Institute for Environmental Studies

UNIVERSITY OF TORONTO
TORONTO, CANADA

THE WOODSTOCK TORNADOES (AUGUST 7, 1979)
EVENT RECONSTRUCTION AND
ORGANIZATIONAL RESPONSE

O.T. Coomes, M.S. Rudolph and J.P. Wilson

Working Paper ERR-10

EMERGENCY AND RISK RESEARCH

THE WOODSTOCK TORNADOES (AUGUST 7, 1979)
EVENT RECONSTRUCTION AND
ORGANIZATIONAL RESPONSE

O.T. Coomes, M.S. Rudolph and J.P. Wilson

Working Paper ERR-10

Publications and Information
Institute for Environmental Studies
University of Toronto
Toronto, Canada
M5S 1A4

November 1980

TABLE OF CONTENTS

		Page
1.	INTRODUCTION	1
2.	DESCRIPTION OF EVENT	3
3.	DESCRIPTION AND EVALUATION OF THE ORGANIZATIONAL RESPONSE	11
	3.1 The Warning Phase	13
	3.2 The Immediate Response	20
	3.3 The Recovery and Restoration	29
4.	CONCLUSIONS	35
5.	ACKNOWLEDGEMENTS	36
6.	REFERENCES	37
7.	APPENDICES	39

1. INTRODUCTION

Tornadoes do not occur very frequently in Canada, relative to the United States; somewhere between 20 and 50 cases are reported every year.[1] Their occurrence is largely confined to the summer months (April to September) and late afternoon or early evening in the southern regions of five provinces: Alberta, Saskatchewan, Manitoba, Ontario and Quebec (Emergency Planning Canada 1979). Despite their small number, tornadoes have devastated many communities in Canada.

On August 7, 1979, between 6:00 and 8:00 p.m., two tornadoes swept through part of the City of Woodstock, several surrounding communities and many farms, leaving a trail of destruction unmatched in the area's history. Two persons were killed, another 150 injured and several hundred households left without shelter. Estimates which have been made of the property damage range from $20 to $100 million dollars (London Free Press 1979). The pair of tornadoes were the worst to hit anywhere in Canada in 1979 and were "possibly the worst in southern Ontario since the Sarnia to Stratford outbreak in 1953" (Chinook 1979).

According to Evans and Start (1979), the Woodstock tornadoes mark the eighth recorded tornado occurrence in Oxford County, an area of 2,032 sq. km, in the last 130 years. Residents may, therefore, expect to receive a tornado once every 16 years, although the probabilities with which specific communities within the County can expect to receive tornadoes are much lower. The most recent tornadoes, however, were notable for the scale of damage they brought about. The tornadoes devastated an area of 117 sq. km, causing record amounts of property damage in addition to loss of life and personal injury.

This paper describes the event, the resulting damage, and evaluates the organizational response associated with these events. Analysis of the emergency response can be divided into three general categories: the warning or initiatory phase; the immediate response or "emergency" proper; and the medium and long-term clean-up and restoration. The information on which this analysis is based was gathered by personal (face-to-face) or telephone interviews with the key actors of the participating organizations listed in Appendix 1. The interviews were completed with these key actors by the three authors with the help of Ms. Bev. Jaffray in a period from October 1979 until January 31, 1980.

---

[1]The Atmospheric Environment Service is currently involved with a National Tornado Statistics Project to compile information related to tornadoes. This will make available more information about the occurrence of tornadoes throughout Canada (Newark 1980, pers. comm.).

2. DESCRIPTION OF THE EVENT

Several parts of Ontario were affected by severe weather events on August 7, 1979, which led the Ontario Weather Centre to issue thirteen severe weather watches and warnings. The day began with numerous thunderstorms and intermittent heavy rainfall along the north shore of Lake Huron and Georgian Bay. A tornado touchdown was reported during the morning at Powassan, south of North Bay (Taylor 1979). These events were associated with a warm front - characterized by high temperatures and high humidity -which, at 6:00 a.m., lay along a line from Sault Ste. Marie to southeast Michigan. This system was accompanied by thunderstorms and periods of heavy rainfall as it moved east-southeastwards. In the late morning, heavy thunderstorms were reported at Wiarton near Owen Sound; where 26 mm of rain fell during 5 min. This system passed directly over western Lake Ontario accompanied by thunderstorms about mid-day. Funnel clouds were sighted over the Lake near Oakville, while another was reported over Toronto International Airport at Malton.[2] By mid-afternoon, this system had moved into New York State and had shrunk considerably in size (Ontario Hydro 1979).

The severe thunderstorm and tornado activity which struck Woodstock area in the early evening hours of August 7 was set off by a cold front which had moved in from the northwest to central Ontario during the afternoon (i.e. behind the initial warm front). The activity associated with the front culminated in the two tornadoes which cut three damage tracks through parts of Perth, Oxford, Brant and Haldimand-Norfolk counties (Fig. 1).

The first tornado touched down approximately 2 km southeast of Stratford at 6:18 p.m., and after damaging farms northwest of Hickson, it skirted that community and the Village of Bright, 15 km to the east, devastating more farms southwest of Bright. Figure 1 identifies the curved damage path (A-B) cut by this tornado and shows that it left the ground at 6:56 p.m. Four minutes earlier, a second tornado touched the ground in an area northwest of the City of Woodstock. It took almost an hour to cut two damage tracks (C-D, E-F) as it traversed an almost straight path in a southeasterly direction. The two damage tracks shown in Fig. 1 indicate that this tornado was composed of two parallel funnels which both touched ground along the middle portion of its path. This tornado left the ground approximately 6 km southeast of Waterford at 7:58 p.m. (Fig. 1).

The first tornado travelled at a constant speed of 50 km/h, whereas the second tornado travelled the initial two-thirds of track, C-D, at 70 km/h before slowing to a speed of 45 km/h over the last third.[3] Attempts have also been made to estimate the rotational wind velocity of the tornadoes. An Ontario Hydro report estimates that the speed was in excess of 150 km/h.

---

[2]These funnel cloud reports prompted the Ontario Weather Centre at Malton to issue a tornado warning for Toronto at 12:55 p.m.; however, this was cancelled at 1:50 p.m. after the warm front passed safely by.

[3]These estimates of the speed of travel are taken from Chinook (1979) and were calculated from weather radar and a log of power outages on lines operated by Ontario Hydro. The London Weather Office followed the second tornado from start to finish on radar (Finch 1979, pers. comm.) while the power outages were caused by the destruction of 29 electric transmission towers by the tornadoes.

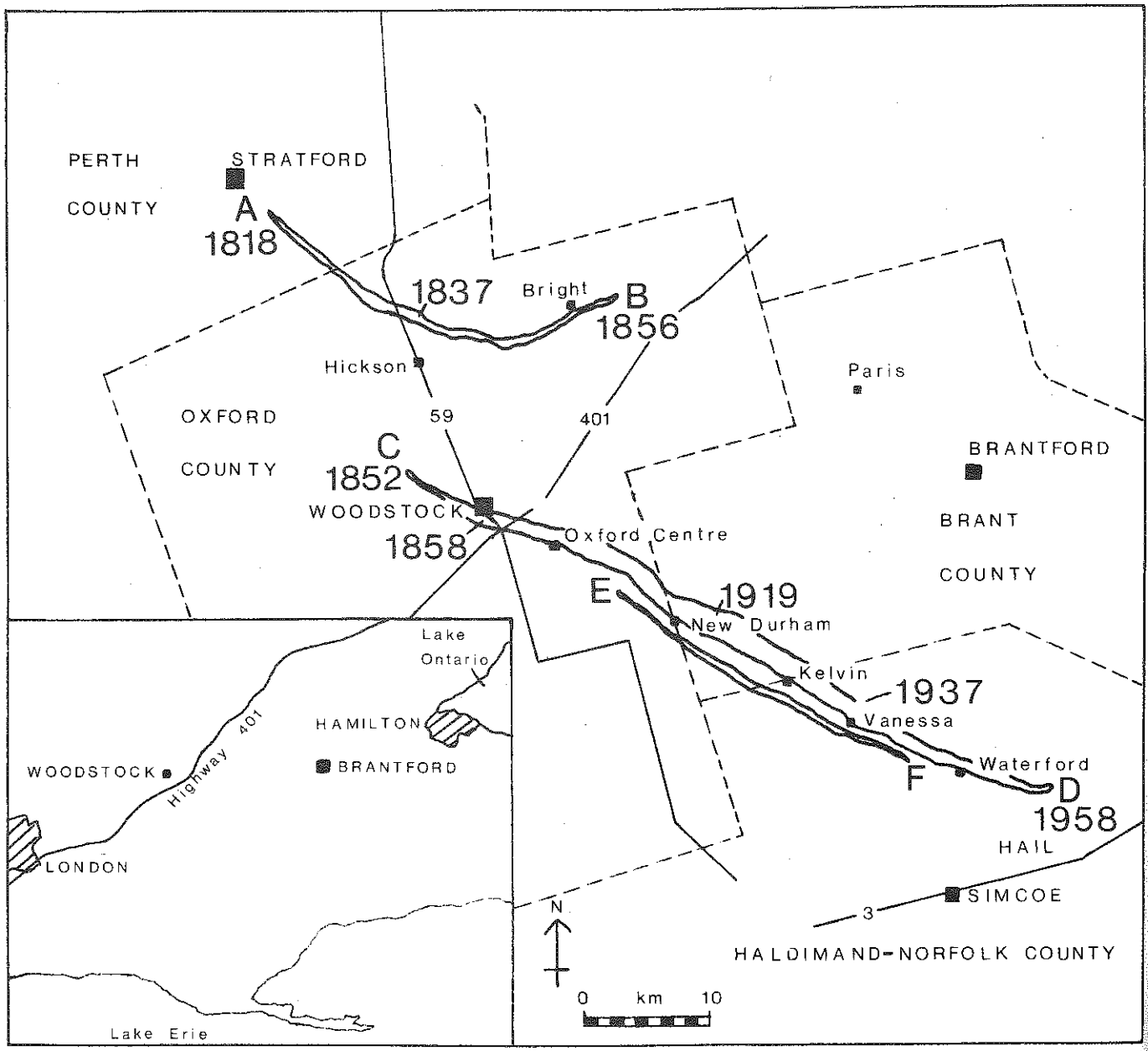

Fig. 1. Location of tornado damage tracks (Chinook 1979)

However, Taylor (1979) has suggested a more precise range of 175-200 km/h.[4] Whatever the actual speed, it was sufficient to cause catastrophic damage over a large area.

Mark Bourrie, a reporter who watched a funnel of the second tornado skirt the Woodstock Fairgrounds (Fig. 2) has described the weather conditions in the area at the time:

> "It was 6:45 p.m. Tuesday... Thunder grew worse and lightning struck around the fairgrounds. The 150 or so people in the area found themselves in the dark as the power failed.
>
> Bogart (a local horse trainer) and I were making small talk about the races that night and whether they would be called off by the rain - when I looked up and saw a cloud about one and a half kilometers wide, turning in a clockwise direction.
>
> (We) stepped around the corner when we saw a funnel come down from the low, black cloud.
>
> The rain, which had been severe, tapered off slightly and the funnel began moving in a northeasterly direction.
>
> The funnel was wide, not like the long, skinny twisters usually thought of in connection with those of the United States midwest. It resembled a monstrous swirling black cloud.
>
> (We) stood aghast as the twister moved. We ran to the south side of the building to get a better view, and by then, word had travelled through the barn. Trainers, drivers, and owners flocked around the door watching.
>
> The twister travelled in a northeasterly direction and, as it grew closer, we could see shingles, branches, and birds being sucked towards the centre.
>
> Some of the material began to fall out behind the funnel and several smaller funnels reached down from the cloud to touch the earth. The tornado continued to move toward us... The twister seemed to make no noise... The tornado didn't reach the fairgrounds but it destroyed trees in the area.
>
> We watched as it passed behind two apartment buildings and realized it was not as close as it seemed... (It) moved in a constant direction and only once did it lift from the ground while it was in our sight.

