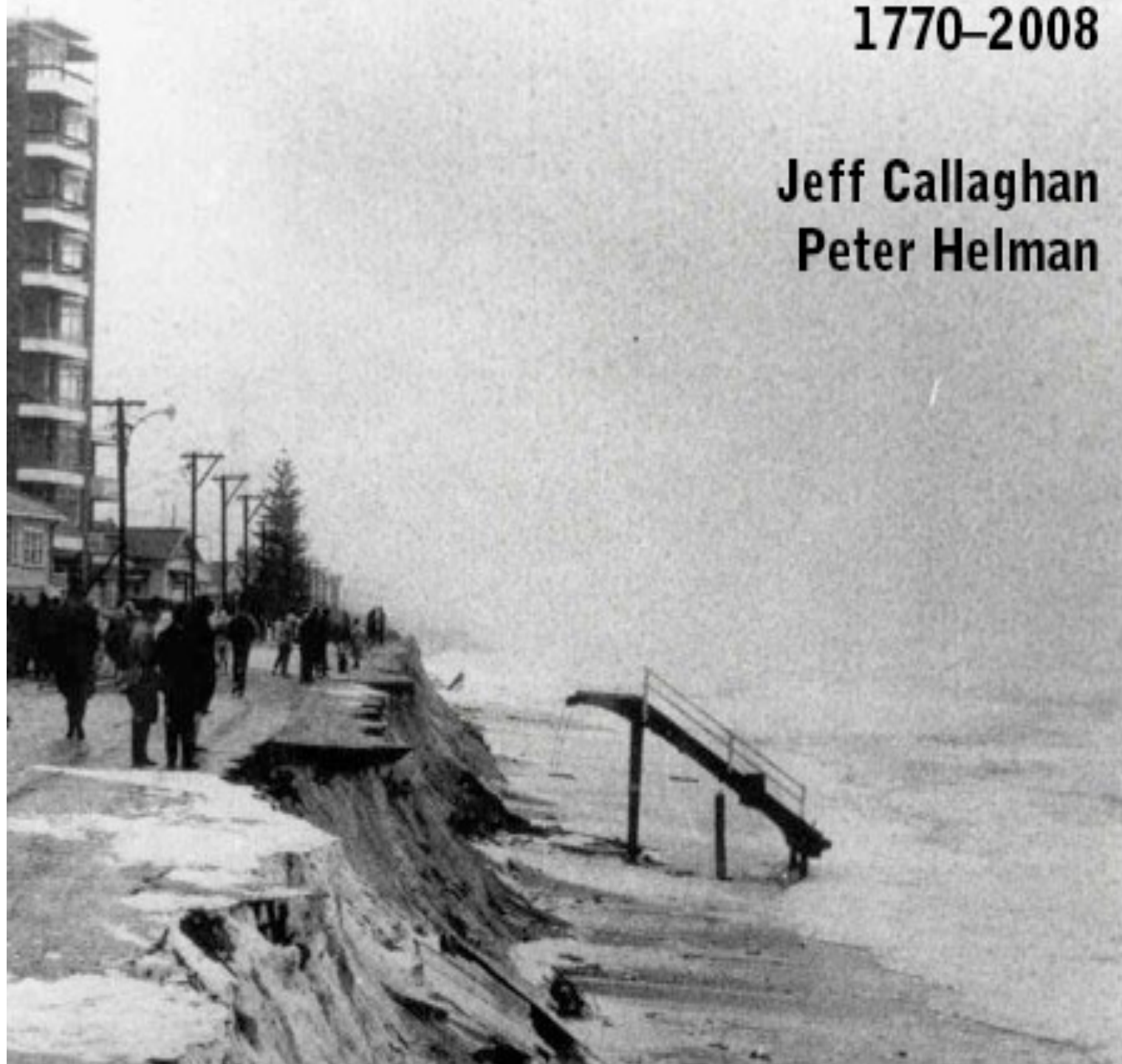


# **Severe storms on the east coast of Australia 1770–2008**

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**SEVERE STORMS**  
**ON THE EAST COAST OF AUSTRALIA**  
**1770 – 2008**

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**Australian Government**  
**Bureau of Meteorology**

**GCCM**  
Griffith Centre for Coastal Management

# Foreword

Severe storms can cause dramatic changes to the coast and devastation to our settlements. If we look back through history, to the first European observations by James Cook and Joseph Banks on *Endeavour* in 1770, we can improve our understanding of the nature of storms and indeed climate on the east coast.

In times of climate change, it is essential that we understand natural climate variability that occurs in Australia. Looking back as far as we can is essential to understand how climate is likely to behave in the future. Studying coastal climate through this chronology is one element of the process. Analysis of the records has already given an indication that east coast climate fluctuates between phases of storminess and drought that can last for decades.

Although records are fragmentary and not suitable for statistical analysis, patterns and climate theory can be derived. The dependence on shipping for transport and goods since European settlement ensures a good source of information on storms that gradually improves over time.

The Bathurst Bay Hurricane stands out in history as the most severe storm experienced on this coast. It occurred in March 1899, so it can only be estimated as a category 5 tropical cyclone by the complete devastation it caused; over 350 people were killed and 100 vessels destroyed. A century later with extensive developments along much of the coast, a category 5 tropical cyclone would have enormous impacts. In the last 30 years, even allowing for TC *Larry* (2000), there have been a relatively low number of storms. We need to be prepared for severe storms that will undoubtedly occur in the future.

Given the compelling evidence for climate change, and the research which indicates that storms may increase in intensity, our coastal communities need to understand the extent of their vulnerability to these events. This publication provides a timely reminder of the power of nature and impact of coastal storms on the natural and built environment.

**Professor Rodger Tomlinson BE PhD FIEAust CPEng**  
**Director**  
**Griffith Centre for Coastal Management**  
**And**  
**Griffith Climate Response Program**

## INTRODUCTION

This chronology was developed to study the relationship between severe storms and coastline change on the east coast of Australia. It dates back to the first known European observations made by James Cook in 1770. Coastal droughts and floods are included, making it representative of two centuries of east coast climate variability.

Understanding climate variability is essential when considering the future impacts of climate change. On the coast, climate change is represented as a slowly accelerating sea level rise, only expressed when severe storms provide energy for erosion and inland coastal movement. Climate change may also increase the frequency, intensity and southward extent of severe tropical storms. Coastal developments already at risk may be subjected to further pressures.

Two centuries of documented variability demonstrates how climate extremes, such as severe storm periods and drought, occur in alternate phases that can last for decades. For example, the storms, floods and erosion from the 1950's to 1970's compared to the last three decades of recurring droughts. These phases have been related to oscillations of the Pacific Ocean described by the Interdecadal Pacific Oscillation (IPO) index (Helman 2007).

Much of the chronology covers periods before reliable observations began, making this compilation unsuitable for statistical analysis.

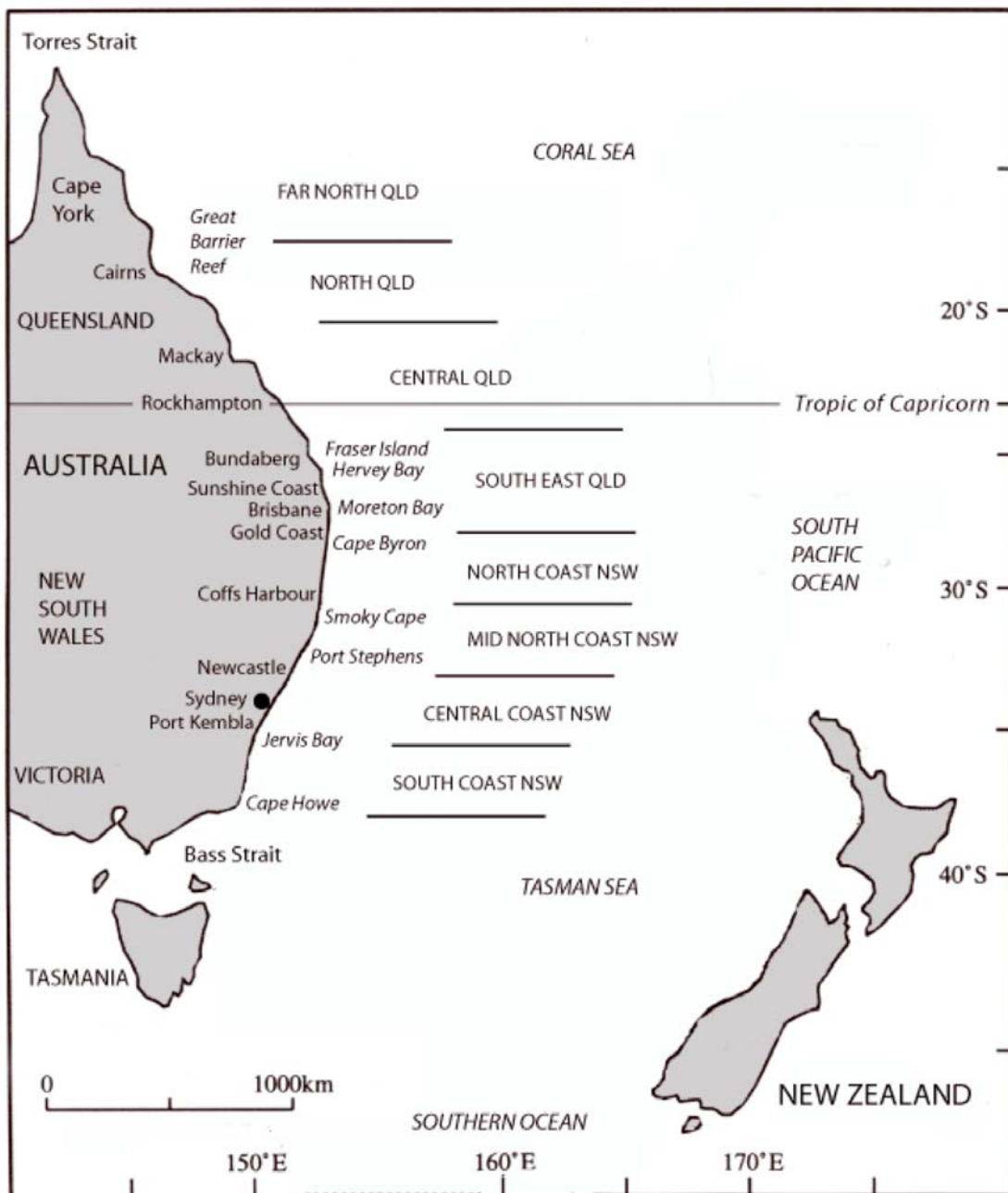
### Information Sources

The chronology includes significant weather events, calms, storms, droughts, floods and observations on coastal features such as: river bars, marine deltas, beaches, dunes and erosion. Major volcanic eruptions and tsunami's are also included. It does not include thunderstorm cells, which can cause local damage.

Records are considered for the east coast of Australia from Cape York to Tasmania. Contemporary names, from current maps and charts, have been used for the location of events. The geographic divisions of the east coast referred to in the chronology are shown in Figure A.

A wide range of published and compiled records are referenced. Many types of records were reviewed as evidence of significant events prior to the preparation of daily weather maps around 1880. The maritime records are not a 'shipwreck' record but are used to determine storm occurrence.

While there is general agreement between authorities, some early records demonstrate significant disagreements due to inadequate or conflicting primary sources. Such records have been treated cautiously. Minor discrepancies between historical authorities have been ignored. Significant differences are noted after the citation.



**Figure A:** Descriptive divisions of the east coast, Australia.

The east coast is divided into 8 sections:

**Queensland** – FNQ (far north), NQ (north), CQ (central), SEQ (south east) coasts.

**New South Wales** – N (north), M (mid north), C (central) and S (south) coasts, divisions previously used by PWD 1985.

## RECORD CATEGORIES

### 1770 to 1788

Records are limited and a summary of events from available sources is included.

### 1788 to 1820

Prior to exploration and establishment of Port Macquarie and Moreton Bay penal colonies, most records are from the early colonial settlement and shipping activities around Sydney. Records from limited voyages in the Coral and Tasman Seas, including some New Zealand records have been considered.

### 1820 to 1880

During this period there was increased settlement and shipping, especially the cedar trade along the New South Wales and southern Queensland coasts. Details are compiled from: historical accounts in maritime records, local coastal histories and records compiled by the Bureau of Meteorology.

### 1881 to 2008

For NSW coast, storm events from 1881–1985 are classified by PWD 1985 and PWD 1986. For south east Queensland and severe storms to the north (Coral Sea), information was sourced from Beach Protection Agency (BPA) 1985, 1989, Bureau of Meteorology (BoM) and records of severe storms compiled by Jeff Callaghan.

### Comparison of records 1881–1919

For the period 1881 to 1919, historical storm records are compared to the published NSW coast storm record (PWD 1985).

### Observations from BoM website

From the early 1900's, consistent observations made by the Bureau of Meteorology and newspaper accounts cover many severe storms.

## EAST COAST STORMS

Severe storms can occur at any time of year but are more likely to occur between December and July. The Australian east coast is not only influenced by immediate storms but also from swells that originate thousands of kilometres away in the Pacific Ocean.

East coast storms are typically tropical storms in the Coral Sea between November and April. Extra tropical storms in the Tasman Sea, and temperate storms in the Southern Ocean, can occur at any time of year but tend to occur from January to August.

### Storm Names

Tropical cyclones were first named in 1894 by Clement Wragge in Queensland, the practise was discontinued but was recommenced by Bureau of Meteorology in 1963.

In historic literature many storms are named in memory of the loss of a ship, its crew and passengers, for example the **Maitland Gale** 1889 and the **Cawarra Storm** 1866. Other storms are referred to by two names, for example the most severe storm recorded on the east coast, in far north Queensland, 1899, is referred to as the **Bathurst Bay Hurricane** or the **Mahina Cyclone**, named and located by Clement Wragge in a weather map. Due to delays in receiving information, the map was not published until the storm had made landfall (Townsend 2008). Some of the more notable storms are named after significant



shipping losses, such as the **Volunteer Storm** 1864, after an early shipwreck at Cape Byron.

### STORM INTENSITY

Classification of severe storms depends on the criteria used: tropical cyclone categories, central pressure, wind strength, wind damage, storm surge, number killed or injured, flood height and recently insurance claims.

Storm intensity prior to 1881 is assessed from historical records and is only indicative, after 1881 it follows PWD 1985, PWD 1986 and BoM cyclone classification. The table below compares the different classifications used. In the chronology, the shaded rows are used to show the classified 'severe storms'.

Wind Speed (km/h)	Tropical Cyclone categories BoM Strongest Gust (km/h)	Forecast and Potential Damage	Mariners observations Beaufort Scale	NSW coast (PWD 1985 [BB]) Significant wave height (Hsig)
50–60		Strong wind warning	7 Near gale	C >2.5m
60–75		Gale warning	8 Gale	B 3.5m–5m
75–90	Tropical storm	Gale/ Storm warning	9 Strong gale	A 5–6 m
90–125	Category 1	Tropical cyclone warning. Damage to crops, trees and small craft	10 Storm 11 Violent storm	X >6m
125–164	Category 2	Moderate damage, minor structural, crops destroyed	12 Hurricane	
165–224	Category 3	Major structural damage, damage, power failure likely, small vessels driven ashore		
225–279	Category 4	Devastating, buildings destroyed, dangerous airborne debris, widespread power failure, ships distressed		
>280	Category 5	Extremely dangerous with catastrophic destruction		

After: Bureau of Meteorology website, Harper and others (2001), PWD (1985) and Laughlin (1997:48–49).

N.B The single highest wave (Hpeak) is typically around 1.8 times higher than an estimate of average height of the highest one-third of waves in a 20 minute period (Hsig) (Laughlin 1997:48–49).

### SEVERE STORMS

Only one cyclone Cat 5 (estimated) has been recorded on the east coast in the last 200 years, the **Bathurst Bay Hurricane** (4–5 March 1899), this storm also claims the lowest central pressure (914hPa), the highest storm surge (14.6m), the highest number of casualties (350), and probably the highest wind speed. Of the four Category 4 cyclones experienced, two have devastated Innisfail (1918 and 2005). There have been numerous Category 3 cyclones.

The highest wave height recorded was during the Sydney Hobart Storm (1998). In early 1893, the highest flood was recorded in the Brisbane River and was the result of a series of cyclones and years of proceeding wet weather, with the highest rainfall ever recorded in south east Queensland.



During the two hundred years of European occupation of east coast Australia, it is noted that severe storms tend to occur when ENSO (El Niño Southern Oscillation index) is positive and IPO negative.

To date, storms have predominantly affected unsettled coastline. However, the rapid expansion of coastal development, especially in south east Queensland, means that future storms are more likely to impact settled areas. The result will be greater economic damage from increased insurance claims. No storm above Category 3 Tropical Cyclone has been recorded crossing the south east Queensland coast. If a storm of the intensity of TC *Dinah* (Jan 1967, Cat 4 and well offshore) was to make landfall, destructive losses would result from storm surge, coastal erosion and flooding.

## EXAMPLES OF SEVERE STORMS EAST COAST, AUSTRALIA

### MOST SEVERE STORM

#### Bathurst Bay Hurricane

4–5 March 1899

Estimated Cat 5  
Cape York, Q  
914hPa  
14.6m storm surge  
Winds over 300km/h

Catastrophic Tropical Cyclone, 350 people lost when all the 100 vessels in Princess Charlotte Bay, Cape York were wrecked

### VERY SEVERE TROPICAL CYCLONES

#### Severe TC Innisfail

10 March 1918

Cat 4 (possibly Cat 5)  
926hPa  
4.65m storm surge

‘tidal wave surged up river sweeping away buildings’. All buildings Innisfail damaged or destroyed, 100 lives lost

#### Severe TC Mackay

20–21 Jan 1918

Cat 4  
933hPa  
7.6m storm surge

Extensive damage to all buildings, 30 lives lost

#### TC Larry, Innisfail

17–21 March 2006

Cat 5 offshore, Cat 4 at landfall  
<5m storm surge  
294km/h wind

Extensive damage to buildings and crops. Strongest cyclone to landfall Q coast since 1918. Insurance claims \$1.5billion, total crop losses \$0.5 billion

#### TC Ada, Whitsunday Islands

17 Jan 1970

Possibly Cat 4,  
962hPa

14 lives lost, severe structural damage and flooding.

#### TC Wanda

24–27 Jan 1974  
SEQ N NSW

Monsoon Low,  
996hPa  
1m storm surge, Noosa

Fatalities and one of Australia's most damaging storms. 5 days torrential rain. Australia day flood Brisbane River. 2500 people evacuated from Canal estates, Gold Coast

#### TC Dinah

Jan 28–31 1967  
Off coast SEQ

Cat 4  
945hPa  
1.5m storm surge Gold Coast

Storm surge flooded Hastings Street, Noosa

<b>TC</b> 19–22 Feb 1954 SEQ	972hPa	Storm surge Moreton Bay. Byron Bay jetty destroyed, 28 lives lost
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<b>TC, Cardwell</b> 24–28 March 1890 NQ	storm surge 12m	Destroyed most houses, 6 vessels, 12 lost
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<b>TC, St Lawrence</b> 21–22 Jan 1874 Q		Storm surge and damage St Lawrence, 6 vessels lost
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## VERY SEVERE EAST COAST LOWS

<b>Maitland Gale</b> 5–7 May 1898 Central NSW		Very severe ECL, 10 vessels, including paddle steamer <i>Maitland</i> lost, enormous seas, Stradbroke Is cut in two.
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<b>Cawarra Storm</b> 10–14 July 1866 Central NSW		Very severe ECL, 20 vessels, over 100 lives lost
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<b>Sydney Hobart Storm</b> 25–27 Dec 1998 NSW	190km/h wind 42.5m wave height	Highest recorded waves 42m, 6 lives lost
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<b>Dandenong Storm</b> 1876 Southern NSW	Winds 240km/hr	Very severe ECL, 11 vessels, including steamer <i>Dandenong</i> lost
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<b>Severe Gale</b> 27 Sept to 4 Oct 1864 Central Q, off Yeppoon		12 vessels lost, 22 lives lost,
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<b>Severe ECL</b> 23–26 June 1950 Gold Coast to Newcastle	>120km/h wind 15m waves	Severe lows of Newcastle and Ballina. Heavy rain and severe floods. Fatalities and many houses swept away, two vessels floundered
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<b>Maitland Floods</b> 22 Feb 1955 Hunter Valley		Monsoon low moved towards Central NSW coast. Severe floods Hunter River, 14 lives lost and many houses swept away
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<b>Sygna Storm</b> 24–27 May 1974 Newcastle	986hPa >180km/h wind	Very severe ECL, damaged houses, <i>Sygna</i> largest ship lost on Australian coast
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<b>St Magnus Gale</b> 15–18 March 1875 SEQ		ECL off SEQ, 6 vessels lost, hurricane force winds
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<b>Pasha Storm</b> June 2007 Newcastle	max gusts 93km/h 980hPa Waves over 10m	10 deaths, Insurance claims AU\$1.35billion, 6000 homeless. <i>Pasha Bulka</i> ship ashore.
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## DIRECTIONS FOR USE

The size of this publication, and the anticipation it will later be updated, has led to the first edition being published as a pdf document. The document is navigable using bookmarks that can be used to go to a particular decade or return to sections of the introduction.

To help the reader and conserve space, shading and abbreviations have been used throughout and are shown below.

### SHADING

Very severe storms Cat X, severe TC's Cat 3–5  
 Severe storms generally Cat A and TC Cat 2  
 Gales Cat B, TC Cat 1 and tropical lows  
 Inferred storms from historical record  
 Floods  
 Recorded coastline change and erosion events  
 Noted severe storms  
 Drought periods  
 Descriptions of significant periods

Dark grey shade
Mid grey shade
Light grey shade
Light red stipple
Mid blue stipple
Orange stipple
Medium pink
Light yellow stipple
purple stipple

### Year shading

1800 to 1880 – from historic records  
 1881 to 1919 – overlap of historic and published records  
 1920 to 1985 – observed record  
 1986 to 2004 – recent observed record

light brown
light green
light pink
lavender

### ABBREVIATIONS

c	Approximately
Ck	Creek
E	East
EAC	East Australian Current
ECL	East coast low (Extra tropical cyclone) often referred to as 'an unexpected easterly'
ft	Feet (0.305m)
GBR	Great Barrier Reef
HAT	Highest Astronomical Tide
Hpeak	The single highest wave (Hpeak) during the same period is typically around 1.8 times higher than Hsig (see below)
Hsig	Significant wave height (Hsig) is an estimate of average height of the highest one-third of waves in a 20 minute period, and is found to be similar to the visually estimated wave height made by an experienced observer (After Bureau of Meteorology website)
Is	Island
Kt	Knot (1.852km/hr)
m	Mile (1.609m)
N	North
nm	Nautical mile (1 852m)
NSW	New South Wales
Q	Queensland
R	River
S	South
t	Displacement of vessel, originally Imperial tons, after 1966 metric tonnes
TC	Tropical cyclone
W	West

**CITATION ABBREVIATIONS**

AE	Australian Encyclopaedia 1955
Atlas	Shipwreck Atlas of NSW
BB	PWD 1985 (prepared by Blain Bremner and Williams Pty Ltd)
BoM	Bureau of Meteorology: <a href="http://www.bom.gov.au/">www.bom.gov.au/</a>
BPA	Beach Protection Authority, Queensland
HCT	Historic coastal timelines: <a href="http://www.coastal.crc.org/timelines/index.asp">www.coastal.crc.org/timelines/index.asp</a>
HDHS	Hastings District Historical Society
Herald	<i>The Herald</i> , Newcastle. <i>Sygn's storm</i> 25 May 2004 (shipwrecks in the Newcastle area, compiled by Norm Barney, 1994)
JC	Jeff Callaghan
Loney	various publications, primary references for Australian shipwrecks
LT	PWD 1986 (prepared by Lawson and Treloar Pty Ltd)
MBC	<i>Moreton Bay Courier</i>
NS	<i>Northern Star</i>
NLA	National Library of Australia, South Seas Project, Journals of James Cook and Joseph Banks, <a href="http://www.nla.gov.au/southseas/journals/">www.nla.gov.au/southseas/journals/</a>
NSD	National Shipwreck Database: <a href="http://www.eied.deh.gov.au/nsd/">www.eied.deh.gov.au/nsd/</a>
PH	Peter Helman comments
SMH	<i>Sydney Morning Herald</i>

**Future updates**

Since the original compilation (Helman 2007), there has been considerable expansion to cover the whole east coast and to include a wider range of sources. It is envisaged that with future research, it will expand further. Comments on any aspect of the chronology, edits or suggestions to improve its usefulness, should be directed to

[j.callaghan@griffith.edu.au](mailto:j.callaghan@griffith.edu.au)

## SEVERE STORMS ON THE EAST COAST OF AUSTRALIA 1770–2008

1770	James Cook Summary of storms		<i>Endeavour</i> crossed the Tasman Sea and sailed north along the east coast, from April to June 1770	From journals of James Cook and Joseph Banks	NLA
2–6 April	Brisk gale	Eastern Tasman Sea	After departing Cape Farewell, NZ <i>Endeavour</i> encountered a 'brisk gale' from SSW to SSE that made a 'large hollow sea' from the south		NLA
17–20 April	Strong gale	Eastern Bass Strait	Approaching NE Tasmania, Cook was forced to run before a 'hard gale' with reduced sail, on 19 April sighted Pt Hicks		NLA
14–17 May	Fresh gale, big seas	SEQ	From Cape Byron to Noosa <i>Endeavour</i> weathered a 'fresh gale' and off Point Lookout 'we had a great sea from the south ward which broke prodigious high upon' the offshore reefs [Flat Rock]. Banks described this gale 'as the briskest breeze I think <i>Endeavour</i> has gone before on this voyage'		NLA
Late May, mid June	Gale force SE	N – CQ	28–29 May, off Shoalwater Bay fresh SE gale, 15–19 June fresh to strong SE gale off Cooktown		NLA
1788 – 1800	Early colonial exploration		British colony of New South Wales with arrival of the first fleet at Port Jackson 1788. For the next 25 years shipping was mainly restricted to official voyages from Sydney to Norfolk Is and Hobart. Colonial coastal trade was prevented until 1813 (25 year monopoly to East India Co) and no shipbuilding permitted until after 1815 (to prevent the escape of convicts). Local shipping in small vessels to Hawkesbury R, Bass Strait and Hunter R coal trade from 1801	Accounts from official voyages. Little coastal trade	Mackey 2001:27
March 1788	Stormy weather	Botany Bay	Constant heavy rain 11 March Continual heavy rain ends 12 March very hot		King 1984:44, 48
31 May 1788	Weather very cold	Broken Bay	Governor Hunter noted that in the cold weather the fish stocks in the harbour had fallen and by June fish had become scarce in the harbour		King 1984:70, 74
22 June 1788	Earthquake	Sydney cove	About 4pm a shock of an earthquake at Sydney Cove and it's environs		King 1984:75
1 July 1788	Gale	Sydney, Port Jackson	It having blown a gale of wind dead upon the shore for 40 hours producing 'so great a sea'		King 1984:78
11 July 1788	Frost	Port Jackson	'A white frost in the morning which was priety sharp'		King 1984:80
14 July 1788	Gale	Port Jackson	A fresh gale from the NW		King 1984:81

July – August	Bad weather		Tench noted 'In July and August we experienced inclement tempestuous weather than had been observed of any former period of equal duration' Rain continued until mid August		King 1984:84
26 Aug 1788	Bad weather	Norfolk Island	<b>Supply</b> returned from Norfolk Island after a long and rough passage. 4 lost when boat swamped by surf at Norfolk Island.		King 1984:92
9 Sept 1788	Aurora Australis	Port Jackson	'This evening the element [sun] was very red more so than ever I saw in my life...which lasted about an hour...about half past 6 in the evening we saw an Aurora Australis a phenomenon uncommon in the southern hemisphere'		King 1984:94
31 Oct – Nov 1788	Hail Storm	Port Jackson	The weather dark and gloomy with dreadful lightning ...68 F		King 1984:100
8 May 1789	Rough weather	Tasmania	<b>Sirius</b> returning from Cape Town met with very bad weather south of Tasmania. Receiving considerable damage and was 'very much weakened'		King 1984:120
8–22 May 1789	Gales	Coral Sea	Bligh experienced gales and wet weather in the eastern Coral Sea in an open boat sailing to Torres Strait		Hughes in Sellick 2005
11 July 1789	Gale	Broken Bay	Party delayed by southerly gale		King 1984:134
19 Feb 1790	Gale	Port Jackson	Heavy rains with gales of wind 20 Feb rainy weather continued		King 1984:153
19 March 1790	<b>Sirius</b> gale		<b>HMS Sirius</b> driven ashore at Norfolk Island in gale	Painting of wreck Coltheart1997:2	EAS Bateson 1972:35 King 1984:159 (19 Feb)
23 June 1790	Heavy weather	Port Jackson	<b>Surprise</b> ship 400t could not enter Port Jackson for three days due to 'heavy weather'		EAS
Early – mid April 1791	Gales	South of Moreton Bay	Bryants and party of escaped convicts sailing to Timor in an open boat experienced two gales on NSW north coast		Martin in Sellick 2005
1789 – 1793	Very severe drought	Sydney	Severe El Niño 1788–1795 and after two years the European colony at Sydney suffered very severe drought. Gov Phillip noted little rain from June 1790 to mid 1791. Tank Stream and other harbour creeks dried up and did not flow until 1794	Gov Phillip 'I do not think it probable that so dry a season often occurs'	Grove 2005:128–129, 139 Droughts in southern Africa, central America and SE Asia
Aug 1795	Gale	C NSW	<b>HMS Providence</b> driven north of Sydney in bad weather, sheltered in Port Stephens		Coltheart 1997:3

Jan – Feb 1797	Gales	S NSW – Tas	Gales across S Aust and Bass Strait. <b>Sydney Cove</b> from Bengal, leaking and beached after bad weather 9 Feb 1797. Lost Preservation Is, Bass Strait		Bateson 1972:30 Loney, NSD EAS
Early March	Gale	Bass Strait	Longboat fro Sydney Cove beached in rising seas Ninety Mile Beach, Vic		Love 2003
Late June 1797	Gale	S NSW – Tas	<b>Francis</b> and sloop <b>Eliza</b> sent to search for survivors of <b>Sydney Cove</b> , Francis returned to Sydney. <b>Eliza</b> presumed lost in gale, possibly near Cape Howe		Coltheart 1997:6 EAS
1797 – 1800	Drought		Extended periods of drought		Russell in Grove 2005:139
late Oct 1798 – Jan 1799	Gales	Bass Strait	Flinders sheltered from gales in Bass Strait and S NSW, including a 'violent gale' in late Nov		Flinders in Flannery 2004:9, 13, 20, 33
July 1799	Gale	Moreton Bay	Flinders sheltered from SE gale in Moreton Bay		Flinders in Flannery 2004:33
	YEARLY RECORDS		Yearly summaries from improving records		
1800					
	Drought		Recurring periods of drought from 1790 to 1829		Russell in Grove 2005:139
Summer 1799 – 1800	Strong SE wind	Sydney	Relentless SE in summer		Coltheart 1997:9
Aug	Gale		<b>Martha</b> schooner 30t loaded coal Lake Macquarie, which Captain Reid thought was Hunter R, later known as Reids Mistake. Probably lost Little Manly and refloated  <i>Speedy</i> whaler reported bad easterly gales around Norfolk Island 'On all coasts in the same latitude the winter weather is bad but on this coast worse than any other, for there is such a sea in these months...you may have little wind still the sea never gets down, from the middle of June to the middle of August....only ten days I could safely lower a boat... need be a good ship to stay out in the winter'		Bateson 1972:30 NSD, LN, EAS Coltheart 1997:11 lost Lake Macquarie  Dakin 1934:20
Oct	Gale	Newcastle	<b>Norfolk</b> sloop 25t captured by convicts, Hawkesbury River and lost ashore when forced to seek shelter in bad weather in Hunter R, all survived		Bateson 1972:30 NSD, EAS Callen 1986:20
1801					



	Coal trade began from Newcastle to Sydney		Sept 1797 Shortland searching for <i>Cumberland</i> , stolen by convicts, found coal and drew first chart of Hunter R May 1801 <i>Anna Joseph</i> brig shipped first coal from Newcastle, sold to India. Governor King remarked 'This is the first return ever made from NSW'		Richards 1996 Callen 1986:21 Coltheart 1997:6
1801			Unidentified wreck north of Port Stephens		Loney, NSD
May – June 1801	Fresh	Hunter R	Surveyor Barrallier spent six weeks of very cold, wet weather in the Hunter R estuary. Fresh in river for the tide range was 4ft but the river was drinkable		Coltheart 1997:11
Late 1801			Unidentified wreck off ship King Is		Bateson 1972:30
1802					
1802–1804	Drought		Also drought in India		Russell in Grove 2005:139
1802	Whaling	SW Pacific Ocean	Flinders <i>Investigator</i> observed whaler off Pt Lookout		Salter 2002:33
27 Oct	Gale	Bass Strait	<i>L'Enterprise</i> schooner 90t driven ashore in gale, Furneaux Group, Tas		NSD, EAS
1803					
15 May	Heavy Gale	Bass Strait	<i>George</i> sealing sloop driven ashore on King Island and badly damaged in heavy gale and not refloated until a year later		Loney, Atlas, EAS Bateson 1972:34
22 May	Gale	C NSW	<i>John</i> sloop forced to anchor in bad weather and capsized in Broken Bay, crew survived		Bateson 1972:35 NSD, EAS
14 June	Squall	C NSW	<i>Sophia Maria</i> driven ashore in squall Collaroy, all survived, wreck broke up		Loney 1993:10 NSD, EAS
17 Aug	Heavy seas	GBR	<i>HMS Porpoise</i> 308t and <i>Cato</i> ship 430t wrecked on Wreck Reef, 220nm NE Bundaberg. Flinders was returning to England as a passenger aboard <i>Porpoise</i>	Seas broke over <i>Cato</i> on reef. Heavy swell from the south PH	Bateson 1972:36 Salter 2002:25 Carter and others 1994:36, NSD, EAS
Late Aug and Sept	No severe storms PH		Flinders returned to Sydney in ship's cutter nicknamed ' <i>Hope</i> ' with small party including master of <i>Cato</i> , reached Sydney 8 Sept and returned in rescue vessel to Wreck Reef late Sept		Bateson 1972
1804					
Late April	Severe gale	C NSW			
	Gale and heavy seas	Broken Bay	24 April <i>James</i> sloop 14t ashore and broke up in gale with heavy seas		Loney, EAS NSD

			27 April <b>Hope</b> sloop 16t aground Broken Bay, later refloated and lost Long Reef Aug 1808		Bateson 1972 EAS 31 Oct 1803 Loney Nov 1803
Early Oct	Gale?	C NSW	14 Oct <b>Speedwell</b> (Andrew Thompson) aground Broken Bay. <b>Hope</b> and <b>Hawkesbury</b> (Andrew Thompson) assisted in refloating (5 Dec)		Bateson 1972:37 EAS
1805					
21 March 1805	Gale	Newcastle	<b>Francis</b> colonial schooner 40t could not enter Hunter R in S squalls, anchored under Nobbys and driven ashore north beach, crew survived		Coltheart 1997:13 Bateson 1972:39 Loney 1993:11 Atlas, NSD, EAS
Mid April	<b>Nancy Gale</b>	C NSW	Severe gale		
	Violent gale	Illawarra	18 April <b>Nancy</b> sloop 40t returning from Bass Strait with sealskins and oil. Wrecked near of Jervis Bay in violent gale, one lost and survivors walked overland to Sydney		Bateson 1972:39 Loney 1993:11 Atlas NSD,EAS
	Heavy gale	Newcastle	Mid April <b>Surprise</b> sloop 20t beached north of Newcastle in heavy gale		Bateson 1972:39 NSD, Loney, EAS
July	Gale and heavy sea	Broken Bay	<b>Trimmer</b> sloop 20t abandoned off Broken Bay, crew spent several days in a boat before reaching Newcastle		Bateson 1972:39 Loney Atlas, NSD, EAS
1806					
			No wrecks off Qld coast 1806 to 1814		PH
Late April	<b>Governor King Gale</b>		Possible tropical storm and secondary low to S? PH		
	Gale and heavy swell	Newcastle	22 April <b>Governor King</b> schooner 38t Norfolk Is to Sydney, forced to seek shelter but heavy swell drove her ashore Newcastle near wreck of <b>Francis</b> (21 March 1805), all survived		Loney NSD EAS
			April <b>Raven</b> sloop King Island to Sydney and lost in Bass Strait		NSD EAS
Early July	Gales	Off Newcastle	<b>Bee</b> sloop 11t left Sydney for Hawkesbury R, battered by rough weather and ran to Newcastle but forced far out to sea in second storm, Captain died and crewman rescued by American whaler <b>Brothers</b>	Two gales in early to mid July? PH	Loney Atlas NSD EAS
Mid Aug 1806	Heavy swell	Tasman Sea	25 Aug <b>Britannia</b> brig 301t early South Pacific whaler lost Elizabeth or Middleton Reef in heavy swell	Inferred Tasman Sea low to south PH	Bateson 1972:40 AE NSD, EAS
Early Sept	Gale	Tasman Sea	Crew of <b>Britannia</b> in 3 boats left reef, 2 boats reached Newcastle 8 Sept, one boat with 8 crew lost in gale (c early Sept 1806)		As above
1807					

