



COLLEGE *of*
CHARLESTON

THE RILEY CENTER FOR
LIVABLE COMMUNITIES

Tri-County Resilience Assessment: Post Hurricane Dorian

January 6, 2020

CONFIDENTIAL

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IN PARTNERSHIP WITH

Charleston Resilience Network
Charleston Metro Chamber of Commerce

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BACKGROUND INFORMATION

Findings in this report are the result of the partnership of the College of Charleston's Joseph P. Riley, Jr. Center for Livable Communities, Charleston Resilience Network (CRN), and Charleston Metro Chamber of Commerce (CMCC) to increase understanding of how hurricanes impact local organizations as represented by members of the Chamber. The Riley Center, with the support of CMCC and CRN, administered an electronic survey to Chamber members in Charleston, Dorchester, and Berkeley Counties, SC to assess damage sustained and perception of major storms. This survey focuses on the impacts of Hurricane Dorian, with questions that also address regional resilience, information reliability, and response planning.

METHODS

Feedback for the Riley Center's survey of Chamber members has been collected via Qualtrics survey. Questions and survey format were designed by the Riley Center and included edits provided by the Charleston Metro Chamber of Commerce and Charleston Resilience Network. The survey contains 27 questions and takes approximately 20-30 minutes to complete. Initial distribution of this survey to 5,604 Chamber members occurred on September 16th, with subsequent reminders to non-responders sent on September 19th, 23rd, and 27th. The list of emails to which the survey was distributed was provided by the Charleston Metro Chamber of Commerce.

At the closing of the survey at 5:00 pm EST on Friday, September 27th, 784 full and partial responses had been collected, resulting in a 14% response rate. To prepare for meaningful data analysis, respondents who did not answer at least the first three questions were removed, leaving a total of 541 responses and a 10% response rate (Table 1). Within this sample there are 222 records that have multiple responses from a single Chamber member organization. These account for 41% of the sample from a total of 76 Chamber member organizations. Table 2 shows the number of Chamber members per number of responses, a full list of member organizations with multiple responses is provided in Appendix A.

Table 1. Sample Disposition		
	Number	Response Rate
Total Recipient Sample	5627	
Duplicates	23	
Bounce backs	79	
Total Recipients	5525	
Surveys Started	784	14%
Usable Surveys	541	10%
Unique Organizations	395	

Joseph P. Riley, Jr. Center for Livable Communities, College of Charleston

This occurrence of multiple-responses from the same organizations should be noted by readers. Main findings presented in the following sections will summarize data from the entire respondent sample of 541 records. Many responses collected are from the top-ranking individuals within Chamber member organizations, providing this report with input from some of the tri-county region’s most influential leaders.

Table 2. Number of Multiple Responses	
# of Responses	# of Member Organizations
9	1
7	5
6	2
5	0
4	5
3	20
2	43
TOTAL	76

EXECUTIVE SUMMARY

Dorian Impact

Nearly nine out of ten respondents (88%) report a negative impact on their organization from Hurricane Dorian. Twenty percent of the total report negative impact in the highest range of magnitude on the ten-point scale (seven to ten).

Many types of negative impacts are reported with the most common concern being the loss of production and revenue due to the mandatory evacuations. Employers are also concerned about the economic impact on their employees due to lost wages. Most commonly, respondents report negative impacts specifically around:

- Forced closure due to mandatory evacuation;
- Loss of productivity;
- Loss of revenue and business;
- Physical damage to buildings, vehicles, and other equipment;
- Power and internet outages;
- Impacts on employees and lost wages;
- Cancelled meetings and events; and,
- Perception the region is unsafe to visit during hurricane season.

Twenty nine percent of the sample report a positive impact from Hurricane Dorian, though unlike the negative impact distribution, most (72%) positive impacts are minor (one to three). Among positive impacts:

- Stronger sense of community;
- Increased sales as some competitors closed, or storms caused for long hotel stays; and
- Practice preparedness for more severe storms in the future.

Cumulative Impact of Storm Over the Last Five Years

Respondents were also asked to rate the cumulative impact of hurricanes over the last five years (Dorian 2019, Florence 2018, Irma 2017, and Matthew 2016). In this instance they could rate from negative ten to positive ten. Overall, respondents report a mean of -3.59. Eighty percent of respondents report a negative impact across the magnitude scale. Twelve percent report an overall positive impact, though with responses clustered on the low impact portion of the scale. Eight percent report no impact.

Response Planning

A large portion (70%) of Chamber members responding to this survey currently have a written disaster response plan. Among this group, the vast majority keep their disaster plans up to date,

with 91% reporting that their plans were updated in either 2018 or 2019. Only 34% of these respondents expect to update these plans based on their experience with Dorian.

Resilience Action Items

To gauge resilience efforts, respondents were asked to indicate from a list which actions are currently being considered, implemented, or are already completed. The three resilience efforts that have the highest percentage of 'completed' responses are improving communication among leadership/employees/contractors, investing in protecting IT infrastructure, and assisting employees with evacuation. In terms of items they report they are considering or in-process (not all items shown).

- | | |
|--|-----|
| ● Improve communication | 37% |
| ● Protecting IT | 24% |
| ● Protecting physical structures | 24% |
| ● Investing in back-up generators | 22% |
| ● Financial assist. to emp./lost wages | 17% |
| ● Relocating some/all operations | 13% |

Other items that emerged from the qualitative questions include:

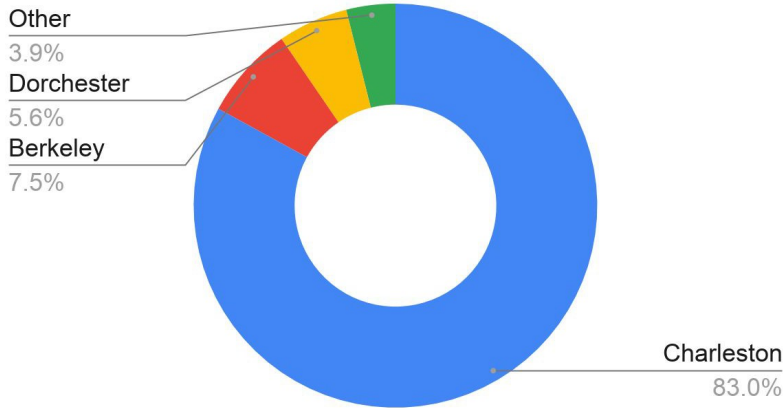
- Requesting the state reconsider procedures/timelines for mandatory evacuation orders
- Improve governmental communication pre and post storm
- Streamline debris removal post storm
- Develop plans for virtual work during closures
- Accelerate power restoration following storm
- Take proactive measures to invest in flood mitigation
- Provide relief programs for business impacted by non-physical damages.
- Insurance claims

Responsible Entities/Charleston Resilience Network

- Awareness of the Charleston Resilience network is low among this sample of Chamber members, as 70% report they are not at all aware of CRN and only 4% report being aware and familiar with its work.
- Generally, this sample sees the multiple layers of government being primarily responsible for addressing resilience efforts in the tri-county region, with the vast majority (72%) citing local governments. The Chamber is the most reported non-governmental entity.

