

**PARTNERS IN COMMUNICATION:  
NATIONAL WEATHER SERVICE AND LOCAL MEDIA WORKING TOGETHER TO SAVE  
LIVES DURING THE MICHIANA TORNADO OUTBREAK OF 24 OCTOBER 2001**

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**Abstract**

Late October is a very unusual time for tornadoes to occur in the lower Great Lakes. However, on 24 October 2001, one of the worst tornado outbreaks ever recorded in north-central Indiana and extreme southwest Michigan struck the region. Eight tornadoes swept across the area, resulting in two fatalities and causing damage ranging from F1 to F3 on the Fujita Scale [The Fujita Scale correlates damage with likely wind speeds. The scale ranges from F0 (weakest) to F5 (strongest)]. It was the greatest known number of tornadoes ever to strike this region (Fig. 1) in a single day.

As early as Saturday 20 October, the Northern Indiana NOAA/National Weather Service Weather Forecast Office (IWX) began issuing statements via the NOAA Weather Wire Service, NOAA Weather Radio, the Internet, and other sources, that referred to a cold front expected to cross the region on Wednesday 24 October. On 23 October, IWX issued various products that discussed the next day's severe weather potential. On the morning of 24 October, IWX disseminated a zone forecast package that included specific mention of tornadoes, which is very rarely done. Local media, including WSBT-TV in South Bend, Indiana, were well informed of the upcoming tornadic event and were able to pass the information on to their viewers and listeners.

During the event, two Tornado Watches were issued by the NOAA/National Weather Service Storm Prediction Center (SPC). Between 1950 UTC and 2204 UTC, six Severe Thunderstorm Warnings, six Tornado Warnings, and numerous other products were issued by IWX. Each product was received by WSBT-TV who immediately delivered the information to their audience. WSBT-TV halted normal programming at 2045 UTC for continuous weather coverage and did not break for commercials until 2312 UTC. News crews were sent to tornado-ravaged locations within 30 minutes of reports received from the National Weather Service. These crews beamed back live pictures of the devastation, graphically emphasizing the true magnitude of the unfolding weather event.

The day after the tornadoes, damage survey teams were dispatched from IWX to map and catalogue the damage. As information was gathered, it was phoned back to the office, put on the office web site, and sent out in public information statements.

*Working in tandem, IWX and WSBT-TV were instrumental in warning the public of the tornadoes of 24 October 2001. This paper will describe the severe weather processes undertaken at IWX and WSBT-TV before, during, and after this significant tornado outbreak. Finally, the partnership between IWX and WSBT-TV that helped reach the common goal of supplying the public with vital weather information will be presented.*

**1. Introduction**

Though Midwestern tornado outbreaks are usually associated with the spring season, the most prolific tornado outbreak recorded in Michiana (Fig. 1) occurred 24 October 2001. Eight tornadoes were witnessed across this area between 2015 UTC and 2230 UTC. The infamous Palm Sunday outbreak of 11 April 1965 was responsible for six tornadoes in this area, as was the outbreak of 12 March 1976. In the fifty-one years from 1950 to 2000, this region experienced a total of only eleven October tornadoes.

A tornado outbreak at any time of year requires smooth cooperation and open communication between the National Weather Service (NWS) and the media in order to get vital weather information to the public. That relationship is all the more important during out-of-season severe weather events such as the 24 October 2001 tornado outbreak, a time when severe weather is not normally experienced, and the public may not be in the correct frame of mind or state of readiness.

**2. Meteorological Overview**

On the morning of the outbreak, Michiana was in an ideal location for severe weather – ahead of a strong approaching cold front and a favorable upper level jet (Taylor et al. 2002).

