### **Appendix C: State Profile Sheets**

This appendix provides an overview of the results of a review of U.S states' post-construction stormwater standards. Each one-page profile sheet provides an overview of the standards, how each state ranked in terms of vulnerability to stormwater-related climate impacts and readiness to adapt stormwater standards, and a list of the top five recommendations for improvement. Click on your state to see the results.

Alabama	Kentucky	North Dakota		
Alaska	Louisiana	Ohio		
Arizona	Maine	Oklahoma		
Arkansas	Maryland	Oregon		
California	Massachusetts	Pennsylvania		
Colorado	Michigan	Rhode Island		
Connecticut	Minnesota	South Carolina		
Delaware	Mississippi	South Dakota		
District of Columbia	Missouri	Tennessee		
Florida	Montana	Texas		
Georgia	Nebraska	Utah		
Hawaii	Nevada	Vermont		
Idaho	New Hampshire	Virginia		
Illinois	New Jersey	Washington		
Indiana	New Mexico	West Virginia		
Iowa	New York	Wisconsin		
Kansas	North Carolina	Wyoming		



ALABAMA

**STATE STORMWATER MANUAL?** Yes Updated 2018

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

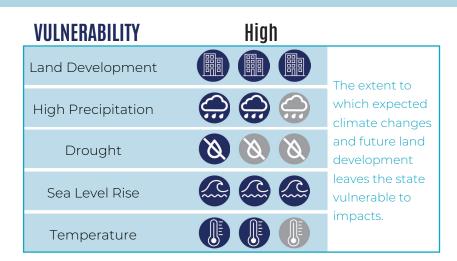
### **QUALITY STORMS**

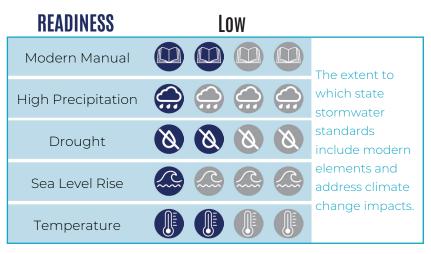
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

🖌 Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.





ALASKA

**STATE STORMWATER MANUAL?** Yes Updated 2011

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

TP-47 with the note that it this storm data resource needs a critical update

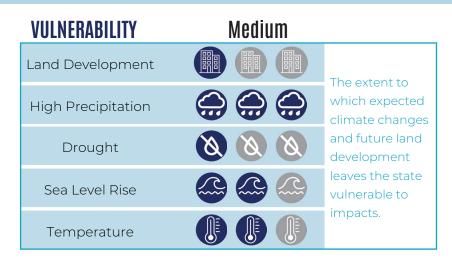
### **QUALITY STORMS**

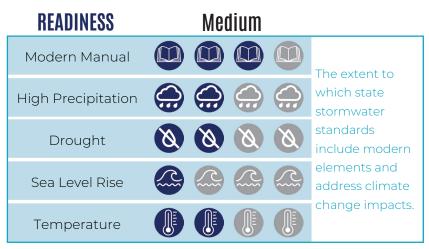
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





ARIZONA STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

**Goal:** No goal identified

Storm Source: Unknown or not identified

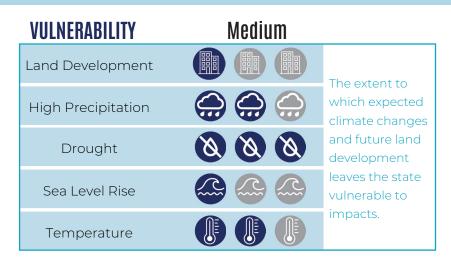
### **QUALITY STORMS**

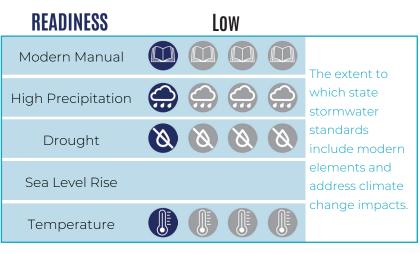
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





ARKANSAS

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

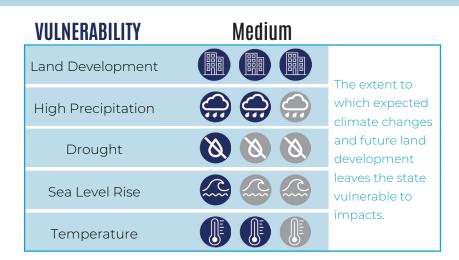
### **QUALITY STORMS**

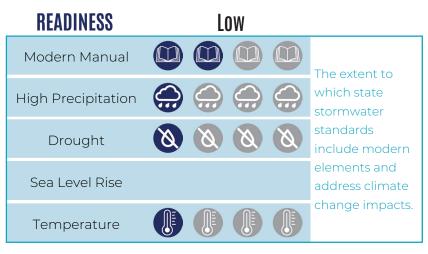
Traditional target pollutant (e.g., 80% TP Removal presumed)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





### CALIFORNIA

**STATE STORMWATER MANUAL?** Yes Updated 2021

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
  MS4
  New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source: Atlas 14

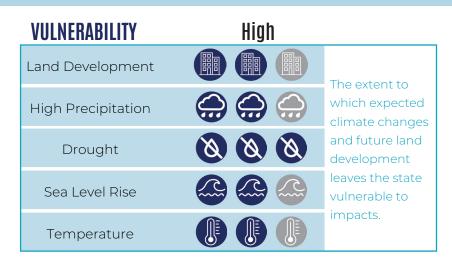
### **QUALITY STORMS**

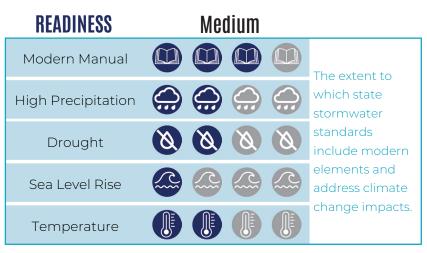
No Specific Storm

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

Provide guidance on how to modify plant selections based on changing climate conditions, including fire-resistant and drought-tolerant species.

Set specific goals for rainwater harvesting and incorporate design details for sizing of the systems.

Bioretention designs should incorporate methods to retain soil moisture such as internal water storage, or incorporating adding polymers or biochar to the media to retain soil moisture.

Review BMP materials and plantings to reduce carbon footprint and accommodate future climate change.





