



Insurance
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Business &
Home
Safety®



RATING THE STATES 2021

 **HURRICANE COAST**

*An Assessment of Residential Building Code and Enforcement Systems
for Life Safety and Property Protection in Hurricane-Prone Regions*

ATLANTIC AND GULF COAST STATES
JUNE 2021



Table of Contents

4	The 2021 Edition
5	Importance of Mitigation
5	Building Codes and Mitigation
6	Rating the States Methodology
7	Overview of 2021 Results
8-9	Changes over Time
10-23	State-by-State Building Code System Assessments
24	Consumer Support for Stronger Codes
24	Consumer Resources



Rating the States: 2021 Edition

This is the fourth edition of the Insurance Institute for Business & Home Safety (IBHS) *Rating the States* report evaluating building code enforcement and administration, and contractor licensing in the 18 states most vulnerable to catastrophic hurricanes along the Atlantic and Gulf coasts. Each was scored on a 0–100-point scale. In this edition, IBHS revisited the US territories of Puerto Rico and the Virgin Islands, which were covered for the first time in the 2018 edition. These US territories suffered major damage from Hurricanes Maria and Irma in 2017.

IBHS is a nonprofit organization supported by property insurers and reinsurers that conducts scientific research to identify and promote effective actions to strengthen homes, businesses, and communities against natural disasters and other causes of loss. As part of this mission, IBHS provides technical guidance to inform and improve model building codes, advocates for timely adoption of national model building codes and standards, and encourages uniform enforcement of these codes.

The IBHS Rating the States report is intended to help provide a roadmap states can follow to improve their system of residential-related building regulations by following best practices. It is not intended for use in insurance underwriting or rating, or for regulatory purposes.

The *Weather, Climate & Catastrophe Insight: 2020 Annual Report* from the re-insurance services and analytics firm Aon highlights the record economic damage and insured losses that occurred in just one year due to hurricanes and severe convective storms. From 2018 to 2020, ten hurricanes made landfall in the United States (Figure 1). During the hyperactive 2020 Atlantic hurricane season, the United States experienced 12 named storm landfalls (6 of which were hurricanes) during a season with 30 named storms.

Severe convective storms in 2020 also caused over \$30 billion in losses, which included the derecho event of August 2020 that caused \$11 billion alone in losses.¹ Tropical cyclones and severe convective storms resulted in combined economic losses of \$89 billion for 2020.

Building resilience is the key to reducing the potential financial costs associated with these destructive natural disasters. Ensuring that standards required by the building code are incorporated into construction of residential dwellings has a direct relationship to building resilience. Because of the relationship between codes and resilience, the goal of this report is to focus attention on the need for effective statewide building codes, enforcement of those codes, and proper training and education for building officials. Requirements for licensing of building officials and construction contractors is a key to ensuring the quality of construction and should be regulated at the state level to achieve the best results.

¹ Data source: AON NatCat Insight

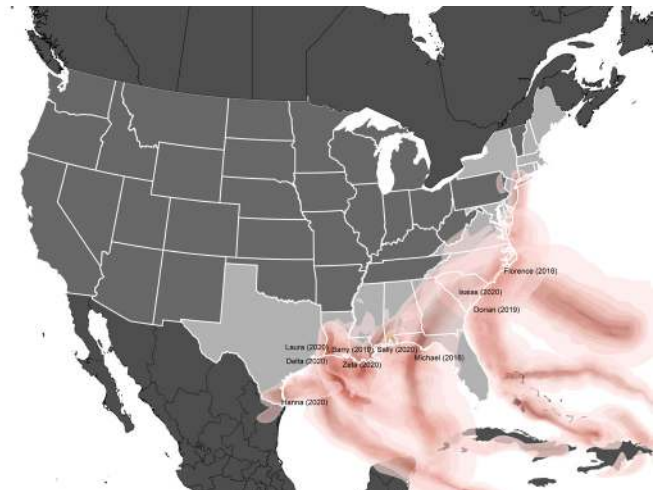


Figure 1. Wind swaths from hurricanes that made landfall since the 2018 edition of IBHS's *Rating the States*. Ten hurricanes made landfall along the US Gulf or Atlantic coastline during this period, the strongest being Hurricane Michael (2018). Swaths show estimated open terrain peak wind gusts greater than 50 mph. Wind data courtesy of RMS HWind.

Importance of Mitigation

What has made our structures stronger over the past several decades? Why do we take for granted that our buildings will survive undamaged in the face of weather-related hazards?

While there are many factors at work, mitigation plays a vital role. Mitigation is action to lessen the impact of disasters before they happen. *"Mitigation reduces the loss of life and property endured by affected communities." Stringent building codes, flood-proofing requirements, earthquake design standards and wind-bracing requirements are examples of mitigation efforts.*² While building codes primarily address occupant safety, certain construction techniques have been proven to significantly increase the ability of a structure to withstand extreme events. This ultimately leads to faster recovery. The remarkable improvements in resilient construction techniques are central to reducing damage, faster recovery, and supporting overall community resilience. Some of the improvements are now incorporated into model building codes. Experts have long argued that we need to *"... put a price on the costs of disasters. As long as the costs of disasters are invisible, it is*

² Testimony of Mr. David Miller, Associate Administrator, Federal Insurance and Mitigation Administration, Federal Emergency Management Agency; July 24, 2012. https://www.fema.gov/media-library-data/1411484284311-e8fb5fa4daa75683bc75ad-c9fb01fd9d/7_24_12___review_of_building_codes_and_mitigation_efforts.pdf

*very easy to ignore them, and it is very hard to make the case to invest up-front on prevention."*³ Mitigation against disasters reduces the disruption and displacement that often follows catastrophic events and helps accelerate economic recovery. This is supported by the National Institute of Building Sciences (NIBS), Natural Hazard Mitigation Saves: 2019 Report.⁴

The NIBS study shows that:

- Adopting model codes saves \$11 per \$1 spent
- Federal mitigation grants save \$6 per \$1 spent
- Private-sector building retrofit saves \$4 per \$1 spent
- Exceeding codes saves \$4 per \$1 spent
- Mitigating infrastructure saves \$4 per \$1 spent

These savings are for investments that exceed select provisions in model building codes. Mitigation helps solve the problem of the cycle of damage from recurring events.

³ Robert Glasser, United Nations Office for Disaster Risk Reduction (UNISDR)

⁴ National Institute for Building Sciences Mitigation Saves: 2019 Report. <https://www.nibs.org/page/mitigationsaves>

Building Codes and Loss Prevention

Damage reduction that results from the adoption and enforcement of building codes helps to keep people in their homes and businesses following a natural or manmade disaster, reduces the need for public and private disaster aid, and preserves the built environment. For example, a study conducted by IBHS following Hurricane Charley⁵ in 2004 found that improvements to the codes adopted in 1996 in Florida resulted in a 60% reduction in residential property damage claims and a 42% reduction in damage severity (cost of claims).

Additional benefits of strong, uniform, well-enforced statewide codes include:

- Giving residents a sense of security about the safety and soundness of their buildings.
- Preserving economic resources of a community and reducing the burden on post-disaster government spending.
- Offering protection to first responders during and after fires and other disaster events.
- Incorporating newly identified best practices and cost efficiencies.
- Reducing the amount of solid waste in landfills produced by homes that are damaged or destroyed during disasters.