RESPONDENT PROFILE

Figure 1. County Representation



The average respondent to this survey is primarily located in Charleston County, has 0-50 employees, and brings in a minimum of one million dollars in gross annual revenue. While the Charleston Metro Chamber of Commerce includes employers from Charleston, Dorchester, and Berkeley Counties, the majority of responses in this survey are from those located in Charleston County (83%; Figure 1).

The median number of employees reported by all respondents is in the 26-50 range, with 57% of the sample falling in the 0-50 range. Figure 2 provides an illustration of the ratio of Chamber member size based on number of employees.

In terms of gross annual revenue, 55% of respondents are bringing in a minimum of one million dollars each year, with the average falling in the \$1M-\$4.9M range. While thirty percent of respondents chose not specify this metric for their business/organization, Figure 3 illustrates gross annual revenue across the portion of the sample that chose to respond.

Figure 2. Number of Employees

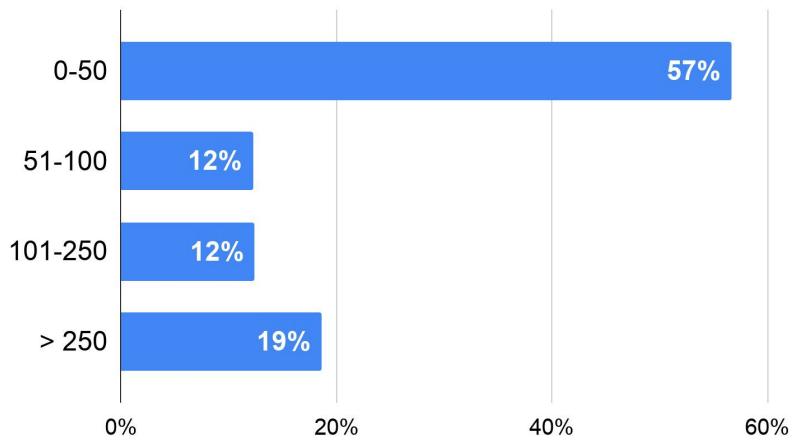
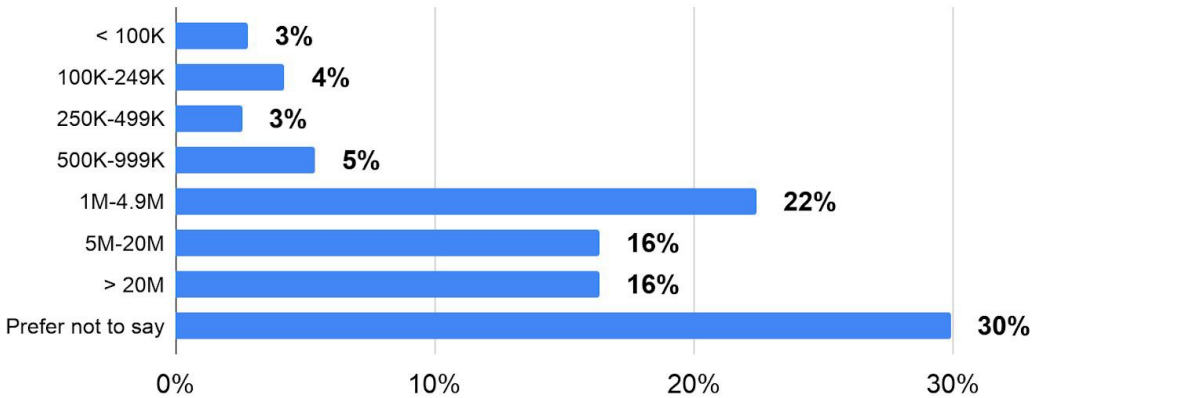


Figure 3. Gross Annual Revenue



SECTION 1: IMPACT & RESPONSE

Figure 4. Negative Impact Histogram

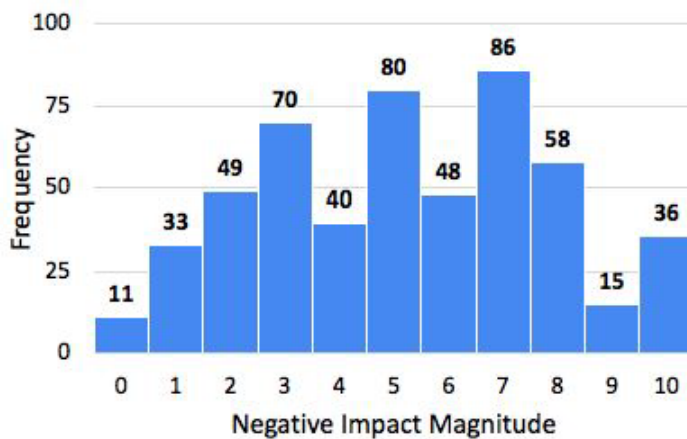
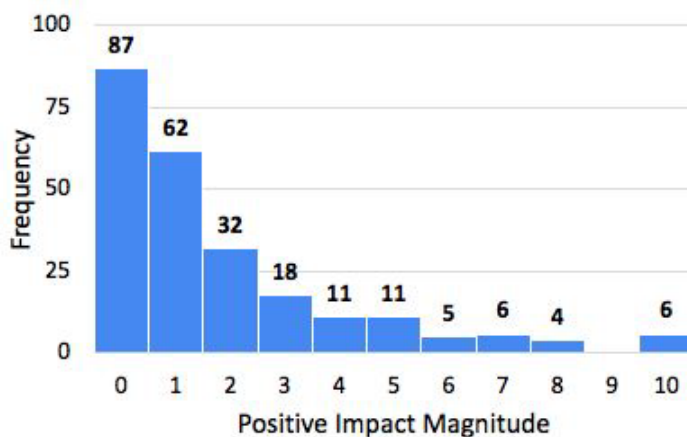


Figure 5. Positive Impact Histogram



Dorian Impact

To assess the overall effect hurricane Dorian had on CMCC members, respondents are asked to separately quantify the positive and negative total impact endured on a scale of zero to ten (0=no impact, 10=greatest possible impact). The entire sample reports an average of 5.23 and median of five on the negative impact scale, with a minimum of zero (2% of responses) and a maximum of ten (7% of responses). A great deal of variation is seen among these impact respondents (Figure 4). Nearly nine out of ten respondents (88%) report a negative impact on their organization from Hurricane Dorian. Twenty percent of the total report negative impact in the highest range of magnitude on a ten-point scale (seven to ten).

