
**Confirmed Tornado
Purple Valley, Ontario
June 2, 1999**

Date- Local: Wednesday, June 2nd, 1999

UTC: Wednesday, June 2nd, 1999

Time- Local: 1200

UTC: 1600

Location: Purple Valley, N of Wiarton

Region: Grey-Bruce

Classification: Confirmed Tornado

Category: A

Casualties: Starling crushed by combine

Track Length: None available

Width: None available

Motion: None available

Damage Estimate: \$ 60 000

F-Scale Rating: F1

Code: BS

Damage Survey: David Sills, Patrick King and Caroline Floyd

Spotter Reports: Six

Other Documents:

Damage Survey Report written by David Sills, MSC King Radar

Set of 24 Slides

Newspaper Articles

sjs

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

Tornado F-Scale Re-Assessment

Sarah J. Scriver

Tornado Data Production Assistant, Environment Canada

April 20th, 2004

Classification: Confirmed Tornado

Date: Wednesday, June 2nd, 2004

Location: Purple Valley, Grey-Bruce Region

Original Assessment: F1

Re-Assessment: F1

F-Code: BS

Explanation of Assessment: Barn destroyed, heavy farm equipment lifted and moved, numerous large trees snapped and uprooted.

SJS

Meteorological Service of Canada
4905 Dufferin Street, ARMP
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CANADA

Storm Damage Survey - June 2, 1999

Investigators

David Sills, AES King Radar
Patrick King, AES Downsview
Caroline Floyd, RCTO

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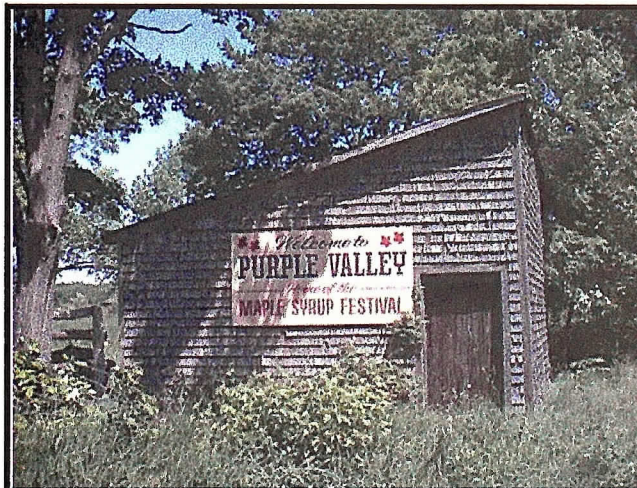
Quick Facts

Severe Weather Type	Tornado
Location	Purple Valley, Ontario
Time	12:00 EDT
Magnitude	F1
Path Length	1 km
Path Width	50 m
Significant Damage	Barn destroyed, heavy farm machinery lifted and moved, numerous large trees snapped and uprooted
Damage Estimate (Source)	\$60 000 (farm owners)

Overview

A cluster of low-topped thunderstorms passed through the Grey-Bruce area of southern Ontario near noon on June 2, 1999. A report of damage, possibly by a tornado, was received by RCTO (see Appendix A). Approximately 50 mm of rain fell in about 20 minutes at Wiarton. No injuries or fatalities were reported. The damage site was at Purple Valley in Bruce County, approximately 20 km northeast of Wiarton. The survey team left Toronto via King City on the morning of

Thursday, June 3 to investigate. The team concluded that an F1 tornado travelled in a SW-NE direction through Purple Valley for a distance of approximately 1 km. The damage path width was approximately 50 m. A pole barn, a drive shed and a calf hut were destroyed with debris strewn downwind up to 500 m away. A tractor-driven combine weighing approximately one metric tonne was lifted and deposited to the northeast approximately 15 m away with no evidence of dragging. A large Niagara limestone rock, also weighing approximately 1 metric tonne in weight, was dragged about 1 m along the ground. A dozen or so large trees were either uprooted or snapped. No witness actually saw the tornado as it occurred.