⁵ Insurance Institute for Business & Home Safety Hurricane Charley Damage Assessment Report: www.DisasterSafety.org/hurricane/hurricane-charley

Rating the States Methodology

The *Rating the States* scoring system evaluates 47 components of building code adoption, enforcement, licensing, and education to assess the effectiveness of a state's code program. The assessment covers factors such as:

- The current statewide residential building code, and whether one exists at all.
- The processes in place to ensure uniform code application without amendments that weaken it.
- State and local enforcement programs.
- Licensing and education of building officials, contractors, and subcontractors.

After identifying data points in each category, activities and/or processes associated with each element are weighted as follows:

- **50%** of the total score is based on statewide adoption and enforcement of building codes.
- **25%** is based on state-adopted requirements for building official certification, training, and continuing education.
- **25%** is based on state regulations for on-site implementation and proficiency, as demonstrated by contractor and subcontractor registration, licensing, and continuing education.

The statistical weighting allows for recognition that the building code is the focal point of an effective state regulatory life safety and property protection system. Within each of the three components, there are several subcategories:

- Whether statewide building codes can be amended at the local level.
- Certification requirements for building officials.
- Specific construction trades covered by licensing requirements.

Points are scored in these subcategories based on their relative importance to building safety and integrity, with an emphasis on the wind hazard protection requirements.

States received points based on IBHS research relating to a set of questions seeking to gauge the statutory and regulatory environment in three categories and associated subcategories identified. Points were allotted when the answer to a given question was consistent with promotion of safer residential construction. No points were allotted if the answer to a given question was inconsistent with the promotion of safer construction. No negative points were allotted.

As a result, possible scores range from 0 to 100, with 0 as the weakest and 100 as the strongest score. Actual scores ranged from 17 to 95. By examining the detailed assessment elements, policymakers and other interested parties can find a clear roadmap to strengthen their residential building code system and improve their standing in this report.

Overview of 2021 Results

During this *Rating the States* cycle, no state achieved a perfect rating based on the IBHS 100-point scale. Several states received high scores including Florida (95 points), Virginia (94 points), South Carolina (92 points), and New Jersey (90 points). Florida and Virginia continue to battle for the top spot in the ratings. Other states that performed well were Connecticut (89 points), Rhode Island (89 points), North Carolina (88 points), Louisiana (82 points), Massachusetts (78 points), and Maryland (78 points). The results are summarized in Table 1 and shown geographically in Figure 2.

North Carolina is our most improved state. While Massachusetts continues to score in the upper one-third, after the 2018 report the state made certain changes that weakened their score by 3 percentage points.

While all of these states have uniform statewide residential building codes and enforcement processes, some have taken actions that may weaken their codes in the future.

The states that received less than 70 points (Georgia, New York, Maine, New Hampshire, Texas, Mississippi, Alabama, and Delaware) have no mandatory statewide codes. There are some individual jurisdictions within these states that have strong code adoption and/or enforcement programs, and have made improvements since the original *Rating the States* report in 2012. The “State-by-State Building Code Assessment” section of this report identifies additional meaningful steps that could be implemented by these states to improve their statewide code adoption and enforcement programs. Figure 3 provides the state-by-state total scores for each of the four *Rating the States* editions and Figure 4 shows the scores for each of the three components that comprise the total rating.

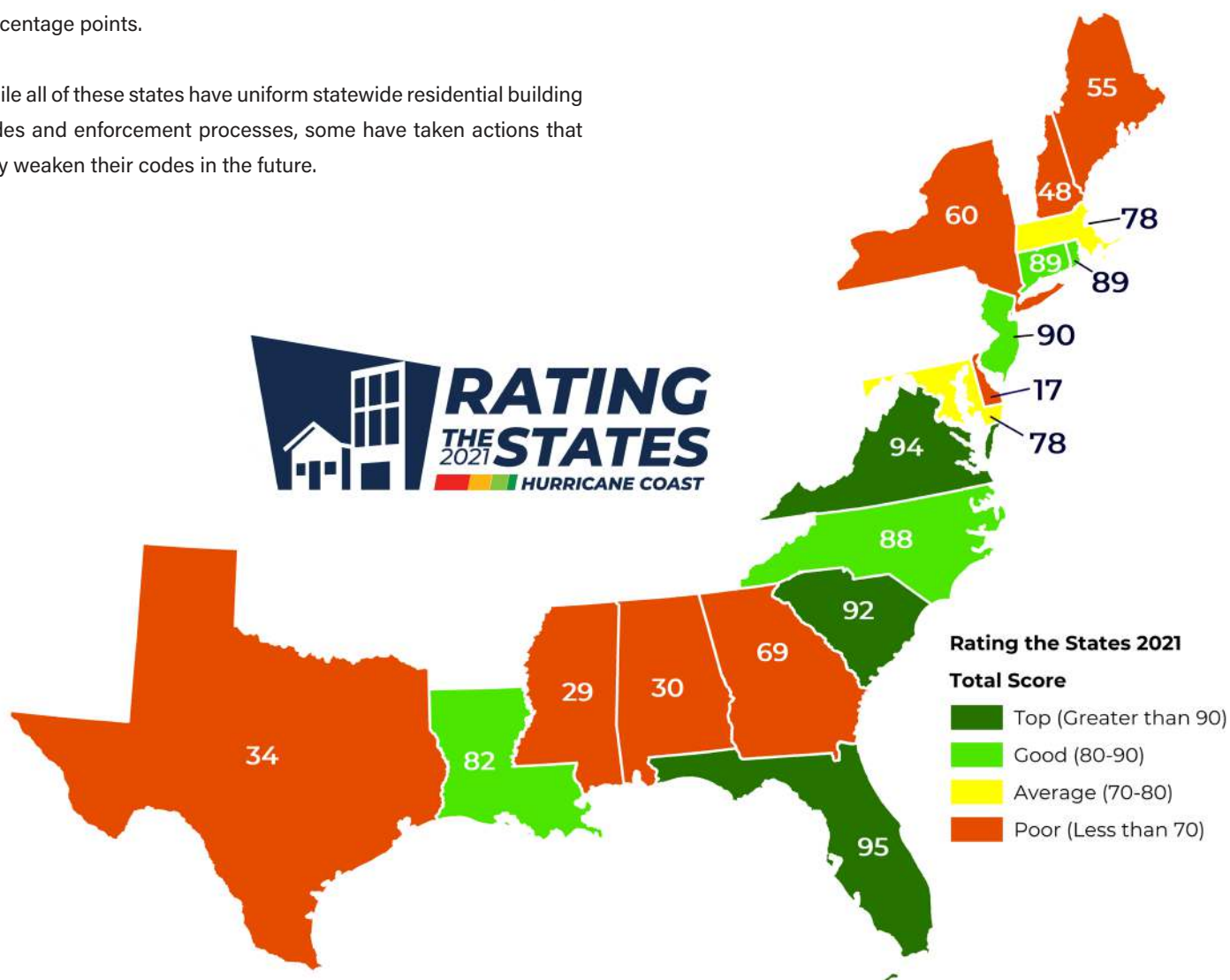


Figure 2. Map of the 18 states included in this report. Each state is labeled with their 2021 total score.

