
**Confirmed Tornado
Shannonville, Ontario
September 10, 1981**

Date- Local: Thursday, September 10th, 1981.

UTC: Thursday, September 10th, 1981.

Time-Local: 19:40

UTC: 23:40

Location: Shannonville

Region: Kingston – Prince Edward

Classification: Confirmed Tornado

Category: A

Casualties: None

Track Length: 12844m

Width: 150m

Motion: 287°

Damage Estimate: None Available

F-Scale Rating: F1

Code: BS/TS

Damage Survey: one

Spotter Reports: None

Other Documents:

Logged event citing event as a confirmed F1 tornado, no evidence given. Information on this event, including field survey report by M.J. Newark and P.J. Elms, can be found in the 'Ontario September 1981' folder at the front of this year.

An unedited version of 'The Multiple Tornado Outbreak of September 10, 1981 In Eastern Ontario' by M.J. Newark and P.J. Elms.

Tornado F-Scale Assessment

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Tornado Data Production Assistant, Environment Canada

August 10, 2005.

Classification: Confirmed Tornado

Date: Thursday, September 10th, 1981.

Location: Shannonville, Kingston – Prince Edward

Assessment: F1

F-Code: BS/TS

Explanation of Assessment: There is a project summary sheet along with a damage survey (including newspaper clippings and Tornado survey forms) that was conducted by the weather office that confirms this as an F1 tornado. The damage survey states that damage found was in the form of trees broken/uprooted and a barn and drive shed badly damaged. Due to the damage found and the survey, this tornado is rated an F1.

CLASSIFICATION: Severe Thunderstorm**SOURCE/WATCHER ID:****EVENT TIME (UTC):** 23-40 **EVENT DAY:** 10.0 **MONTH:** 9.0 **YEAR:** 1981.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0**DAY OF THE WEEK:****EVENT LOCALE:** Near Shannonville**ASOCTD PUBLIC RGN:** Peterborough and the Kawarthas**DETAILED DESCRIPTION:**

confirmed tornado, F1, 1 related death

INITIAL ASSESSMENT: YES**SPL WX STATEMENT IN EFFECT ?:** UKN **STATEMENT LEAD TIME (HR):** (MIN):**WATCH IN EFFECT ?:** UKN **WATCH LEAD TIME (HR):** (MIN):**WARNING IN EFFECT ?:** UKN **WARNING LEAD TIME (HR):** (MIN):**TORNADO:** F1**WINDSPEED:****RAINFALL:** MM **RAIN DURATION:****HAIL DIAMETER:** MM **HAIL DESCRIPTION:****EVENT DESCRIPTION:** Tornado**Mesoscale ?:** **Synoptic ?:** **Big Event ?:** YES**Statement Est Hit/Miss:****Watch Est Hit/Miss:****Warning Est Hit/Miss:****Separate Event (30km/30min):** YES**Vetted by:****Vetted date:**

THE MULTIPLE TORNADO OUTBREAK OF SEPTEMBER 10, 1981
IN EASTERN ONTARIO

TORNADES MULTIPLES DU 10 SEPTEMBRE 1981
DANS L'EST DE L'ONTARIO

Surveys of the "Shannonville" Tornado, the "Howe Island" Tornado
and the "Adolphus Reach" Tornado

Études des tornades de Shannonville, de l'île Howe
et d'Adolphus Reach

by/par
M.J. Newark and P.J. Elms

Ontario Weather Centre/Centre météorologique de l'Ontario
Toronto International Airport/Aéroport international de Toronto

1. THE WEATHER SITUATION

On Thursday September 10, 1981 a low pressure area from the upper Great Lakes moved eastsoutheastwards along the Ottawa Valley. By 2000 EST it was centred mid-way between Ottawa and Montreal with a central pressure of 100.5 kPa (see Figure 1). A narrow wedge of mP air, characterized by afternoon temperatures of 19 or 20 degrees Celsius and dew points near 17 degrees Celsius was drawn across southern Ontario by the low pressure area. At 2000 EST the advancing edge of mA air stretched approximately from Cornwall to Trenton to Toronto. Preceding this cold front, and within 250 km of the low centre, a number of late afternoon thunderstorms developed. The weather radar at Carp, Ontario indicated that the individual thunderstorm cells were moving generally from northwest to southeast. Two of the cells (moving along AA' and BB', Figure 2) produced a total of three confirmed tornadoes. The cell travelling along AA' was responsible for the Howe Island tornado, and in this case the average velocity of the radar echo was from 306 degrees at 46 km/h. The cell travelling along track BB' was responsible for both the Shannonville and Adolphus Reach tornadoes, and had an average velocity from 302 degrees at 39 km/h.