Two hours before the first tornado touched down, an area of surface low pressure was positioned over northern Minnesota, with an occluded front to a wave over south-

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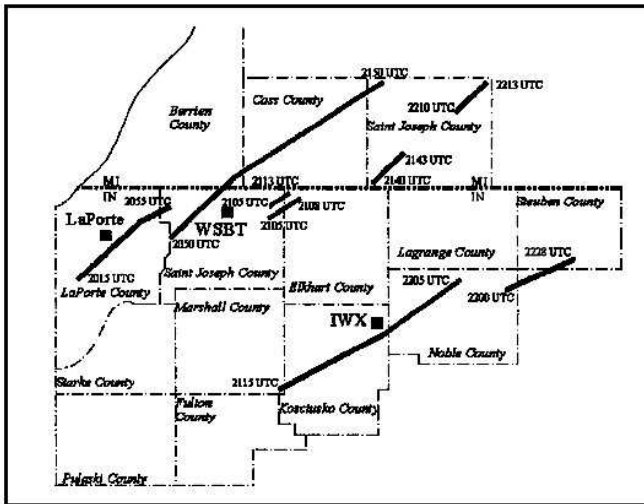


Fig. 1. Area of concern in this paper ("Michiana"), with tornado tracks and times (UTC) from 24 October 2001. (NCDC 2001).

east Wisconsin. From there a cold front arced southwestward through Illinois.

Thunderstorms erupted ahead of the cold front as it pushed east into northwest Indiana. Two bow echoes formed in the squall line. It was from these two bow echoes that the tornadoes would later develop. A mesolow developed in eastern Illinois, moved up the front, and arrived at South Bend in Saint Joseph County, Indiana, around 2100 UTC (Fig. 2). This greatly enhanced low-level circulation and inflow which facilitated tornadogenesis from LaPorte County to Saint Joseph County, Michigan. A mesocyclone formed around 2100 UTC in the southern bow echo (Fig. 3) and moved northeast with the squall line. This portion of the line would be responsible for the tornadoes that swept from Marshall County to Steuben County, Indiana. The northern and southern tornado families were occurring simultaneously from 2115 UTC to 2220 UTC. From 2140 UTC to 2145 UTC, separate tornadoes were moving across northwest and southwest Saint Joseph County, Michigan, and northeast Kosciusko County, Indiana. The complexity and urgency of the situation necessitated clear, concise communication of information between the NWS and the media.

### 3. Technology Resources

The National Weather Service has a plethora of state-of-the-art computing equipment and other tools with which to acquire, analyze, and disseminate data. The operators of these tools must be fluent in their use, and each tool must perform, in tandem, to a very high standard for a severe weather warning to be a success.

The NWS's Weather Surveillance Radar-1988 (WSR-88D) is used extensively during severe weather episodes by the NWS, media, and the public to track storms as they move across the area. The radar supplies a great deal of information such as rainfall intensity, likelihood of hail, circulations within thunderstorms, and storm movement.

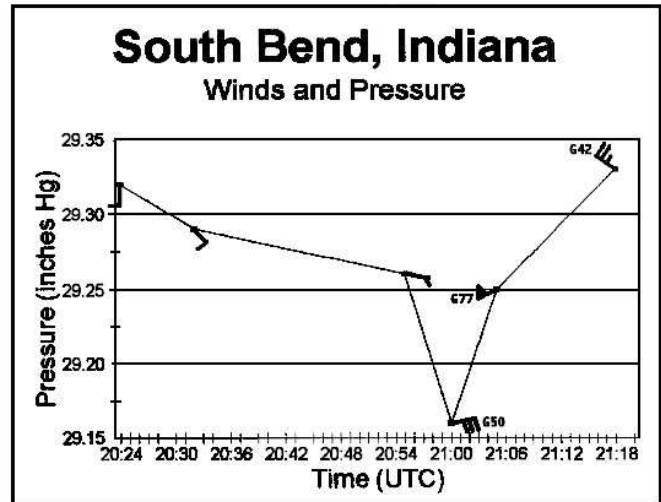


Fig. 2. Pressure trace and wind barbs from the Automated Surface Observing System (ASOS) at South Bend Regional Airport (KSBN) as a tornado struck the airfield at approximately 2100 UTC 24 October 2001. Damage typical of an F1 rating was done at the airport, which agrees with the observed peak gust of 78kt (90 mph).

