Louisiana Watershed Initiative

Sustainability and resilience through science, engineering and objective decision-making

Objective

Develop a common understanding of known flood risks, vulnerabilities and priorities in Region 8

Building on previous efforts

Region 8 planning and policy professionals worked with LWI to identify these priorities based on their region's flood risk and mitigation needs.

Agenda

1. Region 8 flood risk assessment
Objective

Develop a common understanding of known flood risks, vulnerabilities and priorities in Region 8.

Building on previous efforts

Region 8 planning and policy professionals worked with LWI to identify these priorities based on their region’s flood risk and mitigation needs.

Agenda

1. Region 8 flood risk assessment
2. Break
3. Discussion—Pivoting from previous work: Inside and outside of the HSDRRS

Flood risk assessment

Each watershed region throughout Louisiana faces unique flood risks. To understand these risks and to prioritize solutions, we must accomplish the following:

1. Build a common vocabulary
2. Consider various risk factors
3. Work with nature
Building on previous efforts

Region 8 planning and policy professionals worked with LWI to identify these priorities based on their region’s flood risk and mitigation needs.

Agenda

1. Region 8 flood risk assessment
2. Break
3. Discussion—Pivoting from previous work: Inside and outside of the HSDRRS

Flood risk assessment

Each watershed region throughout Louisiana faces unique flood risks. To understand these risks and to prioritize solutions, we must accomplish the following:

1. Build a common vocabulary
2. Consider various risk factors
3. Work with nature

Parishes in Region 8

FUND PROJECTS THAT SHIFT THINKING

SUPPORT REGIONAL WATERSHED PLANS

ENCOURAGE FLOODPLAIN MANAGEMENT POLICIES

FOCUS ON DATA-DRIVEN WATERSHED PROJECTS

CONSIDER FUTURE RISK IN PLANNING
Flood Risk in Louisiana

Louisiana Watershed Initiative

Agenda

1. Region 8 flood risk assessment
2. Break
3. Discussion—Pivoting from previous work: Inside and outside of the HSDRRS

Flood risk assessment

Each watershed region throughout Louisiana faces unique flood risks. To understand these risks and to prioritize solutions, we must accomplish the following:

1. Build a common vocabulary
2. Consider various risk factors
3. Work with nature

Parishes in Region 8

Working together to address risk at the watershed scale

- St. Charles Parish
- Jefferson Parish
- Orleans Parish
- Plaquemines Parish
- St. Bernard Parish
Flood risk assessment

Each watershed region throughout Louisiana faces unique flood risks. To understand these risks and to prioritize solutions, we must accomplish the following:

1. Build a common vocabulary
2. Consider various risk factors
3. Work with nature

Parishes in Region 8

Working together to address risk at the watershed scale:
- St. Charles Parish
- Jefferson Parish
- Orleans Parish
- Plaquemines Parish
- St. Bernard Parish

Region 8 watersheds
Parishes in Region 8

Working together to address risk at the watershed scale

- St. Charles Parish
- Jefferson Parish
- Orleans Parish
- Plaquemines Parish
- St. Bernard Parish

Region 8 watersheds

Hydrology: a science that deals with the properties, distribution and circulation of water on and below Earth's surface and in the atmosphere

Types of flood risk

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

Types of flood risk

- Fluvial floods: river floods
- Coastal floods: surge and tidal
Hydrology: a science that deals with the properties, distribution and circulation of water on and below Earth's surface and in the atmosphere.

Types of Flood Risk

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

- Fluvial floods: river floods
- Coastal floods: surge and tidal
- Fluvial floods: rainfall-induced flash floods and urban flooding

Fluvial Floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dike to break and inundate nearby areas.
Types of flood risk

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

Types of flood risk
- Fluvial floods: river floods
- Coastal floods: surge and tidal
- Pluvial floods: rainfall-induced flash floods and urban flooding

Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river’s capacity is often monitored by checking the height of a river’s crest. These events can cause dams and dikes to break and inundate nearby areas.
Types of flood risk

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

Types of flood risk
- Fluvial floods: river floods
- Coastal floods: surge and tidal
- Fluvial floods: rainfall-induced flash floods and urban flooding

Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dikes to break and inundate nearby areas.
**Types of flood risk**

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

**Types of flood risk**
- Fluvial floods: river floods
- Coastal floods: surge and tidal
- Fluvial floods: rainfall-induced flash floods and urban flooding

**Fluvial floods**

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dikes to break and inundate nearby areas.
Types of flood risk

We must consider all types of flood risk to effectively manage flood risk within Region 8 watersheds.