---

[4]This estimate should be viewed cautiously. Taylor derived her estimate from (a) the translational windspeeds given in Chinook (1979), and (b) a comparison of photographs of the damage to buildings in these cases with earlier instances in the United States. The ability to make accurate comparisons can be doubted given suggestions by other researchers, e.g. Brinkman (1975), that minor variations in building design or construction practices can affect the susceptibility of buildings to tornado damage. It is highly unlikely that these would have been discernible in the photographs of buildings in either case.

> We continued to watch it as it moved along the southern horizon until it was gone from the overcast sky.
>
> The whole incident lasted just five minutes... Some people in the building prayed and most of the children hid along the walls. There is no basement in the stable. The nearest basement was about 200 m away.
>
> After the tornado passed, torrents of rain flooded the parking lot in the fairgrounds with about eight centimetres of water. (London Free Press 1979)."

The thunderstorms, lightning and heavy rainfall described by Bourrie probably covered a much wider area than the tornado paths and immediately adjacent areas. These weather conditions probably extended to areas in and around the towns of Simcoe, Jarvis and Hagersville, for example, since minor damage (i.e. lifted shingles and broken tree limbs) consistent with thunderstorms was noted in these areas (Ontario Hydro 1979). A severe hail storm in the Renton-Tyrell area caused extensive crop damage as well (Chinook 1979).

The length, width and areal characteristics of the three tornado damage tracks are given in Table 1. Along the cores of both major tracks (tracks A-B and C-D in Fig. 1 and Table 1) there was almost total destruction of buildings, which left several thousand people without shelter. In total more than 600 houses or farm buildings were destroyed or damaged to an extent which made them unfit for continued occupation or use without major repairs, as well as scores of industrial and commercial premises, nine churches and three schools. The three small communities of Oxford Centre, New Durham and Vanessa were almost completely flattened.

Table 1. Physical characteristics of the tornado damage tracks

Tornado track	Width range (km)	Length (km)	Approximate area (km^2)
A - B	0.2 to 1.0	33	20
C - D	0.5 to 2.0	59	80
E - F	0.1 to 0.9	29	17
Totals	0.1 to 2.0	121	117

Chinook (1979)

The second tornado swung in a C shape striking 15 blocks in the southwestern part of the City of Woodstock (Fig. 2). Over 350 buildings were destroyed or damaged. Table 2 outlines the types of buildings damaged and summarizes the extent of the damage. The tornado left an estimated 1,000 residents seeking shelter on the evening of August 7.

The affected area included houses which were still under construction in the Bridlewood subdivision. Two schools - St. Patrick's Christian Reform and Southside - were severely battered, as was the Church of the Nazarene - while the Christian Reformed Church was flattened (Globe and Mail, August 8, 1979).

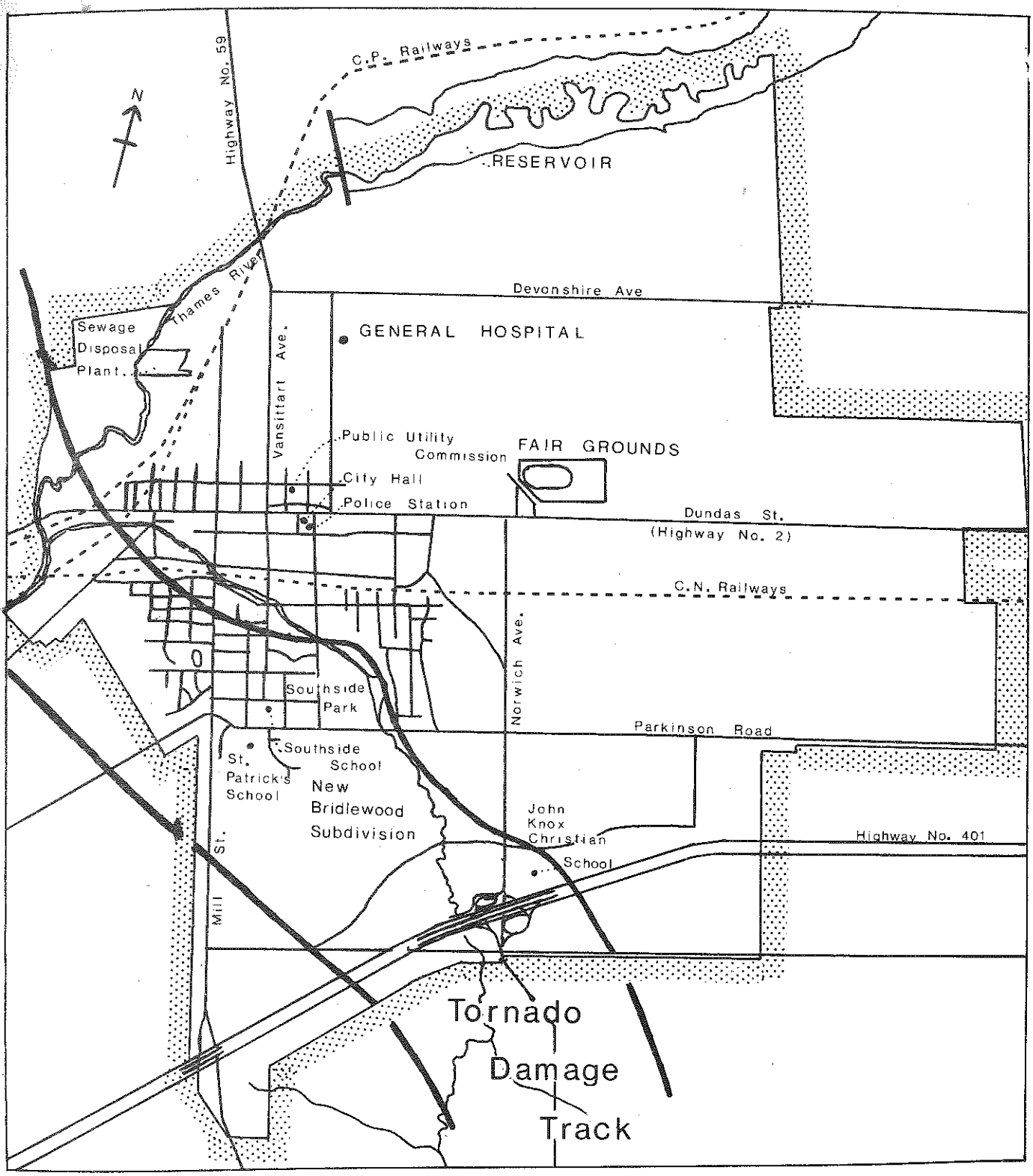

Fig. 2. Extent of damage and location of key facilities in City of Woodstock

Table 2. Structural damage suffered by buildings in the City of Woodstock

Type of structure		Degree of damage to private homes	
Private homes	356	Very heavy	66
Commercial premises	13	Heavy	47
Industrial premises	7	Medium	63
Schools, churches	7	Slight	150
		Very slight	30
Total	373	Total	356

(Hevenor 1979, pers. comm.)

Southside Park, which incorporated swimming and lawn bowling facilities, was wiped out. Commercial and industrial premises in the tornado's path suffered a similar fate. A supermarket on old Highway 2 was torn apart and the parking lot littered with groceries. Three large industrial plants, Hobart Bros. of Canada, the Provini flourmills and the newly constructed King Hydraulic plant were badly damaged (London Free Press, 1979).

Automobiles and pieces of farm machinery were blown from their parking spaces or crushed by falling trees and other debris. On the Zilkie farm near Hickson, for example, a costly combine lay upside down and wrecked, two vehicles parked behind the house were extensively damaged and a farm tractor-trailer was found on its side in a drainage ditch (London Free Press 1979). After the tornado left a tangle of cars and trucks on the roadway, the junction of Highways 59 and 401 was closed (Globe and Mail, August 8, 1979).

Ontario Hydro lost 28 high voltage transmission towers and had to replace another which was severely damaged.[5] Referring to the destruction of these towers, which are made of steel and which are either 24 or 38 m in height and weigh up to 10 tons, Ontario Hydro helicopter pilot Ralph Heard noted:

> "I've never witnessed such total destruction... the towers downed by the tornado were thrown all over. Even short towers were mangled so badly they looked like a plate of spaghetti." (Paoline 1979)

Ontario Hydro also lost hundreds of kilometres of low voltage electricity transmission lines along the damage tracks. Bell Canada facilities fared no better. The major long distance telephone cable linking Toronto and Windsor, known as Toll Cable 185, was cut just north of Hickson. Local service was also curtailed, with an estimated 1,100 lines being affected for varying lengths of time in the City of Woodstock. For example, 60% of the City's electricity consumers, including the General Hospital, the sewage treatment plant and local Police Station, had their supplies cut, while 90% of the telephone circuits were damaged (Brown 1979, pers. comm.).

[5]High voltage line repair work, which included replacement of these towers, was estimated by Ontario Hydro (1979) to have cost approximately $1,200,000.00 Ontario Hydro incurred total expenses of nearly $2 million dollars.

In rural areas, hundreds of cattle and pigs were killed by the collapse of barns and trees. In Vanessa, Gerald Dierick said that "chickens from a neighbour's poultry farm were going past me like bullets", when describing the loss of 90% of the 50,000 chickens from a neighbouring chicken farm. Not a trace of the missing birds could be found. Dierick had weathered out the storm in his truck. His family miraculously emerged from their home which looked as though it had been hit by a bomb (Chinook 1979).

Crops of corn and tobacco along the tornado track were levelled and orchards uprooted. Hundreds of trees of all shapes and sizes were shattered and twisted, their trunks adorned with the debris from homes, barns and other buildings upwind along the tracks. The entire area was littered with evidence of tornado missiles: countless examples of holes left in windows, walls, roofs and cars, plus impact marks on bricks and stucco were testimony to the quantity and sizes of flying debris. Flying debris also appears to have been responsible for at least one of the two fatalities (London Free Press 1979).

3. DESCRIPTION AND EVALUATION OF THE ORGANIZATIONAL RESPONSE

The occurrence of tornadoes is associated with the occurrence of severe thunderstorms. Tornadoes are characterized by very rapid onset, high energy output and relatively short tracks. The highly localized nature of tornadoes has provided little incentive for governments and the public to invest in protective measures. The likelihood of protection being needed in any one place is small; and given the nature of a major tornado, such measures are often not effective (Burton *et al.* 1978). However, tornado shelters do save lives, if not property.

The destructive power of a tornado lies primarily in its high wind velocities and sudden changes of pressure. In addition, tornadoes frequently contribute to the compound hazard situation, since their association with storm systems often means that they are accompanied by hail, torrential rain, thunder and intense lightning (Brinkman 1975). The Woodstock occurrences were no exception, as the preceding description shows.