2 SURVEY RESULTS

2.1 The Howe Island Tornado

The location of this tornado (see map, Figure 3) was visited on September 11, 1981, the day after the event. The area is remote and sparsely populated, and the terrain (an extension of the Canadian shield) is fairly rough. Only one inhabited property (that of Franz and Greta Koritnik) lay on the damage track, while the remainder of the track was either over water or virgin land.

Location 1, Figure 3. Bateau Channel. The operator of the cruise boat "Island Queen" reported to the Kingston weather office that three funnel clouds were observed forming into one at about 1830 EST. The resulting funnel then moved southeastwards towards Howe Island. This location is only an estimate of where the funnels were observed.

Location 2, Figure 3. Byrne Point. No damage was reported in this vicinity.

Location 3, Figure 3. Lot 21, Howe Island Township, the Koritnik property. An examination revealed broken or uprooted trees, the largest of which was a willow about 100 cm in diameter. Grass and cattails were flattened, and minor damage (eavestroughing removed, broken glass) was observed to the two buildings on the site. At a dock near

the main residence, a moored 4.8 m aluminum boat filled with water and with a 9-1/2 horsepower motor attached, was picked up and thrown northwestwards. It landed upside down on the dock. The direction of tree fall, flattening of the grass etc., was noted and mapped in Figure 4 which clearly reveals a line of wind convergence more or less centred in a damage swath about 80 m wide and oriented from northwest to southeast. The convergence line itself shows the hint of a sinusoidal wave motion along its length. Flattened patches of vegetation in Photo 1 show the convergent pattern.

Mrs Koritnik saw the storm approaching sometime between 1800 and 1830 EST, and observed a swirl on the water of Johnston Bay to the northwest. She noted that the storm was "too noisy for such a small disturbance". During the examination at this location, the Ontario Provincial Police from Kingston made a visit to look at the damage and Sergeant Rudi Scott told us that he had been informed of another funnel sighting on Adolphus Reach (see section 2.3).

Location 4, Figure 3. This location is a rocky ridge covered by an open forest immediately adjacent to a swamp filled with cattails. The damage track could be followed across the ridge by minor breakage of tree limbs and a flattening of the low undergrowth. In the cattails, which were about 2.5 m tall, a very clear and sharply defined path was observed (see photos 2 and 3) where all the vegetation was flattened for a width of 5 m. The cattails adjacent to the damage track were undisturbed.



PHOTO 1. Grass and cattails flattened in a convergent pattern on the Koritnik property, Howe Island, location 3, Figure 3.



PHOTO 2 (top). A swath of damage 5 metres wide through a cattail marsh on Howe Island, location 4, Figure 3. PHOTO 3 (bottom). The same swath (between the arrows) viewed from above.

Location 5, Figure 3. This is another finger of the same swamp observed at location 4. A similar damage track could be seen crossing it. Beyond this point lay the access road to the Koritnik property. No damage to the trees could be seen along the road and further surveying towards the southeast was halted by an impenetrable tangle of bush.

2.2 THE SHANNONVILLE TORNADO

Most of the track of this tornado lay across open farm country but the final leg angled through thick uninhabited cedar stands bordering the Salmon River (see map, Figure 5). A survey of the damage was conducted on September 13, 1981.

Location 1A, Figure 5. The forming tornado funnel was observed by Wayne Haddock who was at location 1B. This location is simply an estimate of where the funnel was seen.

Location 1, Figure 5. Earl Ross farm, lot 27, concession 4, Thurlo township. At approximately 1820 EST a cone shaped funnel was observed approaching from the northwest accompanied by a train-like rumble. A machine shed was demolished and a large barn was 70-80% damaged (photos 4,5). The entire back (east facing) wall was taken out of a 3-bay garage constructed of cement blocks (photo 6), while one of its west-facing doors was blown out. Several trees were damaged and split cedar railings were blown down along a fence to the northwest of the barn. The main residence and two small sheds near the barn were undamaged. Tin from the barn roof was found at locations 2 and 3, as far as 3 km to the southeast.