Types of flood risk
- Fluvial floods: river floods
- Coastal floods: surge and tidal
- Eolian floods: rainfall-induced flash floods and urban flooding

Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dikes to break and inundate nearby areas.

Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dikes to break and inundate nearby areas.
Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river’s capacity is often monitored by checking the height of a river’s crest. These events can cause dams and dikes to break and inundate nearby areas.

Graphic by Jacob Rosenweig, Tulane University
Fluvial floods

Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river's capacity is often monitored by checking the height of a river's crest. These events can cause dams and dikes to break and inundate nearby areas.

Graphic by Jacob Rosenweig, Tulane University
Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river’s capacity is often monitored by checking the height of a river’s crest. These events can cause dams and dikes to break and inundate nearby areas.

A constrained system

Engineered systems in Orleans and Jefferson parishes providing water management from Lake Pontchartrain.

Coastal floods: surge and tidal

Storm surge from the winds and waves of tropical storms and hurricanes causes coastal flooding. The changing tides also have a compounding impact on these types of floods.
Fluvial floods occur when excessive rain falls over an extended period of time and causes a river to exceed its capacity. A river’s capacity is often monitored by checking the height of a river’s crest. These events can cause dams and dikes to break and inundate nearby areas.

A constrained system

Engineered systems in Orleans and Jefferson parishes providing water management from Lake Pontchartrain

Coastal floods: surge and tidal

Storm surge from the winds and waves of tropical storms and hurricanes causes coastal flooding. The changing tides also have a compounding impact on these types of floods.

Future flood risk: coastal surge floods

Future flood risk is understood in terms of how severe future events may be and how often they will occur. This is reflected as a probability:

- 1% annual chance event: 26% chance of at least one event in any 30-year period (commonly known as a 100-year event)
A constrained system

Engineered systems in Orleans and Jefferson parishes providing water management from Lake Pontchartrain

Coastal floods: surge and tidal

Storm surge from the winds and waves of tropical storms and hurricanes causes coastal flooding. The changing tides also have a compounding impact on these types of floods.

Future flood risk: coastal surge floods

Future flood risk is understood in terms of how severe future events may be and how often they will occur. This is reflected as a probability:

- 1% annual chance event: 26% chance of at least one event in any 35-year period (commonly known as a 100-year event)
- 0.2% annual chance event: more severe and less likely to happen (commonly known as a 500-year event)

Source: 2017 Coastal Master Plan modelling analysis, Coastal Louisiana Risk Assessment model grid

Coastal flooding
Coastal floods: surge and tidal

Storm surge from the winds and waves of tropical storms and hurricanes causes coastal flooding. The changing tides also have a compounding impact on these types of floods.

Future flood risk: coastal surge floods

Future flood risk is understood in terms of how severe future events may be and how often they will occur. This is reflected as a probability:

- 1% annual chance event: 26% chance of at least one event in any 30-year period (commonly known as a 100-year event)
- 0.2% annual chance event: more severe and less likely to happen (commonly known as a 500-year event)

Source: 2017 Coastal Master Plan modeling analysis, Coastal Louisiana Risk Assessment: model grid

Coastal flooding

Coastal high tide flooding in Plaquemines Parish

Coastal flooding

Flooding in Braithwaite after Hurricane Isaac
Future flood risk: coastal surge floods

Future flood risk is understood in terms of how severe future events may be and how often they will occur. This is reflected as a probability:

- **1% annual chance event:** 26% chance of at least one event in any 30-year period (commonly known as a 100-year event)

- **0.2% annual chance event:** more severe and less likely to happen (commonly known as a 500-year event)

*Source: 2017 Coastal Master Plan modeling analysis, Coastal Louisiana Risk Assessment model grid*