Three major categories of methods: modification of a hazard; strengthening of the man-made environment; and the encouragement of man to be more responsive; may be used to bear or reduce losses from tornadoes (Brinkman 1975). The physical attributes of tornadoes, combined with a lack of development of suitable science and technology, have precluded the opportunity to cope by modifying the hazard. Kessler (1972) concludes that, while modification appears conceptually possible, there is insufficient information on the basic physics and climatology of tornado evolution and formation to predict whether it is technically possible or economically feasible.

Similarly, the low frequency and high energy outputs of tornadoes have severely limited the scope for using modification of the man-made environment as a coping strategy. Nevertheless, some structural modifications are available to limit structural damage, even for highly susceptible wooden frame buildings. However, the emphasis placed on the provision of cheap affordable family dwellings since World War II has produced buildings which have few, if any, of these modifications (Brinkman 1975).

The limited potential of the first two strategies make the third strategy (the encouragement of man to be more responsive) particularly important as a societal strategy for coping with the tornado hazard. Man's response to the hazard is set in the social system in which he lives. The adaptability of these systems to external stresses, such as tornadoes, is extremely complex, embodying responses by individuals, households, neighbourhoods, communities, regions and nations. For each of the last three levels, a distinction can be drawn between formal organizations and overlapping sets of "masses" or "publics" - large unorganized aggregates of people acting with reference to common goals (Barton 1969).

The remainder of this paper analyses how formal organizations contributed to the emergency brought by the tornadoes on August 7, 1979. The discussion of this response is divided into the three phases outlined in the Introduction.

3.1 THE WARNING PHASE

The Atmospheric Environment Service (AES), part of Environment Canada, is responsible for weather observation and monitoring in Canada. These tasks are directed in Ontario from the Ontario Weather Centre located at Toronto International Airport (Malton). This station is supplemented by a network of eleven regional weather offices distributed throughout the Province.[6]

The responsibilities of the Ontario Weather Centre include the prediction of severe weather conditions in the Province and the dissemination of this information to the public. Two types of messages are issued: forecasts and warnings. A forecast indicates that a particular meteorological phenomenon will probably occur in a particular place during a specific time period. Forecasts are generally based on interpretations of synoptic conditions from the Canadian Meteorological Centre in Montreal. These messages are information based on scientifically observable facts and offer no prescription as to how people should respond. In contrast, a warning is a message which advises the public to take steps in preparation for the severe weather events mentioned. All warnings are based on forecasts, but very few of the forecasts are followed by warnings.

In the case of tornadoes, the Ontario Weather Centre follows an American practice and distinguishes between weather "watches" and "warnings". A "tornado watch" is intended to alert the public to the possibility of tornadoes occurring in the area for which the watch is issued. In Ontario, the decision whether to issue a watch is based upon a number of explicit criteria relating to the presence or absence of certain meteorological conditions (Pender 1980, pers. comm.). These watches seldom mention tornadoes explicitly, as forecasters fear that the failure of tornadoes to materialize in the majority of cases would adversely affect the credibility of these watches, and thus affect future public response.

A "tornado warning", in contrast, is issued to indicate that a tornado has been sighted, and that persons within the area should take protective action immediately. The Ontario Weather Centre requires the presence of a distinct radar echo hook, or an eye-witness sighting of a funnel, before it will issue such a warning. Although the Centre relies primarily on its own efforts and those of its regional weather offices to determine whether these conditions exist, it has also set up the Summer Severe Weather Watch Programme to improve its ability to issue appropriate warnings based on eye-witness accounts. This programme, which was initiated in 1979, currently has approximately 2,000 members - these members carry cards with an unlisted telephone number which they call to report severe weather directly to the Ontario Weather Centre.[7]

Severe weather information is disseminated according to the communication system outlined in Fig. 3. Once the messages are transferred from the Ontario

---

[6]Regional weather stations are located at Sault Ste. Marie, Copper Cliff, North Bay, Ottawa, Peterborough, Kingston, Guelph, Hamilton, St. Catharines, London and Windsor.

[7]This programme has been reasonably successful during its first two years of operation. During this period, the probability of detecting a severe weather event, such as a tornado or thunderstorm, was 0.480, while the false alarm ratio (# false alarms/# forecasts) was 0.195 (Pender 1980, pers. comm.).

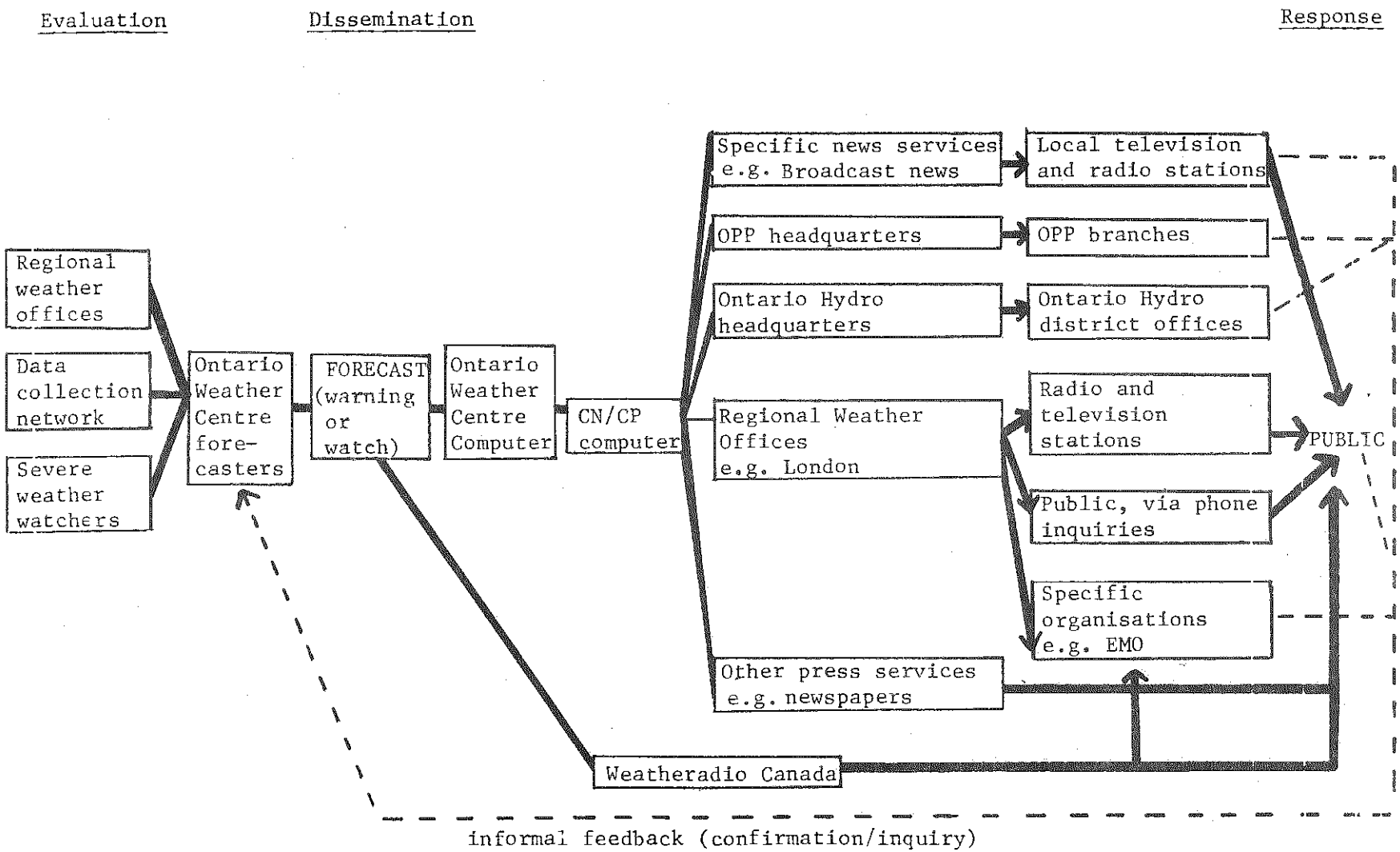

Fig. 3. Schematic presentation of Ontario's severe weather information distribution system

Weather Centre computer to the CN/CP Telecommunications computer, the messages are transferred by land lines to a number of other groups and ultimately to the public. Specific news services, such as Broadcast News, purchase this information on a commercial basis and pass it on to the local television and radio stations with whom they do business. The Ontario Provincial Police (OPP) and Ontario Hydro also purchase the information and distribute it to their local offices via their own communications system. Rarely do they pass such information on to anyone else. Regional weather offices, by contrast, relay these messages to key persons or organizations, such as an Emergency Measures Organization Officer (if there is one) and specific target groups, i.e. petroleum companies in the case of a lightning strike. These weather offices also answer queries from the public and relay messages to local radio and television stations, if they have requested such a service. It is important to stress that weather information is distributed by the news media to the public on a voluntary basis. Consequently, individual stations and/or announcers decide whether or not to transmit severe weather messages.

The Weatheradio Canada path is a relatively new one in this system. Weatheradio Canada stations have been established in four Canadian cities to continuously transmit weather information.[8] These stations have a range of only 100 km and transmit on a very high frequency modulated band (VHF - FM) which requires special receivers.

Weather forecasts and watches of August 7, 1979

It has already been noted that several parts of Ontario were affected by severe weather events on August 7, 1979, and that this led the Ontario Weather Centre to issue a total of thirteen severe weather watches or warnings during the day of August 7.

Although the Ontario Weather Centre recognized the potential for severe weather in the Woodstock area as early as 10:00 a.m. that morning, no message to this effect was distributed until late afternoon. At 3:30 p.m. the following forecast was provided for the Woodstock area by the Ontario Weather Centre on its daily scheduled weather report:

> CLEAR WITH CLOUDY PERIODS TONIGHT. CHANCE OF A THUNDERSTORM. GUSTY SOUTHERLY WINDS. LOWS 16 TO 18. WEDNESDAY SUNNY WITH OUTLOOK FOR THURSDAY... MAINLY SUNNY.

The next forecast was not scheduled until 6:00 p.m. However, at 3:40 p.m., a severe weather watch (No. 78) was issued for the majority of southwestern Ontario. It stated:

> THE ONTARIO WEATHER CENTRE SAYS THERE IS A POSSIBILITY OF SEVERE THUNDERSTORMS WITH LARGE HAIL AND DAMAGING WINDS FOR PORTIONS OF LAKE ST. CLAIR, LAKE HURON, SOUTHERN GEORGIAN BAY AND WESTERN LAKE ONTARIO REGIONS FROM 4:00 EDT UNTIL 10:00 p.m. EDT TONIGHT.

---

[8] Weatheradio Canada stations have been set up in Toronto, Vancouver, Montreal and Halifax.

THE WATCH INCLUDES ADJACENT LAKES ERIE, ONTARIO AND HURON AND GEORGIAN BAY WATERS.

THIS IS NOT A WARNING OF IMMEDIATE DANGER BUT RATHER AN ALERT OF POTENTIAL DEVELOPMENT OF SEVERE LOCAL STORMS. PERSONS IN THESE AREAS SHOULD BE ON THE LOOKOUT FOR THREATENING WEATHER CONDITIONS AND LISTEN FOR LATER STATEMENTS AND POSSIBLE WARNINGS.

THIS WATCH WILL BE UPDATED OR CANCELLED BY 7:00 p.m. EDT TONIGHT.