Location 2. Figure 5. An abandoned farm. A large sheet of tin (3.3 m x 0.8 m) from location 1 was found in a tree.

Location 2A. Figure 5. Harold McAvoy (at location 2B) and Greg Longhurst (at location 2C) both saw the funnel lifting water from a swamp and carrying it 60 to 70 m into the air.

Location 3, Figure 5. Jack McAvoy farm, lot 1, concession 3, Tyendinaga Township. Just after milking time (approximately 1800 EST) Mr. McAvoy saw a vee-shaped cloud approaching from the northwest. "You never heard such a roar in your life" he said. The funnel passed to the east of the farm buildings causing no damage to them, but left a clear damage track through an adjacent cornfield. Corn stalks were flattened in a convergent pattern towards the middle of a swath measured as 155 m in width. Limbs of trees along a fenceline beside the cornfield were broken towards the east.



PHOTOS 4 (top) and 5. Damage caused by the "Shannonville" tornado to the Earl Ross barn, location 1, Figure 5. The top view is of the south side of the barn, the bottom view is of the north side.

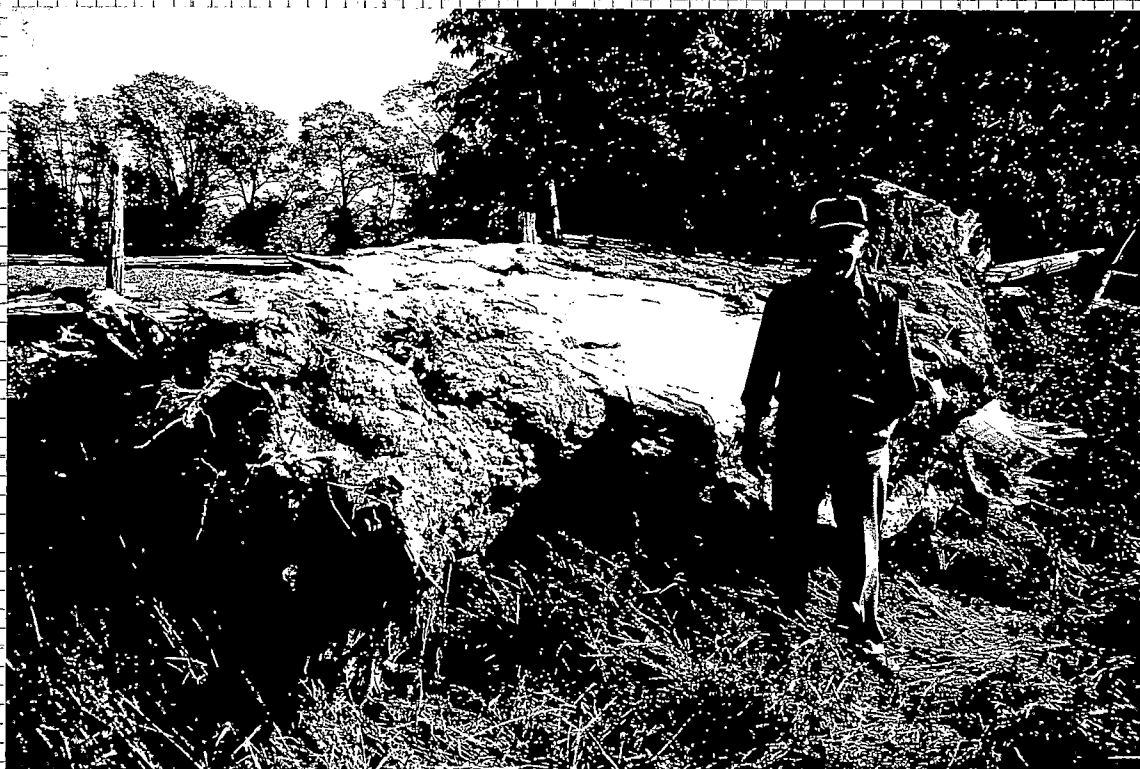


PHOTO 6 (top). The east facing wall blown out of the 3-bay concrete block garage on the Earl Ross farm, location 1, Figure 5. PHOTO 7 (bottom). D.J.Lazier standing beside a section of an uprooted Manitoba maple tree 1.4 m in diameter, location 5, Figure 5.