Changes over Time

Table 1. 2012 Through 2021 State Scores

STATE	2012	2015	2018	2021
Florida	95	94	95	95
Virginia	95	95	94	94
South Carolina	84	92	92	92
New Jersey	93	89	90	90
Connecticut	81	88	89	89
Rhode Island	78	87	87	89
North Carolina	81	84	83	88
Louisiana	73	82	83	82
Massachusetts	87	79	81	78
Maryland	73	78	78	78
Georgia	66	69	68	69
New York	60	56	64	60
Maine	64	55	54	55
New Hampshire	49	48	46	48
Texas	18	36	34	34
Alabama	18	26	27	30
Mississippi	4	28	28	29
Delaware	17	17	17	17

IBHS Rating the States

Total scores for each edition of Rating the States.
Each state receives a total score of 0 – 100

2012 - 2021 Total Scores by State

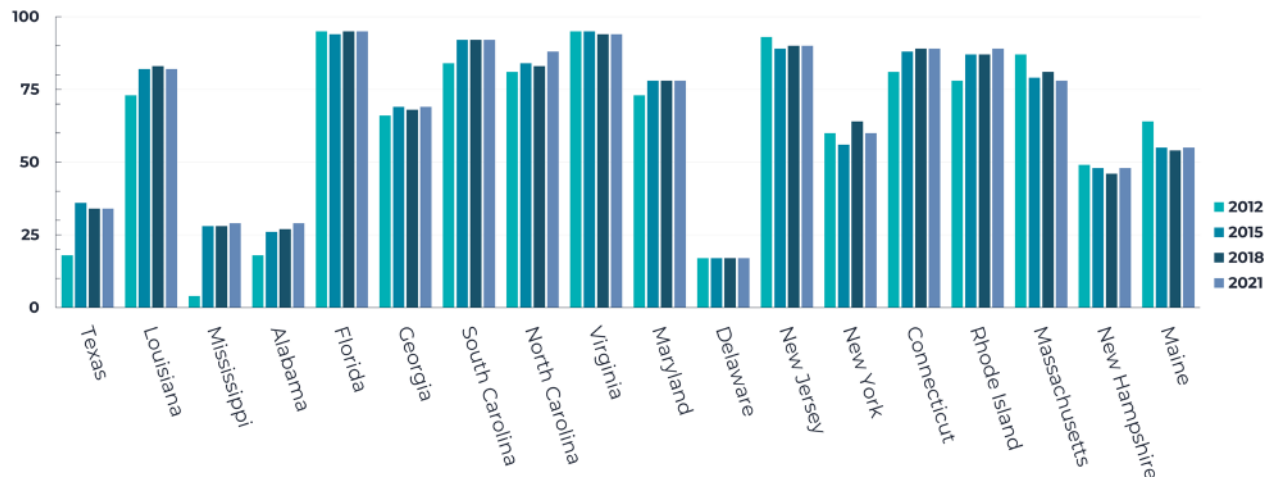
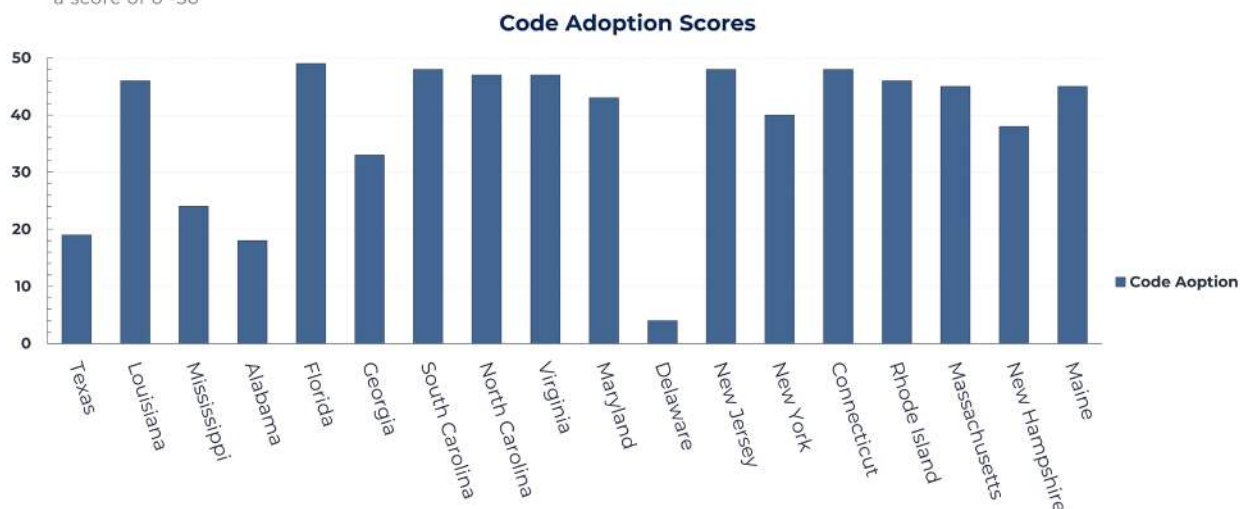


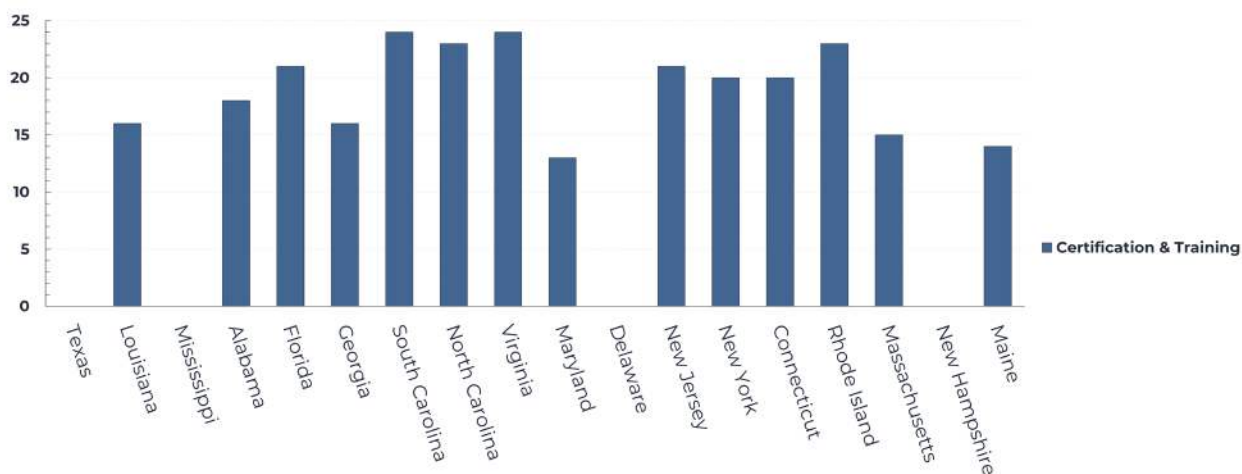
Figure 3. Total scores from each edition (2012–2021) of IBHS's Rating the States.

