards Americans face. Tornadoes and waterspouts form during severe weather events, such as thunderstorms and hurricanes, when cold air overrides a layer of warm air, causing the warm air to rise rapidly, which usually occurs in a counterclockwise direction in the northern hemisphere. The updraft of air in tornadoes always rotates because of wind shear (differing speeds of moving air at various heights), and it can rotate in either a clockwise or counterclockwise direction; clockwise rotations (in the northern hemisphere) will sustain the system, at least until other forces cause it to die seconds to minutes later.

Since February 1, 2007, the Enhanced Fujita (EF) Scale has been used to classify tornado intensity. The EF Scale classifies tornadoes based on their damage pattern rather than wind speed; wind speed is then derived and estimated. This contrasts with the Saffir-Simpson scale used for hurricane classification, which is based on measured wind speed. *Table 2-33* shows the EF scale in comparison with the old Fujita (F) Scale, which was used prior to February 1, 2007. When discussing past tornadoes, the scale used at the time of the hazard is used. Damage and adjustment between scales can be made using the following tables.

Table 2-33: Comparison of the Enhanced Fujita (EF) Scale to the Fujita (F) Scale.

	Enhanced Fujita Scale					
	EF0	EF1	EF2	EF3	EF4	EF5
Wind Speed (mph)	65-85	86-110	111-135	136-165	166-200	>200
	Fujita Scale					
	F0	F1	F2	F3	F4	F5
	<73	73-112	113-157	158-206	207-260	>261

Table 2-34: Fujita and Enhanced Fujita Tornado Damage Scale.

Scale	Typical Damage
F0/EF0	Light damage. Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1/EF1	Moderate damage. Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2/EF2	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars overturned; light-object missiles generated; cars lifted off ground.
F3/EF3	Severe damage. Roofs and some walls torn of well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4/EF4	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5/EF5	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yards); trees debarked; incredible phenomena will occur.

The National Weather Service (NWS) has the ability to issue advisory messages based on forecasts and observations. The following are the advisory messages that may be issued with definitions of each:

- *Tornado Watch*: Issued to alert people to the possibility of a tornado developing in the area. A tornado has not been spotted but the conditions are favorable for tornadoes to occur.
- *Tornado Warning*: Issued when a tornado has been spotted or when Doppler radar identifies a distinctive "hook-shaped" area within a thunderstorm line.

Structures within the direct path of a tornado vortex are often reduced to rubble. Structures adjacent to the tornado's path are often severely damaged by high winds flowing into the tornado vortex, known as inflow winds. It is here, adjacent to the tornado's path, that the building type and construction techniques are critical to the structure's survival. Although tornadoes strike at random, making all buildings vulnerable, mobile homes, homes on crawlspaces, and buildings with large spans are more likely to suffer damage.

The major health hazard from tornadoes is physical injury from flying debris or being in a collapsed building or mobile home. Within a building, flying debris or missiles are generally stopped by interior walls. However, if a building has no partitions, any glass, brick, or other debris blown into the interior is life threatening. Following a tornado, damaged buildings are a potential health hazard due to instability, electrical system damage, and gas leaks. Sewage and water lines may also be damaged.

Peak tornado activity in Louisiana occurs during the spring, as it does in the rest of the United States. Nearly one-third of observed tornadoes in the United States occur during April. About half of those in Louisiana, including many of the strongest, occur between March and June. Fall and winter tornadoes are less frequent, but the distribution of tornadoes throughout the year is more uniform in Louisiana than in locations farther north.

Location

While there is a significant tornado record in St. Helena Parish with actual locations, tornadoes in general are a climatological based hazard and have the same approximate probability of occurring in St. Helena Parish as all of its jurisdictions. Because a tornado has a similar probability of striking anywhere within the planning area for St. Helena Parish, all areas in the parish are equally at risk for tornadoes.

Previous Occurrences / Extent

The NCEI Storm Events Database reports a total of 12 tornadoes or waterspouts occurring within the boundaries of St. Helena Parish since 1990 ranging in extent from F0 to F2 under the Fujita Scale and EF0 to EF1 on the Enhanced Fujita Scale. St. Helena Parish can expect future tornadoes up to an EF3 under the Enhanced Fujita Scale as a worst-case scenario.

The tornado that caused the most damage to property occurred on November 15, 2006. The F2 tornado was responsible for approximately $250,000 in damage when it destroyed a home and a travel trailer near the intersection of Louisiana Highways 441 and 1046. Since the 2015 HMP Update, four tornadoes have occurred within the boundaries of St. Helena Parish. Below is a list and brief description of the impact for the event.

Table 2-35: Historical Tornadoes in St. Helena Parish with Locations since the 2015 Update.

Date	Impacts	Property Damage	Location	Magnitude
February 23, 2016	0.3 mile path with 50 yard length. A weak tornado touched down near Montpelier and tracked northeast shifting a mobile home off its block piers and damaging the roof. It also destroyed a metal shed and snapped a few small trees. It lifted near Jackson Lane. Maximum wind speed was estimated near 85 mph.	$0	MONTPELIER	EF0
March 31, 2016	0.18 mile path with 50 yard length. A weak tornado touched down southeast of Greensburg, uprooting several large trees and snapping large branches and small tree trunks. Maximum wind speed was estimated at 95 mph with an EF1 scale rating. Time of the event was estimated from radar.	$0	GREENSBURG	EF1
April 14, 2018	1.64 mile path with 120 yard length. A storm survey indicated an EF-0 tornado track that began in St. Helena Parish at the intersection of Louisiana Highways 441 and 1048, and moved eastward into Tangipahoa Parish. Large pine and oak trees were uprooted. Maximum winds were estimated at 85 mph.	$0	UNINCORPORATED AREA	EF0
May 19, 2019	0.18 mile path with 30 yard path. A NWS storm survey found damage consistent with an EF-0 tornado in Montpelier. The storm touched down just south of Louisiana Highway 16 and ripped off the majority of the south side roof of Bear Creek Western Store. Most of the roof was thrown in a field southeast of the store. This was a secondary roof on top of the building's original roof. There was a 2 foot space between the roofs and it appeared that winds got between the two, allowing it to more easily lift the recent roof off. This is the reason the lower end of the spectrum was used for the rating. Some of the metal pieces were lofted over a section of dense and large trees, landing 200-300 yards downstream. A power pole behind the store was snapped. The tornado continued east-	$0	GEORGEVILLE	EF0

Date	Impacts	Property Damage	Location	Magnitude
	southeast, snapping and uprooting multiple trees. One large oak tree fell across the middle of a mobile home on 3rd street, crushing it. The tornado quickly lifted thereafter. Estimated peak wind 80 mph.			

Frequency / Probability

Tornadoes occur frequently within St. Helena Parish and its jurisdictions with an annual chance of occurrence calculated at 40% based on the records for the past 30 years (1990-2020). *Figure 2-17* displays the density of tornado touchdowns in St. Helena Parish and neighboring parishes.

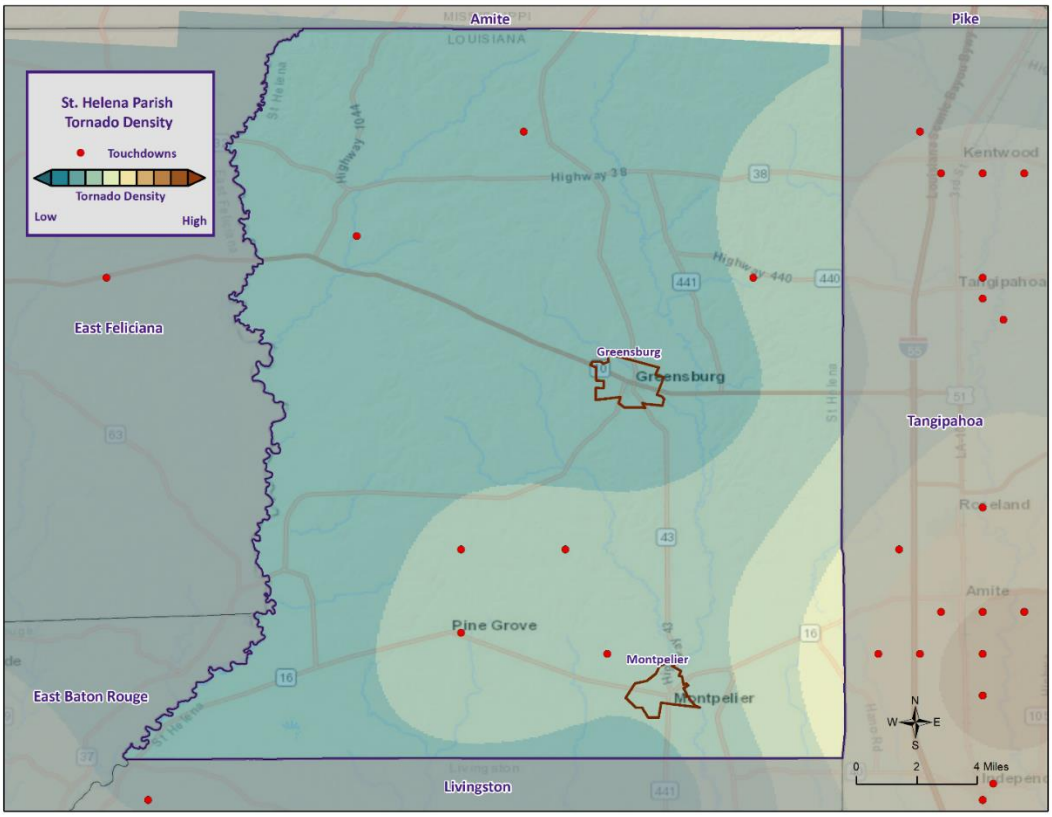


Figure 2-17: Location and Density of Tornadoes to Touchdown in St. Helena Parish. (Source: NOAA/SPC Severe Weather Database)

Estimated Potential Loses

According to the NCEI Storm Events Database, there have been 12 tornadoes that have caused some level of property damage. The total damage from the actual claims for property is approximately $655,000 with an average cost of $54,583 per tornado event. When annualizing the total cost over the 30-year record, total annual loses based on tornadoes are estimated to be $21,833. The following table provides an annual estimate of potential losses for St. Helena Parish.

Table 2-36 Estimated Annual Losses for the St. Helena Parish Planning Area Resulting from Tornadoes.

Estimated Potential Annual Losses from Tornadoes		
Unincorporated Area	Greensburg	Montpelier
$19,916	$1,399	$518

Table 2-37 presents an analysis of building exposure that are susceptible to tornadoes by general occupancy type for St. Helena Parish, along with the percentage of building stock that are mobile homes.

Table 2-37: Building Exposure by General Occupancy Type for Tornadoes in St. Helena *Parish. (Source: Hazus)*

Building Exposure by General Occupancy Type for Tornadoes ($1,000)							
Residential	Commercial	Industrial	Agricultural	Religion	Government	Education	Mobile Homes (%)
638,319	72,062	21,830	3,114	24,318	15,029	5,879	35.4%

The Parish has suffered through a total of 12 tornado events which have accounted for one fatality and no injuries during this 30-year period.

In accessing the overall risk to population, the most vulnerable population throughout the parish are those residing in manufacturing housing. Approximately 35.4% of all housing in St. Helena Parish consists of manufactured housing. The location and density of manufactured houses can be seen on the next page in *Figure 2-18*.

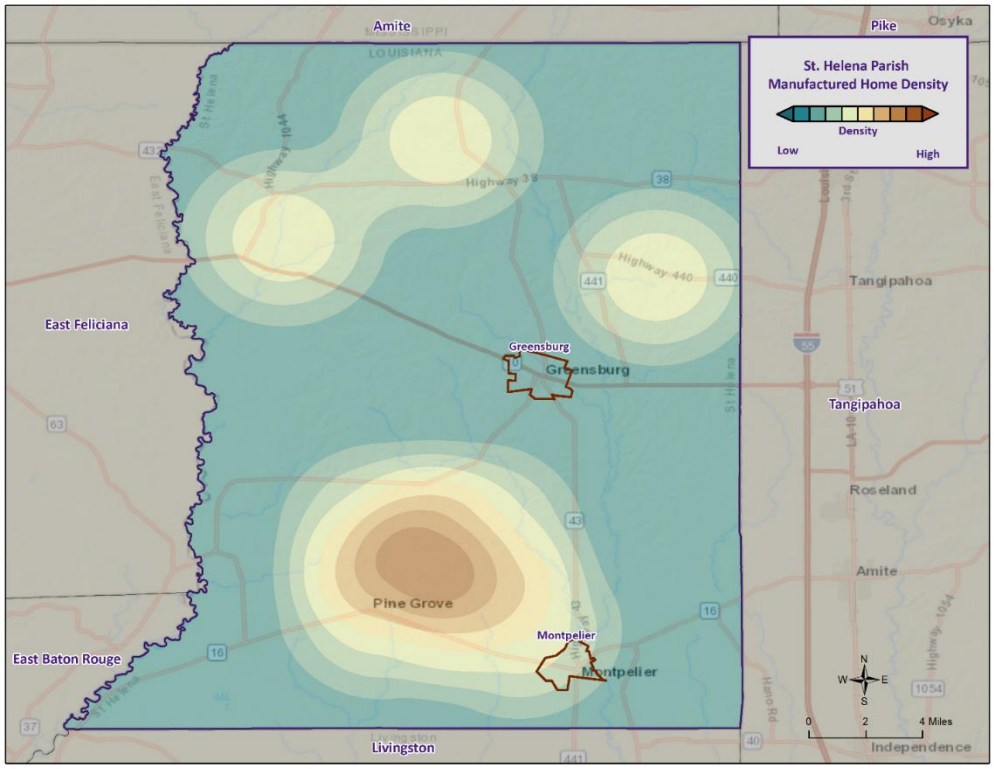


Figure 2-18: Location and Approximate Number of Units in Manufactured Housing Locations throughout St. Helena Parish.

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality building exposure to tornadoes.

Tropical Cyclones

Tropical cyclones are among the worst hazards Louisiana faces. These spinning, low-pressure air masses draw surface air into their centers and attain strength ranging from weak tropical waves to the most intense hurricanes. Usually, these storms begin as clusters of oceanic thunderstorms off the western coast of Africa, moving westward in the trade wind flow. The spinning of these thunderstorm clusters begins because of the formation of low pressure in a perturbation in the westerly motion of the storms associated with differential impacts of the Earth's rotation. The west-moving, counterclockwise-spinning collection of storms, now called a tropical disturbance, may then gather strength as it draws humid air toward its low-pressure center. This results in the formation of a tropical depression (defined when the maximum sustained surface wind speed is 38 mph or less), then a Tropical Cyclone (when the maximum sustained surface wind ranges from 39 mph to 73 mph), and finally a hurricane (when the maximum sustained surface wind speeds exceed 73 mph). On the next page, the table presents the Saffir-Simpson Hurricane Wind Scale, which categorizes tropical cyclones based on sustained winds.

Table 2-38: Saffir-Simpson Hurricane Wind Scale

Saffir-Simpson Hurricane Wind Scale			
Category	**Sustained Winds**	**Pressure**	**Types of Damage Due to Winds**
Tropical Depression	<39 mph	N/A	N/A
Tropical Cyclone	39-73 mph	N/A	N/A
1	74-95 mph	>14.2 psi	Very dangerous winds will produce some damage. Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap and shallow-rooted trees may be toppled, especially after the soil becomes waterlogged. Extensive damage to power lines and poles will likely result in power outages that could last several days.
2	96-110 mph	14-14.2 psi	Extremely dangerous winds will cause extensive damage. Well-constructed frame homes could sustain major roof and siding damage. Many shallow-rooted trees will be snapped or uprooted, especially after the soil becomes waterlogged, and block numerous roads. Near total power loss is expected, with outages that could last from several days to weeks.
3	111-129 mph	13.7 -14 psi	Devastating damage will occur. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, especially after the soil becomes waterlogged, blocking numerous roads. Electricity and water may be unavailable for several days to weeks after the storm passes.
4	130-156 mph	13.3-13.7 psi	Catastrophic damage will occur. Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, especially after the soil becomes waterlogged, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	157 mph or higher	<13.7 psi	Catastrophic damage will occur. A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks to months.

Many associated hazards can occur during a hurricane, including heavy rains, flooding, high winds, and tornadoes. A general rule of thumb in coastal Louisiana is that the number of inches of rainfall to be expected from a tropical cyclone is approximately 100 divided by the forward velocity of the storm in mph; so a fast-moving storm (20 mph) might be expected to drop five inches of rain while a slow-moving (5 mph) storm could produce totals of around 20 inches. However, no two storms are alike, and such generalizations have limited utility for planning purposes. Hurricane Beulah, which struck Texas in 1967, spawned 115 confirmed tornadoes. In recent years, extensive coastal development has increased the storm surge resulting from these storms so much that this has become the greatest natural hazard threat to property and loss of life in the state. Storm surge is a temporary rise in sea level generally caused by reduced air pressure and strong onshore winds associated with a storm system near the coast. Although storm surge can technically occur at any time of the year in Louisiana, surges caused by hurricanes can be particularly deadly and destructive. Such storm surge events are often accompanied by large, destructive waves (exceeding ten meters in some places) that can inflict a high number of fatalities and economic losses. In 2005, Hurricane Katrina clearly demonstrated the destructive potential of this hazard, as it produced the highest modern-day storm surge levels in the State of Louisiana, reaching up to 18.7 feet near Alluvial City in St. Bernard Parish.

