Confirmed Tornado
Hamilton Mountain, Ontario
August 4, 1999

Date- Local: Saturday, August 4th, 1999
UTC: Saturday, August 4th, 1999
Time- Local: 1310
UTC: 1710
Location: Hamilton Mountain
Region: City of Hamilton
Classification: Confirmed Tornado
Category: A
Casualties: None
Track Length: 4000 m
Width: 50 m
Motion: ENE
Damage Estimate: $100 000
F-Scale Rating: F1
Code: AH
Damage Survey: Mark Payne, RCTO and David Sills, AES King Radar
Spotter Reports: None
Other Documents:
Storm Damage Survey Report by Mark Payne, RCTO and David Sills, AES King Radar
Media Reports
Newspaper Articles

sjs

Meteorological Service of [illegible]
4905 Dufferin Street, [illegible]
Downsview, Ontario [illegible]
CANADA

Tornado F-Scale Re-Assessment

Sarah J. Scriver
Tornado Data Production Assistant, Environment Canada
April 20th, 2004

Classification: Confirmed Tornado
Date: Saturday, August 4th, 1999
Location: Hamilton Mountain, City of Hamilton

Original Assessment: F1
Re-Assessment: F1
F-Code: AH
Explanation of Assessment: Roof off of garage, damage to five houses, some only minor shingle damage. Several large trees snapped or uprooted.

SJS

Meteorological Service of Canada
4905 Dufferin Street, ARMP
Downsview, Ontario M3H 5T4
CANADA

Storm Damage Survey - August 4, 1999

Hamilton Mountain

Investigators
Mark Payne, RCTO
David Sills, AES King Radar

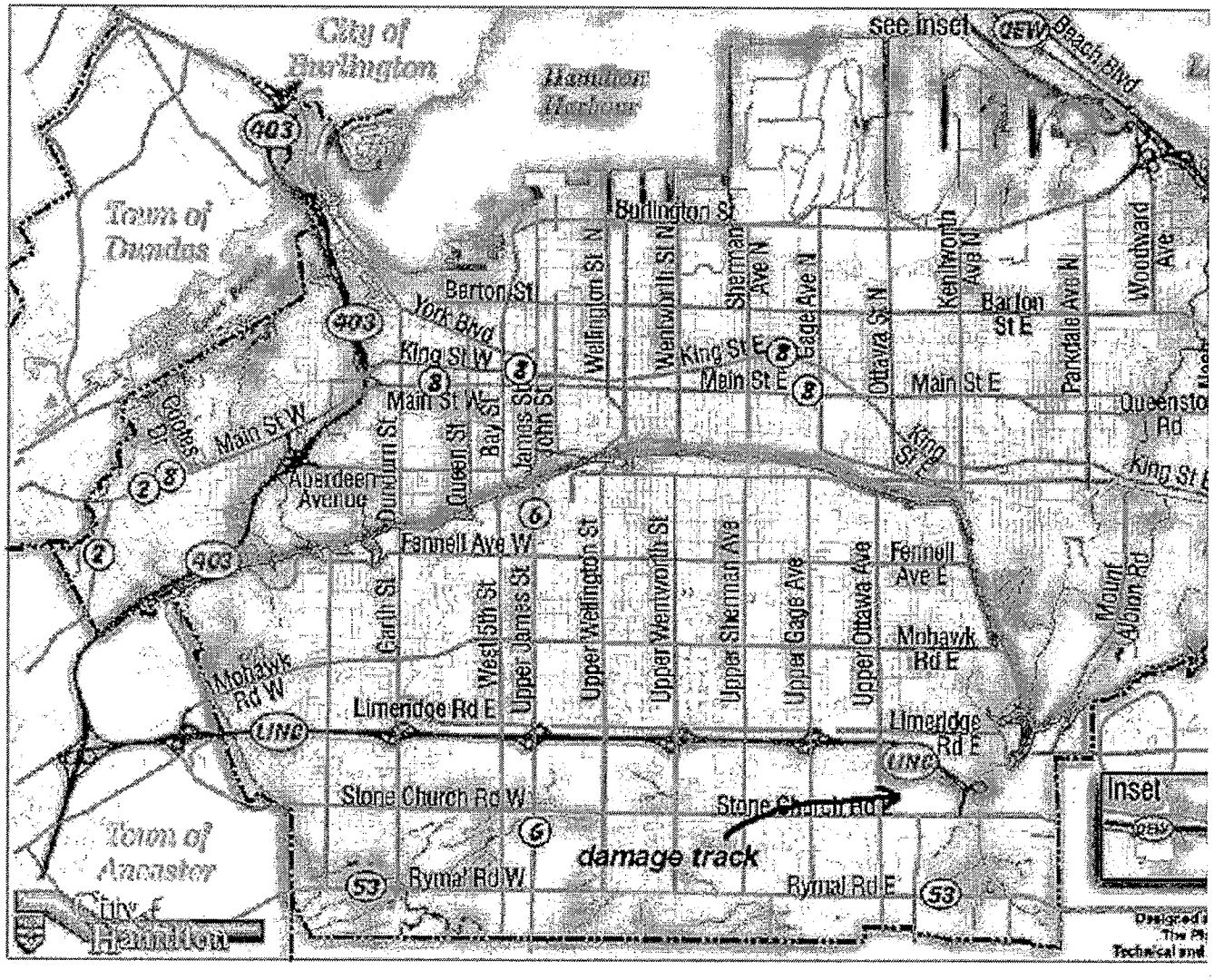
Quick Facts

Severe Weather Type	Tornado
Locations	Hamilton, Ontario
Time	13:10 EDT
Magnitude	F1
Path Length / Direction	4 km / ENE
Path Width	50 m
Significant Damage	Roof and other exterior damage to houses, several large trees snapped or uprooted
Damage Estimate (Source)	$100 000 (DS)