During the 24 October 2001 severe weather outbreak, two IWX meteorologists were dedicated to the sole job of interpreting radar data and issuing warnings.

Advanced Weather Interactive Processing System (AWIPS) is the NWS meteorologist's primary all-purpose workstation. These workstations are used for the great majority of the meteorologist's weather-related duties such as receiving forecast model data as well as preparing and sending forecasts. Additionally, data from the WSR-88D are also displayed on AWIPS.

Five identical AWIPS workstations are located in the "operations area" of the IWX office. During the 24 October 2001 event from their respective work stations, two meteorologists monitored the radar, and issued warnings and statements. One of the radar meteorologists studied the structure and behavior of the atmosphere over the region as the event unfolded. A third meteorologist was in charge of routine public products such as the Zone Forecast, assisted in examining radar data, and issued severe weather products when necessary. Additional personnel prepared aviation forecasts, answered telephones, sent out storm reports, and monitored NOAA Weather Radio. A coordinator oversaw the entire operation and kept things running smoothly.

The products and warnings issued by IWX were delivered to the public and media via several sources including NOAA Weather Radio (NWR), NOAA Weather Wire Service (NWWS), and the Internet. NWWS was the source from which WSBT-TV drew data. The warnings sent over NWWS were broadcast on WSBT-TV.

WSBT-TV's duty was to take the information and pass it on quickly to the viewer. WSBT-TV utilized a warning display system called Stormwarn. Stormwarn, a product of Baron Services, Huntsville, Alabama, displays warnings issued by IWX automatically at the bottom of the screen. This information was pulled directly from the NWWS.

In addition to the automatic updates, WSBT-TV meteorologists were able to display radar images on-air. NexTrac

and VIPIR are Baron Services products used by WSBT-TV to broadcast radar images. Both are capable of showing reflectivity, radial velocity, storm relative velocity, radial shear, storm radial shear, vertically integrated liquid (VIL), and VIL density. Most of these products are not shown to the viewer; however they do provide additional data to the WSBT-TV meteorology staff.

#### 4. Before the Event

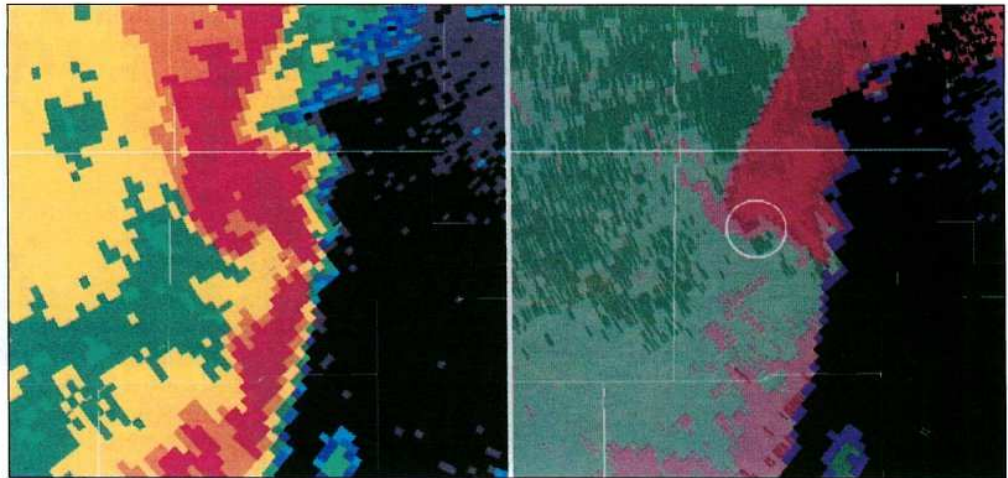
The NWS and media strive to alert citizens of approaching severe weather as far in advance as possible. The 24 October 2001 event was no exception. Information was sent to the public days in advance of the actual outbreak. In Area Forecast Discussions (AFDs) and Zone Forecast Products (ZFPs) starting as early as 20 October, IWX mentioned the approaching cold front and likelihood of thunderstorms on 24 October. The potential for severe weather was highlighted the day before the outbreak by both IWX and WSBT-TV.