Late Feb	Gale	C NSW	28 Feb <b>Contest</b> sloop 45t Sydney to Newcastle, driven north by bad weather and driven ashore southern end of beach north of Port Stephens		Atlas Loney 1978:18 NSD EAS
1808					
11–15 Aug	Severe gale <b>Dundee Gale</b>	C NSW	13 Aug Heavy gale and strong fresh in Hunter R		Callen 1986:52
	Rough weather	Tasman Sea	15 Aug <b>Dundee</b> full rigged ship left Sydney for Fiji, forced to return for shelter in rough weather and lost on Oyster Bank, 2 lost		Loney 1978:18 Herald, NSD, EAS Bateson 1972:44 1807
	Gale	Port Stephens	15 Aug <b>Estramina</b> , schooner 120t, Sydney to Newcastle, sheltered Port Stephens during bad weather		Callen 1986:52
	Minor Flood	Hunter R			Callen 1986:52
Late Aug	Gale	Sydney	27 Aug <b>Charlotte</b> sloop 16t left Sydney with <b>Hope</b> sloop 16t (Soloman Wiseman), capsized and sank off Long Reef, 2 lost		Loney 1978:18 Atlas NSD, EAS
1808–1815	Drought period		Recurring periods of droughts from 1789, also drought in India 1808–1813		Russell in Grove 2005:139
1809					
10–11 March	Gale	Broken Bay	Possibly severe gale PH		
			10 or 11 March <b>Argument</b> sloop 9t lost Broken Bay, 3 lost		Loney 1978:18 Atlas
			11 March <b>Hazard</b> sloop 10t ashore, Broken Bay and later refloated. A boy was saved by Aborigines		Bateson 1972 Loney 1978:18 Atlas, NSD
Early April	Gale	Bass Strait	1 April <i>Governor Hunter</i> driven ashore in gale. Salvaged		EAS
1810					
Early 1810	Vessel cap-sized	North of Broken Bay	19 July <i>Lady Nelson</i> found an <b>unidentified hull</b> , c60t 6km off Broken Bay	Possibly drifted south in EAC? PH	Bateson 1972:47 Loney 1978:18 Atlas NSD
1811					
Early June	Gale	C NSW	Possibly severe gale PH		
	Gale	Port Stephens	June <b>Eliza</b> sloop driven from Hawkesbury R in gale and driven ashore Port Stephens and lost		Atlas NSD EAS
			June <b>Northumberland</b> left Sydney for Newcastle and disappeared		EAS
1812					

1812			Engraving (Absolom West) of Newcastle harbour, shows pre causeway (Macquarie Pier) swell diffraction		Coltheart 1997:15
Mid July	Gale	C NSW			
			16 July <b>Boyd</b> schooner 18t lost at Stockton Beach after leaving Hawkesbury R		Atlas, AE, NSD Loney 1978:18 EAS
			16 July <b>Sally</b> sloop 23t Newcastle to Sydney driven offshore and abandoned, crew landed Lake Macquarie		Atlas NSD EAS
Mid Dec 1812	Sudden Gale	Southern Tasman Sea	<i>Isabella</i> hove-to for 24 hours. Gale preceded and followed by long period of fine weather		Miller 1995:9
1813					
			No record of storm events PH		
1808–1815	Drought continued		Recurring periods of droughts from 1789		Russell in Grove 2005:139
1814					
7 April	Gale	C NSW	<b>Speedwell</b> sloop 21t four convicts seized the vessel and driven ashore in gale, Hawkesbury River, 4 lost		Bateson 1972, EAS Loney, Atlas, NSD
Sept	Gale?	C NSW	<b>Resource</b> schooner 19t, lost leaving Hunter R, all saved	Built from <i>Porpoise</i> on Wreck Reef 1803	Loney, Atlas, NSD, EAS, Bateson 1972
1815					
March	Gale?	Illawarra	Large quantity of wreckage washed ashore at Shoalhaven R		Loney
April	Tambora volcanic eruption	Indonesia	Considered to be largest eruption for 10 000 years. 1816 northern hemisphere, 'year without a summer'. Cold spring and summer, crops failed with frosts and snow, glaciers advanced and extensive sea ice	Generated 10m tsunami Indian Ocean coasts	Johnson 1993
1816					
			Except for 1816, no shipwrecks in Victoria 1797–1830		NSD
Mid Jan	Storm	N and C NSW	Possible tropical storm in Coral Sea crossed N NSW coast PH		
			Mid Jan <b>Amelia</b> brig 90t East India Co left Sydney for Java, possibly lost off NSW coast		Atlas, NSD Loney 1978:18 EAS
	Strong NE wind	Newcastle	19 Jan <b>Estramina</b> colonial schooner 120t originally Spanish Ship <i>Estremina</i> captured Peru October 1804. Drifted ashore and lost Hunter bar in strong NE wind	Low to N PH	Bateson 1972:52 Loney 1978:18 Atlas, EAS

Late April	Gale	C NSW – Bass Strait	25 April <i>Elizabeth</i> cutter driven ashore in severe storm at Wilson's Promontary		Bateson 1972:53 NSD, EAS, Love 2003
	Gale	C NSW	<i>Recovery</i> sloop 14t blown out to sea from Broken Bay, beat back to coast and lost Stockton Bight in Great Gale, crew walked to Hunter R		Loney 1978:18 Atlas, EAS
Mid – late June 1816	<i>The Great Gale</i>	NSW coast	Very severe winter gale, from Bass Strait to mid north coast, duration of 10 days, many vessels lost PH		
			20 June <i>Hawkesbury Packet</i> sloop 28t sheltered during Great Gale, Port Stephens. Later wrecked Kiama Aug 1817		Loney Atlas EAS
			Around mid June <i>Edwin</i> schooner 15t forced ashore in Great Gale near Cape Hawke, crew reached shore		Loney 1978:19 NSD Atlas, EAS
	Storm	Cape Hawke	June <i>Jane</i> sank off Cape Hawke in storm crew lost. Wreck found by Oxley Oct 1818 near Old Bar and boat N of Crowdy Head		Atlas, NSD, EAS Loney 1978:19 Linton 2004:12
	Gale	Bass Strait	25 June <i>Brothers</i> schooner 40t driven ashore and lost in heavy easterly gale, Kent Group, Bass Strait	Low to north PH	Bateson 1972:54 NSD, EAS
	Gale	Sydney	Late June <i>Windsor</i> sloop 22t wrecked in gale at Collaroy. <i>Windsor</i> picked up crew of <i>Recovery</i> and was heading for Sydney, all survived	See Late April above	Loney 1978:19 Atlas, EAS NSD
			30 June <i>Elizabeth Henrietta</i> brig 160t capsized at anchor Hunter R, 2 lost. Later salvaged and lost Dec 1825		Bateson 1972 Loney NSD, EAS
July 1816	<i>Governor Hunter Gale</i>	NSW coast	Severe gale, possibly around five days PH		
			<i>Governor Hunter</i> schooner 35t seen off Cape Howe in July returning to Sydney from Kangaroo Island. Wreck later found near entrance to Wallis Lake by Oxley Oct 1818		Bateson 1972:55 McLachlan 1988:30 EAS
	Rough weather	Broken Bay	July <i>Whale</i> sloop 14t lost off Broken Bay during rough weather, 3 lost		Bateson 1972:55 NSD, Loney 1978:19
	Gale	Tasman Sea	July <i>Atlas</i> convict transport forced to sea for a week in gale		Bateson 1972:55
Sept 1816	Gale?	Trial Bay	12 Sept Captain Heany <i>Mary</i> schooner arrived at Port Jackson with news of the captured <i>Trial</i> (brig 80t, seized by convicts). <i>Rosetta</i> sent in pursuit but found no trace. In Feb 1817 Master Thomas Whyte, <i>Lady Nelson</i> described the mouth of Macleay R and wreckage of <i>Trial</i> on the beach north of Smoky Cape. Convicts reported to have left in a boat constructed from wreckage	May have been sheltering in Trial Bay and ashore in storm late 1816. Ship and boats damaged suggests storm PH	Richards 1996:11 Loney 1978:20 Atlas EAS
24 Nov	Gale?	Newcastle	<i>Nautilus</i> brig 70t lost on Oyster Bank, all survived		Loney 1978:20 Atlas, NSD, EAS Callen 1986:99

1816	Chart	Hunter R	Lieutenant Charles Jeffrey's <i>Kangaroo</i> Admiralty survey vessel, charted Hunter R entrance, shows the wrecks of <i>Nautilus</i> brig 1816, <i>Estremina</i> schooner 1816, and <i>Dundee</i> ship 1812, on Oyster Bank, shown as a series of shoals, running parallel to the south shore and island. No clearly defined bar, 3 fathoms N of Nobbys	<i>Dundee</i> lost in 1808 PH	Coltheart 1997:16 Callen 1986:99
1817					
Early July	Gale		<i>Hawkesbury Packet</i> ashore in gale Port Stephens, later refloated		Bateson 1972:55
	Gale		July <i>Hope</i> ketch 16t possibly driven ashore and wrecked in gale at Port Stephens		Bateson 1972:55 Loney, Atlas, EAS
August			<i>Hawkesbury Packet</i> sloop 28t lost on a reef at Minnamurra R mouth		Loney, NSD, Atlas Bateson 1972, EAS
Mid Dec	Gale	Newcastle	<i>Endeavour</i> schooner driven ashore in gale and lost Nobbys Head, crew saved		Loney 1978:20 NSD, EAS
22–26 Dec 1817	Gale	S NSW	Phillip Parker King in <i>Mermaid</i> colonial cutter left Sydney for circumnavigation of Australia. SW gale and forced to shelter in Twofold Bay	Returned to Sydney July 1818	King 1822
28 Dec	Gale	Bass Strait	SW gale with heavy rain		King 1822
1818					
March	Gale	C NSW	12 March <i>Experiment</i> sloop driven ashore in SW gale Broken Bay, all survived		Bateson 1972:57 Loney 1978:20 Atlas, NSD, EAS
May	Overlapping spits	Hastings R	King sketch of Hastings R mouth shows the N spit extended towards S bank.	In late 1820's Clarence R spit described as similar arrangement PH	McLachlan 1988:37 Mackey 2001
June	East coast low	NSW coast	21 May Phillip Parker King departed Port Macquarie for northern Australia.		King 1822 BoM
June – July	Periods of galeforce SE	FNQ	Along the north Q coast King experienced three periods of strong trade winds		King 1822
Aug 1818	Macquarie Pier Foundation stone of causeway laid by Gov Macquarie		In 1816 Gov Macquarie had ordered the construction of 'a strong rampart of massy stonework' from Beacon Hill to Coal Island (Nobbys) across the southern channel, 10ft [3m] deep and used by ships. The wall was to scour the main channel and prevent the cross tide which forced ships onto the northern shoals of Oyster Bank	Funding reduced by Gov Hunter and by 1825 much of wall had collapsed.  Sketch showing wall half completed	Coltheart 1997:15–16, 39

19–22 Sept	<b>Violent storm</b>	Port Macquarie	19 Sept, Oxley near Mt Seaview, Port Macquarie describes a very cold storm with 'unabated violence' and 'incessant rain'		McLachlan 1988:18
27 Dec	<b>Severe gale</b>	Tasmania	King encountered a heavy SW gale		King 1822
1819					
March	Hunter R causeway		Only one eighth completed, despite extra effort 'every storm washed the great blocks away'		Coltheart 1997:15
Mid March – April	<b>Three floods</b>	Hawkesbury R			King 1822
May	Hastings R bar 4.6m		Oxley in <i>Mermaid</i> to Port Macquarie. Bar could be crossed by vessels drawing 3m	<i>Mermaid</i> drew 2.7m PH	McLachlan 1988:36
Late Oct	<b>E gale</b>	Bass Strait	<i>Daphne</i> brig 151t left Sydney for India 10 Oct, took shelter from E gale, Kent Group		EAS
1820 – 1840	Colonial settlement north of Sydney		Colonial shipping to penal settlements at Port Macquarie and Moreton Bay. Coastal trade increasing coal from Newcastle, (mainly to Sydney, also Moreton Bay) cedar from lower north coast to Sydney, later Macleay R 1828, Clarence R 1838 and Richmond R 1839. Ship building on Manning R from early 1830's to late 1830's, on Clarence R. Western Pacific Ocean whaling increasing	Brisbane R. Records of major floods from 1825. Records of events improve during this period as coastal trade increases PH	Mackey 2001:27
1820					
Late April – early June 1820	No severe storms PH	SEQ – NSW	21 April <i>Echo</i> whaler 345t lost Wreck Reef. 13 June Ship's boat reached Sydney. Second boat rescued by <i>Cumberland</i> off Moreton Bay. New Zealand canoe (Maori?) from <i>Echo</i> found in Moreton Bay by Oxley 1823		Mackness 1979:11,18 Longhurst 1996:3 Loney, NSD, EAS
8 July	<b>Gale</b>	C NSW	<i>William Broughton</i> colonial sloop 26t lost in gale off Botany Bay, 3 crew lost		Loney, Atlas, NSD Bateson 1972:61 EAS
1821					
	Settlement north of Sydney		Port Macquarie settlement established early 1821		McLachlan 1988 Coltheart 1997:15
	Hunter R causeway	Newcastle	By early 1821 it was only half completed, but the channel had improved and swell in the entrance reduced		Coltheart 1997:15
Late March – mid April	<b>Period of severe storms</b>			Tropical storm off SEQ? PH	



	North easterly gales	Port Stephens	22 March – 4 April. 21 March Capt Allman left Sydney in 3 ships to establish Port Macquarie settlement, sheltered in Port Stephens from NE gale for 14 days		McLachlan 1988:55 Moyes and Mant 1993:36
	Heavy seas	Port Macquarie	6 April Allman could not cross Hastings R bar		HDHS:7, Moyes and Mant 1993:36
6–16 April	Severe gale	M NSW	Allman forced to shelter in Trial Bay from heavy (southerly?) gale	Sheltered in Trial Bay 11 days	McLachlan 1988:55
	Big swell?		17 April <i>Prince Regent</i> struck a rock and <i>Mermaid</i> aground on bar for 7 hours	<i>Mermaid</i> drew 2.7m and was entering at low water PH	HDHS 1983:7
Late April	Gale	Port Macquarie	Gale 'whipped the harbour into a fury' preventing <i>Lady Nelson</i> from leaving until May 2. <i>Lady Nelson</i> ashore on south beach (inside the bar) when attempting to leave	Possibly severe PH	McLachlan 1988:56
30 May – 4 June	Gales of wind	Port Macquarie			King 1822
16 May	Heavy seas	Port Macquarie	<i>Prince Regent</i> at anchor delayed by heavy swell on bar and no westerly wind		McLachlan 1988:57
Late May	Severe gale	S NSW			
	Heavy SE gale	Twofold Bay	26 May <i>Mary</i> schooner 52t lost Twofold Bay in heavy SE gale and tremendous seas. Strong SE gale veered E, driven ashore		Bateson 1972:61 Loney, NSD, EAS
Early July	Heavy gale	Bass Strait	8 July <i>Phatisalam</i> ship 259t lost in heavy gale, Three Hummock Is, Bass Strait		NSD, EAS
May – October	Vessel on beach	Port Macquarie	<i>Lady Nelson</i> ashore town beach, Hastings R entrance, for many months until repaired and refloated	Suggests no severe swell mid north NSW coast PH	Moyes and Mant 1993:36
1–3 Nov	Gale	Central NSW	Gov Macquarie on voyage to inspect Port Macquarie describes 'a very smart gale, with high seas'		McLachlan 1988:67
Early Dec	Gale	Port Macquarie	7 Dec Boat overturned on Port Macquarie bar and 2 drowned. <i>Sally</i> could not cross bar and ran to Trial Bay	Implies SE wind PH	McLachlan 1988:96
1822					
Late 1821 or early 1822	Inferred storm	Southern Moreton Bay	Storm washover and breach of barrier dune at Southport	Major storm event(s) inferred during late 1821 or early 1822 PH	Salter 2002:4
			1 Jan <i>Hydery</i> ship 345t Sydney to Calcutta and possibly lost FNQ		NSD
	Southport washover		Early March 1822 Bingle in <i>Sally</i> observed at Southport a 4 km wide breach in the dune with hardly any water on it		Bingle 1822 (Log of <i>Sally</i> )

1 March 1822	Severe Gale	Off Cape Byron	'severe gales for the whole evening. In the morning ... the ship had been blown 35 to 40 miles to the southeast'	Suggests NW gale and influence of EAC? PH	Ryan and Smith 2001: 5
July	Continuous Dune	Moreton Bay	William Edwardson <i>Snapper</i> sailing close to shore in calm weather observed a continuous beach from Pt Danger to Pt Lookout	Dune reformed at Southport washover PH	Edwardson, 1822 Longhurst, 1996 Salter 2002:4
	Southport bar not open		Rowed to Broadwater. Separated by a narrow neck of low sandy land (around The Basin)	Previously considered to be Jumpinpin PH	Edwardson 1822 Neil 1991
	North end of Pumicestone		Rowed to near Caloundra and found passage ended in mangroves	Passage not open? PH	Edwardson 1822
14 Aug	Gale?	Broken Bay	<i>Betsey</i> sloop ashore in Broken Bay, possibly refloated		Atlas, Bateson 1972 11 Aug
Late Oct	Severe gale	Hobart	28 Oct <i>Actaeon</i> ship 305t struck rocks and broke up off Hobart in fierce gale		Bateson 1972:63 NSD
1823					
Early 1823	Flood	Boyne R	Nov 1823 Oxley had difficulty finding fresh water around Port Curtis but notes evidence of past flood debris +20m in the Boyne R. Oxley recognised the 'rainy season' and the possibility of summer storms 'late in the year' and decided not to proceed north to Port Bowen	Flood previous wet season but later found no recent high flood marks in Brisbane R PH	BoM Riviere 1998:67
21–26 March	Severe gale 'gale continued with unabated violence for five days'	Off Illawarra	Thomas Pamphlet, Richard Parsons and John Finnegan, blown out to sea in 5 day westerly gale sailing to the Five Is (Illawarra) in a 10m open boat. Seas remained rough for next 11 days. After 24 days landed Moreton Is. Found living with Aboriginal people on Bribie Is by Oxley 8 months later. Parsons not found until late 1824	Intense low to south in Tasman Sea. Boat driven NE then NW as low moved E PH	Riviere 1998:92 McLeod 1990:191–202
Early Sept	Severe gale	Tasman Sea			Bateson 1972:64
	Heavy gale	Newcastle	6 Sept <i>Comet</i> sloop 17t left Sydney for Newcastle and disappeared in heavy W, later SW gale		Loney 1978:20 Atlas, EAS NSD
	Severe gale	Bay of Islands, NZ	8 Sept <i>Brampton</i> ship lost in severe three day gale Bay of Islands, NZ	Gale moved across Tasman Sea PH	AE EAS
c24 Oct	Wild overnight storm and heavy rain	Port Stephens	<i>Mermaid</i> struck bad weather near Port Stephens	Low to S? PH	Riviere 1996:159
25–27 Oct	Moderate swell	Port Macquarie	<i>Mermaid</i> did not enter Port Macquarie and embarking from the rocks was 'with some little difficulty on account of the surf'		Uniacke in Riviere 1998:61

31 Oct – 3 Nov	<b>Black Nor'easter</b> Very strong NE winds	SEQ N NSW	Oxley in <i>Mermaid</i> to Port Curtis 'tedious passage occasioned by adverse NE winds and strong southerly currents.' Off Stradbroke Island 'wind came on to blow so hard that we determined to run in shore and look for an anchorage, this we found under the lee of a small island' [Cook Is]	Low swell as vessel would not anchor south of Cook Is in SE swell PH	Uniacke in Riviere 1998:61 Keats 1999:3 Mackaness 1979:6
Oct – Nov 1823	<b>Southport Bar</b>  <b>Two entrances open</b>  Oxley observed Southport Bar as navigable by boats and located around 28 degrees south		1 Nov Oxley put <i>Mermaid</i> about near the middle of South Stradbroke Is and sailing back south [off Southport] 'from the top of the masts, they saw in the interior a <b>large river or a lagoon</b> [The Broadwater] with an opening to the SW, it seemed to spread over quite a considerable distance to the north and Mr Oxley was in some doubt as to its connection with the southern extremity of Moreton Bay. They hove to and the master was sent to take soundings at the entrance of this river. He came back a short while later and reported that he had found <b>two mouths</b> , the second to the SE of the one which had been seen from the ship. They were both blocked by a sandbank (bar) over which the sea lashed with too much fury for him to attempt to cross it with the boat'	Entrances at The Basin and Narrow-Neck open, both shallow with bars and without clearly defined channels. Jumpinpin not open PH	French copy by Auguste Bernard of Uniacke's account of voyage (now lost) (Archives Nationales, Paris 5JJ 82) Translated by Riviere 1996:159 Salter 2002:5
Nov	<b>Tweed R bar</b>		Bar 3.6m at low tide		Riviere 1998:62
4–5 Nov	<b>Severe gale</b>	SEQ and NSW	Fresh winds from SW and severe gale, <i>Mermaid</i> made a fast passage from Point Danger to Port Curtis	Low to S? PH	Uniacke in Riviere 1998:65–68 Oxley
20 Nov	Very fresh SSE wind	SEQ	'it blew very fresh' and on 21 Nov moderate SSE	Low to E PH	Uniacke (Field) in Riviere 1998:69
23–29 Nov	<b>Very severe six day gale</b>	Fraser Is	Off northern Fraser Is, 'towards evening (23 Nov) it commenced blowing and raining extremely hard from SW ...treble reefed the mainsail, which ...shortly afterwards split ...set the trysail and spitfire jib' and <b>hove to for 6 days</b> 'the seas running tremendously high, the cutter labouring very much, and making so much water that we were obliged to pump her every hour'. Moderated suddenly and despite the storm 'the current ...had drifted us nearly 20 miles per day to windward'	Low to S off coast moved into Tasman Sea PH	Uniacke in Riviere 1998:70
6–8 Dec	<b>Strong SE two day gale</b>	Moreton Is	Off Moreton Is 'the wind at NE ... suddenly chopped around to the southward, and came on to blow with great violence ... less strong than we encountered off Breaksea Spit ...[after 2 days] ...moderated as suddenly as it commenced. The wind then veering NE'	Possibly tropical storm PH	Uniacke in Riviere 1998:83

Early Dec 1823	<b>Drought</b> No recent major flood and possibly several years since serious flooding in river	Brisbane R	Oxley reported 'there was no appearance of the river being even occasionally flooded, no mark being found more than 7 feet above the level [of high water?] which is little more than would be caused by the Flood Tide at High Water forcing back any unusual accumulation of waters in the Rainy Seasons' Previous storms off the coast either produced little or moderate rainfall that was retained by the catchment in drought conditions PH	No serious flood in early 1820s as breakup of flood debris would take several years. Oxley was looking for signs of flood as he had earlier noted recent flood debris in the Boyne R PH	Sheehan in BHG 2000:5 HCT
1824					
1824			Moreton Bay settlement established		Sheehan 2000:8
1824–1830	<b>Long drought periods</b>		Except for early 1825 and late 1826 recurring drought continued	Recurring periods of drought dominated the east coast climate from 1789 to 1830 PH	Russell in Grove 2005:139
1824	<b>Drought</b>	Cooloolo	Parsons living with Aboriginal people around Cooloolo unable to find fresh water inland		Brown 2000:79
Dec 1823 – Jan 1824	<b>Drought</b> and hot summer winds	Sydney	A few days confined to house by 'hot wind' 'it seldom seems to rain...[streams are] ...frequently dried up in summer...water sold in Sydney at two pence a bucket'		Uniacke in Riviere 1998:41
Late Jan	Rain	Sydney			Uniacke in Riviere 1998:41
25 Feb	Storm	NZ	<i>Elizabeth Henrietta</i> colonial brig 160t driven ashore Ruapuke Bay NZ and took eight months to salvage	Storm surge? PH	Bateson 1972:65 EAS
11 March			<i>William Cossar</i> capsized Sydney Harbour in sudden squall		Bateson 1972:65 EAS
Winter 1824	<b>Drought</b>		Severe drought in Hastings R		McLachlan 1988:145
Nov	Deep channel	South Passage, Moreton Bay	South Passage charted by Oxley and <i>Amity</i> departs Moreton Bay by the South Passage	First use of South passage PH	McLeod 1984:100
19 Dec	Gale	Newcastle	<i>Elizabeth Henrietta</i> colonial brig 160t driven ashore on rocks Nobbys Is		Loney, Atlas, EAS Bateson 1972
1825					
1825			John Grey instructed to survey and buoy South Passage		McLeod 1984:101
Mid Feb	<b>Severe storm</b>	NSW coast	Mid Feb <i>Corsair</i> driven onto South Head by heavy swell	Heavy E swell in Sydney Harbour suggests low in N Tasman Sea PH	NSD,EAS

			14 Feb <b>William Cossar</b> 20t thrown onto Sow and Pigs Reef, Sydney Harbour	Big E swell, possible tropical storm PH	Bateson 1972:67 NSD, EAS
Early 1825	<b>Major Flood</b> First major flood described	Brisbane R	Sept 1825 Lockyer noted evidence of recent major flood in Brisbane R [around Mt Cosby pumping station] of +30m. Similar stage height to record flood in 1893	Between Oxley's visit in Sept 1824 and Sept 1825	Cossins 1990:56 Lockyer in Craig 1925:47, BoM
Early April	Gale?	NSW			
	Big swell	Port Macquarie	13 April <b>Sally</b> colonial sloop 49t, <b>Mary Ann</b> sloop 24t and <b>Brisbane</b> cutter 16t ashore Port Macquarie entrance in light wind and high seas. <b>Sally</b> and <b>Mary Ann</b> lost, <b>Brisbane</b> refloated, later lost Shoalhaven Aug 1832		Loney, NSD Bateson 1972 Atlas 18 April EAS
June	<b>Strong SE Trades</b>	Tasman Sea			
			12 June <b>Endeavour</b> schooner 50t lost off Broken Bay		Loney 1978:20 Atlas, EAS
	Heavy ground swell	Newcastle	19 June <b>Nereid</b> cutter (gentleman's yacht) 66t left Sydney for Manila 18 June. Forced to return in bad weather and driven ashore Stockton Bight, all survived		Loney 1978:20 Atlas NSD, EAS
	Strong SE but not storm	GBR	20 June <b>Royal Charlotte</b> ship 471t lost GBR off Mackay, Some crew reached Qld coast, others lost		Loney NSD, EAS Bateson 1972:68
Spring	Hot winds		Hot winds in Sept, Oct and Nov 1825 (with blight and rust) destroyed Port Macquarie wheat crop	Drought continued in C NSW PH	McLachlan 1988:163
Early Nov	Gale?	S NSW	<b>Charlotte</b> schooner driven ashore at Five Islands		Loney EAS
19 Dec	<b>Heavy swell</b>	Newcastle	<b>Elizabeth Henrietta</b> brig 160t driven onto Nobbys and lost, crew and passengers (70) rescued by pilot boat		Loney 1978:21 Atlas Bateson 1972 NSD EAS, Callen 1986:95
1826					
1826 – 1830	<b>Severe drought</b>	East coast	Severe drought 1826 to 1829 NSW coast, SEQ and inland	Drought began in 1823, but 1825 was wet on the coast (Brisbane R flood and Hastings R flowing in early 1826) then dry again until 1830 PH	Jeans 1972:48 McLachlan 1988:147 Neil 1998 Favenc 1888
1826	Southport Bar		Capt Logan described Southport Bar as 3.35m deep, 'useful for small vessels'		Salter 2002:6
Mid April	<b>Severe gale</b>	C NSW			
	S gale	Newcastle	12 April <b>Mars</b> colonial cutter 30t lost in gale north of Newcastle		Loney, Atlas, EAS Bateson 1972:72

	S gale	Newcastle	13 April <b>Australia</b> brig arrived off Sydney and could not enter in southerly gale, badly leaking, ran to Newcastle but drifted ashore Stockton Bight		Loney 1978:21 Atlas, NSD Bateson 1972:73 EAS
2 May 1826	Heavy seas	Port Macquarie	A seaman washed overboard from boat on bar in heavy seas		McLachlan 1988:97
Late July	Severe Gale	C NSW			
	Heavy gale	Central coast	26 July <b>Sophia</b> lost on Oyster Bank in heavy gale and swept high on beach		Bateson 1972:74 Loney 1978:21 NSD, EAS
			Early Aug <b>Balberook</b> sloop sprang a leak and sank off Port Stephens, crew survived in boats		Loney 1978:21 Atlas, NSD, EAS
Mid Aug 1826	Gale?	C NSW			
			August <b>Sally</b> small coaster possibly lost off central coast		Bateson 1972:74 Loney, EAS
	Gale?	Newcastle	7 Aug <b>Newcastle</b> schooner 32t left Newcastle 'apparently overloaded' and disappeared. Wreckage ashore Lake Macquarie in Sept, 9 lost		Loney 1978:21 Atlas, EAS NSD Bateson 1972:74
Mid to late Sept	Severe Gale	Central NSW		Possibly two gales? PH	
	Gale	Sydney	11 Sept <b>Perseverance</b> brig whaler 136t driven ashore Bradleys Head, refloated		Bateson 1972:75 EAS
	Severe gale	Camden Haven	16 Sept <b>Trusty</b> sloop disappeared after leaving Camden Haven. On 9 Oct it was reported 'she must have foundered...in one of the late severe gales'		McLachlan 1988:138
	Gale	Sydney	19 Sept <b>Governor Darling</b> schooner 37t sheltering in Watsons Bay caught in fierce gale. Run ashore and later refloated		Bateson 1972:76 NSD, EAS
1827					
11 Feb	SE gale	Sydney	<b>Emma Kemp</b> 37t blown onto Sow and Pigs Reef in SE gale, refloated		Bateson 1972 EAS
Winter 1827	Storms?			Possibly one or more winter storms	
Before Aug	Wreck on beach	NSW	4 convicts reported <b>wreck</b> on beach 50 miles 'below' [south of] Trial Bay	Around Manning R PH	Sydney Gazette 29 Aug 1827 in Mackey 2001:5
Before Aug	Second wreck on beach		Report of <b>wreck</b> on beach between Solitary Is and Cape Byron. In Sept Capt Barcus, sloop <b>Alligator</b> sent to investigate		Mackey 2001:5 Sydney Gazette 22 Aug 1829
Mid Sept	Gale	C NSW – Tas			
			c 19 Sept <b>Charlotte</b> sloop 10t left Sydney (7 Sept) for Port Stephens, beached and broke on Stockton Beach, 4 lost		Loney 1978:21 Atlas, EAS NSD
			Sept <b>Governor Sorell</b> schooner 35t damaged in gale Bass Strait?		EAS

2 Oct	Gale	Bass Strait	<b>Governor Sorell</b> schooner 35t driven ashore in gale Slopen Is, Tas		EAS
19 Nov	Gale	S NSW	<b>Olivia</b> schooner 60t driven ashore in gale south of Twofold Bay, crew survived		Loney Atlas, NSD, EAS
9 Dec	High seas	Port Macquarie	Boat overturned on Port Macquarie bar in high sea. 7 crew rescued by local Aborigines 'the sea ran so high that no European would venture to assist them'		McLachlan 1988:98
1828					
	Drought	East coast	'Capt Rous noted that the 'country to the northward appeared to have suffered as much from drought as the southern parts of the colony'		Mackey 2001:6
1828		W NSW	Sturt reaching the Darling R, above Bourke, found it 'so salt as to be unfit to drink' and that 'the long continued drought having lowered the river so that brine springs in the banks' flowed into the river, which was salty below Walgett. At Macquarie marshes noted 'the reed beds were in flames in all parts'	No rain had fallen in W NSW for two years	Favenc 1888
Jan 1828	Gale	Coral Sea	<b>Vixen</b> schooner (French Canadian) arrived off Port Macquarie badly damaged from previous gale with 3 crew, remaining crew abandoned vessel		McLachlan 1988:98 Finkel 1987:16
April and May	Strong SE Trades		18 April <b>Bonna Vista</b> brig 237t lost Kenn Reef		NSD EAS
			18 April <b>Woodlark</b> brig 160t Hobart to Capetown via Torres Strait, lost Saumarez Reefs, 18 crew reached Moreton Bay (14 May), 6 lost from raft		AE NSD EAS
June 1828	Gale	Port Stephens	5 June <b>Dove</b> cutter driven ashore in gale and lost north head Port Stephens, 7 lost		Loney 1978:21 Atlas, NSD, EAS
	Gale	NZ	8 June <b>Hunter</b> schooner 61t lost in gale Entry Island, NZ	Storm crossed Tasman Sea PH	Bateson 1972 EAS
Early Aug	Heavy swell	Clarence R	Rous could not get through the heavy surf at the entrance to Shoal Bay		Coltheart 1997:28
14 Aug	Calm seas	North coast	<b>Rainbow</b> anchored off Tweed R bar and the next day moved around to Danger Bay. Suggests wind had shifted to SE PH	Could only be an anchorage in very calm conditions PH	Keats 1999:5
1829					
			Low storm year, long drought continues but early summer rain SEQ PH		
1829	Wet weather		Cunningham encountered wet weather in headwaters of Mary R		Logan 1988:11



Late April	Gale?	Newcastle	24 April <b>Governor Arthur</b> cutter 47t lost on reef off Nobbys Head		NSD, EAS Loney 1978:21
June	Strong SE Trades	Coral Sea to NSW	13 June <b>Mermaid</b> schooner 84t lost on Franklands Reef, GBR. Crew survived in boats		NSD, EAS
			June Manning R cedar cutter lost at Seal Rocks. Crew guarding cargo of flour and spirits killed by Aborigines in July		McLachlan 1988:183
1830					
	River entrances shoaled during long drought	North of Port Stephens	Australian Agricultural Co abandoned run as the Manning R had 'no depth of water at either entrance', Farquhar Inlet 'a boat could scarcely enter' and Harrington's Inlet 'is not a good deal better'. These shallow entrances would 'not allow for produce being conveyed by a vessel sufficiently large to do business safely and efficiently'	Low storm year, long drought ends in Nov PH	Coltheart 1997:25
1830's	Work resumed on Macquarie Pier	Hunter R	When inspected in 1836 stone from Beacon Hill was found to be breaking up in rough conditions. Later stone from Nobbys was used but still frequently washed away	First commenced in Aug 1818 and completed in 1846 PH	Coltheart 1997:39
Late Jan	Severe gale	Tasman Sea			
	Gale	Sydney	20 Jan <b>Liberty</b> schooner forced ashore North Head, Sydney Harbour, all survived		Loney 1978:22 NSD, EAS
	Heavy gale	Sydney	30 Jan <b>Hunter</b> schooner, 62t driven north in heavy gale returning to Sydney from Five Is. Crew discovered on small island in FNQ in 1831		NSD, EAS
June/ July	Shallow bar	Port Macquarie	Bar was 'much diminished in width and depth' and was impassable for 'vessels drawing more than 6 feet' (1.8m) In 1819 Port Macquarie bar could be crossed by vessels drawing 3m	The bar shoaled during the late 1820's PH	McLachlan 1988:99
Nov 1830	End of drought	Port Macquarie	5 days of torrential rain scoured bar 'deep enough to admit vessels of any burthen'		McLachlan 1988:99
Dec	Wet Flooded rivers	Central NSW	Waiting for rivers to fall before moving fat cattle from Bathurst to Port Macquarie		Mackey 2001:8
1831					
Mid April 1831	Gale	C NSW			
	Gale	Central NSW	c Mid April <b>Rover</b> cutter lost off central coast in gale, no survivors		Loney 1978:22 Atlas, NSD, EAS
	Gale	Port Stephens	April <b>Caribbean</b> cutter 17t sank off Port Stephens in gale	Second gale? PH	Atlas, NSD, Loney 1978:22
Early June	Gale	Lake Macquarie	5 June <b>Frederick</b> cutter driven ashore and lost in gale Lake Macquarie entrance, crew and passengers lost		Atlas NSD EAS