Twenty nine percent of the sample report a positive impact from Hurricane Dorian, though unlike the negative

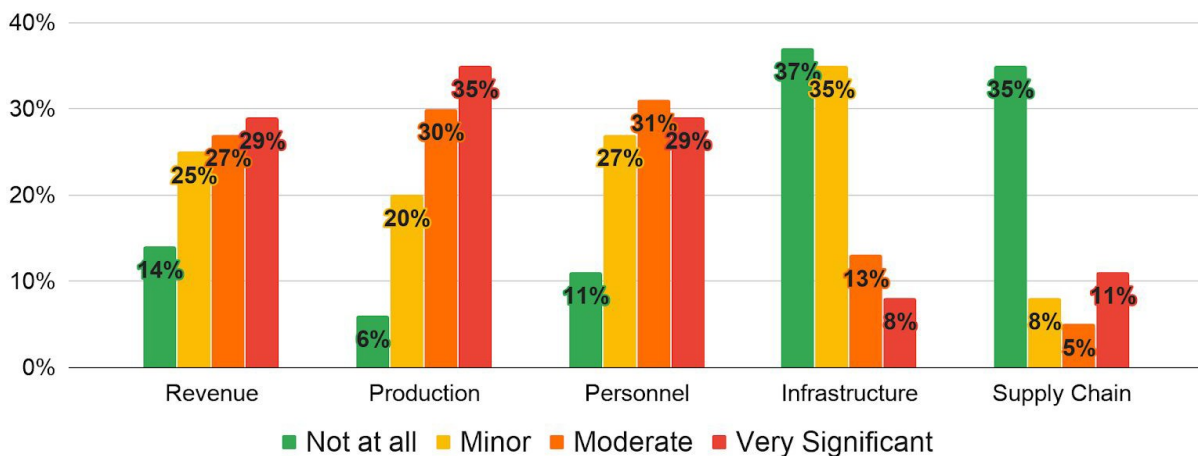
impact distribution, most (72%) positive impacts are minor (one to three). Distribution of these responses is illustrated in Figure 5. Among the positive impacts, qualitative responses find the following are experienced:

- Stronger sense of community;
- Increased sales as some competitors closed or storms caused for long hotel stays; and
- Practice preparedness for more severe storms in the future.

Further analysis of various impact ratings based on respondent type was conducted to determine if these responses varied by number of employees or gross annual revenue. However, findings did not produce a strong enough trend to draw conclusions about the connection between these factors and impact experienced. A table of negative and positive Dorian impact ratings, along with cumulative impact ratings, broken down by respondent category is provided in Appendix B.

In order to examine Dorian’s influence on a more granular level, respondents are asked to rate the level of impact endured for the following categories: revenue, production, personnel, infrastructure, and supply chain, with an additional category for ‘other’ where individuals have the opportunity to write-in an additional category (Figure 6). These ratings are set on a five-point scale of not at all, minor, moderate, very significant, or does not apply (not shown). The category with the highest amount of ‘significant’ responses is production (35%). Revenue, production, and personnel all have at least 50% of respondents choosing moderate to significant impacts endured. The two categories that show the lowest impact experienced by employers are infrastructure and supply chain.

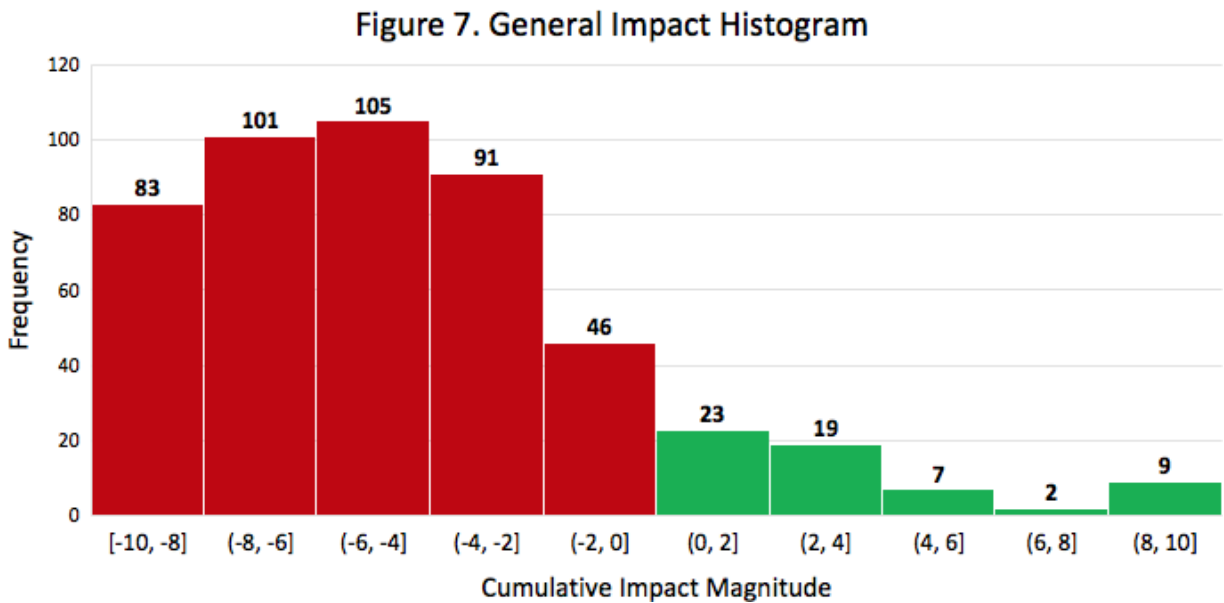
Figure 6. Categorical Negative Impact Ratings



Cumulative Impact

Respondents report a moderately negative impact from the tri-county’s recent hurricane exposure. When asked to quantify the overall impact from the region’s four most recent hurricane experiences (Dorian, 2019, Florence, 2018, Irma, 2017, and Matthew, 2016) on a scale of negative ten (most negative) to ten (most positive), the group averages an impact score of -3.59. Figure 7 illustrates the distribution of choice frequency, showing 80% of responses being less than zero (negative) and 20% of responses in the zero to ten range (no impact or positive.)

When given the opportunity to describe the positive and negative cumulative impacts in an open-ended response, the majority of employers respond with negative impacts, which is consistent with the findings of the quantitative impact rating. Those who note positive impacts describe experiences such as increased sales while other businesses were closed; the ability to practice preparedness; and an increased sense of community in the face of the storms. Further detail on cumulative impact gathered from qualitative responses is provided on the following page.