On the morning of 24 October, tornadoes were mentioned in the IWX ZFPs for that day. The specific mention of tornadoes in a forecast before any watch has been issued is extremely rare and emphasizes the highlighted possibility of tornadoes. During its morning broadcasts, WSBT-TV mentioned the potential for tornadic activity and kept a close eye on statements issued by IWX.

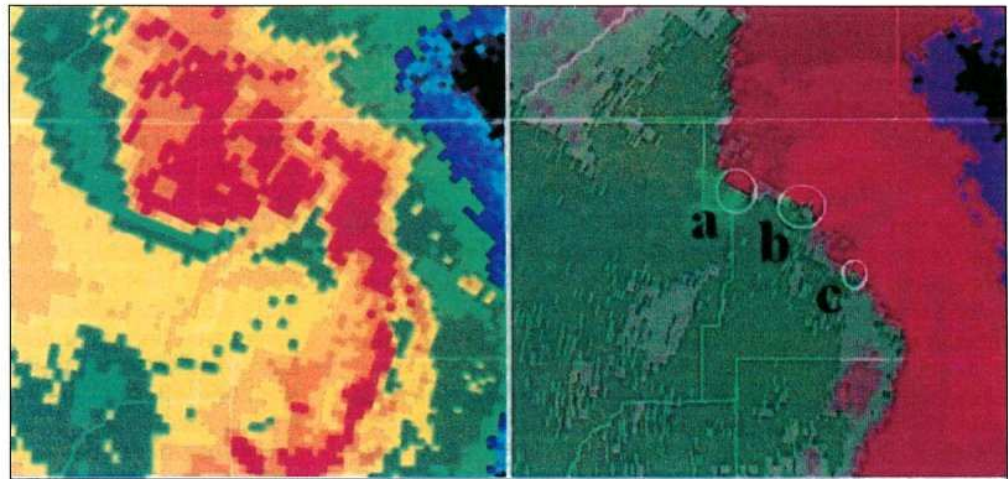
SPC issued a statement at 0930 UTC that told of the possibility of "strong tornadoes" in Michiana for that afternoon. SPC placed the region in an area of High Risk for severe weather, which is unusual for the lower Great Lakes. Meteorologists at both IWX and WSBT-TV closely monitored all SPC discussions and statements.

At 1315 UTC 24 October 2001, an IWX staff meeting was called during which the day's potential for severe weather was discussed. Staffing concerns were addressed and steps were taken to ensure that enough people would be available to handle the afternoon's expected event.

At 1400 UTC the newsroom staff of WSBT-TV met and addressed the possibility of severe thunderstorms and tornadoes for that day. A plan was developed to determine who



**Fig. 3.** 2100 UTC 24 October 2001, Northern Indiana (IWX) WSR 88-D base reflectivity (left) and storm-relative mean radial velocity map (SRM, right). Note the circulation (circled) developing over Fulton County, Indiana, which would go on to produce a tornado at 2115 UTC which would cross Kosciusko and Noble counties.



**Fig. 4.** As in Fig. 3, except for 2055 UTC 24 October 2001. Note the three distinct circulations associated with the book-end vortex and bow echo at 2055 UTC 24 October 2001 over St. Joseph County, Indiana. The northwestern circulation (a) was the dissipating LaPorte County tornado; the middle circulation (b) represented the tornado that would strike South Bend Regional Airport (see Fig. 2); and the southeastern circulation (c) would produce a tornado east of South Bend about 10 minutes later (see Fig. 1).

would be responsible for live breaks in programming. Staffing decisions were also made to keep reporters and anchors on stand-by. A diagnostic check of the weather equipment was undertaken to make sure everything was in working order.