Nov? 1831	Storm?		Late 1831 <b>Samuel</b> schooner 67t Sydney to Hobart, lost Wycatta, NZ, Oct or Nov	Driven off course? PH	Bateson 1972 EAS
1832					
March	Gale	CQ – C NSW		Possible tropical storm PH	
			13 March <b>Dart</b> cutter 21t swept onto rocks and lost Port Macquarie bar, all survived and gear salvaged		Loney 1978:22 NSD Finkel 1987:40
			March <b>Lucy Royal</b> coaster 6t lost off Norah Head		Bateson 1972 EAS
			Early March, <b>Elizabeth</b> brig 140t aground on Middleton Reef, crew left wreck in boats and disappeared. Wreck found by <b>Fairy</b> 31 March 1833		Loney EAS
28 March	Flood	Hastings R	4ft (1.2m) of water in the house at Rolland's Plains and the flats completely covered	Major flood? PH	Mackey 2001:9
July or Aug 1832	Gale?	S NSW	Aug <b>Brisbane</b> cutter 16t capsized and lost on south coast, no survivors. Previously ashore Port Macquarie 13 April 1825 and refloated	Possibly lost July, wreckage ashore Aug? PH	Loney, Atlas, NSD, EAS AE July 1832 lost off Ulladulla
1833					
	Low storm year		Vessels carried 300 loads of coal from Hunter R		Callen 1986:53
1833	Drought year				Russell in Grove 2005:139
Mid July	Gale	Smoky Cape	19 July <b>Deveron</b> barque whaler 243t sprang a leak in gale off Solitary Is and sank off Trial Bay, some survivors reached shore		Loney 1978:22 Atlas NSD 21 July EAS
1834					
Feb	Gale	Newcastle	c19 Feb <b>Monitor</b> cutter 20t ashore near Newcastle		NSD, Atlas EAS
	Gale	Newcastle	19 Feb <b>Ceylon</b> cutter 10t beached and lost in gale near Newcastle, 2 lost		Atlas, NSD EAS
Mid April	Gale	C NSW			
	Gale	Broken Bay	April <b>Linnett</b> cutter 10t dragged anchors and wrecked Broken Bay		Loney Atlas, NSD, EAS
	Gale	Newcastle	26 April <b>Redpole</b> swamped and lost off Hunter R bar in gale		NSD EAS
Late Aug	Severe Gale	C to S NSW			
	Heavy seas	Middle Head	25 Aug <b>Edward Lombe</b> barque 347t driven ashore and lost on Middle Head. Dashed to pieces 12 lost and 17 saved		Loney AE, EAS NSD
	Gale	Vic	29 Aug <b>Henry</b> 34t schooner driven ashore at Portland, Vic		NSD EAS

1835					
Late Jan	Gale	C NSW	Late Jan <i>Jane</i> cutter 20t lost on Manning R bar		NSD EAS
			27 Jan <i>St Patrick</i> sloop 7t lost off Sydney Heads in bad weather		NSD EAS
March	Shallow Bar?	Manning R	<i>Fanny</i> lost Manning R on bar		Atlas, NSD, EAS
Mid July	Gale	Tasman Sea		Extensive gale PH	
	Gale	Norfolk Island	17 July <i>Friendship</i> schooner 89t lost ashore in gale Norfolk Island, all saved		Loney EAS
	Gale	Port Macquarie	July <i>Port Macquarie Packet</i> schooner capsized and lost ashore in squall		Atlas NSD
			Aug <i>Wreck</i> of 20t vessel with cargo of cedar found on Stockton Beach	Possibly lost July PH	Atlas EAS
Early– Mid Nov	Squall?	M NSW	<i>Isabella</i> schooner 23t Manning R to Sydney capsized off mid north coast, 3 lost		Loney, Atlas NSD, EAS
10 Dec	Fresh SE		<i>Hive</i> barque convict transport 485t lost ashore Wreck Bay (navigation error) and swept by moderate sea		Loney, EAS Atlas NSD
17–18 Dec	Gale	Jervis Bay	Wreck of <i>Hive</i> broke up in 'strong afternoon southerly'		Mawer 1997
1836					
	Severe storm year		Storms mid Jan, late Feb and early March. Gales April, mid June (7 day gale Fraser Is), late June (5 day gale), July and Dec PH		
Mid Jan 1836	Gale	C to S NSW		Possible tropical storm to N PH	
	Gale	Wreck Bay	15 Jan <i>Blackbird</i> schooner 68t ashore and lost attempting to salvage cargo of <i>Hive</i> (ashore Dec 1835) at Wreck Bay		Loney Atlas, EAS NSD
			Jan <i>Experiment</i> ketch 63t sank north of Sydney, 1 lost		Atlas, NSD, EAS Loney 1978:22
			9 Jan <i>Pandora</i> cutter 27t lost ashore north head Port Stephens, some survived, 5 lost		Loney 1978:22 NSD, EAS
Late Feb 1836	Gale		27 Feb <i>Swan</i> cutter 40t sank off Wollongong, wreckage spread from Seven Mile Beach to Sydney, 16 lost	SE Gale? Possibly severe PH	Loney, EAS Atlas NSD
Early March	Tropical low?	SEQ			
8–12 March	Major flood	Brisbane R	'Constant rain from 8–12 March.... the river rose about 12ft' [3.7m] Capt. Foster Fyans	Around 1m lower than 1974 flood	BoM
Mid April	Gale	Central NSW		Possibly severe gale PH	

	Storm	Manning R	Mid April <b>Providence</b> cutter 22t ashore south spit Manning R entrance in storm, refloated		Bateson 1972 NSD, EAS
	Gale	Crowdy Head	Mid April <b>Sally</b> ketch ashore at Crowdy Head in gale		Loney lost at sea NSD
			April <b>Priscilla</b> cutter ashore Crowdy Bay, later refloated and lost September 1859		NSD
	Gale	NZ	15 April <b>Rodney</b> brig whaler 166t lost in gale, Whangaroa, NZ		Bateson 1972
Late May 1836	<b>Strong SE Trades</b>	GBR	<b>Sterling Castle</b> brig 351t lost on Eliza Reef, Swain Group, outer GBR. 21 May 'bright, clear, wind strong and steady, lower topsails set ... [10pm] ... the vessel was striking [the reef]... the sea was running and breaking over us with such fearful violence ... the second sea ... tore the rudder off, and washed away the stern boat'.	Waves from heavy swell washed away and damaged the boats.	Williams 2002:31–44 NSD
June/ July 1836	<b>WINTER GALES</b>		Winter gales took a heavy toll of coastal trading vessels on NSW north coast		Loney 1978:23
Mid June 1836	<b>Severe gales</b>	SEQ to all NSW	Account of <b>Sterling Castle</b> survivor Youlden describes three violent storms of several days duration in June and July	Two severe gales in June and one in mid July PH	Williams 2002: 39–46
	Violent Gale	Fraser Is	<b>Sterling Castle</b> survivors in damaged long boat spent a week battling a gale to reach the coast ... and when the storm abated ... the sea was breaking with a terrible force upon the beach' ... Landed Waddy Point, Fraser Is. Persistent SE winds prevented launching the boat		Brown 2000:105
	'Winter gale'	NSW	Mid June <b>Native</b> coastal trader lost off Illawarra in gale, crew survived		Loney 1978:23 NSD
			June <b>Providence</b> cutter 22t blown out to sea in gale and disappeared		EAS
			June <b>Three Sisters</b> sank in Broken Bay, 8 lost		Loney, Atlas, NSD Bateson 1972, EAS
			June <b>Mary Ann</b> schooner 32t lost Launceston to Sydney		Atlas, EAS NSD
Mid July 1836	<b>Severe gale</b>	SEQ to C NSW			
	Ferocious storm 5 day gale	Fraser Is	'a <b>violent storm</b> now came upon us .. [and later] .. we were detained here for five days by a <b>terrible storm</b> '		Williams 2002:37–46, Brown 2000:105
			17 July <b>Jane</b> cutter 34t lost on rocks at Trial Bay		Atlas, NSD, EAS Mackey 2001:22
	Gale	Manning R	17 July <b>Beginning</b> sloop 15t sprang a leak in gale and abandoned after leaving Manning R for Sydney		Loney, EAS Atlas NSD June
			July <b>Adventure</b> sloop 24t disappeared at sea in gale off NSW coast, all lost		Loney, EAS Atlas, NSD
	Bar shoaling	South Passage	James Hexton, pilot, reported that an easterly wind had shifted the sand and left only 15ft [4.6m] at high tide	Bar c 2.5m at low tide	McLeod 1984:101

Late Sept/ Mid Oct	Fine weather		22 Sept <i>Prince Regent</i> colonial cutter departed Sydney to search for brig <i>Sterling Castle</i> and returned on 14 Oct		Mackey 2001:12
Early Oct	Shallow bar?	Macleay R	<i>Catherine</i> cutter 35t lost crossing Macleay R bar		Loney 1978:23 Atlas, NSD Nov
Dec	Gale	C NSW	11 Dec <i>Jolly Rambler</i> sloop 37t lost on Macleay bar, crew saved		Loney 1978:23 NSD, EAS
	Gale	Camden Haven	Dec <i>Friends</i> schooner 48t capsized and lost in gale off Camden Haven, all lost.		Loney Atlas, NSD
1837					
1837	Drought	Sydney	Severe drought Sydney 1837 to 1839		Jeans 1972:48 Grove 2005:139
During 1837	Shipwrecks SEQ		During 1837 Moreton Bay commandant (Capt Foster Fyans) responded to three reports of shipwrecks north of Brisbane (One was <i>Duke of York</i> )		Brown 2000:119
1837 Jan to Oct	Bar closed by drifting sand	Macleay R	'Macleay River has been almost closed up by a furious drifting sand' (3ft over bar) <i>Eliza</i> ... and a number of other vessels (10 by May 1837) are quite land locked' Vessels left early Oct and several stranded on bar for days [calm weather] (Oct 1837)	Bars shoaled along the coast from Marine sand infilling during stormy weather in 1836 PH	Mackey 2001:14
Jan	Shallow bar	Hunter R	Jan 19 <i>Joseph Weller</i> schooner 50t lost ashore Hunter R entrance		Loney 1978:23 NSD
March	Shallow Bar?	Macleay R	March <i>Richmond</i> schooner 42t lost on bar Macleay R		NSD, EAS Loney 1978:23
July 1837	Gale	C NSW	1 July <i>Governor Burke</i> schooner 49t capsized off Sydney Heads		NSD, EAS
			Early July <i>Adelaide</i> cutter capsized off Broken Bay		Loney 1978:23 EAS
			Early July <i>Rob Roy</i> schooner 47t lost ashore at Nobbys Head		NSD, EAS
Late Sept	Gale?	M to C NSW			
		Macleay R	Late Sept <i>Eliza</i> schooner 51t ashore and refloated	Possibly shallow bar? PH	Bateson 1972 NSD, EAS
Late Sept and Early Oct	Calm weather		<i>Eliza</i> , <i>Jane</i> and <i>Emma</i> and <i>Speculator</i> aground and stranded on Macleay R bar. 13 Oct <i>Eliza</i> arrived Sydney 'returned in safety from the Macleay with a fine cargo of cedar ...was detained some time in consequence of grounding on the bar ... while endeavouring to ...[cross] ...and in consequence sustained trifling damage to her rudder'		Mackey 2001:15

Late Dec	<b>Gale</b>	C to Bass Strait			
	Gales and heavy swell	Bass Strait	20 Dec <i>Shah</i> schooner dep Hobart 15 Dec on Sun 17 Dec 'complete hurricane' overnight, on 18 Dec heavy SE gale, wind, dropped and lost in heavy swell Shipwreck Ck, Mallacoota, Vic. SE gale again later in night		NSD Love 2003
	Gale	Newcastle	23 Dec <i>Vulcan</i> sloop 28t lost entering Newcastle in gale, some rescued, several lost		Loney 1978:23 Atlas, NSD, EAS
1838					
1838	<b>Severe Drought</b>	SEQ	Severe drought on east coast from 1837 to 1839, severe in SEQ during 1838		HCT
12 April	<b>Gale</b>	Hunter R	<i>Delight</i> cutter 35t swamped and lost off Hunter R entrance in gale		Loney 1978:23 NSD, EAS
April to June	<b>Shallow bar</b>	Clarence R	Early April <i>Susan</i> sailed to Clarence R and found that 'the bar was too rough to attempt a crossing' waited days and as conditions had not improved sailed to Moreton Bay. Upon return could not enter 'because of the treacherous sandbar at the mouth'. In early May <i>Susan</i> returned to Clarence R and crossed bar after sounding the channel. Entrance impeded by sand bar with 15ft (4.5m) and a second bar with 10ft (3m) and 'the bottom of rock'	Similar to bar depth described by Flinders 40 years before during severe drought conditions PH	Mackey 2001:15–16
July	<b>Drought</b> No recent floods on Clarence R	Clarence R	'The adjoining flats ...[floodplain]... do not seem subject to floods' Captain Butcher	In 1846 Surveyor Wilson selected 2ha on a hill which he called <i>Youlumba</i> an Aboriginal word for areas safe from floods	Mackey 2001:17, 46
Early Oct	<b>Shallow bar?</b>	Clarence R	<i>Taree</i> brigantine 48t ran aground and lost Clarence R bar leaving with cedar, crew saved		Mackey 2001:16 EAS
1839					
	<b>Low storm year</b>		Regular cedar trade to Clarence R throughout 1839 and cedar was regularly shipped by 11 schooners		Mackey 2001:17
April to May 1839	<b>Shallow river bars</b>		Mid April <i>Denmark Hill</i> barque 253t grounded and broadside Hunter R bar 21 May steamer <i>King William</i> 'grounded on sandspit opposite the breakwater' Hunter R May steamer <i>Sophia Jane</i> (drew 6 ft) aground Clarence R bar in heavy weather. Several vessels lost on Manning R bar	Hunter R bar formed at end of breakwater PH	Loney Mackey 2001:98

Late March	Gale	Tas	20 March <b>Rebecca</b> sloop 27t driven ashore in gale on Cape Portland, Tas		NSD April EAS
Early May	Rough seas and shallow bar	Clarence R bar	13 May <b>Sophia Jane</b> wood paddle steamer 256t Brisbane to Sydney put into Clarence R to load firewood and <b>lost one of her quarter boats</b> after grounding on the bar in violently breaking seas. Arrived Newcastle 20 June	Ran out of coal, headwinds from S? PH	Mackey 2001:98 First steamer to cross Clarence R bar
Early May	Shallow bar?	Macleay R	Early May <b>Fairy</b> schooner 36t lost Macleay R bar		Loney, NSD, EAS Atlas, Manning R
20–25 May 1839	Fine weather		<b>King William</b> paddle steamer 81t arrived Sydney early 1838. Left Sydney 20 May and made 'a pleasant voyage' to Clarence R		Mackey 2001:98–100
25 May	Shallow bar	Clarence R bar	Crossed bar in 2 fathoms (3.7m) and 'the difficulty of passage over the bar' (draft 2.8m)		Mackey 2001:98
25 May – 1 June	Storm	SEQ and N NSW	At Clarence R rain from 25 May, inferred storm 28 May – 1 June and heavy seas until 12 June. <b>King William</b> reached Clarence R 25 Aug and First Falls (Grafton) 30 Aug		Mackey 2001:98–100
	Squall	Sydney	8 June <b>Sarah</b> cutter 33t capsized in squall and lost Sydney Heads		Atlas, EAS NSD
			June <b>Swallow</b> cutter 26t ashore Macleay R bar, refloated		Loney, Atlas NSD Seal Rocks
	S gale		11 June <b>Francis Freeling</b> ship 185t left Sydney for Melbourne and driven N in strong S gale. Lost entering Port Stephens		Atlas NSD EAS
11–12 June	Heavy swell	Clarence R bar	<b>Susan</b> and <b>King William</b> waiting to leave Clarence R due to 'the violence of the sea over the bar'		Mackey 2001:100
	End of swell	Clarence R bar	13 June Schooners <b>Eliza</b> and <b>Elizabeth</b> crossed in. <b>King William</b> and <b>Susan</b> left for Sydney		Mackey 2001:100
	Gale	S of NZ	18 June <b>Ann and Mary</b> brig 171t broke moorings and lost in gale Chatham Islands	Storm crossed Tasman to NZ PH	Bateson 1972
Late May	Heavy rain	Clarence R	25–30 May Rain period and on 29 May very heavy rain 'falling in torrents' during night		Mackey 2001:98–9
1 June 1839	Fresh	Clarence R	Strong current 'occasioned by the late heavy rain'		Mackey 2001:99
June 1839	Major Flood	Brisbane R	<b>Great Flood</b> After several days of heavy rain Brisbane R flooded possibly higher than the 1864 flood		BoM, Cossins 1990
Early July	Gale	Hunter R	2 July <b>King William</b> wood paddle steamer 81t lost Hunter R entrance when gale put fires out		Loney, Atlas, AE Mackey 2001:36 NSD Nobbys Head EAS



Late August	Gale?		<b>Edward</b> schooner 81t left Sydney 21 Aug for Clarence R and lost at Anna Bay, all survived		Loney 1978:24 Mackey 2001:33 EAS
Oct	Gale	Bass Strait	<b>Sarah</b> Schooner disappeared in Bass Strait in gale		EAS
Early Nov	Gale	Tasman Sea			
	SW gale	Batemans Bay	7 Nov <b>Elizabeth</b> schooner 13t sheltering from SW gale in Batemans Bay and driven ashore by heavy swell		Bateson 1972:140 Loney, EAS NSD
12 Nov	Gale	NZ	12 Nov <b>Henry Freeling</b> brigantine 91t lost ashore Tautuku NZ		NSD
			Nov <b>Britannia</b> brig 270t left Melbourne 9 Nov for Sydney and disappeared around Cape Howe. Figure head found with local Aborigines 1847		NSD EAS
Dec? 1839	Gale	Port Stephens	<b>Survey boat</b> driven ashore and wrecked in gale		Mackey 2001:46
1840's	1840's Early river valley settlement and cedar trade along NSW north coast and north from Brisbane		1839 end of convict arrivals at Moreton Bay, 1842 Moreton Bay district opened to free settlement. Period of north coast trade by coastal sailing ships and low powered steamers vulnerable to severe weather. Grazing 'Runs' established in Clarence and Richmond valleys 1840's and Burnett R. 1844 ship building Nerang Ck (Southport), and N NSW rivers 1847 Maryborough opened as a wool port, shipping bales, skins and tallow	During 1840's wool replaced cedar as the main cargo of the Clarence R	Mackey 2001 Coltheart 1997:29
1840					
1840	Drought		Drought continues [from 1837] and bushfires on north NSW coast Economic depression in early 1840s	Despite rain and floods in mid 1839 drought continues PH	BHG 2000:122
Jan to June 1840	Bushfires  Drought had prevailed for several years	N NSW	End Jan Hot westerly winds and most terrible fire ever to occur in the Clarence region. Burnt from Rocky R down the Clarence valley to Richmond valley and to the coast at Evans Head. May – June 1840 'drought conditions throughout the east coast of the colony'	Drought returned by late 1839	Mackey 2001:186–7 CRHS:1998:28
27 April			<b>Ferguson</b> ship 555t lost on Sir Charles Hardy Is, GBR. Military and crew taken off with 1 lost		NSD 1841 EAS
15 June 1840	Shallow bar Tweed Bar silted up	Tweed River	Schooner <b>Letitia</b> (first vessel to cross bar) aground on south spit when leaving in early July		Keats 1999:6 Longhurst 1996:15

June 1840	Southport Bar		Survey by Robert Dixon shows position of Nerang R mouth 2km S of present seaway entrance. Soundings of Richmond, Brunswick and Tweed Rivers	From 1823 the bar had moved N some	Maps in Keats 1988: 79
			c26 June <i>Charlotte</i> 18t parted mooring and lost W gale, Woolongong		EAS
3 July			Robert Dixon survey party boat swamped on Brunswick R bar	Swell from gale to S PH	Longhurst 1996:15
Mid July	Gale	S NSW – Tas			
	Gale	Bass Strait	11 July <i>City of Edinburgh</i> ship 366t lost in heavy Bass Strait gales, Flinders Is, crew survived		NSD EAS
			18 July <i>Eliza</i> cutter 12t left Broulee and disappeared		EAS
Autumn to Spring 1840	Drought and very cold winter on coast		Particularly cold winter with early (and late) heavy frosts. Mackey suggests prolonged drought and cold winter may have driven Aboriginal people to raid shepherd huts		Mackey 2001:187
8 Aug	Frost on coast	Clarence River	Heavy frost on coast. 'The ground was covered with ice... being only one mile from the beach' Commissioner Oaks		Mackey 2001:70
Sept	Drought	Richmond Valley	Casino station taken up in drought conditions. Severe drought continued until late 1843 and station failed		Mackey 2001:108–9
Mid Sept	Gale	Newcastle	19 Sept <i>Sir David Ogilby</i> schooner 123t lost in gale on north spit of Hunter R and broke up with no hope of salvage		Mackey 2001:39 Loney 1978:24 NSD, EAS
Dec			<i>Sally</i> brigantine (34t) first vessel to enter Richmond R since entrance charted by Rous 1828		Dening 1966
Mid Dec	Tropical Cyclone	Coral Sea			
			12 Dec <i>Mary</i> ship whaler 250t driven ashore in cyclone near Woodlark Island PNG, one survivor rescued in Oct 1844		AE 1842 EAS
1841					
	Break in drought	SEQ	Wet year and break in drought on coast	Drought continues to south?	PH
1841	Macquarie Pier	Hunter R	Capt Lort Stokes <i>Beagle</i> , visiting Newcastle noted the bar from the Pier and considered that it was formed by silt washing down the river	The bar would have been formed by littoral sediments PH	Coltheart 1997:40
3 Jan	Calm sea thick fog	East Vic	<i>Clonmel</i> paddle-steamer 524t lost ashore in thick fog Ninety Miile Beach, Vic	Possible dust and drought continued in south PH	Love 2003

Jan	<b>Tropical low?</b>		Extremely heavy rain in SEQ and rough seas on N NSW coast		Mackey 2001:30
			<b>Alexander Macleay</b> sloop 39t wrecked on Clarence R bar		Atlas, NSD, EAS Loney 1978:24
Mid January 1841	<b>Major flooding</b>	Moreton Bay and south to Hastings R	City and South Brisbane flooded, bridges swept away, and travel in Moreton Bay district restricted by floods in 1841		Wales 2000:56, 122, HCT BHG 2000:122
14 Jan	<b>Major Flood</b>	Brisbane R	First recorded major flood, estimated to have exceeded flood of 5 Feb 1893 by 7cm. Both higher than 1974		BoM Cossins 1990:56
Jan/Feb 1841	<b>Floods</b>	N NSW	Rivers flooded from Clarence to Hastings R. Commissioner Oaks delayed by swollen rivers February. On 1 March a settler drowned at First Falls Crossing, Clarence R		Mackey 2001:64, 73
1841	<b>Storm dune face</b>	Gold Coast	Heavy mineral lenses storm face cut in dunes attributed to 1841 from assumed similarity to 1893 (major flood)	More probable date for face 1863 or 1864 PH	Smith and Jackson 1990
14 Oct	<b>Gale</b>	S NSW	<b>Rover</b> schooner 87t dragged anchor and lost in gale at Broulee		NSD EAS
1842					
	Moreton Bay opened to free settlement		Increased southern Queensland coastal shipping after Moreton Bay opened to free settlement 'and tales of shipwreck...more frequently reported in the press'		Brown 2000:122
1842	<b>Entrance scoured?</b>	Nambucca R	<b>Northumberland</b> entered Nambucca R, previously considered not to be navigable due to rocks at entrance	Entrance deepened by floods previous year? PH	Coltheart 1997:29
5 May	<b>Gale?</b>	C NSW	<b>Perseverance</b> cutter 34t lost on saw and Pig Reef, Sydney		Atlas, Loney 5 Jan, EAS
May 1842	Strong N winds	NSW	<b>Victoria</b> steamer boisterous passage Sydney to Moreton Bay in contrary winds	El Nino conditions? PH	Harrison in BHG 2000:66
Mid May	<b>Severe Gale</b>	SEQ to Sydney			
	SW to SE gale	Hervey Bay	18 May very fresh from SW, lulled then increasing, very heavy sea and 2 days strong SE wind		Maryborough 1998:34
			24 May <b>Eliza Ann</b> schooner 32t capsized Sydney Harbour (altered to 43t) and later lost 19 Oct 1847		Atlas Loney
	SE gale	Newcastle Bight	May <b>Carrington</b> schooner 22t left Sydney 19 May and lost in SE gale Newcastle Bight. Wreckage ashore, all lost		NSD EAS
			19 May <b>Recovery</b> schooner 30t lost in gale between Newcastle and Sydney, one lost		Loney 1978:24 EAS
			Late May <b>Edward</b> schooner 60t lost in gale. N Tas, all lost		EAS

29 June			Arab ship aground on Slasher Reef GBR, probably refloated	Not storm PH	NSD
Mid July 1842	Gale	NSW coast	Low in southern Tasman Sea PH		
			18 July, <i>Sovereign</i> 'had boisterous passage from Moreton Bay to Sydney 'she was obliged to scud under bare poles most of the way'	Implies NW or northerly wind PH	Harrison in BHG 2000:65
	Strong W wind	Moreton Bay	20 July	Gradient from top of winter low? PH	Gosling 2000:104
Early Dec	Gale		5 Dec <i>Ranger</i> cutter 11t capsized in gale and heavy seas between Sydney Heads		Loney NSD
			15 Dec <i>Industry</i> sloop 14t swamped off Port Hacking, crew survived		EAS
Christ-mas Eve	Storm	Burnett R	Fearful storm overnight – hurricane strength bending and breaking the trees	Storm cell or tropical storm landfall? PH	Maryborough 1998:35
			Late Dec <i>Nancy</i> schooner 38t Sydney to Brisbane and lost Macleay R bar (reported SMH 26 Jan 1843)	No details	Mackey 2001:37 Harrison in BHG 2000:66
1843					
			Economic recession in wool industry throughout Australia from 1843 to 1846		Brown 2000:127
Early 1843	Drought and saltwater intrusion	Richmond R	'At the height of the drought in 1843, the camp had to be shifted as the [Richmond] River [at Pelican Creek 13km SE of Casino] became salty'	Despite floods in 1841 drought continued into early 1843 PH	Mackey 2001:18
	Shallow bar?		15 Feb <i>Perseverance</i> schooner 45t struck bar and lost South Passage, Moreton Bay		NSD, EAS Loney
March	End of drought		Wet period on coast	Drought possibly continued in southern Australia PH	
March – April 1843	Rain and Floods	SEQ and N NSW	Fresh in Richmond R and 'continuous wet weather and rise in the creeks and rivers' Surveyor Burnett		Mackey 2001:53
Late March	Flood	Mary R	Heavy wet season. River carried a flood of some 12ft [3.7m]		Maryborough 1998:37
9 June	Minor Flood	Brisbane R			BoM
Late Aug	Gale	S NSW	Aug <i>Alligator</i> schooner 20t lost ashore at Bulli		Atlas, NSD, EAS
			28 Aug <i>Charlotte</i> cutter 29t disabled and aground in gale, 2 lost Falmouth, Tas		EAS
			26 Aug <i>Port Phillip</i> schooner 40t stranded off Solitary Is		EAS, NSD, Atlas
Early Sept	Gale		<i>The Brother</i> arrived Newcastle in distress following gale		Callen 1986:95
Mid Sept	Gale	C to S NSW			

1843	Heavy seas SE gale	Seal Rocks	18 Sept <b>Sally</b> schooner 34t capsized in SE gale and heavy seas off Seal Rocks on route from Sydney to Clarence R, 6 lost, one survived	Possibly severe PH	Mackey 2001: 39 Loney 1978:24 NSD, Atlas
Sept			Sept <b>Marie Ann</b> cutter 16t wrecked in gale near Seal Rocks		Loney 1978:24 Herald
1844					
			Thomas Dowse diaries 1844 to 1853 comment on weather and shipping movements		Gosling 2000:102
			Serious floods on Tweed R during cedar cutting [mid 1840's to mid 1860's]		Keats 1999:148
Early Jan	<b>Tropical Storm</b>	CQ to N NSW	Possibly severe storm with high surge PH		
Early 1844	Heavy Seas	Gladstone	Reported in 1844 that hull of ship <b>Ferguson</b> lost Sir Charles Hardy Is, 27 April 1840 'had recently been thrown high up on the reef by heavy seas'	Suggests severe tropical storm and surge PH	Loney EAS
	Gale	Richmond R	7 Jan <b>Northumberland</b> schooner 43t lost on south spit Richmond R bar. None lost and crew salvaged gear.		Loney 1844 Atlas and AE lost 1845, EAS
10 Jan	<b>Major Flood</b>	Brisbane R	Around 1m lower than 1841 and 1893 record floods Brisbane R		Cossins 1990:56 BoM
1844	<b>Flood breach north spit</b>	Clarence R	1845 survey shows a bay more than a mile [c 2km] wide with sandbanks across the entire entrance	Possibly flood breach and north spit washed away in 1844? PH	Coltheart 1997:44
Feb	Heavy seas		<b>Paterson</b> aground north spit Hunter R with seas washing over her, refloated		Callen 1986:95 EAS
Early April	Gale	Tasman Sea	Early April <b>Harriet</b> schooner 43t Sydney to Newcastle blown offshore and disappeared at sea in gale		Bateson 1972 Atlas, NSD EAS
			12 April <b>Selina</b> schooner 32t left Sydney for south coast and disappeared in gale		EAS
Late June	Gale	Tasman Sea			
	Gale	N NSW	24 June <b>Matilda</b> schooner 24t driven ashore North Spit Bellinger River	SE gale? PH	Loney 1978:24 Atlas, NSD EAS
	Gale	Flinders Is	22 June <b>Isabella</b> ship 423t dragged anchor in 'hurricane' force gale and lost Chappell Is, Bass Strait		EAS
Late July	Gale	Port Stephens	27 July <b>Bessy</b> schooner 51t went ashore in gale and wrecked south of Port Stephens, crew survived		Mackey 2001:31 Loney 1978:24 Atlas, NSD, EAS
Early Aug	Gale	C NSW coast	4 Aug <b>Express</b> schooner 24t lost off Sydney in gale		NSD EAS

Early Sept	Strong trade winds?	Coral Sea		Low in Tasman Sea? PH	
			6 Sept <b>Lady Grey</b> brig 323t lost on Lihou Reef, Coral Sea, crew reached Port Essington in boats		NSD EAS
			10 Sept <b>Thule</b> ship US whaler lost on Bellona Reef, Coral Sea, due to strong current, 2 boats reached Moreton Bay, a third boat may have landed on coast to the north		AE NSD EAS
	Shallow bar Big seas Not storm PH	Richmond R	9 Nov <b>Jess</b> schooner 77t lost entering Richmond R on ebb tide. William Wilson used salvaged goods to open a store at Ballina		Richards 1996:26 Mackey 2001:35 EAS
18 Nov	Gale	Portland, Vic	<b>Elizabeth</b> schooner 51t drove ashore in gale, Portland. Schooner <b>Sally Ann</b> also lost		EAS
1845					
1845	Coast and entrance survey	Richmond to Clarence R	Surveyor Burnett came down the Richmond R to 'Bul-loona' [Ballina] and south along the coast to Clarence R		Mackey 2001:53
Late April	Gale	C NSW			
			22 April <b>Mary</b> cutter 13t ashore and lost Broken Bay		Bateson 1972 EAS
			Late April <b>Paterson</b> schooner 48t Sydney to northern rivers lost ashore near Newcastle		Mackey 2001: 37 NSD May EAS
Mid June	Gale?	NSW			
			Mid June <b>Hope</b> cutter 38t went ashore and lost on north spit Richmond R bar		Mackey 2001: 34 Atlas, NSD, EAS
			Mid June <b>Industry</b> cutter lost at Broulee		NSD, EAS
Mid Aug 1845	Severe gale	Coral Sea to N NSW			
	'cyclone'	Brampton Reef	13 Aug <b>Elizabeth</b> schooner 58t Sydney to Chesterfield Reefs to salvage whaler, <b>Clarence</b> wrecked in June 1844. Driven out to sea and lost, remaining crew reached Moreton Bay after 37 days in longboat	Crew waited 6 weeks	Loney NSD 5 Jan 1845 EAS
			Aug 1845 <b>Challenger</b> cutter 31t lost on Manning R bar		Mackey 2001: 32 Loney 1978:25 Linton 2004:70 NSD,EAS
Early Oct 1845	Gale	M – C NSW			
	Gale	Broken Bay	10 Oct <b>Brothers</b> cutter 11t capsized in Broken Bay sheltering from gale		Atlas NSD, EAS
			10 October <b>Fly</b> schooner 20t lost Manning R bar, tiller failed		Atlas, Linton 2004:70 NSD, EAS Loney 1978:25

Dec	<b>Tropical Storm</b>	SEQ			
	Gale?	Fraser Is	Late 1845 Thompson and crew lost around Fraser Island trying to salvage a wreck when boat driven out to sea. Surviving crew member rescued by schooner <i>Ariel</i>		Brown 2000:122 Loney
			11 Dec <b>Hannah</b> brigantine 90t left NZ for Sydney, wreck ashore Jan 1846, Kaitia, NZ, all lost		Bateson 1972 EAS
17 Dec 1845	<b>Minor Flood</b>	Brisbane River	3 bridges carried away between Brisbane and Ipswich		Sheehan 2000:45 BoM
1846					
			Possibly prolonged period of stormy weather from mid 1846 into 1847		PH
1846	Macquarie Pier completed	Newcastle	Causeway to former Nobbys is completed, sea continued to breach wall requiring continuous repairs	Work began in 1818	Callen 1986:53 Coltheart 1997:40
Late Feb 1846	<b>Tropical Storm</b>				
			Feb <b>Lark</b> schooner 19t lost in Moreton Bay		Mackey 2001:36 NSD, EAS
	Blowing fresh, heavy seas	Manning R	22 Feb <b>Tam O'Shanter</b> cutter 12t capsized and lost in heavy seas Manning R bar, 1 lost		Atlas, NSD, EAS Loney 1978:25 Linton 2004:70
	Heavy weather	Coral Sea	24 Feb <b>Peruvian</b> barque 304t left Sydney, lost Chesterfield Reefs in heavy weather, early March boats swept away. Crew later escaped on raft, 7 reached Q coast, remaining survivor (carpenter James Murrell) lived with Aboriginal people for 17 years		AE Loney NSD 26 Feb EAS 8 March
March to June	No severe storms? PH	Coral Sea	Wreck of <b>Peruvian</b> still visible on Chesterfield Reef in mid June		Loney, EAS
6–15 July	<b>Gale</b>	SEQ – Coral Sea			
	Strong S gale	Moreton Bay	6–15 July Schooners <i>Coolangatta</i> and <i>Jane</i> sheltering under Amity Point from strong southerly gale		Longhurst 1996:22
			17 July <b>Dundee Merchant</b> schooner whaler 93t lost Chesterfield Reef Coral Sea		NSD EAS
Early Aug	Heavy seas	Bass Strait	6 Aug <b>Ariel</b> schooner ashore Port Albert bar in heavy seas		Love 2003
	Strong winds	Newcastle	Early Aug 17 coasters windbound Hunter R		Callen 1986:53
18–20 August 1846	<b>Coolangatta Gale</b>	SEQ to Sydney	Three day SE gale and strong SW the following day, rough seas to Sydney	Intense winter storm moving SE PH	Longhurst 1996:22 JC
			17 Aug <i>Coolangatta</i> anchored at Danger Bay wind shifted from W to NE		Longhurst 1996:22
	Easterly gale	Gold Coast	18 Aug Strong NE wind, morning 19 Aug then wind veered E and strengthened		Longhurst 1996:23

	Heavy surf, gale and incessant rain	Gold Coast	19 Aug <b>Coolangatta</b> schooner 88t dragged anchors and driven ashore on beach north of Pt Danger in 3 day gale. Repaired but broke up in a SE gale later in 1846		Mackey 2001:32 Longhurst 1994:1 Atlas, EAS Loney 1978:25 NSD 8 Aug
			19 Aug <b>Secret</b> schooner dismantled off Solitary Is		Longhurst 1996:22
27 Aug	Heavy seas	Tweed R bar			Longhurst 1996:23
July – Oct 1846	<b>Bar bound</b> Closed by gales and storms	Tweed R bar	'loaded vessels wanting to put to sea were often trapped inside the river by fickle channels closing up and becoming too shallow after gales and storms had lashed the coastline. SMH reported that six ships were held up in Tweed R and by Oct four more bar bound <i>Louisa, Hyndes, Rose, Sarah Wilson</i> .	Marine sand infilling during storm period PH	Keats 1999:7, 278 Longhurst 1996:24
Sept – Oct	Wet weather	Gold Coast	Crew working on beach for two months to repair and salvage <i>Coolangatta</i> 'never saw two fine days'		Longhurst 1996:22 24, 25
Late Oct 1846	<b>Gale</b>	Bass Strait	28 Oct <b>Elizabeth</b> brig 106t lost in storm, Cape Schanck, Vic		EAS
Mid Nov	<b>New channel opened</b>	Tweed R bar	<i>Sarah Wilson, Louisa, Hyndes</i> bar bound as the north channel was blocked. A south channel opened and <i>Fanny Morris</i> left for Sydney 22 Nov	South (flood) channel opened after continuous rain PH	Mackey 2001:39 Longhurst 1996:24 Keats 1988:278
2–4 Dec	<b>Gale</b>	Coral Sea to N NSW			
1846	Gale	Gold Coast	4 Dec <b>Coolangatta</b> (on the beach since 19 Aug) was repaired by mid Nov but before she could be launched 'a gale of wind wrecked her again'		Longhurst 1996:24–25
			Early Dec <b>Eliza</b> schooner 51t left Sydney for Tweed 3 Dec 1846 and lost off north NSW coast		Mackey 2001:33
1846	Wreck of <b>Coolangatta</b>	Coolangatta Creek	1846 to 1970s wreck periodically exposed on beach for 125 years PH		Longhurst 1996:24–26, 43
1847					
1847	<b>Closure of South Passage to ships</b>	Moreton Bay	Used as the main entrance to Moreton Bay from 1824, South Passage was abandoned due to shoaling of bar	1836–1847 Shoaling of South Passage	Trundle 1958 McLeod 1984:106
Jan	Shallow bar? Vessel lost in south channel	Tweed R	Early Jan <b>Rose</b> cutter 28t lost Tweed R Bar when leaving river by south channel	South channel formed in mid Nov 1846, now possibly silting up PH	Keats 1999:7 Mackey 2001:38 Loney, Atlas Longhurst 1996:26 late Dec or early Jan
Mid Jan	<b>Tropical storm?</b>	FNQ to C NSW			