For the code adoption category, states receive a score of 0 -50



Building Official Certification, Training, & Continuing Education Scores

For the building official training and continuing education category, states receive a score of 0 -25



Contractor Licensing Scores

For the contractor licensing category, states receive a score of 0 -25

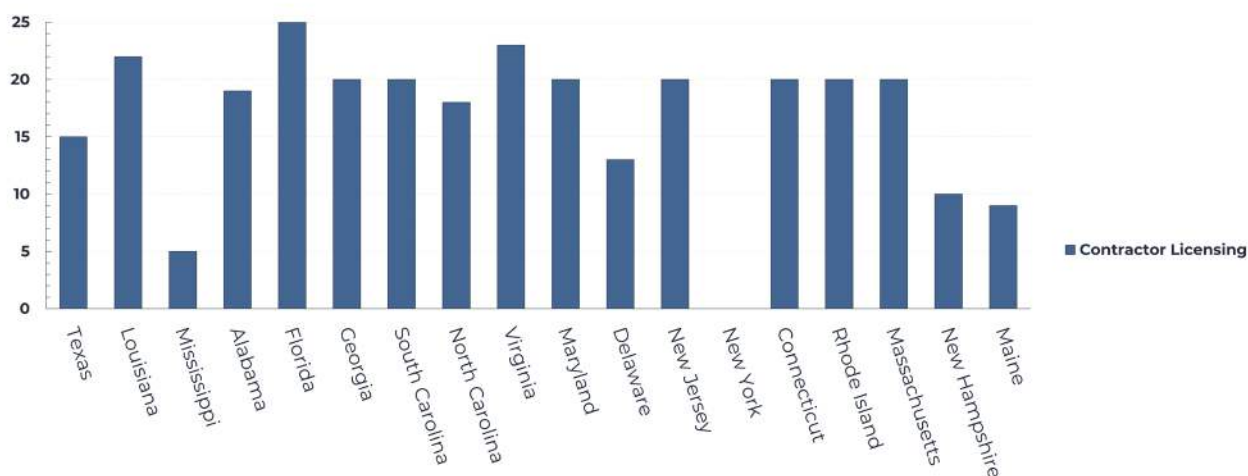


Figure 4. Rating the States 2021 component scores for each stat: (top) code adoption, (middle) building official certification, training and education, and (bottom) contractor licensing.

State-by-State Building Code System Assessments

#1. Florida

BUILDING CODE ADOPTION

Florida continues to be the leader in building code safety. The 7th Edition of the *Florida Building Code, Residential* (FBCR) became effective as of December 2020. This is the first statewide code update since 2017, when the State of Florida enacted legislation that changed the process for adopting building codes. Under the 2017 law, the Florida Building Commission employed a new process to update the code using the existing (6th edition) FBCR as the base code.

The Commission approved amendments resulting from updates to the 2018 edition of the I-Codes and voted to include those but with significant changes to accommodate the specific needs of the state. These requirements ensure protection of the buildings and their occupants from fire, wind, flood, and storm surge using the latest research and technical requirements. The changes included requirements necessary to maintain eligibility for federal funding and discounts from the National Flood Insurance Program (NFIP), the Federal Emergency Management Agency (FEMA), and the U.S. Department of Housing and Urban Development (HUD). The Commission also allowed the public the opportunity to submit amendments to the approved changes for the FBCR, which is the focus of this edition of the *Rating the States* report.

During the 2020 code adoption cycle, the Florida Building Code adopted several provisions that strengthened loss prevention. One of the most important was the adoption of methods to seal roof decks, helping to mitigate the effects of wind-driven rain if the roof cover (e.g., shingles, tiles, etc.) are damaged. These changes are now in effect across a significant area of the state where new homes will have nearly the same protections as the IBHS FORTIFIED Home™ Gold standard.

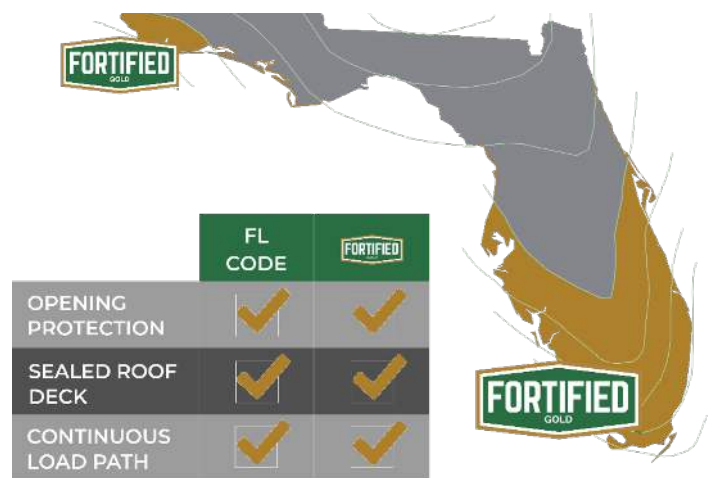


Figure 5. With the updates to the Florida Building Code, new homes built in the areas shaded in Gold will mirror the protections offered by IBHS's FORTIFIED Home™ Gold standard.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Florida has a mandated program for training and certifying building officials. The program requires individuals to take code-specific courses prior to taking a certification or licensing exam. However, a combination of experience and education can qualify candidates as well. The state has a one- and two-family dwelling inspector certification category that is limited to residential inspections and is valid for 24 months.

LICENSING OF CONTRACTORS

The state requires licensing of general, plumbing, mechanical, electrical, and roofing contractors. To be licensed, a contractor

must pass an examination and participate in continuing education. The state can also discipline a contractor for violations or noncompliance with the code.

CHANGES OR KEY AREAS FOR IMPROVEMENT

The lack of requirement for building officials to participate in continuing education (specific to the residential code) to maintain their certification and/or license is one area that could be improved. Because the state places greater emphasis on the Florida Building Code, it will be necessary to monitor the new code development process carefully to ensure important improvements to the *International Residential Code* (IRC) are not bypassed.

#2. Virginia

BUILDING CODE ADOPTION

Virginia is currently enforcing the 2015 edition of the IRC and has one of the strongest code enforcement programs among the group of states evaluated in this report. However, the commonwealth is in the process of updating the *Virginia Uniform Statewide Building Code* to the 2018 editions of the *ICC International Codes* (I-Codes), which would potentially be effective in 2021. The Virginia Department of Housing and Community Development has launched a customized code development system for Virginia (cdpVA®), modeled after the International Code Council's (ICC) cdpACCESS™ system. The cdpVA® system is being used for the 2018 adoption cycle.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Virginia requires certification and training for its building officials. On-the-job training prior to sitting the certification exam is permitted. While in training, the inspectors work under supervision of a licensed inspector. Upon completion of on-the-job training

and the examination, inspectors receive the official construction trade recognition. A mechanism for consumers to file complaints related to building code enforcement is available in Virginia. The rules permit the authority to apply disciplinary actions, which also can be applied at the local level.

LICENSING OF CONTRACTORS

Virginia issues licenses for general, plumbing, mechanical, electrical, and roofing contractors. However, general and roofing contractors are not required to complete continuing education to renew licenses.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Virginia has an exemplary code adoption and enforcement program. The addition of continuing education requirements for general and roofing contractors can further enhance the commonwealth's model statewide code adoption and enforcement program.