Property can be damaged by the various forces that accompany a tropical cyclone. High winds can directly impact structures in three ways: wind forces, flying debris, and pressure. By itself, the force of the wind can knock over trees, break tree limbs, and destroy loose items, such as television antennas and power lines. Many things can be moved by high winds. As winds increase, so does the pressure against stationary objects. Pressure against a wall rises with the square of the wind speed. For some structures, this force is enough to cause failure. The potential for damage to structures is increased when debris breaks the building “envelope” and allows the wind pressure to impact all surfaces (the building envelope includes all surfaces that make up the barrier between the indoors and the outdoors, such as the walls, foundation, doors, windows, and roof). Mobile homes and buildings in need of maintenance are most subject to wind damage. High winds mean bigger waves. Extended pounding by waves can demolish any poorly or improperly designed structures. The waves also erode sand beaches, roads, and foundations. When foundations are compromised, the building will collapse.

Nine out of ten deaths during hurricanes are caused by storm surge flooding. Falling tree limbs and flying debris caused by high winds have the ability to cause injury or death. Downed trees and damaged buildings are a potential health hazard due to instability, electrical system damage, broken pipelines, chemical releases, and gas leaks. Sewage and water lines may also be damaged. Salt water and fresh water intrusions from storm surge send animals, such as snakes, into areas occupied by humans.

Location

Hurricanes are the single biggest threat to all of South Louisiana. With any single tropical cyclone event having the potential to devastate multiple parishes at once, tropical cyclones are a significant threat to the entire St. Helena Parish planning area. The worst-case scenario for a tropical cyclone event in St. Helena Parish is a Category 3 Hurricane.

Previous Occurrences / Extents

St. Helena Parish has experienced six major tropical cyclone events since 2002. The table on the next page provides a list of tropical cyclones which have impacted St. Helena Parish since 2002.

Table 2-39: Historical Tropical Cyclone Events in St. Helena Parish from 2002 – 2019.

Date	Name	Storm Type At Time of Impact
October 2, 2002	Lili	Hurricane – Category 1
August 28, 2005	Katrina	Hurricane – Category 3
September 1, 2008	Gustav	Hurricane – Category 1
September 3, 2011	Lee	Tropical Storm
August 29, 2012	Isaac	Hurricane – Category 1
July 13, 2019	Barry	Tropical Storm

Since the last St. Helena Parish HMP update in 2015, there has been one tropical cyclone event which has directly impacted St. Helena parish and the jurisdictions of Greensburg and Montpelier.

Tropical Storm Barry (2019)

Hurricane Barry initial developed from a disturbance that moved from Georgia southwest to the northeast Gulf of Mexico on July 8-9, 2019. The weak low pressure system continued to move west-southwest and strengthen, and was eventually classified as Tropical Storm Barry on the morning of July 11th, 95 miles south-southeast of the mouth of the Mississippi River. Barry continued to move slowly west then northwest and briefly reached hurricane strength on the morning of July 13th before landfall in south-central Louisiana near Intracoastal City, Louisiana in Vermillion Parish. Tropical storm force winds reached the southeast Louisiana coast by midday on Friday, July 12th and spread slowly northwest reaching the Baton Rouge area during the evening of the 12th. Tropical storm wind impacts had ended across all of southeast Louisiana by midday on July 14th. Tropical storm force winds were primarily measured in gusts across southeast Louisiana. The exception was in Terrebonne and Assumption Parishes, close to the landfall location, where sustained tropical storm force winds and frequent gusts caused more significant power line and tree damage. A few tropical storm wind gusts were recorded in the metro New Orleans area but were not very impactful. No hurricane force wind gusts were recorded in southeast Louisiana.

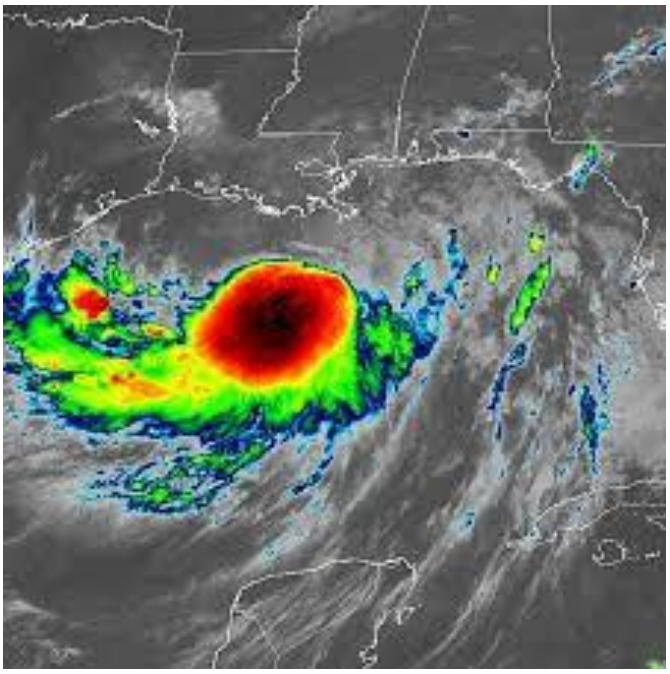


Figure 2-19: Hurricane Barry Rain Bands in the Gulf Coast Area. (Source: NOAA)

Mostly minor to moderate storm surge flooding occurred across coastal southeast Louisiana, including Lake Pontchartrain, and a small part of the Mississippi Coast. Terrebonne Parish had significant storm surge flooding in the lower portion of the parish with storm tides of five to eight feet, locally up to nine feet. Several local levees were overtopped on the morning of July 13th flooding roads and a few homes. The highest storm tide reading was 9.11 feet NAVD88 at a USGS tide gauge at Caillou Lake near Dulac, Louisiana.

Storm total rainfall was generally between four and eight inches with a maximum rainfall of 8.83 inches recorded northeast of Denham Springs, Louisiana in Livingston Parish. Isolated flash flooding of streets and secondary roadways occurred on July 13th in the greater Baton Rouge area, but flash flooding was not widespread or significant. The lower Mississippi River was at unusually high stages from late August with the state at the New Orleans Carrolton gauge near 16.5 feet. The combination of storm surge entering the lower Mississippi River with very high river stages prompted concern of potential overtopping of levees along the Mississippi River in lower Plaquemines Parish prompting some evacuations of the area.

In St. Helena Parish, no significant impacts were reported. Estimated storm total rainfall was from twin inches in the southeast portion of the parish to four to five inches in a swath along the western edge of the parish. The highest reported storm total rainfall was 4.43 inches near Grangeville at site GVLL1.

The following figure displays the wind zones that affect St. Helena Parish in relation to critical facilities throughout the parish.

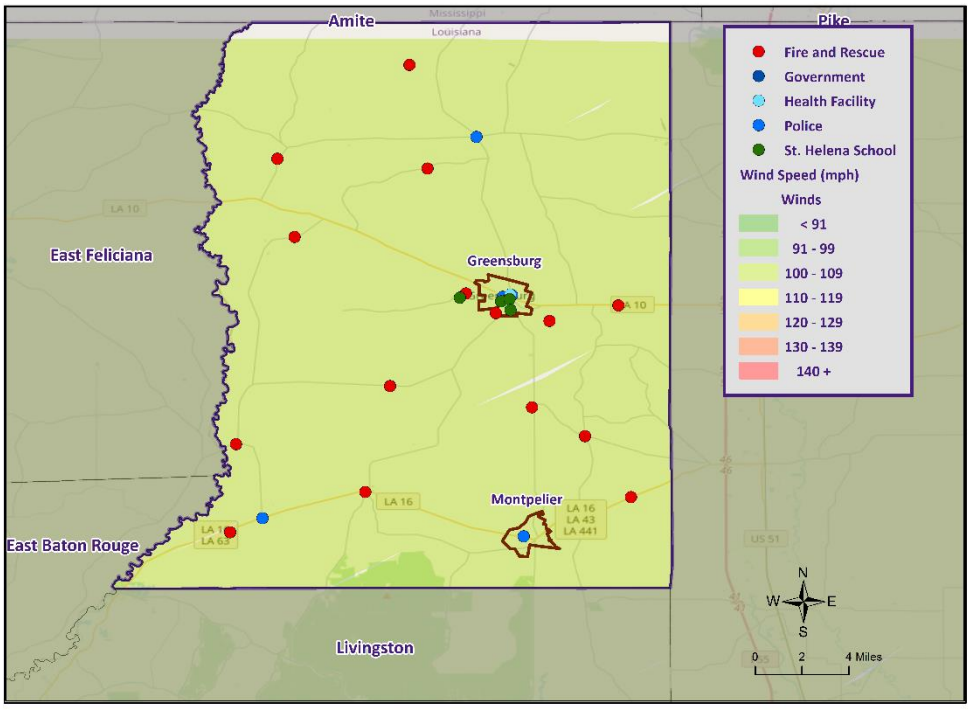


Figure 2-20: Winds Zones for St. Helena Parish in Relation to Critical Facilities

Frequency / Probability

Tropical cyclones are large natural hazard events that regularly impact St. Helena Parish. The annual chance of occurrence for a tropical cyclone is estimated at 36% for St. Helena Parish with six events occurring within 17 years (2002 to 2019). The tropical cyclone season for the Atlantic Basin is from June 1st through November 30th, with most of the major hurricanes (Saffir-Simpson Categories 3, 4, & 5) occurring between the months of August and October. Based on geographical location alone St. Helena Parish and its jurisdictions are highly vulnerable to tropical cyclones. This area has experienced several tropical cyclone events in the past and can expect more in the future.

Estimated Potential Losses

Using Hazus 100-Year Hurricane Model, the 100-year hurricane scenario was analyzed to determine losses from this worst-case scenario. The following table shows the total economic losses that would result from this occurrence.

Table 2-40: Total Estimated Losses for a 100-Year Hurricane Event (Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event
St. Helena Parish (Unincorporated)	$6,652,267
Greensburg	$467,397
Montpelier	$173,158
Total	**$7,292,822**

Total losses from a 100-year hurricane event for St. Helena Parish were compared with the total value of assets to determine the ratio of potential damage to total inventory in the table below.

Table 2-41: Ratio of Total Losses to Total Estimated Value of Assets for St. Helena Parish (Source: Hazus)

Jurisdiction	Estimated Total Losses from 100-Year Hurricane Event	Total Estimated Value of Assets	Ratio of Estimated Losses to Total Value
St. Helena Parish (Unincorporated)	$6,652,267	$689,437,000	1.0%
Greensburg	$467,397	$65,965,000	0.7%
Montpelier	$173,158	$25,149,000	0.7%

Based on the Hazus Hurricane Model, estimated total losses for St. Helena Parish and its jurisdictions ranged from 0.7% to 1% of the total estimated value of all assets.

The Hazus Hurricane Model also provides a breakdown for seven primary sectors (Hazus occupancy) throughout the parish. The losses for St. Helena Parish by sector are listed in the table below.

Table 2-42: Estimated Losses in Unincorporated St. Helena Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Helena Parish (Unincorporated)	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$14,332
Commercial	$192,056
Government	$125,220
Industrial	$21,276
Religious / Non-Profit	$47,725
Residential	$6,247,687
Schools	$3,971
Total	**$6,652,267**

Table 2-43: Estimated Losses in Greensburg for a 100-Year Hurricane Event (Source: Hazus)

Greensburg	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$0
Commercial	$13,494
Government	$8,798
Industrial	$1,495
Religious / Non-Profit	$3,353
Residential	$438,970
Schools	$279
Total	**$467,397**

Table 2-44: Estimated Losses in Montpelier for a 100-Year Hurricane Event (Source: Hazus)

Montpelier	Estimated Total Losses from 100-Year Hurricane Event
Agricultural	$0
Commercial	$5,372
Government	$3,259
Industrial	$0
Religious / Non-Profit	$1,796
Residential	$162,730
Schools	$0
Total	**$173,158**

Threat to People

The total population within the parish that is susceptible to a hurricane hazard is shown in the table below:

Table 2-45: Number of People Susceptible to a 100-Year Hurricane Event in St. Helena Parish (Source: Hazus)

Number of People Exposed to Hurricane Hazards			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
St. Helena Parish (Unincorporated)	10,219	10,219	100%
Greensburg	718	718	100%
Montpelier	266	266	100%
Total	**11,203**	**11,203**	**100%**

The Hazus hurricane model was also extrapolated to provide an overview of vulnerable populations throughout St. Helena Parish. These populations are illustrated in the following tables:

Table 2-46: Vulnerable Populations in Unincorporated St. Helena Parish for a 100-Year Hurricane Event (Source: Hazus)

St. Helena Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	10,219	100.0%
Persons Under 5 Years	760	7.4%
Persons Under 18 Years	1,760	17.2%
Persons 65 Years and Over	1,441	14.1%
White	4,591	44.9%
Minority	5,628	55.1%

Table 2-47: Vulnerable Populations in Greensburg for a 100-Year Hurricane Event (Source: Hazus)

Greensburg		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	718	100.0%
Persons Under 5 Years	49	6.8%
Persons Under 18 Years	113	15.7%
Persons 65 Years and Over	149	20.8%
White	356	49.6%
Minority	362	50.4%

Table 2-48: Vulnerable Populations in Montpelier for a 100-Year Hurricane Event (Source: Hazus)

Montpelier		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	266	100.0%
Persons Under 5 Years	15	5.6%
Persons Under 18 Years	49	18.4%
Persons 65 Years and Over	47	17.7%
White	120	45.1%
Minority	146	54.9%

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality buildings that are susceptible to tropical cyclones.

Wildfires

A wildfire is combustion in a natural setting, marked by flames or intense heat. Most frequently wildfires are ignited by lightning or unintentionally by humans. Fires set purposefully (but lawfully) are referred to as controlled fires or burns. There are three different types of wildfires. (1) **Ground fires** burn primarily in the thick layers of organic matter directly on the forest floor and even within the soil. Ground fires destroy root networks, peat, and compact litter. These fires spread extremely slowly and can smolder for months. (2) **Surface fires** burn litter and vegetative matter in the underbrush of a forest. (3) **Crown fires** spread rapidly by wind and move quickly by jumping along the tops of trees. There are two types of crown fires—(a) passive (or dependent) crown fires rely on heat transfer from surface fire, whereas (b) active (or independent) crown fires do not require any heat transfer from below. Active crown fires tend to occur with greater tree density and drier conditions. A firestorm is a mass, crown fire (also called a running crown fire, area fire, or conflagration). They are large, continuous, intense fires that lead to violent convection. They are characterized by destructively violent surface in-drafts near and beyond their perimeter. Crown fires are the most damaging and most difficult to contain. The intensity of crown fires enables the fire to produce its own wind gusts. These so-called fire whirls can move embers ahead of the fire front and ignite new fires. Fire whirls are spinning vortex columns of ascending hot air and gases rising from the fire. Large fire whirls have the intensity of a small tornado.

The conditions conducive to the occurrence of wildfires are not distributed equally across the United States. Wildfires have a much greater likelihood of occurring in the western part of the country. Although less frequent than in other areas, wildfires do occur in Louisiana. Wildfire danger can vary greatly season to season and is exacerbated by dry weather conditions. Factors that increase susceptibility to wildfires are the availability of fuel (e.g., litter and debris), topography (i.e., slope and elevation affect various factors like precipitation, fuel amount, and wind exposure), and specific meteorological conditions (e.g., low rainfall, high temperatures, low relative humidity, and winds). The potential for wildfire is often measured by the Keetch–Byram Drought Index (KBDI), which represents the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in the soil. The KBDI tries to measure the amount of precipitation needed to return soil to its full field capacity, with KBDI values ranging from 0 (moist soil) to 800 (severe drought).

According to the State of Louisiana Forestry Division, most forest fires in Louisiana are caused by intentional acts (arson) or carelessness and negligence committed by people, exacerbated by human confrontation with nature. The wildland–urban interface is the area in which development meets wildland vegetation, where both vegetation and the built environment provide fuel for fires. As development near wildland settings continues, more people and property are exposed to wildfire danger.

The Southern Group of State Foresters developed the Southern Wildfire Risk Assessment Portal to create awareness among the public and government sectors about the threat of wildfires in their areas. The Southern Wildfire Assessment Portal allows users to identify areas that are most prone to wildfires. The table on the next page summarizes the intensity levels assigned to areas in the Southern Wildfire Assessment Portal.

Table 2-49: Southern Group of State Foresters Wildfire Risk Assessment Fire Intensity Scale. (Source: Southern Wildfire Assessment Portal)

Fire Intensity	
Level	**Definition**
1	Lowest Intensity: Minimal direct wildfire impacts. Location has a minimal chance of being directly impacted by a wildfire.
2	Low Intensity: Small flames usually less than two feet long; small amount of very short range spotting possible. Fires are easy to suppress.
3	Moderate Intensity: Flames up to eight feet in length; short-range spotting is possible.
4	High Intensity: Large flames up to 30 feet in length; short-range spotting common; medium range spotting possible.
5	Highest Intensity: Very large flames up to 150 feet in length; profuse short-range spotting, frequent long-range spotting; strong fire induced winds.

Location

Wildfires impact areas that are populated with forests and grasslands. The worse-case scenario for St. Helena Parish and the jurisdictions of Greensburg and Montpelier is a level 4 on the fire intensity scale. The following figures display the areas of wildland-urban interface and intermix in St. Helena Parish and its jurisdictions.