Overview

A trough of low-pressure swinging southeast through Southern Ontario was the focus for the development of several low-topped (8-10 km echo tops) thunderstorms on August 4, 1999. Storm damage was reported on the Hamilton Mountain in the area of Upper Sherman Avenue and Stone Church Road. The single damage report received by

RCTO at 13:10 EDT local time (17:10 UTC) mentions only shingles coming off a roof and a few small trees down (see Appendix A). However, ground surveys conducted on the August 5 recorded more than 5 houses with damage, one house having had part of its roof torn off. As well, many large trees were uprooted or snapped. No injuries or fatalities were reported. Witnesses reported seeing swirling debris. Also, the debris pattern on the ground was consistent with cyclonic rotation. The building and tree damage appeared to be consistent with an F1 classification (see Fujita, 1981). The damage path width was about 50 metres at its greatest and the observed damage path length was about 4 km extending in a ENE direction to as far east as Upper Ottawa Street (see map below).

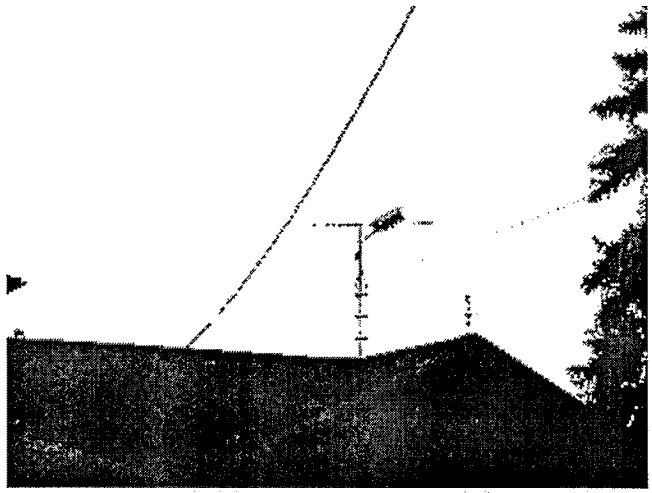


Investigation

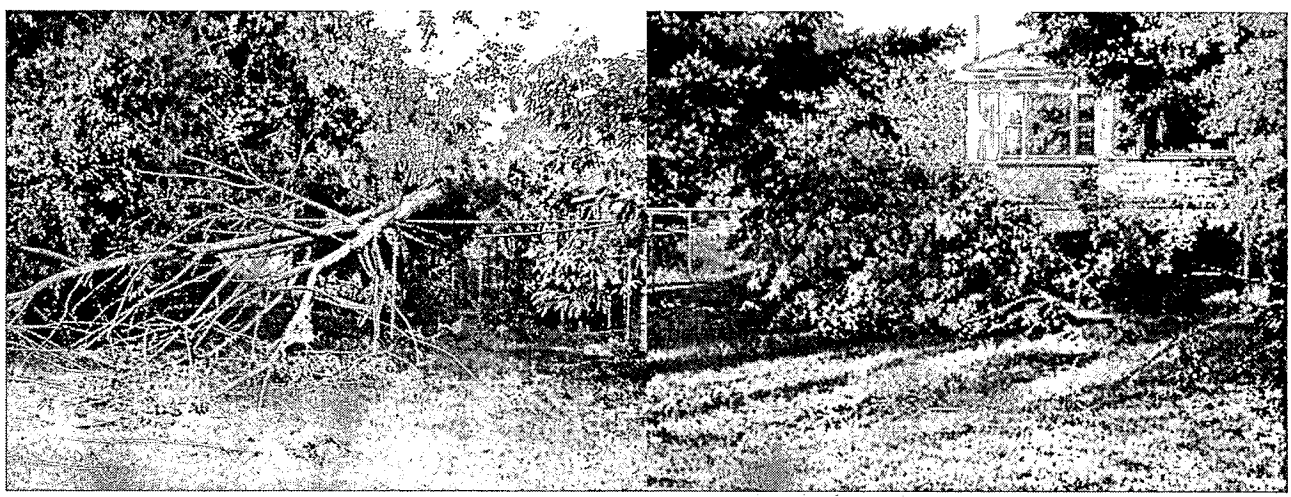
The path of visible damage started at St. Jean de Brebeuf highschool, which is southwest of the corner of Upper Sherman and Stone Church. There were small branches down and much small debris in the school yard. There was very little damage except to one fence board and one small tree as we moved in a northeast direction until we reached Upper Sherman. Once on Upper Sherman, there was evidence of damage on both sides of the road. On the west side, there was a property just south of 1448 with many trees down having already been cut up (see photo below).

Beside this lot, just to the north, the house had its garage roof

ripped off and its neighbour had a piece of it caught on a TV antenna (see photo below).