### COLORADO

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

**Goal:** No goal identified

Storm Source: Unknown or not identified

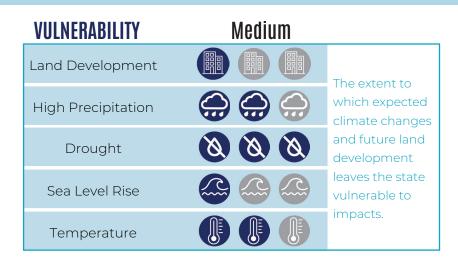
### **QUALITY STORMS**

None

### **GREEN STORMWATER PRACTICES**

] Green Infrastructure Practices

☑ Low Impact Development



#### **RFADINESS** Modern Manual The extent to which state **High Precipitation** stormwater standards Drought include modern elements and Sea Level Rise address climate change impacts. Temperature

### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





### CONNECTICUT

**STATE STORMWATER MANUAL?** Yes

Updated 2023

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- Statewide
- New Development

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

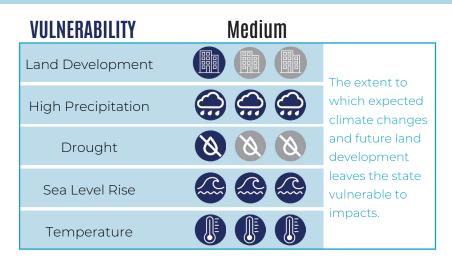
### **QUALITY STORMS**

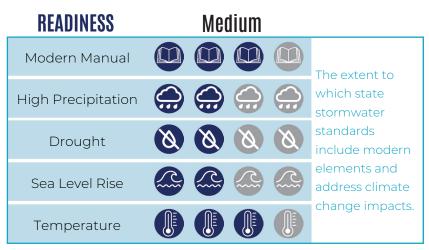
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.





DELAWARE

**STATE STORMWATER MANUAL?** Yes Updated 2019

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ✓ Statewide☐ MS4✓ New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source: Unknown or not identified

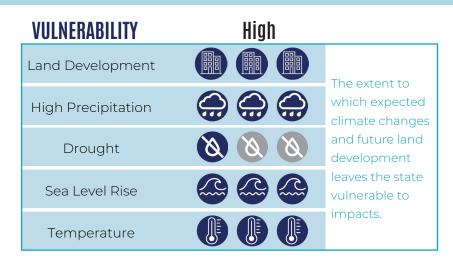
### **QUALITY STORMS**

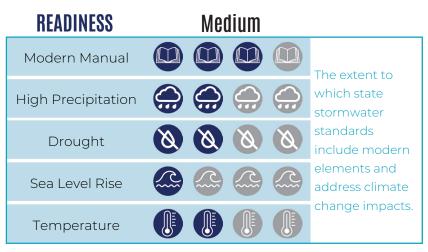
1-year

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





DISTRICT OF COLUMBIA STATE STORMWATER MANUAL? Yes

Updated 2020

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide MS4
- New Development

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

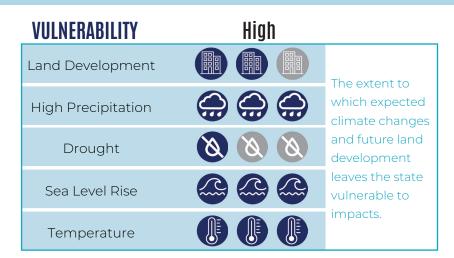
### **QUALITY STORMS**

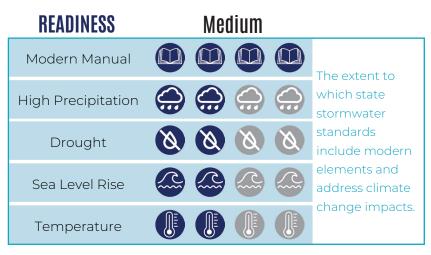
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





FLORIDA

**STATE STORMWATER MANUAL?** Yes Updated 2016

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

TP 40 or TP 49

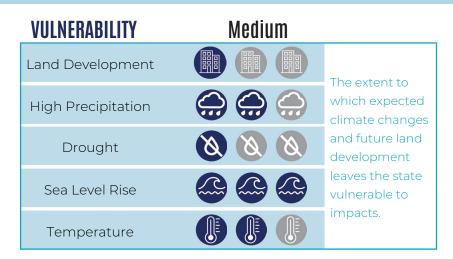
### **QUALITY STORMS**

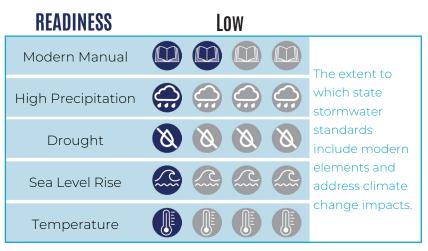
Varies by District. Often First Flush or 90th Percentile.

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.





GEORGIA

**STATE STORMWATER MANUAL?** Yes Updated 2016

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- Statewide
- MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

### **QUALITY STORMS**

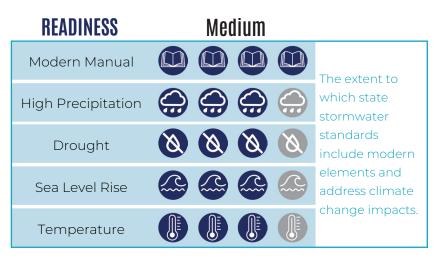
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development

VULNERABILITY	High	
Land Development		The extent to
High Precipitation	€ 🖨	which expected climate changes and future land development
Drought	88	
Sea Level Rise		leaves the state vulnerable to
Temperature		impacts.



### **PRIORITY RECOMMENDATIONS**

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

Add a section in the standards to include approaches and techniques that reduce the impact of sea level rise on stormwater practices, such as increasing conveyance capacity and elevating outfall inverts.

CENTER FOR WATERSHED PROTECTION



HAWAII STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

### **QUALITY STORMS**

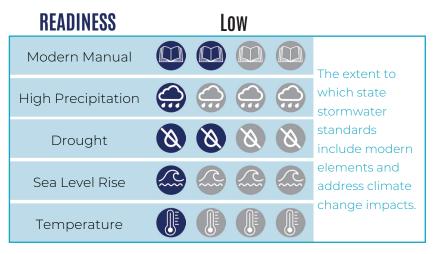
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development

VULNERABILITY	Medium	
Land Development		The extent to
High Precipitation	چ چ	which expected climate changes and future land development
Drought	88	
Sea Level Rise		leaves the state vulnerable to
Temperature		impacts.



### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





IDAHO STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- ☑ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- Runoff Reduction

### **QUANTITY STORMS**

**Goal:** No goal identified

Storm Source: Unknown or not identified

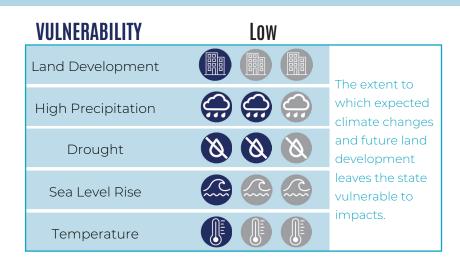
### **QUALITY STORMS**

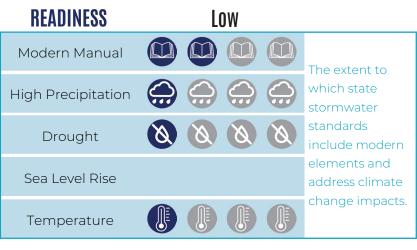
None

### **GREEN STORMWATER PRACTICES**

] Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





ILLINOIS

**STATE STORMWATER MANUAL?** Yes Updated 2020

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

### **QUALITY STORMS**

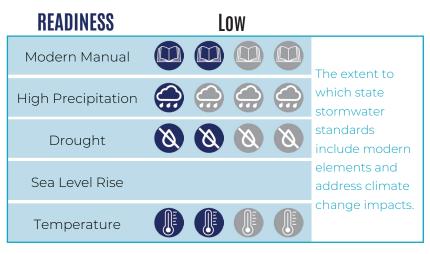
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





INDIANA

**STATE STORMWATER MANUAL?** Yes Updated 2007

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source: Unknown or not identified

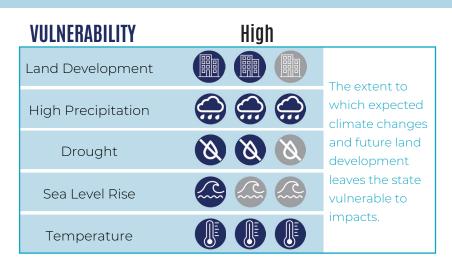
**QUALITY STORMS** 

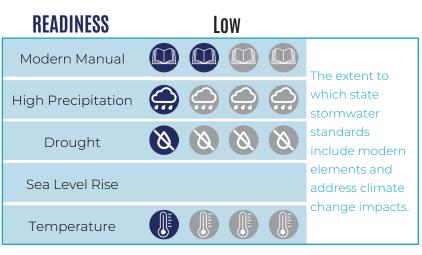
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.





ΙΟΨΑ

**STATE STORMWATER MANUAL?** Yes Updated 2023

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

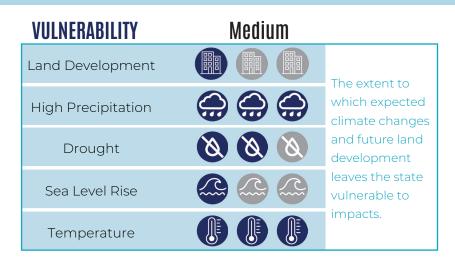
### **QUALITY STORMS**

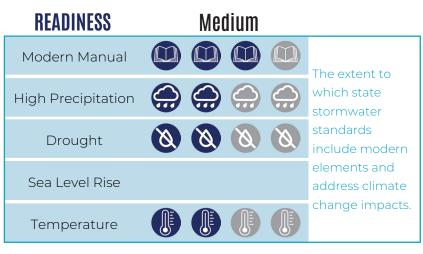
Achieve Woods in Good Condition or Equivalent

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





KANSAS

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

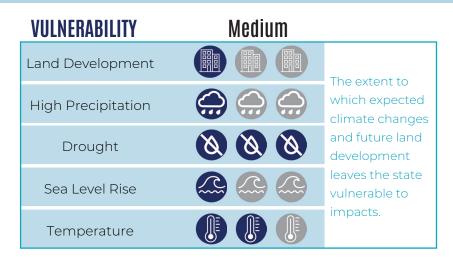
### **QUALITY STORMS**

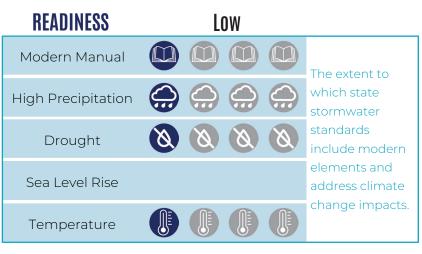
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





KENTUCKY

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

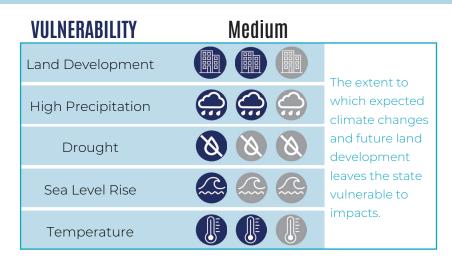
### **QUALITY STORMS**

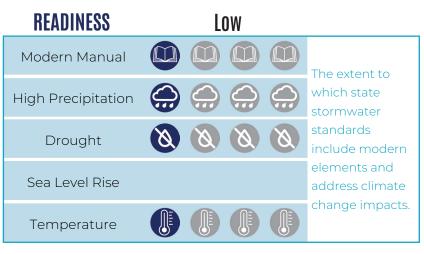
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





LOUISIANA

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
   MS4
   New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

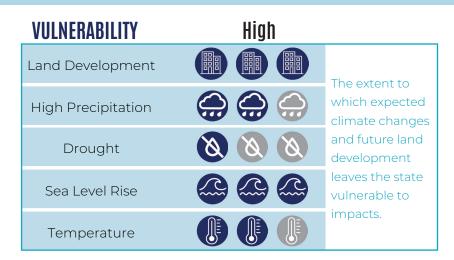
### **QUALITY STORMS**

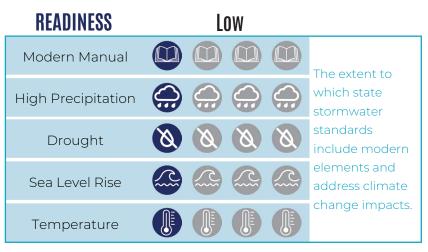
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





MAINE

**STATE STORMWATER MANUAL?** Yes Updated 2016

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide MS4
- New Development

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

### **QUALITY STORMS**

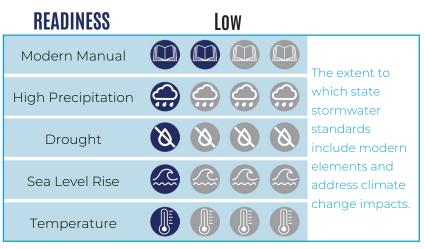
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.

Incorporate pretreatment, maintenance requirements, evaluation methods and schedule into the design standards.





### MARYLAND

**STATE STORMWATER MANUAL?** Yes Updated 2009

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- StatewideMS4New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

TP-40 (pre-Atlas 14)

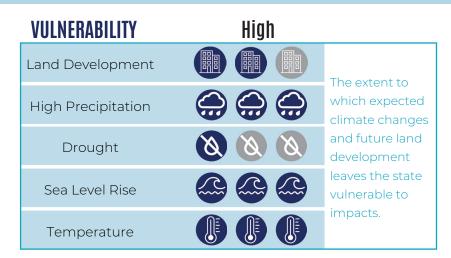
### **QUALITY STORMS**

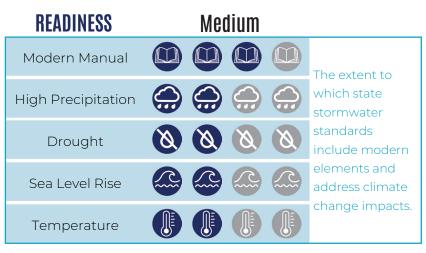
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





