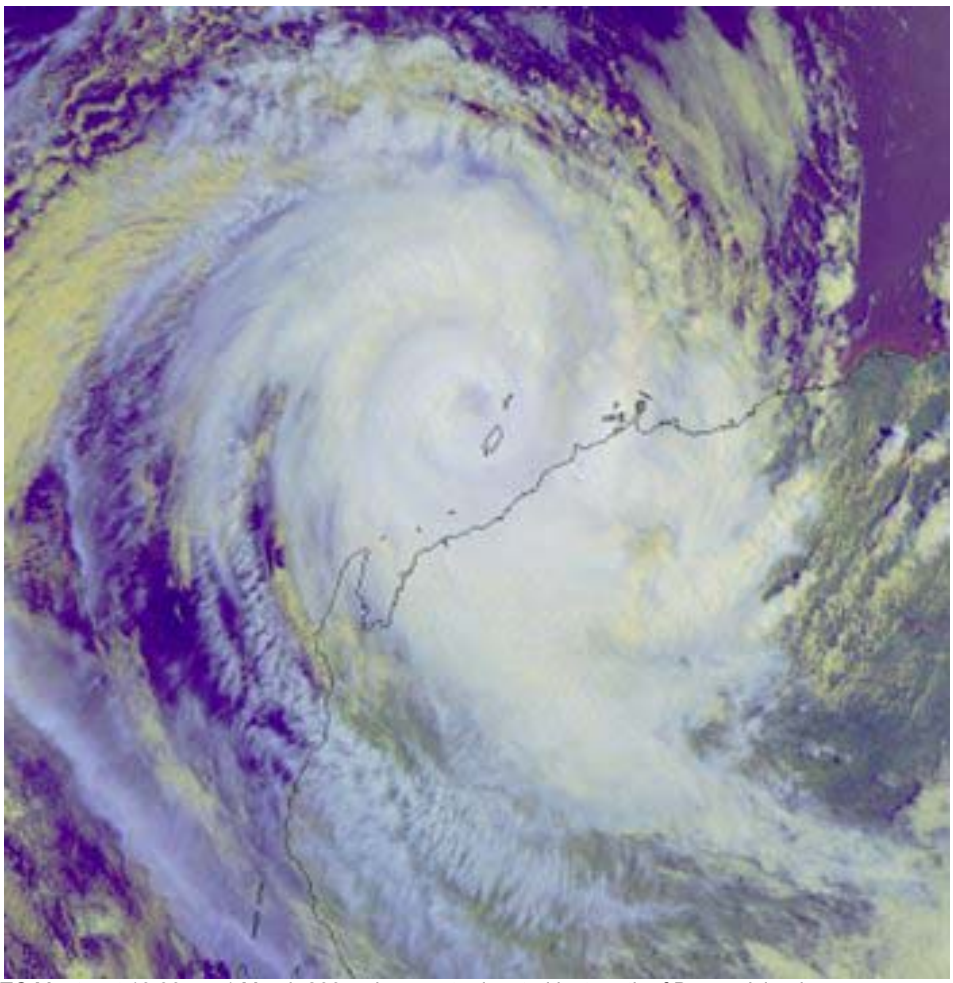
Australian Government

Bureau of Meteorology

Tropical Cyclone Season Summary
Western Australian Region
2003 – 2004



TC Monty, at 10:30 am 1 March 2004 when centre located just north of Barrow Island.
Image from *NOAA-17* satellite received and processed by Bureau of Meteorology courtesy from NOAA (USA).

Season Overview

There were six tropical cyclones that occurred in the Perth TCWC area of responsibility. *Monty* and *Fay* crossed the Pilbara coast while the remaining four were over open waters in the eastern an Ocean. Four of the six cyclones reached category three intensity causing hurricane-force winds.

In early March Tropical Cyclone *Monty* disrupted Pilbara mining operations particularly on offshore drilling operations and caused widespread flooding to the western Pilbara damaging roads and other infrastructure. However, the rainfall was generally welcomed by west Pilbara residents as it ended a long drought. In late March Tropical Cyclone *Fay* made landfall in a remote area of the east Pilbara and caused significant flooding, particularly in inland parts between Nullagine and Telfer.