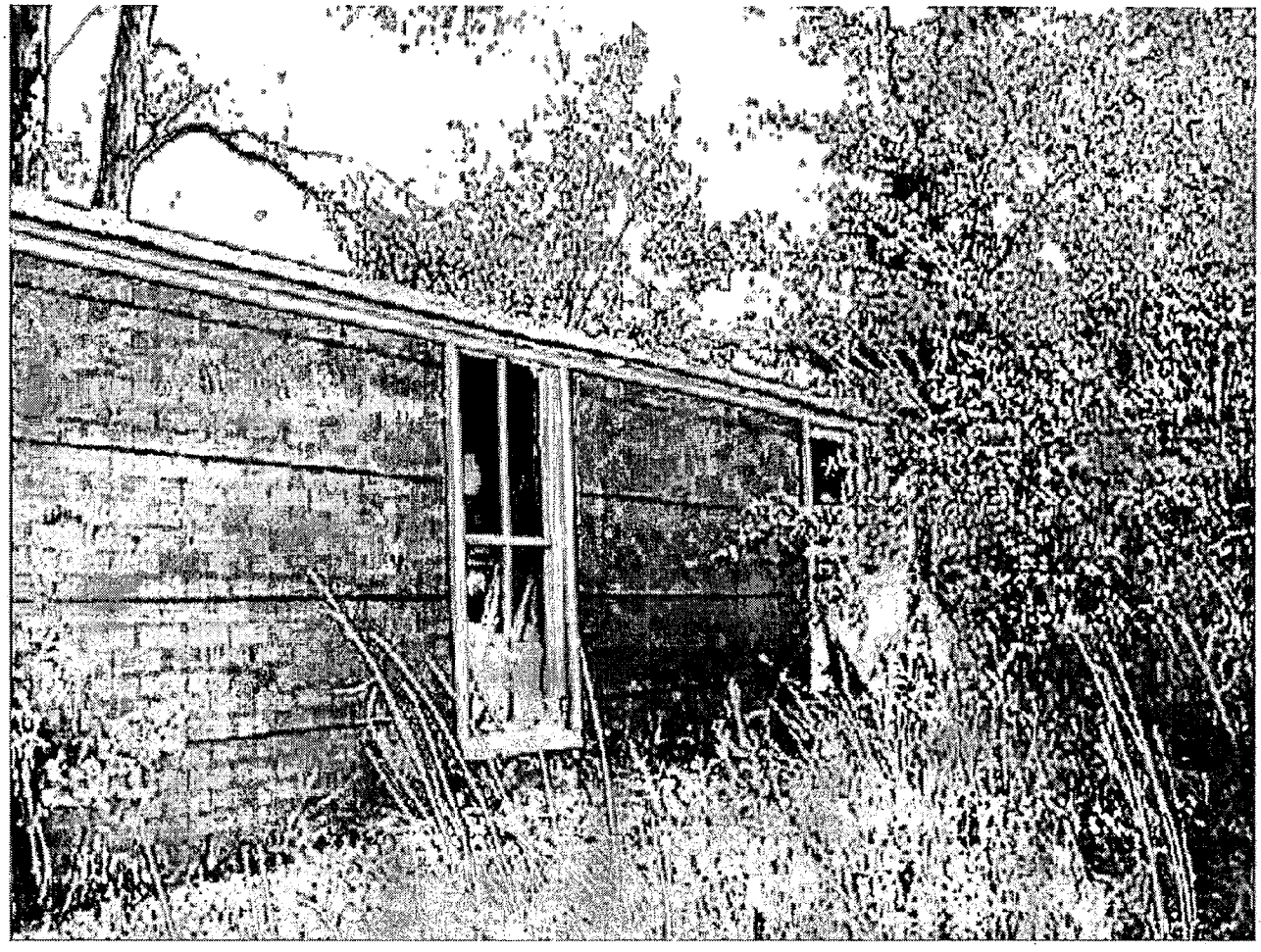


Across the street at 1437 Upper Sherman, the garage had completely collapsed when a tree fell on it. All that was still standing when we got there was the garage door, propped up. The house also had a tree uprooted on the front lawn and a large willow downed just to the northeast (see photos below).



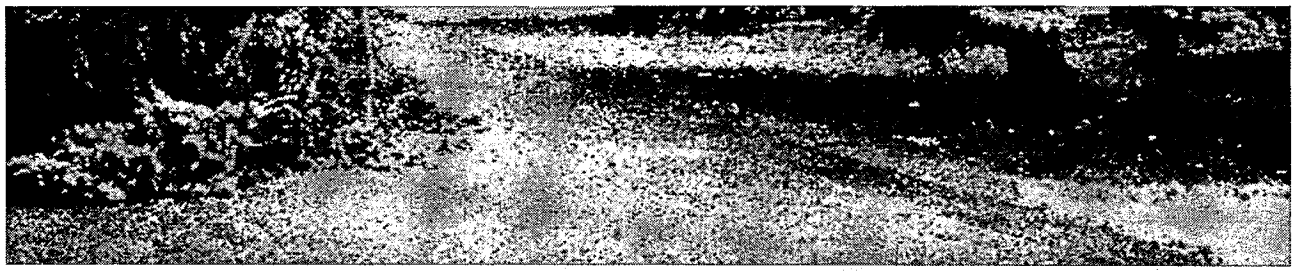
The first sign of damage spotted on Stone Church was at a house just east of the Upper Sherman / Stone Church intersection. A large willow tree in its front yard lost a major branch (30 - 40 cm in diameter) (see photos below).

As well, the backyard was strewn with debris and a shed's windows had been broken. A large (25 cm diameter) branch had fallen on the shed's roof (see photo below).