The most common negative impacts described in the open-ended responses center around eight major themes:

1.	Forced closure due to the mandatory evacuation orders.
2.	Loss of productivity.
3.	Loss of revenue and business.
4.	Physical damage to business/property caused by storms.
5.	Power and connection loss.
6.	Impacts on employees and wages.
7.	Cancelled meetings and events.
8.	Perception region is unsafe to visit.

Below are illustrative quotations of the major themes enumerated in the list above.

1. *"The manufacturing base takes a huge hit when lane reversals and evacuation orders are issued early. This creates a logistics nightmare if you try to sustain operations for a longer period of time. Freight carriers stop running, commutes to and from work are compromised and as a result the business takes a significant hit."*

1. *"Mainly for our business as we are a hotel, when a mandatory evacuation is ordered, we typically cannot open our inventory to the public. We saw a \$195,000 revenue loss from this storm. Last year, we saw \$175,000 loss."*

2. *"When a storm threatens, we lose business immediately and for days, weeks and months. We lose momentum from the sales team, and we [lose] constant communication with our customers, which is something we rely on to conduct business. It's a disruption to our staff because they can't be productive when they're worried about their homes, families, pets and property."*

2. *"We could not produce products for 4 days. We had to expedite shipments to our customers and work overtime on the weekends for around a month after the storm to make up our inventory losses. We also lost some business to our sister plants as we could not make the products in time immediately following the storm, so this is production we lost permanently."*

3. *"We have lost approximately \$1.6 million dollars in revenue over the past 5 years between the 4 hotels that I manage."*

3. *"We are in the staffing business, so we have experienced a loss of revenue during the storms as our temporary employees aren't able to work and we can't bill for their time. We have lost 3-5 days' worth of billing during each of the storms. Dorian cost us around \$115,000 in revenue."*

4. "We've had water damage 4 of the last 5 years that have cost us over \$50,000 in cleaning expenses."

5. "We had to invest in laptops and IT infrastructure to get some work done. The power surges we experienced just recently after Hurricane Dorian did a lot of damage to our computer equipment resulting in an additional week of work interruptions."

6. "When my employees can't work due to evacuation orders and the fear of a potential landfall everyone suffers. My business loses all production and the employees lose out on daily pay. We have goals in place and every year due to storms there have been partners of mine who can attribute missing goal due to the weather."

7. "Our business is greatly affected by hurricanes, both for locals and tourists. We have many events and programs that are cancelled, along with tremendous revenue loss from admissions/retail and cafe sales. These losses are not only felt during the immediate time frame around the hurricane but sometimes weeks or months later."

8. "Not only do we lose significant business during the hurricane event with evacuations and preparation, but we see a significant drop in visitors throughout the fall season. It seems to be worsening every year and [fewer] people choosing to visit in the fall due to the trend of hurricanes and evacuations."

4. "We have had several trees fall and damage buildings at our apartment community during the past several storms. Most recent storm had our community closed for a week and we are still currently waiting for contractors to be able to make it here for repairs."

5. "Post-storm power outages delayed facility assessments, HVAC system issues and resulted in spoilage of food."

6. "Most recent storm had our community closed for a week and we are still currently waiting for contractors to be able to make it here for repairs. This also has caused our employees to lose pay for the time that we are closed. Our new parent company does not pay for inclement weather."

7. "We are a full-service hotel in North Charleston. All 4 storms caused mass cancellations of Rooms and Banquet business. Most of the Rooms business was recouped during and after Matthew with emergency crews, insurance companies, etc. Some was recouped during Dorian. Florence and Irma were complete losses, especially Florence. No Banquet business was recouped."

8. "We lost millions in revenue and there is a lingering effect of not wanting to book business during this time of the year because of a fear of storms."

Response Planning

The majority (70%) of Chamber members responding to this survey currently have a written disaster response plan. Among this group, the vast majority keep their disaster plans up to date, with 91% reporting that their plans were updated in either 2018 or 2019. When asked whether updates to these response plans would be made due to recent experiences with hurricane Dorian, 34% of these respondents choose “yes”.

To gauge resilience efforts, respondents were asked to indicate from a list which actions are currently being considered, implemented, or are already completed. Table 3 lists the percentage of response types for each given action. The three resilience efforts that have the highest percentage of ‘completed’ responses are improving communication among leadership/ employees/contractors, investing in protecting IT infrastructure, and assisting employees with evacuation.

	Not Considering	Considering	In-process	Completed	N
Improve communication among leadership, employees and contractors	27%	12%	25%	35%	118
Investing in protecting IT infrastructure	46%	14%	10%	29%	199
Assisting employees with evacuation	54%	13%	3%	29%	237
Investing in protecting physical structures	54%	16%	8%	23%	233
Investing in back-up generators	55%	16%	6%	23%	238
Financial assistance to employees for lost wages	60%	12%	5%	23%	259
Relocating some/all operations	73%	11%	2%	14%	318
Purchasing additional insurance	78%	9%	2%	11%	336
Other	82%	8%	5%	5%	50

The listed option of ‘other’ provides an opportunity for respondents to fill-in other resilience actions that they are considering, in the process of implementing, or have already completed. Those who note that their business is taking another action step other than those listed communicate actions such as determining safer vehicle storage; coordinating with local service providers to assist with recovery; budgeting for a hurricane; rewriting office closure policy; and, forming a reimbursement policy for employees for evacuation expenses.

When asked to elaborate on lessons from Hurricane Dorian that may change their preparation or response to the next major storm event in the tri-county area, some respondents elaborate on actions that were listed in the quantitative questioning, such as creating/updating a company

disaster response plan, or improving communications among employees. Others respond with other possible company policy changes. Still others note that no changes are planned based on their experiences with Hurricane Dorian. Below is a list of common themes found among the open-ended responses with corresponding illustrative quotations:

1.	Reconsider closure policy during mandatory evacuations.
2.	Account for annual business closures and loss of revenue caused by natural disasters.
3.	Create or update a company disaster response plan.
4.	Improve communications with employees and clients.
5.	Develop plans for virtual work during closures.
6.	No changes planned.