			Jan <b>Thomas Lord</b> schooner 70t driven ashore in gale while anchored at Cape Sidmouth, refloated		NSD
			18 Jan <b>Sir Robert Peel</b> ship 724t Auckland to Sydney, driven north and lost ashore near Terrigal	Navigation error due to weather? PH	NSD
	Four day southerly gale	Coffs Harbour	Early 1847 John Kroff <b>Brothers</b> ketch, took shelter in the lee of the south headland Coffs Harbour for 4 days, waiting to cross Bellinger R bar. <b>Brothers</b> later lost Crowdy Head Aug 1847		Yeates 1990:1
3–11 March 1847	<b>Sovereign Storm</b>	SEQ	<b>Sovereign</b> left Brisbane 3 March but was delayed in Moreton Bay by 'a succession of southerly gales'	Severe SE storm PH	Thomson 1967:297 Loney
	Fierce south easterly	Moreton Bay	11 March <b>Sovereign</b> wood paddle steamer 119t leaving Moreton Bay during a severe storm when engines failed on South Passage bar. Drifted ashore north point, 44 lost, 10 survived		Harrison in BHG 2000:65 Mackey 2001:40 AE NSD, EAS
	<b>Flood</b>	Richmond R	March Steam ship <b>Phoenix</b> entered river in flood		Mackey 2001:44
	Heavy wet	SEQ	March Floods caused Surveyor Burnett to abandon exploration of Wide Bay until July		Maryborough 1998
Late March 1847	<b>Gale</b>	N–M NSW			
			21 March <b>Ann Mary</b> schooner 49t departed Tweed R for Sydney. 18 April <b>Susan</b> sighted upturned hull of <b>Ann Mary</b> off Norah Head		Atlas NSD EAS
Early April	Heavy seas	Richmond R bar	Early April <b>Golden Fleece</b> barque 123t drifted ashore in heavy seas and lost on south spit Richmond R	End of gale? Possibly trying to cross bar after storm? PH	Loney 1978:25 NSD Atlas EAS
Early June	<b>Gale</b>	Tasman Sea			
			<b>Ranger</b> schooner 52t left Tas 6 May for Sydney and disappeared		Atlas NSD EAS
	Gale	Lake Macquarie	10 June <b>Catherine Mackellar</b> schooner 26t lost in gale off Lake Macquarie		Loney 1978:25 Atlas, NSD, EAS
Early July 1847	<b>Severe gale</b>	CQ to NSW coast	Possibly very severe gale PH		
	Severe gale?	SEQ	3 July <b>Selina</b> schooner 62t left Moreton Bay for Sydney with timber. Hull found Keppel Bay late Oct 1848	Vessel driven north in strong gale? PH	Loney NSD EAS 31 July
	Heavy gale	N NSW	4 July <b>Enterprise</b> schooner 55t aground in heavy gale Richmond R bar, two lost		Loney 1978:25 NSD
			9 July <b>Lucy</b> schooner 47t left Sydney for Melbourne and disappeared c.mid July		Loney, Atlas NSD, EAS
27 July	<b>Gale?</b>	C NSW	<b>Pedlar</b> cutter 16t ashore on Bondi Beach		NSD, EAS
			25 July <b>Lucy</b> cutter 15t ashore in gale Geelong		EAS

Early Aug	Severe gale	C to S NSW			
	Gale	Crowdy Head	8 Aug <b>Brothers</b> schooner 10t Sydney for Twofold Bay and driven north in gale, lost at Crowdy Beach		Loney 1978:25 Atlas NSD
			Aug <b>Vixen</b> brigantine 46t blown 400nm to sea in gale		EAS, Loney, NSD
1848					
Late Feb	Severe gale		28 Feb <b>Corno</b> lost Sow and Pigs Reef Sydney Harbour	Possible low to N PH	NSD
Feb	Severe easterly gale	Coffs Harbour	<b>Port Phillip</b> schooner 40t beached 'high and dry' in easterly gale Coffs Harbour		Atlas 26 Aug NSD 26 Aug
Mid April 1848	Gale	C to S NSW			
			13 April <b>Sarah Wilson</b> brigantine 30t lost on Nobbys Head		NSD EAS
	Gale	Illawarra	15 April <b>Alexander</b> cutter 10t sank in a gale between Shoalhaven R and Sydney		Loney, Atlas NSD, EAS
Late May	Gale	N NSW			
			c 20 May <b>Matilda Ann</b> schooner 48t aground Richmond R Bar in mid 1848 and not refloated until 6 May 1849		Loney 1978:26 Atlas NSD EAS 26 July
			21 May <b>Fanny Morris</b> schooner 40t driven ashore on north spit Tweed R bar. Regular in Tweed cedar trade from 1846		Keats 1999:7 Atlas, EAS Mackey 2001:34
	Heavy Seas	Richmond R	22 May <b>Sarah</b> schooner 50t lost north head Richmond R when wind failed		Loney, Atlas NSD, EAS
			22 May <b>Secundus</b> ketch 26t lost crossing Richmond R bar		Loney, EAS
Early July	Gale	N to C NSW			
			1 July <b>Jane</b> schooner 41t wrecked on Tweed R bar. Regular cedar trade from Tweed since 1845		Keats 1999:7 Atlas, Loney, NSD Keats 1988:278
	Gale	C NSW	Early July <b>Union</b> schooner 32t left Shoalhaven for Sydney 7 July, wreckage off Avoca Bay in gale, all lost		Atlas, NSD
	Gale	Sydney	9 July <b>Wanderer</b> schooner 131t drifted ashore and lost Middle Head, Sydney with nine crew		Mackey 2001:41 NSD
	Gale	Sydney	9 July <b>Elizabeth</b> schooner 32t anchor chain broke and driven ashore Sydney Harbour, refloated		NSD
Early Sept	Gale	Bass Strait	2 Sept <b>Peellar</b> schooner 19t driven in gale to Kent Group, dragged anchor and lost		EAS
			2 Sept <b>Matildo</b> schooner 47t driven ashore and wrecked Gabo Is		EAS

Late Sept 1848	Gale	S NSW – Tas	<i>Alice</i> schooner 43t from Tasmania and lost in sudden squall off Sydney		NSD EAS 15 Sept
			26 Sept <i>Trial</i> schooner 22t driven on to rocks		EAS
1849					
			Sponsored immigrants commenced arriving in Brisbane		Brown 2000:123
	Storms		In early 1849 'a series of gales swept the coast and several small craft were lost' and in early May 1849 disastrous gales hit much of the coast north and south of Sydney and 'wreaked havoc amongst coastal shipping, 22 lives lost'		Mackey 2001:21 Longhurst 1996
Early Feb 1849	'Hurricane'	C NSW	9 Feb <i>Ellen</i> ketch 10t capsized between Sydney Heads in 'hurricane', 4 lost, 1 survived	possibly thunderstorm cell PH	NSD Atlas
Mid April	Gale	C NSW	15 April <i>Dolphin</i> cutter 17t lost off Port Hacking		Atlas, Loney NSD, EAS
Late April	Fine weather		21 April <i>Midas</i> left Sydney and crossed Brunswick R bar in fine weather		Mackey 2001:21 Keats 1988:215 Mills 2000:1
6–20 May 1849	<b>Swift Storm</b>	SEQ to M NSW	Eight vessels lost between SEQ and Coffs Harbour. Byron Bay, severe NE storm and <i>Matilda Ann</i> aground on Richmond R bar since 20 May 1848 refloated on storm surge and lost in June 1849	Prolonged gale and rough seas to 20 May	Ryan and Smith 2001:96
			5 May <i>Will Watch</i> could not enter Newcastle and forced to shelter at Port Stephens		Callen 1986:82
	<b>'Fierce cyclone'</b>	Cape Byron	6 May <i>Swift</i> schooner 45t from Moreton Bay to Sydney 'encountered a fierce cyclone off Cape Byron'. Capsized 20k north of Byron Bay and hull drifted ashore 2.5km north of Brunswick Heads. 2 trapped inside hull were released by cedar cutters Boyd and King, 3 lost	Wind NE (Cape Byron) low close to coast and north of Cape Byron PH	Brokenshire 1988:2 Ryan and Smith 2001:96 Keats 1988:214 Mackey 2001:41 NSD EAS
			6 May <i>Jane Scott</i> cutter 36t lost at Fingal Head		Keats 1988:279 Atlas, Loney 1978 :26, NSD 16 June
	Strong gale	Tweed R	6 May <i>Tweed</i> schooner lost south of Tweed River in a 'strong gale'. Maiden voyage of <i>Tweed</i> built by Joseph Parsley for Thompson to ship cedar to Sydney		Mackey 2001:30 Atlas June 1849 NSD June EAS
	Gale	Coffs Harbour	May <i>Narara</i> schooner 24t lost off Solitary Islands in gale		Mackey 2001:37 Atlas, NSD
			May <i>Louisa</i> schooner 61t, ashore late March Brunswick R, vessel broke up in May gale		NSD, EAS Mackey 2001:21
21 May	Fine weather	Coastal shipping resumes	21 May <i>Midas</i> loaded with cedar leaves Brunswick R for Sydney	End of swell PH	Mackey 2001:21

June 1849			<b>Matilda Ann</b> schooner 48t aground on Richmond bar since 20 May 1848 refloated in early May (on storm surge?) and lost on Richmond R bar in June		NSD
Early July	Heavy swell	S NSW	3 July <b>Susan</b> schooner 253t lost on Ulladulla Reef and immediately broke up, crew survived		Atlas, EAS Loney
26 July	Heavy swell	Manning R	<b>Mary Ann</b> schooner 34t lost Manning R bar in heavy swell		EAS
Late Aug 1849	Gale	S NSW			
	NE gale	Illawarra	29 Aug <b>Mermaid</b> cutter 12t lost ashore Gerringong in NE gale		Atlas NSD, EAS
Dec 1849	Gale	C NSW			
			Dec <b>Priscilla</b> cutter capsized off Port Stephens, wreckage ashore, crew lost		Loney, EAS NSD (no month)
1850					
1850's	Increasing coastal trade by sailing vessels and low powered steam paddle schooners		Settlement and timber trade to coastal rivers (over the bars) and from open roadsteads at Coffs Harbour, Trial Bay and Byron Bay. Shipment of coal from Illawarra in 1850's	Increasing shipping to Australia during Gold Rush	Longhurst 1996:15, 27 Gleeson 1993:8
1850's	'Beach road' Beaches increasingly used for travel along the coast		From 'Nerang Heads' (Southport Bar) along the beaches to the Tweed and south to Ballina. Beaches were a well trod route for timber cutters and 'surf loading' of timber from open beaches (in good weather) was commenced around 1850		Longhurst 1996:27
Jan	Gale?	Sydney	<b>Petrel</b> schooner 7t lost between Wollongong and Sydney		Atlas NSD, EAS
Early Feb	Gale	C NSW	6 Feb <b>Pilot</b> schooner 32t lost ashore Nobbys Head		NSD 1849 Loney, EAS
Early March 1850	Tropical Storm?	SEQ – C NSW			
	Gale	Newcastle	3 March <b>Wave</b> schooner 21t driven ashore and lost Newcastle Bight		Atlas NSD, EAS
	Gale	Clarence R	3 March <b>Phoenix</b> wood paddle steamer 212t from Clarence River to Sydney, driven ashore 9m south of Clarence R mouth. Refloated and later wrecked Clarence Bar 14 April 1852		Richards 1996:7 Bateson 1972 Loney 1978:28 EAS
			Early March <b>O.P.S.</b> ketch ashore south of Richmond R bar		Atlas NSD, EAS
			3 March <b>Fanny</b> cutter 10t beached Anna Bay, Port Stephens		Atlas
	Flood	Brisbane R	Heavy rain severe erosion and siltation Brisbane valley		HCT

Mid April 1850	Gale	Brunswick R N NSW	16 April <b>Clara</b> schooner 50t lost ashore in gale and smashed to pieces on rocky headland at entrance to Brunswick R. Brunswick cedar camp abandoned due to loss of vessels on river bar		Keats 1988:407, 535 Loney 1978:26 Atlas, EAS NSD
11 May 1850	Gale?	C NSW	<b>Scud</b> ketch 27t sank between Sydney and Newcastle, 4 lost		Loney 1978:26 Atlas, NSD, EAS
Early June	Gale	S NSW	<b>Medina</b> schooner 12t lost ashore in gale at Ulladulla		Atlas NSD
	Gale	C NSW	4 June <b>Hope</b> cutter 9t caught in gale off Manning R		EAS
Late July 1850	Gale	Whole NSW			
			30 July <b>Susan</b> schooner 53t lost Clarence R inside bar. Regular voyages to Clarence R from Feb 1840		Mackey 2001:41 Atlas Aug 1850 NSD Aug
	Gale	C NSW	31 July 20 coasters left Newcastle, 3 arrived Sydney, some returned and some sheltered Broken Bay		Callen 1986:53
Early Sept	Heavy squalls	S NSW	1 Sept <b>Juniper</b> barque 340t forced ashore in squall St Georges Head and broke up in 28 Sept gale		Loney Atlas EAS
Late Sept 1850		GBR	21 Sept <b>Jenny Lind</b> barque 474t wrecked Kenn Reef, crew built boat from wreckage, reached Moreton Bay late Oct	Strong trades? PH	Loney NSD EAS
28 Sept	Severe Gale		Three vessels lost south of Richmond R		
	SW Squall	Richmond R	28 Sept <b>Bramble</b> schooner 53t lost ashore south of Richmond R in squall, 7 lost		Loney 1978:26 Atlas, NSD, EAS
			28 Sept <b>Heroine</b> schooner 36t capsized in gale south of Richmond River		Loney 1978:26 Atlas, NSD, EAS
			28 Sept <b>Lucy Ann</b> schooner 36t capsized in squall south of Richmond River, 1 lost		Loney 1978:26 Atlas, NSD, EAS
	Gale	Jervis Bay	<b>Juniper</b> barque 340t ashore St Georges Head since 1 Sept and broke up		Loney Atlas, NSD, EAS
Oct – Dec	Bar bound	Tweed R	<b>Ocean Queen</b> held up from late Oct to early Jan 1851	Shallow bar PH	Keats 1988:280
Early Dec	Tropical storm?	Coral Sea			
	Gale	Elizabeth Reef	1 Dec <b>Rosetta Joseph</b> barque 265t swept onto Elizabeth Reef in gale. When weather moderated crew attempted to reach Lord Howe Is but rough weather drove them to Port Macquarie (10 Dec)	SE gale suggests tropical storm in Coral Sea PH	AE Loney NSD EAS
1851					
Feb	Shallow bar?		<b>Columbine</b> schooner 68t struck Richmond River bar and later sank in river		Loney NSD, EAS

Late March	Gale	NSW coast			
			27 March <b>Jeannie Deans</b> schooner 31t drifted ashore Broulee, all saved, salvaged		Loney Atlas, EAS
			30 March <b>Comet</b> schooner 34t lost Tweed R bar. 'Struck spit and driven onto rocks ... crew remained on board until low water'		Mackey 2001:32 Loney 1978:27 Atlas, EAS Keats 1999: 7, NSD
	Easterly gale	Richmond R	30 March <b>Madge Wildfire</b> schooner 36t capsized and sank Richmond R bar in easterly gale, 5 crew lost		Loney 1978:26 Atlas, EAS NSD 28 March
	Fresh	Clarence R	26 March Martin Quirk drowned First Falls Crossing		Mackey 2001:177
Mid May 1851	Gale	NSW coast	Possibly severe gale S NSW, swell to N NSW PH		
			11 May <b>Harriett</b> cutter 30t lost ashore on Richmond R bar		Atlas, NSD, EAS Loney 1978:27
	SE gale and floods	Bermagui	15 May <b>Catherine</b> cutter 26t washed to sea in flood and lost in gale Bermagui		Loney, EAS Atlas
	Gale	Illawarra	15 May <b>Amphitrite</b> ketch 17t ashore in gale Shellharbour		Loney Atlas, NSD, EAS
	Gale	Ulladulla	15 May <b>Currency Lass</b> ketch 21t driven ashore Ulladulla beach		NSD EAS
Early June	Gale	C – S NSW	3 June <b>Twin Sisters</b> ketch 19t drifted onto rocks and lost Kiama	Big swell? PH	Loney, EAS Atlas, NSD 4 June
			11 June <b>Paterson</b> wood paddle steamer 450t lost at Norah Head		Atlas EAS
			17 June <b>Alligator</b> schooner 20t wrecked ashore in gale, Emu Bay, Tas		EAS
Mid Aug 1851	Gale	SEQ – N NSW		Severe gales during August PH	
			13 Aug <b>Mary Ann</b> schooner 58t lost on sand spit Richmond R bar when wind failed	Big swell? PH	Atlas NSD
			Mid Aug <b>Vanguard</b> schooner 61t left Wide Bay 12 Aug for Sydney, last seen SEQ		Atlas, EAS Loney 1978:27
	Gale	Tweed R	12 Aug <b>Ocean Queen</b> schooner 40t lost Tweed Bar during a gale		Loney 1978:27 NSD, EAS
Late Aug	Gale	SEQ – C NSW			
	S gale	Newcastle	Late August <b>Anna Maria</b> schooner 49t lost ashore Newcastle Bight in southerly gale, refloated		Atlas, NSD Loney 1978:27
	Gale		26 Aug <b>Countess of Minto</b> barque 265t blown off shore from Lady Elliot Is and taken in tow by <b>Moselle</b> 17 Sept 75nm off Port Macquarie. Lost, Macquarie Is, 2 Dec 1851	Drifted S in EAC PH	
	Gale	Lady Elliot Island	26 Aug <b>Bolton Abbey</b> ship 539t lost in gale off Lady Elliot Is while loading guano		Loney NSD 25 August
			Sept <b>wreck</b> of vessel seen near Port Stephens		Loney 1978:27 EAS
Late Oct	Gale				
			26 Oct <b>Bee</b> cutter 7t driven ashore and lost Cronulla Beach		Atlas EAS

	Gale	Coral Sea	Oct <b>Wanderer</b> schooner 240t (private yacht) badly damaged in gale and lost 15 Nov attempting to enter Port Macquarie in fresh NE wind, crew saved	Drew 14.5ft (4.35m), possibly aground on bar PH	Loney, AE, NSD Moyes and Mant 1993:38, EAS Finkel 1987:18
Late Nov	<b>Tropical storm?</b>	Coral Sea			
			24 Nov <b>Tyrian</b> UK barque 226t lost on Elizabeth Reef London to NZ and Sydney Some crew reached coast, others rescued		Atlas AE NSD, EAS
			Late Nov <b>Two Friends</b> brig 270t driven ashore south at Sydney Harbour		NSD, EAS
			No wrecks on Tweed R Bar at height of cedar trade from Sept 1851 to Jan 1857		Keats 1999:7
1852					
Feb 1852	<b>Tropical Storm</b>	SEQ – C NSW			
			18 Feb <b>Active</b> ketch 40t lost Hunter R entrance		Atlas NSD, EAS
	'cyclone'	N NSW	Feb <b>Gulnare</b> brig 186t Sydney to San Francisco. Lost off north NSW coast, with 55 passengers aboard and wreckage spread from Gold Coast to Coffs Harbour	Very wide spread of wreckage PH	Longhurst 1996:27
Early April	<b>Storm?</b>	SEQ			
			Early April <b>Mary Jane</b> cutter 32t lost and broke up on Richmond R bar		NSD, Loney Atlas, EAS
11–14 April	<b>Moderate Flood</b>	Brisbane R			BoM
14 April	<b>Flood</b>	Clarence River	14 April <b>Phoenix</b> wood paddle steamer 212t entering Clarence R against tide with 'a strong fresh running out', grounded on bar and forced ashore on the north beach, crew rescued		Richards 1996:7 Loney 1978:28 NSD
17 April	Calm weather		<b>Thomas King</b> barque 346t wrecked Cato Reef. Some survived on reef and later rescued by whaler <b>Lady Blackwood</b> , two reached Brisbane late May, 5 killed by Aboriginals at Coolum		Brown 2000:12 Loney NSD EAS
Mid May	<b>Severe gale</b>				
	Heavy gale	South coast	c17 May <b>Favourite</b> schooner 96t left Melbourne for Sydney 9 May and seen off Cape Howe before heavy gale. 21 passengers and crew lost		AE, Love 2003 Loney NSD 1 May EAS
June – July	<b>Two Week Storm</b>	S – C NSW	Many vessels [14] lost during storms that lasted two weeks. One of the most violent storms of the century ripped along the NSW coast, 10 vessels were wrecked or blown out to sea and never seen again. Seven wrecks littered the beaches between Bird Is and Terrigal.	Possibly two storms? PH	Loney Berry 1994:33

1852	Storm	Terrigal	22 June <b>Rose</b> schooner 23t left Richmond R 16 June and lost Terrigal Beach in storm		Loney 1978:28 NSD Atlas, Bateson 1972, EAS
	Gale	Sydney	22 June <b>Venus</b> schooner 28t lost off Cronulla in gale		Atlas NSD, EAS
			23 June <b>Baruah</b> schooner 71t lost Tuggerah Beach, 2 crew lost		Loney 1978:28 Atlas, NSD, EAS
	Gale	Broken Bay	23 June <b>Elizabeth Jane</b> schooner 43t ashore in gale central coast		Atlas, NSD, EAS Bateson 1972
			June <b>Black Swan</b> cutter 19t disappeared in storm between Newcastle and Sydney		Atlas, EAS NSD
	Heavy gale	Lake Macquarie	8 July <b>Henri</b> French ship 364t left Sydney for Newcastle and lost off Lake Macquarie in heavy gale, one lost		Loney 1978:29 Atlas June 1852 NSD
			11 July <b>Susan</b> ketch 27t lost at Crookhaven		Loney, EAS Atlas 11 July 1853
			July <b>Rose of Eden</b> schooner 50t from Macleay R with tallow and passengers, all lost Broken Bay		Loney 1978:28 Atlas, EAS NSD
			13 July <b>Margaret</b> brig ashore and lost north of Twofold Bay		Loney EAS
			July <b>Effort</b> schooner 47t Maryborough to Sydney, driven ashore and lost Tuggerah beach, 5 bodies found		Loney 1978:28 NSD June Berry 1994:36 [27 June], EAS
	Gale	Lake Macquarie	July <b>Elizabeth</b> schooner lost south of Lake Macquarie in gale		Loney 1978:28
	Gale		July <b>Jane</b> schooner lost in gale Lake Macquarie		Loney 1978:28 EAS
	Gale		July <b>Pelican</b> schooner 48t lost Tuggerah beach. Crew buried bodies from <b>Effort</b> in sandhills		Loney 1978:28, Atlas, EAS Berry 1994:36
			July <b>Pompey</b> schooner 36t wrecked near Lake Macquarie in gale		Atlas, NSD June Loney 1978:28 EAS
			13 July <b>Frederick Griffiths</b> schooner 53t lost Lake Macquarie in gale, refloated		Loney 1978:28 NSD June
Mid Aug	<b>Strong winds and heavy surf</b>	Tallebudgera Ck	Lyon sailing an open boat from Tweed R to Moreton Bay 'until strong winds forced them to the beach...through heavy surf'		Longhurst 1996:28
			17 Aug wave cutter driven ashore and lost in gale, Broken Bay		EAS
1853					
Early May	Gale	S NSW			
	Bad weather	Shoalhaven R	1 May <b>Chase</b> schooner 40t driven onto rocks and lost in bad weather Shoalhaven R		Atlas EAS
Mid July	Gale	Tas – C NSW			
	Gale	Newcastle	4 July <b>Eliza Appleton</b> brig seeking shelter ran aground and broke up Oyster Bank. 40 passengers from San Francisco and crew survived		Loney 1978:29 NSD 27 June EAS



			11 July <b>Luck's All</b> cutter 12t sank in channel S Tas, 3 lost		EAS
	Heavy swell	Sydney	11 July <b>Rosa</b> brig 134t (Italian) lost ashore and broke up in heavy swell South Head, crew survived		Loney, EAS Atlas NSD
	Heavy E gale	Shoalhaven R	11 July <b>Susan</b> ketch 27t ashore Shoalhaven R in heavy easterly gale		NSD EAS
			14 July <b>Troy</b> barquentine 512t beached north of Newcastle, refloated		NSD
July – Aug	<b>Strong trade winds</b>	Coral Sea			NSD
			24 July <b>Island Queen</b> schooner lost on Great Detached Reef GBR, crew rescued by <i>SS Ann</i>		EAS
	Big seas	GBR	3 Aug <b>Bourneuf</b> ship 1400t lost on Great Detached Reef GBR, 8 lost		NSD EAS
			5 Aug <b>Stata</b> brig 272t lost on Great Detached Reef GBR, crew rescued by <i>Amigos</i>		NSD EAS
			7 Aug <b>Dockenhuden</b> brig 335t (German) lost on Cato Reef, survivors repaired boats and sailed to Moreton Bay	Damaged boats suggests heavy swell PH	NSD Loney EAS
20–22 Oct	<b>Severe Gale</b>				
	Heavy gale	Manning R	22 Oct <b>Juno</b> paddle steamer 362t. 20 Oct left Sydney for Manila and 'battered by succession of heavy gales'. Driven ashore north of Manning R entrance, 6 lost		Loney 1978:29 AE Linton 2004:70 NSD, EAS
31 Oct	Strong NE winds	SEQ	<b>Countess of Derby</b> barque 329t left Sydney 14 Oct. Long passage in NE winds, lost on south spit entering South Passage in strong NE wind. Crew landed on Stradbroke Is		Thomson 1967:294, 303 Loney NSD EAS
1854					
			Numerous ships lost in the Coral Sea, April to July	Strong trade winds?	PH
Early Jan	<b>Tropical storm?</b>	Q – C NSW			
	Gale	N NSW	8 Jan <b>Eclipse</b> brig 168t lost at mouth of Richmond R in gale, later refloated		Loney 1978:29 NSD, EAS
	Gale	Newcastle	Jan Forty vessels wind bound under Nobbys Head		Callen 1986:53
Late March	<b>Severe three day gale</b>	S NSW			
	Severe gale	Shoalhaven R	24 March <b>Beppo</b> schooner 30t forced ashore and lost Shoalhaven R in severe 3 day gale		Loney, Atlas NSD 24 March EAS
			22 March <b>Alert</b> schooner 92t ashore in gale, Port Fairy, Vic, refloated		EAS

Late April	Strong trade winds?	Coral Sea		Not storm PH	
			21 April <i>Hester</i> 840t, <i>Doelwyck</i> 720t Dutch ships lost on Kenn Reef. Crew of <i>Hester</i> arrived Gladstone 10 days later. Crew of <i>Doelwyck</i> disappeared		Loney <i>Doelwyck</i> NSD EAS
May 1854	Gale?	Tasman Sea	<i>Penyard Park</i> brigantine 377t (UK) Newcastle to NZ with cattle lost Tasman Sea		Atlas NSD EAS
Late May – June	Strong trade winds?	Coral Sea		Not storm PH	
			30 May <i>Mahaica</i> barque 260t lost on Wreck Reef, GBR. Survivors reached Hervey Bay, 2 lost from exposure		NSD, EAS Loney 1 April
			30 May <i>Delta</i> Dutch ship 902t lost Kenn Reef Coral Sea		NSD
			19 June <i>Thomasine</i> barque 364t lost Holmes Reef Coral Sea, after 14 days in boats, rescued Bato		NSD EAS
Late June 1854	Severe gale	N – C NSW			
	Heavy easterly gale	Smoky Cape	21 June <i>Sir Henry Hardinge</i> ship 608t driven ashore in gale Smoky Cape. Passengers and crew survived		Loney 1978:29 Atlas, EAS NSD
			June <i>Alert</i> schooner 66t lost on north spit Richmond R bar		Atlas, EAS 4 Aug NSD
			22 June <i>Phantom</i> ketch 23t Sydney to Port Macquarie, sheltering at Trial Bay and driven ashore in easterly gale. Refloated?		Atlas, EAS NSD
			25 June <i>Waterwitch</i> brig 195t lost Oyster Bank when wind failed	End of gale PH	Atlas, EAS NSD
Late June	Strong trade winds		26 June <i>Fatima</i> UK barque 520t lost on Great Detached Reef GBR, crew rescued	Swell to Coral Sea? PH	NSD, EAS
			28 June <i>Elizabeth</i> barque lost on reef, Cape Direction, survivors met those from <i>Thomasine</i> (9 June) and <i>Fatima</i> (26 June) and all three crews rescued by Dutch ship <i>Bato</i>		Loney EAS
Late July 1854	Strong trade winds?	Coral Sea		Not storm? PH	
Late July	Gale	Port Phillip	20 July <i>Isabella</i> schooner damaged at customs wharf, Geelong, Vic, in storm		EAS
			28 July <i>Ningpo</i> schooner 73t Hong Kong to Melbourne (gold rush) struck reef off New Caledonia. 4 crew reached Brisbane, Sept 1854, surviving crew rescued by <i>HMS Torch</i> 26 Oct 1854		AE Loney NSD EAS
Mid Aug 1854	<i>Isabella Gale</i>	NSW – Bass Strait	Severe winter gales		
	Gale	N NSW	Mid Aug <i>Isabella</i> schooner 114t left Sydney for Clarence R 9 Aug and disappeared off north coast in gale. 20 passengers and crew lost	Built on Clarence R and returning from Sydney on maiden voyage	Mackey 2001:30 Loney 1978:30 Atlas NSD, EAS

Winter 1854			<b>Tremalga</b> Portuguese barque arrived Port Phillip with 400 Chinese passengers after being driven to Twofold Bay	Severe gale Bass Strait PH	Loney EAS
4 Sept	Gale?	Camden Haven	<b>Agnes &amp; Elizabeth</b> schooner lost off Camden Haven		Atlas
17 Sept	Gale	Bass Strait	<b>Water Witch</b> schooner 140t ashore in gale, King Is		EAS
Early Oct	Gale	S NSW			
	Gale	Cape Howe	11 Oct <b>Teazer</b> schooner 58t Launceston to Melbourne blown off course in gale, dismantled and abandoned off Cape Howe. Crew rescued by schooner <b>Sophia</b>		Loney Atlas EAS
21 Oct	Heavy swell	Newcastle	<b>Canmore</b> schooner 131t capsized and lost on Oyster Bank when sheltering from storm inside Nobby's, 7 lost, 2 saved		Atlas NSD EAS
Late Dec	Strong SE winds	NSW			
	Strong SE winds?		Dec <b>William the Forth</b> ran fortnightly trips to Clarence. Very slow trip to Sydney		Richards 1996:7
			24 Dec <b>Pianet</b> schooner 99t lost on Richmond R		Atlas NSD
1855					
Jan 1855	Gale	C NSW			
	Gale	Lake Macquarie	19 Jan <b>Kiwi</b> brig 79t leaking and beached in gale near Lake Macquarie. Crew saved, vessel broke up quickly		Loney 1978:30 Atlas NSD, EAS
14 March	Shallow bar	South Passage, Moreton Bay	<b>Aurora</b> German barque 505t ashore South Passage, Moreton Bay. Crew disembarked at low tide	Attempting to use South Passage. Closed to shipping 1847	Loney NSD EAS
March	Bar bound	Tweed R	5 vessels bar bound, some since Dec 1854		Longhurst 1996:32
Late April 1855	Gale?	S NSW	26 April <b>Martha and Elizabeth</b> schooner 81t wrecked Pt Perpendicular, Jervis Bay		Mackey 2001:36 Loney, EAS Atlas 24 May NSD 26 May
28 May 1855	Gale	Bass Strait	<b>Maypo</b> brig 174t and <b>Whistler</b> clipper ship 942t both wrecked NW King Is in gale		EAS
Late Oct 1855	Gale				
	ESE Gale	Coral Sea	1 Nov <b>Agnes Napier</b> schooner 35t Sydney to Lord Howe Is lost on Middleton Reef in gale. Crew reached Nambucca R in ships boat early December	Crew 28 days at sea in boat. Very long passage? PH	Loney NSD Atlas 1856 EAS
1856					

Late Feb	<b>Tropical Storm?</b>	FNQ – SEQ?	Possibly several tropical storm PH		
	Storm	Cape York	28 Feb <b>Lightning</b> schooner 147t blown ashore in storm Albany Passage, Cape York		NSD EAS mid Jan
		Fraser Is	Early 1856 (before April) an unidentified wreck at the northern end Fraser Is reported <i>Moreton Bay Courier</i> 5 April 1856		Loney, NSD Williams 2002:147 Williams 1982:129
24 Apr		Manning R	<b>Gipsy</b> cutter 44t lost north spit Manning R bar		Atlas, NSD Loney 1978:30 Nov
15 July	<b>Shallow bar?</b>		<b>William and James</b> schooner 75t lost at Richmond R		Atlas, EAS NSD
Mid Aug – Sept 1856	Fine weather	Coral Sea	<b>Duroc</b> French steam frigate wrecked on Mellish Reef 13 Aug. Crew landed on sandbank. 33 sailed to Q coast in three boats. Remaining 31 crew sailed to Timor in Sept		Loney NSD EAS
Early Oct	<b>Gale</b>	C to S NSW	2 Oct <b>Hunter</b> schooner 58t driven ashore north beach Newcastle		NSD, EAS 1 Oct Atlas
			6 Oct <b>Oliver Frost</b> brigantine 150t lost ashore south of Twofold Bay		Atlas NSD
Late Oct	Summer NE		<b>Eleanor Lancaster</b> delayed in Newcastle for two weeks by 'summer northeasterlies'	Lost when leaving port 7 Nov	Coltheart 1997:41
1–10 Nov 1856	<b>Severe gale</b>	M – C NSW	Many vessels, between central NSW to Bass Strait, lost in violent gale		EAS Berry 1994:41
	Strong gale and raging seas	Newcastle	7 Nov <b>Eleanor Lancaster</b> barque, 480t driven ashore Oyster Bank, crew rescued by lifeboat		Loney 1978:31 (430t) AE EAS
	Gale	Port Stephens	7 Nov <b>Currency Boy</b> schooner 41t ashore in gale and broke up quickly Port Stephens, 2 lost		Atlas Loney 1978:31 <i>Currency Bay</i>
			7 Nov <b>Marion</b> schooner 58t lost Broken Bay		Atlas, Bateson 1972
			Early Nov <b>Herculean</b> driven ashore Port Stephens, later refloated		Loney 1978:30
			9 Nov <b>Sea Nymph</b> brig 169t lost ashore Stockton Beach in squall		NSD, Loney 1978:30 (30 Oct)
	Heavy gale	Newcastle	9 Nov <b>Rover</b> schooner lost on Oyster Bank seeking shelter from a heavy gale. Crew saved by <i>Lady Burnleigh</i>		Loney 1978:30 AE
	Gale	M NSW	Early Nov <b>Mary Theresa</b> left Newcastle and lost to north in gale		Loney 1978:30 NSD
			c9 Nov <b>Island Queen</b> cutter 17t disappeared in Bass Strait		EAS
Late Nov 1856	<b>Gale</b>	CQ – C NSW			
	Gale	Port Stephens	Late Nov <b>Lavinia</b> schooner driven ashore and lost Port Stephens. Salvaging cargo of <i>Herculean</i> lost early Nov		Loney 1978:31