### MASSACHUSETTS

STATE STORMWATER MANUAL? Yes

Updated 2008

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- New Development
- 🖌 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- 🗹 Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source: Unknown or not identified

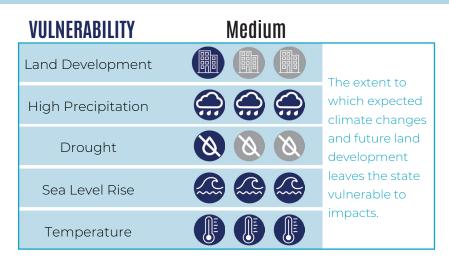
### **QUALITY STORMS**

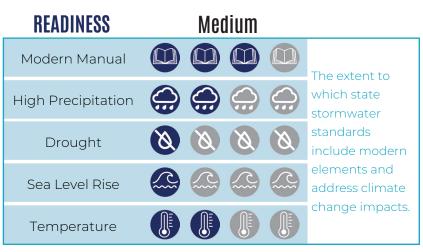
A short duration storm event (e.g., 5-yr,1-hr)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





### MICHIGAN

STATE STORMWATER MANUAL? Yes

Updated 2023

### **REFERENCES CLIMATE CHANGE?** No

### APPLICABILITY

- Statewide MS4
- New Development Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- Runoff Reduction

### **OUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source: TP-40 (pre-Atlas 14)

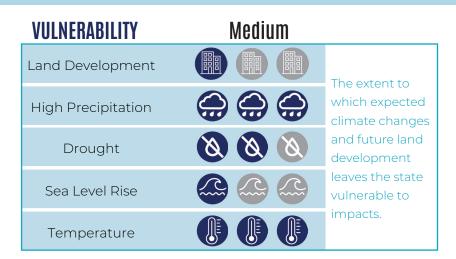
### **OUALITY STORMS**

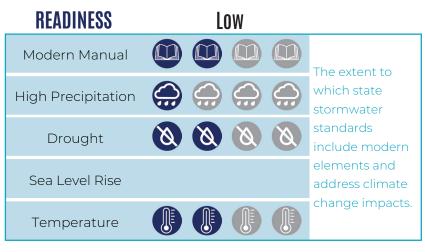
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

🖌 Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





MINNESOTA

**STATE STORMWATER MANUAL?** Yes Updated 2023

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- ✓ Statewide
   ☐ MS4
   ✓ New Development
- **V** Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

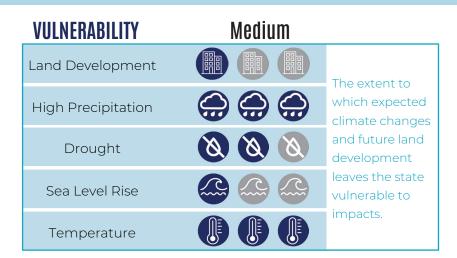
### **QUALITY STORMS**

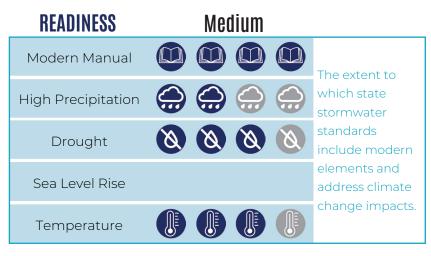
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.





MISSISSIPPI

**STATE STORMWATER MANUAL?** Yes Updated 2011

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

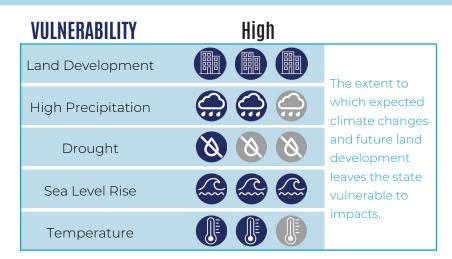
### **QUALITY STORMS**

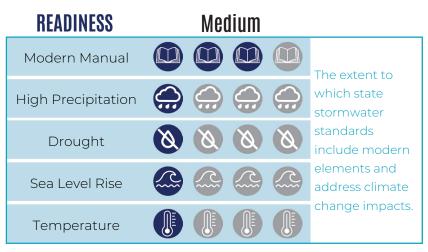
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.

Add a section in the standards to include approaches and techniques that reduce the impact of sea level rise on stormwater practices, such as increasing conveyance capacity and elevating outfall inverts.





MISSOURI

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- Runoff Reduction

### **QUANTITY STORMS**

**Goal:** No goal identified

Storm Source: Unknown or not identified

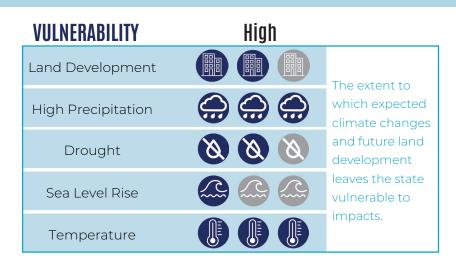
### **QUALITY STORMS**

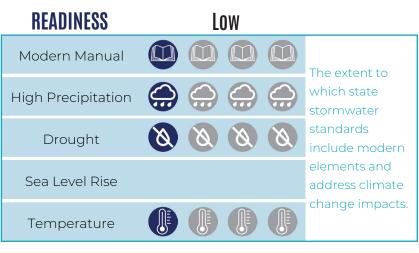
Traditional target pollutant (e.g., 80% TP Removal presumed)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





### MONTANA

**STATE STORMWATER MANUAL?** Yes Updated 2017

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗌 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

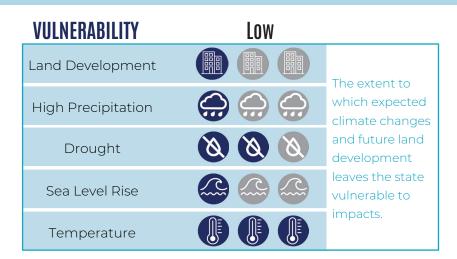
### **QUALITY STORMS**

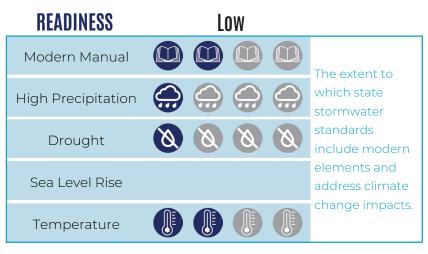
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