As conditions worsened, the Ontario Weather Centre issued two further watches for more circumscribed areas. Similar watches to the one above were issued at 6:15 p.m. for Perth, Waterloo and Oxford Counties (No. 79) and at 7:15 p.m. for Brant County and Haldimand-Norfolk Regional Municipality (No. 80) respectively. None of these watches mentioned tornadoes explicitly and no warnings were issued, since neither of the pre-conditions were met on August 7.

The forecast and three weather watches were distributed through the communications system outlined in Fig. 3 with varying degrees of success.

Broadcast News, a commercial news service which serves at least ten television and radio stations broadcasting in the Woodstock area, including the Woodstock based radio station (CKDK), received watch No. 78 on its teletypewriter at approximately 3:40 p.m. and immediately distributed it to all ten stations. Transmission of the scheduled 3:30 p.m. forecast was delayed until after the weather watch was relayed to these stations. The log at CKDK indicates that this station received watch No. 78 at 3:56 p.m., or 16 min. after it was initially issued. However, this watch was not broadcast by the radio station, as such messages are common in summer and serious conditions rarely materialize (Bell 1979, pers. comm.). The radio station also received the scheduled weather forecast. It did not receive the other weather watches (No. 79 and 80). Broadcast News claims that it did not receive these messages from the Ontario Weather Centre to transmit in the first place (Bell 1979, pers. comm.). Consequently, none of the weather watches reached members of the public who listened to station CKDK on the afternoon of August 7.[9]

Weather information is also sent to the Ontario Provincial Police Headquarters at Downsview, which then distributes this information to OPP detachments likely to be affected via its CPIX telecommunications system. It is not clear how many of the watches were received or disseminated to local detachments by the OPP. The London Weather Office was able to establish that one of the four OPP offices in the general area received watch No. 78 by 4:00 p.m. and suggests that all four detachments must have received this watch at or about this time (Finch 1979, pers. comm.). However, this investigation revealed that the Woodstock detachment's teletypewriter was inoperative on August 7 awaiting mechanical repairs. Therefore, this office could not have received any of the messages via the intended channel.

---

[9]It is not clear to the authors whether the other stations received and/or broadcast weather watch No. 78. The London Weather Office has compiled this information (Finch 1979, pers. comm.); however, the Atmospheric Environment Service has not released it to the public.

Ontario Hydro staff were busy watching for severe weather developments throughout Ontario on August 7. However, the Ontario Hydro weather office was not manned past 4:30 p.m. since decreased thunderstorm activity was expected. It is not clear whether Hydro received the two later weather watches, although it did receive weather watch No. 78 at 5:15 p.m. (Ontario Hydro, 1979).

The London Weather Office received all three weather watches promptly after their dispatch from Malton. It is not known if the London Weather Office succeeded in contacting specific organizations to inform them of the expected weather conditions, as the Atmospheric Environment Service has not released this information. However, the London Office did respond to ten times its normal number of public inquiries on August 7. These inquiries reflected concern not only in the Woodstock area but also further north in Owen Sound, where other disturbances were experienced. Weatheradio Canada in Toronto also received all three weather watches and disseminated them quickly. However, its limited coverage does not extend to Woodstock and surrounding areas.

Finally, it seems that no feedback occurred on August 7. The Ontario Weather Centre did not receive any calls from its severe weather watchers. The Centre was called by an Ontario Hydro employee at about 7:00 p.m. inquiring why their transmission towers were toppling; however, the call was hurriedly terminated without a description of the weather conditions having been given. The Ontario Weather Centre then tried to call OPP detachments and radio stations in the affected area to get confirmation of what was occurring. It appears the majority of these calls were unsuccessful as the tornadoes severely disrupted telephone communications. Consequently, the Ontario Weather Centre did not receive confirmation of the tornadoes until approximately 8:00 p.m. that evening.

Evaluation and comments

The warning system is an enormously complicated process involving evaluation (detection, measurement and collation), dissemination (decision to warn, message content and distribution of the message), and response (interpretation of the message and subsequent response). Brinkman (1975, 33) notes that a great deal of significance has been attached to tornado warning systems as an effective coping strategy. The Ontario warning system (Figure 3) failed to issue effective warnings on August 7. Consequently, few members of the public were even aware of the possibility of tornadoes.

It is very difficult to improve the system at the evaluation stage. The occurrence of tornadoes is difficult to predict for many reasons, including the suddenness of the onset of the hazard, the relatively short duration of the event, the extreme variability of the typical tornado striking any particular area, the relatively low level of knowledge of the hazard and the extent of the weather observing system in Ontario. The latter confines meteorologists to indicating the likelihood of thunderstorms and tornadoes in regions much larger than the extent of the potential disturbance. Even if the forecaster is able to predict severe thunderstorms and tornadoes for a relatively small area, say 80 by 150 kilometres, it is estimated that the probability of experiencing such a storm at any particular location is approximately 0.001 (AES 1974).

Although warning problems cannot be solved simply by introducing great quantities of detection hardware and by taking innumerable measurements, they can be reduced. One possibility is to equip television sets with radar equipment for the detection of severe weather events such as tornadoes (Eagleman *et al.* 1975). Another possibility is to increase the scale of the Summer Severe Weather Watching Programme. The Ontario Programme is modelled on the successful Project Skywarn launched in 1969 in the United States. The Ontario Weather Centre has recently undertaken an intensive drive to increase participation in the programme, and a special effort has been made to recruit OPP and conservation authority personnel and CB radio operators as watchers, although these people would still report on the special telephone lines. The reliance of this system on telephones, however, makes it highly susceptible to failure even when weather watchers have spotted a tornado and attempt to report it. The Woodstock experience shows that telephone communication is particularly susceptible to disruption by tornadoes. Consequently, a proposal by the Oxford Amateur Radio Operator's Club and its London equivalent to establish a CB radio system in conjunction with the programme and the Ontario Weather Centre warrants serious consideration.[10]

The second stage comprises warning dissemination. At this stage the decision is made to warn, and appropriate messages are constructed and distributed. In this case, the appropriateness of the three weather watches can be queried since none of them explicitly mentioned the possibility of tornadoes occurring. The rationale is that such a warning would only generate panic. On the other hand, not mentioning tornadoes has the effect of failing to elicit any response whatsoever, as shown in the case of CKDK radio. The radio station did not broadcast severe weather watch No. 78 because it felt these messages were too common, that nothing hardly ever materializes after such a message, and that they are unpopular with its teenage listening audience (Bell 1979, pers. comm.).

The last part of this dissemination stage, distribution of the messages, also failed on August 7. As a result, most of the residents of Woodstock and surrounding areas had no advance warning of the severe weather events they endured. The communication system needs to be upgraded so that the information reaches its intended public. In particular, modifications can be suggested which would substantially reduce the possibility of failure. These are:

1. expanding the responsibilities of the organizations involved to increase the interrelations of the system and thereby minimize the chance of the system breaking down because of the failure of one or more specific links. For example, the London Weather Office received all three messages on August 7, but was relatively ineffective in disseminating them to the public because of its narrowly defined functions. Its task of checking that local television and radio stations have broadcast watches and warnings could be made mandatory;

[10] The Citizen Band (CB) radio clubs are still negotiating with the Atmospheric Environment Service in connection with this proposal.

2. there is a need for more durable communications paths. The closer a message gets to the public at present, the greater the reliance on the telephone as a means of communication (Fig. 3). There are two ways in which the current system could be strengthened:
   (a) by making regional weather offices responsible for distribution of the messages as well, or
   (b) by extending the coverage of Weatheradio Canada.[11]
   These modifications would reduce reliance on the land-based communication systems which are susceptible to disruption by tornadoes;

3. increased liaison between the Ontario Weather Centre and television and radio stations to ensure that the latter organizations broadcast these messages in an appropriate manner. The news media are most efficient at reaching a large segment of the general populace; and

4. the establishment of stronger formal feedback paths. These are particularly important in the case of tornadoes since the warning phase does not end until the tornado dies. Up until that time it may be possible to warn residents and organizations of their existence elsewhere in adjoining areas which are likely to be affected as well.

It is not possible to comment on the effectiveness of the third and final stage, the response in this case, since few members of the public were warned in advance of the possibility of tornadoes. However, the response by the local radio station, CKDK, to weather watch No. 78 and by the crowd at the Woodstock Fairgrounds when they sighted a tornado funnel approaching them[12] does not generate much cause for optimism. Consequently, there may be a need for public education so that people take appropriate protective action when threatened by a tornado.

By way of conclusion, it is important to stress that all three stages in a warning system are crucial, since the effectiveness of a warning system can be measured only in terms of the degree to which the protective response is elicited in the threatened public (Mileti, 1975, 15). Therefore, it is necessary to evaluate the benefits and costs of proposed changes in terms of the whole system and not just the specific stage in which the improvement is to be made.

---

[11] It is estimated that 90 per cent of the population in Ontario could be reached if 5 or 6 studios and 10 repeater stations were constructed. However, the initial capital investment is currently considered prohibitive (Pender, 1980, pers. comm.).

[12] From the quotation on page 6 it is clear that the crowd did not take the appropriate protective action that they should have taken; that is, taking cover in the nearest available basement. Instead they stood in the doorway to the barn and watched the spectacle.

3.2 THE IMMEDIATE RESPONSE

Immediately after the tornadoes, a large number of local emergency services were activated to fulfil three tasks:

1. rescuing the injured and locating possible dead;

2. restoring the power and communications in the area; and

3. assisting the displaced and dispossessed victims.

The first of these tasks was performed by the Woodstock City Police Department and the Ontario Provincial Police, who followed the damage tracks looking for people trapped in the wreckage of their homes. All local policemen were called in, and the local forces were supplemented with OPP personnel from London. Due to the disruption of telephone services, and the failure of the ambulance radio network, the OPP also provided a vital communications link between rescue crews, ambulances, and Woodstock General Hospital. This was accomplished by routing a relay system from ambulances to the police cars, and in turn to Police Headquarters, and finally to Woodstock General Hospital. However, there was a delay of several hours before the link was completed, during which the hospital operated "blind".

The majority of Woodstock General Hospital staff who were not on duty reported to the hospital as soon as they heard the news of the tornadoes. The first patients arrived at 7:10 p.m., and as a result eighteen "non-essential" hospital patients were relocated in the chapel adjoining the hospital, where they were attended to by Salvation Army volunteers. The hospital partially implemented its emergency plan, which sets out procedures for the deployment of staff and equipment, the operation of an advance medical team, and regulation of the patient's arrival at the hospital. The plan is summarized in Appendix 2.

The hospital could not implement the second and third procedures mentioned above, since victims arrived at the hospital by themselves. Those who were not seriously injured and those who could by driven directly arrived first. All patients were assisted in completing triage tags when they arrived.[13] Between 7:10 p.m. and 11:00 p.m., an estimated 187 victims arrived at the hospital seeking medical attention. Two of the victims were dead on arrival, and another six were seriously injured. Three of the latter required immediate surgery, and one was transferred to London General Hospital to have a leg amputated at the groin. Of the 187 patients treated, a total of thirty were admitted overnight, and all but eleven were discharged the next day.

The hospital was able to cope with these extra duties with relative ease although it was inconvenienced by the difficulty of communication with the outside world and by the disruption of its water supply. The lack of communication, for example, at one point led the hospital to make an unnecessary set of preparations to accommodate an expected influx of one hundred

---

[13] Approximately fifty patients inadvertently took their tags with them on leaving the hospital, however.

seriously injured patients when it was rumoured that the fully staffed Hobart Brothers of Canada industrial plant had been demolished by the tornado. The rumours turned out to be false, as the plant sustained only structural damage, from which the staff walked away with mostly minor injuries. The hospital relied on a Silverwood milk truck filled with water to replace its normal water supply until this was restored the next day; and it had to rely on its emergency generator to supply electricity for several hours during the evening of August 7 as well.