Location 4, Figure 5. A farm rented by L.R.Mortimore, lot 7, concession 2, Tyendinaga Township. At about 1830 EST, a drive shed located slightly to the north and west of the main residence was flattened. The residence itself was not damaged except that a brick chimney was twisted and pushed off above roof level. It fell from northwest to southeast. A farm waggon was flipped over and a metal farm gate was twisted out of shape by the wind. Four willow trees were uprooted, some of which fell pointing southwards, with others towards the southeast. A corn field about 200 m southwest of the house was damaged (the intervening area, it should be noted, was a bare field containing nothing that would indicate damage).

Location 4A, Figure 5. R.Mooney residence. At about 1830 EST, Mr. Mooney was driving home from a neighbour's place to the south. He saw a cone shaped funnel which was moving from west to east beyond his house. It caused no damage to this property.

Location 5, Figure 5. D.J.Lazier farm, lot 8, concession 2, Tyendinaga Township. At approximately 1850 EST Mr. Lazier heard a "roaring ,whistling sound" which followed a 10 minute heavy downpour of rain. A huge Manitoba maple tree 1.4 m through the butt (photo 7) was uprooted adjacent to the south side of his house. It fell from west to east and the crown crushed a corner of the roof. The house itself was otherwise undamaged. The tree had been cut and removed prior to the survey. The only other damage at this location was to trees along the roadside, one of which was uprooted from the north towards the south, while limbs were broken from others. A cluster of outbuildings survived intact except for some tin roofing peeled back from the southwestern portion of the barn roof towards the north. From the orientation of the damage, it is inferred that the tornado convergence line was positioned to the east of the farm buildings. The damage width at this location was estimated to be about 80 metres.

Location 6, Figure 5. Grahame farm, lot 9, concession 1, Tyendinaga Township. Mr. Grahame was in the milkhouse at approximately 1850 EST when he heard the roar of the storm. None of his buildings were damaged because the tornado passed just to the south of them. It's path was highly visible through a cornfield (plants about 2 m high) with cornstalks flattened in a convergent pattern towards the centre of a swath measured as 52 m in width. The only other visible signs of damage at this location were limbs broken from a few trees beside the cornfield. Mr. Grahame measured 30 mm of rain from the storm using a fence mounted rainauge. Beyond this location lay a pond and then cedar bush which extended several kilometres, none of which was surveyed.

Location 7, Figure 5. Go-cart track. This location was not examined first hand but it was reported that a large sign had been overturned. The precise location of the sign is not known. There was no known damage beyond this location.

2.3 THE ADOLPHUS REACH TORNADO

Information concerning this event was initially received from Kingston OPP Sergeant Rudi Scott, and then confirmed by telephone with the principal observer, Peter Vandenburg, a commercial fisherman. Mr Vandenburg lives very close to Prinyer Cove, on the Prince Edward County shore of Adolphus Reach (see map, Figure 6). At approximately 1915 EST he was leaving his house when he noticed a funnel cloud over the water of the Reach. He estimated that it was about mid-channel and moving towards the east. As he watched, he saw water being lifted up, but after a few moments lost sight of it due to rain.

No reports of damage due to this tornado have been received and it is not known whether it had any land trajectory.

3 CONCLUSION

The combination of physical evidence and eyewitness reports lead conclusively to the existence of a least two tornadoes near the east end of Lake Ontario at approximately the same time on Thursday evening, September 10, 1981. The third event (the Adolphus Reach tornado), although a confirmed sighting, could be interpreted as being the "tail-end" of the Shannonville tornado, and thus not an independent event. However, it is judged to be a separate tornado for two reasons. Firstly, it was located 25 km distant from the last damage due to the Shannonville tornado, and secondly, the extrapolated track of the Shannonville tornado ($287^{\circ} \pm 3^{\circ}$) lies about 8 km northeast of the Adolphus Reach tornado. These displacements satisfy the National Tornado Project requirements for distinguishing individual tornadoes in an outbreak situation. Consequently September 10, 1981 is considered to be a multiple outbreak tornado day with 3 confirmed tornadoes. Their known physical dimensions are summarized in Tables 1, 2 and 3.