#3. South Carolina

BUILDING CODE ADOPTION

South Carolina adopted the 2018 edition of the IRC as of January 2020 with South Carolina modifications. The South Carolina Building Codes Council approved the 2015 wind speed design maps that have been amended to align the wind contour lines with physical boundaries such as streets, highways, streams, rivers, and lakes for use. The Council also revised boundaries for seismic design categories based on a state-sponsored study conducted by The Citadel.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

South Carolina requires registration, certification, and licensing for all building officials. A nonrenewable two-year provisional license is issued to code enforcement officials who are undergoing state-required training for certification. The state, under a new rule, requires that a chief code enforcement officer/building official must

at least be certified in one trade category before hire. However, they are granted a period of one year to obtain the remaining code certification categories. South Carolina has continuing education requirements for building officials.

LICENSING OF CONTRACTORS

South Carolina requires licensing of general, plumbing, mechanical, electrical, and roofing contractors, but does not mandate continuing education for renewal of licenses in any category.

CHANGES OR KEY AREAS FOR IMPROVEMENT

South Carolina's on-schedule code adoption process has helped position it among the top three states with the best building code systems in this report. Implementing a set schedule for code adoption/revision is a methodology that all states should follow. A meaningful change would be to require continuing education for licensed contractors.

#4. New Jersey

BUILDING CODE ADOPTION

On September 3, 2019, the New Jersey Division of Codes and Standards adopted the 2018 edition of the IRC as the *New Jersey One- and Two-Family Dwelling Subcode* without any modification that would weaken the requirements. The Division also oversees enforcement of the state's *Uniform Construction Code* and licensing of building officials.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

New Jersey has a state program for building official certification and training with continuing education requirements that is modeled after the certification program administered by the ICC.

LICENSING OF CONTRACTORS

New Jersey requires registration for homebuilders. However, an exam is not required for obtaining a license and there is no continuing education requirement for renewal. Similarly, registered roofing contractors are not required to take an exam or complete any continuing education. The state has a good system in place for licensing and continuing education of electrical, mechanical, and plumbing contractors.

CHANGES OR KEY AREAS FOR IMPROVEMENT

The state would benefit from continuing education for building officials specifically dealing with the residential code.

#5. Connecticut

BUILDING CODE ADOPTION

Connecticut is currently enforcing the 2015 edition of the IRC and announced intent to adopt the *2020 State Building and Fire Safety Codes* based on the 2018 editions of the I-Codes. The review and adoption of the 2018 IRC is ongoing with the target effective date set for the final quarter of 2021.

Over the past few years, the Connecticut Division of Construction Services has been developing initiatives to improve resilience of the residential dwellings in the state. Although the state is no longer in the high-wind design required category, the initiatives focus on homes located in coastal areas at risk for high wind, flooding, and storm surge.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Connecticut has a program for certifying building officials. The program requires education classes prior to becoming certified as a residential code inspector.

LICENSING OF CONTRACTORS

Connecticut requires licensing for all construction trades. However, only electrical and plumbing contractors are required to take continuing education to maintain their licenses. The state has a system for consumers to file complaints against licensed contractors and may institute disciplinary action as appropriate.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Connecticut should consider requiring continuing education for all contractors.

#6. Rhode Island

BUILDING CODE ADOPTION

Rhode Island is currently enforcing the 2015 edition of the IRC with Rhode Island state amendments. The Rhode Island code still contains a deficiency that was highlighted in prior editions of this report. Specifically, Section R301.2.1.2 of the *Rhode Island State Building Code* (RISBC-2) allows buildings to be designed as partially enclosed in wind-borne debris regions in lieu of protecting glazed openings. Although this design methodology results in a building designed for generally higher wind loads, it increases the possibility that wind-driven rain could enter a home if windows and glazed areas are broken during a storm. The partially enclosed building design was allowed in the 2003 edition of the IRC but has been eliminated as an option in subsequent updates of the IRC. Also, the state has published a prescriptive method for high-wind design (Appendix AA of Rhode Island State Building Code, SBC-2).

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Rhode Island has a program for building official certification and licensing and includes code-specified training courses prior

to certification. The state also has requirements for continuing education of its building officials.

LICENSING OF CONTRACTORS

Rhode Island requires general and roofing contractors to be registered and issues licenses for plumbing, mechanical, and electrical contractors. However, only electrical and plumbing contractors are required to complete continuing education classes to renew licenses.

Roofing contractors are required to be registered and are governed by a licensing board.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Rhode Island should consider updating the residential statewide code based on the latest edition of the IRC. Another meaningful step would be to eliminate the state amendment that allows the partially enclosed building design in the wind-borne debris region as described above.

#7. North Carolina — Most Improved for 2021

BUILDING CODE ADOPTION

As of January 2019, the North Carolina Department of Insurance, Office of State Fire Marshal adopted the 2018 edition of the *North Carolina Building Code*, which is based on the 2015 edition of the IRC with North Carolina Building Code amendments. Section R324.4, rooftop-mounted photovoltaic (PV) systems, is deleted in the 2018 *North Carolina Residential Code*. This section in the IRC provides practical requirements for installation and positioning (such as pathways around arrays and proximity to ridge, etc.) of PV solar systems on steep-slope roofs to facilitate fire department personnel access in an emergency. It is not clear why this section was deleted.

The design wind speeds for each county are tabulated in the North Carolina Residential Code. Chapter 45 of the North Carolina Residential Building Code contains design and construction provisions for buildings constructed in high-wind zones throughout the state, and provides alternatives based on ICC 600 *Standard for Residential Construction in High-Wind Regions* or AF&PA *Wood Frame Construction Manual for One- and Two-Family Dwellings*.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

North Carolina has a program for building official certification and licensing that includes code-specific training courses prior to certification with continuing education requirements.

LICENSING OF CONTRACTORS

North Carolina requires licenses for general, plumbing, mechanical, and electrical contractors. However, except for general and electrical contractors, other trades are not required to complete continuing education classes to renew licenses.

There are no licensing requirements for roofing contractors.

CHANGES OR KEY AREAS FOR IMPROVEMENT

North Carolina needs to reinstate regular updates of the state residential code and ensure that statewide requirements are consistently updated based on national model codes and standards published by ICC every three years. Section R324.4 of the model IRC should be reinstated in the 2018 *North Carolina Residential Code* or an alternate should be provided for this requirement of the IRC. Other meaningful changes the state should take include requiring continuing education for plumbing and mechanical contractors, and enacting licensing requirements for roofing contractors.

#8. Louisiana

BUILDING CODE ADOPTION

Since publication of the last *Rating the States* report, Louisiana has adopted the 2015 edition of the IRC. Large parts of coastal Louisiana are within the zone where wind speeds can exceed 130 mph. This effectively makes the wind design requirements of the IRC mandatory in coastal areas of Louisiana.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Louisiana has a state program that requires building official certification. However, no mandatory code education classes are included in the certification process.

LICENSING OF CONTRACTORS

Louisiana requires licensing of general, plumbing, mechanical, electrical, and roofing contractors. This includes requiring general and plumbing contractors to participate in continuing education to renew their licenses. Electrical, mechanical, and roofing contractors are not required to take continuing education classes.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Louisiana should consider requiring continuing education classes for electrical and mechanical contractors as a part of their licensing requirements.

#9. Massachusetts

BUILDING CODE ADOPTION

Massachusetts had the worst decline in scoring in any edition of this report after eliminating the wind-borne debris region. This is of significant concern.