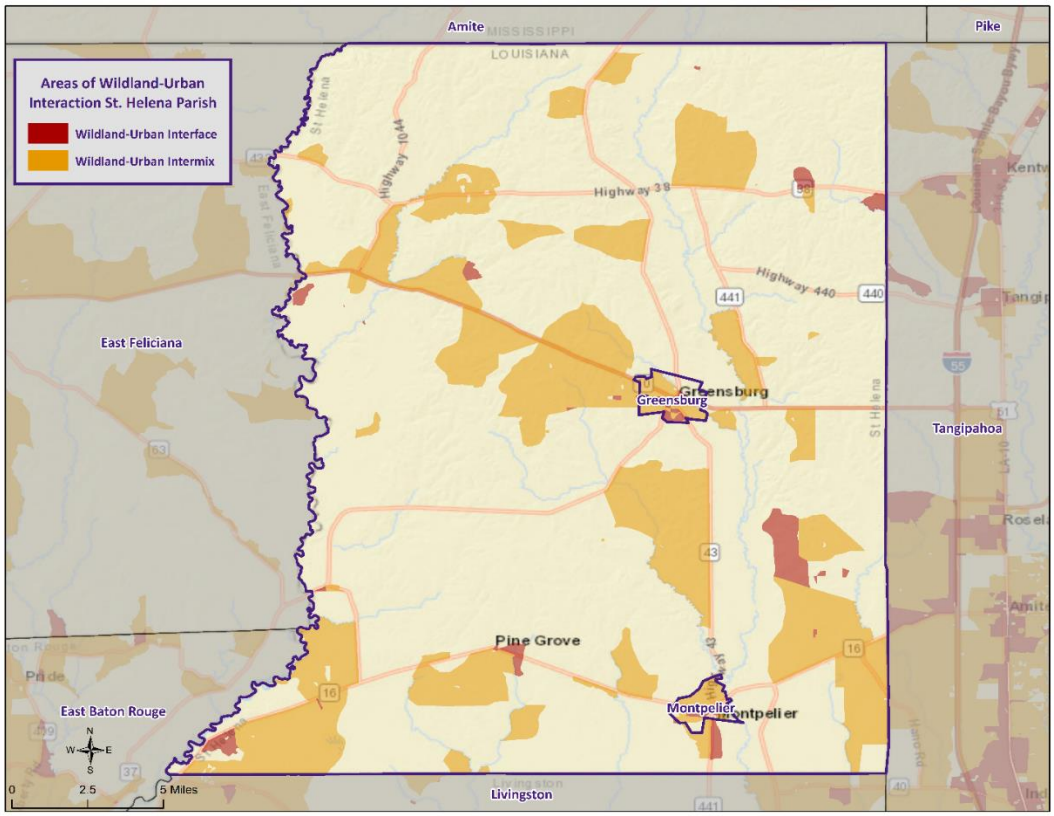


Figure 2-21: Wildland-Urban Interaction in St. Helena Parish.

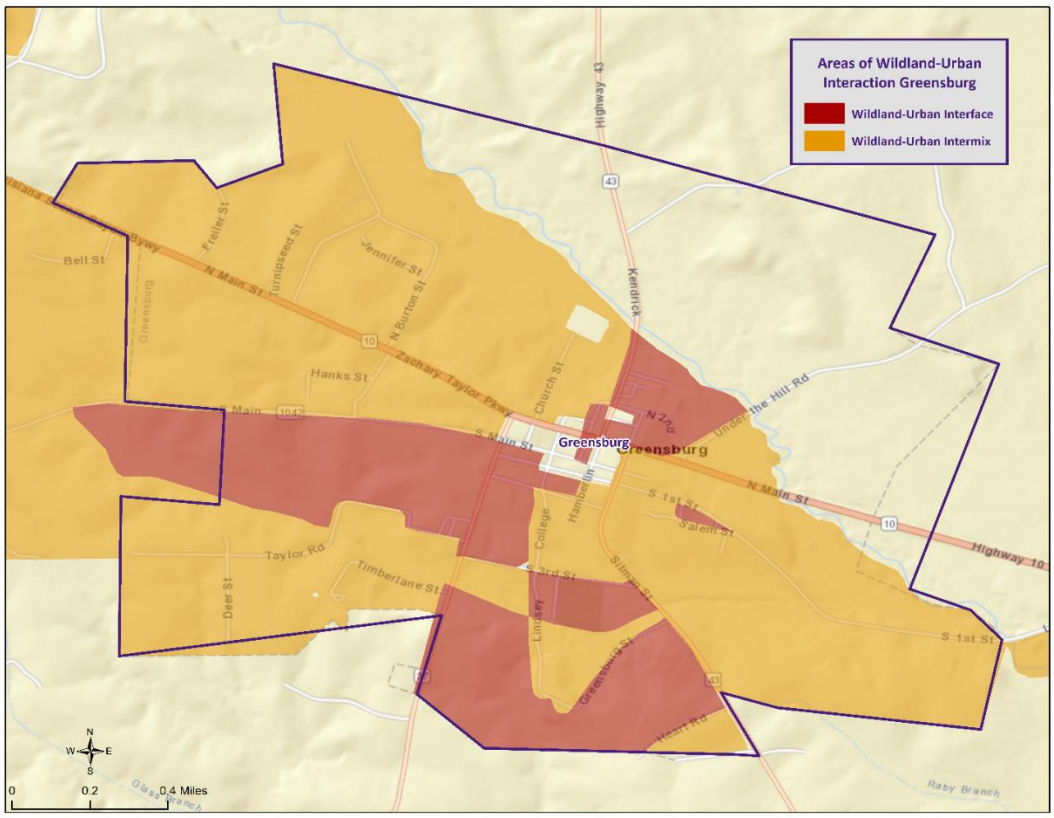


Figure 2-22: Wildland-Urban Interaction in Greensburg.

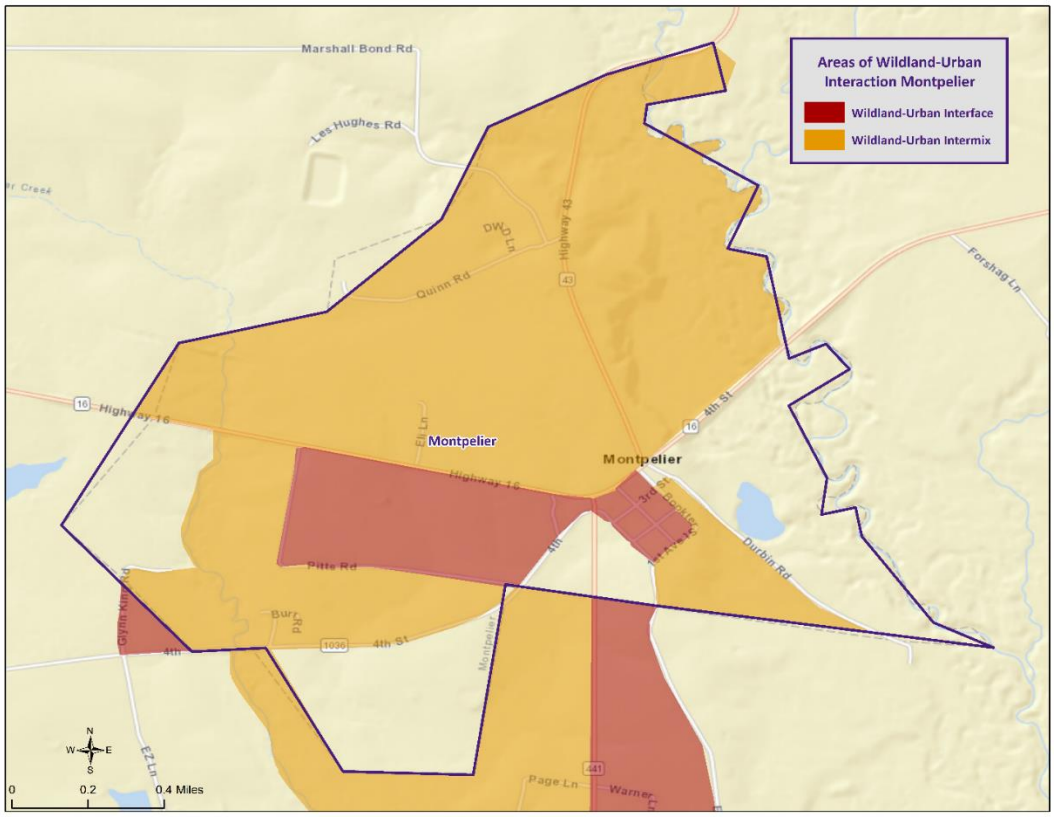


Figure 2-23: Wildland-Urban Interaction in Montpelier.

Previous Occurrences / Extents

The NCEI Storm Events report no wildfire events having occurred within the boundaries of St. Helena Parish between the years 1990 and 2020.

Frequency / Probability

Based on historical records, there have been no significant wildfire events within the boundaries of St. Helena Parish and the jurisdictions of Greensburg and Montpelier; therefore, the annual chance of occurrence for wildfires is estimated at less than 1%.

Estimated Potential Loses

According to the NCEI Storm Events database, there have been no wildfire events which have caused property damage, crop damage, injuries, or fatalities in St. Helena Parish and its jurisdictions. In assessing overall risk to population, the most vulnerable population throughout the parish consists of those residing in areas of wildland-urban interaction.

Using Hazus, along with wildland-urban interaction areas, the following table presents an analysis of total building exposure that is located within the wildland-urban interaction areas.

Table 2-50: Total Building Exposure by Wildland-Urban Interaction Areas. (Source: Hazus)

Jurisdiction	Estimated Total Building Exposure
St. Helena Parish (Unincorporated)	$364,580,000
Greensburg	$42,942,000
Montpelier	$17,375,000
Total	**$424,897,000**

Hazus also provides a breakdown by jurisdiction for seven primary sectors (Hazus occupancy) throughout the parish. Utilizing this information with the wildland-urban interaction areas allows for identifying the total exposure by jurisdiction. The total exposure for each jurisdiction by sector is listed in the following tables. These sectors are comprised of privately owned structures/facilities, as well as locally, state, and federally owned structures/facilities.

Table 2-51: Estimated Exposure for Unincorporated St. Helena Parish by Sector. (Source: Hazus)

St. Helena Parish (Unincorporated)	Estimated Total Building Exposure by Sector
Agricultural	$1,104,000
Commercial	$47,299,000
Government	$5,073,000
Industrial	$12,147,000
Religious / Non-Profit	$11,082,000
Residential	$286,883,000
Schools	$992,000
Total	**$364,580,000**

Table 2-52: Estimated Exposure for Greensburg by Sector.
(Source: Hazus)

Greensburg	Estimated Total Building Exposure by Sector
Agricultural	$0
Commercial	$2,467,000
Government	$124,000
Industrial	$107,000
Religious / Non-Profit	$2,395,000
Residential	$37,849,000
Schools	$0
Total	**$42,942,000**

Table 2-53: Estimated Exposure in Montpelier by Sector.
(Source: Hazus)

Montpelier	Estimated Total Building Exposure by Sector
Agricultural	$0
Commercial	$113,000
Government	$0
Industrial	$0
Religious / Non-Profit	$326,000
Residential	$16,936,000
Schools	$0
Total	**$17,375,000**

Threat to People

The total population within the parish that is located within a wildland-urban interaction area is shown in the table below:

Table 2-54: Population Located within a Wildland-Urban Interaction Areas.
(Source: 2010 U.S. Census Data)

Number of People Located in Wildland-Urban Interaction Areas			
Location	**# in Community**	**# in Hazard Area**	**% in Hazard Area**
St. Helena Parish (Unincorporated)	10,219	3,571	34.9%
Greensburg	718	517	72.0%
Montpelier	266	129	48.5%
Total	**11,203**	**4,217**	**37.6%**

The 2010 U.S. Census data was also extrapolated to provide an overview of populations located within wildland-urban interaction areas throughout the jurisdictions. The date is illustrated in the following tables:

Table 2-55: Population in Unincorporated St. Helena Parish Located within a Wildland-Urban Interaction Area.
(Source: 2010 Census Data)

St. Helena Parish (Unincorporated)		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	3,571	34.9%
Persons Under 5 Years	266	7.4%
Persons Under 18 Years	615	17.2%
Persons 65 Years and Over	504	14.1%
White	1,604	44.9%
Minority	1,967	55.1%

Table 2-56: Population in Greensburg Located within a Wildland-Urban Interaction Area.
(Source: 2010 Census Data)

Greensburg		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	517	72.0%
Persons Under 5 Years	35	6.8%
Persons Under 18 Years	81	15.7%
Persons 65 Years and Over	107	20.8%
White	256	49.6%
Minority	261	50.4%

Table 2-57: Population in Montpelier Located within a Wildland-Urban Interaction Area.
(Source: 2010 Census Data)

Montpelier		
Category	**Total Numbers**	**Percentage of People in Hazard Area**
Number in Hazard Area	129	48.5%
Persons Under 5 Years	7	5.6%
Persons Under 18 Years	24	18.4%
Persons 65 Years and Over	23	17.7%
White	58	45.1%
Minority	71	54.9%

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality facilities that could potentially be exposed to a wildfire hazard. Buildings were determined based on whether or not they fall within the wildfire-urban interface and/or intermix.

Winter Weather

For Louisiana and other parts of the southeastern United States, a severe winter storm occurs when humid air from the Gulf of Mexico meets a cold air mass from the north. Once the cold air mass crosses Louisiana, and the temperature drops, precipitation may fall in the form of snow or sleet. If the ground temperature is cold enough but air temperature is above freezing, rain can freeze instantly on contact with the surface, causing massive ice storms.

The winter storm events that affect the state of Louisiana are ice storms, freezes, and snow events. Of the winter storm types listed above, ice storms are the most dangerous. Ice storms occur during a precipitation event when warm air aloft exceeds 32 °F, while the surface remains below the freezing point. Ice will form on all surfaces when precipitation originating as rain or drizzle contacts physical structures. These ice storms are usually accompanied by freezing temperatures and occasionally snow.

Winter storms can be accompanied by strong winds, creating blizzard conditions with blinding, wind driven snow, severe drifting, and dangerous wind chill. These types of conditions are very rare in Louisiana, even in north Louisiana, but ice storms are more common. The climatic line between snow and rain often stalls over north Louisiana, creating ideal conditions for ice accumulation.

In a typical winter storm event, homes and buildings are damaged by ice accumulation, either directly by the weight of the ice on the roofs or by trees and/or limbs falling on buildings. While it is not very prevalent, this type of damage can occur in Louisiana, particularly in north Louisiana. Effects of winter weather more likely to occur in Louisiana, especially southern Louisiana, include extreme temperatures which can cause waterlines to freeze and sewer lines to rupture. This is especially true with elevated or mobile homes, since cold air is able to access more of the building's infrastructure. Winter storms can also have a devastating effect on agriculture, particularly on crops (like citrus) that are dependent on warm weather. Long exposures to low temperatures can kill many kinds of crops, and ice storms can weigh down branches and fruit.

Winter storms are not only a direct threat to human health through conditions like frostbite and hypothermia, but they are also an indirect threat to human health due to vehicle accidents and loss of power and heat, which can be disrupted for days. However, these impacts are rarely seen in Louisiana. As people use space heaters and fireplaces to stay warm, the risk of household fires and carbon monoxide poisoning increases.

Winter storm events occur throughout Louisiana usually during the colder calendar months of December, January, and February. Severe weather events do not occur with the same frequency across all parts of Louisiana. The northern quarter of Louisiana has historically experienced the most severe winter events between 1987 and 2012. The central, and to an even greater extent the southern parts of the state, such as Ascension Parish, have experienced the fewest severe winter events. The following table shows the Sperry-Piltz Ice Accumulation Index which is utilized to predict the potential damage to overhead utility systems from freezing rain and ice storms.

Table 2-58: Sperry-Piltz Ice Accumulation Index

Ice Damage Index	Damage and Impact Descriptions
0	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 – 5 days.
4	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structure. Outages lasting 5 – 10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

Location

Because a winter storm is a climatological based hazard and has the same probability of occurring in St. Helena Parish as all of the adjacent parishes, the entire planning area for St. Helena Parish is equally at risk for winter storms.

Previous Occurrences / Extents

The NCEI Storm Events Database reports three winter weather events wildfire events occurring within the boundaries of St. Helena Parish between the years 1990 and 2020. Since the last St. Helena Parish HMP Update in 2015, there have been no significant winter weather events.

Frequency / Probability

Based on historical records, there have been three significant winter weather events within the boundaries of St. Helena Parish and the jurisdictions of Greensburg and Montpelier; therefore, the annual chance of occurrence for winter weather is estimated at 10%.

Estimated Potential Loses

Since 1990, there have been three winter weather events that have resulted in property damages according to NCEI Storm Events Database. The total property damages associated with those storms have totaled approximately $1,000. To estimate the potential losses of a winter weather event on an annual basis, the total damages recorded for winter weather was divided by the total number of years of available winter weather in the NCEI Storm Events Database (1990 - 2020). This provides an annual estimated potential loss of $33 and $333 per event.

The following table provides an estimate of potential property losses for St. Helena Parish:

Table 2-59: Estimated Annual Losses for the St. Helena Parish Planning Area Resulting from Winter Weather.