Coastal flooding

Coastal high tide flooding in Plaquemines Parish

Flooded in Braithwaite after Hurricane Isaac

Pluvial floods

Pluvial, or rainfall-induced, floods result from intense rain that causes surface, flash or urban flooding. These events are independent, not caused by an overflowing body of water.
Future flood risk: coastal surge floods

Future flood risk is understood in terms of how severe future events may be and how often they will occur. This is reflected as a probability:

- **1% annual chance event**: 26% chance of at least one event in any 30-year period (commonly known as a 100-year event)
- **0.2% annual chance event**: more severe and less likely to happen (commonly known as a 500-year event)

*Source: 2017 Coastal Master Plan modeling analysis, Coastal Louisiana Risk Assessment model grid*

Coastal flooding

- Coastal high tide flooding in Plaquemines Parish

Coastal flooding

- Flooding in Braithwaite after Hurricane Isaac

Pluvial floods

- Pluvial, or rainfall-induced, floods result from intense rain that causes surface, flash or urban flooding. These events are independent, not caused by an overflowing body of water.
Coastal flooding

Coastal high tide flooding in Plaquemines Parish

Pluvial floods

Pluvial, or rainfall-induced, floods result from intense rain that causes surface, flash, or urban flooding. These events are independent, not caused by an overflowing body of water.

Extreme rainfall or precipitation

Louisiana has some of the highest rainfall rates in the country on an average statewide basis and often experiences high water levels in its major riverine systems.

Because of our flat landscape and interconnected waterways, the impact of a rainfall event in one part of the state is often felt far beyond the boundaries of where the rain falls.

August 2016 flood

<table>
<thead>
<tr>
<th>Storm Total Rainfall</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>3.00</td>
</tr>
<tr>
<td></td>
<td>4.00</td>
</tr>
</tbody>
</table>
Coastal flooding

Flooding in Braithwaite after Hurricane Isaac

Pluvial floods

Pluvial, or rainfall-induced, floods result from intense rain that causes surface, flash or urban flooding. These events are independent, not caused by an overflowing body of water.

Extreme rainfall or precipitation

Louisiana has some of the highest rainfall rates in the country on an average statewide basis and often experiences high water levels in its major riverine systems.

Because of our flat landscape and interconnected waterways, the impact of a rainfall event in one part of the state is often felt far beyond the boundaries of where the rain falls.

August 2016 Flood

<table>
<thead>
<tr>
<th>Storm Total Rainfall (Inches)</th>
<th>0.00</th>
<th>0.01</th>
<th>0.10</th>
<th>0.25</th>
<th>0.50</th>
<th>0.75</th>
<th>1.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Pluvial, or rainfall-induced, floods result from intense rain that causes surface, flash or urban flooding. These events are independent, not caused by an overflowing body of water.

Extreme rainfall or precipitation

Louisiana has some of the highest rainfall rates in the country on an average statewide basis and often experiences high water levels in its major riverine systems.

Because of our flat landscape and interconnected waterways, the impact of a rainfall event in one part of the state is often felt far beyond the boundaries of where the rain falls.

August 2016 flood

<table>
<thead>
<tr>
<th>Storm Total Rainfall</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>0.75</td>
<td>0.75</td>
</tr>
<tr>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>2.50</td>
<td>2.50</td>
</tr>
</tbody>
</table>

| 3.00     | 3.00 |
| 4.00     | 4.00 |
| 5.00     | 5.00 |
| 6.00     | 6.00 |
| 8.00     | 8.00 |
| 10.00    | 10.00|
| 15.00    | 15.00|
| 20.00+   | 20.00+|
Extreme rainfall or precipitation

Louisiana has some of the highest rainfall rates in the country on an average statewide basis and often experiences high water levels in its major riverine systems.

Because of our flat landscape and interconnected waterways, the impact of a rainfall event in one part of the state is often felt far beyond the boundaries of where the rain falls.