In 2017, Massachusetts adopted the ninth edition of the statewide building code based on the 2015 IRC. The Commonwealth of Massachusetts has amended the IRC definition of wind-borne debris region in the *Ninth Edition of the Massachusetts Residential Building Code*. Under this amendment, the code-designated trigger for hurricane-prone regions has been changed from *design wind speed, V_{ult}* to *nominal design wind speed, V_{asd}* , which reduces the trigger wind speeds and basically eliminates wind-borne debris protection throughout the state. While ASCE 7-16 significantly reduces the wind-borne debris regions throughout the state, it does not completely eliminate it. Parts of Cape Cod are still within a mile of the coast line, which places them within wind-borne debris region under ASCE 7-16.

To enhance fire resistance of underfloor system, the ICC model residential code requires 1/2-inch-thick gypsum wallboard or 5/8-inch-thick wood structural panels on the underside of manufactured I-joist floor framing. The Massachusetts amendments eliminate underfloor fire protection requirements of the code for manufactured wood I-joists.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Although there is a program for building official certification, it does not require individuals to complete training classes prior to the certification exam. Massachusetts does not require a continuing education program specifically related to the residential dwelling code.

LICENSING OF CONTRACTORS

Massachusetts requires licensing of general, plumbing, electrical, and roofing contractors along with continuing education requirements. However, no licensing is required to perform heating, ventilation, and air conditioning work for HVAC units that are rated 10 ton or less. Most one- and two-family dwellings subject to IRC requirements use units rated below that threshold.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Although it affects a small geographic area, Massachusetts' weakening of the wind-borne debris requirement of the IRC, which is based on ASCE 7-16, is not endorsed. The state should consider reinstating the code requirements for wind-borne debris regions. Underfloor protection (i.e., covering engineered I-joists with noncombustible materials), is intended to afford greater time for building occupants to exit during a fire and more opportunity for first responders to perform search and rescue in the structure, when needed. This fire safety requirement of the code should be reinstated.

#10. Maryland

BUILDING CODE ADOPTION

Maryland adopted the 2018 edition of the IRC as a part of *Maryland Building Performance Standards*, which is the designated building code law throughout the state. Local jurisdictions may modify provisions of the Maryland Building Performance Standards—except for wind design requirements and the requirements for automatic fire sprinkler systems. However, through amendments, they can address conditions specific to the local jurisdiction's needs. The state is recognized as a leader in life and public safety by requiring residential automatic fire sprinklers in all new residential dwellings.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Maryland does not license inspectors separately for residential construction or require completion of code training classes prior to certification. The state does not have a mechanism for the public to file complaints against inspectors.

#11. Georgia

BUILDING CODE ADOPTION

The state has adopted the 2018 edition of the IRC, with state amendments consistent with the major provisions of the model code, except that the requirements for automatic residential fire sprinklers are optional in new one- and two- family dwellings and townhouses. In Georgia, the decision to enforce the code is left up to local jurisdictions. Appendix U in the *Georgia State International Residential Code* provides requirements for disaster resilient construction that local jurisdictions can choose to adopt through their local ordinances.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Georgia law defines a qualified inspector as one certified by the ICC as residential inspector and requires any construction work to be inspected by a qualified inspector. The state requires the governing authority of a municipality or county that has adopted provisions for enforcement of the state minimum standard codes to post a notice stating whether the local inspectors possess certain

LICENSING OF CONTRACTORS

The state requires licensing of general, plumbing, mechanical, electrical, and roofing contractors. Continuing education is required only for electrical contractors.

CHANGES OR KEY AREAS FOR IMPROVEMENT

The Maryland Office of Code Administration provides a voluntary training program for building officials throughout the state. Mandating certification and licensing for residential inspectors would further reinforce Maryland's commitment to an even stronger building and safety code program. Such a program would improve the capabilities of the code enforcement personnel, improve the uniformity of enforcement, and help elevate their recognition as professionals throughout the state.

qualifications. It also provides for persons possessing qualifications to conduct inspections to determine code compliance if the municipal or county inspectors do not possess such qualifications. There is no mechanism for the state to take disciplinary action against an inspector.

LICENSING OF CONTRACTORS

General contractors, plumbing, mechanical, and electrical contractors are required to be licensed in Georgia. Exams and continuing education are a part of the licensing programs. There are no licensing requirements for roofing contractors.

CHANGES OR KEY AREAS FOR IMPROVEMENT

To strengthen its building code system, Georgia should make adoption and enforcement of the statewide code mandatory for all jurisdictions. The state would benefit from a mandatory program for certification and licensing of building officials.

#12. New York

BUILDING CODE ADOPTION

The 2020 Residential Code of New York State, which is based on the 2018 edition of the IRC, became effective on May 12, 2020. The *New York State Uniform Code* requires that any single-family dwelling or a townhouse over two stories in height be equipped with an automatic fire sprinkler system conforming to the NFPA 13D standard.

The New York City building regulatory system remains exempt from the New York State requirements. The 2014 *New York City Construction Codes* (currently enforced) are based on the 2009 edition of the *International Building Code* (IBC) with city-specific requirements for residential construction.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

New York State has a mandated program for certification of building officials including code classes prior to certification. However, this program does not require that continuing education focus specifically on the residential code.

LICENSING OF CONTRACTORS

The state does not require licensing of general, plumbing, mechanical, electrical, or roofing contractors and leaves the decision of whether to require regulations for licensing of construction trade contractors to local jurisdictions.

CHANGES OR KEY AREAS FOR IMPROVEMENT

New York State should consider adopting a state-mandated certification and licensing program for construction trade contractors.

#13. Maine

BUILDING CODE ADOPTION

The only significant change in the *Maine Uniform Building Code* since the last published edition of the *Rating the States* report is the update of the *Maine Uniform Building Code* to the 2015 edition of the IRC. The Office of Maine State Fire Marshal is now managing the code adoption and enforcement process. A continuing major weakness in state regulations allows municipalities with fewer than 4,000 people to choose not to have or enforce a building code.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Maine has a program for certifying building officials but does not require code-specific education courses prior to certification. The state requires continuing education, but it is a minimal requirement of nine hours every six years. The state has a certification category for residential construction inspectors, but there is no process for filing complaints or disciplinary action against inspectors.

LICENSING OF CONTRACTORS

The state requires licensing for plumbing and electrical contractors, but not for other trades. Plumbing and electrical contractors are required to take an exam prior to licensing, and they are subject to disciplinary action. Electrical contractors are required to obtain continuing education for license renewal.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Maine's long delay in code adoption is an area of concern. Considering the model residential code is updated every three years, the state should consider regular adoption and enforcement of the IRC, and require all municipalities throughout the state, regardless of population, to adopt and enforce the *Maine Uniform Building Code*.

#14. New Hampshire

BUILDING CODE ADOPTION

On September 15, 2019, New Hampshire updated the state residential building code to the 2015 edition of the IRC. However, adoption and enforcement of the residential code is not mandatory throughout the state and is at the discretion of the local jurisdictions.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

New Hampshire has no statewide program to license building officials.

LICENSING OF CONTRACTORS

Contractor licensing is required for plumbing and electrical contractors, but not for other trades. Plumbing and electrical contractors are required to take an exam prior to licensing, are subject to disciplinary action, and are required to take continuing education classes.