1. *"Possibly implementing a plan to remain in limited operation once evacuations are ordered...and decouple our decision regarding when to close operations from government evacuations."*

1. *"We will not comply with the governor's mandatory evacuation orders until we have determined the path of the storm and if it does appear to be heading towards Charleston, we will close later in the timeline than what is ordered by the Governor."*

2. *"We are working towards building a separate savings account to specifically aid in financially weathering future closures/loss of business due to a weather-related event that is not deemed significant enough to be covered by our insurance."*

2. *"We learn that every year in September or October to expect to be closed for 4 to 5 days. We have clients who purposely set aside money each month to account for the week they are closed."*

3. *"[W]orking on an official disaster plan for our office. We are a local office of a large publicly traded company with 360 offices worldwide. We are partnering with corporate for more guidance for future events."*

3. *"Continually update needs and plans for our clients' evacuation & disaster plans."*

4. *"Better communication between our Leadership Team members - more timely and more check-ins. Discussing impact of storm once we knew of the potential of it coming to Charleston - discussing how to prevent lost time and offer up options depending on storm severity."*

4. *"To have social media posts and website verbiage in place prior to a storm's arrival both best case and worst case for pre-storm and post storm messaging."*

5. *"Improved capability for virtual operations in the non-manufacturing functions (i.e. conducting business remotely)."*

5. *"[Make] sure that my folks can work at home if needed to maintain their hours."*

6. *"We conduct a hurricane evacuation table-top exercise and actually shift our operations to our backup IT facilities every year, and use [the] results to inform our hurricane preparedness plans. Dorian did not present us with any new situations that we have not seen previously."*

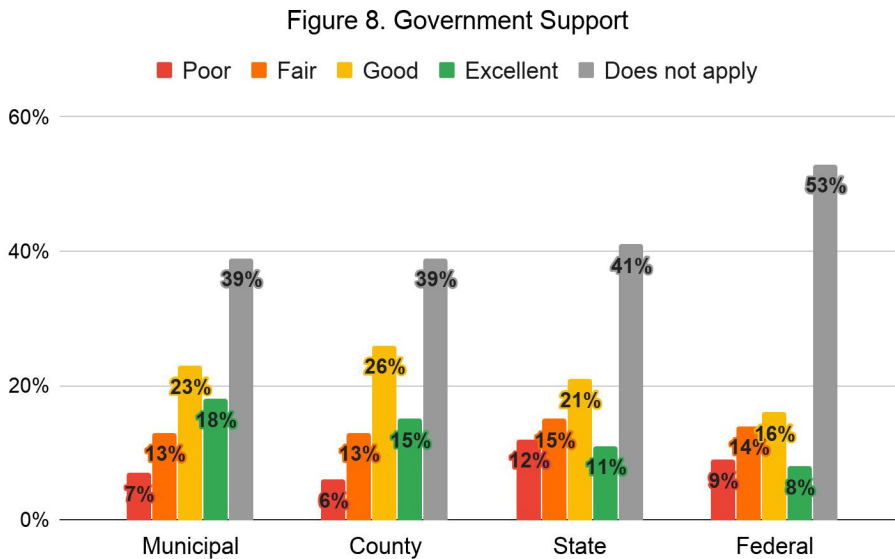
6. *"No new lessons learned with Dorian. [Our company] has a practiced, well-oiled, and well-orchestrated disaster preparedness and response plan that has been improved with every event annually since we created our plan over 10 years ago."*

6. *"The preparation was similar to what was adopted in the previous 3 years. No changes are expected from the experience with Dorian."*

SECTION 2: REGIONAL RESOURCES & SUPPORT

Satisfaction with Government Response

When asked to communicate the level of satisfaction each respondent has with the level of support offered by various levels of government before, during, and after major storms, the majority of respondents choose ‘does not apply’ (Figure 8). Among the remaining responses, on a scale of poor, fair, good, excellent, there is a general consensus that support has been ‘good’ across all four tiers of government (municipal, county, state, federal). The entity with the highest percentage of poor and fair responses is state government. Special attention should be paid to the high level of ‘does not apply’ responses for each category, which could be representative of a lack of knowledge of government support surrounding these storm events or a lack of trust for support to be offered.



Chamber members were then asked to describe how municipal, county, and/or state government could better support them through future major storm events. Below is a list of common themes found among the open-ended responses with corresponding illustrative quotations:

1.	Reconsider timelines for state-level evacuation orders.
2.	Improve city, county, and state communications pre- and post-storm.
3.	Streamline debris removal following storm.
4.	Take proactive measures to improve power restoration following storm.
5.	Invest in flood mitigation.
6.	Provide relief programs for businesses impacted by non-physical damages.
7.	Government services were effective.

1. "The Governor and his advisors need to be more understanding [of] the consequences of their decisions. To order a mandatory evacuation over a Holiday weekend gives little opportunity for a company to prepare. Instead the entire burden falls now on the ownership. Aside from business though, they need to be cautious so [as] not to become the boy who cried wolf. Twice now it's been mandatory and it hasn't been bad. [Fewer] and [fewer] people will start to evacuate, which can prove deadly if we were to receive a direct hit."

1. "Better understanding of timeline for decisions, eg. mandatory evacuation, and criteria behind how such a decision will be made."

2. "Direct updates via email prior to it going out to the news. Being in the hotel business guests and employees get very stressed when life threatening comments are made on the news."

2. "We have put out information on our 211 services for non-emergency relief and have received moderate usage but the information has not been readily pushed by county and municipal governments."

3. "Storm debris is not removed from our streets in a timely fashion. This impacts our traffic and parking and overall appearance. This is the only county service that is applicable to us at this time."

3. "After 4 years, pick-up of debris needs to be much more stream-lined. We can't have debris on the streets for 3+ weeks."

4. "Be better prepared for vast power outages, such as borrowing workers from inland counties."

3. "We are 2 weeks post-storm and our debris is still waiting to be picked up outside of our business, so the Town of Mount Pleasant could certainly do better."

5. "Better infrastructure on roads and flooding need to be addressed. We are growing at a fast rate yet the county/city keep the building going but do NOTHING to address infrastructure or flooding."

4. "Being proactive on preserving/restoring power more quickly. Most of the power losses were from broken polls and tree limbs taking out power lines - there should be an effort to bury power cables and regular trimming of trees. A lot of these disruptions could have been prevented/minimized."

5. "Please address the flooding downtown. The recent Dutch dialogues discussed 4 areas they were going to concentrate on but I did not see downtown Charleston in the summary. If we don't fix downtown we can forget about the need to fix the others since downtown drives the tourist business."

5. "Considering these events have become an annual occurrence, there needs to be stronger plans in place to handle clean up, plus a plan to improve drainage instead of pointing fingers at each other and not accepting responsibility. Most would be willing to increase their taxes if it went toward fast, efficient clean-up for this annual expense."

6. "Most grant funds are tied to physical damage after a storm or are limited to individual homeowners. We would like to invest funds in our campus and organization to prevent damage to physical structures during a storm and lower evacuation costs through preplanning; however, such funding sources are very difficult to find. Disaster preparedness grants for nonprofits would be a tremendous benefit to the community."

6. "[Offer] coverage, similar to flood insurance that covers business interruption due to civil authority. As any currently-available insurance policies stand, one can only be covered for damage (spoilage, business loss, etc.) if physical damage is incurred, and we are closed for 3+ days. We are only forced to be closed for that duration due to government action, yet we cannot claim losses when that is the cause. Debilitating."