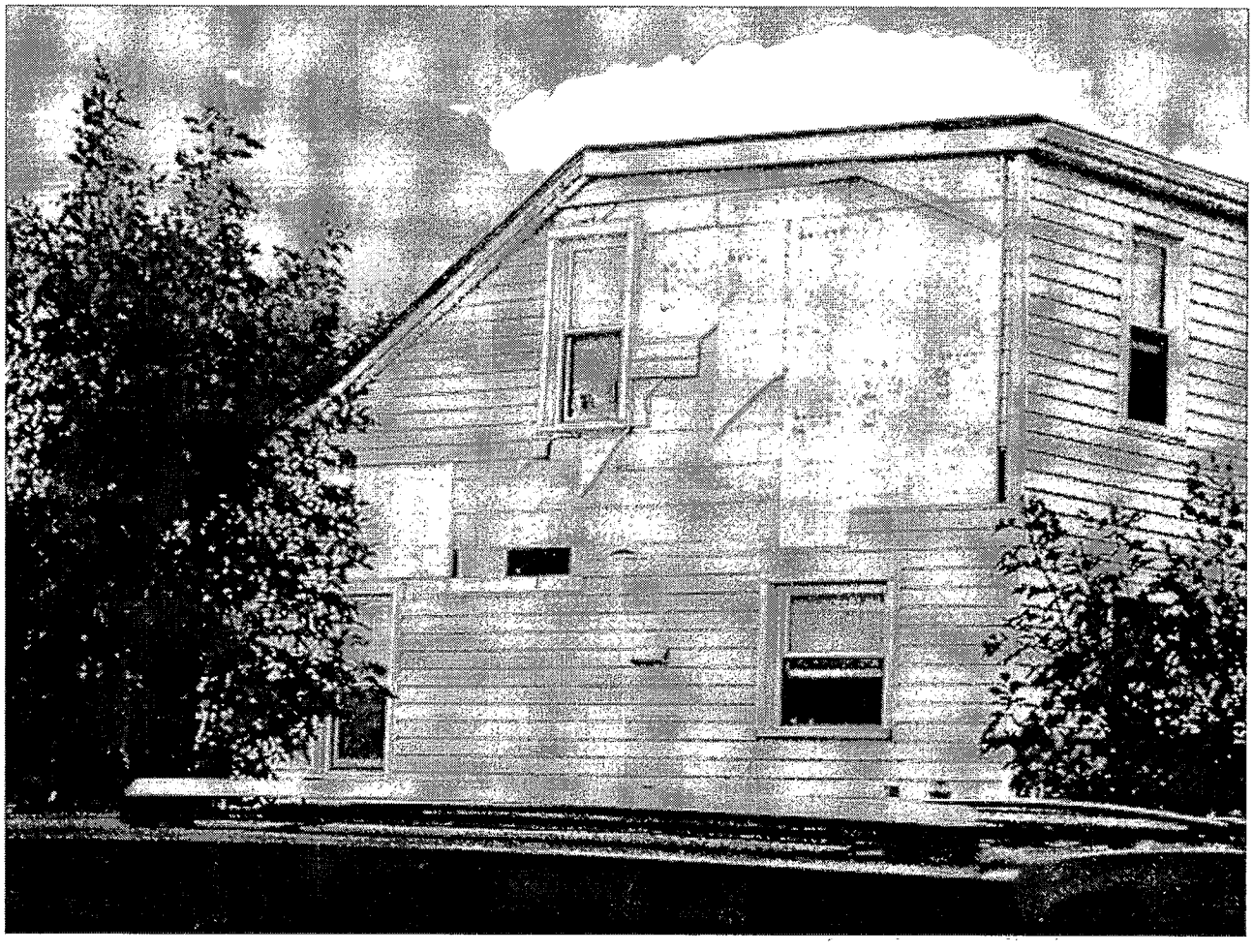


The house next door (798 Stonechurch) had only a damaged fence and debris in the backyard. The following pictures were taken looking east at the backyard of the first two houses (802 and 798 Stonechurch).

However, the next house (784 Stone Church) had a large pine tree (about 30 cm in diameter) snapped about 3 metres up at in their front yard. It fell onto their driveway but there no cars were parked there at that time (see photo below).

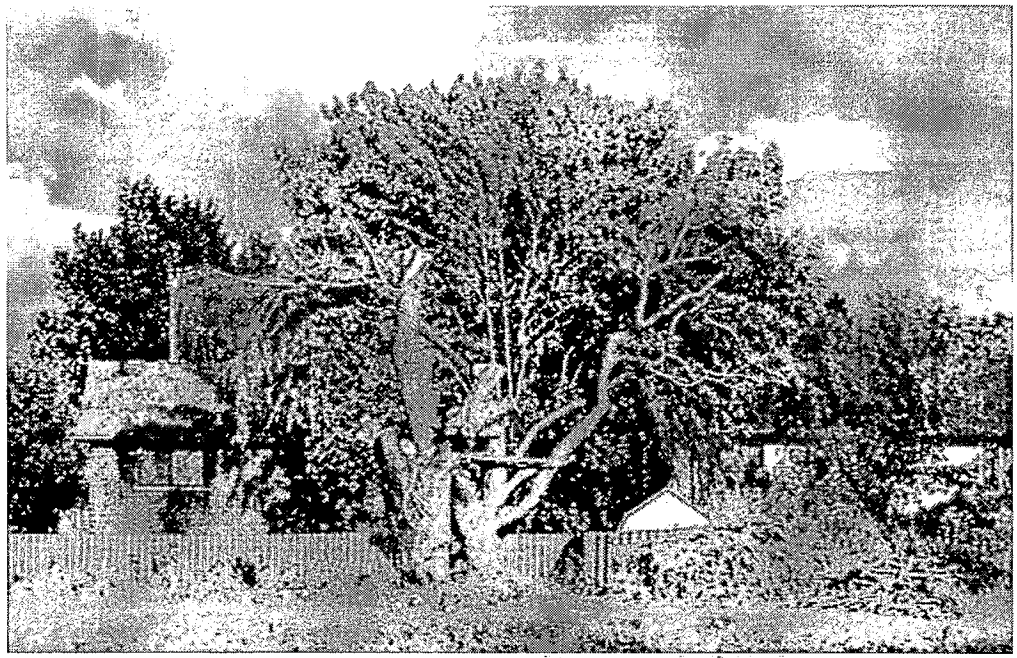


The next few houses had very little damage with just a few limbs down, the largest being about 7 cm in diameter. However, on the southeast side of the corner of Stone Church and Eleanor Avenue, the house had sustained significant damage with much of the west-facing siding stripped off (see photo below).