At 1630 UTC, SPC issued another statement that included the wording "intense tornadoes". At 1645 UTC, SPC issued a Tornado Watch for the Indiana portion of Michiana, emphasizing the fact that it was a "particularly dangerous situation". Over the course of the morning, computer model forecasts were scrutinized by both WSBT-TV and IWX. NWS forecasts and statements were updated and sent to the media as well as other outlets.

As the severe weather neared Michiana, meteorologists at IWX were assigned to certain posts including WSR-88D and warnings, NWR, mesoanalyst, aviation forecaster, pub-

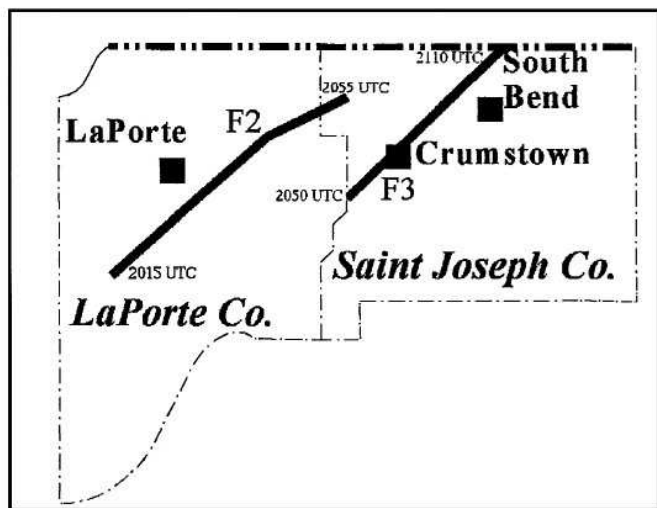


Fig. 5. Location of Crumstown in relation to LaPorte, South Bend, and tornado paths.

lic forecaster, and coordinator. The coordinator's job was to oversee the event and ensure that everything was working smoothly, while the other meteorologists tended to the weather and computer equipment.

## 5. During the Event

The tornadoes that occurred formed in thunderstorms that were part of a large, fast-moving squall line stretching from north to south across the entire region. As the line moved through the South Bend area, it produced circulations in quick succession (Fig. 4). From 1950 UTC to 2204 UTC six Severe Thunderstorm Warnings and six Tornado Warnings were issued (on an average of one warning about every eleven minutes). In addition to the warnings, Severe Weather Statements, Short Term Forecasts, and the evening ZFP were also sent out. With all of these products being issued in such a rapid-fire fashion, it was vital that the communication links between the NWS and WSBT-TV were working so that WSBT-TV could get the latest weather information broadcast to the public as soon as possible. The NWS products needed to be clear, concise, and have all the necessary codes correct for transmission over NWR and the NWWS.

WSBT-TV utilized the resources of a fully staffed newsroom during the outbreak. Reporters, producers, and anchors were instrumental in collecting information about damage and injuries. Two meteorologists were working during the event. One was on-air, while the other monitored IWX products, amateur radio, emails and phone calls. This meteorologist also relayed IWX storm reports to news crews who were able to respond to the hardest hit areas. WSBT-AM 960 Radio simulcast WSBT-TV for the duration of the event. Over sixty thousand people lost power during the storms making battery powered commercial radio, in addition to NWR, very valuable in passing information to the public.

The first break in programming at WSBT-TV came after a Tornado Warning was issued by IWX for LaPorte County, Indiana, at 2012 UTC. The break in programming

lasted four minutes. Regular programming then resumed, although the warning continued to scroll at the bottom of the screen. The news department dispatched a crew towards the city of LaPorte in LaPorte County, near the location of the tornado. At 2048 UTC another break in programming took place after IWX disseminated a Tornado Warning for St. Joseph County, Indiana. St. Joseph County, Indiana, is home to the densely populated South Bend metropolitan area. South Bend itself has a population of approximately 108,000 people (Census Bureau 2005). The projected path of the tornado extended through the northwest side of the city. As a result, WSBT-TV continued its coverage of the event uninterrupted.