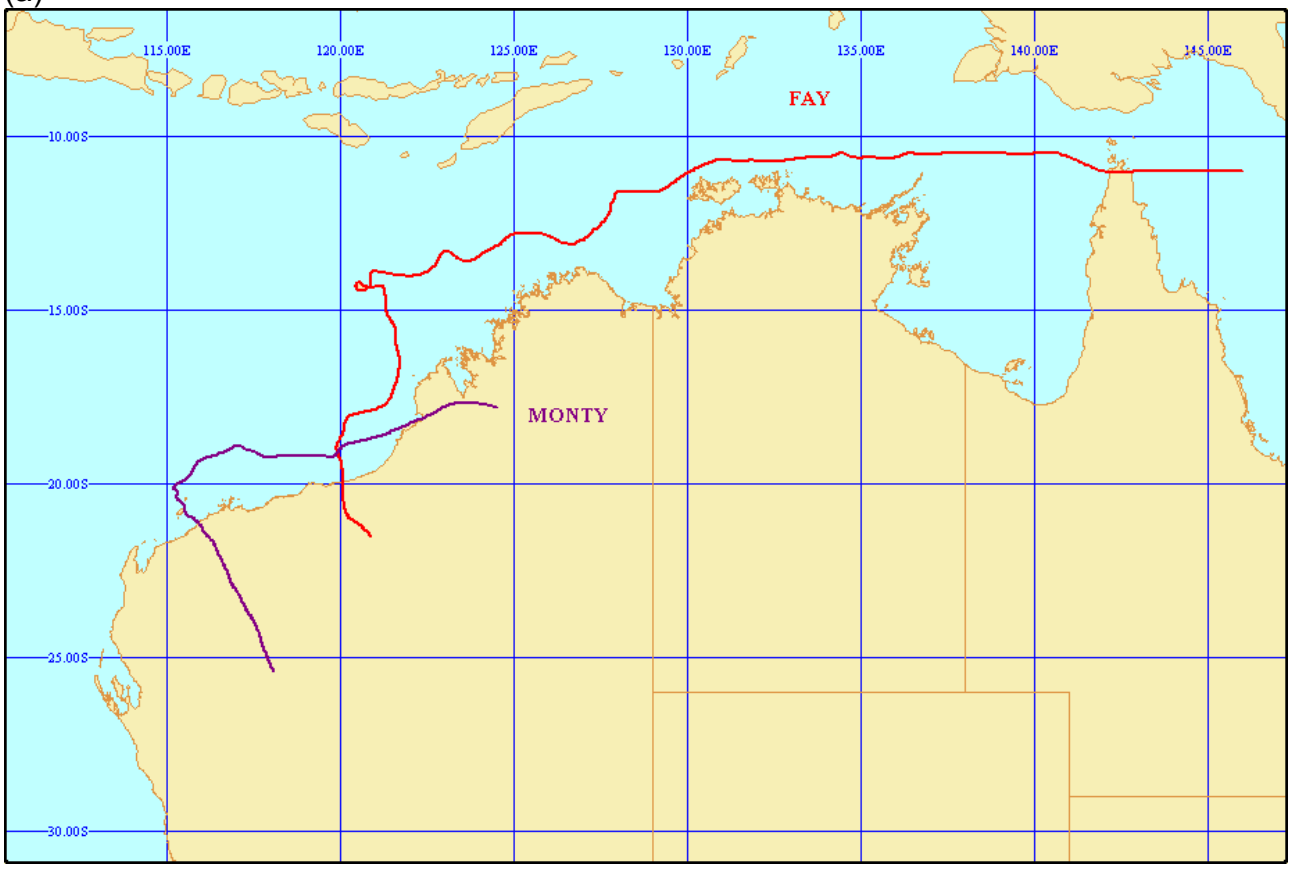
In addition to warnings for *Monty* and *Fay*, cyclone advices were also issued for Northwest communities for two other tropical lows 1-5 January (see note on Ken below) and 8-12 February, while advices for Cocos Islands were issued for *Jana* and *Linda*.

The Southern Oscillation remained in a neutral phase during the season which is associated with an average number of cyclones. Although there were only two cyclones in the Northwest region (east of 110°E) both of these crossed the coast which is average. Overall the total number of six cyclones is close to the average of seven for the entire region.

Verification statistics indicate significantly better location accuracy than the long-term values (see table 1). The season averages for analysis, 12 hour forecast, 24 hour and 48 hour forecast were 29 km, 65 km, 111 km and 212 km compared to the most recent five year averages (1998/99 to 2002/03) of 28 km, 78 km, 126 km and 207 km.