7. "Everyone works together at a high-level including power restoration as soon as possible. There were excellent communications among agencies. I have no suggestions for improvement."

6. "[T]hey need to understand the economic loss and have a plan in place to defer for the month or other amount taxes owed. Businesses want to pay their taxes they just need to have the ability to do it without late fees because of storms and government evacuations. Dominion, CWS, Blue Cross Blue Shield all allowed extra time for payments--Comcast did not. Taxes are still due on time as well."

7. "The emergency preparations and notifications made by the statewide and municipal governments is smooth and well-done, and for that, I'm greatly appreciative."

Information Sources

To assess the types of information used by employers to prepare for major storm events, respondents are asked to list the specific weather-related resources they relied on the most to inform their decision-making in advance of Hurricane Dorian. The sources most frequently cited are Weather Channel, local news, and NOAA. Table 4 provides a summary of the information sources most commonly consulted by survey respondents. In addition to naming go-to information sources, respondents are also asked to rate their reliability. On a five-point scale of not at all reliable (1) to extremely reliable (5), 84% of respondents choose either a four or five, with an average of 4.17.

Information Source	Response Count	% of Total
Weather Channel	116	19.9%
Local news (general)	75	12.9%
NOAA	73	12.5%
National Hurricane Center	52	8.9%
State government (general)	39	6.7%
National Weather Service	33	5.7%
Local news - Live5 News	27	4.6%
Local news - NBC News 2	18	3.1%
Mike's Weather page	16	2.7%
Weather Underground	16	2.7%
Local government (general)	13	2.2%
Charleston County Emergency Management Department	12	2.1%
Local forecaster (Shea Gibson, Bill Walsh, etc.)	10	1.7%
Other (<10 responses)	83	14.2%
Total	583	100.0%

Insurance Claims

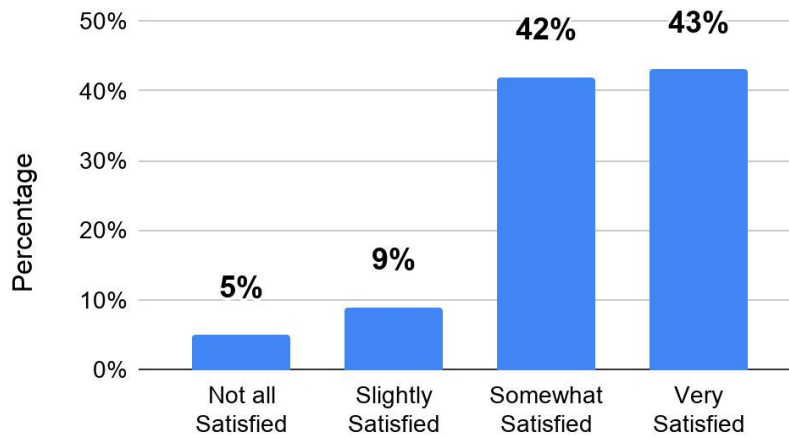
In general, only a small portion of this sample has or will utilize insurance to cover losses caused by Dorian. Out of 489 respondents, only 13% indicate that they have filed or plan to file an insurance claim to cover damage or loss resulting from hurricane Dorian. Among this group of 64 individuals, 46% are filing to cover physical structures, 22% for contents/property, and 4% for vehicles. The remaining 28% chose 'other' and explain through open-ended responses that their insurance claims are for coverage of loss of revenue, loss of production, business interruption, or damage to grounds caused by fallen trees. When asked to communicate how confident this small group of respondents are that compensation provided for their claims will adequately cover losses, only 17% choose yes, 38% somewhat, 36% no, and 9% unsure.

SECTION 3: PUBLIC/PRIVATE PARTNERSHIPS

Regional Resilience

“Resilience is the capacity of individuals, communities, institutions, businesses, and systems within the Charleston region to survive, adapt, and grow despite episodic natural disasters and chronic coastal hazards. Resilience requires proactive thought, preparation, and planning to absorb, recover, successfully adapt, and thrive in the face of adverse events and conditions.” (<http://www.charlestonresilience.net/>). When asked to express on a scale from one (not at all resilient) to one hundred (extremely resilient) how resilient they perceive the tri-county region to be currently based on this definition, respondents choose a mean response of 75. The maximum resilience score chosen by respondents is one hundred (10%), with a minimum of one, which was only chosen by a single Chamber member. The large bulk of respondents (89%) choose a score of fifty or higher and only 1% choose a score of ten or less. This indicates that the overall sample perceives the resilience of this area as being moderate to fairly high.

Figure 9. Satisfaction with Public/Private Partnerships

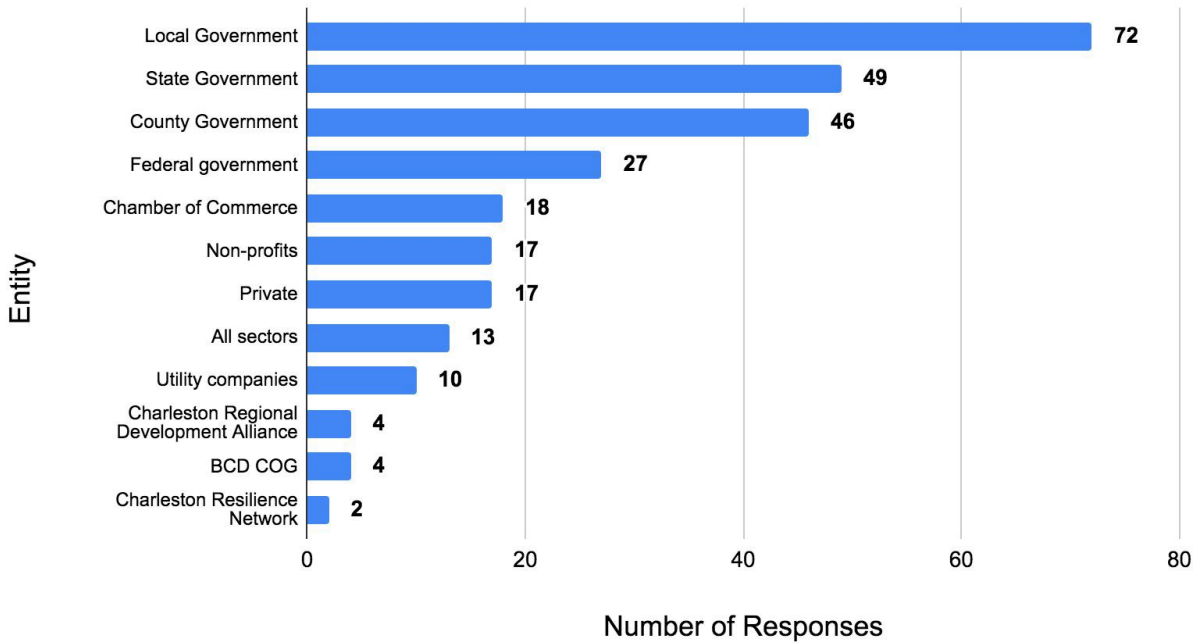


Collaborations between the public and private sectors are vital to building a more resilient tri-county region. When asked to communicate the level of satisfaction employers have with current coordination between government, businesses, and non-profit organizations to increase resilience, the majority of respondents (85%) are either somewhat satisfied or very satisfied (Figure 9). The next

Joseph J. ... Director for ... Charleston

graphic (Figure 10) shows which entities respondents believe to be most responsible for addressing resilience in the region. In this case, the top four entities are various tiers of governments: municipal, state, county, federal (starting with the highestranked).