Shortly after 2100 UTC, a WSBT-TV news crew broadcast pictures from Crumstown, Indiana, where F3 damage had just occurred. The images broadcast by WSBT-TV were able to reinforce the dangerous nature of the situation. Crumstown, located nine miles southwest of South Bend (Fig. 5), was the scene of the most intense damage. Images of damaged homes and uprooted trees (Fig. 6) were shown during the live coverage. Warnings were on-going at the time, thus the immediacy of the situation was evident. As additional warnings were issued, WSBT-TV remained live on the air for a total of two hours and twenty-seven minutes.

At IWX, reports of severe weather came in via telephone, amateur radio, and e-mail. Sources of information included emergency managers, police and sheriff departments, media personnel, and the general public. As these reports filtered in to the office, they were collected and disseminated via AWIPS in the form of Local Storm Reports (LSRs). The LSRs were issued frequently and went directly to the NWWS for use by the media. At the end of the event, a summary LSR was released which listed all credible reports of severe weather and damage that had been received during the event. Passing this information along to the media, including WSBT-TV, assisted them in informing the public of the storms' locations and their potential for damage. Frequent storm damage reports brought a clearer reality to the situation, and demonstrated the true power and danger of the storms.

## 6. After the Event

Much of the IWX staff gathered at the office at 1300 UTC 25 October 2001 to organize the day's follow-up activities, the primary thrust of which was geared towards completing storm surveys. Four teams were dispatched from IWX to investigate and catalog the damage caused by the previous day's storms. As the teams performed their surveys, they periodically reported their findings back to the office. A meteorologist at the office would, in turn, send that information out via AWIPS using a Public Information Statement (PNS). The office webpage was frequently updated, often within minutes of receiving new information from the field. The media received the PNSs and prepared the information for presentation to their viewers. Storm damage reports alerted the media regarding the locations to send news crews who were covering the story. While most of the storm surveys were completed 25 October, the surveys were not fully complete until 27 October. As new information came in, it was then distributed via PNSs and IWX's website. IWX needed to perform a delicate balancing act in the



**Fig. 6.** Screen shot showing live picture of tornado damage in Crumstown, Indiana, as well as Tornado Warning information for Cass County, Michigan.

attempt to get information out quickly, yet refrain from sending incomplete, inaccurate, or misleading data.

## 7. IWX/Media Relationship

Interaction between the NWS and local media varies from one media market to another. In some instances, the NWS and media work closely together, willingly sharing information and maintaining strong ties with each other through frequent and productive communication. In other cases, the bond may not be as strong.

In the years since IWX opened in 1998, efforts to improve communications were made by both IWX and WSBT-TV. Media seminars were hosted by the NWS, forecasters shadowed WSBT-TV personalities during their shifts, and a concerted effort was made to talk with WSBT-TV about their concerns ranging from IWX's general performance to the day's forecast. Great strides were made which culminated in excellent cooperation during the 24 October 2001 tornado outbreak.

WSBT-TV realizes the importance of a working relationship with IWX. This relationship is especially vital in severe weather situations when WSBT-TV relies on IWX for warnings and updates. In turn, the tools used by WSBT-TV help IWX with storm reports and live images. Conceptually, this brings home the unfolding event to viewers as well as IWX meteorologists.

There are several important factors in acquiring and maintaining a healthy working relationship between the NWS and the media, including but not limited to:

- a. *Addressing each other's concerns*
  - 1) Define each other's needs.
  - 2) Uncover misconceptions about each other's job.
  - 3) Be receptive to input and offer explanations.
- b. *Personal contact*
  - 1) Via telephone to discuss daily forecasts, storm reports, or whatever is important that day.