	Rough seas	Sydney	30 Nov <b>Prosperous</b> ketch 15t Sydney to Broken Bay capsized in squall and rough seas off Sydney Heads, 1 lost		Loney 1978:31 NSD
			30 Nov <b>Jane</b> whaler lost Wreck Reef, crew may have reached Wide Bay		NSD EAS
			30 Nov <b>Lion</b> whaler lost Wreck Reef. Crew left in boats 4 Dec reached Wide Bay		Loney 30 Nov NSD, EAS
Mid Dec	<b>Tropical storm?</b>	C Q			
			17 Dec <b>Sable Chief</b> brigantine 80t lost ashore Facing Island, Port Curtis, crew saved		NSD Loney 31 Dec EAS
1857					
1857	<b>Storm year</b>		Continuous rain from storms until May when coastal rivers flooded. Severe winter gales NSW coast and recorded erosion		
1857	Lighthouse opened	Cape Moreton	14 Feb After South Passage bar silted the shipping entrance to Moreton Bay was moved to the northern channel		Buchanan 1999:5 Trundle 1958 Aug
Late Jan	<b>Gale?</b>	NSW coast			
1857	Heavy weather	Sydney	20 Jan <b>Flora Bella</b> brigantine 103t lost on rocks Bondi, crew saved		Atlas NSD, Bondi
1–10 Feb 1857	<b>Tropical storm?</b>	CQ	1 Feb 'blowing a heavy gale [sheltering Lady Elliot Is]...continued to blow a gale until' 10 Feb		Buchanan 1999:14
	Heavy gale	Bustard Bay	2 Feb <b>Jenny Lind</b> schooner 125t beached ashore in heavy gale and lost Jenny Lind Ck. Refloated lost 1862		Buchanan 1999:14 Loney 25 Feb EAS
11 Feb	End of storm		Boat to Port Curtis		Buchanan 1999:14
Late Feb 1857	<b>Tropical storm?</b>	SEQ – C NSW			
	Gale	Coral Sea	24 Feb <b>Packet</b> whaling brig 183t lost in gale Elizabeth Reef. Crew later left in two boats and rescued by schooner <b>Ebenezer</b>		AE, NSD, EAS Atlas Middleton Reef
			28 Feb <b>Contest</b> schooner ashore at Port Stephens		Loney 1978:31 EAS
			Late Feb <b>Flirt</b> schooner 56t lost on Tweed R bar		Atlas, NSD March Keats 1999:213
Late Feb 1857	No wind		Feb <b>Favourite</b> schooner 47t lost on Pt Danger due to lack of wind. Wreck salvaged and rebuilt as schooner <b>Fortune</b> , lost in 1862	Possibly big swell at end of gale PH	Keats 1988:257, 280, Keats 1999:7 Loney 1978:31 Atlas March
April	<b>Tropical Storm</b>	CQ – C NSW			
	E gale	Stradbroke Is	April <b>Jane</b> brigantine 180t beached in gale, Stradbroke Is		NSD Loney, EAS 17 Feb

			April <b>Sea Belle</b> brig 158t left Port Curtis 1 April for Sydney. Possibly lost on Breaksea Spit. Search for survivors after vessel believed to have been wrecked on Spit		AE, NSD, Loney Maryborough 1998: 224, Williams 2002: 147–8, Williams 1982:129 EAS
			April <b>Emily</b> ketch 30t lost Macleay R or Port Stephens		Atlas, EAS NSD
Mid May 1857	Storm	SEQ – Tas			
			3 May <b>Thomas Lord</b> schooner 70t ashore in gale Georgetown, Tas		EAS
			17 May <b>Juno</b> barque whaler 212t lost ashore at Pilot station, Moreton Island		Loney NSD, EAS
			May <b>Rose</b> light ship broke free off Moreton Island and disappeared, 16 lost		Loney EAS
May 1857	Moderate Flood	Brisbane R	Continuous rain March to May. Wharves and lower parts of Brisbane flooded		BoM
1857	Great floods	N NSW	Floods Richmond, Manning and Hunter R		Richards 1996:17 Gill 1998:26, Ferguson 1995
Mid June	Storm	C NSW	Several vessels lost in gale		Loney
	Storm	Terrigal	16 June <b>Rainbow</b> ketch 19t driven ashore and lost Terrigal, crew saved		Loney 1978:31 NSD, EAS
	Storm	Terrigal	17 June <b>Owen Glendower</b> collier lost ashore Terrigal in same storm near <b>Rainbow</b> , crew survived		Loney 1978:31 EAS
			17 June <b>Defiance</b> cutter 34t ashore on South Reef Sydney Harbour		NSD EAS
Late July 1857	Severe winter gale	N – C NSW	'the wind sprang up from the east without warning' and 'a heavy gale destroyed several coastal traders north of Sydney in late July'	ECL? PH	Loney 1978:32
			14 July <b>Blue Jacket</b> schooner 74t last seen near Middleton Reef before gale. Disappeared, 6 lost		NSD EAS
	Gale	Broken Bay	27 July <b>Rapid</b> schooner 44t lost north of Sydney in gale		Loney 1978:32 EAS, Bateson 1972 Atlas
	Gale	Broken Bay	27 July <b>Norna</b> schooner 43t lost in gale at Broken Bay		Loney 1978:32 NSD Bateson 1972, Atlas
	Gale	Broken Bay	27 July <b>Harp</b> schooner 72t ashore in gale central coast. Refloated and lost Richmond R 1863		Loney 1978:32 NSD Broken Bay Aug or Sept
	Gale	Newcastle	28 June <b>Chance</b> ketch 39t driven ashore and lost on Oyster Bank in gale	Previously ashore in 1851	Loney 1978:32 NSD Bateson 1972, Atlas
	Gale	Broken Bay	30 July <b>Ariel</b> schooner 67t driven ashore in gale Broken Bay. Later salvaged and wrecked Cleveland Bay, Townsville 1865		Loney 1978:32 NSD
			Late July <b>Anna Maria</b> schooner 50t left Richmond R for Sydney 21 July and sank near Broken Bay, 7 lost		Loney 1978:32 NSD

20 Aug 1857	<b>Dunbar Storm</b>	NSW			
	<b>Huge seas</b>	Sydney	20 Aug <b>Dunbar</b> clipper ship 1167t wrecked on cliffs south of Sydney Harbour, one survivor, 121 lost. Hurlled almost broadside onto rocks. Huge seas swept over the starboard side sweeping away crew, boats and rigging. <b>Painting</b> Wreck of Dunbar, South Head	Andrews (1916) considered Dunbar storm 'the greatest storm' at Sydney from 1850s to 1916	NSD Loney EAS
	<b>Suggested shoreline erosion</b>	Sydney	For the Sydney region, Andrews (1916:170–1) describes three dune erosion faces further inland than 1912 erosion face. The most inland face was considered the Dunbar Storm (1857), then the Dandenong Storm 1876 and the most seaward face, the great storm of 1889	Probably not cut in this storm, more likely storms in mid 1860's especially 1864 or 1866 PH	Andrews in Chapman and others 1982:116, 125
Early Sept	<b>Gale</b>	C NSW			
			5 Sept <b>Australasian League</b> schooner 91t lost north head Richmond R		Atlas NSD, EAS
			5 Sept <b>Gitano</b> ketch capsized Brisbane Water, all lost		NSD EAS
	<b>Gale</b>	Port Stephens	8 Sept <b>Clarissa</b> schooner 61t beached and lost in gale Port Stephens		NSD Atlas, EAS
Mid Oct	<b>Gale</b>	C NSW	12 Oct <b>Dove</b> cutter 13t driven north, sprang a leak and sank off Long Is, Port Stephens		NSD, Loney 1978:32 Early Nov EAS
Late Oct	<b>Gale</b>	C – S NSW			
	<b>Heavy seas</b>	Sydney	24 Oct <b>Catherine Adamson</b> ship 886t driven onto rocks North Head, Sydney Harbour, 21 lost		NSD EAS
			Late Oct <b>Elizabeth Cohen</b> schooner 43t left Manning R for Sydney and disappeared south of Broken Bay		Loney 1978:32 NSD EAS
Dec	<b>Tropical storm?</b>	Coral Sea – N NSW			
			Early Dec <b>Lucy Ann</b> schooner 42t lost ashore Bellinger R		Atlas NSD, EAS
	<b>Big seas</b>	Tweed R bar	Late 1857 <b>Ebenezer</b> could not enter Tweed R for 2 weeks. Big sea and bar 'treacherous and uncrossable' Ships boat overturned in Danger Bay		Keats 1988:257
1858					
Jan	<b>Severe storm</b>	NQ	7 Jan <b>Oliver van Noord</b> ship 507t and <b>Rodney</b> barque, both lost Kenn Reef, crews rescued 'one gale uprooted and damaged trees and storm surge nearly covered the [Green] Island'	N and NW gale off Cairns	JC, EAS Loney NSD 7 June
20 Feb	<b>Gale</b>	NSW			

1858			Late Feb <b>HMS Sappho</b> 428t from England last seen 18 Feb Cape Otway and disappeared		Loney EAS
	Strong wind and heavy seas	Macleay R	20 Feb <b>Kangaroo</b> schooner 44t lost on spit Macleay R bar departing with cedar, crew saved, vessel broke up in 2 hours		Loney 1978:33 Keats 1988:281 NSD, EAS
23 April	Gale	Wilsons Promontary	<b>Sophia</b> schooner 22t dragged anchor and lost in gale		EAS
Late June	Gale	Sydney	30 June <b>Annie</b> barque 470t lost on North Head, Sydney Harbour in sudden gale		Loney 1978:33 NSD, EAS
Early Aug	Gale	M – C NSW			
1858	Gale	Port Stephens	29 July <b>Damaris</b> brigantine 146t driven ashore and lost Port Stephens		Atlas, NSD, EAS Loney 1978:33
			28 July <b>Bard's Legacy</b> schooner driven ashore inside north head Port Stephens, refloated		Loney 1978:33 Atlas, NSD, EAS
	Heavy weather	Port Stephens	6 Aug <b>Daring</b> schooner 35t attempting to shelter at Port Stephens driven onto rocks, refloated		Loney 1978:33 NSD EAS 2 Aug
			6 Aug <b>John Franklin</b> schooner 25t ashore on rocks Long Reef		Atlas NSD, EAS
Late Aug	Severe gale	Bass Strait	Late Aug <b>Bristol</b> brigantine 150t found dismasted and abandoned Bass Strait, crew arrived Port Albert. From NZ encountered 'severe gales' entering Bass Strait.		EAS
Early Oct	Gale?	SEQ – N NSW			
			4 Oct <b>Vision</b> ketch 42t lost on Pambula bar	Big sea? PH	NSD, EAS
7 Oct	Minor flood	Upper Brisbane R			BoM
1858	Major flood and spit breach	Richmond R	New entrance breached in south beach [spit] cutting a new wide, straight and deep channel	Not in Ferguson 1995 PH	Coltheart 1997:43
1859					
	Colony of Queensland		6 June 1859 Queen Victoria signed Letters Patent to establish the Colony of Queensland with Point Danger as the southern coastal boundary	Records divided between State jurisdictions PH	Longhurst 1996:32
Jan	Flood	Fitzroy R	8.23m Rundle erects a gauge on the riverbank at Quay and Derby Sts.		Webster
Late Feb	Tropical storm?	SEQ – C NSW			
			27 Feb <b>Defender</b> 1226t full rig ship (USA) lost on Elizabeth Reef. Crew reached coast in 3 boats, one lost. Wreck salvaged by <b>Ebenezer</b> July 1859		AE Loney NSD, EAS Keats 1988:274



	Gale	C NSW	28 Feb <b>Oceana</b> schooner 45t sank in gale off Bird Is, crew rescued by <i>Liberty</i>		Bateson 1972 Loney 1978:33 NSD 23 Feb, EAS
Late March	Gale	S NSW	28 March <b>Charles Webb</b> ketch 24t driven ashore in southerly gale near Twofold Bay		NSD, EAS
Late May	Severe gale	Bass Strait	<b>Louisa</b> schooner 60t Launceston to Melbourne driven down E coast Tas in severe gale, beached Eddystone Point		EAS
Mid July 1859	Severe gales	NSW – Bass Strait			
	Gale	Bass Strait	7 July <b>Ebenezer</b> cutter 45t ashore in gale NW Tas		EAS
	Severe E gale	N NSW	14 July <b>Arrow</b> brigantine 124t driven ashore and lost on Tweed R Bar in heavy easterly gale		Loney, NSD, EAS Atlas lost Richmond R, Richards 1996 Lost 3 July
Late July	Gale	C NSW	Late July <b>Speculant</b> schooner 102t lost ashore in Newcastle Bight		NSD, EAS Atlas
			29 July <b>Paterson Packet</b> cutter 41t lost ashore Nobbys Head		NSD, EAS Atlas
	Violent SE gale and big seas during night		30 July <b>Ebenezer</b> schooner 90t stranded on sand bank, Tweed R bar in afternoon, that night 'a violent storm occurred during the night with driving rain, howling gale force winds and mountainous seas ... smashed to pieces'. Many lives lost		Keats 1999:7 Keats 1988:273–7 Atlas, Loney NSD EAS
Early Sept	Gale	C – S NSW			
	Gale	Tuggerah	4 Sept <b>Suffolk</b> brig 380t driven ashore on Tuggerah Beach in gale, near <i>Effort</i> (lost Tuggerah Beach July 1852)		Loney 1978:34 Atlas, NSD Bateson 1972 EAS
	Gale	Illawarra	4 Sept <b>Helen</b> cutter driven ashore Bellambi Creek in gale		Loney NSD, EAS
	Gale	Illawarra	4 Sept <b>Victoria Packet</b> barque 170t driven ashore in gale Bellambi, after anchor chain broke		Atlas, NSD Loney, EAS
Early Dec 1859	Gale	N – C NSW			
			1 Dec <b>Tayfield</b> schooner lost on Richmond R bar		Atlas, EAS NSD
	Gale	Newcastle	3 Dec <b>Architect</b> schooner 67t left Sydney for Newcastle and disappeared in gale, wreckage sighted later		Bateson 1972 Atlas, EAS NSD
1860					
1860	Inspection of river entrance	Clarence R	Northern sand spit covered with vegetation and entrance 800ft [0.24km] wide. E O Moriarty designed training walls	Compare to 1845 2km wide PH	Coltheart 1997:44
Late Jan	Gale	C – S NSW			

	Gale	Illawarra	19 Jan <b><i>Ocean Queen</i></b> brig 130t lost at Bellambi in strong southerly		NSD, EAS Atlas
	Gale	Port Stephens	25 Jan <b><i>Iris</i></b> schooner 87t lost at Anna Bay, Port Stephens in gale		Atlas, EAS NSD
Early Feb	Gale	C – S NSW			
	Gale	Sydney	8 Feb <b><i>Messenger</i></b> schooner 15t ashore Manly, Sydney Harbour in gale		EAS NSD
			9 Feb <b><i>Cecelia</i></b> cutter 20t ashore and lost off Long Reef		Loney ( <i>Cecelia</i> ) Atlas, NSD
Late April	Gale	C NSW – Tas	29 April Sydney 191mm, record April rainfall		JC
			23 April <b><i>Swift</i></b> ketch 21t capsized in squall off Long Reef, 1 lost		EAS
			23 April <b><i>Saracen</i></b> schooner 86t Newcastle to EAS Geelong, lost near Port Albert, Vic in bad weather, crew lost vessel broke up		EAS
Early May	Gale	C NSW			
1860	Terrible Weather	Terrigal	Early May <b><i>Friend</i></b> cutter 10t skipper lost overboard and ashore Terrigal		Atlas, EAS NSD
	Gale	Broken Bay	May <b><i>Caroline</i></b> schooner 127t lost in gale off Broken Bay		Bateson 1972 Atlas, NSD, EAS
Early June	Gale?	SEQ – C NSW			
			3 June <b><i>Mousam</i></b> barquentine 197t sprang a leak and lost off Port Macquarie, all survived		Atlas, NSD Finkel 1987:38–9 June 1864
			10 June <b><i>Marina</i></b> barque 580t lost off Cape Moreton		NSD, EAS
13 July 1860	Severe gale	Newcastle	Strong gale battered Newcastle and several vessels lost		
	Severe gale	Newcastle	13 July <b><i>Phantom</i></b> brig 158t and <b><i>Margaret</i></b> schooner 33t collided in gale. Both lost Oyster Bank		Loney 1978:34 NSD
			13 July <b><i>Frederick Griffiths</i></b> , schooner 52t in gale Newcastle, sank at mooring		Loney 1978:34 Mackey 2001:34 EAS, NSD
			13 July <b><i>Agnes</i></b> cutter 13t ashore and lost in gale Newcastle Bight		Loney 1978:34 Atlas, NSD
Late July	Gale	C NSW			
			23 July <b><i>Gazelle</i></b> schooner 100t ashore leaving Newcastle, crew rescued		Loney 1978:34 NSD
	Gale	Sydney	c26 July <b><i>Sisters</i></b> schooner 44t left Newcastle for Sydney 25 July leaking and abandoned off Sydney in rough seas		Loney 1978:34 NSD
			Late July <b><i>William and Mary</i></b> schooner 22t ashore in Broken Bay, salvaged and lost NZ 9 Jan 1866		Loney 1978:34 Bateson 1972, NSD Atlas
18 Nov	Severe gale	S NSW			

1860			18 Nov <b>Prospector</b> schooner 56t lost in gale at Bellambi, 2 lost		Loney Atlas
	Heavy gale	Illawarra	18 Nov <b>Colina</b> schooner 54t driven ashore in heavy gale Wollongong, salvaged and later lost at Narooma 7 May 1865		Loney
27 Nov	<b>Shallow bar?</b>	Richmond R	<b>Champion</b> schooner 73t lost on Richmond R bar		Atlas NSD
1861					
1861	Dry on coast		Despite a number of gales, generally dry on coast		Grove 2005:139
Mid Feb	<b>Gale?</b>	N NSW	Mid Feb <b>Goldseeker</b> schooner 76t lost Richmond R bar		Atlas NSD
			14 Feb <b>Daring</b> schooner 93t lost on Clarence R bar		NSD, Mack 1998:7 Loney 1978:34
Early April	<b>Gale?</b>	C NSW	2 April <b>Alice</b> schooner 80t left Newcastle, ran into squall and lost on Nobbys Head		Loney 1978:34 Atlas, NSD
Late April	<b>Gale</b>	N – M NSW			
	Gale	Coffs Harbour	28 April <b>Chase</b> schooner 45t cedar from Richmond and lost in gale 14m north of Bellinger R		Atlas NSD
Mid May	<b>Gale?</b>	N – C NSW			
	Squall	Port Stephens	18 May <b>Trial</b> cutter 23t lost on north head Port Stephens in squall		Atlas NSD
			Mid? May <b>Sancho Panza</b> schooner 80t capsized on Bellinger R bar		NSD
Mid June	<b>Gale?</b>	CQ – C NSW	June <b>Alliance</b> schooner 57t left Rockhampton to Sydney 25 May and disappeared		NSD
			14 June <b>Harp</b> brigantine 55t lost on Wreck Reef		NSD
			20 June <b>Cambrian Packet</b> ketch 21t capsized and sank off Sydney, one lost		Loney, NSD Atlas
Early Aug	<b>Gale</b>	C NSW			
	SE Gale	Broken Bay	7 Aug <b>Mountain Maid</b> schooner ashore and lost Pittwater in SE gale		Atlas, NSD, Loney 1978:43 lost 1868?
	Severe storm	S Tas	Aug <b>James</b> coaster ashore in severe storm S of Hobart		EAS
Early Sept	<b>Gale</b>	C NSW	3 Sept <b>Concord</b> ketch ashore in gale Port Hacking after anchor dragged, refloated		Atlas NSD
Mid Nov	<b>Gale</b>	C NSW			
	Gale	Newcastle	13 Nov <b>Shamrock</b> schooner 100t ashore on Oyster Bank in rough seas, crew saved		Loney 1978:35 NSD

Early Dec	Gale	C NSW	7 Dec <i>Elizabeth Seldon</i> schooner 100t ran ashore and wrecked in breakers Norah Head, crew saved		Atlas NSD
Dec 1861	Shallow breaking bar	Southport Bar	Postmaster Heath surveyed Southport Bar 'seldom available for boats, in consequence of the heavy surf that breaks across the entrance when the wind is blowing onshore'		Longhurst 1994
1862					
	Severe drought	SEQ			HCT Grove 2005:139
1862	Breakwater works began	Clarence R			Coltheart 1997:44
March	Flood	Fitzroy R	8.46m		Webster
Early April	Gale	C NSW			
	Gale	Port Stephens	6 April <i>Venus</i> schooner 40t lost seeking shelter in Port Stephens		Loney 1978:35 (54t) Atlas
	Gale	Newcastle	8 April <i>Cumberland</i> schooner 59t sank in gale off Newcastle. <i>Elfin</i> could not rescue crew in rough weather		Loney 1978:35 6 April Atlas, NSD 8 April
23 April 1862			<i>Hope</i> schooner struck breakwater at Wollongong, possibly refloated and lost Broulee Dec 1866		Atlas Loney
	Drought ends				PH
From July	Wet and stormy	Clarence River	'Weather was exceedingly wet'		Clarence RHS 1998:24
1863					
	Storm year		Between 1863 and 1866 ten steamships, 79 sailing vessels and 243 lives lost on NSW coast	10 storms follow end of drought with floods in Brisbane R from late Jan to April PH	Neil 2001
Jan	Strong N wind 'rough passage'	N NSW	<i>Emma (2)</i> three week long 'rough passage from Sydney to Bellinger River'	Strong N wind, late start to wet season PH	Yeates 1990:2
Late Jan 1863	Tropical storm?	CQ – C NSW			
			Jan <i>Australia</i> schooner 50t ashore St Lawrence, repaired then ashore and wrecked in gale Feb		Loney NSD
			28 Jan <i>Snowdon</i> schooner 83t lost on North Head Sydney Harbour		NSD

26 Jan – 2 Feb	Minor Flood	Brisbane R			BoM
12–15 Feb 1863	Tropical Cyclone	C – SEQ	Damaging winds Rockhampton to Hervey Bay, c14 Feb <i>Bonnaparte</i> schooner dismantled off Breaksea Spit and ships off Moreton Bay forced to sea	Severe storm PH	JC
	Gale	Keppel Bay	13 Feb <i>Satellite</i> pilot boat driven ashore in gale Keppel Bay		NSD Loney
12–15 Feb	Heavy rain	SEQ			BoM
15–21 Feb	Moderate Flood	Brisbane R	Flood 12ft [3.7m] lower than 1893. Wharves and Stores flooded several feet deep.		BoM
Mid Feb	Severe erosion	Hervey Bay	Erosion of 32km of coast, including some areas of mature forest, on western shore of Hervey Bay		JC
15 March 1863	Tropical storm	SEQ		Severe storm PH	
		Moreton Bay	15 March <i>Princeza</i> brigantine 141t abandoned and ashore Amity Point. Schooner <i>Lady Bowen</i> lost attempting to salvage cargo 20 March 1863		Loney, NSD Thomson 1967:377 <i>The Prince Caesar</i>
	Severe storm	Rodds Bay	March <i>Jane Somerville</i> barque 79t aground Keppel Bay in Feb storm and lost in Rodds Bay during severe storm		NSD
17–18 March	Local flooding	Brisbane R	Very heavy rain		BoM
19–20 March 1863	Tropical storm	CQ – S NSW			
	Gale	Coral Sea	19 March <i>Prince of Denmark</i> whaling schooner 69t lost on Chesterfield Reef in gale. Crew built cutter <i>Hamlets Ghost</i> from wreckage, reached Moreton Bay 17 June		Loney NSD
	Storm	Moreton Bay	20 March <i>Lady Bowen</i> schooner lost Moreton Bay. Blown from mooring in storm (was salvaging wreck of <i>Princeza</i> at Amity Point), wrecked on western side of Moreton Bay?		Loney NSD
			Late March <i>Schnapper</i> cutter driven ashore and lost at mouth of Brisbane R		Loney 1980:142 NSD
			21 March <i>Everton</i> ship 904t lost ashore Moreton Is, later refloated		NSD
			21 March <i>Echo</i> schooner 170t struck rock and lost Shellharbour, crew survived		Loney Atlas, NSD
Early April	Tropical Cyclone	SEQ	Rain depression? PH		
2–10 April	Cyclone	Fitzroy Is	3 April <i>Jeannie Deans</i> schooner 31t damaged in cyclone and lost Green Is		NSD EAS 14 April
	8 day SE gale, heavy rain squalls	Moreton Bay	6 April <i>Queen of the Colonies</i> sheltered off N end of Moreton Is, buffeted by days of gale, ships boat washed to Caloundra		Trundle 1958
			Early April <i>Absalom</i> ketch 25t drifted into south spit and lost Macleay R bar	Big swell? PH	NSD Atlas 27 April

Late April	Tropical storm?	SEQ		Possibly tropical rain depression PH	Trundle 1958
23–25 Apr	Minor flooding	Brisbane R	Rain caused local floods		BoM
April 1863	Creeks flooded	Gold Coast	Surveyor Roberts had to cross flooded creeks to reach Point Danger. Equipment arrived later 'along the beach ... by dray'	Survey for Queensland / NSW border	Longhurst 1996:33
Mid–late June 1863	Gale	C – S NSW			
	Storm	Illawarra	15 June <i>Duke of Wellington</i> brigantine 88t capsized off Wollongong, 5 lost, 2 survived		Loney Atlas
	SSE gale	Manning R	Mid June <i>Pluto</i> steamer 200t Sydney to Brisbane, last seen off Manning R in SSE gale		NSD Atlas
Mid July	Gale	SEQ – all NSW			
			9 July <i>Almeda</i> brigantine 210t sprang a leak and lost off Cape Howe		NSD
			12 July <i>Black Diamond</i> iron schooner 71t abandoned and lost off Cape Hawke		Loney Atlas, NSD
			19 July <i>Rebecca</i> schooner 68t ashore and lost Baffle Ck bar, crew survived		Loney NSD
			Mid July <i>Regent Bird</i> schooner 34t lost off NSW coast between Macleay R and Sydney		NSD Atlas
			Mid July <i>Thomas S Mort</i> steamer 772t abandoned Tasman Sea		NSD
Mid Oct	Gale	CQ – Vic			
			17 Oct <i>Hope</i> brig 300t US whaler and <i>Sporting Lass</i> brig whaler lost on Brampton Shoal, crews combined in rescue, one boat reached Moreton Bay. 24 Nov, another picked up by <i>Yarra Yarra</i>		Loney NSD EAS
	Heavy squall	Port Stephens	17 Oct <i>Sarah Dent</i> ketch 17t hit by squall off Port Stephens and sank immediately, crew lost		Loney 1978:35 AE NSD
	Gale	Port Phillip	Oct <i>Corsair</i> pilot cutter driven from mooring in gale		EAS
Late Nov	Tropical low?			Tropical rain expression? PH	BOM
3 Dec	Minor flood	Brisbane R	Continuous rain		BoM
1864					
	Storm year		2 severe TC (March <i>Panama cyclone</i> Hervey Bay) and severe winter storms (Aug <i>Volunteer Storm</i> Cape Byron and floods SEQ to NSW PH		
	No settlement on coast	Byron Bay	Constable Henderson travelled from Ballina to Tweed 'not a single habitation to be seen at or near Byron Bay'		Dening 1966
Early Feb	Tropical storm	CQ – SEQ	Stormy weather 'very tempestuous'		BoM

1864	Gale	Whitsunday Is	8 Feb <b>Nightingale</b> schooner 29t ashore and lost Long Is (southern Whitsundays) while sheltering from a gale		Loney
			Feb <b>Eva</b> schooner 34t driven ashore Molle Is, salvaged and lost in cyclone March 1867		NSD
	Heavy surf	Hervey Bay	10 Feb <b>Fayaway</b> brig 197t Maryborough to Sydney and lost on Breaksea Spit, crew reached Q coast in two boats and 3 lost when boat overturned in [heavy?] surf		Loney NSD 1863
8 Feb 1864	Minor flood	Brisbane R	Heavy rain and flood Brisbane R		BoM
Feb and March	Flood	Fitzroy R	8.46m (Feb) and 8.69m (March). Changes to river banks occur and the Upper Flats crossing shifts 300ft down stream		Webster
17–19 March	Severe TC	SEQ – N NSW	Building damage Gladstone to Brisbane		JC
1864	<b>Panama cyclone</b>	Hervey Bay	19 March <b>Panama</b> barque 414t (US) wrecked in cyclone Rooney Pt, Fraser Is, 11 lost. 4am 19 March wind shifted from ESE to NW	Eye crossed over Hervey Bay PH	Loney Williams 2002: 52–3 23 March JC
			<b>Macleay Packet</b> schooner 48t left Sydney early March for Richmond R and disappeared, 10 lost		Loney 1978:36 Atlas, NSD AE 30 April
	Gale	Newcastle	19 March <b>Zone</b> brigantine 95t lost in gale Newcastle Bight. 4 lost during rescue when lifeboat overturned		NSD April Loney 1978:36 Herald
19–22 March	Moderate flood	Brisbane R	Channel in Brisbane R bar silted up <b>24 inches [610mm] of rain in 4 days</b>	Heavy rain	McLeod 1990:93 BoM
	Major flood	Mary R	Maryborough 8.2m above low water		JC
	Floods	Richmond and Clarence R		Not in Ferguson 1995 PH	Richards 1996:22
	Shoreline damage	Moreton Bay	The night of 18 March was a terrific hurricane and the stone jetty at Cleveland swept away	Moreton Bay	BoM
April 1864	Gale				
			18 April <b>Fox</b> schooner 159t aground north shore Hunter R, refloated and lost Jan 1871		NSD, Atlas
			18 April <b>Perseverance</b> schooner 74t lost on sandbank leaving Clarence R bar		Loney 1978:36 Atlas, NSD
Early May	Gale	C – S NSW			
1864	Gale and heavy seas	Newcastle	30 April <b>Grecian</b> brig 209t went ashore in gale and heavy seas south of Red Head, broke up quickly, one lost		Loney 1978:37 NSD
	Rough weather	Tasman Sea	Early May <b>Prince Arthur</b> brigantine 420t Newcastle to NZ sprang a leak and lost in rough weather Tasman Sea, crew reached Lake Macquarie in boat		NSD Loney 1978: 36 Atlas
	Easterly gale	Shoalhaven R	13 May <b>Pacific</b> barquentine 312t lost ashore Cookhaven Heads in easterly gale, refloated		Atlas NSD

Early June 1864	Severe gale	SEQ – S NSW	Tremendous gale off Q and NSW coasts with several vessels lost on N NSW coast		Loney JC
			June <i>Diana</i> brig 103t lost while guano mining Barker Group, GBR		NSD
			Early June <i>Diamond</i> iron schooner 120t lost off Seal Rocks		NSD, Loney 1978:37 early Jan
	Gale	Trial Bay	2 June <i>Julia</i> schooner 59t sheltering in Trial Bay, beached and lost		Loney 1978:37 Atlas, NSD
	Gale	Trial Bay	<i>Woolloomooloo</i> ketch 32t left Macleay R 28 May, dragged anchors sheltering in Trial Bay, lost ashore near <i>Julia</i> , 1 saved, 3 lost		Loney 1978:37 26t Atlas NSD
	Gale	Trial Bay	2 June <i>Gazelle</i> schooner 25t ashore Trial Bay north of <i>Woolloomooloo</i> , all survived		Loney 1978:37 NSD
	Gale	Seal Rocks	Early (c2) June <i>Rainbow</i> wood paddle steamer 89t lost in gale Seal Rocks, 7 lost, 9 saved		AE, NSD, Richards 1996:9, 167 Loney 1978:37 all saved
	Gale	Sydney	2 June <i>Waratah</i> schooner 109t disappeared in gale after leaving Newcastle for Sydney, 7 lost		Loney 1978:37 NSD, Atlas AE
Mid June 1864	Gale	S NSW	Tathra wharf, (built 1862), damaged in winter gales	Severe gale PH	Coltheart 1997:52
			11 June <i>Ewald</i> schooner 152t driven ashore and lost on beach near Ulladulla		Atlas NSD
	Gale	Illawarra	12 June <i>Reaper</i> schooner 40t ashore and lost in a gale at Bellambi		Loney Atlas, NSD
			12 June <i>Sarah</i> ketch lost on north spit Crookhaven Heads		Loney, Atlas <i>Sarah Jane</i> NSD
	Gale	South coast	Mid June <i>Emma</i> schooner 52t beached in gale and lost south of Shoalhaven R		NSD Atlas
14–15 July 1864	Gale?	SEQ – Newcastle			
			14 July <i>Warren Goddard</i> brigantine 203t lost Comboyuro Pt, Moreton Is		NSD Loney
			15 July <i>Star of Peace</i> schooner 50t lost north beach Newcastle		Atlas
5–10 Aug 1864	<b>Volunteer storm</b> Severe easterly gale  <b>Major storm surge</b> and very heavy rain	SEQ – Cape Byron	7 August <i>Volunteer</i> schooner, 70t from boiling down works at Baffle Ck, Q to Sydney capsized off Cape Byron and blown onto the rocks in easterly gale. '114 casks of tallow, was strewn along the beaches south and north of Cape Byron' [confirms wind E] Tallow [hence name of Tallow Beach] was collected by James Ainsworth of Ballina and later shipped to Sydney on the <i>Wallaby</i>	Foam ten feet [3m] thick was reported covering the track from Tallow Beach to Byron Bay	Ryan and Smith 2001:95, 131 Coltheart 1997:43 (cites Ainsworth form Daley 1965) PWD 1978:11 NSD, Atlas Denning 1966
5–10 Aug	Rain	Brisbane valley	Heavy and almost continuous rain Ipswich		BoM
	Storm surge, washover	Around Cape Byron	Ainsworth describes dunes flattened and the ocean flooded into the land behind. The wetlands 'deeper than a horses' back'		As above
Late Sept to early Oct	Severe gales	CQ – S NSW	Many ships lost or ashore from Yeppoon to Newcastle in severe gales with high seas		EAS 8 lost



1864	Heavy surf	Yeppoon	27 Sept <b>Presto</b> cutter lost Yeppoon in heavy surf		NSD
			27 Sept <b>Mermaid</b> cutter lost Moreton Is		Loney, NSD
	Gale	Pt Plummer	30 Sept <b>Guiding Star</b> schooner 39t left Manning R and ran into gale and lost off Cape Hawke, wreckage drifted north to Point Plummer, 5 crew lost	Very strong SE wind PH	Loney 1978:38 Atlas AE NSD
	Gale	Port Stephens	30 Sept <b>Tybee</b> barque 271t lost ashore sheltering from gale in Port Stephens, 7 lost		Loney 1978:38, Atlas, NSD AE 2 Oct, Herald 30 Aug
	Gale	Newcastle	30 Sept <b>Gertrude</b> brig 117t wrecked in gale south of Newcastle, crew saved		Loney NSD
	Gale	Newcastle	30 Sept <b>James</b> schooner 114t driven ashore in gale near <i>Gertrude</i> , crew saved		Loney, EAS NSD
	Gale	Port Stephens	1 Oct <b>New Moon</b> wood paddle steamer 48t Macleay R to Sydney lost in gale Anna Bay Port Stephens, 10 lost, 2 survived		AE, NSD, Atlas Richards 1996:10, 165, Loney all lost
	Gale	Illawarra	1 Oct <b>Breadalbane</b> barquentine 214t driven ashore Bellambi		NSD
	Hugh seas	Newcastle	1 Oct <b>Lowestoff</b> iron paddle steamer (tug) 103t driven ashore in huge seas north of Lake Macquarie and broke up, crew saved		Loney 1978:38 Atlas NSD
	Heavy surf	Bowen	4 Oct <b>Presto</b> cutter lost near beach and broke up in heavy surf Port Denison, Bowen		NSD
			4 Oct <b>Mary</b> cutter left Broken Bay and capsized, one lost		Bateson 1972 Atlas, NSD
	Gale	Port Stephens	7 Oct <b>Freak</b> schooner 79t anchors dragged and lost middle bank Port Stephens in gale		Loney 1978:38 Atlas, NSD
Mid Oct 1864	Gale	S NSW			
	Heavy seas	Illawarra	17 Oct <b>Bonaparte</b> schooner 119t passage to NZ, sprang a leak, abandoned and sank 20km off Illawarra, crew survived in boat		Loney Atlas NSD <i>Buonaparte</i>
26–28 Nov	Gale	C NSW			
	Gale	Broken Bay	27 Nov <b>Southern Light</b> ketch 50t capsized and lost in gale between 26–28 Nov Broken Bay		NSD, Bateson 1972 Loney and Atlas lost April 1863
	Southerly gale	Manning R	Nov <b>Flying Fish</b> schooner 37t ashore on Manning R bar in southerly gale, refloated and lost Port Stephens March 1870		NSD
Late Dec	Heavy swell Shallow bar	Manning R	27 Dec <b>Emily Anne</b> schooner 39t struck Manning R bar in heavy swell and later sank at Crowdy Head	Swell from distant storm? PH	Atlas NSD <i>Emily Ann</i>
1865					
Mid Jan 1865	Tropical storm	SEQ to N NSW	Probably severe storm? PH		
			Early Jan <b>Twins</b> ketch lost in Macleay River		Loney 1978:38 Keats 1988:283 <i>The Twins</i>
		Clarence R	12 Jan <b>Boomerang</b> schooner 63t left Newcastle for Clarence R and lost off north coast with all 7 crew		Mack 1998:7 NSD, AE, Atlas Loney 1978:38