CHANGES OR KEY AREAS FOR IMPROVEMENT

New Hampshire should consider mandatory enforcement of the statewide residential code and establish a building official certification and licensing program throughout the state.

#15. Texas

BUILDING CODE ADOPTION

In 2001, the Texas legislature adopted the 2000 IRC as the standard for residential construction. However, the state does not require mandatory adoption and enforcement of its residential building code throughout the state. Generally, all incorporated cities in Texas have adopted a building code and a large percentage of these jurisdictions adopted more recent editions of the IRC than mandated

by the outdated state law. However, the building code gap is evident in many unincorporated areas of the state. Some of the deficiencies in unincorporated areas of coastal counties are mitigated by the Texas Windstorm Insurance Association (TWIA) code and inspection requirements for property owners that obtain windstorm and hail insurance through the state's wind catastrophe pool. TWIA is a nonprofit insurance organization administered by the Texas Department of Insurance.

A 2017 state law requires builders in unincorporated areas of certain counties to provide an inspection report to the county that shows their construction complies with the building code. Failure to provide inspection documentation to the county could result in prosecution of the builder. However, because the inspection is conducted by a party hired by the builder, the requirement could create a conflict of interest scenario. The current requirement does not assure the same level of protection and safety that an active code enforcement program would provide.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Texas has no statewide program to license building officials.

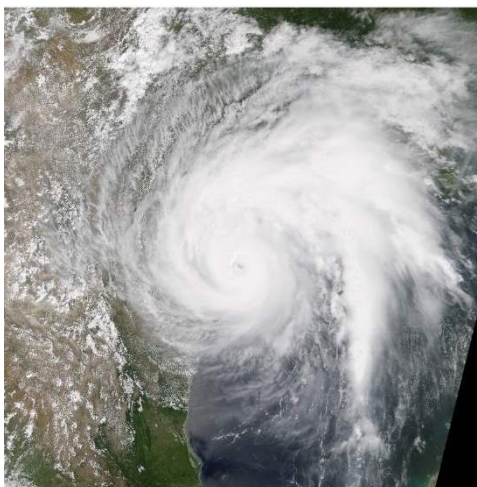
LICENSING OF CONTRACTORS

The state requires licensing for plumbing, mechanical, and electrical contractors, and contractors are required to take continuing education classes for license renewal.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Specifically, unincorporated and vulnerable coastal communities of Texas are not uniformly protected by high-wind design

standards and building codes. Adoption of a mandatory statewide code system throughout the state and adequate uniform code enforcement gives communities a high degree of building safety through application of modern building codes. In 2019, IBHS released [a report that focused on the coastal counties](#) and their building code practices.⁶



The Texas coast is extremely vulnerable to hurricanes making landfall; the most recent was Hurricane Harvey (2017). On average, any 50 mile stretch of the Texas coast will be affected by a hurricane every six years. Unfortunately, coastal communities of Texas are not uniformly protected by high-wind design standards and codes, and there are significant differences between incorporated cities and county jurisdictions. Of

the 10 counties surveyed by IBHS in the [Eye on Texas Codes Study](#), only 2 had adopted a building code, while all the incorporated cities surveyed have adopted a code.

Code enforcement, which includes construction permitting and inspections is the responsibility of the local jurisdiction and can vary widely. However, all the incorporated cities surveyed require permitting for new residential construction. Some of the deficiencies in unincorporated areas of coastal counties are mitigated by the Texas Windstorm Insurance Association (TWIA) code and inspection requirements for those who are not able to insure their property on the open market.

⁶ Insurance Institute for Business & Home Safety "Eye on Texas Codes," 2019 <https://ibhs.org/public-policy/survey-of-coastal-texas-building-codes/>

#16. Alabama

BUILDING CODE ADOPTION

Alabama does not have a mandatory statewide building code system. The state Department of Economic and Community Affairs (ADECA) updated the *Alabama Energy and Residential Codes* to the 2015 edition of the IRC for voluntary adoption by jurisdictions in the state.

Although the energy portion of the code is mandatory at the local level, local jurisdictions can continue enforcing the residential code edition they had previously adopted. However, if a jurisdiction has not previously adopted a residential building code and decides to adopt one, the law requires adoption of the current *Alabama Energy and Residential Codes*. Unfortunately, the enforcement aspects of the Alabama code are not clearly defined in the rule and could be considered nonexistent.

Despite the deficiencies at the state level, communities along the coast are commended for adopting and enforcing strong building codes. In fact, 16 of the 24 permitting jurisdictions within Mobile and Baldwin counties also enforce the [Coastal Construction Code Supplement](#)⁷, which was created after Hurricanes Ivan (2004) and Katrina (2005) by building code officials and community leaders, with the support of local builders and developers. The code supplement is based on the IBHS FORTIFIED Home™ standard.

⁷ <https://www.smarthomeamerica.org/resources/code-supplement>

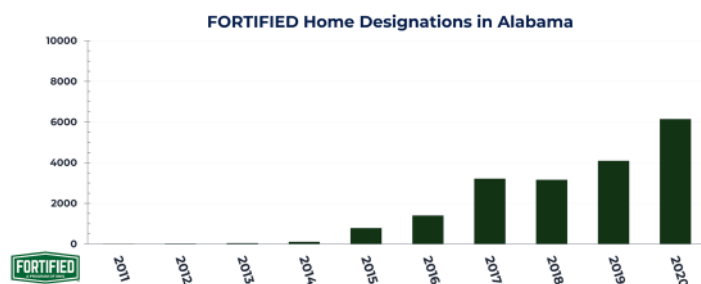


Figure 6. Chart of the annual growth in IBHS FORTIFIED designated homes in Alabama since 2011. There are over 17,000 FORTIFIED designations in the state now.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Alabama has no statewide program to license building officials.

LICENSING OF CONTRACTORS

The state requires licensing for general, plumbing, mechanical, electrical, and roofing contractors. General, mechanical, electrical, and roofing contractors must take part in continuing education for license renewal.

CHANGES OR KEY AREAS FOR IMPROVEMENT

The entire state is no stranger to extreme winds, whether from hurricanes or severe convective storms. In 2020, Alabama experienced the direct landfall of Hurricane Sally and tropical storm conditions from Hurricane Zeta. Beyond hurricanes, the state was in the center of the largest tornado outbreak in US history, the April 25–28, 2011 *Super Outbreak*.

Adoption of a modern mandatory statewide residential code would help establish uniformity in enforcement and application of the important code provisions. It would reduce losses to life and property in the event of severe convective storms, and hurricanes moving onshore for inland areas near the Gulf Coast.

In the absence of an enforced statewide code, state and local officials have made improvements by encouraging participation in the IBHS FORTIFIED designation program. With the only difference between the Coastal Construction Code Supplement and FORTIFIED being the additional, third-party verification, there has been exponential growth in FORTIFIED designations along the coast. The state has also fostered growth through various incentives, including the Strengthen Alabama Homes grant program, which provides grants for existing homeowners to obtain a FORTIFIED Roof™. The success of these collective efforts was proven when Hurricane Sally affected nearly 17,000 FORTIFIED homes and approximately 95% incurred little to no damage. Additional FORTIFIED growth is anticipated with the recent expansion of the grant program to inland areas of the state.