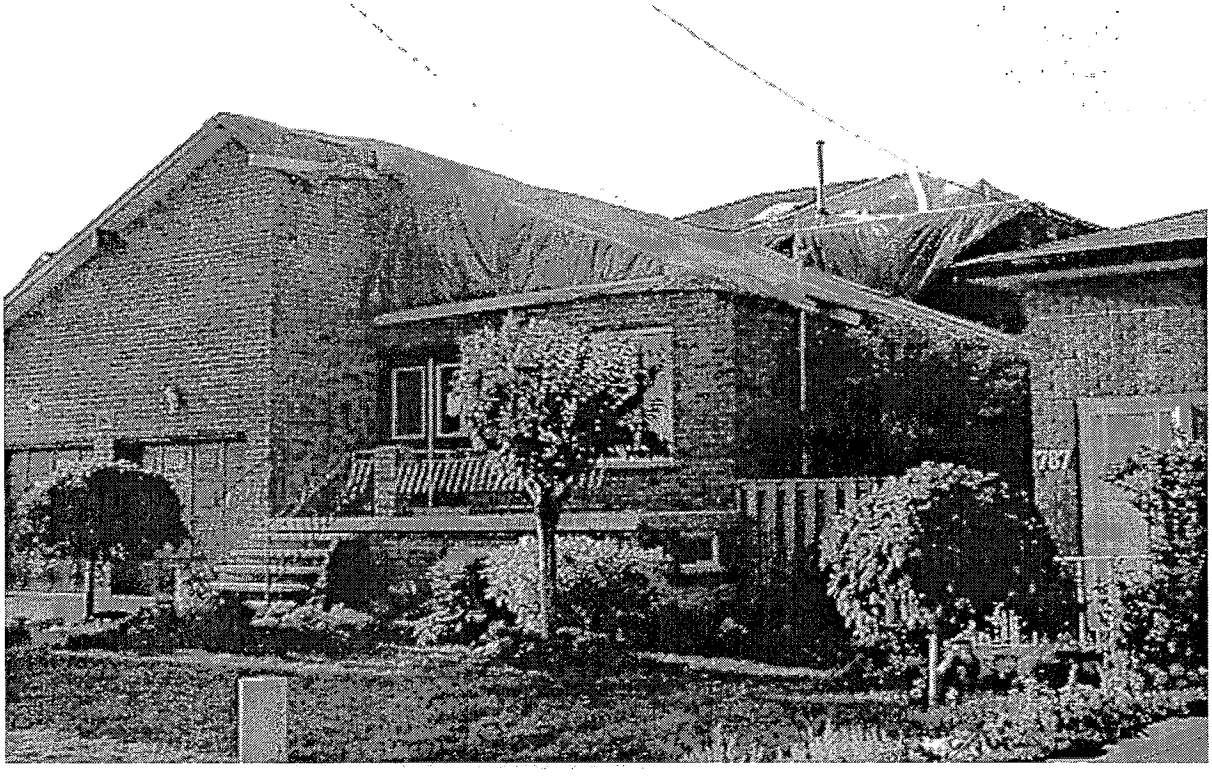
As well, the back yard and adjacent back field had much debris and one willow tree (30 cm diameter) had lost some good sized limbs

(see photo below).



The front yard also had a 10 cm diameter tree limb down. Please refer to the photo below taken looking NE.

There was very little noticeable damage until the next block east. Near the corner of Stone Church and Rambo Street at 783 Stone Church, a house had part of its roof completely ripped off (see photo below).



The large area of missing roof and questions about the structural integrity of the remaining roof resulted in the family being forced to move out. A neighbour reported seeing swirling debris at this location. This house had gotten much media attention (see Appendix B) and is on the north side of Stone Church, meaning the tornado had now tracked NE from the house that had its siding removed.

A house on the corner of Rambo and Rexford (522 Rexford) had some siding removed
from under a north facing overhanging. There was very little other damage visible in the Rambo street vicinity. Moving further NE we encountered small debris in the form of tree leaves, small branches, etc.. There was a section of wooden panel fence toppled near Upper Ottawa Street and a fairly substantial limb down just west of

Upper
Ottawa Street but at least 500 metres north of Stone Church. A commercial gravel pit was located to the east of this location, making further damage unspottable. Thus, the apparent path of the tornado starts southwest of Upper Sherman and Stone Church then continues ENE to as far east as Upper Ottawa and as far north as two suburban blocks. This is a distance of approximately 4 km.

Conclusions

Evidence of rotation was found at several sites consistent with a cyclonically rotating tornado. In addition, there were several witnesses claiming to have seen debris swirling into the sky as far as the eye could see. Considering the damage to well-built houses, evidence of missiles, and uprooted and snapped trees, the maximum intensity of the tornado would appear to be consistent with F1 damage on the Fujita scale (Fujita, 1981). The damage sites appear to be in a relatively straight line consistent with a tornado moving from WSW to ENE over a distance of approximately 4 km. The damage path width was approximately 50 m at its greatest.