August 2016 flood

<table>
<thead>
<tr>
<th>Storm Total Rainfall</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>1.50</td>
<td>2.50</td>
</tr>
<tr>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>0.75</td>
<td>4.00</td>
</tr>
<tr>
<td>0.50</td>
<td>5.00</td>
</tr>
<tr>
<td>0.25</td>
<td>6.00</td>
</tr>
<tr>
<td>0.10</td>
<td>8.00</td>
</tr>
<tr>
<td>0.01</td>
<td>10.00</td>
</tr>
<tr>
<td>&lt;0.01</td>
<td>15.00</td>
</tr>
<tr>
<td>-0.05</td>
<td>20.00+</td>
</tr>
</tbody>
</table>
Extreme rainfall or precipitation

July 2019 flash flood event

<table>
<thead>
<tr>
<th>Storm Total Rainfall</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>6.00</td>
<td></td>
</tr>
<tr>
<td>8.00</td>
<td></td>
</tr>
<tr>
<td>10.00</td>
<td></td>
</tr>
<tr>
<td>15.00</td>
<td></td>
</tr>
<tr>
<td>20.00+</td>
<td></td>
</tr>
</tbody>
</table>

Extreme rainfall

Pluvial flood in Orleans Parish at Bayou St. John in July 2019

Rainfall study

In a regional study of precipitation trends, LSU professor Dr. Vincent Brown reported the following findings:
Extreme rainfall

Pluvial flood in Orleans Parish at Bayou St. John in July 2019

Rainfall study

In a regional study of precipitation trends, LSU professor Dr. Vincent Brown reported the following findings:
- While total precipitation has remained stable, it is occurring in shorter, more intense events.
- Precipitation during 1% events increased by 18% since 1901 (1901-2016) and 27% since 1958 (1958-2016).
- Precipitation is projected to increase 10% to 29% by 2099 depending on emissions levels.
- These more intense rainfall events increase flood risk because they are more likely to overwhelm the drainage systems.


Traditional gaps in understanding flood risk
Extreme rainfall

Pluvial flood in Orleans Parish at Bayou St. John in July 2019

Rainfall study

In a regional study of precipitation trends, LSU professor Dr. Vincent Brown reported the following findings:
- While total precipitation has remained stable, it is occurring in shorter, more intense events.
- Precipitation during 1% events increased by 18% since 1901 (1901-2016) and 27% since 1958 (1958-2016).
- Precipitation is projected to increase 10% to 29% by 2099 depending on emissions levels.
- These more intense rainfall events increase flood risk because they are more likely to overwhelm the drainage systems.


Traditional gaps in understanding flood risk

The Federal Emergency Management Agency is responsible for mapping the nation's hazardous flood areas.

FEMA Special Flood Hazard Areas:
- Provide a basis for flood insurance rates and floodplain management.
Rainfall study

In a regional study of precipitation trends, LSU professor Dr. Vincent Brown reported the following findings:
- While total precipitation has remained stable, it is occurring in shorter, more intense events.
- Precipitation during 1% events increased by 18% since 1901 (1901-2016) and 27% since 1958 (1958-2016).
- Precipitation is projected to increase 10% to 29% by 2099 depending on emissions levels.
- These more intense rainfall events increase flood risk because they are more likely to overwhelm the drainage systems.


Traditional gaps in understanding flood risk

The Federal Emergency Management Agency is responsible for mapping the nation's hazardous flood areas.

FEMA Special Flood Hazard Areas:
- Provide a basis for flood insurance rates and floodplain management regulations nationwide
- Inform mapped communities about their flood vulnerability
- Impact development of the built environment

Region B: 95% is located in a SFHA and is subject to flooding.
Traditional gaps in understanding flood risk

The Federal Emergency Management Agency is responsible for mapping the nation's hazardous flood areas.

FEMA Special Flood Hazard Areas:
- Provide a basis for flood insurance rates and floodplain management regulations nationwide
- Inform mapped communities about their flood vulnerability
- Impact development of the built environment

Region 8: 95% is located in a SFHA and is subject to flooding.