Figure 10. Entities Expected to Address Resilience Efforts

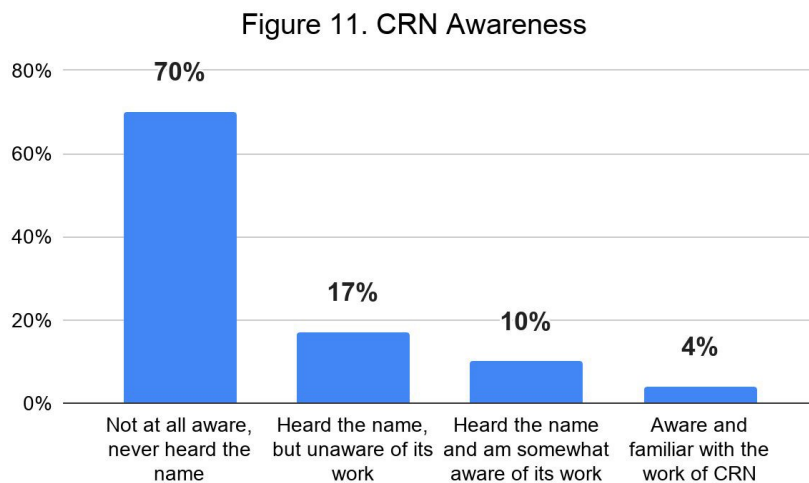


When respondents were asked whether they were currently involved in any cross-sector resilience related partnerships, response rates drop considerably. Fifty-seven (10.5% of total) respondents submitted a response, with 33 (6.1% of total) providing an affirmative response. Table 5 provides an alphabetical list of the partnerships or planning organizations provided by the respondents.

Army Corps of Engineers	Mount Pleasant Chamber of Commerce
Berkeley County Local Emergency Planning Committee	National Voluntary Organizations Active in Disaster
Charleston Area Convention and Visitors Bureau	New Hanover Disaster Coalition
Charleston County Project Impact	North Charleston Chamber of Commerce
Charleston County Resilience Committee	Red Cross
Charleston Metro Chamber of Commerce	Salvation Army
Charleston Resiliency Network (CRN)	South Carolina Emergency Management Division
City of Charleston Resilience & Sustainability Advisory Committee	Southeastern Disaster Recovery Partnership
Dunes West Emergency Operation Team	Town of Seabrook Disaster Recovery Council
Dutch Dialogues	Trident United Way (TUW)
East Cooper Community Outreach (ECCO)	Urban Land Institute (ULI)
Lowcountry Healthcare Coalition	

Awareness and Interest in Charleston Resilience Network

The Charleston Resilience Network (CRN) is a collaboration of public, private, and non-profit organizations seeking to enhance the resilience of the tri-county region. Its mission is to foster a unified regional strategy and provide a forum to share science-based information, educate



stakeholders, and enhance long-term planning decisions that result in resilience. Among the Chamber members that responded to this survey, seventy percent are unaware of the existence of CRN (Figure 11). Upon asking if respondents are interested in engaging with CRN, 19% say yes, 33% say no, and the majority (48%) say they don't know or need more information.

FURTHER INVESTIGATION

- Determine the level of support and types of services that members expect to receive from the Charleston Metro Chamber of Commerce.
- Analyze the capacity of local governments and agencies to provide support and services to businesses in the area.
- Create a plan for future evaluations of employers' experiences surrounding all types of natural disasters, extreme weather events, and chronic weather issues.
- Analyze variances in vulnerability across business types.
- Identify areas in which Charleston Resilience Network can facilitate public/private partnerships to address resilience needs in the tri-county region.
- Define the relationship between CMCC, CRN and the Riley Center to identify ways to better understand and meet the information and planning needs of the Chamber.
- Learn more about desire of Chamber members to be involved in resilience efforts.

Appendix A - Multiple Response Entities

Table A. Multiple Response Entities	
Chamber Member	Number
College of Charleston	9
Charleston SC County School District	7
Ingevity	7
Medical University of South Carolina	7
Seamon Whiteside + Associates	7
The Boeing Company	7
Carolina One Real Estate - Corporate Office	6
Charleston Metro Chamber of Commerce	6
Charleston Shoe Co.	4
Charlestowne Hotels Inc.	4
Colliers International	4
Roper St. Francis Healthcare	4
Trident Technical College	4
Avison Young	3
BB&T	3
Buxton and Collie, Attorneys at Law	3
Charleston Day School	3
Charleston Trident Association of Realtors	3
City of Charleston	3
Clemson University Restoration Institute	3
Daniel Ravenel Sotheby's Real Estate	3
Dixon Hughes Goodman LLP	3
Dorchester School District Two	3
Francis Marion Hotel	3
Kimley-Horn and Associates Inc.	3
Matt O'Neill Real Estate	3
Mt. Pleasant Networking	3
Robert Bosch LLC	3
SC Biz News	3
SMHa	3

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South Carolina Stingrays Hockey	3
The Dewberry Charleston	3
Thomas & Hutton	3
Adams Outdoor Advertising	2
AHT Cooling Systems USA, Inc.	2
Alice's Clubhouse	2
Architecture Plus LLC	2
ATI - Advanced Technology International	2
Atlantic South, LLC	2
Burtons Grill	2
Cambria Hotel Mount Pleasant	2
Charles Towne Montessori School	2
D.J. Powers Company, Inc.	2
Davis & Floyd Inc.	2
Doubletree by Hilton Hotel & Suites Charleston Airport	2
Eaton	2
Engaging Creative Minds	2
Explore Charleston	2
First National Bank of PA	2
Fox Audio Visual	2
Home Telecom	2
Hotel Bennett	2
Indigo Hall	2
Keller Williams Realty (all locations)	2
KION North America Corporation	2
Landmark Enterprises	2
PhishLabs	2
Rawle Murdy Associates, Inc.	2
REI Engineers, Inc.	2
Ronald McDonald House Charities of Charleston	2
Science Applications International Corp. (SAIC)	2
Singular Private Wealth, P.C.	2
Snyder Event Rentals	2
South Carolina Federal Credit Union	2