	Gale	SEQ	15 Jan <b>Star of Australia</b> wood steamship 231t left Sydney 10 Jan for Rockhampton towing 2 punts. Both punts broke loose in a gale. One punt located, steamer and second punt disappeared, 24 passengers and crew lost		Loney NSD AE late Jan
7 April	<b>Agnes</b> cutter	North coast	Run ashore when in danger of sinking, crew survived		Loney 1978:39 NSD 4 July
May 1865	Gale	C and S NSW			
			6 May <b>Leah</b> barque 216t left Newcastle for NZ badly leaking and went ashore Port Stephens		Loney 1978:39 Atlas 6 May 1856 NSD
			7 May <b>Colina</b> schooner 54t lost Narooma, previously ashore Wollongong 18 Nov 1860		Loney NSD
			May <b>Julie Heyn</b> barque 318t beached and lost south of Jervis Bay		Atlas, NSD Loney
Late June	Gale?	C NSW	30 June <b>Edward</b> cutter 29t left Newcastle for Sydney and disappeared with all hands		Loney 1978:39, Atlas, AE, NSD
20 July	Shallow bar	Baffle Creek bar	<b>Gil Blas</b> brig 172 t aground and lost on Baffle Creek bar, cargo salvaged	Not storm PH	Loney NSD
Late Sept 1865	Severe gale	Central Q to SEQ			
	Severe gale	Central Q	<b>Susannah</b> schooner left Brisbane for FNQ, last seen Keppel Bay (17 Sept), prior to onset of severe gales c 20 Sept		Loney NSD
22 Sept	Heavy rain	Brisbane Valley			BoM
Mid Oct	Gale?	S NSW			
			17 Oct <b>Spec</b> schooner 17t sank off Kiama in squall, 2 lost		Loney, Atlas NSD
Early Nov 1865	Gale?		2 vessels lost leaving Richmond R on same day	Big swell from previous or distant storm? PH	
			7 Nov <b>Alexandra</b> brigantine 112t lost Richmond R heads		Loney 1978:39 Atlas, NSD
			7 Nov <b>Ranger</b> schooner 42t driven ashore and lost Richmond R heads		Atlas, NSD Loney 1978:39
			12 Nov <b>Aenid</b> cutter lost on Long Reef, 2 lost		NSD
Late Nov 1865	Gale	N to C NSW			
			23 Nov <b>Josephine</b> brigantine 125t lost middle spit Richmond R bar		Atlas NSD
			25 Nov <b>Hope</b> ketch 30t drifted ashore and lost north spit Bellinger River		Atlas NSD
			25 Nov <b>River Chief</b> brig 159t lost Richmond R bar		Atlas NSD
			26 Nov <b>Minerva</b> schooner 45t lost on Tweed R bar in severe squall		Keats 1999: 213 Atlas, NSD

28 Nov	Big swell	Sydney Harbour	<i>William Hill</i> brig 109t lost North Head when wind failed in big swell		Loney 1978:39 NSD
1866					
	Trial Bay Harbour		Proposed in 1866. In 1870 10 000 pounds voted for 'Trial Bay Harbour' as a storm refuge for coastal shipping		Coltheart 1997:55
19 – c 23 Feb	Tropical Cyclone	Lady Elliot Island	19 Feb <i>Loda</i> barque (US) 637t dismasted in cyclone, a few days later caught fire and burnt near Lady Elliot Is. Crew reached coast		Loney NSD
Late Feb to late March	TC	Coral Sea	Several vessels lost between CQ and N NSW. No gales reported on NSW coast but big swell PH		
			25 Feb <i>Helen</i> schooner 47t lost Bellinger R bar		Loney Atlas
			25 Feb <i>Mary</i> schooner 47t lost on Bellinger R		Atlas NSD
March	Shallow Bar	Richmond R	8 March <i>Petrel</i> ketch 62t lost on Richmond R bar	No details	NSD Atlas
			12 March <i>Pioneer</i> schooner 87t lost in heavy seas on Masthead Island, crew sailed to Keppel Bay		EAS, Loney NSD 10 March
Late March	Tropical Storm?	CQ to SEQ			
			21 March <i>Britons Queen</i> schooner 118t lost Masthead Reef		NSD
			26 March <i>Lady Darling</i> cutter 10t anchor chain broke and lost on Jenny Lind Ck bar		Buchanan 1999:15 Loney 26 Feb
	Gale	Double Island Point	30 March <i>Flora</i> pilot schooner ashore in a gale Double Island Point		NSD Loney March 1867
Late April	Severe Gale				
1866	Heavy gale	Brunswick R	28 April <i>Francis George</i> schooner 53t lost on rocks, north side of the Brunswick R bar		Brokenshire 1988:7 AE, NSD, Keats 1988:216 Loney 8 April
Mid May 1866	Severe Gale	S NSW		Severe Tasman Sea gale PH	
	Heavy gale	Cape Howe	17 May <i>Ellen Simpson</i> barque 310t lost in gale off Cape Howe, 2 crew saved, 9 lost		Loney NSD, AE
			16 May <i>Porpoise</i> schooner 39t lost on Wagonga R bar		Loney 24 May Atlas, NSD
			<i>Urara</i> iron paddle steamer 382t aground on Clarence R bar (2 May) and hull broke up in later bad weather	Probably this storm PH	Richards 1996:8,170 Loney 1978:39 NSD wood steamer
Early June	Storm	Coral Sea/ SEQ to NSW			

	Gale	SEQ	After 9 June <i>Missie</i> brig 182t badly leaking when abandoned off SEQ, crew rescued by steamer <i>Salamander</i>		Loney NSD 2 June
	Huge Seas	Coral Sea	10 June <i>Mary Lawson</i> barque 432t lost Middleton Reef in huge seas, 3 survivors later reached coast, 5 lost		Loney AE 12 lost NSD
	Gale	Newcastle	11 June <i>Comet</i> schooner 87t and <i>Orient</i> schooner 32t both lost ashore in gale Newcastle Bight		Loney 1978:40 Atlas NSD
10–14 July 1866	Very severe storm <b>CAWARRA STORM</b> <i>'the great gale'</i>	SEQ to S NSW	Furious storm, some 20 vessels and over 100 lives lost from Lady Elliot Is to Wollongong  'one of the worst gales ever recorded on the north coast'.	Centre of low moved from mid north to central NSW coast PH	Loney 1978:39 AE NS Herald
			10 July <i>Brothers</i> schooner grounded on bar and later wrecked on rocks Brunswick R bar		Brokenshire 1988:7 Keats 1988:216
	Gale	Illawarra	11 July <i>Tiger</i> schooner 76t ashore Bulli jetty, 3 lost. <i>Tiger</i> was being towed to sea by steamer <i>Woniara</i> when <i>Corio</i> cut tow rope. <i>Corio</i> lost at sea and <i>Woniara</i> sheltered in Botany Bay		Atlas Gleeson 1993:9 Loney 13 July NSD
	Rough seas	Wollongong	12 July <i>Corio</i> iron steamer 169t left Bulli jetty and lost off Wollongong in gale and rough seas, wreckage ashore, 10 crew lost		AE, Atlas Gleeson 1993:9 NSD
	Easterly gale, enormous seas	Newcastle	12 July <i>Cawarra</i> iron paddle steamer 522t. Left Sydney for Brisbane and lost on Oyster Bank, seeking shelter from easterly gale. Swept by enormous seas, 62 lost, 1 saved		Loney 1978:40 AE Bateson 1972 Atlas, NSD
			12 July 2 crew lost from barque <i>Keder</i> attempting to salvage spirits from <i>Cawarra</i>		NSD
	Raging seas	Lake Macquarie	12 July <i>Arthur</i> ketch 39t lost in Newcastle Bight attempting to enter Hunter R, 5 lost		Loney 1978:40 Atlas, NSD
			12 July <i>Lismore</i> schooner 88t attempting to return to Newcastle run ashore Oyster Bank, crew rescued by rocket lines		Loney 1978:40 Loney NSD
			12 July <i>William Watson</i> barque 384t from NZ swept over Oyster Bank and wrecked north beach, 2 lost, other crew saved		Loney 1978:40 Atlas NSD 13 July
	Great gale	Coffs Harbour	12 July <i>Carrywell</i> schooner 74t dragged anchor at Coffs Harbour in a great gale and run ashore		Keats 1988:284 Atlas, NSD Loney 1978:42
	Heavy seas	Seal Rocks	12 July <i>Carnation</i> schooner 32t forced inshore and beached in gale and heavy seas Seal Rocks		Loney 1978:41 Atlas, NSD
	Gale	Tuggerah	12 July <i>Friends</i> schooner 95t ashore Tuggerah beach in gale		Loney 1978:41 Bateson 1972, Atlas, NSD
			12 July <i>Lydia</i> ketch 30t beached and lost ashore at Crowdy Head		Loney 1978:41 NSD, Atlas
July 1866	Heavy gale	Trial Bay	12 July <i>Sarah Barr</i> schooner 46t beached in heavy gale Trial Bay, crew saved, and later refloated		Loney 1978:42, NSD Atlas <i>Sarah Bar</i>
July 1866			12 July <i>Eclipse</i> schooner 170t from Gladstone to Sydney with cattle, lost off Manning River, 8 lost		AE, Loney 1978:41 Linton 2004:70 12 June

			12 July <b>Mary and Rose</b> schooner 86t driven ashore Port Stephens, 5 lost and 2 saved		Loney 1978:40 AE, Atlas, NSD
	Raging seas	Nambucca Heads	12 July <b>Slippery Charlie</b> schooner 56t lost ashore in raging seas Nambucca Heads, 1 survived, 15 passengers and crew lost		AE Loney 1978:40 NSD
	Gale	Lady Elliot Island	13 July <b>Golden City</b> ship 779t ashore in gale at Lady Elliot Island loading guano		Loney NSD
			13 July 1866 <b>Rhoderick Dhu</b> schooner 76t from Richmond R with timber and lost south of Port Stephens, all survived		Atlas Loney 1978:41
	Gale	Trial Bay	13 July <b>Janet</b> ketch disappeared in gale with all hands off Trial Bay		AE NSD 1867
	Heavy gale	Newcastle	13 July <b>Sea Gull</b> schooner 64t lost off Newcastle in heavy gale, 5 crew lost		Loney 1978:41 AE, NSD
			13 July <b>Esk</b> ship 404t lost near Sydney Heads, later refloated		NSD
			14 July Hunter R coaster driven ashore		Callen 1986:59
July 1866			July <b>Woodpecker</b> schooner 37t beached at Port Macquarie and broke up quickly, Master lost, crew survived		Loney 1978:41 Finkel 1987:40 NSD
	Extreme storm	Cape Byron	<b>Yarra Yarra</b> Captain Richard Phillips had left Sydney the day before <b>Cawarra</b> and when the gale came 'we were off Cape Byron, expecting every moment to founder', 'we put out to sea. The plan we adopted was to put a large hawser astern to keep her steady; she was a bad steerer as any passenger who travelled in her knows full well. We did not know that we should survive the storm, but we got safely through'		Parliament of NSW 1890:993, 1046
14 July 1866	End Cawarra Storm			Swell to 18 July? PH	
			16 July <b>Mimmie Dyke</b> schooner 87t lost south of Twofold Bay		Atlas NSD
			17 July <b>Bungaree</b> paddle steamer (tug) 62t stranded on rocks Nobbys Head	Big swell? PH	Atlas NSD
18 July 1866			18 July <b>Caroline</b> ketch sank off Nobbys Head, no survivors	Big swell? PH	Loney 1978:40 Atlas, NSD 1869
July 1866	Great flood	Manning R	Higher flood than 1857	Following Cawarra storm?	Richards 1996:17 Gill 1998:26
Winter 1866	Flood	Hunter R			Coltheart 1997:53
Winter 1866	Breakwaters damaged	Hunter R	Destroyed part of southern breakwater and parts of the newly restored northern bluestone wall	No erosion recorded Sydney by Andrews? PH	Coltheart 1997:53
Late July 1866	Two gales	C to S NSW	28 July <b>Eagle</b> schooner 125t left Sydney for Wollongong and forced north to Broken Bay, returned to Bellambi but again forced north and lost North Head, Sydney Harbour		Loney 1978:41 NSD
Late Aug	Gale?	C to M NSW			
			Aug <b>Blue Rocket</b> schooner 34t lost south of Sydney		Atlas
			22 Aug <b>Vixen</b> schooner 121t lost on rocks near Port Macquarie bar		Finkel 1987:39 Atlas, NSD

Late Oct	<b>Very severe storm</b>	Moreton Bay	26–27 Oct Terrific storm Brisbane, local flooding and buildings unroofed	Very severe storm	BoM
	Gale	Bowen	Oct <i>Queen of the Colonies</i> driven ashore in gale at Bowen Beach		NSD
			30 Oct <i>Maria Ann</i> schooner 34t lost in Mooloolah R		NSD
Possibly Oct 1866	Tropical storm?	Kin Kin	Sometime between 1865–7 wild storm struck cedar getters camp at Kin Kin. Storm was <b>the worst ever experienced in the colony</b> and elsewhere destroyed houses and stripped the forest		Brown 2000:7–8, 135
Nov – Dec	<b>Gale</b>	SEQ – S NSW			
1866	SW gale	Tweed R	26 Nov <i>Minerva</i> schooner 45t driven ashore and lost in SW gale, Tweed R		NSD Atlas
	Heavy swell?	South NSW	29 Nov <i>Adophus</i> brigantine 121t lost on rocks and broke up near Wollongong		Loney
10–12 Dec	<b>Floods</b>	Brisbane	Minor flood ‘incessant rain’		BoM
Late Dec	<b>Gale</b>				
			17 Dec <i>Eliza</i> schooner 94t driven ashore in gale, Port Fairy, Vic		EAS
			18 Dec <i>Falcon</i> ketch 35t lost Richmond R bar		Atlas NSD
	S gale	Newcastle	20 Dec <i>Nautilus</i> barque 166t ashore in southerly gale Nobbys Head		Loney 1978:41 NSD
			Late Dec <i>Hope</i> schooner lost off S NSW wreckage and bodies ashore Broulee Is		Loney
1867					
			Jan economic depression in Queensland but economy relieved by Gympie Gold Rush Oct 1867		Brown 2000:137
Late Jan	<b>Tropical Storm?</b>	SEQ to S NSW			
			23 Jan <i>Prince Patrick</i> schooner 110t beached and lost Jervis Bay. Refloated and lost Sydney 1869		Loney Atlas, NSD
1–2 Feb 1867	<b>Minor flood</b>	Brisbane River	Heavy rain Brisbane		BoM
Feb? 1867	<b>Fresh</b>	Manning R			Linton 2004:21 Gill 1998:26
2–4 March 1867	<b>Severe Tropical Cyclone</b>	FNQ	<i>TC Eva</i> severe building damage and heavy rain, Townsville and Bowen		JC
			March <i>Julia Percy</i> brigantine 61t lost at Bowen		NSD
			2 March <i>WA</i> schooner left Cardwell for Townsville and disappeared		NSD
	Ferocious cyclone	Cardwell	4 March <i>Eva</i> schooner 34t lost in ferocious cyclone, 7 lost. Capt MacBeath regarded as most experienced skipper on NQ coast		Loney NSD

8 March	Tropical Cyclone	Townsville	WSW strong gale in am, at noon stronger wind and heavy rain. Wind back SSW. At 2pm wind strong, debris flying dangerous to walk in streets. Serious wind damage and heavy rain.		JC
Late March	Gale	Central NSW		One or two gales in late March? PH	
March 1867			20 March <b>Albion</b> schooner 170t lost at Port Hacking, 5 lost, 2 saved		AE NSD
	Gale	Illawarra	23 March <b>Moselle</b> schooner 94t ashore in gale near Bulli		Loney, Atlas NSD 6 April
	Squall	Broken Bay	29 March <b>Cumbria</b> ketch 32t capsized and sank in squall off Broken Bay		Bateson 1972 Atlas, NSD
Early April	Storm				
			Early April <b>Concord</b> ketch 26t beached in gale Port Stephens		NSD
		SEQ coast	c11 April <b>Lombard</b> barque 256t left Gladstone 7 April for NZ with cattle. Wreckage and dead cattle seen off Fraser Is and part of hull ashore Port Macquarie in May 1867		Loney Atlas Nambucca R NSD
			10 April <b>Cyclone</b> schooner 96t lost North Head Port Stephens	SE wind? PH	Atlas NSD
20–21 April	Tropical Cyclone	Brisbane	Severe flood and buildings damaged in Brisbane. Houses unroofed.		JC BoM
26–28 April	Tropical Cyclone	SEQ	Central pressure Brisbane 993hPa. Trees uprooted, crops damaged, railway line damaged. Houses and wharves in Brisbane flooded. 'Wind lifted house off its foundations moving it 9m'		JC BoM
26–28 April			Heavy rain and severe floods SEQ		JC BoM
19–21 June 1867	<b>Catherine Hill Gale</b>	C to S NSW			
			19 June <b>Lord of the Isles</b> ketch 28t lost on Kiama breakwater in gale		Atlas NSD
			20 June <b>J G Coleson</b> schooner 70t lost Shoalhaven R entrance		Atlas NSD
			21 June <b>Margaret</b> ketch 35t lost at Wollongong in gale		Atlas NSD
	Severe gale	Newcastle	21 June <b>Catherine Hill</b> schooner 65t Richmond R to Newcastle and wrecked in a severe gale Catherine Hill Bay, crew saved		Bateson 1972 Loney 1978:42 Atlas, NSD 2 lost
			July <b>George</b> schooner 98t ashore and lost Bulli		Loney, Atlas, NSD
	Big swell until 2 July		2 July <b>H M Warfield</b> barque 157t driven shore and broke up when wind failed Bird Is		Loney 1978:42 NSD
Winter 1867	Breakwaters damaged	Hunter R	Continued damage from 1866. Southern breakwater repaired with 'huge sandstone blocks' by 1872		Coltheart 1997:53

			31 July <b>Otago</b> schooner 64t lost at Newcastle		NSD
20–27 Aug 1867	<b>Strong SE gale</b>	Bustard Head	<i>Gneering</i> sheltered (c 20 – 28 Aug) in Pancake Ck from strong SE gale before unloading material for lighthouse. Pilot schooner <i>Enid</i> could not leave Gladstone		Buchanan 1999:15
Early Sept	<b>Gale</b>	C to S NSW			
	Southerly gale	Bulli	7 Sept <b>Bright Planet</b> brigantine 165t and <b>Matador</b> barque 296t ashore and lost at Bulli in gale		Loney Atlas NSD
Late Sept	<b>Gale?</b>		<b>Victoria</b> schooner 57t left Sydney for Macleay R 20 Sept and disappeared, 9 lost		Loney 1978:42, Atlas, AE, NSD
			25 Sept <b>Mary Ann</b> cutter 15t lost in squall Sydney Heads, one lost		NSD
Early Oct	<b>Gale</b>	C to S NSW			
	Heavy seas	South NSW coast	9 Oct <b>Picard</b> schooner 190t abandoned in heavy seas, crew reached Montague Is		Atlas, NSD Loney
	Heavy seas	Camden Haven	9 Oct <b>Telegraph</b> iron paddle steamer 521t hit rock (not storm, as passengers and luggage landed safely) Camden Haven. Broke up following week		Loney Atlas NSD
Late Oct	<b>Gale</b>	CQ to S NSW			
			28 Oct <b>Aeolus</b> ketch 47t dragged anchors and lost Jervis Bay		Atlas, NSD Loney 22 Oct
	<b>Strong SE</b>	Bustard Head	Late Oct <i>Gneering</i> forced to shelter in Pancake Ck from strong SE winds		Buchanan 1999:16
Late Dec 1867	<b>Gale</b>	N NSW	29 Dec <b>Lucynder</b> cutter 12t lost inside Sandon River		Atlas NSD
<b>1868</b>					
	Clarence R entrance works		Only small sections of southern breakwater and inner training wall built by 1868. The SMH described the storm damaged wall as 'desultory patching...a little bit of breakwater cropping out here and there in an unfinished state'		Coltheart 1997:44
	Pilot station and lighthouse		Pilot Station (Capt Thomas Stewart) established at Bellinger Heads. Bustard Head lighthouse operating 26 June 1868		Yeates 1990:16 Buchanan 1999:28
1868	<b>Noosa Bar silted up</b>		April 1868 Noosa bar silted from Pettigrew map of Noosa in June 1865	1866–68 storm years, marine sand infilling PH	Brown 2000:138, 144
1868	<b>Brisbane Bar silted</b>		Bar silted to 3.5ft (1.07m) at Low Water	Catchment erosion PH	HCT
Mid Jan 1868	<b>Tropical Storm</b>	CQ to SEQ			Buchanan 1999
			21 Jan <b>Salamander</b> iron schooner 87t lost Main Beach, (near Jubilee Bridge) Gold Coast		Thomson 1967: 377, NSD Hanlon 1935:228



22–23 Jan	Local floods	SEQ			BoM
	Wreck on beach, <b>periodically exposed</b> 1868 to 1930's	Main Beach, Gold Coast	Wreck of <i>Salamander</i> 'was at times...seen on the [main] beach...[near Jubilee Bridge] ... until comparatively recent years' [1930's]. 'A remarkable feature of this wreck was that it periodically disappeared beneath the sand to reappear, after a few years, obtruding its bluff bows several feet above the beach level'		Hanlon 1935: 228–229
Early Feb	Gale	C NSW			
			5 Feb <i>Terrara</i> schooner 50t sprang a leak and sank off Port Stephens		Loney 1978:43, Atlas, NSD
	Gale	Terrigal	8 Feb <i>Wave</i> brig 174t lost in gale Terrigal, 9 crew lost, refloated		AE, Loney, Atlas, NSD
15–16 Feb	Severe Gale	Mid N NSW	Possibly two gales PH		Loney 1978:43
1868	Gale	Crowdy Head	15 Feb <i>Barwon</i> schooner 56t disappeared in gale, possibly off Crowdy Head, 5 lost		AE, Atlas, NSD Loney 1978:42
			15 Feb <i>Abbey</i> schooner 90t lost in gale 5km north of Crowdy Head		Loney 1978:43, Atlas Linton 2004:57
			15 Feb <i>Raven</i> brigantine 148t lost ashore in gale south of Crowdy Head		Atlas, Loney 1978:43 Finkel 1987:39 Linton 2004:57
	Severe gale	Crowdy Head	16 Feb <i>Cheetah</i> schooner 119t lost Crowdy Head in heavy gale, crew lost		AE, Finkel 1987:37 Loney 1978:43 16 Feb
			15 Feb <i>Mountain Maid</i> brigantine 51t lost in southerly squall off Sydney		NSD
	Easterly gale	Cape Hawke	c16 Feb <i>General Wood</i> barque 171t left Sydney (15 Feb) for Queensland, wreckage found Charlotte Bay, crew lost		Loney 1978:43 AE NSD
			16 Feb <i>Woodlark</i> brig 231t forced ashore at Seal Rocks, all survived		Loney 1978:43 Atlas, NSD
			16 Feb <i>Chelydra</i> barque 295t forced ashore and lost in gale Port Stephens, 1 lost		Loney 1978:43 Atlas, NSD
			16 Feb <i>Kellermont</i> brigantine 147t at anchor for 2 days before wind shifted E, driven ashore and lost in gale Broken Bay		Loney 1978:44 NSD
	Enormous seas	Newcastle	16 Feb <i>Esperanza</i> brig 117t lost Bird Is in gale with enormous seas. Wreck broke up and 10 lost, 1 survived		Loney 1978:43 AE NSD
	Gale	Cape Hawke	17 Feb <i>Gratia</i> brig 175t disappeared off Cape Hawke in gale, 7 crew lost		Loney 1978:42 Atlas, NSD
			18 Feb <i>Wreck</i> believed to be a French vessel found off Newcastle		Loney 1978:43
20–23 Feb	Storm	Brisbane	Heavy rain and local flooding SEQ		BoM
			28 Feb <i>Atalanta</i> schooner struck and lost on Tweed R bar	Swell continued to late Feb? PH	Atlas NSD

	Gale	NSW	28 Feb <b>Sarah</b> ketch 44t left Sydney for Brisbane 22 Feb, wreckage found S of Sydney		EAS NSD
March 1868	Heavy seas	Bustard Head	Schooner from Gladstone to Bustard Head delayed 16 days (c 4–20 March) by strong southerly winds and heavy seas	Tropical lows in Coral Sea? PH	Buchanan 1999:18
			March? cutter c 5t driven ashore and lost Jenny Lind Ck bar		Buchanan 1999:25
March to April			Very bad weather. Bustard Head lighthouse construction delayed		Buchanan 1999:26
April	Heavy rain and local floods	Brisbane			BoM
28 May 1868	Gale	Bass Strait	<b>Mary Ann</b> schooner 52t blown across Bass Strait in gale and lost off King Is		EAS
Early June	Gale	S NSW?		Heavy swell to north? PH	
	Heavy Seas	Manning R	4 June <b>Black Swan</b> wood paddle steamer 69t struck and lost on Manning R bar in heavy seas. Inquiry found vessel overloaded allowing heavy seas to sweep over vessel		Loney 1978:44 Linton 2004:71 Atlas NSD
			11 June <b>May Queen</b> schooner 72t lost on south spit Manning R		Atlas NSD
			13 June <b>Mimmie</b> cutter 30t lost south side Long Reef		NSD
			17 June <b>Susannah</b> schooner 43t lost ashore Crowdy Bay		Atlas, NSD Finkel 1987:40
July 1868	Gale	SEQ to N NSW	5 July <b>Willing Lass</b> brig 106t lost in Capricorn Group		NSD
			Mid July <b>Annie D</b> brigantine 76t disappeared off N NSW coast in gale, last seen 11 July		NSD, Atlas Loney 1978:44
Late Aug	Stormy	S NSW?	3 Sept <b>Trio</b> paddle steamer arrived Manning R 3 Sept after 'dangerous and stormy passage from Melbourne'		Linton 2004:23
Mid Sept 1868	Gale?	N NSW	15 Sept <b>Elizabeth</b> schooner 46t left Maryborough for Newcastle and disappeared. Uprturned hull sighted by <i>Bengal</i> off Norah Head (5 Oct) and hull ashore south of Sydney Nov 1868		NSD Loney Bateson 1972
Early Nov 1868	Gale?	N NSW			
			Nov <b>Clutha</b> brigantine 150t left Melbourne for Clarence River and disappeared		NSD Loney 1978:44
			9 Nov <b>City of Sydney</b> brigantine 88t lost on north head Clarence R		Atlas NSD
Late Nov 1868	Gale	Central and S NSW			

	Gale	Illawarra	20 Nov <b>Chippewa</b> ketch 26t lost in gale Crookhaven Heads, no survivors		Loney NSD
	Heavy seas	Broken Bay	22 Nov <b>Traveller</b> ketch 17t aground and lost Brisbane Water bar, crew survived		Bateson 1972, Atlas, NSD, Loney 1978:44
Mid Dec 1868	<b>Tropical storm?</b>	GBR	17 Dec <b>Jane Lockhart</b> schooner 81t left Sydney for St Lawrence 11 Dec and lost Heron Island		Loney NSD
<b>1869</b>					
			Charts and soundings of north NSW coast prepared by Capt Sidney in <i>Edith</i> 1865 and Lieut Gowlland 1869		Keats 1999:26, 40, 126
	No coastal settlement. Beaches used for travel	Ballina to Moreton Bay	During 1869 242 sailing vessels and 12 steamers left Richmond R with cedar. Except for a few cedar tracks the 'north side of Point Danger' was little changed. In Aug the NSW Premier (John Robertson) travelled overland to the Tweed R and from the 'Heads' along the beach to Moreton Bay	Despite settlement in the river valleys and cedar trade from coastal rivers, no European settlement on N NSW – SEQ coast PH	Longhurst 1996:35–6 Richards 1996:26
Feb	<b>Gale</b>	C to S NSW		Gale NSW, tropical storm to N? PH	
			12 Feb <b>Clio</b> ketch 42t sank off Wollongong		Loney, Atlas, NSD
	Gale	Newcastle	12 Feb <b>Messenger</b> schooner 38t lost Nobbys Head in gale		NSD
			13 Feb <b>Laura</b> ketch lost sails in gale and beached Stockton		NSD
			13 Feb <b>Free Selector</b> ketch 47t sank off Wollongong		NSD
			Feb <b>Gosford Packet</b> ketch 22t Sydney to Shoalhaven, lost at sea		NSD
24–25 Feb	<b>Gale</b>	C to S NSW			
	Gale	Illawarra	c 24 Feb <b>Christopher George</b> schooner 57t lost in gale with crew off Wollongong		Loney Atlas, NSD
			25 Feb <b>Leisure Hour</b> ketch 18t aground and broke up Brisbane Water bar, Broken Bay		NSD
29 March	<b>Squall</b>	Keppel Bay	29 March <b>Mystery</b> cutter 16t lost in squall Keppel Bay		NSD
1 May	<b>Shallow bar</b>	Richmond R	<b>Lizzie Blair</b> schooner 51t struck bar and lost on south spit Richmond R bar		Atlas NSD
8–9 May 1869	<b>Severe storm</b>	Coral Sea to Central NSW	Heavy gale that claimed many ships on the NSW north coast. 11 coasters left Sydney for Newcastle and ran into bad weather. One survived by standing out to sea for <b>11 days</b>	Swell to mid May	Loney 1978:44 Callen 1986:54

	Heavy seas	Elizabeth Reef	8 May <b>Douglas</b> barque 330t lost on Elizabeth Reef. Forced high on reef, boats wrecked, crew rescued from raft by schooner <i>Storm Bird</i>		Atlas Loney NSD EAS
	Gale	North coast	8 May <b>Oriti</b> schooner stranded on Stockton Beach in gale, refloated		Loney, Herald, NSD Atlas <i>Orita</i>
			9 May <b>Jessie</b> schooner 119t lost on Oyster Bank and driven ashore in gale		Atlas, NSD Loney 1978:45
	Hugh seas	Port Stephens	9 May <b>Secret</b> schooner 100t left Newcastle and driven ashore Providence Bay, Port Stephens, one lost		Loney 1978:45 Atlas NSD
			9 May <b>Britannia</b> schooner 48t beached at Anna Bay, Port Stephens in gale		AE, NSD Loney 1978:44
			9 May <b>Eagleton</b> schooner 98t lost on beach south of Port Stephens with all hands		AE, Atlas, NSD Loney 1978:44
	Huge seas	Newcastle	9 May <b>Burnett</b> brig 137t left Newcastle and lost on Oyster Bank in huge seas, crew lost		AE, Atlas, NSD Loney 1978:44
			9 May <b>Nancy</b> 74t schooner driven ashore and lost with all 6 crew in gale Newcastle Bight		Loney 1978:44 AE NSD
			9 May 1869 <b>Don Juan</b> schooner 110t lost off Port Stephen in gale, 6 crew lost		AE, NSD Loney
	Fierce storm	Broken Bay	May 1869 <b>Louis &amp; Miriam</b> brigantine 114t left Newcastle and disappeared in a fierce storm off Broken Bay with all hands		Atlas NSD
July 1869	Severe gale	C to S NSW	5 July <b>Ann and Maria</b> brig 236t lost south of Green Cape		NSD
			8 July <b>Martha</b> schooner 94t lost between Sydney and Port Stephens and lost with crew		Atlas NSD
13–17 July	ECL	CQ to SEQ	Ships unable to leave Moreton Bay due to 'tempestuous seas'	Rough seas	JC
			13 July <b>Boomerang</b> schooner 96t lost off Hinchinbrook Is		NSD
	Local floods	Brisbane	Continuous rain and creeks flooded		JC
Aug – Dec 1869	Bar Bound	Richmond R	39 vessels unable to cross the dangerous bar for up to 17 weeks. <i>Wallaby</i> bar bound for a considerably longer period. In Dec 1869 the crew of <i>Wallaby</i> , bar bound in the Richmond R, decided to walk to Moreton Bay along the beaches, and spent Christmas camped with Aboriginal people at Kirra Beach		Longhurst 1996:36 Keats 1999:41
5 Aug	Shallow bar?		<b>Amphitrite</b> brigantine 93t ashore Macleay R bar. Refloated and modified. Lost in gale Port Stephens 2 March 1891		NSD Atlas
Sept	Gale	C NSW			
		Port Stephens	<b>Lavina</b> schooner 62t left Newcastle for Sydney 7 Sept and driven ashore Port Stephens, refloated		Loney 1978:45 NSD
			10 Sept <b>Lurline</b> schooner 91t sheltering from gale Port Stephens, driven ashore and lost		Loney 1978:45 NSD

Early Oct	<b>Gale</b>	Coral Sea to C NSW			
1869			1 Oct <b>Scotia</b> schooner 104t drifted ashore and lost entering Richmond R on ebb tide		Loney 1978:45 Atlas, NSD
			2 Oct <b>Euromedha</b> barque 345t sank after striking Brampton Reef, crew saved		Loney NSD
			4 Oct <b>Eliza Davis</b> ketch 25t lost south of Manning River		Atlas, Linton 2004:57 Loney Oct 1879
			8 Oct unidentified <b>wreck</b> sighted off Norah Head		Loney 1978:45
<b>1870</b>					
1870	<b>Storm Year</b>		NSW north coast subjected to wild storms and great floods until June		Morley 1981:19
			Sandy Cape Lighthouse operating. 18 July 1870 William McGregor arrives at Tweed Heads to establish a pilot station due to the number of wrecks on the bar. Brunswick R major centre of cedar trade		Keats 1999:22
1870	<b>Exposure and sorting of heavy mineral sands</b> Gold mining on east coast beaches followed gold mining on the beaches of California and the west coast of New Zealand		<b>Beach Gold Rush</b> to north NSW coast. Gold in black beach sand discovered at Ballina. 'Sniggers' pockets of 'black sand' sorted and deposited at the base of the erosion face mined for gold, platinum and silver. One snigger at Ballina yielded 12oz of gold  Gold mining continued on beaches until the early 1900's and continued to 1970's with mining of black sands for other heavy minerals  Population increase along N NSW coast	The storm period (1863 to 1870) produced an erosion face and extensive patches of concentrated heavy mineral sands. It is possible that prior to these storms the heavy mineral sands were not exposed on the beach for long periods PH	Carne 1896 Morley 1981 Helman 2002
30 Jan	<b>Tropical Cyclone</b>	CQ – S NSW	Bowen cyclonic SE to N winds, buildings damaged, lives lost, flood upper Fitzroy R. Thousands of sheep were lost, 15 people killed.	Whole coast PH	JC
			30 Jan <b>Camden</b> barquentine 235t forced ashore south coast NSW		Loney Atlas, NSD 6 Feb
31 Jan	<b>Rain</b>	SEQ	Creeks flooded		BoM
Feb	<b>Flood</b>	Fitzroy R	7.62m		Webster
20 Feb 1870	<b>TC FNQ, Gale NSW</b>	FNQ – S NSW	20 Feb Severe TC in FNQ ships lost and nearly every building damaged, some unroofed. Heavy floods. Schooner <b>Wonder</b> also lost.	Possibly secondary low to south? PH	JC
	TC	Townsville	22 Feb <b>Black Prince</b> steamship 80t lost at Townsville in cyclone		NSD
	Southerly gale	S NSW	22 Feb <b>Mary Cosgrove</b> schooner 31t lost near Ulladulla in southerly		Atlas NSD
			25 Feb <b>Agnes and Henry</b> ketch 34t ashore in southerly squall south coast NSW		Atlas NSD

	Severe gale	Seal Rocks	26 Feb <b>Trio</b> paddle steamer 137t left Manning R for Sydney, sheltered in Seal Rocks Bay and driven ashore as gale intensified, crew survived		Loney 1978:45 Atlas and NSD 3 March
Early March 1870	<b>Tropical cyclone</b>	SEQ – C NSW	5 March Maryborough wind veered S to NW to NE hurricane force, extensive building damage, very heavy rain (353mm in 24hrs). Heavy flood exceed 1864 by 1.2m		JC
	Severe storm	Brunswick R	4 March <b>Eva Maud</b> ketch 55t lost on Brunswick R bar leaving with cedar for Sydney, heavy rain and floods		Brokenshire 1988:216
			5 March <b>Janet Dickson</b> schooner 66t sheltering from gale dragged anchor and driven ashore Cabbage Tree Bay		Baleson 1972 Loney 1978:46 Atlas, NSD June
			5 March <b>Flying Fish</b> schooner 37t ashore Port Stephens in gale and broke up quickly		Loney 1978:46, NSD, Atlas 15 March
	Gale	Port Stephens	5 March <b>Isle of Thanet</b> ketch 28t ashore and broke up in gale Port Stephens		Loney Atlas, NSD
	Gale	Baffle Creek	6 March <b>Jane</b> sloop 15t lost between Baffle Ck and Round Hill Head		Loney NSD
	Gale	Broken Bay	c 10 March <b>Mariposa</b> schooner 164t dragged anchors and ashore while sheltering in Broken Bay		Loney 1978:46 NSD
			12 March <b>Amity</b> ketch 29t left Sydney and lost in gale off Manning R with 5 crew		AE, NSD Loney 1978:46
	Severe weather	N NSW	14 March <b>SS Ballina</b> 'encountered severe weather' off NSW coast		Mack 1998:58
			17 March <b>Islander</b> sloop 106t lost in gale ashore and broke up near Newcastle		Loney 1978:46 NSD
5 March	<b>Severe flood</b>	Mary R	Flood level exceeded 1864 by 4ft (1.2m)		JC
7–11 March 1870	<b>Floods</b>	SEQ to Manning River	10 March minor flood Brisbane R 1870 Floods Brunswick and Richmond R 1870 <b>PS Belmore</b> first vessel to enter Bellinger R to supply flood bound settlers, after major flood. Severe flood Manning R, sugar mill at Tinonee swept away	Very heavy rain <b>Flood breach south spit</b> Richmond R	BoM Keats 1988:299 Richards 1996:75 Coltheart 1997:55 Ferguson 1995
22–30 March 1870	<b>Gale</b>	S NSW			
			21 March <b>Hannah</b> ketch 43t left Sydney for Shoalhaven, wreckage found ashore Bulli		Loney Atlas 26 April
	Strong winds	Kiama	22 March <b>Rangoon</b> barque 374t ashore Kiama. Late April vessel destroyed in heavy gale, see <i>Walter Hood Gale</i> (April)		Loney Atlas NSD
			25 March <b>Mary Ann</b> ketch 24t driven ashore at Tuross R mouth		Atlas NSD
	Gale	Eden	27 March <b>Storm Bird</b> schooner 95t dismasted, abandoned and ashore Eden, crew survived. Possibly salvaged and lost off Newcastle 25 April		Loney Atlas NSD
c10–14 April 1870	<b>Gale</b>	SEQ to NSW	On 14 April <b>Panic</b> loaded and inside Tweed R bar waiting for 'weather to abate'		Keats 1999: 18
	Heavy swell	Moreton Bay	Early April <b>Coral Queen</b> schooner 20t lost entering South Passage in heavy swell		Loney NSD