### NEBRASKA

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

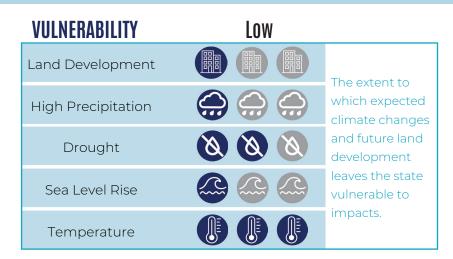
### **QUALITY STORMS**

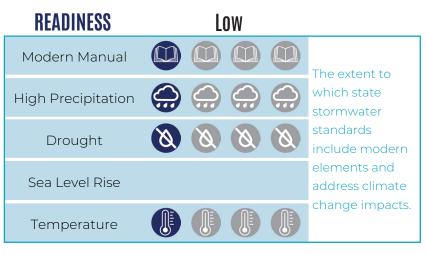
None

### **GREEN STORMWATER PRACTICES**

] Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





**NEVADA** STATE STORMWATER MANUAL? NO

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

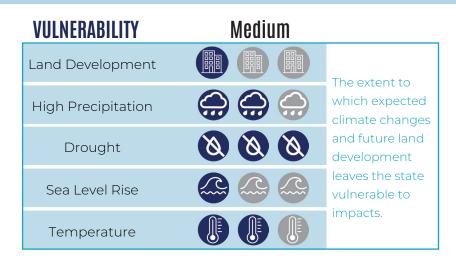
### **QUALITY STORMS**

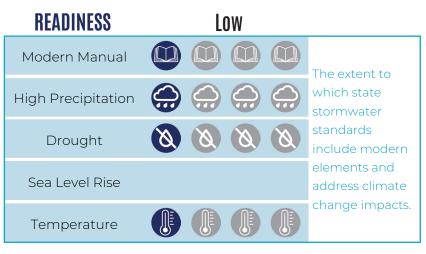
Depth to achieve 80% Capture

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





### NEW HAMPSHIRE

### STATE STORMWATER MANUAL? Yes

Updated 2008

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- ☑ Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

TP-40 (pre-Atlas 14)

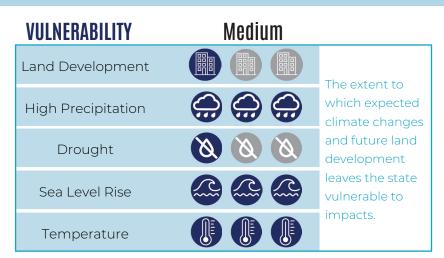
### **QUALITY STORMS**

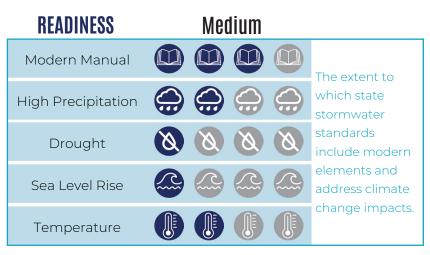
Traditional target pollutant (e.g., 80% TP Removal presumed)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





NEW JERSEY

**STATE STORMWATER MANUAL?** Yes

Updated 2023

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed with Future storm to Pre-Developed with Current Storm

#### Storm Source:

Downscaled or Projected Data

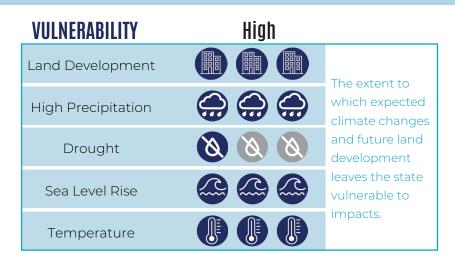
### **QUALITY STORMS**

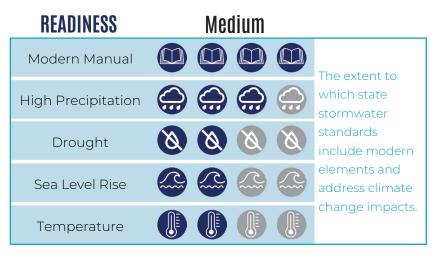
A short duration storm event (e.g., 5-yr,1-hr)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.

Incorporate advanced techniques such as Smart BMPs to provide long-term adaptability.

Review BMP materials and plantings to reduce carbon footprint and accommodate future climate change.

Add a section in the standards to include approaches and techniques that reduce the impact of sea level rise on stormwater practices, such as increasing conveyance capacity and elevating outfall inverts.





NEW MEXICO

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

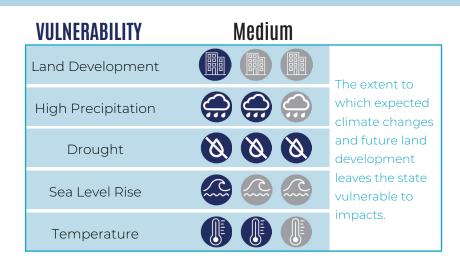
### **QUALITY STORMS**

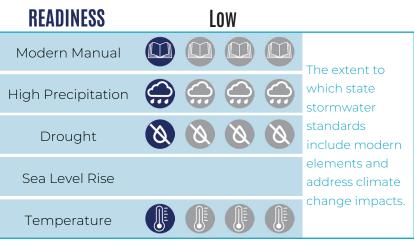
None

### **GREEN STORMWATER PRACTICES**

] Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





### NEW YORK

**STATE STORMWATER MANUAL?** Yes Updated 2022

### **REFERENCES CLIMATE CHANGE?** Yes

### **APPLICABILITY**

- ✓ Statewide☐ MS4✓ New Development
- ☑ Redevelopment

### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

### **QUALITY STORMS**

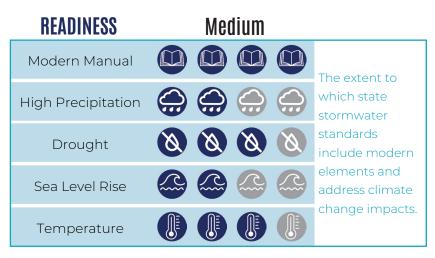
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development

VULNERABILITY	Medium	
Land Development		The extent to
High Precipitation		which expected climate changes
Drought	88	and future land development
Sea Level Rise		leaves the state vulnerable to
Temperature		impacts.



### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





### NORTH CAROLINA

### STATE STORMWATER MANUAL? Yes

Updated 2023

### **REFERENCES CLIMATE CHANGE?** No

### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- ☑ Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Atlas 14

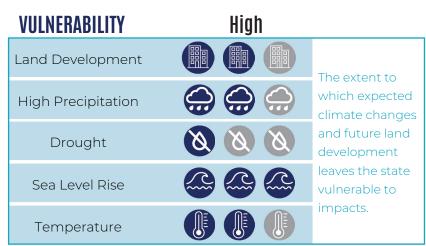
### **QUALITY STORMS**

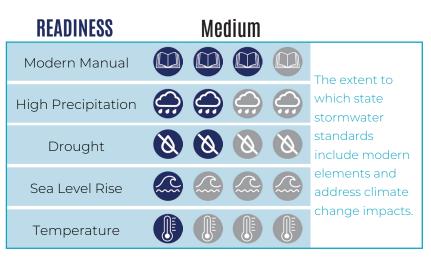
90th Percentile (often about 1 inch)

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.

Add a section in the standards to include approaches and techniques that reduce the impact of sea level rise on stormwater practices, such as increasing conveyance capacity and elevating outfall inverts.