Tracks of tropical cyclones, 2003-04 in (a) the Northwest region and (b) the Indian Ocean region.

(a)



(b)

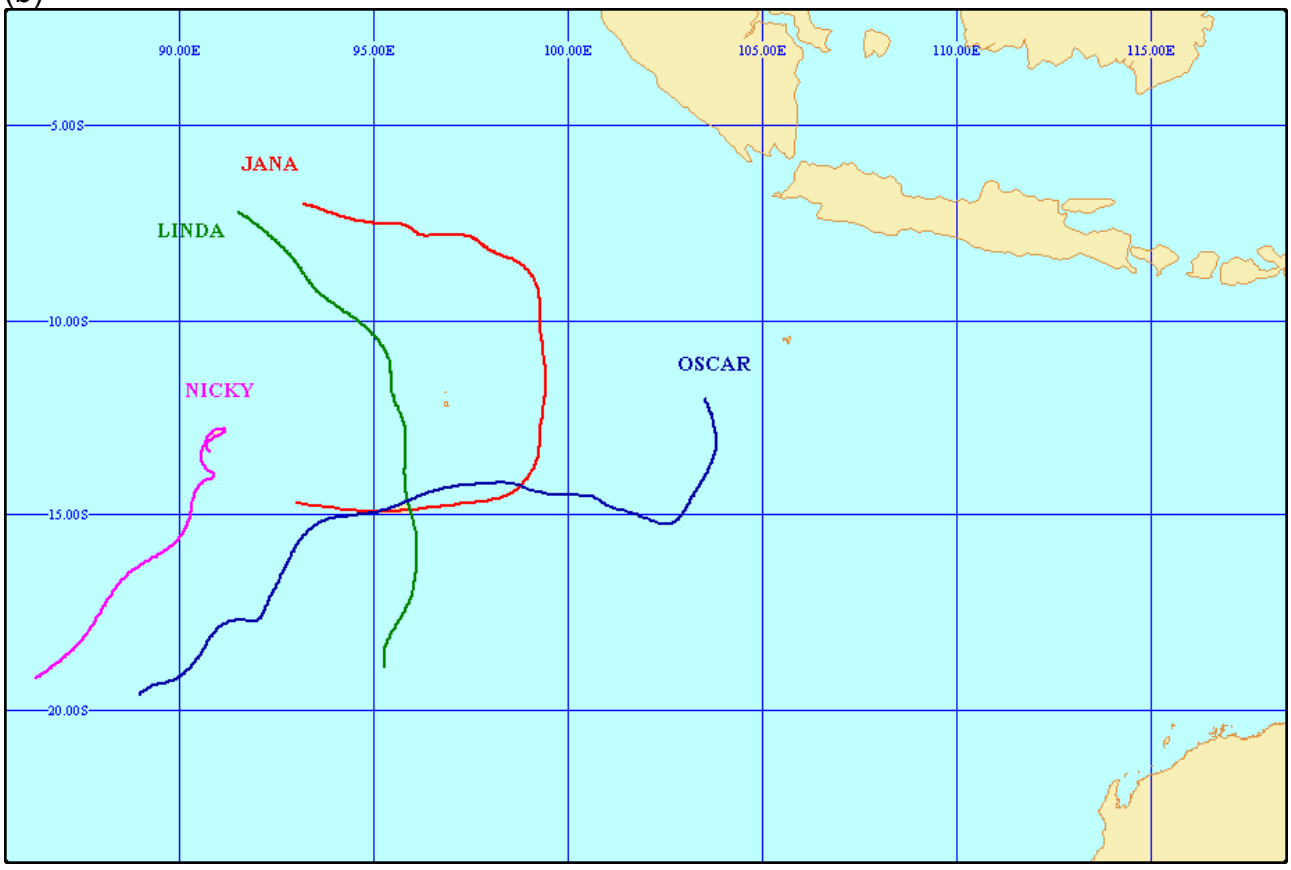


Table 1. WA Tropical Cyclone Verification statistics: 2003-2004 Season.
Note: Five year average location error shown in brackets.