The police were able to account for everyone living in the damaged areas within approximately two to three hours (Captain Scott 1979, pers. comm.). Woodstock and Ontario Provincial Police sought to prevent looting and set up a mobile headquarters in the affected area of Woodstock. The Sandbaggers Club[14] helped patrol these areas to discourage looting as well. The Woodstock Fire Service also had a busy time. Up until 11:00 p.m., when the seventeen "off-duty" firemen were sent home, a total of twenty-five firemen, four trucks, a van, and two private cars were involved, assisting to clear roads and investigating reports of natural gas and propane leaks in the area. During the two hours up until 9:00 p.m., the Fire Service responded to twenty-two calls of leaks; and in doing so, encountered numerous access difficulties caused by fallen trees, power lines, and the presence of thousands of sightseers who converged upon the affected areas. The fallen lines proved less of an obstacle after 8:00 p.m., when the Fire Service was informed that they were no longer electrified. The police, assisted by the Woodstock Board of Public Works, had some difficulty trying to control the sightseers until the affected areas were cordoned off the next morning.

The second priority, restoring power and communications in the area, was met by Ontario Hydro, the local Public Utilities Commission (PUC), and Bell Canada. The collapse of twenty-nine high-voltage electricity transmission towers, described earlier, affected supply to nine circuits. Ontario Hydro's first task was to reroute electricity through the Hydro network. Within two hours of the first outages a central control emergency response group was formed in Toronto, with a smaller group established at the Western Region headquarters in London. The Woodstock transformer station whose supplies were cut at 6:58 p.m. had almost normal power levels restored by 7:35 p.m. All the affected transmission stations had normal power restored by 2:08 p.m. on August 8. In the meantime, maintenance and operation crews were sent out to assess the damage and set up temporary distribution lines.

The Woodstock PUC was responsible for dealing with low voltage line disruptions. It has been estimated that sixty per cent of Woodstock's consumers were without electricity and that rural consumers fared even worse. In Woodstock the local police station, water supply pumping stations[15] and

---

[14] This club has about sixty-five members throughout Oxford County. A CB radio group, it places a large amount of emphasis on social activities and functions.

[15] Woodstock relies on eight wells at four pumping stations for its water supply, although it also maintains a reservoir. Two of these pumping stations, located outside the City, provide the bulk of the City's water supply and also provide better quality water than the two smaller pumping stations.

sewage lift stations[16] did not have power. Priority was given to restoring electricity to these facilities (Rousom 1979, pers. comm.).

The Woodstock PUC response did not commence until approximately 8:00 p.m., when the Woodstock Police Chief called the PUC accountant[17] to inform him that the south end of the city had been hit by a tornado and was without power. Local PUC crews and a six-man crew from the nearby Ingersol PUC worked most of the night to restore power to the key facilities listed above. Power was restored at the local Police Station by 9:15 p.m., to the two smaller pumping stations just before midnight on August 7[18], and to the sewage lift stations by 3:00 a.m. on August 8. In all, the Woodstock PUC was able to restore supply to approximately one-third of the consumers affected by daybreak on August 8.

The possibility of a large operation was excluded due to the accountant's limited knowledge of the cooperative emergency assistance program which has been set up between Ontario Hydro and other PUC's[19]. The plan, on file in the General Manager's office, is activated by calling Ontario Hydro's regional headquarters in London. The plan gives this office responsibility for coordinating the response and assessing the extent of the damage. It also makes provision for supplementing local manpower with personnel from other PUC's in the immediate area if necessary. In this case the accountant, unaware of any program, waited until 6:00 a.m. on August 8 before contacting other PUC's for assistance.

Bell Canada restored most of the damaged telephone circuits within twelve hours, although the Toronto-Windsor long distance cable was severed for two days. Telephone communications were restored to the Woodstock General Hospital and the local OPP office by 9:30 p.m. and 11:06 p.m. respectively.

The third priority, assisting the displaced and dispossessed victims, was mostly carried out at this stage by the Red Cross, which set up a registration and inquiry service. It also provided an emergency shelter and compiled an emergency accommodation list. The emergency shelter was not required, since only two of the more than one thousand people left homeless required this service. The remainder stayed with friends, neighbours, and relatives (London Free Press 1979, 3). However, the other two services were used extensively. The accommodation list was later forwarded to the Woodstock City Housing Department.

---

[16] Woodstock's sewage system relies on gravity and strategically located lift stations, which lift the sewage to higher levels and allow gravity flow from these higher elevations, to regulate flow into the treatment plant. There was concern that the lack of power to lift stations could cause a back-up of sewage in residents homes.

[17] The accountant was the acting manager in the absence of the General Manager and Engineer, who were both away on vacation.

[18] The failure to restore power to the other two pumping stations caused water supply problems the next day. These are described in Section 3.3.

[19] The program was established by the Municipal Electrical Association on March 3, 1965.

In providing the registration and inquiry service, the Red Cross was assisted by local CB radio clubs. The Radio Emergency Action Centre Team (REACT) set up their command at the Red Cross headquarters and provided communication service on an emergency CB channel.[20] This group worked closely with the OPP and Red Cross, sifting and sorting emergency calls for assistance and reports of damage. This group also established a CB radio service for the hospital with the outside world by placing a CB radio equipped vehicle in the hospital grounds. The Oxford County Amateur Radio Operators Club used its longer-range equipment to relay information between the affected areas and interested friends and relatives further away. Three other CB groups - the FLAKE club, the Sandbaggers Club, and the Committee of Five group - also provided assistance. Another volunteer organization, the 600 Club, formed after a 1977 snowstorm emergency, provided four-wheel vehicle service for the Red Cross.

Politically, response at the municipal level was different in all three of the affected jurisdictions. Senior officials of the City of Woodstock, which has no emergency plan, depended upon the police and the Red Cross. The Mayor spent this period going between the Police Station and the Red Cross headquarters nearby, acting as impromptu liaison officer. In Burford Township (Brant County), the Clerk became the Chief Administrative Officer for the coordination of local relief. Burford Township has a disaster plan and avails itself of the services of an Emergency Planning Officer. The Officer in Brantford offered emergency support and came on scene. The Clerk initiated calls to various politicians, including the local MPP, Mr. Robert Nixon (L, Brant, Oxford, Norfolk). He also appears to have been the first to request disaster relief assistance.

In Haldimand-Norfolk, which also has an emergency plan and Emergency Planning Officer, the Emergency Planning Officer's role was as part of the "fan-out" procedure. As in other areas, the immediate municipal response was to assist regional and local police.

Evaluation and Comments

The sudden destruction of buildings and facilities by tornadoes creates a large number of urgent new individual needs - for rescue, medical care, and reassurance about the safety of loved ones. At the same time it damages the means by which normal needs are met, by destroying shelter, household equipment, and supplies of food and clothing, thereby creating a need for substitute facilities. In addition, hurricanes often damage the facilities by which economic and governmental organizations carry on their normal activities and deal with emergencies.

Consequently, the first few hours after a disaster, such as a tornado, are characterized by the crushing overload of needs and the importance of rapid action. In theory, at least, organizations can do many things beyond the power of unorganized groups or individuals during this period, because they have coordination, special skills, and equipment. The role of organizations

---

[20] The REACT team undergoes a rigorous training and screening procedure specifically designed for emergency.

in disasters is to gather personnel together quickly, to get men and equipment into the disaster areas, and to fulfil their proper functions as organizations, with internal communications, division of labour, and leadership. A prior condition is, of course, that an organization have men, equipment, and skills which are useful in disasters, and that among its responsibilities is action to help the community in the type of disaster which has occurred (Barton, 1969).

Overall, the organizations involved in the immediate response to the Woodstock tornadoes responded in an appropriate manner, coping adequately with their responsibilities. Nevertheless, the description of the immediate response highlights several problems which arose during this period. Table 3 summarizes these problems and groups them into three categories.

These problems were not critical because of the limited scale of the event. The tornado which swung through Woodstock left many more unharmed than harmed, and left the emergency organizations with undamaged facilities and equipment and almost full emergency staffs. Would the response have been as adequate if the tornado had taken a path through a more heavily populated part of Woodstock or key facilities such as Woodstock General Hospital (see Fig. 3), or if lightning had triggered a major fire? Probably not, as experience with major tornadoes elsewhere has shown (e.g. Form and Nosow's 1958 study of the Flint-Beechers tornado).

It is frequently suggested that the level of preparedness of emergency organizations has a major influence on the nature and quality of their response (e.g. Barton, 1969; Brinkman, 1975; A.J. Taylor, 1979). This literature suggests that there are four critical questions in this regard:

1. Does the community or organization have an emergency plan?; and if so,

2. Is the plan adequate? (An adequate plan will define responsibilities, lay down procedures, and systematize communications);

3. Does the organization have the necessary mechanical, technical, and human resources to implement this plan?;

4. Is the plan understood and appreciated, and regularly used or practised?

The level of preparedness would have been much greater if there had been one general plan to cover the responses of all the organizations likely to be required. A satisfactory plan would minimize the probability of the problems outlined in Table 3 occurring in an actual emergency. The City of Woodstock did not have such an emergency plan at the time of the Woodstock tornadoes. However, six of the groups which did respond in the emergency had plans to regulate their own responses in emergency situations. The evaluation of these plans in Table 4 highlights how these plans, with one exception, contained questionable elements.

The plans of Woodstock General Hospital and the OPP did not retain enough flexibility or include enough alternatives to cope with the tornado hazard of August 7. Both plans related primarily to "point" disasters. The OPP plan, for example, envisaged setting up a command at the scene of the disaster, whereas the Hospital plan envisaged sending out an advance medical

Table 3. Problems encountered during the immediate response phase. Categories (underlined) and examples.

Uncertainty:
The Woodstock General Hospital preparations for the arrival of one hundred seriously injured Hobart Brothers employees.
Response duplication:
The OPP and Red Cross both set up registration and inquiry services.
The Red Cross provided emergency shelter which only two individuals required. The remainder were accommodated by friends, neighbours, and relatives.
Non-existent or delayed response:
The failure to regulate the access and movements of sightseers adequately on the night of August 7 in the damaged areas.
The delay by Woodstock PUC in responding in the first place, and also before calling adjacent PUC's for assistance.

team to the scene to assess injuries and regulate the victims' arrival at hospital. In this instance the damage extended over an area of 117 square kilometres, and neither plan was appropriate. The OPP did not even implement its plan (Table 4).

Two organizations had plans which did not make adequate provision for communications. Communications should be systematized in two directions: across organizations in a community and across neighbouring communities for similar organizations. The Woodstock General Hospital does not have a strong communications link with nearby hospitals[21], while the Red Cross has to rely almost entirely on the cooperation of local CB radio groups in this regard.

The effectiveness of a plan will also be limited if the organization lacks the resources necessary to enable it to fulfil its responsibilities and if its staff are unfamiliar with or do not understand a plan. The former is closely tied to the nature and scale of the disaster, and in this case only the Red Cross and PUC were pressured to fulfil their roles. The lack of knowledge of the Woodstock PUC plan by staff and the impact this had on this organization's response has already been referred to.