### NORTH DAKOTA

STATE STORMWATER MANUAL? No

### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- Redevelopment

### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

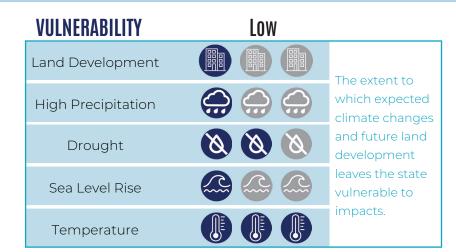
### **QUALITY STORMS**

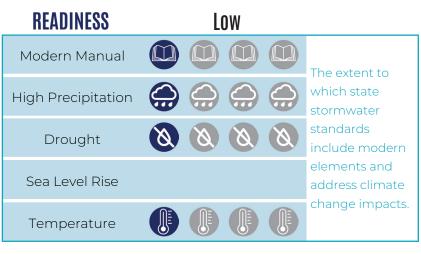
None

### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





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**STATE STORMWATER MANUAL?** Yes Updated 2023

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- StatewideMS4New Development
- Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

#### **QUANTITY STORMS**

**Goal:** Other. Critical Storm Identification

Storm Source: Atlas 14

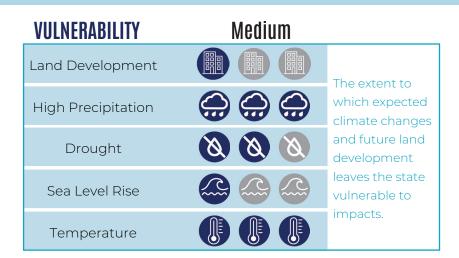
#### **QUALITY STORMS**

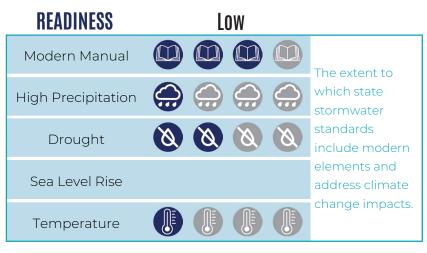
90th Percentile (often about 1 inch)

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.





## OKLAHOMA

STATE STORMWATER MANUAL? No

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

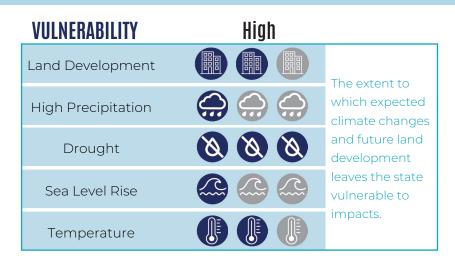
### **QUALITY STORMS**

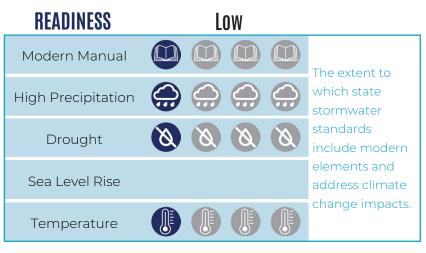
None

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





## OREGON

**STATE STORMWATER MANUAL?** Yes Updated 2016

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

#### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

Atlas 2, but with more recent analyses in some cities.

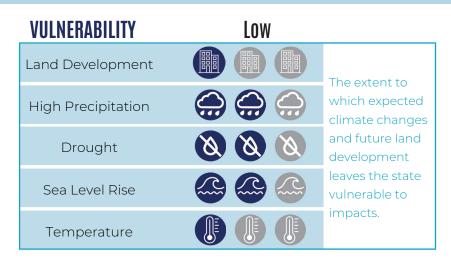
#### **QUALITY STORMS**

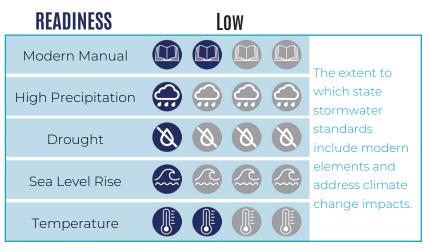
None

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





### PENNSYLVANIA

STATE STORMWATER MANUAL? Yes

Updated 2023

#### **REFERENCES CLIMATE CHANGE?** Yes

#### **APPLICABILITY**

- 🗹 Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

Atlas 14+ (add depth as a factor of safety)

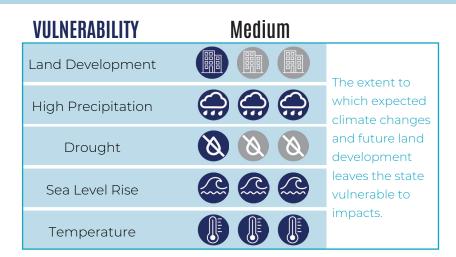
#### **QUALITY STORMS**

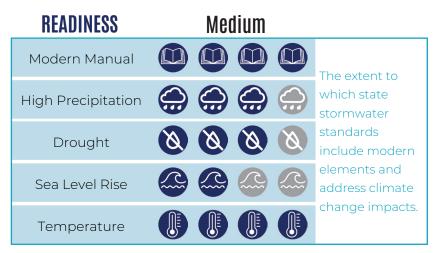
Water Quality Target based on longterm modeling or curves.

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





#### **PRIORITY RECOMMENDATIONS**

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.

Incorporate advanced techniques such as Smart BMPs to provide long-term adaptability.





### RHODE ISLAND

**STATE STORMWATER MANUAL?** Yes Updated 2015

#### **REFERENCES CLIMATE CHANGE?** Yes

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🖌 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

Lists values from precip.net (Northeast Regional Climate Center)

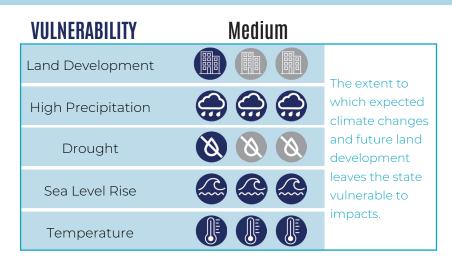
#### **QUALITY STORMS**

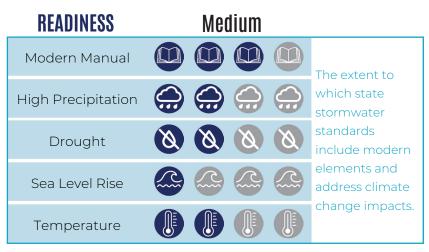
90th Percentile (often about 1 inch)

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





## SOUTH CAROLINA

#### STATE STORMWATER MANUAL? Yes

Updated 2005

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- ☑ Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

Atlas 14

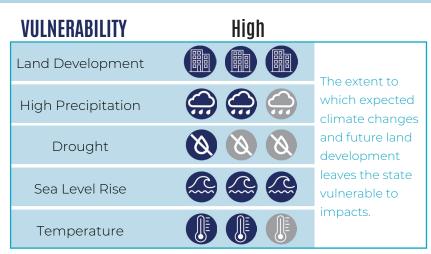
#### **QUALITY STORMS**

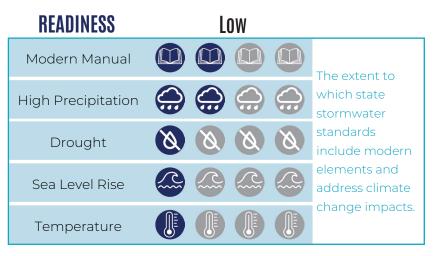
Traditional target pollutant (e.g., 80% TP Removal presumed)

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.