Cyclone Name	Leadtime	No of Locations	Mean Great Circle Error	STD Great Circle Error	Mean Pressure Error	STD Pressure Error
	hours		km	km	hPa	hPa
All Cyclones	0	163	29 (28)	22	6.1	5
All Cyclones	12	116	65 (78)	36	9.4	7
All Cyclones	24	158	111 (126)	53	13.3	11
All Cyclones	48	35	212 (207)	95	19.5	19
All Cyclones	72	21	282	97	26.7	17
Fay	0	59	28	18	7.1	5
Fay	12	42	70	32	11.1	8
Fay	24	59	115	49	16.1	14
Fay	48	15	211	87	23.9	22
Fay	72	12	325	102	33.1	18
Jana	72	3	227	11	18.3	9
Jana	0	26	34	20	5.5	4
Jana	12	17	71	42	8.2	4
Jana	24	22	142	69	10.8	6
Jana	48	6	283	107	7.8	6
Linda	0	19	41	34	4.2	4
Linda	12	14	68	39	4.2	4
Linda	24	17	132	59	5.3	4
Linda	48	2	215	85	5.5	3
Monty	0	26	14	8	5.3	3
Monty	12	17	40	28	9.2	6
Monty	24	23	84	38	11.5	8
Monty	48	5	169	72	17.4	15
Monty	72	3	192	42	21	15
Nicky	0	9	32	21	9.9	4
Nicky	12	7	59	35	12.7	7
Nicky	24	13	98	35	9.9	5
Nicky	48	2	214	140	12.5	8
Oscar	0	24	32	21	5	4
Oscar	12	19	71	33	9.7	6
Oscar	24	24	91	38	17.8	14
Oscar	48	5	174	41	31	13
Oscar	72	3	252	53	15	8

Tropical Cyclone *Monty*, 27 February – 3 March 2004.

TC *Monty* was a small cyclone that developed rapidly and affected offshore oil and gas infrastructure before crossing the coast near Mardie station and causing flooding in the inland Pilbara.

A low moved off the Kimberley coast near Broome on 26 February and rapidly formed into a tropical cyclone just twenty-four hours later. *Monty* moved roughly parallel with the Pilbara coast and developed to category 4 intensity before moving towards the west Pilbara coast on 1 March. After causing hurricane-force winds at offshore reporting sites, *Monty* crossed the coast as a minimal category 3 system near Mardie station between Onslow and Dampier about 9 pm on Monday 1 March. Miraculously only minor property damage occurred although two vessels in Mermaid Sound broke their moorings and ran aground causing significant damage.

Although rapidly weakening later on the 1st, *Monty* produced widespread rainfall over the Pilbara causing significant flooding. Two people were rescued from the roof of the Yarraloola homestead on the Robe River and the town of Pannawonica was cut-off. The bridge over the Maitland River on the Northwest coastal highway was destroyed. The floods on the Maitland, Robe and Fortescue Rivers were reported to be the highest on record.

On a positive note the rainfall brought an end to the long drought over the west Pilbara.

Tropical Cyclone *Fay*, 16 – 28 March 2004

The low that was to become TC *Fay* developed in the Gulf of Carpentaria and moved westward into the Timor Sea where it was named as a cyclone at 1230 UTC (8:30 pm WST, 10 pm CST) on 16 March, when it was 400 kilometres north of Wyndham and 330 kilometres west northwest of Darwin. Strong to gale force winds were reported along the northern Kimberley coast as *Fay* remained seawards coming within 135 km of Kalumburu late on the 18 March before turning toward the northwest and moving away from the coast.

Tropical Cyclone *Fay* steadily intensified reaching peak intensity late on the 21st approximately 280 km north northwest of Cape Leveque when wind gusts near the centre were estimated to be about 300 km/h (Severity Category 5). Around this time the system passed close to Scott Reef where significant damage was done to the reef.

Over the following two days the shear diminished further, to less than 10 knots, and *Fay* would very likely have continued to intensify and become a very intense system if it had not simultaneously ingested a dry airmass. During the 23rd, as the system began to show the effects of the dry air, it did a loop and then turned to the south southeast toward the west Kimberley coast. *Fay* weakened to a category 2 system before beginning to re-intensify.

Early on the 25th *Fay* re-intensified to category 3 and approached to within 90 kilometres of Broome before taking on a more southwesterly track. Broome experienced strong winds with gale-force gusts, some heavy rain and heavy seas but escaped serious damage.

Fay then headed further away from the coast on the 25th before resuming a general southerly track on the 26th. *Fay* crossed the Pilbara coast between the pastoral stations of Pardoo and Wallal between 8 am and 9 am WST on Saturday the 27th as a Category 4 storm with estimated maximum wind gusts of around 235 km/h near the centre.