This evaluation suggests that the absolute level of preparedness of all the emergency organizations in Woodstock could be improved, irrespective of the relative level of their preparedness on August 7, 1979 (Table 4). Indeed, some organizations have taken steps in this regard, most notably the Woodstock PUC,

[21] The Ontario Ministry of Health has refused for the past four years to finance an Ontario Hospital Assocation proposal to install a province-wide radio network between all hospitals in the province at an estimated cost of $1000 per hospital.

Table 4. Evaluation of existing emergency plans

Criteria	Organizations with plans					
	Ontario Hydro	Woodstock General Hospital	Red Cross	REACT	Woodstock PUC	O.P.P.
1. Was plan implemented on August 7?	Yes	Yes	Yes	Yes	Yes	No
2. Is the plan adequate? i.e. define responsibilities?	Yes	Yes	Yes	Yes	Yes	Yes
lay down procedures?	Yes	Some, for "point" disasters	Yes	Yes	Yes	Some for "point" disasters
systematize communications?	Yes	Some, those within hospital	No	Yes	Yes	Yes
3. Does the organization have necessary resources?	Yes	Yes	Yes, except for communication facilities	Yes	Limited supplies of manpower and equipment	Yes
4. Is the plan understood, etc.?	Yes	Yes	Yes	Yes	No, only some of managerial staff knew of its existence	Yes

which has begun staff familiarization programmes to ensure its plan is understood and appreciated. In addition, the Mayor (Ms. Wendy Calder) initially proposed that City Council begin developing a comprehensive emergency plan for the city in January, 1980. However, other business forced its postponement. The Mayor has indicated that the plan will be developed from the London/St. Thomas plan to meet local needs and circumstances. (Mayor Calder, 1979, pers. comm.). It would be based on a hierarchical structure with a predetermined scheme of delegation and coordination of responsibilities. The plan would also specify a control communications headquarters, and special consideration would be made in the budget to equip such a facility. The Mayor suggested that one possible location for the facility is the new police station, and that the Council might contribute towards the cost of emergency equipment such as an auxiliary generator. Finally, various scenarios including airplane crashes, floods, tornadoes, and snowstorm events would be provided for in the plan, and a unique set of responses prepared for each one (Mayor Calder, 1979, pers. comm.). An important omission from the list of scenarios is technological accidents, especially those connected with the transportation of hazardous materials.

It is not possible to assess in detail the adequacy of these proposals until they emerge in their final form. On the credit side, the proposals seem to cover most of the areas considered by the four critical questions earlier. However, a word of caution is warranted: the plan will be inadequate if the Council resolves to prepare for the next disaster simply by learning the lessons of the previous one. Instead, Woodstock should critically review the experience of other jurisdictions such as the City of Mississauga, whose plan has already been linked to the success of responses to particular disasters (Timmerman, 1980). Valuable insights can be gained from these sources and also federal and provincial government agencies which offer assistance in the preparation of emergency plans (e.g. Emergency Planning Canada). Finally, imagination is needed as well as experience.

3.3 THE RECOVERY AND RESTORATION

The restoration of normal services in the communities and the provision of assistance to the dispossessed constituted the major priorities of the response agencies from August 8 onwards.

Early in the morning of August 8 repairs to the high voltage and low voltage transmission and distribution lines in the damaged area were begun on a large scale with approximately 240 men dispatched from Toronto, Pickering, London, Belleville, and Woodbridge, plus local staff. Ontario Hydro and the Woodstock PUC were able to restore power to all their rural and city customers by August 12. Some were without electricity for five days.

One of the major problems caused by the loss of electrical power was the disruption of the Woodstock water supply. As noted previously, Woodstock relies on water pumped from eight wells at four pumping stations for its supply, and also maintains a reservoir. The two smaller pumping stations (and two wells) inside the city had their power supply restored just before midnight on August 7, and these two wells and the reservoir remained on line during the night. However, these two wells provide poor quality water and the reservoir was only partially filled.

Consequently, on the morning of August 8 a PUC official appealed over the radio for conservation of water by city residents and local industries. City residents immediately increased their water consumption by filling bathtubs, sinks, etc. By 3:00 p.m. the PUC was forced to advise voluntary closure of industries and also disconnected the city reservoir in order to maintain an adequate water supply for possible fire-fighting. Ontario Hydro and the PUC were now working in close contact (in contrast to the evening of August 7). The London regional Ontario Hydro office obtained a 500 KV generator for the outer-city wells, which functioned until power was restored at 10:00 p.m. Normal water supplies were available by the morning of August 9.

Bell Telephone continued its efforts to restore telephone services, directing its efforts from a storm centre and supplying materials from Brantford. Reconstruction of the phone system demanded coordination with Ontario Hydro and PUC crews. Use of existing lines had nearly doubled, and CB and ham radio operators were constantly at work throughout this period.

The Red Cross and other volunteer agencies began sending out personnel on Wednesday with blankets and food, both for bulk distribution to affected families and to support the emergency crews. Because of their registration service, inquiries to the Red Cross became a major problem, which was partly solved through the use of amateur radio groups. The emergency accommodation list was transferred to the City Housing Department, which, according to Red Cross spokesmen, was unprepared to use this information (McBride, 1979, pers. comm.). Outside the city, the rural townships organized food relief. Burford, for instance, became a centre for feeding emergency crews from all over the affected area.

After August 8 OPP involvement in the response was directed by supervisory officers who arrived from Toronto. Fifty personnel, including auxiliary regional officers, were also brought in to assist. Restriction of access, reconnaissance over affected areas, prevention of looting, and regulation of

traffic were continuing responsibilities over the next few weeks. The Woodstock Police and OPP caught and prosecuted three people for looting during this period. They also had the news media broadcast messages describing the restriction of access to the damaged areas in order to discourage an influx of sightseers from Toronto and the United States. These messages were effective, especially on the first weekend after the tornado occurrence.

After midnight on August 7, the Provincial Cabinet became involved. A meeting between the Solicitor General, the Honourable Roy McMurtry, and the Minister of Intergovernmental Affairs, the Honourable Thomas Wells, resulted in the Ministry of Intergovernmental Affairs (MIA) being designated as the "Lead Ministry". This designation appears to have been based on the view that since the tornado had crossed through several jurisdictions, and since the relief effort would be substantial, MIA would be the appropriate "Lead Ministry"[22]. Cabinet declared the area a "disaster area" the next day and approved the setting up of a Disaster Relief Assistance Programme. The Technical Coordinator, Mr. Fred Hamblin of MIA, had direct access to Cabinet through his minister. Hamblin immediately proceeded to the area, and after holding a meeting with all the local Heads-of Council on August 9[23], he set up an Intergovernmental Affairs Coordination Headquarters in Woodstock on August 13.

This headquarters monitored two newly formed committees. One was made up of the local Heads-of-Council and civil servants from various Ontario Ministries, including Agriculture, Health, Housing, and Natural Resources, to process requests for assistance. The second committee was the Disaster Relief Committee, also chaired by Mr. Hamblin. This committee, composed of two citizens from each of the cities and/or townships involved, was responsible for raising the monies which would be matched by the Ontario Government (set by Order-in-Council at 3 to 1) and for the appraisal and disbursement of claims. It was the negotiations and raising of funds that followed which took up most of the effort of the local political figures[24].

This Committee, officially named the "Oxford, Brant, Haldimand-Norfolk Disaster Relief Committee", opened two offices on Monday, August 13 to handle donations and claims for assistance. These offices were located in Woodstock and Waterford. The latter was closed on September 15, but the Woodstock office will not close until all the affairs of the Committee are finalized. The last of the claims were settled on July 31, 1980, and this office was expected to close shortly after this date. Residents who felt they had eligible claims were asked to submit at least their names by September 15, as full claims could be processed when time permitted. On August 16 and 17 the Committee held public meetings in Woodstock and Waterford respectively to explain the disaster relief

---

[22] See Timmerman (1980, 26-38) for a fuller description of this concept.

[23] Hamblin met with the Heads-of-Council from the Cities of Nanticoke and Woodstock, the Townships of Blandford-Blenheim, Burford, Delhi, East Yorra-Tavistock, Norwick and Southwest Oxford, the Counties of Brant and Oxford, and the Regional Municipality of Haldimand-Norfolk.

[24] However, local politicians, particularly Woodstock Mayor Calder, were very effective in dealing with the news media as well.

assistance program and the Disaster Committee's role. The information bulletin published by the MIA on this program is included in Appendix 3.

The Fund Raising Subcommittee continued collecting funds up until December 31, 1979, when it had raised $3,547,888.71, which - when matched by the province - came to approximately $14 million. Due to the criteria for the matching of funds, such as counting costs covered by insurance as ineligible, claims with insurance companies and others had to be settled to the extent possible before disbursements could begin. By November, 1979 no monies had yet been paid out, and complaints began to multiply about the funding system. However, in December, the Subcommittee and its adjusters settled with some 260 of the 415 eligible claimants for an average settlement of approximately $19,000 each. All claimants were paid the maximum proportion (ninety per cent) of their claims allowed under the program. The Subcommittee settled with the remaining claimants in January, 1980, and also agreed to reconsider the 235 claims which it initially deemed ineligible. In addition the Subcommittee decided to assist the owners of five orchards for their losses (after deciding orchards are capital assets and not crops), seven churches which were damaged by the tornadoes, and a number of cemeteries.[25]

The financial assistance program has been the major provincial effort in the emergency. Other provincial ministries such as the Ministry of Agriculture and Food (MAF) also provided assistance. The Ministry of Agriculture and Food offered both information[26] and financial assistance in the form of a low interest rate loan program. This program is outlined in Appendix 4. The fact that the MAF did not release local staff from their normal duties severely limited their ability to be directly involved in the restoration effort. The bulk of the restoration work was done by local farmers, farm organizations, and the Mennonite Disaster Relief Committee.

Local farm organizations (e.g. the Federation of Agriculture, the Oxford Soil and Crop Improvement Association, and United Cooperatives of Ontario) organized feed and grain assistance programs. The feed assistance program, for instance, had collected enough feedstock by October 22 to meet seventy to eighty per cent of farmers' anticipated needs for the winter months.

The Mennonites, with Mr. Delmar Zehra as Service Coordinator, began organizing manpower within thirty minutes of the tornadoes. A volunteer was stationed on every concession on August 7, while other volunteers assessed how much help was required. These volunteers were coordinated from the Mennonite Church in Tavistock. On August 8, requests went out for more volunteers, and by the next day five hundred volunteers from as far afield as the United States were available. Mennonite clean-up operations initially focused on damaged areas between Tavistock and Bright, and Hickson and Waterford, respectively; but they later shifted to the Oxford Centre area, which was severely damaged (Fig. 1). By October 24, 1979 sixty-five per cent of the farmers whose

---

[25] However, there may not be sufficient monies available to pay ninety per cent of the uninsured losses in these cases.

[26] For example, the local MAF engineer provided plans for new farm structures.

buildings had suffered structural damage had repaired or rebuilt vital facilities, another twenty per cent were in the process of rebuilding, and the remainder were waiting until 1980 before starting reconstruction. In most instances reconstruction of farm structures took precedence over home repairs. (Mathews, 1979, pers. comm.).

The Ministry of Housing (MOH) was prepared to provide temporary housing and assistance under the Rent Supplement Program, but only one family moved into an Ontario Housing Corporation (OHC) unit.[27] Displaced families were reluctant to move away from their damaged properties, and local officials were dissatisfied with the length of time it took to procure temporary housing from MOH. Consequently, trailers were generously supplied to a number of affected families by other organizations, pre-empting the MOH offers. In mid-October, the MOH ran advertisements in local newspapers to determine if anyone still required temporary housing (due to concerns that some trailers were not winterized). One couple was assisted and moved into an OHC unit.