Investigation

On the way to the damage site, just SW of Purple Valley, there appeared to be some light damage in a woodlot. Arriving at Purple Valley, damage was found to be restricted to a narrow path from the

woodlot behind the community centre to a pasture approximately 1 km to the ENE. The greatest amount of damage appeared to be at the Gilbert farm (519-534-3150).

[map from Pat]

Beginning at the community centre, much of damage appeared to be downed trees. It was reported that the chimney on the community centre had been toppled but we found no evidence of this (it may have been repaired). A witness living across the street from the community centre reported that after a calm, a terrible wind came up accompanied by a roaring noise. As the trees began to bend over, he tried to close the door to the house but had great difficulty, even with help from two other occupants.



Facing SE

At the southwestern part of the Gilbert farm, several large trees were downed and a calf hut was overturned and thrown 10 m . Damage appeared to be cause by a wind from the SSW here.



Facing NNE

A well-maintained pole barn suffered major damage as shown in the photos below.



Facing NNE



Facing NE



Facing S

To the west of the barn, a small drive shed housing a tractor-driven combine was flattened. The combine (green) was found 15 m away to the NE and there was no evidence that it was dragged along the ground. This piece of machinery weighs approximately 1 metric tonne and could not have been easily lifted. Interestingly, it seems the combine was set on the ground on top of a starling as shown below.



Facing NE



Combine and wheel with starling underneath

Debris from the barn was found mostly to the ENE through NNE up to 500 m away.



Debris and cows, facing E



Debris to NNE of barn including metal roofing wrapped around tree limbs, facing NNE

However, as shown below, some debris was found to the NW of the site indicating a cyclonic motion associated with rotating tornadic winds. Also, a patch of long grass on the far right side of the picture was flattened from the N.



Facing S

In addition, the ground was impaled by a wood beam from the barn to a depth of about 30 cm from a westerly direction.



Facing SE (Dave)

Another interesting item was that a Niagara limestone rock, probably weighing more than 1 metric tonne, was moved to the NE along the ground for about 1 m.



Facing SE (Pat)

In a pasture to the northeast of the Gilbert farm, there were several large trees down in various directions. The trees were either uprooted, snapped or bent. Some trees were thrown 30 m away from the stump.



Facing SE



Facing NE, top of snapped tree near centre of picture

The owner of this property reported that the large maple tree below was thrown into another tree, spun around, then dragged about 20 m to the east. The deep, curved gouge in the ground in the forefront of the picture appears to support this.



Facing E

Conclusions

Evidence of rotation found at this site is consistent with a cyclonically rotating tornado. No witness was able to make visual confirmation. Considering the amount of damage to the out buildings, the number of trees felled and the fact that both a heavy piece of farm machinery and a large rock were moved, the maximum intensity of the tornado would appear to be consistent with F1 damage on the Fujita scale (Fujita, 1981). The tornado appears to have moved from SW to NE with a damage path of approximately 50 m in width and about 1 km in length. The time of the event was approximately 1600 UTC (1200 EDT). There were no reports of injuries or deaths. Damaged was estimated to be about \$60 000.

Post Script

Robert and Melanie Gilbert decided to name their new colt, born the night previous to the storm, 'Tornado'.

Reference

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

Appendix A

SOURCE/WATCHER ID: Robert Gilbert / CFOS Radio Station

EVENT TIME (UTC): 16:00

EVENT DAY: 2

MONTH: 6

YEAR: 1999

EVENT DURATION (HR): 0 (MIN): 5

EVENT LOCALE: Purple Valley, north of Wiarton

ASOCTD PUBLIC RGN: Grey-Bruce

DETAILED DESCRIPTION: Path of damage, barn destroyed

Spotter Reports, June 2, 1999

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** Times-Journal
EVENT TIME (UTC): 00-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Wiarton
ASOCTD PUBLIC RGN: Grey-Bruce **DETAILED DESCRIPTION:** "barn destroyed"
INITIAL ASSESSMENT: UNCONFIRMED **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:** **WINDSPEED:** ? **RAINFALL:** MM **RAIN DURATION:** **HAIL DIAMETER:** MM **HAIL DESCRIPTION:** **EVENT DESCRIPTION:** Tornado **Mesoscale ?:** **Synoptic ?:** **Big Event ?:** **Statement Est Hit/Miss:** UKN **Watch Est Hit/Miss:** UKN **Warning Est Hit/Miss:** UKN **Separate Event (30km/30min):** UKN **Vetted by:** Leduc **Vetted date:** 02/09/99