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Terracon	2
The Citadel, The Military College of S.C.	2
The Mills House Wyndham Grand Hotel	2
The Post and Courier	2
The Salvation Army Family Store	2
Total Beverage Solution	2
Touchpoint Communications	2
Trident Health	2
WABCO Vehicle Control Systems	2
WCSC-TV Channel 5	2
Wild Dunes Resort	2
Wonder Works	2

Appendix B - Impact by Respondent Type

Table B. Impact by Respondent Type*				
	Category	Neg. Dorian Impact	Pos. Dorian Impact	Cumulative Impact
# of Employees	0-50	4.84 (295)	1.82 (138)	-3.29 (278)
	51-100	5.88 (64)	1.40 (25)	-4.33 (61)
	101-250	6.09 (66)	2.11 (28)	-4.20 (55)
	>250	5.82 (93)	2.02 (45)	-3.75 (85)
Gross Annual Revenue	<5M	5.10 (144)	1.45 (77)	-4.25 (122)
	5-20M	5.46 (69)	1.94 (36)	-3.60 (62)
	>20M	5.51 (69)	1.33 (27)	-4.85 (65)
County	Charleston	5.35 (433)	1.79 (208)	-3.62 (399)
	Berkeley	5.13 (39)	2.07 (15)	-3.86 (35)
	Dorchester	4.74 (27)	1.92 (12)	-4.30 (27)

*Parenthetical values represent sample size for each data value

Appendix C - Survey Questions

The Charleston Metro Chamber of Commerce has partnered with the Charleston Resilience Network and College of Charleston's Riley Center for Livable Communities to assess the impact of hurricane Dorian on businesses in the tri-county region. This survey aims to collect information about local businesses' preparation, response, and recovery efforts. Data collected will be used to guide future efforts to support the tri-county business community before, during, and after natural disasters. All responses will remain confidential and shared only in aggregate.

If you have any questions, or would like more information, please contact the Riley Center's graduate assistant, Chelsea Diedrich (diedrichcb@g.cofc.edu).

Q2 How many individuals does your business employ?

- Less than 5
- 6-25
- 26-50
- 51-75
- 76-100
- 101-250
- 251-500
- > 500
- Prefer not to say

Q3 In what county is your business or organization primarily based?

- Charleston County
- Berkeley County
- Dorchester County
- Other: _____

Q4 Overall, indicate the magnitude of **negative** impacts on your business caused by Hurricane Dorian? (0 = no impacts, 10 = greatest possible impacts)

Q5 Overall, indicate the magnitude of **positive** impacts on your business caused by Hurricane Dorian? (0 = no impacts, 10 = greatest possible impacts)

Q6 How has your business been cumulatively impacted considering all of the major storms over the last five years [Dorian (2019), Florence (2018), Irma (2017) and Mathew (2016)]?

Q7 Please briefly explain the most significant impacts of recent major coastal storms (both positive and negative) on your business:

Q8 Overall, how significantly was your business impacted by hurricane Dorian in the following five areas?

	Not at all	Minor	Moderate	Very Significant	Does Not Apply
Revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Production	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personnel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supply Chain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 Considering government support for your business before, during, and after major storms, how would you characterize the support your business receives from the following government entities?

	Poor	Fair	Good	Excellent	Does not apply
Municipal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
County	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
State	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Federal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10 How could municipal, county, and/or state government better support you through future major storm events?

Q11 What weather-related information source did you rely on the most to inform your decision-making leading up to Dorian? Please be as specific as possible.

Q12 How reliable do you perceive the weather-related information source you cited above?

	1	2	3	4	5	
Not at all	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Extremely

Q13 Did you, or do you plan to file an insurance claim for property damage or loss as a result of Dorian?

- Yes
- No

If respondent answers yes to Q13...

Q14 For which of the following items did you file a claim?

- Business building structure(s)
- Contents/property
- Vehicle(s)
- Other: _____

If respondent answers yes to Q13...

Q15 Are you confident that compensation provided for your claim will adequately cover the damages that your business sustained from Dorian?

- Yes
- Somewhat
- No
- Unsure

Q16 Does your business have a written disaster response plan?

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- Yes

- No

If respondent answers yes to Q16...

Q17 In what year was the plan most recently updated?

If respondent answers yes to Q16...

Q18 Do you expect to update this plan based on your experience with Dorian?

- Yes
- No

Q19 Considering recent history with major storms in our region, please check all of the action steps that your business is considering, is in process of implementing or has completed.

	Considering	In-process	Completed	Not Considering
Purchasing additional insurance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investing in protecting IT infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investing in protecting physical structures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assisting employees with evacuation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Investing in back-up generators	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Financial assistance to employees for lost wages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improve communication among leadership, employees and contractors	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Relocating some/all operations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20 Resilience is the capacity of individuals, communities, institutions, businesses, and systems within the Charleston region to survive, adapt, and grow despite episodic natural disasters and chronic coastal hazards. Resilience requires proactive thought, preparation, and planning to absorb, recover, successfully adapt, and thrive in the face of adverse events and conditions. From your company's perspective, how resilient is the Charleston tri-county region? On a scale of zero (not at all resilient) to 100 (extremely resilient).

Q21 How satisfied are you with the coordination among government organizations, businesses, and nonprofit organizations in developing a more resilient tri-county region?

- Not all Satisfied
- Slightly Satisfied
- Somewhat Satisfied
- Very Satisfied
- Don't Know

Q22 What entities (public, private, or non-profit) do you expect to address resilience issues for businesses in the tri-county region?

Q23 If you are currently involved in any cross-sector resilience related partnerships, please provide a brief description below:

Q24 What did you learn from the experience with Dorian that will change your preparation and/or response to the next major storm event in the tri-county region?

Q25 The Charleston Resilience Network (CRN) is a collaboration of public, private, and non-profit organizations seeking to enhance the resilience of our region and communities. Its mission is to foster a unified regional strategy and provide a forum to share science-based information, educate stakeholders, and enhance long-term planning decisions that result in resilience. Would your organization be interested in engaging with this network and its affiliated members?

- Yes
- No
- Don't know/need more information

Q26 What is your level of familiarity with the Charleston Resilience Network (CRN)?

- Not at all aware, never heard the name
- Heard the name, but unaware of its work
- Heard the name and am somewhat aware of its work
- Aware and familiar with the work of CRN

Q27 What is your business's annual gross revenue?

- < \$100K
- \$100K - \$249K
- \$250K - \$499K
- \$500K - \$999K
- \$1M - \$4.9M
- \$5M - \$20M
- > \$20M
- Prefer not to say