	Heavy swell	Tweed R	14 April <i>Perseverance</i> wood paddle steamer 35t attempted to depart (Tweed R), 'a big wave struck [the paddlewheel] ...and stalled the engine...drifted ashore onto the North Rocks'	Big seas at end of gale PH	Keats 1999: 18 Loney 1978:46 Longhurst 1996:37 Atlas 26 April NSD
22 April – 2 May 1870	<b>Walter Hood Gale</b>				
	Heavy gale	South NSW	<i>Rangoon</i> barque 379t ashore Kiama since 22 March destroyed in heavy gale		Loney
			24 April <i>Spray</i> brig 142t lost near Bulli jetty		NSD, Atlas Loney 28 April
	Gale	Newcastle	25 April <i>Storm Bird</i> schooner sank off Newcastle in gale, wreckage ashore at Red Head		AE Loney NSD
	Big seas	South NSW	26 April <i>Walter Hood</i> clipper 937t London to Sydney ran into bad weather off Cape Howe and ashore in gale Wreck Bay. Many lost and survivors trapped on wreck for several days by heavy seas. Bodies buried on beach <b>exposed by erosion</b> about a year later	Painting of the loss of <i>Walter Hood</i> in Loney	Loney AE Atlas 30 April NSD 30 April
	Gale		26 April <i>Hannah</i> schooner driven ashore and lost Bellambi jetty in gale		NSD
	Heavy seas		26 April <i>Dauntless</i> ketch 21t wrecked Port Hacking in heavy seas		Loney NSD
	SE gale	Broken Bay	28 April <i>Notion</i> brig 109t lost in Broken Bay sheltering from SE gale		Bateson 1972, Atlas Loney 1978:46, NSD
Late May 1870	<b>Gale</b>	SEQ to all NSW			
	Bad weather	Sandy Cape	Late May lighthouse builders returned from Sandy Cape...' the weather has been very bad'	19 May Sandy Cape lighthouse lit	Williams 2002:143
			20 May <i>Panic of 66</i> schooner 52t lost north head Tweed R bar		NSD
	Gale?	Port Stephens	20 May <i>Lizzie Coleson</i> schooner 61t left Clarence R, wreckage found Anna Bay, Port Stephens		Atlas, NSD Loney Macleay R
			May <i>Colonist</i> schooner 105t lost on Elizabeth Reef, refloated and lost 1890		Atlas NSD
	Heavy weather	S NSW	May <i>Dora</i> schooner 25t ashore in heavy weather on south NSW coast, refloated		Bateson 1972
Autumn 1870	Breakwaters damaged during construction	Clarence R	It was reported that 'the contractor was actively engaged in trying to fill up the Pacific Ocean with blocks of sandstone...at the end of three months he found it necessary to move back his tramway, for he was considerably less forward than when he began'		Coltheart 1997:56
June 1870	<b>Gale?</b>	S NSW	June <i>Harlech Castle</i> ship Melbourne to Newcastle, last seen off Cape Howe and disappeared with 23 crew		Loney Herald NSD no month
28 June	<b>Gale</b>	Bass Strait	<i>Dunkeld</i> barquentine 390t Newcastle to Melbourne, lost in gales E Bass Strait		NSD EAS
Mid July	<b>Gale</b>				



	Gale	Double Island Point	July <b>Dawn</b> ketch beached ashore in gale Double Island Point, later refloated		NSD Loney
14–18 July	Minor flood	Brisbane R	Very heavy rain ceased on 18 July. Only roofs of wharves visible	Heavy rain	BoM
Mid to late July	Bar bound	Tweed R	'schooner <b>Bertha</b> lay bar-bound a common occurrence for laden vessels ...in 1870' . <b>Bertha</b> tried to get out on 27 July and finally left on 29 July 1870	Tweed R bar silted	Keats 1999:22, 23
Early Oct 1870	<b>Summer Cloud Gale</b>	CQ to C NSW	Gale early Oct, swell to SEQ for another week PH		
			5 Oct <b>Summer Cloud</b> barquentine 336t lost ashore Summercloud Bay near Jervis Bay		Atlas, NSD 10 Oct Loney 5 Dec
			7 Oct <b>Capricorn</b> cutter lost on East Bank, Gladstone		NSD
	Strong SE	Tweed R	Early Oct <b>Thomas and Henry</b> could not cross bar Tweed R bar and anchored north of Pt Danger. Danger Bay 'used by craft to shelter from prevailing south easterlies'		Keats 1999:23,182
	End of swell		14 Oct <b>Thomas &amp; Henry</b> crossed Tweed R bar		Keats 1999:23,182
Mid Nov 1870	Tropical low				
			23 Nov <b>Deva</b> brig 244t sprang a leak and abandoned off Smoky Cape		Loney 1978:46 Atlas, NSD 4 Dec Finkel 1987:40 5 Dec
17 Nov	Heavy rain		Brisbane Valley		BoM
23 Dec 1870 to Jan 1871	Tropical Storm	N to CNSW			
	Squall	N NSW	23 Dec <b>Sarah</b> brig 120t leaking after striking Clarence R bar, struck by squall and sank Crescent Head, crew survived		Loney 1978:46 Atlas NSD
	Gale	Jervis Bay	24 Dec <b>Maid of Riverton</b> schooner 201t forced ashore in gale Jervis Bay		Atlas, NSD Loney
	Rough weather	N NSW	25 Dec <b>Maggie Logan</b> ketch Tweed to Sydney struck bad weather off Clarence R and driven north to Moreton Bay		Dening 1966:31
	Gale	C NSW	26 Dec <b>Rialto</b> barque 303t lost Newcastle in gale, crew rescued by life boat		Loney 1978:46 early Dec, Atlas, NSD
			Dec <b>Fanny</b> schooner 47t lost north head Botany Bay		Atlas NSD July
1871			Storm continued PH		
			7 Jan <b>Fox</b> schooner 159t drifted onto Richmond R bar and lost		Loney 1978:47 NSD
			7 Jan <b>Walrus</b> schooner 88t lost on Richmond R bar		Atlas, NSD Loney 1978:47
Late 1870 to early 1871	Rain	Tweed valley	'so much rain during the whole planting season'		Longhurst 1996:40 Keats 1999: 31



4 Jan	New north channel	Tweed R bar	New channel formed close to the headland 200yds [180m] north of the old channel. New channel was 12ft [3.7m] deep, old channel 9ft [2.75m] deep	Possible tropical storm and fresh in river breached new channel to north PH	Keats 1999:24
1871			50 cedar cutters operating in Brunswick valley		Mills 2000:4
1871	Entrance silted	Tallebudgera Creek	Timber rafts could not cross bar. Petition for marine survey and report by Postmaster Heath		Longhurst 1996:41
24 Feb 1871	Heavy thunderstorm	Brisbane	Local flooding		BoM
Late March 1871	Gale	S to C NSW			
			21 March <i>Ellen</i> schooner driven ashore and sank Twofold Bay. Later refloated		
			23 March <i>Day Spring</i> barque 393t sprang a leak and sank E of Newcastle, crew saved		Bateson 1972, NSD Atlas, Loney 1978:47
Early April 1871	Gale	N – C NSW	12 April <i>Helen</i> brigantine 165t ashore and lost north spit Richmond R		Atlas, NSD Loney 1978:47
			April <i>Jewess</i> barque 476t left Newcastle for Manila, sighted off north NSW coast and disappeared		Loney 1978:47 lost with <i>Helen</i> AE, NSD
			12 April <i>Sarah and Jane</i> aground on north spit Tweed R bar for 2 months (April - May)		Keats 1999:26
			13 April <i>Sylvanus</i> schooner 50t lost on rocks north head Richmond R		Atlas NSD
			April <i>Evalina</i> schooner 47t lost Sydney to Port Stephens		Atlas NSD
Late May	Heavy break	Tweed Bar	Recorded by Tweed pilot	Swell from low to south? PH	Keats 1999:26
Early June	Gale?	SEQ – N NSW	6 June <i>Callender</i> brig 139t lost on rocks north head Richmond R bar when wind failed		Atlas NSD
			12 June <i>Juliet</i> schooner 51t Sydney to Townsville abandoned off Breaksea Spit		NSD
Early Sept 1871	Gale	N to C NSW			
			2 Sept <i>John Bullock</i> schooner 149t lost on north head Richmond R		Atlas NSD
	Gale	Seal Rocks	5 Sept <i>Cleone</i> schooner 44t sheltering from gale Seal Rocks Bay and lost when leaving		Loney 1978:47 Atlas, NSD
Early Oct	Severe gale	N to S NSW	30 Sept <i>Dora</i> schooner 25t lost on Brisbane Water bar		Bateson 1972 NSD
	Heavy gale	Newcastle	3 Oct <i>Catherine</i> barquentine 414t left Newcastle for Melbourne, ran into a heavy gale and lost Red Head		Bateson 1972 Loney 1978:47, NSD

			4 Oct <b>Sarah Ann</b> brigantine 135t lost north spit Richmond R bar after steering failed	Big swell? PH	Loney 1978:47 Atlas, NSD 8 Oct
			6 Oct <b>Margaret and Mary</b> schooner 77t lost on Richmond R bar when wind failed	End of storm PH	Atlas NSD
During 1871	Beach erosion	S NSW	Graves exposed on Wreck Bay beach	Possible erosion C to S NSW PH	(see <i>Walter Hood</i> 30 April 1870)
16–19 Oct	Gale	SEQ – C NSW			
	Heavy seas	Tweed R bar	16–19 Oct, recorded by Tweed pilot William McGregor 'squalls with wind varying N to E and gale from S ... gale from S to SE back to SSE. Heavy rain squalls and 'heavy seas on bar'		Keats 1999:26
	Gale	Lake Macquarie	16 Nov <b>Tim Wiffler</b> ketch 23t Sydney to Lake Macquarie, capsized in heavy squall off Bird Is, one survived		EAS Herald NSD
5–9 Dec	Gale	NSW			
	Heavy seas	Tweed bar	Recorded by Tweed pilot		Keats 1999:26
			Late 1871 <b>Walter and John</b> ketch 23t lost on Richmond R bar. 28 Dec, Brisbane 168mm wettest day on record		Atlas Loney 1978:48 JC
1872					
1872	Pilot station	Wide Bay Bar	Pilot John Smith at Inskip Point.	Wide Bay records possibly lost in 1974 Brisbane flood	Brown 2000:178
4 Jan 1872	Tropical Cyclone	FNQ	<b>Janes Merriman</b> barque 345t lost off Cairns in cyclone		NSD
10 Jan	Gale	N to S NSW			
	Heavy seas	Richmond R	10 Jan <b>Waimea</b> iron steamer 229t lost Richmond R bar when driven onto north head in heavy seas		Atlas, NSD, Richards 1996:28, 170, Loney 16 Jan <i>Waimeau</i>
			Jan <b>Indus</b> barque sprang a leak and sank off south NSW coast, all survived		Loney Atlas
Feb 1872	Succession of gales	FNQ to all NSW		Two gales during Feb? PH	
			20 Feb <b>Ellen</b> schooner 54t lost ashore Twofold Bay		Atlas, NSD Bateson 1972
	Gales	Q coast	<b>Maria</b> brig 156t left Sydney 25 Jan, off Q coast battered by a succession of gales, lost Bramble Reef, off Cardwell 26 Feb		Loney AE NSD
Early March	Gale	Port Stephens	5 March <b>Jane Dickson</b> schooner 66t dragged anchors and lost Cabbage Tree Bay, Port Stephens		Loney Atlas lost June 1870
Late April	Severe gale	CQ to N NSW			

1872	Heavy gale	Richmond R	28 April <b>Culloden</b> iron paddle steamer 152t ran into heavy gale and lost north spit Richmond R bar		Atlas, NSD Loney 1978:48 Clarence R
			30 April <b>Hannah Bloomfield</b> brigantine 20t ashore in Capricorn Group, refloated		NSD
Early May	Gale	C NSW			
	Squall	Broken Bay	3 May <b>Phantom</b> ketch 23t lost in squall Broken Bay		Bateson 1972, NSD, Atlas, Loney 1978:48
	Gale	Newcastle	4 May <b>Belle Isle</b> ship 1180t lost at sea off Newcastle in gale		Loney 1978:50 Atlas, NSD
			6 May <b>Bengal</b> barquentine 428t lost off Newcastle		Atlas NSD
May – June	Gale	SEQ – N NSW			
1872			May <b>Examiner</b> barque ashore on sandbank north side of Clarence R bar for five months, salvaged overland	May to Oct 1872	Mack 1998: 7 Richards 1996:23
	Previously strong SE wind and big swell	Cape Moreton	31 May <b>Young Australia</b> clipper 1020t ashore and lost in big swell on the east side of Cape Moreton when previously strong SE wind failed, all saved		Loney Thomson 1967:294, 314 13 May
	Gale?	Clarence R	2 June <b>Clarence</b> iron paddle steamer 378t driven ashore and lost south of Clarence R		Loney 1978:48, NSD, Atlas, Finkel 1987:37
			June <b>Bards Legacy</b> schooner 32t lost in Moreton Bay		NSD
Late July	Gale	C NSW	22 July <b>Mary Ann</b> ketch 17t beached in gale Seal Rocks		Atlas NSD
Early Aug	Gale?	Port Stephens	11 Aug <b>Emily</b> ketch 18t beached north of Port Stephens		Atlas NSD
Late Aug 1872	Gale	Coral Sea	24 Aug <b>Restless</b> brig 258t Solomon Is to Brisbane. Sprang a leak in gale and lost off Solitary Island, all saved		Loney 1978:48 Atlas NSD
Early Oct	Gale	N to C NSW	Possibly severe gale PH		
	Gale	Broken Bay	4 Oct <b>Caledonia</b> schooner 60t capsized in gale Broken Bay. Captain lost, crew saved by ketch <i>Prince Alfred</i>		Bateson 1972
			<b>West Hartley II</b> schooner 69t left Newcastle 5 Oct for Macleay R and disappeared off NSW mid north coast		Atlas, NSD Keats 1999: 212
			6 Oct <b>Bella Coulter</b> cutter capsized in gale Broken Bay		Atlas NSD
			7 Oct <b>Hilander</b> brigantine 93t lost north spit Richmond R bar		NSD
	Flood	Manning R	10 Oct <b>Ulmara</b> wood paddle steamer 50t swept from river and lost Manning R heads		Richards 1996 Loney 1978:48, NSD
Late Dec	Tropical storm				

			24 Dec <b>Lanercost</b> barque 358t lost off Twofold Bay	Secondary low to south? PH	Loney, NSD Atlas 24 Nov
			31 Dec <b>Coquette</b> schooner 61t lost on north spit Clarence R when wind failed. Regular cedar trader to Clarence and Richmond R. Hull remained on beach for a year	Big seas and possibly fresh in river. End of storm? PH	Mackey 2001: 32 Atlas, NSD Loney 1978:48 early Jan 1873
22–30 Dec	Heavy rain	SEQ	Week of heavy rain caused local flooding		BoM
1873					
1873	Shifting bar and marine infilling	Tweed R	After two years at Tweed R the pilot reported a shifting bar with between 12–5ft (3.7–1.5m) at high tide under North Head and 'Flats' 4ft (1.2m) deep		Keats 1999:36
9–11 Jan 1873	Severe Storm	SEQ to NSW	Gale and floods with rough seas Fraser Is to Sydney PH	Possible tropical storm and more intense CQ PH	
		Cape Schanck	9 Jan <b>Eliza</b> 14t lost Cape Schanck, Vic		EAS
	E gale	Smoky Cape	9 Jan <b>Helen</b> brigantine 63t lost ashore south of Smokey Cape in easterly gale		Atlas, NSD, Loney 1978:49 13 Jan EAS
	Heavy weather	Port Stephens	c 11 Jan <b>Matilda</b> schooner 42t left Macleay R for Sydney, last seen in heavy weather off Port Stephens and disappeared, 9 lost		AE, NSD March? Loney 1978:49 late Jan
	Heavy gale	Newcastle	11 Jan <b>Polly Hopkins</b> brigantine 59t lost in heavy gale S of Newcastle with all hands		AE, Atlas NSD 12 March
	Heavy seas	Norah Head	11 Jan <b>Tamar</b> wood paddle steamer 200t ran ashore and lost Norah Head after damage in heavy seas, all survived		Loney 1978:48, NSD Richards 1996:5 Mackey 2001:41 11 Feb
	Rough seas	Tweed Heads	18 Jan previous period 'boisterous weather outside the (Tweed) Heads'	Big swell to 18 Jan PH	Keats 1999:29
18 Jan	Minor flood	Brisbane R	Edward St and Botanic Gardens. Bar deepened and sand bars shifted		HCT
Jan 1873	Pilot station washed away	Inskip Pt	Pilot Station houses being built at Inskip Pt and all their belongings <b>washed away in a gale</b> . New station constructed further inland	Possible major channel realignment PH	Brown 2000: 179
			2 Feb <b>Polmaise</b> barque 878t Rockhampton to London lost Polmaise Reef, Capricorn Group, GBR		NSD
Late Feb	Tropical low?				
			26 Feb <b>Ellesmere</b> iron barque 179t lost on Richmond R bar when tug was disabled		Loney 1978:49 NSD
28 Feb–1 March	Minor flood	Upper Brisbane R			BoM
Late March 1873	Gale	SEQ to C NSW			
			26 March <b>Vesta</b> iron paddle steamer 93t lost on south spit Richmond R bar		Loney 1978:49 Atlas, NSD

			30 March <b>Terrigal Jack</b> ketch 23t lost off Seal Rocks		Atlas
	Gale	Fraser Is	30 March <b>Mary</b> schooner struck SW gale off Cape Moreton and beached Fraser Island, crew saved	Low off NSW coast PH	Williams 2002: 147, 149, Loney NSD 6 April
Late April	<b>Tasman Sea Storm</b>	SEQ to central NSW	From around 21 April, big seas continued on NSW coast until 30 April PH		
			April <b>Sylph</b> ketch 18t left Lord Howe Is for Sydney and disappeared with all hands		Atlas NSD
	Heavy break	Tweed R bar	25 April Pilot took <b>Arakoon</b> over Tweed Bar in heavy break		Keats 1999: 48
	Enormous seas	Manning R	30 April <b>Fire King</b> wood paddle steamer 221t wrecked North Head, Manning R. An enormous sea swept over the ship and destroyed steering gear, all saved		Richards 1996:9, 162 Loney 1978:49 Linton 2004:71
1873	<b>Tombolo eroded</b>	Broulee Is	During 1873 the tombolo to Broulee Is was breached by storms. The bay, previously Broulee Harbour with 7 fathoms [13m] near the shore, became a shallow bay that would 'barely wet the knees at low tide'. Blamed on clearing of vegetation on spit	Not necessarily this storm PH	Coltheart 1997:101
Mid June 1873	<b>Gale</b>	CQ to N NSW	Possibly severe storm SEQ PH		
	ENE Gale	Bustard Head	<b>Agnes</b> schooner 66t left Mackay for Brisbane 8 June, sheltered from storm in Pancake Creek until 16 June. Left into 'very dirty weather' ENE gale and disappeared c 17 June		NSD Buchanan 1999:36
			22 June <b>Undaunted</b> schooner 56t lost on Macleay R bar when wind failed	End of storm, big swell? PH	Atlas, NSD
17–24 June	<b>Minor Flood</b>	Brisbane R	Highest flood since 1864 at Ipswich		BoM
Early Aug 1873	<b>Gale</b>	C NSW	7 Aug <b>Mary</b> schooner 43t sank off Newcastle in southerly squall		Atlas, NSD, Loney 1978: 50 7 Aug 1872
			10 Aug <b>Julia</b> schooner 64t lost at North Head, Sydney Harbour		NSD
Mid Aug	<b>Severe gale</b>	CQ to C NSW			
			Mid Aug <b>Vanguard</b> schooner disappeared after leaving Wide Bay for Sydney 12 Aug with passengers, wool, tallow and hides		Loney
	Gale	Hervey Bay	21 Aug <b>Countess Russell</b> ship 985t Rockhampton to Newcastle ran aground during SE gale Wreck Reef, crew rescued	Anchor and monument at 1770 PH	NSD
	SW gale	Seal Rocks	Late? Aug <b>Maa Fu</b> schooner 70t left Sydney for Manning R and lost in SW gale at Long Island, 8 lost		NSD, Atlas, AE <i>Maafu</i> , Loney 1978:50 <i>Maafie</i>
Early Oct 1873	<b>Gale</b>	SEQ to NSW			
			Oct <b>Mary Smith</b> schooner 100t left Hobart for NZ and disappeared		AE
	Strong NW wind	Hervey Bay	7 Oct <b>Parame</b> barque 533t from Manila to Maryborough. Struck shoal near Woody Is, Hervey Bay and became a total loss		Williams 2002: 147, 149 NSD

Late Dec 1873	<b>Tropical Cyclone</b>	CQ to SEQ	28 Dec Extensive building damage Bundaberg. Wide Bay strong SE wind veered to E, N then NW	Cyclone crossed coast north of Hervey Bay PH	JC
			28 Dec <b>City of Melbourne</b> barque 180t deliberately beached ashore in a storm north of Barrum River		Loney 24 Dec NSD EAS
			Late Dec <b>Alice Jane</b> schooner left Maryborough for Noumea with timber. Hull found floating off Sydney and ashore on beach Port Hacking 15 Jan 1874, crew lost		AE Loney
			29 Dec <b>James Nash</b> schooner left Baffle Creek for Maryborough, overwhelmed by storm, still missing 26 Jan, 7 lost		JC
31 Dec	<b>Minor flood</b>	Brisbane R			BoM
1874					
Early Jan	<b>Tropical Storm?</b>		13 Jan <b>Helen</b> schooner lost Port Macquarie		Loney
1874			13 Jan <b>Mary Ann</b> brigantine 160t drifted ashore at Clarence Heads near wreck of schooner <b>Coquette</b> a year before		Loney 1978:50 Atlas NSD
21–22 Jan 1874	<b>Tropical Cyclone 'A furious gale'</b>	CQ to all NSW coast	Extensive building damage and new wharf destroyed St Lawrence, 3ft (0.91m) surge Keppel Bay. <b>James Paterson</b> iron barque (387t) aground Masthead Reef (22 Jan), <b>Countess of Belmore</b> schooner badly damaged, <b>Hibernia</b> ketch driven ashore Northwest Island		JC EAC
			21 Jan <b>Florance</b> schooner driven ashore in Northumberland Group, crew reached St Lawrence		NSD Loney
	Gale	Jervis Bay	22 Jan <b>Rose of Australia</b> brig 262t beached in Wreck Bay		NSD
Late Jan 1874	<b>Severe Gale</b>	N to C NSW			
	Gale	North coast	27 Jan <b>Pilot</b> schooner 100t driven ashore near Evans River, crew survived		Loney 1978:50 Atlas
			31 Jan <b>Surprise</b> schooner 90t forced to return in gale and lost Oyster Bank, crew saved		Loney 1978:51
	Heavy gale	Newcastle	1 Feb <b>Yarra</b> schooner 121t driven ashore north beach in heavy gale, crew saved		Loney 1978:51 Atlas, NSD
8–25 Feb 1874	<b>Severe Coral Sea storm and Gale NSW</b>	CQ – all NSW	8 Feb gales NSW coast and from 12 Feb severe storm in Coral Sea		JC
	Severe storm	Central Q	26 Feb <b>Chance</b> schooner returned to Maryborough disabled after 2 week gale in Coral Sea (from 12 Feb), <b>Southern Belle</b> ship (towed into Keppel Bay 5 March) and <b>lo</b> schooner struck SE gales off Percy Is 21 Feb and NE gales off Gladstone 24–25 Feb		JC
	Gale	Jervis Bay	8 Feb <b>Mary</b> brigantine 162t ashore and lost in gale Wreck Bay		Loney Atlas, NSD

			9 Feb <b>Emily</b> schooner 61t lost off Keppel Bay		NSD
			11 Feb <b>West Hartley I</b> schooner 69t lost when wind failed Brunswick R bar		NSD
			11 Feb <b>Australia</b> schooner 124t lost Richmond R bar when tow rope parted		Atlas, NSD Loney 1978:51
			<b>Alice Cameron</b> barque 347t left Newcastle for Manila 11 Feb and disappeared		Atlas, NSD Loney 1978:51
			22 Feb <b>Lismore</b> brigantine 87t Sydney to Cooktown, lost in Northumberland Group		NSD
	Shallow bar?	Bellinger R	10 April <b>Princess Alexandra</b> schooner 51t lost near Bellinger R bar		Loney 1978:51
3–5 May	Gale	C NSW	3 May <b>Traveller</b> schooner 116t lost in Port Stephens when anchor chain broke		NSD, Loney 1978:51 Atlas 22 Nov
	Squall	Newcastle	5 May <b>Mary Lloyd</b> ketch driven ashore and lost in squall at Nobbys Head Hunter R		Loney 1978:51 NSD
Mid May 1874	Severe gale Heavy gale	C to S NSW S NSW coast			
			12 May <b>Corsair</b> brigantine 134t Melbourne to Queensland lost on south NSW coast in heavy gale, crew survived		Atlas Loney NSD
			15 May <b>Wallaby</b> schooner 78t ashore and lost north spit leaving Richmond R bar	Swell to N NSW coast? PH	Loney 1978:51 late May, Atlas, NSD
	Gale	Newcastle	May <b>Velocidade</b> barque 268t lost in gale after leaving Newcastle		Atlas NSD
Mid June	Gale	Manning R	12 June <b>Chance</b> ketch 41t capsized in gale crossing Manning R bar and quickly broke up, crew lost, except master		Atlas, NSD Loney 1978:51 Linton 2004:73
Late June 1874	Gale	C to S NSW			
			21 June <b>Peri</b> schooner anchors failed and lost in Botany Bay		Atlas, NSD Loney
			Around 21 June <b>Lord</b> ketch lost on Nelson Beach, Port Stephens		Loney 1978:51 Atlas, NSD
Late July 1874	Gale	Tasman Sea S NSW			
			25 July <b>Gipsy</b> schooner 44t lost between Sydney and Eden		Atlas, AE
			26 July <b>Eleanor</b> barque 369t left Newcastle (8 July) for Lyttletown NZ, lost Tasman Sea		Atlas, AE
			26 July <b>Clara</b> brigantine 132t lost Nobbys Head when wind failed		NSD
Early Sept	Gale	C NSW			
			6 Sept <b>Esther</b> ketch 37t south of Broken Bay after sails blown out		Atlas Forster NSD
Late Oct	Gale	C NSW			
			26 Oct <b>Edith</b> ketch 33t lost ashore at Seal Rocks when mooring broke		Atlas NSD

	Possibly strong N wind PH		29 Dec <b>Miranda</b> barque 314t lost ashore south side Brunswick R bar, salvaged and lost Brunswick R May 1884?	Not storm PH	Atlas, NSD Denning 1966:50 Byron July 1876
1875					
1875	Telegraph line to coast	Tweed R	Telegraph line to Tweed Heads from Brisbane inland through Nerang		Keats 1999:58
Late Feb	Tropical Cyclone		23 Feb Rockhampton NE gale and heavy rain. 25 Feb wind shifted NE to SE and increased to heavy gale at Hervey Bay		JC
1875			Feb <b>Hector</b> schooner 115t lost between Sydney and Richmond R		NSD
	Heavy weather	Bellinger R	19 Feb <b>Sarah Nicoll</b> schooner 68t sank N of Bellinger R in heavy weather, 5 crew lost		AE, Loney 1978:52 NSD 25 March
	Storm	FNQ	24 Feb <b>Gothenberg</b> steamship 501t lost on reef off Cape Upstart in storm 102 lost, 32 saved		Loney AE
	E gale	Smoky Cape	<b>Annie Ogle</b> brig 210t left Sydney 23 Feb for Clarence R, wreckage found 25 Feb Smoky Cape, 9 crew lost		Loney 1978:53 AE NSD
			Late Feb <b>Lizzie Muir</b> schooner 83t Cook-town to Brisbane disappeared off Q coast		Loney
	Very heavy gale	NSW coast	1 March <b>RMS Brisbane</b> damaged in very heavy gale on voyage from Sydney		JC
28 Feb	Flood	Mary R	8.5m above low water		JC
1 March 1875	Moderate flood	Brisbane R			HCT Not in BoM
1875	Major flood	Manning R			Gill 1998:26
March	Flood	Fitzroy R	8.69m presumed to be limit of flooding possibility		Webster
Late Feb	Beach erosion	Hervey Bay	Western shore of Hervey Bay (Pialba)		JC
15–19 March 1875	<b>St Magnus Gale</b>  Heavy gale 'Hurricane'	SEQ to C NSW	SE gale blowing the previous week [from TC above] and heavy swell continued. Midnight 18 March many vessels could not enter Moreton Bay, barometer 29.7inches [1005hPa], 'hurricane' with very high seas Off Wide Bay 16 March SE gale, 17th heavy E gale lulled 4pm then turned WNW hurricane force. Severe gale along north NSW coast	Eye off Wide Bay, low moving S, off Moreton Bay 18 March PH	Thomson 1967:323 JC Biddle 2001:20
	Heavy seas	Clarence R	12 March <b>Helen Macgregor</b> iron steamer 251t wrecked Clarence R bar in heavy seas, 8 lost		Richards 1996:28 Mack 1998: 7, AE Loney 1978:52 NSD
	Easterly gale	Sandon R	C 15 March <b>Euroka</b> schooner 51t left Richmond R for Sydney 3 days before a heavy gale and lost near Sandon R, crew lost		Loney 1978:52 Biddle 2001:20 AE, Atlas, NSD
	'Hurricane'	Cape Moreton	17 March <b>St Magnus</b> barque 289t from Adelaide anchored under lee of Cape Moreton until forced to sea. Hull sighted off Fraser Is, wreckage found on Inskip Point	Driven north and capsized PH	Loney Thomson 1967:294, 323
			17 March <b>Mona</b> schooner 35t driven ashore and lost Northumberland Island		NSD



	Heavy SE swell	SEQ	17–18 March <i>Young Lady</i> from Rockhampton swept by heavy seas off Wide Bay and could not enter Moreton Bay, seas breaking over vessel		Thomson 1967:323
			19 March <i>Go Ahead</i> ketch 29t lost north spit Manning R bar		Atlas 20 Feb NSD
			March <i>Blackbird</i> steamer 800t lost off NSW coast		Atlas
22 March	Moderate westerly	SEQ	22 March <i>Young Lady</i> left Moreton Bay and passed hull of <i>St Magnus</i> off Fraser Is	End of storm PH	Thomson 1967:323
Early May 1875	Gale	N to C NSW	1 May <i>Victory</i> brigantine 142t lost ashore on north head Richmond R, refloated and lost Nov 1892		Atlas NSD
	Easterly gale	Kiama	2 May <i>Bernard and Isobel</i> ketch 22t lost on rocks Kiama in easterly gale		Atlas, NSD Loney
	Gale	Trial Bay	5 May <i>Commerce</i> schooner 69t driven ashore and lost at Trial Bay in gale		Atlas NSD
	End of gale	Port Stephens	13 May <i>Sea Ripple</i> schooner 126t sheltering in Port Stephens and lost ashore North Head when leaving		NSD Atlas and Loney 1978:52 May
Early June 1875	Gale	Central NSW			
	Gale and enormous seas	Lake Macquarie	5 June <i>P.C.E</i> barque 291t dismasted by enormous waves, went onto rocks and broke up south of Lake Macquarie in gale, one lost		Loney 1978:53 Atlas NSD
Late June 1875	Severe Gale	S to C NSW			
	Heavy seas	Port Stephens	21 June <i>Result</i> fully rigged ship 1140t left Newcastle, forced to shelter at Port Stephens and lost ashore in heavy weather		Loney 1978:53 July Atlas
	ESE gale	Botany Bay	27 June <i>Pioneer</i> steamer 44t lost ashore in ESE gale Botany Bay		Loney NSD
	Heavy gale	Port Stephens	30 June <i>Ben Nevis</i> brig 257t forced to shelter when damaged in heavy seas off S NSW coast and lost on north shore of Port Stephens, crew survived		Loney 1978:53 2 July Atlas NSD
Mid Nov 1875	Gale	NSW	<i>Andrew Fenwick</i> schooner 74t unable to cross Richmond R bar, sheltering Byron Bay with cargo of flour and driven ashore on beach	Big swell from gale to south? PH	NSD, Atlas
Late Dec	Gale	N to C NSW		Two gales	
			Dec <i>Hector</i> schooner 115t left Sydney for Richmond R 3 Dec and disappeared off NSW coast with 6 crew		Loney 1978:54 Atlas AE
			21 Dec <i>Uncle Tom</i> ketch 26t driven ashore and lost near Lake Macquarie		Loney 1978:54 Atlas, NSD
1876					
3 Feb	Gale	N to C NSW	Gale reported by Tweed pilot		Keats 1999:51
			Early Feb <i>Queen</i> ketch 8t beached in SW squall Anna Bay		NSD

17 Feb	Severe gale	FNQ to SEQ	Buildings damaged Townsville and Bowen		JC
			23 Feb <i>Eliza</i> schooner lost on Fraser Island		NSD
			Feb <i>Fairy</i> schooner 36t lost off Mackay		NSD
Feb–March	Bar bound	Manning R	<i>Alexander Newton</i> (new barque)		Linton 2004:49
21 March 1876	Tropical storm	FNQ to C NSW	Heavy gale Townsville		JC
	Storm	Cardwell	21 March <i>Banshee</i> wood steamer 86t lost near Cardwell in storm, 17 lost		Loney NSD
	Gale	Port Stephens	19 March <i>Dart</i> brig 132t Sydney collier probably driven north and lost North Head, Port Stephens		Loney 1978:54 NSD
Late April	Gale	N to C NSW	23 April <i>Susannah Booth</i> schooner 111t lost on Richmond R bar while under tow from steamer <i>Andrew Fenwick</i>		Loney 1978:54 Atlas NSD
	Gale	Broken Bay	28 April <i>Notion</i> brig 160t sank in Broken Bay sheltering from gale		Bateson 1972 Loney, Atlas
Early June	Gale	N to C NSW	6 June <i>Friend in Need</i> ketch 12t lost North Head, Sydney Harbour		Atlas NSD
	Gale	Clarence R	6 June <i>Mary Ann Christina</i> schooner 41t lost on N beach entering Clarence R in gale		Atlas, NSD Loney 1978:54
			8 June <i>Tierpan</i> barque 222t sprang a leak, abandoned off N NSW coast, crew survived		Loney 1978:54
	Heavy seas	Camden haven	<i>Princess Marie</i> ketch 66t aground north spit Camden Haven since 11 May. Salvaged but broke up in later heavy seas		Loney 1978:54 lost 11 April Atlas NSD 11 May
14–20 July 1876	ECL	SEQ to C NSW coast	14 July Very heavy gale off Moreton Bay, 18–20 July heavy gales with high seas on NSW coast, heavy rain and floods SEQ to N NSW		JC
			July <i>Margaret and Jane</i> schooner 51t probably lost off Wide Bay		NSD
	Gale	Seal Rocks	15 July <i>Acme</i> schooner 55t driven ashore and lost Seal Rocks Bay in gale		Atlas, NSD Loney 1978:55
			15 July <i>Hoolet</i> ketch 32t dragged anchors and lost sheltering Seal Rocks Bay, crew rescued		Atlas Loney 1978:55 NSD
	Gale	Seal Rocks	16 July <i>Flirt</i> schooner 34t sheltering in Seal Rocks Bay and abandoned in heavy weather		Atlas, NSD Loney 1978:55
			20 July <i>Blackwall</i> wood steamer 66t lost on reef Shellharbour when anchor dragged		Atlas NSD
			22 July <i>Isabella</i> brig driven ashore on north beach Port Stephens, refloated		Atlas NSD
	Flood	Clarence R	Disastrous flood and loss of life Grafton		JC
Late July	Gale	Central NSW		Second gale PH	