Other ministries played lesser roles. The Ministry of Health watched out for endemic health problems; the Ministry of the Environment allowed "open" burning of garbage and debris during the clean-up;[28] and the Ministry of Natural Resources cleared fallen trees and other vegetation. The Woodstock Fire Department supervised the "open" fires referred to above.

3.3.1 Comments and evaluation

The most striking aspect of the recovery and restoration was the massive amount of "self-help" relief generated in these rural communities. It is in such a situation that the provincial emergency funding mechanism is most effective; unless, of course, the area has been completely devastated. The "self-help" effort in the recovery and restoration stage was outstanding, both for its extent and for its rate.

On the other hand, some provincial relief mechanisms operated much too slowly or inappropriately for the situations present. The Ministry of Housing, for instance, took one week to survey the available housing stock - a survey which could be part of MOH's regular responsibility province-wide - and in any case, those affected in rural areas did not want to leave the immediate area. The urban bias of provincial Ministry officials can also be criticized. Although the Disaster Relief Committee is an excellent mechanism for eliciting local assistance, the foundation of policy for the Committee was a source of disagreement. The (ultimately successful) attempt to get the Committee to consider orchards as capital assets rather than crops is a case in point. The delay in covering disbursements until mid-winter is another.

Much more could also be done in order to encourage the "self-help" emergency response organization. The Mennonites, Red Cross, CB, ham radio operators, and others provided major inputs during the recovery and restoration stage. There seems to have been little encouragement of these

---

[27] This program allows people to rent housing units at rental rates proportional to their incomes.

[28] This is not allowed under the Environmental Protection Act, 1971.

organizations at the provincial level during any part of the Woodstock emergency. Timmerman (1980) has suggested that a reversal of this policy could reap surprising dividends.

It is not clear whether the recovery and restoration has affected the future vulnerability of the damaged areas and surrounding communities to the tornado hazard. The crucial importance of the Disaster Relief Assistance Program in funding the recovery and its emphasis on restoring the *status quo*, however, suggest that the vulnerability of the area has not changed. Further research on such matters as building designs and practices[29], individual attitudes to the tornadoes, or insurance and relief assistance is required to give a more definitive answer.

---

[29] Some structural modifications can be made to buildings to minimize the damage caused by tornadoes. This is true in the case of wooden frame dwellings as well, although these are difficult to render substantially more tornado-resistant. Brinkman (1975, 30) outlines numerous ways in which the design could be improved to limit structural damage. They include:

(a) making the buildings more rigid;
(b) adding removable shutters and vents;
(c) using special blow-out glass;
(d) attaching roof shingles in an intervening fashion;
(e) using non-lift roofs with reinforced attachments;
(f) avoiding overhanging structures;
(g) designing buildings to reflect impinging wind; and
(h) the building of a tornado-safe room either inside or outside the structure.

4. CONCLUSIONS

The description of the Woodstock tornadoes of August 7, 1979 and the associated organizational response highlights the magnitude of the disaster and the relief effort. Division of the organizational response into three phases distinguishes three sets of federal, provincial, and community relationships during the response. The warning phase involved a Federal agency and the channeling of warnings to a localized area in southwestern Ontario; the immediate phase focused on local emergency services; and the recovery and restoration depended, for the most part, on local requests and organizations, monitored and supported by the Provincial government (Timmerman, 1980). The response in all three phases also involved combinations of governmental and voluntary organizations.

The organizational response, apart from the warning system which gave no real notice of tornado onset, was impressive in terms of its scale, its speed, and the manner in which it has helped these communities recover. Even if a timely warning had been given on August 7, there is some evidence to suggest that the effect of the tornadoes would not have been greatly different. The evaluation of these three phases individually raises a number of specific criticisms and key issues, and identifies some areas for improvement.

The warning system did not perform effectively on August 7 and clearly could be improved in several respects. However, whether the cost of the improvements would be justified by the reduction in loss is not clear without further enquiry. Such an enquiry, if made, would have to recognize that issuance of a warning does not by itself necessarily result in prompt action or response. If improvements are to be made, priority should be given to eliminating the key weaknesses which were identified in the section on the warning phase.

The immediate response, on the other hand, was well handled, although some minor problems were encountered. Many of these problems could be overcome by increasing the level of preparedness. In particular, the development of an appropriate emergency plan for the City of Woodstock, coupled with the provision of basic emergency facilities such as a community emergency communications system, would raise the level of preparedness. However, it is difficult to assess whether provision of an emergency plan would have improved the immediate response in this particular case. This reflects the effect which the nature and size of the disaster itself has on the "adequacy" of the response. Nevertheless, a properly designed emergency plan could avoid some of the weaknesses illustrated here which, in different circumstances, might have had a critical and adverse impact on the adequacy of the response during this phase.

The extent and rate of recovery and restoration was remarkable in this case. Equally remarkable was the amount of "self-help" relief. Apart from pointing out minor flaws in the roles played by provincial organizations, the response during this phase is difficult to criticize. The critical issue for hazard research is whether vulnerability has changed, and a tentative suggestion

has been made that the relief efforts have restored the communities to the same level of vulnerability which was present before the tornadoes struck. If this is the case, then Woodstock and the other communities which were affected have missed a unique opportunity to diminish the threat imposed by the tornado hazard.

ACKNOWLEDGEMENTS

The authors would like to express their appreciation for the assistance of a number of people who helped with the preparation of this report. In particular, thanks are extended to Ms. Bev. Jaffray, who undertook some of the interviews and wrote the first draft for a portion of the section on recovery and restoration. Peter Timmerman provided advice throughout the project, and with Professor Ian Burton made many helpful suggestions to improve earlier versions of this paper. Also, the authors would like to thank those persons who were interviewed for their assistance. Finally, special thanks are extended to the Publications Office for the care and energy in typing this report.

REFERENCES

Atmospheric Environment Service 1974. Tornadoes. Pamphlet.

Barton, A.H. 1969. Communities in disaster: a sociological analysis of collective stress situations. Archer Books, New York. 352 pp.

Brinkman, W.G.R. 1975. Severe local storm hazard in the United States: a research assessment. Institute of Behavioural Science, Univ. Colorado, Boulder. 154 pp. (Monograph No. NSF-RA-E-75-011).

Burton, I., R.W. Kates and G.F. White 1978. The environment as hazard. Oxford Univ. Press, New York. 240 pp.

Chinook 1979. Severe storm log: the Woodstock tornado. Chinook, 2(1): 8-10.

Eagleman, D.R., U.V. Muirhead and N. Willens 1975. Thunderstorms, tornadoes and building damage. Heath, Lexington. 317 pp.

Emergency Planning Canada 1979. Severe storms: self-help advice. Pamphlet.

Evans, M. and S. Start 1979. Tornadoes not new to Oxford County. Information pamphlet, prepared by Local History Department, Woodstock Public Library.

Form, W.H. and S. Nosow 1958. Community in disaster. Harper, New York. 273 pp.

Globe and Mail 1979. Villages flattened, many hurt. 3 die in Woodstock-area tornado. Newspaper (August 8).

Kessler, E. 1972. On tornadoes and their modification. Technology Review (May): 48-55.

London Free Press 1979. Tornado. London Free Press, London, Ontario. 47 pp.

Mileti, D.S. 1975. Natural hazard warning systems in the United States: a research assessment. Institute of Behavioural Science, Univ. Colorado, Boulder. 97 pp. (Monograph No. NSF-RA-E-75-013).

Ontario Hydro 1979. Woodstock tornado report. Unpublished report. 30 pp.

Paolini, D. 1979. Tornado strikes: big clean-up after twister blitzes S.W. Hydroscope, 16(7): 1-2.

Taylor, A.J. 1979. Disaster prevention and mitigation: a compendium of current knowledge: social and sociological aspects. Office of the United Nations Disaster Relief Co-ordinator, Geneva. 127 pp. (forthcoming).

Taylor, B.L. 1979. The Woodstock tornadoes of August 7, 1979: a preliminary assessment. Unpublished paper. Applications and Impact Division, Canadian Climate Centre, Downsview, Ontario. 8 pp.

Timmerman, P. 1980. Emergency planning in Ontario: a critical history and analysis. Institute for Environmental Studies, Univ. Toronto, Toronto. (forthcoming).

APPENDIX 1 - LIST OF PERSONS INTERVIEWED

Mr. Derek Amm, Technical Services Engineer,
Hydraulic Generation and Transmission Division, Ontario Hydro, Toronto.

Mr. Gerry Axworthy, Emergency Measures Officer (part time),
Brant County, Burford.

Mr. Aubrey Bell, (Former) News Director,
CKDK (1340) Radio, Radio Woodstock, Woodstock.

Mr. Cliff Blair, Member of REACT CB radio group,
Woodstock district.

Mr. Hunter Brown, District Manager,
Bell Canada, Kitchener.

Ms. Wendy Calder, Mayor,
Woodstock.

Mr. Don Carol, Member of the Flake Club, (a local CB radio group),
Woodstock district.

Mr. Peter Deerling, Clerk of Burford Township,
Burford.

Mr. Brad Finch, Supervisor,
London Weather Office, London Airport, London.

Mr. William Fraser, Manager,
Distribution and Systems Division, Ontario Hydro, London.

Reverend Tom Griffin, President,
Oxford County Amateur Radio Operators Club, Woodstock district.

Mr. Fred Hamblin, Director,
Field Services Branch, Local Government Division, Ontario Ministry of
Intergovernmental Affairs, Toronto.

Mr. Carl Hevenor, City Engineer,
Board of Public Works, Corporation of the City of Woodstock, Woodstock.

Mr. Gordon Hickery, Co-ordinator,
Community Housing, Southwest Region, Ontario Ministry of Housing, Toronto.

Ms. Carol Klaponski, Meteorologist,
Ontario Weather Centre, Malton International Airport, Toronto.

Mr. Ray Knox, Member of the Sandbaggers Anonymous Club, (a local CB radio group),
Woodstock district.

Staff Sergeant Robert E. McArthur,
Woodstock City Police Department, Woodstock.

Mr. Ken McBride, Director,
Red Cross Emergency Services, Red Cross, Ontario Division, Toronto.

Mr. McCreight,
Woodstock Public Utilities Commission, Woodstock.

Mr. Cliff Mathews, Agricultural Representative,
Ministry of Agriculture and Food, Woodstock.

Mr. Don Millard,
Power Systems Operation Division, Ontario Hydro, Toronto.

Mr. Mike Newark, Shift Supervisor,
Ontario Weather Centre, Malton International Airport, Toronto.

Mr. Robert E. Nixon, MPP, Brant-Oxford-Norfolk,
Toronto.

The Honourable Harry Parrott, D.D.S., MPP Oxford, and Minister of the Environment,
Toronto.

Mr. Tom Pender,
Atmospheric Environment Service, Toronto.

Mr. Ken Peers, Chairman,
Oxford, Brant, Haldimand-Norfolk Disaster Relief Committee, Woodstock.

Mr. William Pogue, Executive Director,
Woodstock General Hospital, Woodstock.

Mr. O. L. Roberts, Emergency Measures Co-ordinator,
Haldimand-Norfolk Regional Municipality, Simcoe, Ontario.