Incorporate pretreatment, maintenance requirements, evaluation methods and schedule into the design standards.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





## SOUTH DAKOTA

STATE STORMWATER MANUAL? No

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ☑ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

#### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

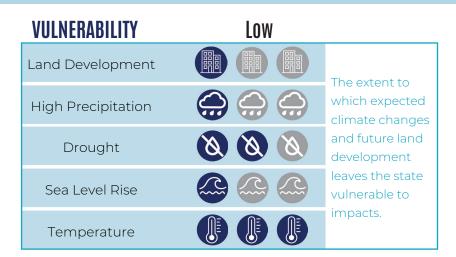
### **QUALITY STORMS**

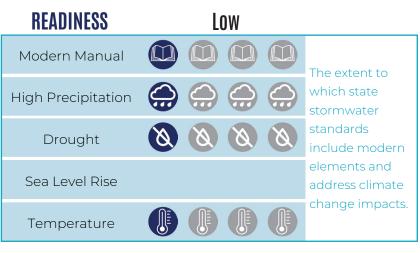
None

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





## TENNESSEE

STATE STORMWATER MANUAL? Yes

Updated 2015

#### **REFERENCES CLIMATE CHANGE?** No

#### APPLICABILITY

- Statewide
- MS4
- New Development
- Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- Runoff Reduction

### **OUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source: Atlas 14

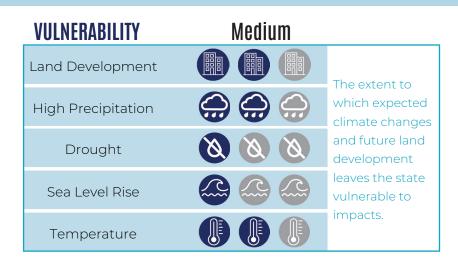
#### **OUALITY STORMS**

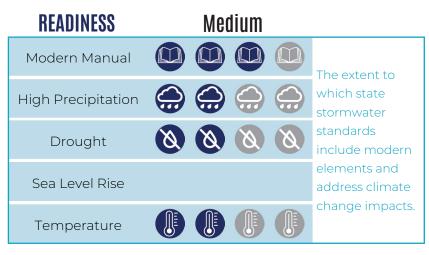
1-year

#### **GREEN STORMWATER PRACTICES**

🖌 Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.





T E X A S STATE STORMWATER MANUAL? No

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- ☐ Statewide✓ MS4
- New Development
- Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

**Goal:** No goal identified

Storm Source: Unknown or not identified

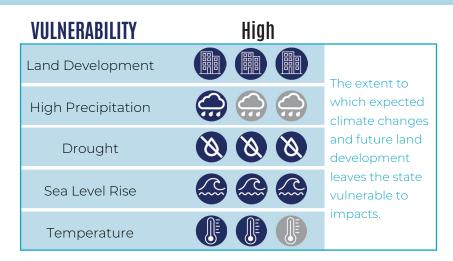
### **QUALITY STORMS**

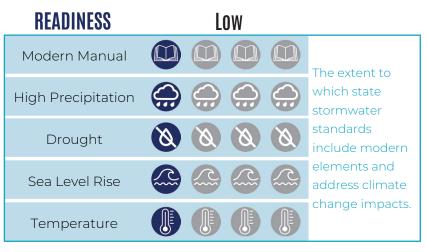
None

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.





UTAH

**STATE STORMWATER MANUAL?** Yes Updated 2020

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🗹 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

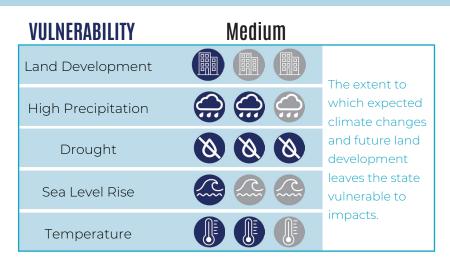
#### **QUALITY STORMS**

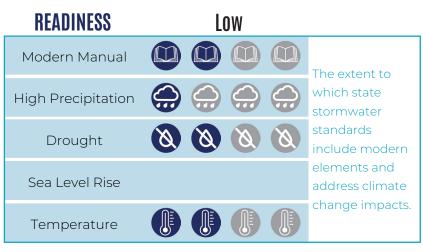
80th Percentile Storm

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

🗹 Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Ensure that practices are resistant to erosion. Methods include prescribing non-erosive storm events, providing detention at the inlet, or designing practices off-line.

Expand permit coverage by applying standards to redevelopment, smaller sites, or outside of MS4 areas.





VERMONT

**STATE STORMWATER MANUAL?** Yes Updated 2017

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- ✓ Statewide
   ☐ MS4
   ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

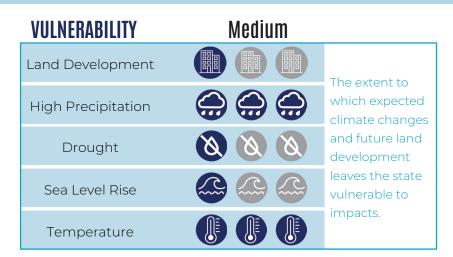
#### **QUALITY STORMS**

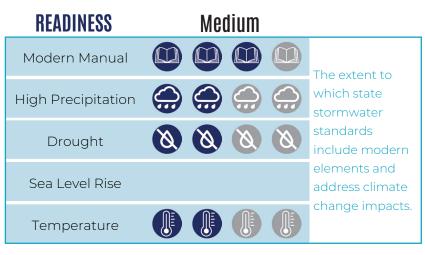
90th Percentile (often about 1 inch)

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.





## VIRGINIA

**STATE STORMWATER MANUAL?** Yes Updated 2013

#### **REFERENCES CLIMATE CHANGE?** Yes

#### **APPLICABILITY**

- ✓ Statewide
   ☐ MS4
   ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- 🗹 Channel Protection
- 🗹 Water Quality
- $\mathbf{M}$  Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

Storm Source:

Atlas 14

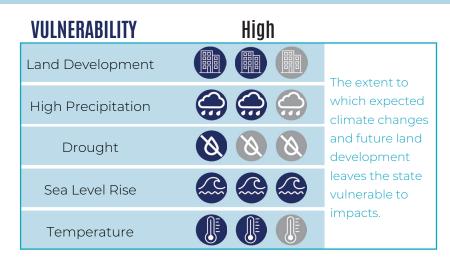
#### **QUALITY STORMS**

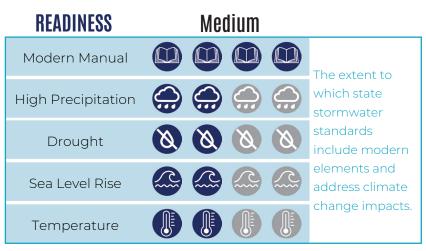
90th Percentile (often about 1 inch)

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Revise stormwater quantity sizing to either over-control the storm event or match a historic peak discharge.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Add a section in the standards to include approaches and techniques that reduce the impact of sea level rise on stormwater practices, such as increasing conveyance capacity and elevating outfall inverts.