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** Orleans Community Weekly Journal
EVENT TIME (UTC): 07-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Chapel Hill **ASOCTD PUBLIC RGN:** Ottawa-Hull **DETAILED DESCRIPTION:** "microburst causing roof damage, damage to house on an entire street ~~Nothing on radar- wrong day~~" **INITIAL ASSESSMENT:** UNCONFIRMED **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:** NO **WINDSPEED:** ? **RAINFALL:** ? MM **RAIN DURATION:** **HAIL DIAMETER:** MM **HAIL DESCRIPTION:** **EVENT DESCRIPTION:** Wind **Mesoscale ?:** **Synoptic ?:** **Big Event ?:** **Statement Est Hit/Miss:** UKN **Watch Est Hit/Miss:** UKN **Warning Est Hit/Miss:** UKN **Separate Event (30km/30min):** NO **Vetted by:** Leduc **Vetted date:** 02/09/99

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** The Star (Orleans)
EVENT TIME (UTC): 07-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Chapel Hill
ASOCTD PUBLIC RGN: Ottawa-Hull **DETAILED DESCRIPTION:** "Parts of roofs and aluminum siding blown off several homes. Branches snapped off trees, bushes uprooted. Likely microburst." **INITIAL ASSESSMENT:** UNCONFIRMED **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:** NO **WINDSPEED:** **RAINFALL:** MM **RAIN DURATION:** **HAIL DIAMETER:** MM **HAIL DESCRIPTION:** **EVENT DESCRIPTION:** Wind **Mesoscale ?:** **Synoptic ?:** **Big Event ?:** **Statement Est Hit/Miss:** UKN **Watch Est Hit/Miss:** UKN **Warning Est Hit/Miss:** UKN **Separate Event (30km/30min):** NO **Vetted by:** Leduc **Vetted date:** 02/09/99

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** The Intelligencer (Belleville) **EVENT TIME (UTC):** 16-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Purple Valley, Wiarton Area **ASOCTD PUBLIC RGN:** Grey-Bruce **DETAILED DESCRIPTION:** "Suspected tornado .. ripped apart a 20 by 30 metre barn, tossed combine ~20 metres." **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:** **WINDSPEED:** **RAINFALL:** **MM RAIN DURATION:** **HAIL DIAMETER:** **MM HAIL DESCRIPTION:** **EVENT DESCRIPTION:** Tornado **Mesoscale ?:** **Synoptic ?:** **Big Event ?:** **Statement Est Hit/Miss:** UKN **Watch Est Hit/Miss:** UKN **Warning Est Hit/Miss:** UKN **Separate Event (30km/30min):** NO **Vetted by:** Leduc **Vetted date:** 02/09/99

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** Melanie Gilbert - 519-534-3150 **EVENT TIME (UTC):** 16-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Purple Valley **ASOCTD PUBLIC RGN:** Grey-Bruce **DETAILED DESCRIPTION:** "Add to Purple Valley Report. Debris, steel from barn in trees." **INITIAL ASSESSMENT:** YES **SPL WX STATEMENT IN EFFECT ?:** YES **STATEMENT LEAD TIME (HR): (MIN):** **WATCH IN EFFECT ?:** NO **WATCH LEAD TIME (HR): (MIN):** **WARNING IN EFFECT ?:** NO **WARNING LEAD TIME (HR): (MIN):** **TORNADO:** F1 **WINDSPEED:** 150 **RAINFALL:** **MM RAIN DURATION:** **HAIL DIAMETER:** **MM HAIL DESCRIPTION:** None **EVENT DESCRIPTION:** Tornado **Mesoscale ?:** YES **Synoptic ?:** NO **Big Event ?:** YES **Statement Est Hit/Miss:** YES **Watch Est Hit/Miss:** NO **Warning Est Hit/Miss:** NO **Separate Event (30km/30min):** NO **Vetted by:** Kuhny **Vetted date:** 28/06/1999