**Fig. 7.** Image of destroyed factory in South Bend as taken from the WSBT-TV helicopter.

- 2) Via e-mail for less urgent matters.
- c. *Workshops and open houses*
  - 1) Tours of the weather office or television station.
  - 2) Opportunities to speak face-to-face with colleagues.
  - 3) Chance to discuss topics of interest.
  - 4) Share technical knowledge.
- d. *Collaborative projects*
  - 1) Studies.
  - 2) Storm surveys.
  - 3) Attending conferences together.
  - 4) Special on-air reports or interviews.
  - 5) The NWS must avoid any appearance of favoritism towards one media outlet over another.
- e. *Post-Storm Press Meetings*
  - 1) Opportunity for NWS to describe how it arrives at its conclusions.
  - 2) Lets media have a Q & A session with NWS officials.
  - 3) Lets the NWS address all interested media simultaneously.
- f. *Shadow shifts*
  - 1) Meteorologists work side-by-side, sharing knowledge and expertise.
  - 2) Develop an appreciation for what happens during a shift.

## 8. Conclusion

The public has access to the media via television, radio, and the Internet, while acquiring NWS information through several outlets including NWR and the Internet. Thus, people can use two independent data sources, the media and the NWS, to develop a comprehensive picture of the meteorological situation. The WSR-88D radar imagery can be viewed at the IWX website for a large scale view of the entire region. One may tune in to WSBT-TV to get a local picture, possibly as detailed as street scale. NWR may be kept nearby so it

can be monitored for new warnings, and then several minutes later, one can turn on the television to get an up-to-the-minute, live update from the broadcaster about current storm locations.

The media response to this event was excellent. WSBT-TV and other members of the media were able to pass along the necessary information to warn the public. The intensity of the storms was illustrated with live pictures from damaged areas, and NWS WSR-88D doppler radar proved vital in tracking the storms.

WSBT-TV kept the public informed of reports coming from IWX. Every newscast featured updated information on the number and paths of the tornadoes. The station showed the full extent of the damage and clean-up efforts. Their helicopter captured the scene from the air (Fig. 7). Media outlets also held donation drives to aid the victims. WSBT-TV collected \$10,000 and gave out more than seven thousand pounds of dry ice for those without power.

A media outlet can prepare for a major event, but until it happens the reaction is unknown. WSBT-TV was able to process a tremendous amount of information from many sources and disseminate it quickly and accurately, and was the only South Bend area station to stay live on the air for the duration of the event. This allowed the viewers to follow the progression of the storms as they moved through Michiana. It also allowed WSBT-TV to pass on information immediately and warn communities in the path of the tornadoes and severe thunderstorms, a likely factor in the resulting very low death toll for the event.

The event turned out to be a great success in terms of communication between IWX and WSBT-TV. Important weather information was sent from IWX in a timely manner, was immediately received by WSBT-TV, and disseminated to the public through both NWS and WSBT-TV. As a result of building the partnership between IWX and WSBT-TV over the years, the event proceeded smoothly. Hosting media seminars, participating in shadow shifts, hosting an open house, and staying in close personal contact all contributed to the strong bond that was forged between the two public servants.

During the Palm Sunday outbreak of 11 April 1965, tornadoes caused 82 fatalities across Michiana (NCDC 2005). If the 24 October 2001 outbreak had happened a few decades ago, there may have been scores of fatalities. The low death toll (2) was due in part to the communication between IWX and local media, allowing the two entities to work in tandem toward the common goal of warning the public of life-threatening weather via widespread coverage of the event through several different outlets including the Internet, NWR, television, and commercial radio. Had the relationship between IWX and WSBT been poor, conflicting or incomplete information may have been presented to the public, resulting in confusion and possibly a greater loss of life.

The Michiana tornado outbreak of 24 October 2001 tested the skills, tools, and relationship of the NWS and WSBT-TV. Fortunately for the public, the event was handled with aplomb by both the NWS and WSBT-TV, due in large part to the open, receptive relationship that developed over the previous few years. The NWS and media

can remain in good stead with one another through frequent contact, either via phone, e-mail, or in person. Collaborative projects may include post-storm survey press meetings, open houses, shadow shifts, scientific studies, public severe weather conferences, spotter talks, and on-air interviews. Routine contact is very important, such as discussions about the current forecast or questions about why a certain weather event was handled in a certain way. With more communication comes more familiarity, understanding, and trust.

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