Reference

Fujita, T.T. 1981. Tornadoes and Downbursts in the Context of Generalized Planetary Scales. *J. Atmos. Sci.* **38**: 1511-1534.

Appendix A

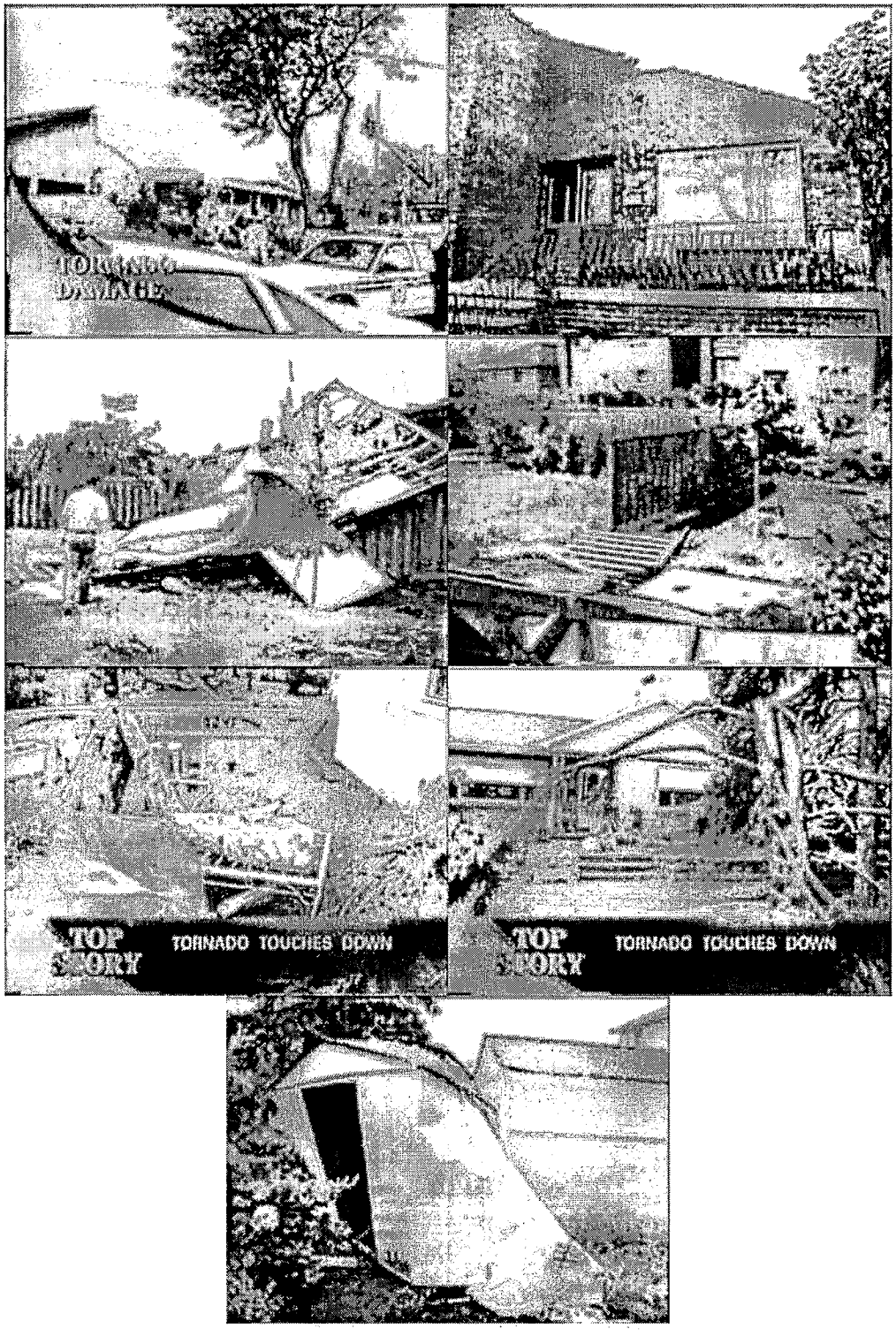
RCTO severe weather log:

SOURCE/WATCHER ID:	contract Observer
EVENT TIME (UTC):	17:10
EVENT LOCALE:	Stone Church and Upper Sherman, Hamilton
ASOCTD PUBLIC RGN:	Hamilton-Wentworth

DETAILED DESCRIPTION: shingles off of a roof, small trees down

Appendix B

Vidcaps of ON-TV coverage of damage on August 4 courtesy of Marc Nagy.



b) Hamilton Spectator, August 5, 1999

TORNADO DESTROYS HOUSE TRAILER

SUSAN CLAIRMONT
The Spectator

A tornado that destroyed a trailer in Burlington and another that ripped the roof off a Hamilton Mountain house rattled the unscathed homeowners. Weather experts were less impressed by the weakling storm.

Funnel clouds that touched down twice yesterday afternoon during violent thunderstorms were spectacular to most who witnessed their fury. But Environment Canada officials say that on a tornado scale of zero to five, this weather show ranked zip.

The funnel clouds were as weak as they could be while still ranking as tornadoes, said Andrea Sale of Environment Canada's Toronto office.

RIPPED OFF ROOF

Tell that to Dave Prosia and his mother Wilma.

The two were at their Stone Church Road East home just after 1 p.m. when the first minor tornado ripped off a section of their roof, leaving the living room exposed.