Traditional gaps in understanding flood risk

A Zones (shown in light blue)
Special Flood Hazard Areas – High Risk
Special Flood hazard Areas represent the area subject to inundation by a 1% annual chance flood. Structures located within SFHAs have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

V Zones (shown in dark blue)
Coastal High Hazard Areas – High Risk
Coastal High Hazard Areas represent the area subject to inundation by a 1% annual chance flood, extending from offshore to the inland limit of a primary frontal dune along an

Gulf Coast.
Traditional gaps in understanding flood risk

A Zones (shown in light blue)
Special Flood Hazard Areas - High Risk
Special Flood Hazard Areas represent the area subject to inundation by a 1% annual chance flood. Structures located within SFHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

V Zones (shown in dark blue)
Coastal High Hazard Areas - High Risk
Coastal High Hazard Areas represent the area subject to inundation by a 1% annual chance flood, extending from offshore to the inland limit of a primary coastal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within CHHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.
Traditional gaps in understanding flood risk

A Zones (shown in light blue)
Special Flood Hazard Areas - High Risk
Special Flood Hazard Areas represent the area subject to inundation by a 1% annual chance flood. Structures located within SFHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

V Zones (shown in dark blue)
Coastal High Hazard Areas - High Risk
Coastal High Hazard Areas represent the area subject to inundation by a 1% annual chance flood, extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within CHHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.
Traditional gaps in understanding flood risk

A Zones (shown in light blue)
Special Flood Hazard Areas - High Risk
Special Flood Hazard Areas represent the area subject to inundation by a 1% annual chance flood. Structures located within SFHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

V Zones (shown in dark blue)
Coastal High Hazard Areas - High Risk
Coastal High Hazard Areas represent the area subject to inundation by a 1% annual chance flood, extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within CHHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance requirements apply in these zones.

FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.
FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.

A Severe Repetitive Loss structure is an NFIP-insured property that meets at least one of the following criteria:
- At least four NFIP claim payments (including building and contents) over $5,000 each with the cumulative amount of such claims exceeding $20,000
- At least two separate claims payments (building payments only) with the cumulative amount of the building portion of such claims exceeding the market value of the building

CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation
FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.

A Severe Repetitive Loss structure is an NFIP-insured property that meets at least one of the following criteria:
- At least four NFIP claim payments (including building and contents) over $5,000 each with the cumulative amount of such claims exceeding $20,000
- At least two separate claims payments (building payments only) with the cumulative amount of the building portion of such claims exceeding the market value of the building

CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation
FEMA Repetitive and Severe Repetitive Loss data

A Repetitive Loss structure is an NFIP-insured property that has had at least two paid flood losses of more than $1,000 each in any 10-year period since 1978.

A Severe Repetitive Loss structure is an NFIP-insured property that meets at least one of the following criteria:
- At least four NFIP claims (including building and contents) over $5,000 each with the cumulative amount of such claims exceeding $20,000
- At least two separate claims payments (building payments only) with the cumulative amount of the building portion of such claims exceeding the market value of the building.

CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation
CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation

Discussion

Discussion: Where do we go from here?

Reincorporating nature

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and floodwaters. Trees, root mats and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion.

The holding capacity of wetlands helps control floods and prevents waterlogging of crops. Preserving and restoring wetlands is a crucial step towards mitigating the impacts of natural disasters.
CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation

Discussion

Discussion: Where do we go from here?

Reincorporating nature

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and floodwaters. Trees, root mats and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion.

The holding capacity of wetlands helps control floods and prevents waterlogging. Protecting and restoring wetlands can help mitigate the effects of future floods.
CDC Social Vulnerability Index

Natural disasters disproportionately impact socially vulnerable populations. Understanding and addressing vulnerability can help mitigate suffering and recovery costs.

Social vulnerability is based on the following factors:
- Socioeconomic status
- Household composition and disability
- Minority status and language
- Housing and transportation

Discussion

Discussion: Where do we go from here?

Reincorporating nature

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and floodwaters. Trees, root mats and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion.

The holding capacity of wetlands helps control floods and prevents waterlogging of crops. Preserving and restoring wetlands is essential to protect communities and ecosystems from the impacts of climate change.
Discussion

Discussion: Where do we go from here?

Reincorporating nature

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and floodwaters. Trees, root mats and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion.

The holding capacity of wetlands helps control floods and prevents waterlogging of crops. Preserving and restoring wetlands together with other water retention efforts can often provide the same level of flood control otherwise provided by expensive dredge operations and levees.