#17. Mississippi

BUILDING CODE ADOPTION

There have been no significant changes in the state code adoption since the 2018 edition of the *Rating the States* report. Mississippi took an important step forward in 2014 by adopting a building code law that governs construction of most residential buildings in the state. The law allows municipalities to adopt one of the last three effective IRC editions. However, municipalities can opt out of the requirements for adoption and enforcement within 120 days of the effective date (i.e., November 30, 2014). The opt-out provision of the law has complicated the code adoption coverage throughout the state.

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Mississippi has no statewide program to license building officials. However, the state has allocated funding for training of building officials and inspectors through local governments.

LICENSING OF CONTRACTORS

General contractors are the only trade required to obtain a license and continuing education is required. Also, the state has a mechanism to register complaints from the public and discipline contractors, if needed.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Establishment of a State Construction Code Council with the primary function of administering (i.e., reviewing, adopting, maintaining, providing guidance for staff qualification/certification and training, as well as direction for contractors) up-to-date codes throughout the state would be highly beneficial in promoting the Mississippi statewide building code program.

#18. Delaware

BUILDING CODE ADOPTION

Delaware does not have a statewide residential building code, except for plumbing. The plumbing code is based on the 2018 edition of the *International Plumbing Code*® (IPC).

CERTIFICATION AND EDUCATION OF BUILDING OFFICIALS

Delaware has no statewide program to license building officials.

LICENSING OF CONTRACTORS

Delaware requires licensing for plumbing, mechanical, and electrical contractors. Electrical contractors are required to obtain continuing education for license renewal. General and roofing contractors are not licensed.

CHANGES OR KEY AREAS FOR IMPROVEMENT

Delaware should consider adoption and enforcement of a model statewide residential code system throughout the state along with a program to license building officials and construction trade contractors.

Puerto Rico

Since the last publication of the *Rating the States* Report, Puerto Rico has adopted the 2018 *Puerto Rico Residential Code* (PRRC), which is based on the 2018 edition of the IRC. This was one of the recommendations of the FEMA Mitigation Assessment Team (MAT) report (FEMA P2020) following Hurricane Maria in 2017.⁸

The Puerto Rico Office of Permit Management is tasked with implementation of the residential code. The *Puerto Rico Residential Code* has provisions for permit requirements and inspections of construction work by representatives of the local municipalities. However, it is difficult to determine if these requirements are uniformly enforced.

Puerto Rico requires sign-off by licensed professionals for all construction. However, there is evidence of what is referred to as informal construction or construction without a permit throughout the territory. This has been noted as common practice in residential construction in rural areas.⁸

The FEMA MAT that visited the territory in the aftermath of Hurricanes Irma and Maria observed severe damage to residential low-rise buildings. Many damaged or collapsed wood-framed buildings lacked a continuous load path to resist the imposed uplift forces. Also observed was substantial damage to roofs due to inadequate roof attachment or coverings. Water intrusion

through damaged roofs and flooding was very common and is a loss amplifier due to the damage to interior finishes and contents. Failure of components and cladding systems and windows also were contributors to water intrusion problems. Many residential buildings using concrete construction also fell short of seismic requirements. Most were buildings classified as informal construction or construction without a permit. It needs to be emphasized that Puerto Rico is located in a very seismically active zone. In fact, during December 2019, in a span of less than one month, the southern region of Puerto Rico was struck with more than two dozen magnitude 4.5 or greater earthquakes, which damaged or destroyed more than 550 homes in addition to many other types of structures.

During the past few years, Puerto Rico has experienced major damage from hurricanes as well as powerful earthquakes. To reduce future damage to the territory's building stock and prevent a repeat of the past cycle of destruction, the focus of the Puerto Rico territorial government and authorities must be directed toward implementing a comprehensive program that ensures compliance with design and construction standards of the modern building codes. This should include stringent permitting and inspection requirements along with the recommendations contained in the FEMA MAT Report (FEMA P2020).⁸

⁸ https://www.fema.gov/sites/default/files/2020-07/mat-report-hurricane-irma-maria-puerto-rico_2.pdf

US Virgin Islands

All residential construction in the US Virgin Islands must comply with *USVI Building Code*, which is based on the 2018 edition of the IRC. The building code laws enforced by the USVI Department of Planning and Natural Resources have provisions for permit requirements as well as inspections of construction work by representatives of the territory's building commissioner.

In the aftermath of Hurricanes Irma and Maria, a FEMA MAT deployed to the area to assess the performance of buildings. The MAT documented the success of construction mitigation techniques that were put in place following Hurricane Marilyn in 1995. These were residential buildings constructed through the government-sponsored Home Protection Roofing Program (HPRP) that was implemented following Hurricane Marilyn. However, for homes not constructed in accordance with the methods of HPRP, damage such as blown-off roof sheathing and rafters as well as water intrusion were noted on many homes in St. John and St. Thomas. Roof failures were observed throughout the islands, mainly due to inadequate attachment of corrugated steel roof panels.

The findings of the FEMA MAT that visited the territory in December 2017 identified systemic performance improvements in construction techniques throughout the territory after Hurricane Marilyn (1995).⁹

The FEMA MAT report recommended increased staffing and additional training of the territory's building officials.⁹ The update of the territory's building codes to the latest US model building codes and hazard-resistant building construction techniques reinforces the territory's long history of adopting building codes and a commitment to improvement and resilience of the built environment in the USVI to reduce future damage.

⁹ https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-irma-maria_virgin-islands.pdf

Consumer Support for Stronger Codes

Engineering analysis shows that 2 out of 3 US communities lack the building code provisions needed to confront disasters. Yet consumer research by the nonprofit Federal Alliance for Safe Homes (FLASH) found that 8 out of 10 respondents mistakenly believe their codes are adequate. Upon learning that their community may not use a code or that their codes may be outdated, 84% of consumers surveyed were *concerned*, *very concerned*, or *extremely concerned*.

The FLASH research concluded that consumers are not worried about building codes because they have confidence that their leaders and builders are “handling it” for them.

Once they understood that not all cities, counties, or states adopt codes, they developed a high interest level and strong feelings, as reflected in the statements below.

- *State and local leaders should protect the integrity and independence of building code enforcement* (46% Strongly Agree/45% Agree)
- *It's important for state and local elected officials to prepare communities to resist damage from a natural disaster or extreme weather* (40% Strongly Agree/47% Agree)
- *My state and local leaders should adopt the latest building codes to protect the community from disasters* (40% Strongly Agree/46% Agree)

While consumers do not have a deep understanding of codes, they have high expectations of officials and those involved in the building process.

Consumer Resources

FLASH created the *No Code. No Confidence.* - [Inspect2Protect.org](https://inspect2protect.org) Initiative (I2P) to close the gap between public understanding of life-saving codes and the actuality of code status in every community. I2P features Public Service Announcements, public outreach, and the Inspect2Protect.org digital lookup tool to raise awareness, expand understanding, and increase consumer transparency. Users visit the website to learn about personal disaster risk, look up the

specific codes used in their communities, and identify retrofits and upgrade options to increase home strength in the face of disasters. The case for current model building codes is growing along with public understanding and leadership support for code administration investments. This progress comes at a critical time as communities face an accelerating number of billion-dollar disasters each year.