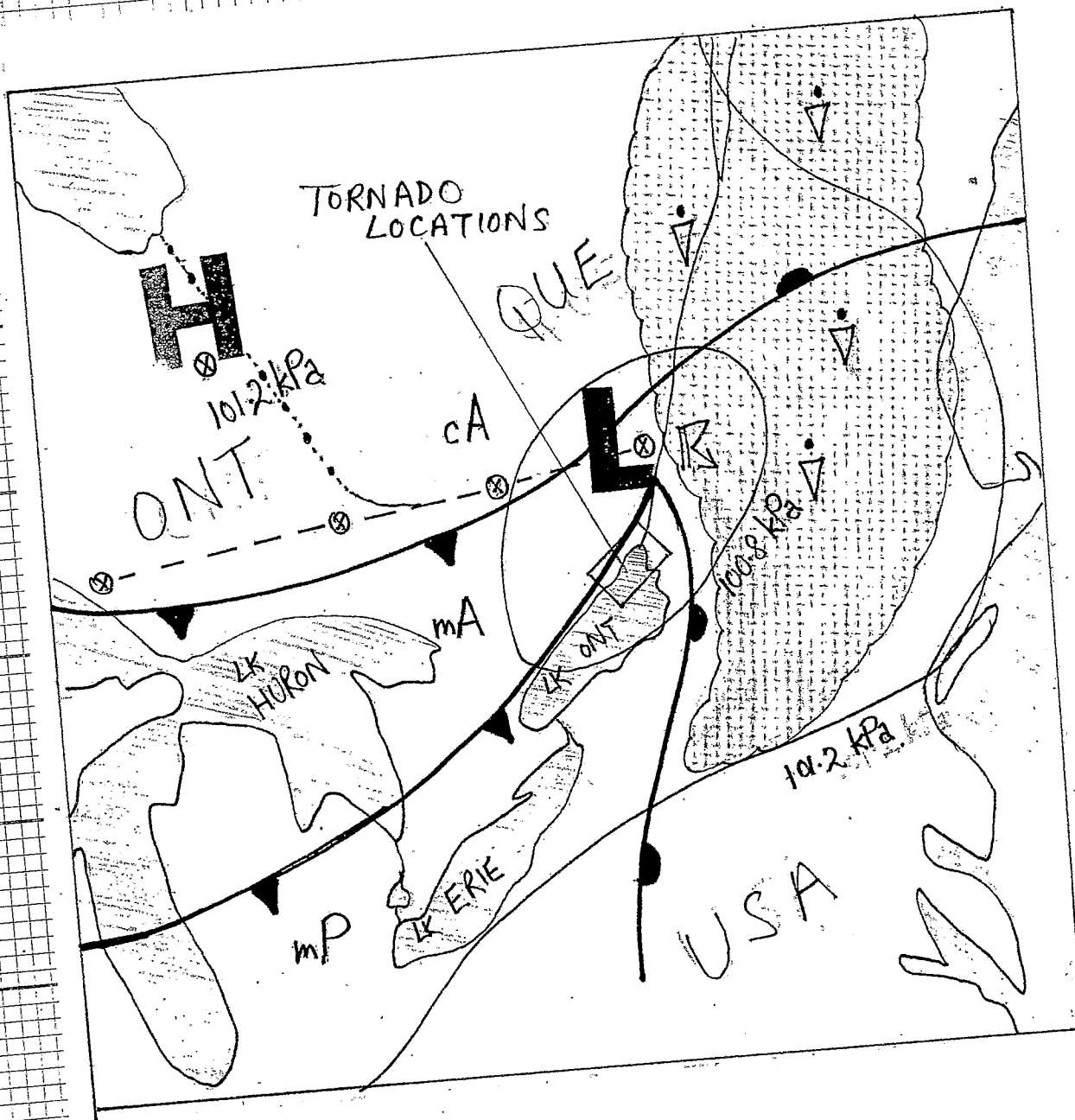


FIGURE 1. Surface weather map, 2000 EST, September 10, 1981

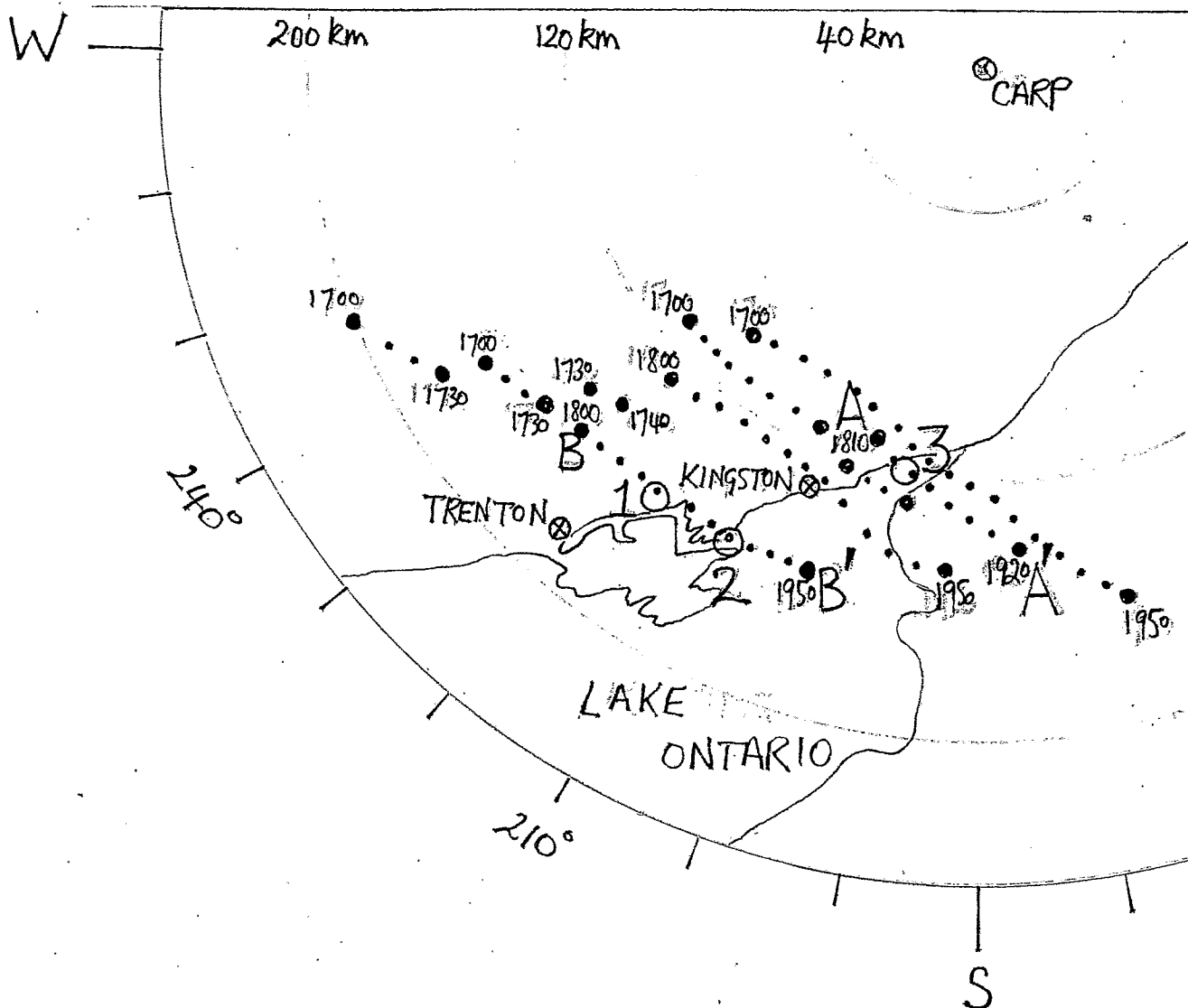


FIGURE 2. Tracks of radar echoes for the period 1700 EST to 1950 EST September 10, 1981 (derived from Carp weather radar). Large dots mark the beginning and end points of individual tracks and are labelled with the time (EST). Small dots are echo locations at ten minute intervals. The numbered circles are the tornado locations; 1 - Shannonville, 2 - Adolphus Reach, 3 - Howe Island.