Mr. J. F. Rousom, General Manager,
Woodstock Public Utilities Commission, Woodstock.

Staff Sergeant Ross,
Woodstock O. P. P. Detachment, Woodstock.

Captain Scott,
Woodstock Fire Department, Woodstock.

Mr. George Simmons, Chairman,
Fund Raising Subcommittee, Oxford, Brant, Haldimand-Norfolk Disaster Relief Fund, Woodstock.

Mr. Jake Wall, Member of the Committee of Five, (a local CB radio group),
Woodstock.

Ms. Deborah Walker, News Announcer,
CKDK (1340) Radio, Radio Woodstock, Woodstock.

Mr. Delmar Zehra, Co-ordinator,
Ontario Mennonite Disaster Service, Tavistock.

APPENDIX 2 - WOODSTOCK GENERAL HOSPITAL EMERGENCY PLAN

In Ontario, hospitals are required to have an emergency plan in order to receive official accreditation. The Woodstock General Hospital plan was written in 1973 and concentrates on man-made disasters. The plan contemplates three types of disasters in particular which have special significance for Woodstock:

(a) train wrecks, (as approximately twenty trains pass through Woodstock each day);

(b) multiple car collisions, (as Highway 401 passes within eight kilometres of Woodstock); and

(c) airplane crashes, (since Woodstock is close to London and Toronto International Airports).

The plan contemplates accidents at specific sites to which doctors are sent to sort disaster victims according to a triage system. The plans call for a hierarchical fan-out telephone procedure, which is initiated by the Executive Director of the hospital. He calls one person who, like subsequent contacts, calls two more personnel. Medical department heads are called first, followed by other doctors, head nurses, and so forth. For this purpose an emergency telephone list has been compiled and is continuously updated.

The Executive Officer is authorized to implement the plan when twenty or more patients arrive at the hospital from one event. The plan names an Emergency Committee who are responsible for formulating the specific responses adopted by the hospital. It also calls for the removal of all "non-essential" patients with the arrival of the initial accident or disaster patients. The plan envisages communication within the hospital by internal telephone and paging systems, as well as by an internal walkie-talkie network. The plan of the Woodstock General Hospital underwent a successful trial run with a simulated disaster in the spring of 1977.

APPENDIX 3 - MINISTRY OF INTERGOVERNMENTAL AFFAIRS (LOCAL GOVERNMENT DIVISION, SUBSIDIES BRANCH) ONTARIO DISASTER RELIEF ASSISTANCE PROGRAM

The purpose of the above-mentioned program is essentially to provide post-disaster financial help to private owners in an area of the province where, as a result of a severe windstorm, flood, or other calamity due to natural causes, substantial losses have been suffered because of damage to properties. Those eligible are year-round residences, including furnishings and essential household equipment, and buildings and equipment of small businesses and farms.

Assistance under the program is subject to the condition that the damages sustained are so widespread and extensive that it is beyond the financial capability of the community to cope.

A municipality experiencing such a disaster and wishing to obtain provincial financial assistance for the victims is required to submit a written request to the province, through the office of the Minister of Intergovernmental Affairs, asking that the affected area be officially declared a "disaster area" by the Ontario Cabinet. This request, of course, should be supported with details as to the type, scope, and extent of damage, number of properties, etc., as well as a rough estimate of the total losses expected.

Where more than one municipality has been affected by the common disaster, it is the practice to submit a joint request.

Once the Cabinet has so designated the area, the Council has the responsibility to appoint a Disaster Relief Committee, composed of various public-spirited citizens whose duty is to establish a relief fund; solicit contributions to it from citizens, private corporations, and other municipalities; appraise damages; and settle claims.

The financial assistance from the province consists of a contribution to the Disaster Relief Fund which amounts to matching dollar for dollar, so far as is necessary, contributions to the fund, except grants from the federal government or the Canadian Disaster Relief Fund.

Attached is a copy of the provincial guidelines and administrative policies and procedures. If further assistance is required, this can be provided by communicating with the Subsidies Branch of this Ministry.

Guidelines and Administrative Policies and Procedures

Request to be declared Disaster Relief Area:

- Municipal Council should direct the request to the Minister of Intergovernmental Affairs, the Hon. Thomas Wells.
- Accompanying the request should be a report, setting forth details of the date and nature of the occurrence, the area affected, and the scope and extent of damages, including an estimate of the total anticipated losses.
- Newspaper reports and photographs, if available, should also be forwarded.

Appointment of a Disaster Relief Committee:

- This Committee should be composed of at least one member of the Council, a municipal treasurer as treasurer of the fund, and a number of responsible, public-spirited citizens willing to provide help.
- Some of the members should have abilities and experience in such areas as finance, public relations, construction, and appraisal of structures.

Duties of the Disaster Relief Committee:

- Establish a Disaster Relief Fund.
- Solicit contributions to the fund from the general public, municipalities of the province, commercial and industrial organizations, private or philanthropic organizations, and others.
- Inform the public of the fund and the assistance available.
- Circulate claim forms.
- Appraise damages.
- Determine policies and pay claims.
- Request contributions from the Province of Ontario, the Federal government, and The Canadian Disaster Relief Fund.

Eligible Damage Costs:

- The restoration or replacement or repairs to pre-disaster condition of the principal year-round residence or farm buildings of a private owner, including the house equipment, chattels, and furnishings of an essential nature such as stoves, refrigerators, beds, furnaces, farm equipment, etc.
- The restoration or repairs to pre-disaster condition of the buildings and equipment owned by small businesses.

Ineligible Items:

- Costs covered by insurance.
- Items such as summer cottages, trailers, boats, swimming pools, landscape and fencing, compensation for personal injury, loss of business revenue.
- Crop losses.
- Damages to public property.

Administrative Policies and Procedures:

Policies:

- All persons suffering losses must be offered the opportunity to receive compensation from any funds collected on an equitable basis related to losses.
- The province will pay to the Committee interest on a bank loan pertaining to its contribution which may be required between the date of the issue of the certificate and payment of the provincial grant.
- The financial transactions of the Disaster Relief Fund must be audited by the municipal auditor and the audited statement of revenue and expenditure submitted to the province.

Procedures:

- The following information is to be forwarded to the Subsidies Branch of the Ministry of Intergovernmental Affairs:
  1. The names and addresses of all committee members.
  2. Cause of damage.
  3. Date of occurrence.

4. Total amount of losses claimed as appraised by the Committee or its agents. (Attach statement showing descriptions and amounts of individual appraisals.)
5. Total amount of insurance proceeds applicable to Item 4.
6. Total amount of net loss not covered by insurance (Item 4, less Item 5).
7. Total amount allowed and paid by the Committee in respect of Item 6.
8. Analysis of revenue showing:
   (a) Amount received from general public, business concerns, etc.
   (b) Amount received from municipalities, showing name and amount for each municipality.
   (c) Amount received from the Government of Canada.
   (d) Amount received from Canadian Disaster Relief Fund.
9. Data re Disaster Relief Fund Committee bank loans showing:
   (a) Date of loan;
   (b) Amount of loan;
   (c) Rate of interest.

APPENDIX 4 - MINISTRY OF AGRICULTURE AND FOOD, ONTARIO TORNADO DISASTER AID PROGRAM - 1979

Purpose

The purpose of this program is to provide assistance to farmers in Oxford, Brant, and Norfolk who suffered major property damage in the tornadoes on August 7, 1979.

Who may apply for assistance

Farmers may apply who experienced the loss of farm buildings and/or farm equipment due to the tornadoes, and the losses exceed the amounts covered by insurance and/or amounts recovered from the Disaster Relief Fund.

Assistance Available

1. Loans will be available from banks, credit unions, and trust companies up to $100,000 per farm operation for the replacement of damaged property including farm buildings,(e.g. barns, machinery, sheds, tobacco kilns, silos, greenhouses,) farm equipment, the replanting of orchards, and to pay contractors for the rebuilding or replacement of uninsured farm property. Residences, personal property, livestock, and crops are not included. A loan recommendation from the Provincial Review Committee is required. Loans shall be made at the discretion of the lender, may be for up to ten years, and the interest rate is not to exceed the lowest commercial lending rate at the bank's head office (prime rate).
2. The Ontario Ministry of Agriculture and Food will refund to each lender an amount which is equal to the difference between six per cent and the chartered bank's prime rate on the principal amount that is outstanding during the period of the loan.
3. Assistance will be given for completing the application form and preparing supporting financial statements which may be necessary. The amount, terms, and repayment schedule of each loan application will be based on the repayment ability of the applicant and the purposes of the loan.

Procedure for Participation in the Program

1. Application forms will be used and they are available at local County (Regional) offices of the Ministry in Brant (207 Greenwich Street, Brantford 759-4190), Norfolk (Horticultural Research Station, Simcoe 426-7120), and Oxford (59 Highway North, Woodstock 537-6621).
2. Local staff of the Ministry will assist each applicant in completing the application form, and in determining the amount of money that should be borrowed in relation to the need resulting from the tornado damage and in relation to repayment ability.
3. Completed application forms will be forwarded for consideration to a Provincial Review Committee appointed by the Ontario Ministry of Agriculture and Food.

4. Two copies of recommended applications will be returned to the applicant to take to the designated lender to negotiate a loan. If an application is not recommended, the applicant will be advised in writing.

5. Loans shall be made at the discretion of the lender and promissory notes signed.

Conditions of Loan

1. The program becomes effective on August 8, 1979. Applications for loans will be received up to and including July 31, 1980. Loans recommended by the Provincial Review Committee may be advanced from the lender up to March 31, 1981.

2. A loan will be for a term not exceeding ten years and may be advanced as buildings are completed and purchases are made. Loans may be repaid in part or in full at any time within the period without notice or penalty.

3. Loans may be used only to cover building and equipment losses which exceed the amounts covered by insurance and/or amounts recovered from the Disaster Relief Fund. The maximum amount of loan will be limited to $100,000 per farm operation.

4. The rate of interest will not exceed the lowest commercial lending rate at the bank's head office (prime rate). This rate may fluctuate as the minimum rate changes. For Credit Unions and Trust Companies, this rate shall be the lowest commercial lending rate at the head office of the chartered bank used by the lender.

5. The Ontario Ministry of Agriculture and Food will forward to each lender an amount which is equal to the difference between six per cent and the prime rate on the outstanding amount of principal.

6. A loan is not transferable from one borrower to another borrower.

7. A loan becomes payable in full if, and when the farm is sold or the borrower ceases farming operations.

8. Proof of purchase or expenditure such as a receipted bill of sale which identifies the purchase must be made available to the lender which granted the loan.

9. Machinery, equipment, and property shall serve as security for the loan. At the option of the lender, a loan shall become due and payable if and when an item pledged as security is sold or otherwise disposed of by the borrower.

Misreprentation or Misuse

Where a borrower misrepresent facts, misuses the proceeds of a loan, or is in default under any of the terms or conditions of the program, the full amount of the loan, together with the accrued interest, shall become due and payable at the option of the lender.

Farm Management Information

1. Each borrower shall agree to maintain such information and agree to the taking of inventories as shall be deemed necessary by the lender.

2. Further details of this program are available from local offices of the Ontario Ministry of Agriculture and Food:

   (a) Brant - 207 Greenwich Street, Brantford N3S 2X7 (759-4190)

   (b) Norfolk - Box 587, Simcoe N3Y 4N5 (426-7120)

   (c) Oxford - Box 666, Woodstock N4S 7Z5 (537-6621)