Estimated Potential Annual Losses from Winter Weather		
Unincorporated Area	**Greensburg**	**Montpelier**
$30	$2	$1

There have been no reported injuries or fatalities as a result of winter weather over the 30-year record.

Vulnerability

See *Appendix C: Critical Facilities* for parish and municipality building exposure to winter weather.

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3. Capability Assessment

This section summarizes the results of efforts by each jurisdiction and other agency to develop policies, programs, and activities that directly or indirectly support hazard mitigation. It also provides information on resources and gaps in the parish's infrastructure, as well as relevant changes in its law since the last plan update, in order to suggest a mitigation strategy.

Through this assessment, St Helena Parish and the incorporated jurisdictions are able to identify strengths that could be used to reduce losses and reduce risk throughout the communities. It also identifies areas where mitigation actions might be used to supplement current capabilities and create a more resilient community before, during, and after a hazard event.

Policies, Plans and Programs

These capabilities are unique to the parish and jurisdictions, including planning, regulatory, administrative, technical, financial, and education and outreach resources. There are a number of mitigation-specific acts, plans, executive orders, and policies that lay out specific goals, objectives, and policy statements which already support or could support pre- and post-disaster hazard mitigation. Many of the ongoing plans and policies hold significant promise for hazard mitigation, and take an integrated and strategic look holistically at hazard mitigation in the St Helena Parish planning area to propose ways to continually improve it. These tools are valuable instruments in pre- and post-disaster mitigation as they facilitate the implementation of mitigation activities through the current legal and regulatory framework. Examples of existing documents include the following:

Table 3-1: Planning and Regulatory Capabilities

Planning and Regulatory				
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.				
	St. Helena Unincorporated	Town of Greensburg	Village of Montpelier	Comments
Plans	Yes / No			
Comprehensive / Master Plan	Yes	No	No	
Capital Improvements Plan	No	No	No	
Economic Development Plan	No	No	No	
Local Emergency Operations Plan	Yes	No	Yes	
Continuity of Operations Plan	No	No	No	
Transportation Plan	No	No	No	
Stormwater Management Plan	No	No	No	
Community Wildfire Protection Plan	Yes	No	Yes	
Other plans (redevelopment, recovery, coastal zone management)	No	No	No	
Building Code, Permitting and Inspections	Yes / No			
Building Code	Yes	No	Yes	
Score	No	No	No	
Fire Department ISO/PIAL rating	Yes	Yes	Yes	
Site plan review requirements	Yes	No	Yes	
Land Use Planning and Ordinances	Yes / No			
Zoning Ordinance	No	No	No	
Subdivision Ordinance	No	No	No	
Floodplain Ordinance	Yes	No	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	No	No	
Flood Insurance Rate Maps	Yes	No	Yes	
Acquisition of land for open space and public recreation uses	No	No	No	
Other	No	No	No	

All jurisdictions within the St Helena Parish planning area will work to expand their capabilities by adding to these plans, as well as work to create new plans that will address a long-term recovery and resiliency framework. In instances where there are no existing plans, there will be a concerted effort to explore opportunities to create new plans that will address long-term recovery and resiliency framework as parish and local resources allow.

Building Codes, Permitting, Land Use Planning and Ordinances

The St Helena Parish Police Jury provides oversight for building permits and codes, land use planning, and all parish ordinances.

As of the 2021 update, St Helena Parish and the incorporated communities ensure that all adopted building codes are enforced and in compliance relating to the construction of any structure within the boundaries of the parish. Building permits are required prior to beginning any type of construction or renovation projects, installation of electrical wiring, plumbing or gas piping, moving manufactured/modular or portable buildings, and reroofing or demolitions.

The St Helena Parish Police Jury is also responsible for enforcing the parish ordinances related to health and safety, property maintenance standards, and condemnation of unsafe structures.

The St Helena Parish Police Jury meets regularly to consider any proposed ordinance changes, and to take final actions on proposed changes.

While local capabilities for mitigation can vary from community to community, the jurisdictions within the St Helena Parish planning area as a whole have a system in place to coordinate and share these capabilities through the OHSEP and through this Parish Hazard Mitigation Plan.

Some programs and policies, such as the above described, might use complementary tools to achieve a common end, but fail to coordinate with or support each other. Thus, coordination among local mitigation policies and programs is essential to hazard mitigation.

Administration, Technical, and Financial

The jurisdictions within the St Helena Parish planning area have administrative and technical capabilities in place that may be utilized in reducing hazard impacts or implementing hazard mitigation activities. Such capabilities include staff, skillset, and tools available in the community that may be accessed to implement mitigation activities and to effectively coordinate resources. The ability to access and coordinate these resources is also important. The table on the following page shows examples of resources in place.

Table 3-2: Administration and Technical Capabilities

Administration and Technical				
Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.				
	St. Helena Unicorporated	Town of Greensburg	Village of Montpelier	Comments
Administration	Yes / No			
Planning Commission	No	No	No	
Mitigation Planning Committee	No	No	Yes	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	No	Yes	
Staff	Yes / No			
Chief Building Official	Yes	Yes	Yes	
Floodplain Administrator	No	Yes	Yes	
Emergency Manager	Yes	Yes	Yes	
Community Planner	No	No	Yes	
Civil Engineer	No	No	Yes	
GIS Coordinator	No	No	yes	
Grant Writer	No	No	Yes	
Other	No	No	No	
Technical	Yes / No			
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	No	No	
Hazard Data & Information	No	No	Yes	
Grant Writing	No	No	No	
Hazus Analysis	No	No	No	
Other	No	No	No	

Financial capabilities are the resources that St Helena Parish and its incorporated jurisdictions have access to or are eligible to use in order to fund mitigation actions. Costs associated with implementing the actions identified by the parish may vary from little to no cost actions, such as outreach efforts, or substantial action costs such acquisition of flood prone properties.

The following financial resources are available to fund mitigation actions in the St Helena Parish planning area:

Table 3-3: Financial Capabilities

Financial				
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.				
	St. Helena Unicorporated	Town of Greensburg	Village of Montpelier	Comments
Funding Resource	Yes / No			
Capital Improvements project funding	Yes	No	Yes	
Authority to levy taxes for specific purposes	Yes	Yes	No	
Fees for water, sewer, gas, or electric services	No	No	No	
Impact fees for new development	No	No	No	
Stormwater Utility Fee	No	No	No	
Community Development Block Grant (CDBG)	Yes	Yes	No	
Other Funding Programs	No	Yes	No	

Education and Outreach

A key element in hazard mitigation is promoting a safer, more disaster resilient community through education and outreach activities and/or programs. Successful outreach programs provide data and information that improves overall quality and accuracy of important information for citizens to feel better prepared and educated with mitigation activities. These programs enable the individual communities and the parish as a whole to maximize opportunities for implementation of activities through greater acceptance and consensus of the community.

The jurisdictions within the St Helena Parish planning area have existing education and outreach programs to implement mitigation activities, as well as communicate risk and hazard related information to its communities. Specifically, focusing on advising repetitive loss property owners of ways they can reduce their exposure to damage by repetitive flooding remains a priority for the entire parish. The existing programs are as follows:

Table 3-4: Education and Outreach Capabilities

Education and Outreach				
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.				
	St. Helena Unincorporated	Town of Greensburg	Village of Montpelier	Comments
Program / Organization	Yes / No			
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	No	Yes	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	No	No	
Natural Disaster or safety related school program	No	No	No	
Storm Ready certification	No	No	Yes	
Firewise Communities certification	No	No	Yes	
Public/Private partnership initiatives addressing disaster-related issues	No	No	No	
Other	No	No	No	

As reflected with above existing regulatory mechanisms, programs and resources within the parish, the jurisdictions within the St Helena Parish planning area remain committed to expanding and improving on the existing capabilities within the parish. Communities will work together along with St Helena Parish toward increased participation in funding opportunities and available mitigation programs. Should funding become available, the hiring of additional personnel to dedicate to hazard mitigation initiatives and programs, as well as increasing ordinances within the parish, will enhance and expand overall risk reduction for the entirety of St Helena Parish.

Flood Insurance and Community Rating System

Participation in the CRS strengthens local capabilities by lowering flood insurance premiums for jurisdictions that exceed NFIP minimum requirements. As noted in the CRS Eligible Communities List effective April 1, 2021, St Helena Parish, the Town of Greensburg, and the Village of Montpelier do not participate in the program.

The Federal Emergency Management Agency's National Flood Insurance Program (NFIP) administers the Community Rating System (CRS). Under the CRS, flood insurance premiums for properties in participating

communities are reduced to reflect the flood protection activities that are being implemented. This program can have a major influence on the design and implementation of flood mitigation activities, so a brief summary is provided here.

A community receives a CRS classification based upon the credit points it receives for its activities. It can undertake any mix of activities that reduce flood losses through better mapping, regulations, public information, flood damage reduction and/or flood warning and preparedness programs. There are ten CRS classes: Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction (see *Figure 3-1*). A community that does not apply for the CRS or that does not obtain the minimum number of credit points is a class 10 community.

CLASS	DISCOUNT	CLASS	DISCOUNT
1	45%	6	20%
2	40%	7	15%
3	35%	8	10%
4	30%	9	5%
5	25%	10	–
SFHA (Zones A, AE, A1–A30, V, V1–V30, AO, and AH): Discount varies depending on class.			
SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1–A30, AR/AH, and AR/AO): 10% discount for Classes 1–6; 5% discount for Classes 7–9.*			
Non-SFHA (Zones B, C, X, D): 10% discount for Classes 1–6; 5% discount for Classes 7–9.			

Figure 3-1: CRS Discounts by Class (Source: FEMA)

As of April 2021, 352 communities in the State of Louisiana participate in the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). Of these communities, 46 (or 13%) participate in the Community Rating System (CRS). Jefferson Parish leads the state with a rating of Class 5, followed by three cities with a rating of Class 6: the Cities of Gretna and Kenner in Jefferson Parish and the City of Mandeville in St. Tammany Parish. Of the top fifty Louisiana communities, in terms of total flood insurance policies held by residents, 27 participate in the CRS. The remaining 23 communities present an outreach opportunity for encouraging participation in the CRS.

The CRS provides an incentive not just to start new mitigation programs, but to keep them going. There are two requirements that "encourage" a community to implement flood mitigation activities. Once the parish has obtained a CRS rating and is a participant, the parish will receive CRS credit for this plan when it is adopted. To retain that credit, though, the parish must submit an evaluation report on progress toward implementing this plan to FEMA by October 1 of each year. That report must be made available to the media and the public. Second, the parish must annually recertify to FEMA that it is continuing to implement its CRS credited activities. Failure to maintain the same level of involvement in flood protection can result in a loss of CRS credit points and a resulting increase in flood insurance rates to residents.

In 2011[1], the National Flood Insurance Program (NFIP) completed a comprehensive review of the Community Rating System (CRS) that resulted in the release of a new CRS Coordinator's Manual. The changes to the 2013 CRS Coordinator's Manual are the result of a multi-year program evaluation that included input from a broad group of contributors to evaluate the CRS and refine the program to meet its stated goals. The changes helped to drive new achievements in the following six core flood loss reduction areas important to the NFIP: (1) reduce liabilities to the NFIP Fund; (2) improve disaster resiliency and sustainability of communities; (3) integrate a Whole Community approach to addressing emergency management; (4) promote natural and beneficial functions of floodplains; (5) increase understanding of risk, and; (6) strengthen adoption and enforcement of disaster-resistant building codes.

[1] https://www.fema.gov/national-flood-insurance-program-community-rating-system

Since the revision of the 2013 Coordinator's Manual, FEMA released the 2017 CRS Coordinator's Manual which continued the evolution of the CRS program and its mission to reward communities that prioritize mindful floodplain regulations. As with the 2013 manual, the changes made in the 2017 manual impact each CRS community differently. Some communities see an increase in the points they receive since points for certain activities have increased (e.g., Activity 420 Open Space Preservation). Other communities receive fewer points for certain activities (e.g., Activity 320 Map Information Service). It is likely that some communities with marginal CRS Class 9 programs have to identify new CRS credits in order to remain in the CRS class. Most notably, as it relates to this hazard mitigation plan, more credit was made available for Activity 410 Floodplain Mapping.

Typically, CRS communities do not request credit for all the activities they are currently implementing unless it would earn enough credit to advance the community to a higher CRS Class. A community that finds itself losing CRS credit with the 2017 manual could likely identify activities deserving credit they had not previously received. Due to the changes in both activities and CRS points, community CRS coordinators should speak with their ISO/CRS Specialist to understand how the 2017 manual will impact their community and when.

In addition to the direct financial reward for participating in the Community Rating System, there are many other reasons to participate in the CRS. As FEMA staff often say, "If you are only interested in saving premium dollars, you're in the CRS for the wrong reason."

The other benefits that are more difficult to measure in dollars include:

1. The activities credited by the CRS provide direct benefits to residents, including:
   – Enhanced public safety
   – A reduction in damage to property and public infrastructure
   – Avoidance of economic disruption and losses
   – Reduction of human suffering
   – Protection of the environment

2. A community's flood programs will be better organized and more formal. Ad hoc activities, such as responding to drainage complaints rather than an inspection program, will be conducted on a sounder, more equitable basis.

3. A community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.

4. Technical assistance in designing and implementing a number of activities is available at no charge from the Insurance Services Office.

5. The public information activities will build a knowledgeable constituency interested in supporting and improving flood protection measures.

6. A community would have an added incentive to maintain its flood programs over the years. The fact that its CRS status could be affected by the elimination of a flood related activity or a weakening of the regulatory requirements for new developments would be taken into account by the governing board when considering such actions.

7. Every time residents pay their insurance premiums, they are reminded that the community is working to protect them from flood losses, even during dry years.

NFIP Worksheets

Parish NFIP worksheets can be found in *Appendix E: State Required Worksheets*.

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4. Mitigation Strategy

Introduction

The Hazard Mitigation Strategy for St Helena Parish and its incorporated communities have a common guiding principle and is the demonstration of the parish's commitment to reduce risks from hazards. The strategy also serves as a guide for parish and local decision makers as they commit resources to reducing the effects of hazards.

Officials from all jurisdictions within the planning area confirmed the goals, objectives, actions and projects over the period of the hazard mitigation plan update process. The mitigation actions and projects in this 2021 HMP update are a product of analysis and review of the St Helena Parish Hazard Mitigation Plan Steering Committee under the coordination of the St Helena Parish Office of Homeland Security and Emergency Preparedness. The committee was presented a list of projects and actions, new and from the 2015 plan, for review from January 2021 – April 2021.

An online public opinion survey of St Helena Parish residents was conducted between December 2020 and May 2021. The survey was designed to capture public perceptions and opinions regarding natural hazards in the St Helena Parish planning area. In addition, the survey sought to collect information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards.

This activity was created in an effort to confirm that the goals and action items developed by the St. Helena Parish Hazard Mitigation Plan Steering Committee are representative of the outlook of the community at large. However, because there were no responses to the survey, this public feedback could not be incorporated into the plan. The full St. Helena Parish survey can be found at the following link:

https://www.surveymonkey.com/r/StHelenaHM2020

Goals

The goals represent the guidelines that the parish and its communities want to achieve with this plan update. To help implement the strategy and adhere to the mission of the Hazard Mitigation Plan, the preceding section of the plan update was focused on identifying and quantifying the risks faced by the residents and property owners in St Helena Parish from natural and manmade hazards. By articulating goals and objectives based on the previous plans, the risk assessment results, and intending to address those results, this section sets the stage for identifying, evaluating, and prioritizing feasible, cost effective, and environmentally sound actions to be promoted at the parish and municipal level – and to be undertaken by the state for its own property and assets. By doing so, St Helena Parish can make progress toward reducing identified risks.

For the purposes of this plan update, goals and action items are defined as follows:

- **Goals** are general guidelines that explain what the parish wants to achieve. Goals are expressed as broad policy statements representing desired long-term results.
- **Action Items** are the specific steps (projects, policies, and programs) that advance a given goal. They are highly focused, specific, and measurable.

The current goals of the St Helena Parish Hazard Mitigation Plan Update Steering Committee represent long-term commitments by the parish. After assessing these goals, the committee decided that the current remain valid.

The goals are as follows:

Goal 1: Identify and pursue preventative measures that will reduce future damages from hazards.

Goal 2: Enhance public awareness and understanding of disaster preparedness.

Goal 3: Reduce repetitive flood losses in the parish.

Goal 4: Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.

The Mitigation Action Plan focuses on actions to be taken by St Helena Parish and its communities. All of the activities in the Mitigation Action Plan will be focused on helping the parish and its communities in developing and funding projects that are not only cost effective but also meet the other DMA 2000 criteria of environmental compatibility and technical feasibility.

The Hazard Mitigation Plan Steering Committee reviewed and evaluated the potential action and project lists in which consideration was given to a variety of factors. Such factors include determining a project's eligibility for federal mitigation grants as well as its ability to be funded. This process required evaluation of each project's engineering feasibility, cost effectiveness, and environmental and cultural factors.

2021 Mitigation Actions and Update on Previous Plan Actions

The St Helena Parish Hazard Mitigation Plan Steering Committee identified new actions that would reduce and/or prevent future damage within the St Helena Parish planning area. In that effort, the committee focused on a comprehensive range of specific mitigation actions. These actions were identified in thorough fashion by the consultant team and the committee by way of frequent and open communications and meetings held throughout the planning process. The addition of these new actions, coupled with any ongoing and/or carried over projects from their previous update, provide St Helena Parish with a solid mitigation strategy through which risk and losses will be reduced throughout the parish and its communities.