TABLE 1 Summary of tornado physical dimensions
GEOGRAPHICAL LOCATION: HOWE ISLAND, ONTARIO

TABLAU 1 Résumé des dimensions physiques de la tornade
LIEU: HOWE ISLAND, ONTARIO

	IDENTITY NUMBER/N° d'identification:	QUANTITY VALUE VALEUR	ESTIMATED STANDARD ERROR/ERREUR-TYPE ESTIMÉE	ERROR DISTRIBUTION CODE ^a /CODE DE DISTRIBUTION DE L'ERREUR ^a
1)	<u>0698129</u>			
5-7)	DATE: <u>THURSDAY SEPT. 10, 1981</u> / Date: <u>JEU. 10 SEPTEMBRE 1981</u>			
9)	TIME: at start point/Heure: début de la tornade			
12-13)	UTM CO-ORDINATES of start point (Zone and easting, northing)/Coordonnées PTM du point d'origine de la tornade (repère de fuseau, abscisse et ordonnée)	<u>1820EST</u> <u>18398600,</u> <u>4906300</u>	<u>6 min</u> <u>500 m</u>	<u>S</u> <u>O</u>
15)	DIRECTION OF TRACK (from start point to end point)/Direction de la trajectoire (du point d'origine au point où elle a pris fin)	<u>296°</u>	<u>11.3°</u>	<u>C</u>
17)	F-SCALE NUMBER/Valeur à l'échelle F	<u>0</u>	not applicable/ne s'applique pas	
	LENGTH OF TRACK (Straight line from start point to end point)/Longueur de la trajectoire (ligne droite allant du point d'origine de la tornade au point où elle a pris fin)	<u>2.504 km</u>	<u>501 m</u>	<u>O</u>
18)	DAMAGE LENGTH/Étendue linéaire des dommages	Assumed to be the same as length of track/supposée égale à la longueur de la trajectoire		
	DAMAGE AREA/Superficie des dommages	<u>0.08 km²</u>	<u>6012 m²</u>	<u>O</u>
20)	MAXIMUM DAMAGE WIDTH/Largeur maximum des dommages	<u>80 m</u>	<u>12 m</u>	<u>S</u>
21)	AVERAGE DAMAGE WIDTH/Largeur moyenne des dommages	<u>30 m</u>	<u>12 m</u>	<u>S</u>
26)	NUMBER OF FATALITIES/Nombre de décès	<u>0</u>		
27)	NUMBER OF INJURIES/Nombre de blessés	<u>0</u>		
29)	VALUE OF PROPERTY DAMAGE/Estimation des dommages matériels			
36.1)	MAXIMUM SIZE OF HAIL/Dimension maximum des grêlons	<u>0</u>		
36.2)	AVERAGE TRANSLATION SPEED/Vitesse moyenne de déplacement	<u>7</u>		
36.3)	RADAR STORM TOP/Sommet de la tempête décelé par radar			

a) S = square uniform/dist. uniforme carrée
O = circular uniform/dist. uniforme circulaire
C = circular normal/dist. normale circulaire
Q = unknown/dist. inconnue
Blank/blanc = no error/aucune erreur

R = rectangular uniform/dist. uniforme rectangulaire
E = elliptical normal/dist. normale elliptique
B = bimodal/dist. bimodale
T = other/autre

TABLE 2 Summary of tornado physical dimensions
GEOGRAPHICAL LOCATION: NEAR SHANNONVILLE, ONTARIO

TABLEAU 2 Résumé des dimensions physiques de la tornade

LIEU: L'ENVIRONNEMENT DE SHANNONVILLE (ONT)

- 1) IDENTITY NUMBER/N° d'identification:
0698130
- 5-7) DATE: THURSDAY SEPT 10, 1981 Date:
JEUDI 10 SEPTEMBRE 1981
- 9) TIME: at start point/Heure: début
de la tornade
- 12-13) UTM CO-ORDINATES of start point (Zone
and easting, northing)/Coordonnées PTM
du point d'origine de la tornade (re-
père de fuseau, abscisse et ordonnée)
- 15) DIRECTION OF TRACK (from start point
to end point)/Direction de la trajec-
toire (du point d'origine au point où
elle a pris fin)
- 17) F-SCALE NUMBER/Valeur à l'échelle F
LENGTH OF TRACK (Straight line from
start point to end point)/Longueur de
la trajectoire (ligne droite allant du
point d'origine de la tornade au point
où elle a pris fin)
- 18) DAMAGE LENGTH/Étendue linéaire des
dommages
- DAMAGE AREA/Superficie des dommages
- 20) MAXIMUM DAMAGE WIDTH/Largeur maximum
des dommages
- 21) AVERAGE DAMAGE WIDTH/Largeur moyenne
des dommages
- 26) NUMBER OF FATALITIES/Nombre de décès
- 27) NUMBER OF INJURIES/Nombre de blessés
- 29) VALUE OF PROPERTY DAMAGE/Estimation
des dommages matériels
- 36.1) MAXIMUM SIZE OF HAIL/Dimension maxi-
mum des grêlons
- 36.2) AVERAGE TRANSLATION SPEED/Vitesse
moyenne de déplacement
- 36.3) RADAR STORM TOP/Sommet de la tempête
détecté par radar