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** CFOS Radio Station **EVENT TIME (UTC):** 16-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Purple Valley, North of Wiarton **ASOCTD PUBLIC RGN:** Grey-Bruce **DETAILED DESCRIPTION:** "Path of damage, barn destroyed." **INITIAL ASSESSMENT:** YES **SPL WX STATEMENT IN EFFECT ?:** YES **STATEMENT LEAD TIME (HR): (MIN):** **WATCH IN EFFECT ?:** NO **WATCH LEAD TIME (HR): (MIN):** **WARNING IN EFFECT ?:** NO **WARNING LEAD TIME (HR): (MIN):** **TORNADO:** F1 **WINDSPEED:** 150 **RAINFALL:** **MM RAIN DURATION:** **HAIL DIAMETER:** **MM HAIL DESCRIPTION:** None **EVENT DESCRIPTION:** Tornado **Mesoscale ?:** YES **Synoptic ?:** NO **Big Event ?:** YES **Statement Est Hit/Miss:** YES **Watch Est Hit/Miss:** NO **Warning Est Hit/Miss:** NO **Separate Event (30km/30min):** NO **Vetted by:** Kuhny **Vetted date:** 28/06/1999

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** Robert Gilbert - 519-534-3150 **EVENT TIME (UTC):** 16-00 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 5.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Purple Valley, north of Warton **ASOCTD PUBLIC RGN:** Grey-Bruce **DETAILED DESCRIPTION:** "Add to previous entries. CONFIRMED TORNADO. About 2 mile track of trees down. No witnesses. Pole barn destroyed. 100 m wide tornado ran about 1000 m along the ground. Damage estimate about \$60,000.00." **INITIAL ASSESSMENT:** YES **SPL WX STATEMENT IN EFFECT ?:** YES **STATEMENT LEAD TIME (HR): (MIN):** **WATCH IN EFFECT ?:** NO **WATCH LEAD TIME (HR): (MIN):** **WARNING IN EFFECT ?:** NO **WARNING LEAD TIME (HR): (MIN):** **TORNADO:** F1 **WINDSPEED:** 150 **RAINFALL:** 50 **MM RAIN DURATION:** 0.333 **HAIL DIAMETER:** MM **HAIL DESCRIPTION:** None **EVENT DESCRIPTION:** Tornado **Mesoscale ?:** YES **Synoptic ?:** NO **Big Event ?:** YES **Statement Est Hit/Miss:** YES **Watch Est Hit/Miss:** NO **Warning Est Hit/Miss:** NO **Separate Event (30km/30min):** YES **Vetted by:** Kuhny **Vetted date:** 28/06/1999

CLASSIFICATION: Severe Thunderstorm **SOURCE/WATCHER ID:** The Warton Echo **EVENT TIME (UTC):** 16-30 **EVENT DAY:** 2.0 **MONTH:** 6.0 **YEAR:** 1999.0 **EVENT DURATION (HR):** 0.0 **(MIN):** 0.0 **DAY OF THE WEEK:** **EVENT LOCALE:** Purple Valley **ASOCTD PUBLIC RGN:** Grey-Bruce **DETAILED DESCRIPTION:** "Pole barn destroyed, combine tossed 15 metres. Most wreckage within about 120 degree area about barn. Trees knocked down and/or twisted off trunks. '5 cm rain in 20 minutes.'" **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 ?:** **Statement Est Hit/Miss:** UKN **Watch Est Hit/Miss:** UKN **Warning Est Hit/Miss:** UKN **Separate Event (30km/30min):** NO **Vetted by:** Leduc **Vetted date:** 02/09/99