As outlined in the Local Mitigation Planning Handbook the following are eligible types of mitigation actions:

- **Local Plans and Regulations –** These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.
- **Structure and Infrastructure Projects –** These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area, and also includes projects to construct manmade structures to reduce the impact of hazards.
- **Natural System Protection –** These actions minimize the damage and losses and also preserve or restore the functions of natural systems.
- **Education and Awareness Programs –** These actions inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them.

Status updates for actions included in the previous plan can be found on the following pages. Additionally, new mitigation actions agreed upon by the parish and its jurisdictions are included.

St Helena Parish Mitigation Actions

Previous Action Update

St. Helena Parish - Unincorporated							
Action	**Description**	**Funding Source**	**Timeframe**	**Responsible Agency**	**Hazard**	**Goal**	**Status**
SH1: Hardening of Critical Facilities Building	Consider mitigation measures that will enhance the performance of new buildings, expansions, or infrastructure during high wind and flood events, as these projects are proposed. This may include hardening structures, installing hurricane clips, or elevating utilities for communications facilities, critical infrastructure, and medical facilities.	Parish/ Grant Funding	As funds are made available	St. Helena Parish OHSEP	Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	1, 4	Not Started - Carried Over
SH2: Drainage Projects	Improve drainage by implementing localized interior drainage projects such as: adding new drainage pumps, enlarging culverts, lining canals with concrete, replacing/ improving any substandard bridges, berms, retention ponds, and other drainage projects where necessary.	Parish/ Grant Funding	January, 2017	St. Helena Parish Engineer/Public Works	Tropical Cyclones, Flooding	1, 3, 4	Ongoing
SH3: Construction of emergency shelters	Provide shelter to local residents by constructing new emergency shelters in the parish	Parish/ Grant Funding	As funds are made available	St. Helena Planning and Zoning	Tornadoes, Tropical Cyclones, Thunderstorms - High Wind	1, 4	Not Started - Carried Over
SH4: Road and infrastructure improvements	Implement mitigation measures that will alleviate road erosion within the parish.	Parish/ Grant Funding	As funds are made available	St. Helena Parish Emergency Manager	Flooding, Tropical Cyclones	1, 4	Ongoing

SH5: Mitigation Outreach and Education	Provide brochures and other publications through media, mail, libraries, Post Offices, and/or the Internet; Sponsor a "Multi-Hazard Awareness Week"; Distribute public awareness information and potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, and parish hazards awareness website, and an educational program for school age children or "how to" classes in retrofitting by local merchants; create public education programs for self-protection mitigation procedures for homes and businesses;	Parish/ Grant Funding	12.31.2017	St. Helena Parish Emergency Manager	Flooding, Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	2	Ongoing
SH6: Elevation Projects	Pursue elevation projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3, 4	Not Started - Carried Over
SH7: Acquisition Projects	Pursue acquisition projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3, 4	Not Started - Carried Over
SH8: Floodproofing Projects	Floodproofing/pilot reconstruction projects and structural solutions to flooding using available grant funding for the repetitive loss structures. Annually review and correct the Repetitive Loss List by submitting correction worksheets to FEMA	Parish/ Grant Funding	As funds are made available	St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3, 4	Not Started - Carried Over
SH9: Communication System Implementation	Implement a public notification system, such as sirens or a call down system with a backup communication system.	Parish/ Grant Funding	As funds are made available	St. Helena Parish Emergency Manager	Flooding, Tornadoes, Tropical Cyclones	2, 4	Not Started - Carried Over

SH10: Upgrade of current communication infrastructure and equipment	Improve both technological and administrative communication capabilities among fire, police, 911, and other state and local emergency operations through improved planning and the upgrading of communication infrastructure and equipment.	Parish/ Grant Funding	Ongoing as funds are made available	St. Helena Parish Emergency Manager	Flooding, Tornadoes, Tropical Cyclones	2, 4	Not Started - Carried Over
SH11: CRS Participation	Participate in the "Community Rating system (CRS)" of the NFIP. Inform the public about the CRS program and the fact that it could result in a discount in Flood Insurance Premiums. Review the existing floodplain ordinance and see how it could be augmented to increase CRS potential and further reduce the flood insurance premiums.	Parish/ Grant Funding	As funds are made available	St. Helena Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Not Started - Carried Over
SH12: Flood regulation of future development	Develop and pass ordinances to help regulate new development in the Parish, such as requiring proper drainage with adequate sloping; stormwater retention ponds; dikes; levees and floodwalls if appropriate, and requiring freeboard above the Base Flood Elevation (BFE) in flood prone areas. Encourage new subdivision developments to install underground utilities, which would help reduce the chances of power outages; Develop and pass building regulations that will require adequately sized water distribution lines and fire hydrants.	Police Jury	As funds are made available	St. Helena Planning Director	Flooding, Tropical Cyclones	1, 3	Ongoing

SH13: Construction of safe rooms	Construct safe rooms for governmental buildings and critical facilities	Parish/ Grant Funding	As funds are made available	St. Helena Parish OHSEP	Tornadoes, Thunderstorms - High Wind, Tropical Cyclones	1, 4	Not Started - Carried Over
SH14: Lightning protection projects	Installation of lightning rods and surge protectors for governmental buildings and critical facilities	Parish Funding	As funds are made available	St. Helena Parish OHSEP	Thunderstorms - Lightning	1, 4	Ongoing
SH15: Drainage Projects	Develop a master drainage plan which will evaluate drainage projects at major drainage laterals to determine best method of increasing drainage capacity. Implement recommended projects resulting from drainage plan; Improve drainage by adding new drainage pumps, enlarging culverts, replacing/improving any substandard bridges, and other drainage projects where necessary.	Parish Funding	As funds are made available	St. Helena Parish OHSEP	Flooding, Tropical Cyclones	1, 3, 4	Ongoing
SH16: Road and Infrastructure Improvements	Implement mitigation measures that will alleviate road erosion within the parish.	Parish Funding	As funds are made available	St. Helena Parish OHSEP	Flooding, Tropical Cyclones	1, 4	Deleted
SH17: Communication System Implementation	Improve both technological and administrative communication capabilities among fire, police, 911, and other state and local emergency operations through improved planning and the upgrading of communication infrastructure and equipment.	Parish Funding	As funds are made available	St. Helena Parish OHSEP	Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	2, 4	Deleted

New Mitigation Actions

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. HELENA PARISH UNINCORPORATED	
	DESCRIPTION
MITGATION ACTION	Increase Wildfire Risk Awareness
LEAD AGENCY	Fire Department
SUPPORTING AGENCIES	St. Helena OHSEP Office
TIMELINE	1-5 Years
COST ESTIMATE	$3+ Million
POSSIBLE FUNDING SOURCE(S)	HGMP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 2. Enhance public awareness and understanding of disaster preparedness.
PRIORITY	Medium
Action Description	Develop citizen outreach program which targets citizens, businesses, developers, landscapers and insurers to increase awareness of wildfire risk and strategies for protecting homes and infrastructure. Also organize a community event with local fire department to provide an overview of the community's wildland urban interface.
Type of Mitigation Action	Education and Awareness Program
How Action Aligns with Risk Reduction	Making citizens of parish and community more aware of wildfire hazards will reduce losses for future wildfire events
Current Status of Action	New
Hazard Addressed	Wildfires

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. HELENA PARISH UNINCORPORATED	
	DESCRIPTION
MITGATION ACTION	Create Defensible Space Around Structures and Infrastructure
LEAD AGENCY	Fire Department
SUPPORTING AGENCIES	St. Helena OHSEP Office
TIMELINE	1-5 Years
COST ESTIMATE	$3+ Million
POSSIBLE FUNDING SOURCE(S)	HGMP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 2. Enhance public awareness and understanding of disaster preparedness. 4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.
PRIORITY	Medium
Action Description	Implementation of defensible space programs to reduce risk to structures and infrastructure to include: creating buffers around residential and non-residential structures through the removal or reduction of flammable vegetation, including tree branches. Replacement of flammable vegetation with less flammable species. Specifically targeting infrastructure systems.
Type of Mitigation Action	Education and Awareness Programs Structure and Infrastructure Projects
How Action Aligns with Risk Reduction	Reduces risk of infrastructure system failures due to fire, saves civilian property and businesses.
Current Status of Action	New
Hazard Addressed	Wildfires

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. HELENA PARISH UNINCORPORATED	
	DESCRIPTION
MITGATION ACTION	Conduct Winter Weather Risk Awareness Activities
LEAD AGENCY	St. Helena OHSEP
SUPPORTING AGENCIES	Mayor's Office - Village of Montpelier; Mayor's Office – Town of Greensburg
TIMELINE	1-5 Years
COST ESTIMATE	$2+ Million
POSSIBLE FUNDING SOURCE(S)	HGMP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 2. Enhance public awareness and understanding of disaster preparedness.
PRIORITY	High
Action Description	Improvement and implementation of public awareness activities relating to winter weather. Production and distribution of emergency preparedness information, including safety strategies for winter weather in driver education materials and carbon monoxide education.
Type of Mitigation Action	Education and Awareness Programs
How Action Aligns with Risk Reduction	Greater awareness of the hazard allows citizens and communities to prepare pre-event.
Current Status of Action	New
Hazard Addressed	Winter Weather

Additional Supporting Information:

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS ST. HELENA PARISH	
	DESCRIPTION
MITGATION ACTION	Heating Centers Throughout St Helena Parish
LEAD AGENCY	St. Helena OHSEP
SUPPORTING AGENCIES	Mayor's Office - Village of Montpelier; Mayor's Office – Town of Greensburg
TIMELINE	1-5 Years
COST ESTIMATE	$7+ Million
POSSIBLE FUNDING SOURCE(S)	HMGP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.
PRIORITY	High
Action Description	Identification and utilization of facilities capable of providing accessible heating centers in the community for vulnerable populations during winter weather events.
Type of Mitigation Action	Structure and Infrastructure Project
How Action Aligns with Risk Reduction	Outreach with information for vulnerable populations for heating centers will allow for those most at risk to find locations with available heating and blankets during winter weather events with long term power outages.
Current Status of Action	New
Hazard Addressed	Winter Weather

Additional Supporting Information:

Town of Greensburg Mitigation Actions

Previous Action Update

Town of Greensburg							
Action	**Description**	**Funding Source**	**Timeframe**	**Responsible Agency**	**Hazard**	**Goal**	**Status**
G1: Hardening of Critical Facilities Building	Consider mitigation measures that will enhance the performance of new buildings, expansions, or infrastructure during high wind and flood events, as these projects are proposed. This may include hardening structures, installing hurricane clips, or elevating utilities for communications facilities, critical infrastructure, and medical facilities.	Parish/ Grant Funding	As funds are made available	Town of Greensburg, Parish OHSEP	Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	1, 4	Not Started - Carried Over
G2: Mitigation Outreach and Education	Provide brochures and other publications through media, mail, libraries, Post Offices, and/or the Internet; Sponsor a "Multi-Hazard Awareness Week"; Distribute public awareness information and potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, and parish hazards awareness website, and an educational program for school age children or "how to" classes in retrofitting by local merchants; create public education programs for self-protection mitigation procedures for homes and businesses;	Parish/ Grant Funding	As funds are made available	Town of Greensburg, Mayors and Parish Emergency Manager	Flooding, Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	2	Not Started - Carried Over

G3: CRS Participation	Participate in the "Community Rating system (CRS)" of the NFIP. Inform the public about the CRS program and the fact that it could result in a discount in Flood Insurance Premiums. Review the existing floodplain ordinance and see how it could be augmented to increase CRS potential and further reduce the flood insurance premiums.	Parish/ Grant Funding	As funds are made available	Town of Greensburg, Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Not Started - Carried Over
G4: Flood regulation of future development	Develop and pass ordinances to help regulate new development in the Parish, such as requiring proper drainage with adequate sloping; stormwater retention ponds; dikes; levees and floodwalls if appropriate, and requiring freeboard above the Base Flood Elevation (BFE) in flood prone areas. Encourage new subdivision developments to install underground utilities, which would help reduce the chances of power outages; Develop and pass building regulations that will require adequately sized water distribution lines and fire hydrants.	Police Jury	As funds are made available	Town of Greensburg, Planning Director	Flooding, Tropical Cyclones	1, 3	Ongoing
G5: Drainage Projects	Improve drainage by implementing localized interior drainage projects such as: adding new drainage pumps, enlarging culverts, lining canals with concrete, replacing/improving any substandard bridges, berms, retention ponds, and other drainage projects where necessary.	Parish/ Grant Funding	January 2017	Town of Greensburg, St. Helena Parish Engineer/ Public Works	Flooding, Tropical Cyclones	1, 3, 4	Ongoing

G6: Elevation Projects	Pursue elevation projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Ongoing
G7: Acquisition Projects	Pursue acquisition projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Not Started - Carried Over
G8: Construction of safe rooms	Construct safe rooms for governmental buildings and critical facilities	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish OHSEP	Tornadoes, Thunderstorms - High Wind, Tropical Cyclones	1, 4	Not Started - Carried Over
G9: Lightning protection projects	Installation of lightning rods and surge protectors for governmental buildings and critical facilities	Parish Funding	As funds are made available	Town of Greensburg, St. Helena Parish OHSEP	Thunderstorms - Lightning	1, 4	Ongoing
G10: Drainage Projects	Develop a master drainage plan which will evaluate drainage projects at major drainage laterals to determine best method of increasing drainage capacity. Implement recommended projects resulting from drainage plan; Improve drainage by adding new drainage pumps, enlarging culverts, replacing/improving any substandard bridges, and other drainage projects where necessary.	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish OHSEP	Flooding, Tropical Cyclones	1, 3, 4	Delete

G11: Hardening of Critical Facilities Building	Develop and pass ordinances to help regulate new development in the Parish, such as requiring proper drainage with adequate sloping; stormwater retention ponds; dikes; levees and floodwalls if appropriate, and requiring freeboard above the Base Flood Elevation (BFE) in flood prone areas. Encourage new subdivision developments to install underground utilities, which would help reduce the chances of power outages; Develop and pass building regulations that will require adequately sized water distribution lines and fire hydrants.	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish OHSEP	Flooding, Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	1, 4	Delete
G12: Hardening of Critical Facilities Building	Consider mitigation measures that will enhance the performance of new buildings, expansions, or infrastructure during high wind and flood events, as these projects are proposed. This may include hardening structures, installing hurricane clips, or elevating utilities for communications facilities, critical infrastructure, and medical facilities.	Parish/ Grant Funding	As funds are made available	Town of Greensburg, St. Helena Parish OHSEP	Flooding, Tropical Cyclones	1, 4	Delete

New Mitigation Actions

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS TOWN OF GREENSBURG	
	DESCRIPTION
MITGATION ACTION	Heating Centers
LEAD AGENCY	Mayor's Office – Town of Greensburg
SUPPORTING AGENCIES	St Helena OHSEP
TIMELINE	1-5 Years
COST ESTIMATE	$7+ Million
POSSIBLE FUNDING SOURCE(S)	HMGP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.
PRIORITY	High
Action Description	Identification and utilization of facilities capable of providing accessible heating centers in the community for vulnerable populations during winter weather events.
Type of Mitigation Action	Structure and Infrastructure Project
How Action Aligns with Risk Reduction	Outreach with information for vulnerable populations for heating centers will allow for those most at risk to find locations with available heating and blankets during winter weather events with long term power outages.
Current Status of Action	New
Hazard Addressed	Winter Weather

Village of Montpelier

Previous Action Update

Village of Montpelier							
Action	**Description**	**Funding Source**	**Timeframe**	**Responsible Agency**	**Hazard**	**Goal**	**Status**
M1: Hardening of Critical Facilities Building	Consider mitigation measures that will enhance the performance of new buildings, expansions, or infrastructure during high wind and flood events, as these projects are proposed. This may include hardening structures, installing hurricane clips, or elevating utilities for communications facilities, critical infrastructure, and medical facilities.	Parish/ Grant Funding	As funds are made available	Village of Montpelier, Parish OHSEP	Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	1, 4	Not Started - Carried Over
M2: Mitigation Outreach and Education	Provide brochures and other publications through media, mail, libraries, Post Offices, and/or the Internet; Sponsor a "Multi-Hazard Awareness Week"; Distribute public awareness information and potential mitigation measures using the local newspaper, utility bill inserts, inserts in the phone book, and parish hazards awareness website, and an educational program for school age children or "how to" classes in retrofitting by local merchants; create public education programs for self-protection mitigation procedures for homes and businesses;	Parish/ Grant Funding	As funds are made available	Village of Montpelier, Mayors and Parish Emergency Manager	Flooding, Tornadoes, Tropical Cyclones, Thunderstorms - High Wind, Hail, Lightning	2	Ongoing
M3: CRS Participation	Participate in the "Community Rating system (CRS)" of the NFIP. Inform the public about the CRS program and the fact that it could result in a discount in Flood Insurance Premiums. Review the existing floodplain ordinance and see how it could be augmented to increase CRS potential and further reduce the flood insurance premiums.	Parish/ Grant Funding	As funds are made available	Village of Montpelier, Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Not Started - Carried Over