Just moments before, the swirling winds outside the window had persuaded the Prosias to seek shelter in the basement.

Neighbours reported seeing shingles, aluminum siding and a plastic lawn chair spiralling in mid-air above the street.

Less than an hour later, John and Karen Hawkins' trailer was destroyed when one of the tornados picked it up from its site in Lost Forest Park on Milburough Line in Burlington and broke it in pieces.

About 2 p.m. the sky over the trailer park became extraordinarily dark.

A moment later, a southeast wind sliced through the area, leaving all but the Hawkins' trailer untouched.

The couple was not home at the time.

Even weak tornadoes are rare in southern Ontario.

No other tornadoes were reported in the province.

"You're unique in that you had your very own tornadoes," weather specialist Sale told The Spectator.

A severe storm warning was in effect for the region, but the tornadoes were not anticipated. Meteorologists are only capable of forecasting them a couple of hours in advance, if at all.

Using the international measuring stick, called the Fujita scale, to assess the tornado's intensity, Sale said our drama came up short in the bigger scheme of the world's extreme weather.

An F5 tornado is the worst, the sort that leaves towns destroyed and people dead. Sale said Canada has never had an F5. The closest we've come in Ontario is the F4 that hit Barrie several years ago.

The last tornado to hit this area was an F1. It severely injured a man in Flamborough last summer when it threw a tree on top of him while he was hunting in the bush off Edgewood Road.

Though Sale and other Environment Canada experts are already calling yesterday's storms tornadoes, it takes a lot more than that to make it official.

First, a severe weather meteorologist must study the pattern of the storm based on eyewitness accounts and, in this case, digital photographs sent by e-mail.

The funnel clouds had barely dispersed from outside his office window when Brent Malseed, an employee at the Canada Centre for Inland Waters near the Burlington Skyway was electronically sending his computerized tornado images to The Spectator and Environment Canada.

"I turned and looked out the window while I was on the phone and I saw it swirling," he said.

"It was black and it went way up. It came down on a bit of an angle."

Grabbing his office's digital camera, Malseed snapped a couple of shots of the funnel cloud through his office window.

The pictures helped Environment Canada evaluate the storm just moments after it hit.

Rob Simpson, a weather service specialist, said the photos showed a tornado just lifting off the ground.

"When a tornado starts to lift again, it turns back into a funnel cloud," he explained.

He called this a tornado because it was on the ground and did cause damage just before the photo was taken.

"We look for particular patterns of damage," Sale said. "Rotation in the pattern of damage as it's spread across the ground is the key."

The final confirmation that these were indeed tornadoes will come if and when weather specialists from Toronto make the trek to Burlington and Hamilton to survey the scene.

Sale said the experts go to learn more about the twisters "so we can get better at forecasting these beasts."

ITEM

PUBLICATION	The Kitchener-Waterloo Record
DATE	Tuesday August 3, 1999
PAGE	B01
BYLINE	Renée Huang and Prithi Yelaja

HEADLINE: Storm cuts swath through region

The long weekend saw Waterloo Region pummeled by some extreme tropical weather.

Monsoon-like downpours accompanied by booming thunder and bolts of lightning kept hydro and fire crews hopping most of Saturday.

But blazing sunshine and more moderate temperatures on Sunday and Monday made up for the dampness.

The storm cut a wide swath, stretching from Georgian Bay to the Niagara Peninsula, uprooting trees, damaging homes and downing power lines in its wake.

Wind gusts reached as high as 110 kilometres per hour in some places, including Stratford.

"That's straight line winds and those would throw things around," ** Jack Dennahower, a meteorologist with Environment Canada said Sunday.

About 22 millimetres of rain fell in a six-hour period from noon to 6 p.m.

The storm was caused by a cold front sweeping through the Great Lakes and colliding with a hot, humid air mass hanging over the province.

"It was just a good old-fashioned set of thunderstorms," Dennahower said. "This is not at all unusual weather for this part of the world at this time of year."

Torrential rain hit the region in two waves, the first around 9 a.m. on Saturday, after a clear and picturesque sunrise.

Roads were awash with errant cyclists who slopped and sloshed miserably towards shelter when the second storm descended on the region around 2 p.m.

Cars on the Conestoga Parkway slowed to a crawl, as cascades of water flooded the highway.

A soaked pooch riding in the open back of a GMC pickup truck looked unimpressed by the downpour.

Waterloo North Hydro crews responded to more than 100 service calls on Saturday, operating supervisor Chuck Stackhouse said.

"I think a mini-tornado touched down," he said.

"It was wild. I had everybody that works here out on the road. We were spread pretty thin."

The worst hit area was near Highway 7 and Regional Road 30, between Kitchener and Guelph, where the storm struck down 10 hydro poles. About 450 homes in the area were without electricity.

Highway 7 traffic was rerouted for several hours as hydro crews repaired damage.

Eight transformers destroyed by the storm had to be replaced. Power was also knocked out in parts of downtown Waterloo for about 10 hours.

Hydro crews worked for 14 hours straight and were able to restore power to all areas at about 10 p.m. on Saturday, Stackhouse said. " There are a lot of tired linesmen."

Police and fire crews were also busy all day responding to house alarms from areas hit by power surges.

A Cambridge man was in critical condition at Hamilton General Hospital when he was hit by lightning while working inside his home with a power saw around 2 p.m. Saturday.

Kitchener fire department responded to close 50 calls.

A home on Belmont Avenue West was struck by lightning, starting a fire in the attic that caused $5,000 in damages. Another home on East Avenue also had $5,000 in damages from lightning.