### WASHINGTON

**STATE STORMWATER MANUAL?** Yes Updated 2019

#### **REFERENCES CLIMATE CHANGE?** Yes

#### **APPLICABILITY**

- Statewide
- MS4
- ✓ New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- $\mathbf{M}$  Runoff Reduction

#### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Downscaled or Projected Data

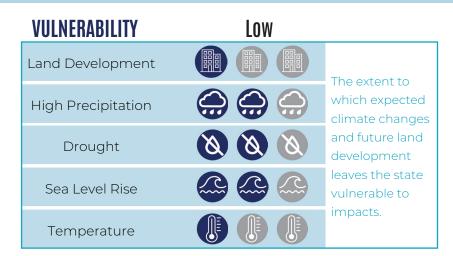
#### **QUALITY STORMS**

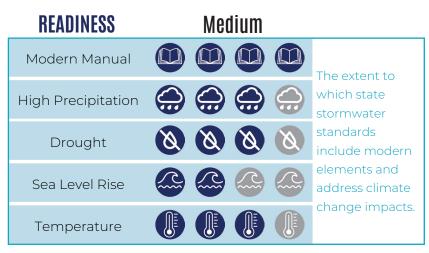
Water Quality Target based on long-term modeling or curves.

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





#### **PRIORITY RECOMMENDATIONS**

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.

Incorporate advanced techniques such as Smart BMPs to provide long-term adaptability.

Review BMP materials and plantings to reduce carbon footprint and accommodate future climate change.





## WEST VIRGINIA

**STATE STORMWATER MANUAL?** Yes

Updated 2012

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide MS4
- New Development
- 🖌 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- Vater Quality
- 🗹 Runoff Reduction

### **QUANTITY STORMS**

Goal: No goal identified

**Storm Source:** Atlas 14



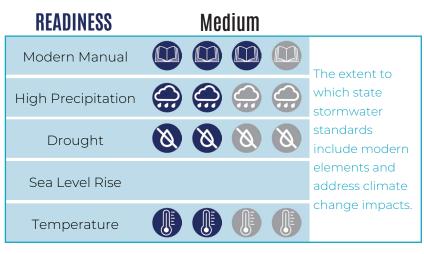
1-year

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development

VULNERABILITY	Medium	
Land Development		The extent to
High Precipitation		which expected climate changes
Drought	88	and future land development
Sea Level Rise		leaves the state vulnerable to
Temperature		impacts.



### **PRIORITY RECOMMENDATIONS**

Add a section that discusses climate change and recommends specific adaptation measures.

For water quantity sizing, incorporate projected storm data or other options that account for increased storm depths. Ensure the precipitation data are referenced to their source.

Provide a factor of safety for conveying the water quality storm, by assuming a greater peak discharge, or providing additional freeboard.

Enhance ponding depth, storage design and filter media specifications in filtering/ bioretention systems to accommodate increasing storm intensities.

When siting stormwater BMPs, consider changes in floodplain and groundwater rise due to climate change.





WISCONSIN

**STATE STORMWATER MANUAL?** Yes Updated 2022

## **REFERENCES CLIMATE CHANGE?** No

#### APPLICABILITY

- Statewide
- MS4
- New Development
- 🗹 Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- 🖌 Water Quality
- Runoff Reduction

### **QUANTITY STORMS**

#### Goal:

Match Post-Developed to Pre-Developed conditions

#### Storm Source:

TP-40 permitted/Atlas 14 recommended

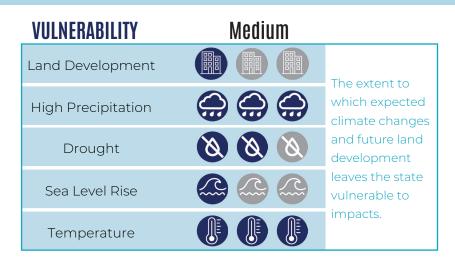
#### **QUALITY STORMS**

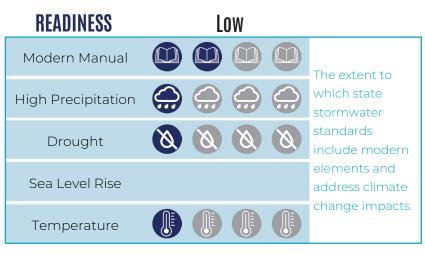
Size to achieve 90% of pre-developed annual infiltration.

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

☑ Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

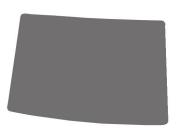
Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

Encourage redevelopment, impervious cover reduction, natural area conservation and tree protection and planting.

Include a plant list that identifies plant tolerances to drought, differing soil conditions, salt tolerance and inundation.





WYOMING

STATE STORMWATER MANUAL? No

#### **REFERENCES CLIMATE CHANGE?** No

#### **APPLICABILITY**

- Statewide
- MS4
- ☑ New Development
- Redevelopment

#### **STORMWATER GOALS**

- Flood Control
- Channel Protection
- ☐ Water Quality
- Runoff Reduction

#### **QUANTITY STORMS**

Goal: No goal identified

Storm Source: Unknown or not identified

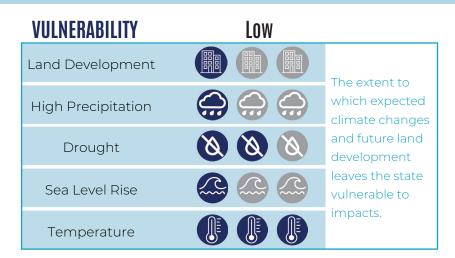
### **QUALITY STORMS**

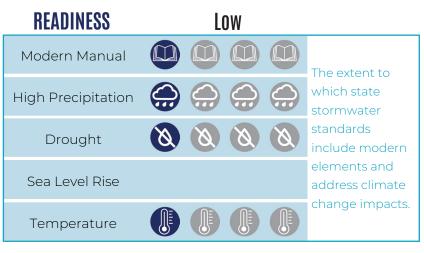
None

#### **GREEN STORMWATER PRACTICES**

Green Infrastructure Practices

Low Impact Development





### **PRIORITY RECOMMENDATIONS**

Revise or update stormwater standards to include specific design criteria and a list of acceptable practices.

Incorporate unified sizing criteria to address water quality, water quantity, channel protection and runoff reduction.

Update design storms to reference the most recent available storm data.

Provide treatment credits or requirements to implement green infrastructure.