M4: Flood regulation of future development	Develop and pass ordinances to help regulate new development in the Parish, such as requiring proper drainage with adequate sloping; stormwater retention ponds; dikes; levees and floodwalls if appropriate, and requiring freeboard above the Base Flood Elevation (BFE) in flood prone areas. Encourage new subdivision developments to install underground utilities, which would help reduce the chances of power outages; Develop and pass building regulations that will require adequately sized water distribution lines and fire hydrants.	Police Jury	As funds are made available	Village of Montpelier, Planning Director	Flooding, Tropical Cyclones	1, 3	Ongoing
M5: Drainage Projects	Improve drainage by implementing localized interior drainage projects such as: adding new drainage pumps, enlarging culverts, lining canals with concrete, replacing/improving any substandard bridges, berms, retention ponds, and other drainage projects where necessary.	Parish/ Grant Funding	January 2017	Village of Montpelier, St. Helena Parish Engineer/ Public Works	Flooding, Tropical Cyclones	1, 3, 4	Ongoing
M6: Elevation Projects	Pursue elevation projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	Village of Montpelier, St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Ongoing
M7: Acquisition Projects	Pursue acquisition projects for severe repetitive loss properties	Parish/ Grant Funding	As funds are made available	Village of Montpelier, St. Helena Parish Emergency Manager/ Floodplain Manager	Flooding, Tropical Cyclones	1, 3	Ongoing
M8: Construction of safe rooms	Construct safe rooms for governmental buildings and critical facilities	Parish/ Grant Funding	As funds are made available	Village of Montpelier, St. Helena Parish OHSEP	Tornadoes, Thunderstorms - High Wind, Tropical Cyclones	1, 4	Not Started - Carried Over
M9: Lightning protection projects	Installation of lightning rods and surge protectors for governmental buildings and critical facilities	Parish Funding	As funds are made available	Village of Montpelier, St. Helena Parish OHSEP	Thunderstorms - Lightning	1, 4	Not Started - Carried Over

M10: Drainage Projects	M10: Develop a master drainage plan which will evaluate drainage projects at major drainage laterals to determine best method of increasing drainage capacity. Implement recommended projects resulting from drainage plan; Improve drainage by adding new drainage pumps, enlarging culverts, replacing/improving any substandard bridges, and other drainage projects where necessary.	Parish/ Grant Funding	As funds are made available	Village of Montpelier, St. Helena Parish OHSEP	Flooding, Tropical Cyclones	1,3,4	Delete

New Mitigation Actions

IMPLEMENTATION KEY FOR POTENTIAL HAZARD MITIGATION ACTIONS VILLAGE OF MONTPELIER	
	DESCRIPTION
MITGATION ACTION	Waterway Debris Removal Program
LEAD AGENCY	Montpelier Mayor's Office
SUPPORTING AGENCIES	St. Helena Parish OHSEP
TIMELINE	1-5 Years
COST ESTIMATE	$8+ Million
POSSIBLE FUNDING SOURCE(S)	HGMP, Federal, State
ASSOCIATED GOALS	1. Identify and pursue preventative measures that will reduce future damages from hazards. 3. Reduce repetitive flood losses in the parish. 4. Facilitate sound development in the parish to reduce or eliminate the potential impact of hazards.
PRIORITY	High
Action Description	Establish waterway debris removal program and procedures to address issues with water flow in waterways throughout St. Helena Parish and the communities of Montpelier and Greensburg
Type of Mitigation Action	Local Plans and Regulations Natural Systems Protection
How Action Aligns with Risk Reduction	By removing debris from waterways, vulnerability of properties and communities along waterways from flooding hazards are reduced
Current Status of Action	New
Hazard Addressed	Flooding, Tropical Cyclones

Additional Supporting Information:

Action Prioritization

During the prioritization process, the steering committee considered the costs and relative benefits of each new action. Costs can usually be listed in terms of dollars, although at times it involves staff time rather than the purchase of equipment or services that can be readily measured in dollars. In most cases, benefits, such as lives saved or future damage prevented, are hard to measure in dollars. Therefore, many projects were prioritized with these factors in mind. In addition, prioritization of the mitigation actions was performed based on the following economic criteria: i) whether the action can be performed with the existing parish resources; ii) whether the action requires additional funding from external sources; and iii) relative costs of the mitigation actions.

In all cases, the committee concluded that the benefits (in terms of reduced property damage, lives saved, health problems averted and/or economic harm prevented) outweighed the costs for the recommended action items.

The steering committee prioritized the possible activities that could be pursued. Steering committee members consulted appropriate agencies in order to assist with the prioritizations. The results were items that address the major hazards, are appropriate for those hazards, are cost-effective, and are affordable. The steering committee met internally for mitigation action meetings to review and approve mitigation actions for St Helena Parish and the incorporated jurisdictions. On-going actions, as well as actions which will provide maximum benefit that can be undertaken by existing parish staff with or without additional external funding were given high priority. The actions with medium benefit and relatively low cost, political support, and public support but require additional funding from parish or external sources were given medium priority. The actions that require substantial funding from external sources and would result in limited benefit to the community were given low priority.

St Helena Parish and the incorporated jurisdictions will implement and administer the identified actions based off the proposed timeframes and priorities for each reflected in the portions of this section where actions are summarized. The inclusion of any specific action item in this document does not commit the parish to implementation. Each action item will be subject to availability of staff and funding. Certain items may require regulatory changes or other decisions that must be implemented through standard processes. This plan is intended to offer priorities based on an examination of hazards.

Appendix A: Planning Process

Purpose

The Hazard Mitigation Plan Update process prompts local jurisdictions to keep their hazard mitigation plan current and moving toward a more resilient community. The plan update builds on the research and planning efforts of previous plans while reviewing recent trends. The steering committee followed FEMA's hazard mitigation planning process per the FEMA Local Mitigation Planning Handbook. This planning process assured public involvement and the participation of interested agencies and private organizations. Documentation of the planning process for the updated plan is addressed in this section.

The St Helena Parish Hazard Mitigation Plan Update

The St Helena Parish Hazard Mitigation Plan Update process began in February 2021 with a series of emails, phone calls, meetings, and collaborations between the contractor (SDMI) and a diverse group of participating agencies and stakeholders. Update activities were intended to give each participating agency and stakeholder the opportunity to shape the plan to best fit their community's mitigation goals. Community stakeholders and the general public were invited to attend and contribute information to the planning process during specific time periods or meetings.

The table below details the meeting schedule and purpose for the planning process:

Date	Meeting or Outreach	Location	Public Invited	Purpose
2/26/2021	Kick Off Email	Email	No	Schedule kick off call with Parish OHSEP and SDMI Staff.
3/1/2021	Kick Off Meeting	Phone Conference	No	Discuss with the Parish OHSEP Director and staff expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.
3/19/2021	Initial Planning Meeting	Zoom Video Conference	No	Discussion with St Helena Parish Hazard Mitigation Steering Committee the process and expectations of plan participants. Discuss timeline and action items of each jurisdiction and parish.
4/21/2021	Mitigation Action Workshop	Greensburg, LA	No	Discussion with St Helena Parish Hazard Mitigation Steering Committee of the outstanding data required for plan update, as well as discussion of mitigation actions (old and new) for plan update. Continued timeline discussions.
5/10/2021	Risk Assessment Overview	Greensburg, LA	Yes	Presentation of Risk Assessment Hazards and maps to Steering Committee.
5/10/2021	Public Meeting	Greensburg, LA	Yes	Presentation of Risk Assessment Hazards and maps to Public. Presentation also includes current mitigation project highlights within communities and public survey discussion.
2/26/2021 – 5/15/2021	Public Opinion Survey	Online	Yes	This survey asked participants about public perceptions and opinions regarding natural hazards in St Helena Parish. In addition, questions covered the methods and techniques preferred for reducing the risks and losses associated with these hazards. Survey Results: https://www.surveymonkey.com/results/SM-72HMLPKV9/

Planning

The plan update process consisted of several phases:

	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7
Plan Revision							
Data Collection							
Risk Assessment							
Public Input							
Mitigation Strategy and Actions							
Plan Review by GOHSEP and FEMA							
FEMA APA							
Plan Adoption							
Final Plan Approval							

Coordination

The St Helena Parish Office of Homeland Security and Emergency Preparedness (OHSEP) and St Helena Parish oversaw the coordination of the 2021 Hazard Mitigation Plan Update Steering Committee during the update process. The parish OHSEP was responsible for identifying members for the committee.

The Parish OHSEP Director was responsible for inviting the steering committee and key stakeholders to planned meetings and activities. SDMI assisted the Parish OHSEP Director with press releases and social media statements for notification to the media and general public for public meetings and public outreach activities.

SDMI was responsible for facilitating all meetings and outreach efforts during the update process.

Neighboring Community, Local and Regional Planning Process Involvement

From the outset of the planning process, the steering committee encouraged participation from a broad range of parish entities. The involvement of representatives from the city, state, and regional agencies provided diverse perspectives and mitigation ideas.

Formal participation in this plan includes but is not limited to the following activities:

- Participation in Hazard Mitigation planning meetings at the local and parish level
- Coordination with St Helena first responder agencies
- Sharing local data and information with jurisdictions
- Incorporation of other planning documents, studies and efforts
- Action item development and action progress from 2015 update
- Risk Assessment review
- Plan document draft review
- Formal adoption of the Hazard Mitigation Plan

SDMI assisted St Helena Parish with encouraging the collaboration with neighboring communities by recommending the involvement of the neighboring parish of Livingston. St Helena Parish has aligned with Livingston Parish on future mitigation strategies as well as have common threats/risks due to the waterways shared by both parishes. The St Helena Parish OHSEP Director also assisted Livingston Parish with their HM Plan Review in May of 2021. The participation of the GOHSEP Region 9 Coordinator during the process also contributed to neighboring community representation.

As part of the coordination and planning process, the parish was provided the State Required Hazard Mitigation Plan Update Worksheet. The completed worksheets can be found in *Appendix E: State Required Worksheets*.

The 2021 Hazard Mitigation Plan Update Steering Committee consisted of representatives from the following parish, municipal or community stakeholders. Below is a detailed list of the 2021 HMPU Steering Committee:

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
Albert Franklin	Superintendent	St. Helena Parish Police Jury	afranklin@sthelenaparish.la.gov
Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
Sharonda Brown	Secretary/Treasurer	St. Helena Parish Police Jury	sbrown@sthelenaparish.la.gov
Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
Paula McNabb	Mayor	Town of Greensburg	pdmcnabb@yahoo.com
Kenneth Giardinia	Mayor	Village of Montpelier	mont.la@centurytel.net
Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Program Integration

Local governments are required to describe how their mitigation planning process is integrated with other ongoing local and area planning efforts. This subsection describes St Helena Parish programs and planning.

A measure of integration and coordination is achieved through the HMPU participation of Steering Committee members and community stakeholders who administer programs such as: floodplain management under the National Flood Insurance Program (NFIP), parish planning and zoning, and building code enforcement.

St Helena Parish will continue to integrate the requirements of this Hazard Mitigation Plan into other local planning mechanisms that are to be identified through future meetings of the parish, and through the five-year review process described in the Plan Maintenance section. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of any individual municipal plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.).

The members of the St Helena Parish Hazard Mitigation Steering Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their communities or agencies are consistent with the goals and actions of the Hazard Mitigation Plan and will not contribute to increased hazard vulnerability in the parish. Existing plans, studies, and technical information were incorporated in the planning process. Examples include flood data from FEMA and the U. S. Geological Survey. Much of this data was incorporated into the Risk Assessment component of the plan relative to plotting historical events and the magnitude of damages that occurred. The parish's 2015 Hazard Mitigation Plan was also used in the planning process. Other existing data and plans used in the planning process include those listed below.

- Parish Emergency Operations Plan
- Flood Insurance Rate Maps
- State of Louisiana Hazard Mitigation Plan

Further information on the plans can be found in the *Capability Assessment*.

Meeting Documentation and Public Outreach Activities

The following pages contain documentation of the meetings and public outreach activities conducted during this hazard mitigation plan update.

Meeting #1: Hazard Mitigation Plan Update Kick-Off

Date: March 1, 2021
Location: Conference Call
Purpose: Discuss with the Parish OHSEP Director and staff expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.
Public Invitation: No
Meeting Invitees:

St Helena Parish Hazard Mitigation Planning Committee		
Name	**Title**	**Agency**
Roderick Matthews	Director	St Helena OHSEP
Lauren Morgan	Associate Director	LSU-SDMI
Chris Rippetoe	Program Manager	LSU-SDMI
Anna Daigle	Emergency Management Specialist	LSU-SDMI

Meeting #2: Hazard Mitigation Plan Update Initial Planning Meeting

Date: March 19, 2021

Location: Zoom Video Conference

Purpose: Discuss with the Parish OHSEP Director and steering committee the expectations and requirements of the project. Discuss meeting schedules, committee make up, and next steps.

Public Invitation: No

Meeting Invitees:

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
Albert Franklin	Superintendent	St. Helena Parish Police Jury	afranklin@sthelenaparish.la.gov
Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
Sharonda Brown	Secretary/Treasurer	St. Helena Parish Police Jury	sbrown@sthelenaparish.la.gov
Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
Paula McNabb	Mayor	Town of Greensburg	pdmcnabb@yahoo.com
Kenneth Giardinia	Mayor	Village of Montpelier	mont.la@centurytel.net
Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Meeting #3: St Helena Parish Steering Committee - Mitigation Action Meeting

Date: April 21, 2021

Location: St Helena Parish Policy Jury Training Room, Greensburg, LA

Purpose: Discussion with St Helena Parish Hazard Mitigation Steering Committee of the outstanding data required for plan update, as well as discussion of mitigation actions (old and new) for plan update. Continued timeline discussions.

Public Invitation: No

Meeting Invitees:

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
Albert Franklin	Superintendent	St. Helena Parish Police Jury	afranklin@sthelenaparish.la.gov
Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
Sharonda Brown	Secretary/Treasurer	St. Helena Parish Police Jury	sbrown@sthelenaparish.la.gov
Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
Paula McNabb	Mayor	Town of Greensburg	pdmcnabb@yahoo.com
Kenneth Giardinia	Mayor	Village of Montpelier	mont.la@centurytel.net
Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Meeting #4: Risk Assessment Overview

Date: May 10, 2021

Location: St Helena Parish Police Jury Training Room, Greensburg, LA

Purpose: Presentation of Risk Assessment Hazards and Maps to Steering Committee.

Public Invitation: No

Meeting Invitees:

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
Albert Franklin	Superintendent	St. Helena Parish Police Jury	afranklin@sthelenaparish.la.gov
Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
Sharonda Brown	Secretary/Treasurer	St. Helena Parish Police Jury	sbrown@sthelenaparish.la.gov
Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
Paula McNabb	Mayor	Town of Greensburg	pdmcnabb@yahoo.com
Kenneth Giardinia	Mayor	Village of Montpelier	mont.la@centurytel.net
Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Meeting #5: Public Meeting

Date: May 10, 2021

Location: St Helena Parish Police Jury Training Room, Greensburg, LA

Purpose: The Public Meeting allowed the public and community stakeholders to participate and provide input into the hazard mitigation planning process. Maps of the St Helena Parish planning area were provided for the meeting attendees to identify specific areas where localized hazards occur.

Public Invitation: Yes

Meeting Invitees:

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
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Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
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Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
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Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Meeting Announcement:

ST HELENA PARISH OFFICE OF HOMELAND SECURITY & EMERGENCY PREPAREDNESS

PUBLIC MEETING ANNOUNCEMENT

St Helena Parish and its partners are seeking community input for the 2021 St Helena Parish Hazard Mitigation Plan update!

St Helena Parish OHSEP, in partnership with The Louisiana Governor's Office of Homeland Security and Emergency Preparedness and the Stephenson Disaster Management Institute at LSU, is leading the process to update the plan. The St Helena Parish Hazard Mitigation Multi-Jurisdictional Plan describes the **naturally occurring** risks to the region and outlines strategies to reduce these risks to save lives, reduce property damage, and lessen the impact of future disasters.

Are you passionate about building a more resilient future for your parish? Do you have questions about the natural hazards your community is at risk to? Please join us on Monday, May 10th, for a public meeting at 4:00pm to learn more about the plan and share your input on the risks and vulnerabilities that most impact you and your community.

Meeting Location:
St Helena Parish Police Jury Meeting Room
Greensburg, LA

Residents of St Helena Parish are asked to participate in a survey about public perceptions and opinions regarding natural hazards in the parish. The survey results will be used in the development of the plan. This short web-based survey can be found at the following link:

https://www.surveymonkey.com/r/sthelenahm2020

The Parish appreciates your input.

If you have questions, please contact: Roderick Matthews, Director, St Helena OHSEP

Outreach Activity #1: Public Opinion Survey

Date: Ongoing throughout planning process
Location: Web survey
Public Invitation: Yes
As referenced in the

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Mitigation Strategy section of this document, an online public opinion survey of St. Helena Parish residents was conducted between January and May 2021. The survey was designed to capture public perceptions and opinions regarding natural hazards in St. Helena Parish. In addition, the survey collected information regarding the methods and techniques preferred by the respondents for reducing the risks and losses associated with local hazards. As of May 16, 2021, there have been zero responses to the St. Helena Parish Hazard Mitigation Public Opinion Survey. Survey results can be found here: https://www.surveymonkey.com/results/SM-72HMLPKV9/

Outreach Activity #2: Incident Questionnaire

Date: April 14, 2021; Public Meeting Activity
Location: Public Meeting
Public Invitation: Yes

An incident/issue questionnaire was provided at the public meeting in an effort to collect additional information from residents of St. Helena Parish regarding hazard events and their localized impacts. While the information collected via the questionnaire was to be integrated into this planning document, there was no public turnout for the meeting, and subsequently no information could be collected. A copy of the incident questionnaire can be found on the next page.