Several motor vehicle collisions sent people to hospital with minor injuries.

ILLUSTATION Residents Michael Boyard (left), Kim Lebold and friend Chris Bagg survey the damage to their Breslau-area property on Saturday. High winds knocked down hydro poles, a large maple tree and tore a chimney off the roof.

SEARCH TERMS ENVIRONMENT; THE; CANADA;

*** END OF STORY***

ITEM

PUBLICATION CTV News and Current Affairs
DATE Fri 06 Aug 1999
STORY LENGTH 482

HEADLINE: Current Extreme Weather Phenomena Around the World

WEST: Well, what is going on with the weather? A tornado in Ontario destroyed a mobile home. A mud slide in Alberta closed a stretch of the TransCanada Highway -- it just reopened. And the US is having the worst drought ever, it's killing crops. Not to mention typhoon floods and landslides in Southeast Asia.

** Amir Shabbar is a research climatologist with Environment Canada and he joins us now.

And, apparently, you're going to explain some of the wackiness that's been going on with the natural disasters and things. First off, can you give me an overview of what is going on where in the world?

SHABBAR: Okay. Well, there are heavy monsoon rains in Southeast Asia which has claimed over 700 lives. But that is still comparatively low compared to over 4,000 which were killed with the floods in the Yangtze River last year. But because of the flood control measures that were taken last year some of the deaths have been averted this year. There are of course severe weather over the North American continent. The heat wave in the US mainly responsible --

WEST: Yeah, we can see that right there. [video excerpt] All of North America highlighted.

SHABBAR: All of North America. In Canada as well we have had all kinds of strange weather recently.

WEST: Well, this is the hottest Ontario has been I think in 160 years. That's what I heard.

SHABBAR: Well, the January-to-July statistics are out and they show that Canada as a whole has been the third-warmest so far this year. But that compares to, for example, '97 and '98. They were all the warmest years for us in Canada, and globally as well. The cause for the heat wave in the US is this Bermuda high which naturally occurs in the summertime in the Atlantic. But this year it has moved further east over the North American continent and is responsible for bringing all this heat and dryness in the US.

WEST: And was that something that was expected? Or is this a surprise?

SHABBAR: The drought in the southeast US was a surprise. It was not in the forecast. I think this could be attributed to somewhat of the variability in the climate. The Bermuda high does occasionally shift westward as it die in the eighties, for example, and brought a lot of deaths from the heat wave there as well.

WEST: How about La Nina?

SHABBAR: La Nina is still in the picture. It refers to the occasionally cooling of the tropical Pacific. We can see some of the effect of La Nina. For example, heavy monsoons in the southeastern Asian continent, cool and wet over the Caribbean. And that is still going on. It is expected to last into the next winter actually.

WEST: Okay, well, thank you so much for coming in, Amir. Appreciate that.

SHABBAR: Thank you.

SEARCH TERMS ENVIRONMENT; CANADA;

INFOMART CUSTOMSEARCH

*** END OF STORY ***

7C405-7	04 Aug 99 CJOH-TV/CTV NEWSLINE OTTAWA	ENVIRONMENT CANADA HAS REPORTED THAT SEVERAL WEAK TORNADOS MAY HAVE HIT THE HAMILTON MOUNTAIN AREA THIS AFTERNOON. A SERIES OF SEVERE THUNDER STORMS RIPPED THROUGH THE AREA AND THERE WERE NO REPORTS OF INJURIES. (MAX KEEPING)	18:05 00:30 MIN

7C965-2 CHYM-FM / KITCHENER / NEWS (08:00) 05 Aug 99 / 213
08:03 JOE PAVIA ENVIRONMENT CANADA
00:30min JOE PAVIA
ENVIRONMENT CANADA OFFICIALS WILL BE IN
THE HAMILTON AREA TODAY TO DETERMINE
THE EXTENT OF DAMAGE DONE BY A TORNADO.

7C8CC-5 CFRB-AM / TORONTO / NEWS (08:00) 05 Aug 99 / 210
08:03 DAVE AGAR ENVIRONMENT CANADA
00:30min AVERY HAINES
ONTARIO: SOUTHERN ONTARIO WAS HIT BY TWISTERS AND ONE TORNADO. [**ENVIRONMENT CANADA**]

7C8EF-8 CFPL-AM / LONDON / NEWS (08:00) 05 Aug 99 / 213
08:03 GORD HARRIS ENVIRONMENT CANADA
00:45min GORD HARRIS
GORD HARRIS, YVONNE VANDERWEILDE
HAMILTON: RESIDENTS ON HAMILTON MOUNTAIN ARE PICKING UP THE PIECES THIS MORNING AFTER A SERIES OF SEVERE THUNDERSTORMS RIPPED ACROSS THE AREA YESTERDAY. **ENVIRONMENT CANADA** IS SURE A TORNADO HIT BURLINGTON.

7C99C-1 CBCL-FM / LONDON / LONDON NEWS (08:30) 05 Aug 99 / 213
08:30 DAVE SEDGELAND ENVIRONMENT CANADA
01:05min DAVE SEDGELAND
HAMILTON: RESIDENTS ALONG THE NORTH SHORE OF LAKE ERIE AND ON THE HAMILTON MOUNTAIN ARE CLEANING UP FROM A MAJOR STORM YESTERDAY. WITNESS "MARG WILLIAMS" DESCRIBES THE SCENE AS A TORNADO HIT THE AREA. INVESTIGATORS FROM **ENVIRONMENT CANADA** WILL BE LOOKING INTO THE FUNNEL CLOUD SIGHTINGS.