QUANTITY VALUE VALEUR	ESTIMATED STAND- ARD ERROR/ERREUR- TYPE ESTIMÉE	ERROR DISTRIBUTION CODE ^a /CODE DE DISTRIBUTION DE L'ERREUR ^a
1840 EST	6 min	S
18 315 000 49 027 00	158 m	R
287°	3"	C
1	not applicable/ne s'applique pas	
12.844 km	766 m	O
Assumed to be the same as length of track/supposée égale à la longueur de la trajectoire		
1.55 km ²	9192 m ²	O
200 m	12 m	S
121 m	12 m	S
0		
0		
0		
0		
0		S
0		

- a) S = square uniform/dist. uniforme carrée
O = circular uniform/dist. uniforme circulaire
C = circular normal/dist. normale circulaire
Q = unknown/dist. inconnue
Blank/blanc = no error/aucune erreur

- R = rectangular uniform/dist. uniforme rectangulaire
E = elliptical normal/dist. normale elliptique
B = bimodal/dist. bimodale
T = other/autre

TABLE 3 Summary of tornado physical dimensions
GEOGRAPHICAL LOCATION: A DOLPHUS REACH, ONTARIO

TABEAU 3 Résumé des dimensions physiques de la tornade
LIEU: ADOLPHUS REACH, ONTARIO

- 1) IDENTITY NUMBER/N° d'identification:
0698131
- 5-7) DATE: THURSDAY, SEPT 10, 1981 / Date:
JEUDI 10 SEPTEMBRE 1981
- 9) TIME: at start point/Heure: début
de la tornade
- 12-13) UTM CO-ORDINATES of start point (Zone
and easting, northing)/Coordonnées PTM
du point d'origine de la tornade (re-
père de fuseau, abscisse et ordonnée)
- 15) DIRECTION OF TRACK (from start point
to end point)/Direction de la trajec-
toire (du point d'origine au point où
elle a pris fin)
- 17) F-SCALE NUMBER/Valeur à l'échelle F
- LENGTH OF TRACK (Straight line from
start point to end point)/Longueur de
la trajectoire (ligne droite allant du
point d'origine de la tornade au point
où elle a pris fin)
- 18) DAMAGE LENGTH/Étendue linéaire des
dommages
- DAMAGE AREA/Superficie des dommages
- 20) MAXIMUM DAMAGE WIDTH/Largeur maximum
des dommages
- 21) AVERAGE DAMAGE WIDTH/Largeur moyenne
des dommages
- 26) NUMBER OF FATALITIES/Nombre de décès
- 27) NUMBER OF INJURIES/Nombre de blessés
- 29) VALUE OF PROPERTY DAMAGE/Estimation
des dommages matériels
- 36.1) MAXIMUM SIZE OF HAIL/Dimension maxi-
mum des grêlons
- 36.2) AVERAGE TRANSLATION SPEED/Vitesse
moyenne de déplacement
- 36.3) RADAR STORM TOP/Sommet de la tempête
détecté par radar

QUANTITY VALUE VALEUR	ESTIMATED STAND- ARD ERROR/ERREUR- TYPE ESTIMÉE	ERROR DISTRIBUTION CODE ^a /CODE DE DISTRIBUTION DE L'ERREUR ^a
1910 EST	6 min	S
18 35 0000 48 86000	750 m	O
270°	23°	S
—	not applicable/ne s'applique pas	
—		
Assumed to be the same as length of track/supposée égale à la longueur de la trajectoire		
—		
—		
—		
0		
0		
0		
—		
—		S
—		

- a) S = square uniform/dist. uniforme carrée
O = circular uniform/dist. uniforme circulaire
C = circular normal/dist. normale circulaire
Q = unknown/dist. inconnue
Blank/blanc = no error/aucune erreur

- R = rectangular uniform/dist. uniforme rectangulaire
E = elliptical normal/dist. normale elliptique
B = bimodal/dist. bimodale
T = other/autre