Greater New Orleans Urban Water Plan

Regional plan: The Greater New Orleans Urban Water Plan is a regional effort spanning three sub-basins in Region 8 including the east banks of Jefferson and Orleans parishes and a portion of St. Bernard Parish.

A different approach to managing water resources: The urban water plan, acknowledging that the region’s 100-year-old infrastructure is no longer adequate to sustain the region, provides a long-term program of retrofits to existing systems and the urban landscape. The plan strongly emphasizes the need for improved management of stormwater and groundwater.
Reincorporating nature

Wetlands function as natural sponges that trap and slowly release surface water, rain, snowmelt, groundwater and floodwaters. Trees, root mats and other wetland vegetation also slow the speed of floodwaters and distribute them more slowly over the floodplain. This combined water storage and braking action lowers flood heights and reduces erosion.

The holding capacity of wetlands helps control floods and prevents waterlogging of crops. Preserving and restoring wetlands together with other water retention efforts can often provide the same level of flood control otherwise provided by expensive dredge operations and levees.

Greater New Orleans Urban Water Plan

Regional plan: The Greater New Orleans Urban Water Plan is a regional effort spanning three sub-basins in Region 8 including the east banks of Jefferson and Orleans parishes and a portion of St. Bernard Parish.

A different approach to managing water resources: The urban water plan, acknowledging that the region's 100-year-old infrastructure is no longer adequate to sustain the region, provides a long-term program of retrofits to existing systems and the urban landscape. The plan strongly emphasizes the need for better management of stormwater and groundwater to prevent subsidence (slow and store).
Greater New Orleans Urban Water Plan

Regional plan: The Greater New Orleans Urban Water Plan is a regional effort spanning three sub-basins in Region 8 including the east banks of Jefferson and Orleans parishes and a portion of St. Bernard Parish.

A different approach to managing water resources: The urban water plan, acknowledging that the region's 100-year-old infrastructure is no longer adequate to sustain the region, provides a long-term program of retrofits to existing systems and the urban landscape. The plan strongly emphasizes the need for better management of stormwater and groundwater to prevent subsidence (slow and store).

Greater New Orleans Urban Water Plan

Plan implementation: The urban water plan outlines a 50-year timeline for implementation of these major retrofits and includes several action items related to community outreach, design, engineering and public policy adoption. From 2013 to 2020, the plan recommends the implementation of seven demonstration projects across the region.

Recap

Putting it all together

• Three types of flood risk
Proposed Stormwater Flows
A storage-based system that works with topography

Plan implementation: The urban water plan outlines a 50-year timeline for implementation of these major retrofits and includes several action items related to community outreach, design, engineering and public policy adoption. From 2013 to 2020, the plan recommends the implementation of seven demonstration projects across the region.

Recap

Putting it all together
- Three types of flood risk
- Future coastal surge flood risk
- Special Flood Hazard Areas, A zones and V zones
- Wetland areas
- Social Vulnerability Index
- Greater New Orleans Urban Water Plan

Your feedback

Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.

Legend

- FEMA Region 8
- CDC - Social Vulnerability
- A Zones
- V Zones
- High
- Medium

System scale water storage
Small scale strategies to slow water
Split at the ridge waterworks

5 miles
Recap

Putting it all together

- Three types of flood risk
- Future coastal surge flood risk
- Special Flood Hazard Areas, A zones and V zones
- Wetland areas
- Social Vulnerability Index
- Greater New Orleans Urban Water Plan

Your feedback

Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.

<table>
<thead>
<tr>
<th>Legend</th>
<th>FEMA Region 8</th>
<th>CDC - Social Vulnerability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A Zones</td>
<td>Vulnerability</td>
</tr>
<tr>
<td></td>
<td>V Zones</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Med-High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Med-Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
</tr>
</tbody>
</table>

Let's Review
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.

Legend
- FEMA Region 8
  - A Zones
  - V Zones
- CDC - Social Vulnerability
  - Vulnerability:
    - High
    - Med-High
    - Med-Low
    - Low

Let's Review
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.
Now we will examine risk more closely by combining some of these datasets and dividing Region 8 into subregions.