ST. HELENA PARISH PUBLIC MEETING

PUBLIC ACTIVITY: INCIDENT/ISSUE QUESTIONNAIRE

1. HAZARD TYPE(S):

A. FLOODING
I. RIVERINE
II. STORM SURGE
III. STREET
IV. OTHER (DESCRIBE):
B. HIGH WINDS (NOT TROPICAL)
C. COASTAL
I. SALTWATER INTRUSION
II. EROSION
III. OTHER (DESCRIBE):
D. TROPICAL SYSTEMS
E. WINTER WEATHER

F. OTHER:

2. DESCRIBE INCIDENT OR ISSUE:

3. LOCATION:

A. CITY:

B. ADDRESS OR AREA:

C. LOCALIZED OR DISPERSED:

4. INTENSITY:

A. DEPTH (FLOODING) OR SIZE (HAIL, ETC):

B. WIND STRENGTH

5. RE-OCCURRING OR ONE-TIME

A. IF RE-OCCURRING, HOW OFTEN?

6. WHAT TYPE OF INTERRUPTIONS DOES/DID THE INCIDENT OR ISSUE CAUSE? (BUSINESS CLOSURE, DAMAGE, EVACUATION, ETC.)

7. HOW LONG WAS THE INTERRUPTION (HOURS, DAYS, WEEKS, ETC.)?

8. HOW COULD THIS PROBLEM OR IMPACT BE PREVENTED, FIXED OR ALLEVIATED?

Outreach Activity #3: 2021 St. Helena Parish Hazard Mitigation Plan Public Review

Date: Ongoing
Location: SDMI Hazard Mitigation Website
Public Initiation: Yes

After an initial review by St. Helena Parish and its communities was completed, the 2021 St. Helena Parish Hazard Mitigation Plan was made available for public review and comment. The plan was hosted on SDMI's Hazard Mitigation website: http://hmplans.sdmi.lsu.edu/Home/Parish/st-helena.

Appendix B: Plan Maintenance

Purpose

The section of the Code of Federal Regulations (CFR) pertaining to Local Mitigation Plans lists five required components for each plan: a description of the planning process; risk assessments; mitigation strategies; a method and system for plan maintenance; and documentation of plan adoption. This section details the method and system for plan maintenance, following the CFR's guidelines that the Plan Update must include (1) "a section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle," (2) "a process by which local governments incorporated the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans", and (3) "discussion on how the community will continue public participation in the plan maintenance process."

Monitoring, Evaluating, and Updating the Plan

The St Helena Parish Hazard Mitigation Steering Committee will be responsible for monitoring, evaluating, and documenting the plan's progress throughout the year. Part of the plan maintenance process should include a system by which local governing bodies incorporate the HMP into the parish's other applicable plans. This process provides for continued public participation through the diverse resources of the parish to help in achieving the goals and objectives of the plan. Public participation will be achieved through availability of copies of HMP in parish public buildings and parish website. This section describes the whole update process which includes the following:

- Responsible parties
- Methods to be used
- Evaluation criteria to be applied
- Scheduling for monitoring and evaluating the plan

Responsible Parties

St Helena Parish has developed a method to ensure that a regular review and update of the Hazard Mitigation Plan occurs. This will be the responsibility of the Steering Committee, which consists of representatives from governmental organizations, local businesses, and private citizens, who will be involved in the process of monitoring, evaluating and updating the plan. All committee members in this plan will remain active in the Steering Committee.

Although the people filling the positions may change from year to year, the parish and its stakeholders will have representatives on the steering committee. The future Steering Committee will continue to be comprised of the same job functions as currently evident in the Steering Committee. However, the decision of specific job duties will be left to the Parish OHSEP Director to be assigned as deemed appropriate.

Methods for Monitoring and Evaluating the Plan and Plan Evaluation Criteria

St Helena Parish has developed a method to ensure monitoring, evaluating, and updating of the HMP occurs during the five-year cycle of the plan. The steering committee will become a permanent body and will be responsible for monitoring, evaluating, and updating of the plan. The steering committee meeting will be held annually in order to monitor, evaluate, and update the plan. The St Helena Parish OHSEP Assistant Director will be responsible for conducting the annual Steering Committee meetings.

The lead person of the agency responsible for the implementation of a specific mitigation action will submit a progress report to the Assistant Director at least thirty days prior to the planning committee meeting. The progress report will provide project status monitoring to include the following: whether the project has started; if not started, reason for not starting; if started, status of the project; if the project is completed, whether it has eliminated the problem; and any changes recommended to improve the implementation of the project etc. In addition, the progress report will provide status monitoring on the plan evaluation, changes to the hazard profile, changes to the risk assessment, and public input on the Hazard Mitigation Plan updates and reviews.

Progress on the mitigation action items and projects will be reviewed during the annual planning committee meeting. The criteria that would be utilized in the project review will include the following:

1) Whether the action was implemented and reasons, if the action was not implemented

2) What were the results of the implemented action

3) Were the outcomes as expected, and reasons if the outcomes were not as expected

4) Did the results achieve the stated goals and objectives

5) Was the action cost-effective

6) What were the losses avoided after completion of the project

7) In case of a structural project, did it change the hazard profile

In addition to monitoring and evaluating the progress of the mitigation plan actions and projects, the mitigation plan is required to be maintained and monitored annually, and fully updated every five years. The annual maintenance, monitoring and evaluation of the plan will be conducted in the annual Steering Committee meeting. The Steering Committee will review each goal to determine their relevance to changing situations in the parish, as well as changes to state or federal policy, and to ensure that they are addressing current and expected conditions. The Steering Committee will evaluate if any change in hazard profile and risk in the parish occurred during the past year. In addition, the evaluation will include the following criteria in respect of plan implementation:

1) Any local staffing changes that would warrant inviting different members to the planning committee

2) Any new organizations that would be valuable in the planning process or project implementation need to be included in the planning committee

3) Any new or existing procedures that can be done more efficiently

4) Any additional ways to gain more diverse and widespread cooperation

5) Any different or additional funding sources available for mitigation planning and implementation

The HMP will be updated every five years to remain eligible for continued HMGP funding. The Steering Committee will be responsible for updating the HMP. The OHSEP Assistant Director will be the lead person for the HMP update. The HMP update process will commence at least one year prior to the expiration of the plan. The HMP will be updated after a major disaster if an annual evaluation of the plan indicates a substantial change in hazard profile and risk assessment in the parish.

Additionally, the public will be canvassed to solicit public input to continue St Helena Parish's dedication to involving the public directly in review and updates of the Hazard Mitigation Plan. Meetings will be scheduled as needed by the plan administrator to provide a forum for which the public can express their concerns, opinions, and/or ideas about the plan. The plan administrator will be responsible for using parish resources to publicize the annual public meetings and maintain public involvement through the newspapers, radio, and public access television channels. Copies of the plan will be catalogued and kept at all appropriate agencies in the city government, as well as at the St Helena Parish Website.

The review by the Steering Committee and input from the public will determine whether a plan update is needed prior to the required five-year update.

Annual Reports on the progress of actions, plan maintenance, monitoring, evaluation, incorporation into existing planning programs, and continued public involvement will be documented at each annual meeting of the committee and kept by the Parish OHSEP Director. The Steering Committee will work together as a team, with each member sharing responsibility for completing the monitoring, evaluation and updates. It is the responsibility of the Parish OHSEP Assistant Director for contacting committee members, organizing the meeting and providing public noticing for the meeting to solicit public input.

2021 Plan Version Plan Method and Schedule Evaluation

For the current plan update, the previously approved plan's method and schedule were evaluated to determine if the elements and processes involved in the required 2021 update. Based on this analysis, the method and schedule were deemed to be acceptable, and nothing was changed for this update.

Incorporation into Existing Planning Programs

It is and has been the responsibility of the St Helena Parish Hazard Mitigation Plan Steering Committee and participating jurisdictions to determine additional implementation procedures when appropriate. This may include integrating the requirements of the St Helena Parish Hazard Mitigation Plan into each jurisdiction's planning documents, processes, or mechanisms as follows:

- Ordinances, Resolutions, Regulations
- Floodplain Ordinances
- Master Plans
- Emergency Operations Plans
- Community Wildfire Protection Plan

Opportunities to integrate the requirements of this plan into other local planning mechanisms will continue to be identified through future meetings of the St Helena Parish Hazard Mitigation Steering Committee and through the five-year review process described herein. The primary means for integrating mitigation strategies into other local planning mechanisms will be through the revision, update and implementation of each jurisdiction's individual plans that require specific planning and administrative tasks (e.g. risk assessment, plan amendments, ordinance revisions, capital improvement projects, etc.). The members of the steering committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the St Helena Parish Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability within the parish.

During the planning process for new and updated local planning documents at the parish and jurisdiction level, such as a risk assessment, comprehensive plan, capital improvements plan, or emergency operations plan, the jurisdictions will provide a copy of the Parish Hazard Mitigation Plan to the appropriate parties and recommend that all goals and strategies of new and updated local planning documents are consistent with and support the goals of the Parish Hazard Mitigation Plan and will not contribute to increased hazards.

Although it is recognized that there are many possible benefits to integrating components of this plan into other parish and jurisdiction planning mechanisms, the development and maintenance of this stand-alone Hazard Mitigation Plan is deemed by the steering committee to be the most effective and appropriate method to ensure implementation of Parish and local hazard mitigation actions.

On behalf of the City of Broussard, City of Carencro, Town of Duson, City of St Helena, City of Scott, City of Youngsville, St Helena Parish has the authority to incorporate the contents of the Hazard Mitigation Plan into the parish's existing regulatory mechanisms. Agreements are currently in place with jurisdictions to allow for the parish incorporation mechanisms to take place.

The following parish and local plans incorporate requirements of this HMP Update as follows through steering committee member and jurisdiction representation throughout the planning process as described above:

St Helena Parish - Unincorporated

Comprehensible Master Plan	Updated as needed	St Helena Parish OHSEP	✓
Local Emergency Operations Plan	Updated as needed	St Helena Parish OHSEP	✓
Wildfire Protection Plan	Updated as needed	St Helena Parish OHSEP/Fire	✓

Town of Greensburg

There are no plans in the Town of Greensburg to incorporate.

Village of Montpelier

Local Emergency Operations Plan	Updated annually	Village of Montpelier Mayor's Office	✓
Wildfire Protection Plan	Updated as needed	Village of Montpelier Mayor's Office	✓

Continued Public Participation

Public participation is an integral component of the mitigation planning process and will continue to be essential as this plan evolves over time. Significant changes or amendments to the plan require a public hearing prior to any adoption procedures. Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Mitigation Committee in the local newspaper, public bulletin boards, and/or city and county office buildings
- Designating willing and voluntary citizens and private sector representatives as official members of the Mitigation Committee
- Utilizing local media to update the public of any maintenance and/or periodic review activities taking place
- Utilizing city and Parish web sites to advertise any maintenance and/or periodic review activities taking place
- Keeping copies of the plan in appropriate public locations.

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Appendix C: Critical Facilities

Critical Facilities within the St Helena Parish Planning Area

St. Helena Parish Planning Area Critical Facilities									
Type	**Name**	**Flooding**	**Hail**	**Lightning**	**High Wind**	**Tornadoes**	**Tropical Cyclones**	**Wildfires**	**Winter Weather**
Government	St. Helena Police Jury Office		X	X	X	X	X		X
	Greensburg Town Hall		X	X	X	X	X		X
	Montpelier Municipal Building		X	X	X	X	X	X	X
Fire & SAR	Hillsdale Volunteer Fire Department		X	X	X	X	X	X	X
	Hillsdale Fire Station		X	X	X	X	X		X
	Hillsdale Fire Substation		X	X	X	X	X	X	X
	Pine Grove Fire Station		X	X	X	X	X	X	X
	Pine Grove Fire Station		X	X	X	X	X	X	X
	South Second Ward Fire Substation		X	X	X	X	X	X	X
	St. Helena Fire Department District 4		X	X	X	X	X	X	X
	North Helena FPD 3 Headquarters		X	X	X	X	X		X
	North Helena FPD 3 Substation		X	X	X	X	X		X
	North Helena FPD 3 Substation		X	X	X	X	X		X
	St. Helena Fire Department District 4 Substation		X	X	X	X	X		X
	6th Ward Fire Headquarters		X	X	X	X	X		X
	6th Ward Fire Substation	X	X	X	X	X	X	X	X
	District 4 Substation		X	X	X	X	X	X	X
	Montpelier Volunteer Fire Dept.		X	X	X	X	X	X	X
	South Second Ward Fire Substation		X	X	X	X	X		X

Type	Name	Flooding	Hail	Lightning	High Wind	Tornadoes	Tropical Cyclones	Wildfires	Winter Weather
Law Enforcement	Greensburg Sheriff's Office		X	X	X	X	X		X
	Pine Grove Sheriff's Office		X	X	X	X	X		X
	Law Enforcement Headquarters		X	X	X	X	X		X
	Parish Sheriff's Office Headquarters		X	X	X	X	X	X	X
	Parish Prison /Inmate Housing		X	X	X	X	X		X
	Montpelier Police Department		X	X	X	X	X	X	X
Public Health	St. Helena Parish Hospital		X	X	X	X	X	X	X
Schools	St Helena School System Elementary School Bldg.		X	X	X	X	X	X	X
	St. Helena School System Middle School Bldg.		X	X	X	X	X	X	X
	St. Helena Public School		X	X	X	X	X	X	X
	Parish School Systems Headquarters		X	X	X	X	X		X
	Early learning school		X	X	X	X	X	X	X

Appendix D: Plan Adoption

WILL UPDATE ONCE JURISDICTIONS FORMALLY ADOPT HMP AFTER FEMA REVIEW

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Appendix E: State Required Worksheets

During the planning process (Appendix A), the Hazard Mitigation Plan Update Steering Committee was provided state-required plan update process worksheets to be filled out. The worksheets were presented at the Initial Planning Meeting by SDMI as tools for assisting in the update of the Hazard Mitigation Plan, but also as a State Requirement (Element E) for the update. The plan update worksheets allowed for collection of information such as planning team members, community capabilities, critical infrastructure and vulnerable populations and NFIP information. The following pages contain documentation of the state required worksheets.

Mitigation Planning Team

St Helena Parish Hazard Mitigation Planning Committee			
Name	**Title**	**Agency**	**Email**
Roderick Matthews	OEP Director	St. Helena Parish Police Jury	rmatthews@sthelenaparish.la.gov
Toni Melton	Deputy Director OEP	St. Helena Parish Police Jury	tmelton@sthelenaparish.la.gov
Albert Franklin	Superintendent	St. Helena Parish Police Jury	afranklin@sthelenaparish.la.gov
Teresa Byrd	Chief Building Official	St. Helena Parish Police Jury	tbyrd@sthelenaparish.la.gov
Sharonda Brown	Secretary/Treasurer	St. Helena Parish Police Jury	sbrown@sthelenaparish.la.gov
Frank Johnson	President	St. Helena Parish Police Jury	frankejohnson@yahoo.com
Paula McNabb	Mayor	Town of Greensburg	pdmcnabb@yahoo.com
Kenneth Giardinia	Mayor	Village of Montpelier	mont.la@centurytel.net
Donald Langston	Superintendent	Town of Greensburg	donaldelangston@yahoo.com
Kenny Smith	Fire Chief	Pine Grove VFD Dist. #2	pinegrovefire2@yahoo.com

Capability Assessment

St Helena Parish

Capability Assessment Worksheet - St. Helena Unincorporated		
Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.		
Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
Plans	**Yes / No**	**Comments**
Comprehensive / Master Plan	Yes	N/A
Capital Improvements Plan	No	N/A
Economic Development Plan	No	N/A
Local Emergency Operations Plan	Yes	Unincorporated - Homeland Security; Montpelier - 911
Continuity of Operations Plan	No	N/A
Transportation Plan	No	N/A
Stormwater Management Plan	No	N/A
Community Wildfire Protection Plan	Yes	N/A
Other plans (redevelopment, recovery, coastal zone management)	No	N/A
Building Code, Permitting and Inspections	**Yes / No**	**Comments**
Building Code	Yes	
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	
Fire Department ISO/PIAL rating	Yes	
Site plan review requirements	Yes	
Land Use Planning and Ordinances	**Yes / No**	**Comments**
Zoning Ordinance	No	
Subdivision Ordinance	No	
Floodplain Ordinance	Yes	
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	
Flood Insurance Rate Maps	Yes	
Acquisition of land for open space and public recreation uses	No	
Other	No	

Administration and Technical		
Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.		
Administration	**Yes / No**	**Comments**
Planning Commission	No	
Mitigation Planning Committee	No	
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	
Staff	**Yes / No**	**Comments**
Chief Building Official	Yes	
Floodplain Administrator	No	
Emergency Manager	Yes	
Community Planner	No	
Civil Engineer	No	
GIS Coordinator	No	
Grant Writer	No	
Other	No	
Technical	**Yes / No**	**Comments**
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	
Hazard Data & Information	No	
Grant Writing	No	
Hazus Analysis	No	
Other	No	