The cyclone began weakening as it moved further inland. Little wind damage was reported from the storm despite its intensity as it made landfall in a remote part of the WA coast and consequently only impacted sparsely populated pastoral and mining areas. As the system passed close to the Yarrie mine it's translation speed reduced and some 200 workers were locked down for 8 hours in two squash courts as accommodation units were overturned, water tanks "shredded" and power lines cut. *Fay* appears to have weakened below cyclone strength on Sunday evening between Nullagine and Telfer.

The heavy rain associated with TC *Fay* caused flooding in the De Grey and Oakover river systems. Flooding in the Nullagine River split the town of Nullagine into four sections (a relatively common occurrence as the town is particularly vulnerable), resulting in the evacuation of the town's population of 140 to the police station, courthouse and buildings on the outskirts of the town. Heavy rain in the Oakover and Nullagine River catchments produced moderate flooding in the De Grey River. Floodwaters inundated the Mulyie station homestead on the 30th.

Tropical Cyclone *Jana,* 7-11 December

A tropical low rapidly developed north of Cocos Islands reaching cyclone intensity on the 7th. Jana initially tracked eastwards reaching Category 3 status on the 8th before heading southwards on the 9th passing 280 km to the east of Cocos Islands. Maximum intensity of approximately 85 knots (mean wind) was reached at about this time. Increasing wind shear and cool sea surface temperatures weakened the system and Jana was downgraded below gale-force intensity on the 11th as it moved westwards. Although cyclone advices were issued for Cocos Islands no gales were recorded and there was no known damage caused.

Tropical Cyclone *Linda*, 30 January – 1 February 2004.

Linda was a small Indian Ocean cyclone passing to the west of Cocos Islands and briefly reached category 2 intensity on the 31st before weakening rapidly as it moved further south.

A weak low emerged from within the monsoon trough late on 28 January to the northwest of Cocos Islands and moved to the southeast. For the next few days the low tracked further to the south. By 30/00UTC the low reached cyclone intensity. Microwave imagery began to show improving banding features during the day. At about 30/10UTC *Linda* passed within 110 km west of Cocos Islands where winds were only less than 20 knots, an indication of how compact the system was.

On the 31st *Linda* briefly reached category two intensity for a period. *Linda's* continued southerly track moved it towards increasing northwesterly shear and also towards cooler sea surface temperatures of less than 26°C.

By 01/00UTC the convection had diminished and the low level circulation became exposed indicating rapid weakening. *Linda* was estimated at below gale-force intensity at 06UTC as supported by the image.

Linda remained over open waters throughout its lifetime and there were no known impacts.

Tropical Cyclone *Nicky*, 9 – 12 March 2004.

A low developed near 15S 90°E west of Cocos Islands on 8 March in the vicinity of deep convection along the monsoon trough. The sea surface temperature in this area was about 27-28°C. There had been a persistent area of convection for several days previously yet a discrete low was not discernible. The low was identified on satellite imagery at 08/00UTC when a band of westerly gales was to the north. Visible imagery showed an exposed low-level circulation that initially moved to the northwest then northeast during the 8th. The system then tracked to the southwest then south developing further on the 9th. Cyclone intensity was estimated at 09/06UTC when deep convection appeared to be wrapped around the low level circulation.

Rapid development was apparent during the 10th as Nicky moved to the south southwest. *Nicky* eventually crossed 90°E at approximately 12UTC. *Nicky* was then renamed *Helma* by La Reunion TCWC and developed further reaching category 3 system before weakening.

Nicky remained over open waters throughout its lifetime and there were no known impacts.

Tropical Cyclone *Oscar*, 21 - 28 March 2004.

An Indian Ocean low developed between Cocos and Christmas Islands on the 21st initially moving to the south then to the west late on the 22nd. Initially hampered by moderate to strong wind shear, the system reached cyclone intensity at about 23/0900UTC. *Oscar* continued its westward movement until the 25th when it tracked to the southwest and developed reaching category 4 intensity on the 26th. Increasing wind shear weakened the system markedly on the 27th. Perth TCWC issued the final shipping warning for *Oscar* at 27/1600UTC when it crossed the border at 90°E being renamed *Itseng* by La Reunion TCWC. The system continued to weaken and was below cyclone intensity late on the 28th. There were no known impacts from this cyclone.