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resource	**Yes / No**	**Comments**
Capital Improvements project funding	Yes	
Authority to levy taxes for specific purposes	Yes	
Fees for water, sewer, gas, or electric services	No	
Impact fees for new development	No	
Stormwater Utility Fee	No	
Community Development Block Grant (CDBG)	Yes	
Other Funding Programs	No	

Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
Program / Organization	**Yes / No**	**Comments**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes / No	
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	
Natural Disaster or safety related school program	No	
Storm Ready certification	No	
Firewise Communities certification	No	
Public/Private partnership initiatives addressing disaster-related issues	No	
Other	No	

Town of Greensburg

Capability Assessment Worksheet - Town of Greensburg		
Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.		
Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
Plans	**Yes / No**	**Comments**
Comprehensive / Master Plan	No	n/a
Capital Improvements Plan	No	n/a
Economic Development Plan	No	n/a
Local Emergency Operations Plan	No	n/a
Continuity of Operations Plan	No	n/a
Transportation Plan	No	n/a
Stormwater Management Plan	No	n/a
Community Wildfire Protection Plan	No	n/a
Other plans (redevelopment, recovery, coastal zone management)	No	n/a
Building Code, Permitting and Inspections	**Yes / No**	**Comments**
Building Code	No	Police Jury handles the building codes
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	n/a
Fire Department ISO/PIAL rating	Yes	7
Site plan review requirements	No	Police Jury handles the building codes
Land Use Planning and Ordinances	**Yes / No**	**Comments**
Zoning Ordinance	No	n/a
Subdivision Ordinance	No	n/a
Floodplain Ordinance	No	n/a
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	n/a
Flood Insurance Rate Maps	No	n/a
Acquisition of land for open space and public recreation uses	No	n/a
Other	No	n/a

Administration and Technical		
Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.		
Administration	**Yes / No**	**Comments**
Planning Commission	No	n/a
Mitigation Planning Committee	No	n/a
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	No	n/a
Staff	**Yes / No**	**Comments**
Chief Building Official	Yes	with the parish
Floodplain Administrator	Yes	with the parish
Emergency Manager	Yes	with the parish
Community Planner	No	n/a
Civil Engineer	No	n/a
GIS Coordinator	No	n/a
Grant Writer	No	n/a
Other	No	n/a
Technical	**Yes / No**	**Comments**
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	n/a
Hazard Data & Information	No	n/a
Grant Writing	No	n/a
Hazus Analysis	No	n/a
Other	No	n/a

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resource	**Yes / No**	**Comments**
Capital Improvements project funding	No	n/a
Authority to levy taxes for specific purposes	Yes	election/state
Fees for water, sewer, gas, or electric services	No	n/a
Impact fees for new development	No	n/a
Stormwater Utility Fee	No	n/a
Community Development Block Grant (CDBG)	Yes	n/a
Other Funding Programs	Yes	LGAP grant

Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
Program / Organization	**Yes / No**	**Comments**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	No	n/a
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	n/a
Natural Disaster or safety related school program	No	n/a
Storm Ready certification	No	n/a
Firewise Communities certification	No	n/a
Public/Private partnership initiatives addressing disaster-related issues	No	n/a
Other	No	n/a

Village of Montpelier

Capability Assessment Worksheet - Village of Montpelier		
Local mitigation capabilities are existing authorities, polices and resources that reduce hazard impacts or that could be used to implement hazard mitigation activities. Please complete the tables and questions in the worksheet as completely as possible.		
Planning and Regulatory		
Please indicate which of the following plans and regulatory capabilities your jurisdiction has in place.		
Plans	**Yes / No**	**Comments**
Comprehensive / Master Plan	No	n/a
Capital Improvements Plan	No	n/a
Economic Development Plan	No	n/a
Local Emergency Operations Plan	Yes	911
Continuity of Operations Plan	No	n/a
Transportation Plan	No	n/a
Stormwater Management Plan	No	n/a
Community Wildfire Protection Plan	Yes	225-777-4343
Other plans (redevelopment, recovery, coastal zone management)	No	n/a
Building Code, Permitting and Inspections	**Yes / No**	**Comments**
Building Code	Yes	St. Helena Building Insp.
Building Code Effectiveness Grading Schedule (BCEGS) Score	No	n/a
Fire Department ISO/PIAL rating	Yes	5
Site plan review requirements	Yes	St. Helena Building Insp.
Land Use Planning and Ordinances	**Yes / No**	**Comments**
Zoning Ordinance	No	n/a
Subdivision Ordinance	No	n/a
Floodplain Ordinance	Yes	St. Helena Building Insp.
Natural Hazard Specific Ordinance (stormwater, steep slope, wildfire)	No	n/a
Flood Insurance Rate Maps	Yes	St. Helena Building Insp.
Acquisition of land for open space and public recreation uses	No	n/a
Other	No	n/a

Administration and Technical

Identify whether your community has the following administrative and technical capabilities. For smaller jurisdictions without local staff resources, if there are public resources at the next higher level government that can provide technical assistance, indicate so in your comments.

Administration	Yes / No	Comments
Planning Commission	No	n/a
Mitigation Planning Committee	Yes	n/a
Maintenance programs to reduce risk (tree trimming, clearing drainage systems)	Yes	Police Jury
Staff	**Yes / No**	**Comments**
Chief Building Official	Yes	n/a
Floodplain Administrator	Yes	n/a
Emergency Manager	Yes	n/a
Community Planner	Yes	n/a
Civil Engineer	Yes	n/a
GIS Coordinator	yes	n/a
Grant Writer	Yes	n/a
Other	No	n/a
Technical	**Yes / No**	**Comments**
Warning Systems / Service (Reverse 911, outdoor warning signals)	No	n/a
Hazard Data & Information	Yes	Pipeline Safety
Grant Writing	No	n/a
Hazus Analysis	No	n/a
Other	No	n/a

Financial		
Identify whether your jurisdiction has access to or is eligible to use the following funding resources for hazard mitigation.		
Funding Resource	**Yes / No**	**Comments**
Capital Improvements project funding	Yes	New Fire Station
Authority to levy taxes for specific purposes	No	n/a
Fees for water, sewer, gas, or electric services	No	n/a
Impact fees for new development	No	n/a
Stormwater Utility Fee	No	n/a
Community Development Block Grant (CDBG)	No	n/a
Other Funding Programs	No	n/a

Education and Outreach		
Identify education and outreach programs and methods, already in place that could be used to implement mitigation activities and communicate hazard-related information.		
Program / Organization	**Yes / No**	**Comments**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Yes	n/a
Ongoing public education or information program (responsible water use, fire safety, household preparedness, environmental education)	No	n/a
Natural Disaster or safety related school program	No	n/a
Storm Ready certification	Yes	n/a
Firewise Communities certification	Yes	n/a
Public/Private partnership initiatives addressing disaster-related issues	No	n/a
Other	No	n/a

Building Inventory

Parish and Jurisdiction Owned Building Information in St. Helena Parish Planning Area								
St. Helena Unincorporated								
Name of Building	Purpose of Building	Address	City	Latitude	Longitude	Assessed Value	Date Built	Construction Type
St. Helena Police Jury Office	Government Office. EOC	17911 Hwy 43	Greensburg	30.849681	-90.668107			
St. Helena Park Bld	Shelter/	227 Park Loop	Greensburg	30.8127	-90.7275			
Fifth Ward Recreation /Shelter	Shelter/	31676 Hwy 16	Amite	30.7087	-90.5943			
St Helena School System Elem Bldg	Shelter/ Public School	1798 Hwy 1042	Greensburg	30.6544	-90.8983			
St. Helena School System Middle Bldg	Shelter/ Public School	1590 Hwy 1042	Greensburg	30.8293	-90.6972			
Northshore Tech College	Community College	948 Hwy 1042	Greensburg	30.8331	-90.6885			
Water Works Office	Water Works Headquarters	3362 Hwy 1045	Amite	30.7446	-90.6203			
Hillsdale Volunteer Fire Department	Hillsdale Fire Headquarters	3313 Highway 1045	Amite	30.7437	-90.6199			
Hillsdale Fire Station	Hillsdale Fire Sub Station	2095 Hwy 10	Greensburg	30.8245	-90.5993			
Hillsdale Fire Substation	Hillsdale Fire Sub Station	3924 Hwy 16	Amite	30.7061	-90.5915			
Pine Grove Fire Station	Pine Grove Headquarters	72 Matthews St.	Pine Grove	30.7092	-90.7557			
Pine Grove Fire Station	Pine Grove Headquarters	99 Dennis Lee Rd	Denham Springs	30.6844	-90.83925			
Fire Station	South Second Ward Fire Headquarters	1021 Hwy 1042	Greensburg	30.8319	-90.6935			
Fire Station	South Second Ward Fire Substation	7267 Hwy 449	Greensburg	30.8668	-90.7994			
St. Helena Fire Department District 4	District # 4 Headquarters	8352 Highway 37	Greensburg	30.7747	-90.7404			
Fire Station	Dist 4 Sub Station	95 Rohner Rd	Amite	30.7615	-90.6527			

Montpelier Volunteer Fire Dept	Fire Station	36310 LA 16	Montpelier	30.681882	-90.657832			
Fire Station	St. Helena Fire Dept Dist 4 Sub Station	72 Powers Ln	Pine Grove	30.7388	-90.8356			
Fire Station North Helena FPD #3	North Helena FPD 3 Headquarters	5138 Highway 1043	Greensburg	30.9091	-90.7172			
Fire Station	North Helena FPD 3 Sub Station	3369 David Allen Rd	Greensburg	30.973051	-90.7284			
Fire Station	North Helena FPD 3 Sub Station	14848 Hwy 38	Greensburg	30.9151	-90.810009			
6th Ward Fire Headquarters	6th Ward Fire Headquarters	3924/3986 Highway 38	Kentwood	30.8197	-90.675			
Fire Station	6th Ward Fire Sub Station	4650 Hwy 440	Kentwood	30.81493	-90.641827			
Sheriff's Office	Sub Station	24324 Hwy 38	Greensburg	30.9286	-90.687			
Sheriff's Office	Sub Station	4644_ Hwy 16	Pine Grove	30.6931	-90.8192			
St. Helena Parish Maintenance	Road Maint Headquarters	17933 Hwy 43	Greensburg	30.840465	-90.667893			
St. Helena Parish Maintenance	Equipment Shop	17955 Hwy 43	Greensburg	30.84079	-90.667888			
Water Work Site	Water Distribution Site	8733 Hwy 38	Greensburg	30.9276	-90.7117			
Water Works Site	Water Distribution Site	Hwy 38	Greensburg	30.9273	-90.7192			
Water Works Site	Water Distribution Site	1012 Turner Chapel	Greensburg	30.882124	-90.692969			
Water Works Site	Water Distribution Site	1939 Hwy 10	Greensburg	30.824449	-90.599086			
Water Works Site	Water Distribution Headquarters	3362 Hwy 1045	Amite	30.744671	-90.620307			
Water Works Site	Water Distribution Site	2088 Hwy 1045	Amite	30.738737	-90.6000331			
Water Works Site	Water Distribution Site	9751 Hwy 449	Greensburg	30.757666	-90.705061			
Water Works Site	Water Distribution Site	107 Merlin	Denham Spring	30.691098	-90.830933			

Town of Greensburg								
Name of Building	**Purpose of Building**	**Address**	**City**	**Latitude**	**Longitude**	**Assessed Value**	**Date Built**	**Construction Type**
Carry Out Town Operations		14516 Hwy 37	Greensburg	30.8298	-90.6709			
Law Enforcement Headquarters		14516 Hwy 37	Greensburg	30.8298	-90.6708			
Volunteer Fire Department Headquarters		13775 Hwy 37	Greensburg	30.8197	-90.675			
St. Helena Public School		14340 Hwy 37	Greensburg	30.82706	-90.6718			
Parish Hospital		16874 Hwy 43	Greensburg	30.8312	-90.6662			
Parish Home for the elderly		32 N 2nd Street	Greensburg	30.8311	-90.6655			
Parish Sheriff's Office Headquarters		53N 2nd Street	Greensburg	30.8309	-90.6651			
Parish Prison /Inmate Housing		387 Sitman St.	Greensburg	30.8291	-90.6671			
Parish Records/Court		369 Sitman St.	Greensburg	30.8289	-90.6672			
Town Water		119 S 3rd St.	Greensburg	30.8237	-90.6692			
Town Sewage		16955 Hwy 43	Greensburg	30.8339	-90.66809			
US Postal Service		6638 Hwy 10	Greensburg	30.8334	-90.6757			
Electrical Headquarters for the Parish		6823 Hwy 10	Greensburg	30.83406	-90.6788			
Parish Office for State Driver's License		38 S Main St.	Greensburg	30.8287	-90.6675			
Parish Office for Tax records		351 Sitman St.	Greensburg	30.8286	-90.6671			
Parish School Systems Headquarters		354 Sitman St.	Greensburg	30.8284	-90.6666			
Towns Water storage /Distribution system		14516 Hwy 37	Greensburg	30.8297	-90.6707			
Telephone Service Office		131 S Main St.	Greensburg	30.8287	-90.6691			
Headquarters for Support of elderly services in the parish		48 Kendrick St.	Greensburg	30.8293	-90.6673			
Early learning school		77 Greensburg	Greensburg	30.8217	-90.666			
Village of Montpelier								
Name of Building	**Purpose of Building**	**Address**	**City**	**Latitude**	**Longitude**	**Assessed Value**	**Date Built**	**Construction Type**
Montpelier Municipality Building	Town Hall, Police station, Gas and Water System and Volunteer Fire Station	36310 Highway 16	Montpelier	30.681882	-90.657832	$283,000	1-Apr-15	Metal

Vulnerable Populations

Vulnerable Populations Worksheet					
St. Helena Parish					
All Hospitals (Private or Public)	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
St. Helena Parish Hospital	16874 LA-43	Greensburg	70441	30-49.908333N	090-39.992833W
Nursing Homes (Private or Public)	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
St. Helena Parish Nursing Home	32 N 2nd St	Greensburg	70441	30-49.908333N	090-39.992833W
Mobile Home Parks	**Address**	**City**	**Zip Code**	**Latitude**	**Longitude**
2M Mobile Home Park	2041 Muse Rd	Greensburg	70441	30.7974N	090.6741W
Salem Street Mobile Home Park	1169 Salem St	Greensburg	70441	30.830738N	090.671761W
McClendon Trailer Park	6298 Pumping Station Rd	Greensburg	70441		
Walter's Trailer Park	76 Walter's TRL Park Ln	Greensburg	70441		
Oak Hill Mobile Home/RV Park	6308 Highway 38	Kentwood	70444		
Timothy Cutrer Mobile home park		Greensburg	70441	30.8261	-90.6647
Morgan Hills Apartments		Greensburg	70441	30.8224	-90.6588
Sitman Heights Apartments		Greensburg	70441	30.8213	-90.6595
St. Helena Apartments		Greensburg	70441	30.822007	-90.6651

National Flood Insurance Program (NFIP)

National Flood Insurance Program (NFIP)			
	St. Helena Parish	**Town of Greensburg**	**Village of Montpelier**
Insurance Summary			
How many NFIP polices are in the community? What is the total premium and coverage?	121 polices are in the community; the total premium is 102,312 and coverage is 33,887,900	**# of Policies**: 5 / **Total Premiums**: $3,286.00 / **Total Coverage**: $1,244,200.00	**# of Policies**: 5 / **Total Premiums**: $2,955.00 / **Total Coverage**: $1,132,400.00
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	47 claims; Claims paid out since 1978 $1,987,240.00; All of the claims were substantial damage.	**Claims Paid**: 3 / **Total Amount Paid**: $136,473 / **Substantial Damage**: 2	**Claims Paid**: 2 / **Total Amount Paid:** $209,178.52 / **Substantial Damage:** 2
How many structures are exposed to flood risk with in the community?	all structures in the parish	42	34
Describe any areas of flood risk with limited NFIP policy coverage.	N/A	N/A	N/A
Staff Resources			
Is the Community FPA or NFIP Coordinator certified?	No	No	No
Is flood plain management an auxiliary function?	Yes	Yes	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	N/A	Permit Review and Education	Permit Review and Education
What are the barriers to running an effective NFIP program in the community, if any?	N/A	Limited resources	Limited resources
Compliance History			
Is the community in good standing with the NFIP?	Yes	Yes	Yes
Are there any outstanding compliance issues(i.e., current violations)?	No	No	No
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	3/1/2000	**CAV**: 12-11-2009 / **CAC**: 10-22-2012	**CAV**: 12-18-2003 / **CAC**: 10-15-2012
Is a CAV or CAC scheduled or needed? If so when?	No	No	No
Regulation			
When did the community enter the NFIP?	9/27/1991	**E** = 02-23-1976 / **R** = 04-01-1980	**E** = 03-08-1976 / **R** = 03-20-1979
Are the FIRMs digital or paper?	Digital	Digital	Digital
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Meet	Meet	Meet
Community Rating System (CRS)			
Does the community participate in CRS?	No	No	No
What is the community's CRS Class Ranking?	N/A	N/A	N/A
Does the plan include CRS planning requirements?	N/A	N/A	N/A