1876	Rough seas	Port Stephens	25 July <b>Ann</b> barquentine 277t swamped and driven ashore by rough sea off Port Stephens, 10 crew lost		AE, Atlas, NSD Herald 22 July Loney <i>Anne</i>
	Rising sea	Forster	25 July <b>Oberon</b> ketch 40t lost at Forster in rising seas		Loney 1978:55 NSD
July	<b>Bar narrow</b>	Tweed R bar	Entrance is very dangerous and narrow		Longhurst 1996:39
11 Sept 1876	<b>DANDENONG GALE</b>	Whole NSW coast	Wind speed 240km/hr		Berry 1994:77
			6 Sept <b>Village Maid</b> ketch 11t lost Lake Macquarie entrance in gale		Atlas NSD
			6 Sept <b>Coomba</b> ketch 52t lost North Spit Manning R in <i>Dandenong Gale</i>		Atlas, NSD Aug Loney 1978:58 1877
			Early Sept <b>Lillian</b> ketch 33t ashore after anchor chain broke Port Stephens, refloated		Atlas, NSD Loney 1978:56
			10 Sept <b>Brothers</b> ketch 18t ashore and lost in heavy weather Brisbane Water		Atlas NSD
	Gale	Broken Bay	10 Sept <b>Industry</b> ketch 19t lost ashore sheltering in gale Broken Bay		Loney 1978:54, Atlas NSD, Bateson 1972
	Heavy gale	South NSW	11 Sept <b>Dandenong</b> steamer 743t sank off Jervis Bay, when prop shaft broke in a very heavy gale, 40 lost		AE, NSD Loney Atlas
	Heavy weather	Cape Hawke	11 Sept <b>Kate</b> ketch 28t beached in heavy weather south of Cape Hawke		Loney Atlas, NSD
			11 Sept <b>Sea Gull</b> ketch 14t lost off Newcastle		NSD
			11 Sept <b>Hawke</b> ketch 27t lost on North Head Port Stephens		Atlas NSD
	Storm and heavy seas	Byron Bay	14 Sept <b>William</b> brigantine 188t sailing north for timber, sheltering in Byron Bay, driven ashore and lost in storm		Atlas, NSD Loney 1978:55 11 Sept
			20 Sept Hull of <b>Atlantic</b> schooner 72t from Richmond R found off Newcastle, crew lost	End storm PH	AE Loney 1978:56
	<b>Storm erosion face</b>	Sydney	Seaward of 1857 face but landward of the later 1889 and 1912 erosion faces		Andrews 1916 in Chapman and others 1982:125
Late Nov 1876	<b>Gale</b>	C NSW	Late Nov <b>Peterborough Lass</b> ketch 35t left Sydney and disappeared off Seal Rocks		Atlas, NSD, Loney 1978:56 Early 1877
	Gale	Seal Rocks	28 Nov <b>Emily Ann</b> ketch 38t sheltering in Seal Rocks Bay. A wind change forced shelter in Camden Haven and lost on bar		Loney 1978:55 Finkel 1987:37
<b>1877</b>					
Early Jan 1877	<b>Tropical Storm</b>	Q to N NSW			
			Jan <b>Burton Stather</b> barque 422t disappeared Sydney to China		NSD AE
			13 Jan <b>Pioneer</b> ketch 73t lost Tweed R bar 'winds strong and squally, break on bar ... wind changed suddenly from SE to S ... went on the rocks'		Atlas NSD Keats 1999: 52, 95

			13 Jan <b>Samuel Merrit</b> barque 259t lost ashore on north spit Richmond R bar		Atlas, NSD Loney 1978:58
28 April	Gale	Port Stephens	<b>Morning Star</b> ketch 25t ran ashore and lost in Port Stephens in SE gale		Loney 1978:56, NSD, Atlas 2 May
Mid May 1877	Gale	C NSW Terrigal	12 May <b>Rose</b> ketch 11t lost in gale near Terrigal, 2 lost		Bateson 1972, Atlas, NSD, Loney 1978:56 Herald 12 April
	Gale	Broken Bay	14 May <b>Resolute</b> schooner 64t from Richmond R and ashore West Head Broken Bay. Refloated and driven ashore Crowdy Bay June 1879		Loney 1978:56 NSD
Late May 1877	Gale	N NSW	21 May <b>Banda</b> barque 481t lost Brampton Shoal		NSD
			23 May <b>Milton Badger</b> schooner 185t lost on south spit leaving Macleay Heads		Loney 1978:57 Atlas, NSD
			May <b>Perseverance</b> brigantine 133t sheltering Port Stephens and lost leaving		Loney 1978:57 Atlas, NSD
	Shallow bar	Nambucca R	18 June <b>Thomas and Henry</b> schooner 55t aground and lost on the Nambucca R bar		Loney 1978:57 Atlas
	Shallow bar?	Noosa R	Early July <b>Bonita</b> schooner wrecked on north spit Noosa R bar after attempting to cross bar at low water		Loney NSD
	Shallow bar?	Camden Haven	5 July <b>Alice</b> ketch 24t lost on north spit Camden Haven bar when wind failed		Loney NSD
11–15 July 1877	<b>YARRA YARRA GALE</b>	C NSW	Severe gale		
			11 July <b>James Afflick</b> cutter 8t driven ashore and lost Port Hacking	Start of gale PH	Atlas Loney
	Heavy seas	Newcastle	15 July <b>Yarra Yarra</b> iron paddle steamer 555t left Newcastle in gale and lost on Oyster Bank in heavy seas attempting to return to port, 18 lost		AE Loney 1978:57 Atlas NSD
	Gale	Port Stephens	Mid July <b>Caledonia</b> schooner 45t sheltering in Port Stephens dragged anchors and lost ashore in gale		Loney 1978:57
August	Gale	NSW		Low to south PH	
	Heavy sea	Tweed R	<b>Settlers Friend</b> schooner 65t lost Tweed R bar. 17 Aug 'Heavy break on bar' and on 19 Aug 'big sea running'		NSD, Keats 1999:52, 213 (pilots log), Loney and Atlas March 1878
Early Sept	Gale	C NSW		Possibly severe gale? PH	
			3 Sept <b>Vine</b> schooner 50t lost at Seal Rocks		Loney 1978:58, Atlas, NSD
	Heavy weather	Terrigal	8 Sept <b>Lord Ashley</b> iron steamer 435t lost ashore in heavy weather Terrigal		Bateson 1972, Atlas NSD, Loney 1978:58

			14 Sept <b>Caroline</b> ketch 36t ashore in squally weather Seal Rocks		Loney 1978:58 Atlas, NSD
Late Oct	Gale	SEQ to N NSW			
			27 Oct <b>Adela</b> barquentine 353t lost Richmond River		Atlas
	Rough Sea	Pt Danger	30 Oct 'Steamer ... in (Danger) Bay ... could not board her too much break on'		Keats 1999:44
	Gale	Tas	22 Oct <b>Trial</b> cutter sank at moorings in gale, west coast		EAS
Early Dec	Gale	C NSW			
	Heavy weather	Port Stephens	4 Dec <b>Florence Irving</b> iron steamer 920t Sydney to Brisbane struck rocks off Port Stephens in heavy weather, all survived		Loney 1978:58 626t Atlas, NSD
			4 Dec <b>Colleen Bawn</b> ketch 27t left Port Stephens for Sydney and disappeared		Loney 1978:58 Atlas, NSD
			Early Dec <b>Zoe</b> schooner lost south spit Nambucca R		NSD
1878					
			Telegraph line to Bustard Head light opened 27 Feb 1878		Buchanan 1999:37
	Bushfires in Victoria		14 Jan 1878 <b>Jane Spiers</b> hit reef due to bushfire smoke off Victorian coast		Loney
Mid Jan	Tropical Storm	CQ			
			13 Jan <b>African Maid</b> brigantine lost at St Lawrence		NSD
Late Jan	Tropical Storm?	CQ to C NSW			
			19 Jan <b>Alchymist</b> wood paddle steamer 54t lost on beach 6nm N of Woody Head		Loney 1978:59, Atlas, Olivieri 1999 NSD 19 Feb
			21 Jan <b>Numba</b> ketch 43t left Port Stephens sprang a leak and sank off Morna Pt		Loney 1978:59 NSD
			28 Jan <b>Western Star</b> brig 179t lost on Brampton Reef crew reached Mackay		NSD
			31 Jan <b>Undine</b> 79t drifted onto rocks north head Nambucca R	Swell? PH	Loney Atlas, NSD
Early Feb	Storm	S NSW			
1878			11 Feb <b>Ellen</b> schooner beached Tathra during storm		Loney Atlas, NSD
Late Feb	Gale?				
			21 Feb <b>Octoroon</b> schooner 52t sprang a leak and sank off Crowdy Head, crew survived		NSD, Loney <i>Octoroon</i> Finkel 1987:39
			22 Feb <b>Star of the Seas</b> schooner 59t drifted onto south spit Brunswick R bar when wind failed	May have been swell? PH	Brokenshire 1988:7 PWD1978:113, Loney

Early March	<b>Tropical Cyclone</b>	FNQ	8 March Buildings damaged and small vessels <i>Louise</i> and <i>Hector Miss</i> lost Cairns		JC
	Gale	Cairns	8 March <i>Kate Conley</i> barque 154t last seen off Cairns during gale. Wreckage found 2 years later 600km N in Temple Bay		Loney AE NSD
	Gale	Cardwell	8 March <i>Princess</i> lost ashore in gale near Cardwell		Loney
			9 March <i>Merchant</i> wooden ship 1059t Mossman R to Melbourne disappeared in cyclone, wreckage ashore Hinchinbrook Is		Loney NSD EAS
18 March 1878	<b>Heavy seas?</b>	Fraser Is	<i>Ottawa</i> schooner 51t ashore S of Indian Head, Fraser Is and broke up rapidly	Possible tropical storm to north PH	Loney, NSD Williams 1982:129
April 1878	<b>Gale?</b>	C NSW			
			Early April <i>Sea Spray</i> brig 296t leaking and abandoned south of Botany Bay		Loney Atlas, NSD
			April <i>Violet</i> ketch 37t aground Brisbane Water bar, refloated		Atlas NSD
Mid May	<b>Gale</b>				
	Heavy seas	Broken Bay	20 May <i>Dolly Walmsley</i> ketch aground on Brisbane Water bar, refloated and lost May 1894		Loney
Early June 1878	<b>Severe gale</b>	SEQ to C NSW	3 June Unprecedented heavy gale SEQ	Possibly two storms PH	JC
	Gale	Crowdy Head	9 June <i>Laura</i> ketch 30t lost in gale Crowdy Head		Loney 1978:59 Loney, NSD
			9 June <i>Bismark</i> schooner 74t lost on Nambucca R bar		Atlas NSD
			9 June <i>Wallace and Bruce</i> schooner 103t left Richmond R for Sydney with timber and disappeared		Atlas Loney 1978:60 NSD
			10 June <i>Lillian</i> ketch ashore at Nelson Bay, Port Stephens, refloated and lost June 1882		Loney 1978:59
Mid July 1878	<b>Four day gale</b>	NSW coast	Solitary Islands Lighthouse under construction and around Mid July, first supply steamer <i>James Comrie</i> forced to run to Trial Bay and shelter for 4 days		Yeates 1990:38
	SW gale	Broken Bay	10 July <i>Pea Hen</i> ketch 17t lost ashore Broken Bay in SW gale	Low in south Tasman Sea PH	Atlas, NSD Loney 1978:60
c.Aug?	<b>Gale</b>	Coffs Harbour	Solitary Islands Lighthouse under construction. Second supply ship <i>Eagle</i> forced to shelter behind Coffs Island		Yeates 1990:38
Sept 1878	<b>Succession of gales</b>	SEQ to C NSW			
			Early Sept <i>Sea Gull</i> ketch 14t lost near Nobbys Head		NSD

			15 Sept <b>Onward</b> barque 286t lost Brampton Shoal. Most crew reached coast in boats		Loney, NSD AE most crew lost
			16 Sept <b>Agnes</b> schooner 110t lost Capricorn Group		Loney NSD
			Sept <b>Atlantic</b> barque 260t beached Trial Bay after springing a leak, crew saved		Loney 1978:60 Loney
			25 Sept <b>Mary Grant</b> brig 138t leaking and beached north of Newcastle		Atlas, NSD Loney 1978:60
Early – mid Oct	Gales?	C NSW	3 Oct <b>Rebecca</b> brigantine 115t heavy southerly squall blew out sails and drifted onto reef Broken Bay, crew rescued by steamer <i>Ballina</i>		Loney 1978:60 Atlas, NSD
			10 Oct <b>Waldenses</b> ketch 50t lost Camden Haven entrance in squall		NSD Loney 1978:60
			12 Oct <b>Will Watch</b> ketch 23t capsized in squall off Sydney Heads. Crew rescued by steamer <i>Ballina</i>		NSD Loney 1978:60 late Oct
Late 1878	Gale		Solitary Islands Lighthouse under construction. Mooring buoy washed away		Yeates 1990:38
			27 Dec <b>La Perouse</b> schooner 113t Clarence R to NZ with ironbark girders and lost off Clarence R		Mack 1998:7 Atlas, NSD
1879					
Early Jan	Tropical Storm?	Coral Sea	8 Jan <b>Wolverine</b> brig 207t lost in a gale Wreck Reef, 10 crew lost		NSD
Mid Jan	Tropical storm?	CQ			
			13 Jan <b>African Maid</b> brig 143t lost near jetty at St Lawrence		Loney NSD
			19 Jan <b>Scottish Bard</b> barque lost on Swains Reef		NSD
Mid Feb	Tropical storm?	Coral to Tasman Seas			
	Heavy Seas	Port Macquarie	14 Feb <b>Ballina</b> iron paddle steamer 253t lost on bar leaving Hastings R. Heavy seas for several days and weather deteriorated on night of 14 Feb. Wreck discovered during extensions to north breakwater	Capt Bedford knew coast well but heavy seas may have shifted sand bar PH	Richards 1996:9 Loney 1978:61 Moyes and Mant 1993:38
	Gale	Cape Hawke	14 Feb <b>Raymond</b> brig 399t sprang a leak and beached Cape Hawke in gale		NSD
			Feb <b>Queensland</b> barquentine 414t Newcastle for Auckland lost (18 Feb) Tasman Sea		Atlas NSD EAS
Early April	Heavy swell?	Bellinger R	4 April <b>Eva Maude</b> ketch 55t struck bar and lost Bellinger R		Atlas, NSD Loney 1978:6, 1 March
Early April	Fresh	Tweed R	Rain period in Tweed valley		Keats 1999: 45

Early May	Gale	C NSW	4 May <b>Margaret Chessel</b> schooner 65t dragged anchor and lost ashore in gale north beach Newcastle		NSD
15 May	Very heavy gale	SEQ	Very heavy gale and heavy rain		JC
May 1879	Inshore sand Splendid sandy beach	Gold Coast	May 1879 members of the Tallebudgera cricket team played Tweed and rode along 'the splendid sandy beach' past the <i>Coolangatta</i> wreck 'embedded in the sand'. Wreck remained a <b>landmark</b> on the beach until 1885. Tweed R 'is bar bound and very shallow in most places'		Longhurst 1996: 24–26, 43
June 1879	Storm	N NSW			
	Storm	Brunswick R	7 June <b>Titanic</b> ketch 51t sailing in ballast to Brunswick R 'overtaken by storm which split her sails ...sprang a leak ... became a total loss while attempting to cross bar'		Brokenshire 1988: 7 Atlas 7 June Loney 1978:61 <i>Titania</i> , NSD
			7 June <b>Tidal Wave</b> brigantine 98t lost at Richmond R entrance		Atlas, NSD Loney 1978:61
	Gale	Port Stephens	11 June <b>Chance</b> cutter 22 badly damaged and abandoned in gale off Port Stephens, crew rescued		Loney 1978:61 NSD 17 June
Mid June	Gale?	Newcastle	18 June <b>Lovet Peacock</b> schooner 309t with cedar from FNQ, lost when anchor chain broke, Oyster Bank, 1 lost		NSD EAS
24–27 June 1879	Severe Gale	SEQ to mid NSW	24 June Thunderstorm developed into 'cyclone' 27 June with great damage		JC
			24 June <b>Ellen</b> schooner 90t lost at Trial Bay		Atlas, NSD
	Easterly gale	Crowdy Bay	24 June <b>Resolute</b> schooner ashore in easterly gale Crowdy Bay, all saved		Linton 2004:69, Atlas, NSD, Loney 1978:61, Finkel 1987:40
Early Aug	Very severe storm	Coffs Harbour	8 Aug Nobbys 169mm record daily Aug rainfall. Solitary Islands Lighthouse under construction 'during an easterly <b>hurricane</b> the water washed clean over the centre of the island' (about 25m high). Crane and landing washed away and cement shed 'blown away'		JC Yeates 1990:38
Late Aug	Gale	SEQ to N NSW			
	Gale	Byron Bay	28 Aug <b>Inglis</b> brigantine 99t surf loading timber near Brunswick River and driven ashore and lost in gale Byron Bay		Loney 1978:62, Atlas NSD, Denning 1966:50 23 Aug
30 Aug 1879	Minor Flood	Brisbane R	Baths washed away. Floods in other SEQ rivers		BoM JC
Early Sept 1879	Gale	S NSW	10 Sept Sydney City 144mm, record Sept daily rainfall recorded		JC
			9 Sept <b>Bertha</b> schooner 64t driven ashore and broke up in gale Shellharbour		Loney Atlas, NSD



	Gale	Illawarra	9 Sept <b>Franz</b> schooner 148t lost in easterly gale Shellharbour		Atlas Loney, NSD
Early Oct	Gale	CQ – M NSW			
			3 Oct <b>Charlotte Andrews</b> barque 356t dragged anchor and lost in gale Ramsay Bay, Hinchinbrook Is		NSD EAS 6 Oct
			4 Oct <b>Eliza Davis</b> ketch 25t driven ashore in squall south of Manning R		NSD
Mid Oct	Gale?	SEQ to C NSW			
			13 Oct <b>Amy</b> ketch 26t capsized and lost on Manning R bar, crew saved	Rough seas? PH	NSD, EAS, Loney 1978:62 21 Sept
19 Oct	Minor Flood	Brisbane R		Not in BoM PH	HCT
Mid Nov	Gale?	C to S NSW			
Nov 1879			17 Nov <b>Lillian</b> ketch 33t capsized in squall off Newcastle, one lost, refloated		Loney 1978:62 NSD
			19 Nov <b>Emily Miller</b> ketch 28t lost ashore Batemans Bay when wind failed		Atlas, NSD Loney
Late Dec 1879	Gale	NSW coast			
			21 Dec <b>Bronzewing</b> schooner 42t sheltering in Port Macquarie and lost when leaving		Atlas, NSD Loney 1978:62 Finkel 1987:37
			21 Dec <b>Adelphoi</b> barquentine 359t struck reef and abandoned off Port Hacking		Loney NSD
	Bigs Seas	Macleay R	26 Dec <b>Agnes Irving</b> iron paddle steamer 431t struck by big sea crossing bar at low tide, driven onto south spit of entrance (then Grassy Head), Macleay River, all survived	New entrance, 10km south formed in 1893 PH	Richards 1996:1, 8 Mack 1998:8 Loney 1978:62 27 Dec, NSD 28 Dec
	Gale	Illawarra	28 Dec <b>Margaret</b> ketch 107t lost near Kiama in gale		Loney, NSD Atlas
1880					
1880's	Shifting Bar	Richmond R	Sand bars at the entrance to the Richmond R moved across 6 000ft [1.8km] sculpturing mazes of channels. Regular dredging from 1878. Floods broke through the southern sand spit 4 times between 1870 to 1890 'so that the channel mouth, as cut by the flood, would become the entrance for shipping; and this new channel would generally work northward, owing to the littoral drift and the prevailing strong winds, until it reached North Head, when a similar action would probably occur at the next heavy flood'. 1889 entrance completely blocked and PWC ordered work to start immediately on the inner training walls recommended by Sir John Coode	Flood breaches 1870, 1880, 1887 and 1889 [or 1890] PH	Coltheart 1997:58–59
c1880	Shallow bar	Brunswick R bar	Small inn established on north bank to cater for travellers along the beach waiting to cross the river 'on the low tide'		Mills 2000:18

1880s	<b>Storm Surges</b>	Southport Bar	Ocean waves across bar at Southport. Wall constructed at Marine Parade. Suggests erosion throughout 1880's	Storm surges during 1880's	Salter 2002: 84
Early Jan	<b>Tropical Storm?</b>	FNQ to CQ			
1880	Gale	Bustard Head	10 Jan <b>Scottish Knight</b> iron barque struck Breaksea Spit. Badly leaking, beached at the entrance to Boyne River		NSD Buchanan 1999:39
			12 Jan <b>Hopeful</b> barquentine 216t driven ashore and wrecked Cardwell		Loney NSD, EAS
	Gale	Hinchinbrook Is	12 Jan <b>Belle</b> brigantine 198t lost Ramsay Bay Hinchinbrook Is in gale, salvaging <b>Merchant</b> lost March 1878		NSD Loney 26 Jan
March	<b>Shallow bar</b>	Maroochy R	7 March <b>Agnes</b> steamer 57t struck Maroochy R bar and lost on rocks		NSD
13 March	<b>Gale</b>	NSW coast			
1880	Gale	Seal Rocks	13 March <b>Myall</b> schooner 38t sprang a leak and lost in gale off Seal Rocks, crew survived		Loney 1978:62 NSD Atlas 11 March
			13 March <b>Nambucca</b> schooner 55t ashore Brunswick R bar when wind failed		NSD, Atlas, Broken-shire 1988:7, Loney 1978:62 late March
Early May	<b>Bar bound</b>	Tweed R	5 schooners bar bound		Longhurst 1996:48
May	<b>Gale</b>	N – C NSW	Possibly severe gale crossing north Tasman Sea? PH		
1880	Heavy sea	Richmond R	5 May <b>Sisters</b> schooner 37t ashore north spit entering Richmond R in heavy sea		Loney Atlas, NSD
			7 May <b>Edith Keep</b> brigantine 100t from Sydney to Richmond R, lost off north coast		Loney 1978:63 Atlas, NSD
	Squall	Newcastle	9 May <b>Sea Bird</b> ketch 23t capsized off ashore and lost Bird Is in squall		Bateson 1972, NSD Loney, Atlas
			13 May <b>Noumea</b> schooner 142t lost on Saumarez Reef with Kanakas for 'labour trade'		NSD
Mid to late June	<b>Gale</b>	N to CNSW		Possibly two events in June PH	
1880			13 June <b>Kate</b> iron steam tug 49t ashore and lost north beach Bellinger R towing ketch to sea		Loney 1978:63 Atlas NSD
			June <b>Dunedin</b> steamer lost Clarence R entrance		Mack 1998:7 Loney, Atlas
			19 June <b>Emmeline</b> ketch 43t lost ashore Port Macquarie when wind failed	Big swell? PH	Loney 1978:63 Atlas, NSD
	Giant waves	Clarence R	20 June <b>Wanganui</b> steamship 221t hit reef Clarence R heads and swept by giant waves, 2 lost, survivors rescued		Loney 1978:63 Atlas NSD

	First entry NSW storm record		Compiled storm record 1880 to 1980 prepared for NSW Public Works in 1985. Storm influence on coast assessed in categories (X, A, B, C), based on wave heights for the north, mid-north, central and south coasts of NSW	See introductory notes PH	BB
c27–28 Sept 1880	Severe gale Tasman Low?	N to C NSW	Heavy seas Newcastle, wind 50kts, three schooners left Sydney for N NSW coast and disappeared in severe gale	Cat B C NSW Shipping losses suggests this event was longer, more severe with impacts further N than assessed by BB PH	BB Loney 1978:63
			Late Sept <i>Minnie Lowe</i> schooner 75t left Sydney for north NSW and disappeared in severe gale		Loney Atlas NSD
	Severe gale	Port Macquarie	<i>Naomi</i> schooner 72t left Sydney for N NSW coast and disappeared. Last seen off Port Macquarie 26 Sept in severe gale		Loney Atlas NSD
	Severe gale		Sept <i>Lucy Ravel</i> ketch 79t lost off C NSW coast. Left Sydney for north NSW coast and disappeared in severe gale		Loney Atlas NSD
	Severe gale	Newcastle	28 Sept <i>Susannah Godeffroy</i> ship 1170t beached and broke up in severe gale north of Newcastle. Bound for Yokohama with coal, 8 crew lost, 13 saved		AE Loney 1978:63 NSD <i>Susanne Godeffroy</i>
Early Nov	Gale	All NSW			
	Heavy seas	Tweed R	5 Nov 'Break on bar' Tweed bar	Not in BB PH	Keats 1999:66
	Gale	S NSW	Early Nov <i>Lady Darling</i> iron steamer 895t Newcastle to Melbourne, lost in gale off Montague Is	Not in BB PH	NSD
1881					
			From 1881 to 1920 the compiled storm record and historic records are compared PH		
14–15 Jan 1881	TC	Mid N to S NSW	Low from N Tasman Sea, S/SE wind	Cat A/B C – S NSW	BB
			20 Jan <i>Collaroy</i> iron paddle steamer ashore on Collaroy Beach. Refloated 3 years later and lost California 1889	Photo	Callen 1986:65 NSD 1887
5–8 Feb	Low (in S Tasman?)	C – S NSW	Rough seas S coast	Cat B S NSW	BB
26–29 March	TC	SEQ to M NSW	TC north of Brisbane	Cat A/B N – M NSW	BB
			31 March <i>Diamantina</i> iron paddle steamer 285t stranded and wrecked Manning R bar, later salvaged		Atlas, NSD, Loney Richards 1996:28,160
29 April – 1 May	Heavy Seas		Heavy break on Tweed Bar	Cat C/B S NSW	Keats 1999:66 BB

20 May	Gale		20 May <i>Ocean Bride</i> schooner 88t aground and lost Richmond R while under tow during a gale	Not in BB PH	NSD Loney Atlas
23 May	Heavy weather		23 May <i>Metaris</i> barquentine 244t abandoned and lost off Port Macquarie in heavy weather		Atlas, Finkel 1987:38 1881
12–15 July	Tasman Low?	C – S NSW	SW – SE wind 45kts, heavy seas	Cat B C–S NSW	BB
23–25 Aug	Low N Tasman	M–S NSW	Very rough seas	Cat A/B most NSW	BB
22–24 Sept	Tasman Low	All NSW	Low moving S	Cat B C – S NSW	BB
	Westerly gale and heavy sea	Tweed R bar	23 Sept <i>True Blue</i> schooner 49t wrecked Tweed bar 'wind NW fresh, then gale from WNW to W, break on bar ... [grounding on spit] ... waves breaking over her [and on 26] ... heavy sea on bar, <i>True Blue</i> broke up before noon'	Swell from low to S PH	Longhurst 1996:48 NSD Keats 1999:95
			23 Sept <i>Jessie Spears</i> ketch 38t ashore and lost Camden Haven bar		Loney, Atlas, NSD Finkel 1987:40
	Gale	Seal Rocks	Sept <i>Prince Victor</i> barquentine 294t abandoned off Seal Rocks in gale		Atlas NSD
18–20 Oct 1881	Low	C to S NSW	Low moved off S coast	More intense and impacts further N than BB PH	BB
	Gale	Newcastle	18 Oct <i>Ben</i> ketch 12t lost in gale off Newcastle		Loney Atlas, NSD
	Heavy gale	S NSW	Oct <i>Balclutha</i> steam ship 456t lost in heavy gale off S NSW coast, 22 crew lost		AE
	Severe gale	Cape Howe	21 Oct <i>Glimpse</i> barque 335t abandoned 400km off Cape Howe in severe gale		Loney Atlas, NSD
			Late Oct <i>School Boy</i> barque 160t lost and wreckage ashore near Port Stephens		Loney Atlas, NSD
			Late Oct <i>Ombar</i> ship 870t lost off Newcastle, wreckage ashore Botany Bay		Loney, Atlas NSD <i>Omba</i>
1882					
2 Feb	Tropical Cyclone	Cardwell	Considerable wind damage, houses destroyed many unroofed. Ships sheltering to south. Vessels damaged: <i>Victory, Gunga and Kent</i>		JC
9 March 1882	Gale	CQ	9 March <i>Lady Belmore</i> brig 254t driven ashore in gale Mackay		NSD Loney
Late March	Gale	Bass Strait	Salvage of <i>Bulli</i> (lost Kent Group June 1877) abandoned after gale		EAS
29 March	Squall	Sydney	29 March <i>Prima Donna</i> schooner 85t capsized off Sydney in squall, 6 lost, 1 survivor		Loney, Atlas NSD
20–22 May	Low	SEQ – M NSW	37kt Yamba and heavy seas	Cat B N–M NSW	BB

Late May	<b>Gale?</b>	M – S NSW	Low south of Sydney?	Not in BB PH	
			27 May <b>Rocket</b> steamer 23t lost ashore Macleay R bar		Loney Atlas, NSD
			28 May <b>Helen White</b> barque 285t left Newcastle for Adelaide and disappeared		Loney Atlas
9–10 June	<b>Heavy Seas</b>	SEQ – M NSW		<b>Cat A N–M NSW</b>	BB
			June <b>Terranora</b> could not enter Tweed R bar		Longhurst 1996:48
			13 June <b>Lillian</b> ketch 33t beached ashore and lost Batemans Bay		NSD
18 Oct	<b>Heavy seas</b>	Tweed R bar	Bar too rough to cross		Keats 1999: 68
20 Oct	<b>Local flood</b>	Brisbane R			BoM
24 Oct – 1 Nov	<b>Severe Low</b>	SEQ – S NSW	SE–S wind to 61kts, heavy seas	<b>Cat A C–S NSW</b>	BB
	Heavy sea	Sydney	28 Oct <b>Woniora</b> steamer 250t sank in heavy sea off Botany Bay, 15 lost, 1 survived. The worst conditions seen by the surviving seaman after 7 years on Australian coast		Loney Atlas NSD Gleeson 1993:10
Early Dec	<b>Gale</b>	S NSW		Not in BB PH	
			9 Dec <b>Plutus</b> steam ship 1259t ashore on beach near Shoalhaven Heads, all survived		Loney Atlas, NSD
	Gale	Ulladulla	9 Dec <b>Alfred Edward</b> ketch 34t driven ashore Ulladulla in gale, all survived		Loney Atlas, NSD
Late Dec	<b>Gale</b>		Low to south? PH	Not in BB PH	
1882	Heavy seas breaking right across bar	Clarence R bar	27 Dec <b>New England</b> steamer 359t ashore and lost in heavy seas crossing out of Clarence R bar on ebb tide, 11 passengers and crew lost	Shifting bar and ebb tide? PH	Loney Atlas NSD Mack 1998:7
1883					
4–8 Jan 1883	<b>TC?</b>	Q – S NSW	SE wind over 40kts and heavy seas	<b>Cat A N–M NSW</b>	BB
	Southerly gale	Richmond R bar	12 Jan <b>Francis Hixson</b> paddle steamer 156t driven ashore and lost on Richmond R bar attempting to assist steamer <b>Platypus</b>		NSD Atlas Loney 17 Jan
4–8 Feb	<b>TC</b> Coral Sea	Q – all NSW	Gales and heavy sea. Steamer sheltered in Coffs Harbour for 5 days	<b>Cat A all NSW</b>	BB Yeates 1990:35
Late March–April	<b>Gale?</b>	SEQ – C NSW		Not in BB PH	
1883	Strong Easterly		27 March <b>Cleveland</b> cutter 38t Brisbane to Gladstone, lost south of Double Island Point in strong E wind	Low CQ PH	NSD Loney 17 March

			1 April <b>Colleen Dhas</b> schooner 103t ashore and lost Richmond R bar while under tow. <b>J and T Fenwick</b> steam tug 26t also lost		Loney NSD
			3 April <b>Alexandra</b> paddle steamer 27t sank off Broken Bay while under tow		Atlas NSD
16–17 April	Gale	N – C NSW	Long fetch and very heavy seas	Cat B N NSW	BB
24–25 April	Tasman Low	C S NSW	Heavy seas S coast wind 36–48kts	Cat B S NSW	BB
10–14 May	Tasman Low	Whole coast		Cat A/B all NSW	BB
			8 May <b>Coquette</b> schooner 214t lost on Richmond R bar	Start of gale? PH	Atlas NSD
			15 May <b>Sea Breeze</b> ketch 57t lost at north head Botany Bay in heavy swell		Atlas, NSD Loney
22–24 May	ECL	NSW	SE–S with heavy seas	Cat B M–C NSW	BB
Before July 1883	Storm erosion face	Byron Bay	Capt. F Howard commences hydrographic survey of Byron Bay (July to Oct). Severe erosion Byron Bay prior to July 1883 resulting in a storm cut face and lost fore dunes	The flat raised beach described by Howard is typical beach/dune rebuilding profile after storm erosion PH	Howard 1884
4 July	Gale	C NSW	<b>Bell</b> brigantine 95t ashore and lost in southerly gale Cape Hawke	Not in BB PH	Atlas NSD
23–25 July	Tasman Low	SEQ – C NSW	Low off M NSW and heavy seas N of Newcastle	Cat A/B N–M NSW	BB
			22 July <b>Deutschland</b> barque (German) 833t ashore Masthead Reef GBR. Broke up in gale on 29 Sept 1883	Low moved S? PH	Loney NSD
August 1883	Volcanic Eruption Krakatau	Indonesia	Second largest historic eruption. World-wide unseasonal cool weather and brilliant sunsets		Johnson 1993
Sept 1883	Beaches used for travel		Between April and Sept 1883 surveyor Henry Schneider prepared a plan of Point Danger. Notes the 'The Cut Hill' (Kirra) and that the only access on the Queensland side of the boarder 'is along the coast'		Longhurst 1996:49, 50
	Wreck of <b>Coolangatta</b>		Wreck remained a <b>landmark</b> on the beach from 1846 until 1885. In 1883 Schneider named the new township and creek after the wreck	Ribs exposed by erosion in 1936 and early 1970's	Longhurst 1996: 24– 26, 43
Aug – Sept 1883	Coastal wetlands dried up	Byron Bay	Late 1883 dry, N winds, black nor'easters with heavy seas. <b>SS Rode</b> anchored in Byron Bay during northerly	El Nino conditions? PH	Howard 1884

1883–4	<b>Drought years</b>	Maryborough	On coast only mid to late 1883 PH		Maryborough 1998
Sept	Calm weather	Coral Sea	9 Sept <i>Ceres</i> barque 454t lost on Brampton Reef. Survivors rescued by <i>Marioness of Lorne</i> and a boat reached Mackay	Not severe weather PH	Loney NSD
28–29 Sept	<b>Gale</b>	CQ – all NSW	SSE wind and heavy seas south of Clarence R	<b>Cat B C NSW</b>	BB
	Gale	S GBR	29 Sept <i>Deutschland</i> aground on Masthead Reef since 22 July, broke up in gale	Gale S GBR suggests storm more intense and influence further north than BB PH	Loney
Oct 1883	Rough Seas	Coral Sea	31 Oct <i>Ramsay</i> barque 821t aground Elizabeth reef. 2 boats reached coast in rough sea 11 lost		NSD EAS
Oct	Ample inshore sand	Byron Bay	At the end of Howard's survey, storm bar had moved back to beach, Belongil Spit was maintained 1.2km north of present mouth		Howard 1884
<b>1884</b>					
1884			Double Island Point Lighthouse constructed		Brown 2000:181
	<b>Erosion year</b>		Stormy and wet year inferred from Belongil Spit erosion PH		
1884	<b>Bar navigation</b>	Clarence R	From 1881 conditions at the entrance was very bad and it was widely assumed that the construction of the breakwaters was making the problem worse. Walter Shellshear challenged Moriarty's design and proposed different solutions for the Richmond, Clarence and Hastings R that overcame the problems of sand movement by trying to understand the process and designing works causing sand to move away from the entrance		Shellshear 1884 in Coltheart and Fraser 1987 Coltheart 1997
Between 1884 to 1891	<b>Access along 'beach road' restricted</b>	Seven Mile and Tallow Beaches	1884–5 Marks the beginning of a period of erosion that restricted access along Tallow and Seven Mile beaches. Since around 1884 'people ... had not had access by [the beach] road to either town' [between Ballina and Byron Bay]	<b>Severe beach erosion</b> along beaches north of Richmond R <b>pre-dates training wall construction</b> PH	Murray 1983:189
Jan 1884	<b>SE gale</b>	N – C NSW		Not in BB PH	
	Southerly squall	Broken Bay	16 Jan <i>Wonga Wonga</i> ketch 56t left Nambucca R and disappeared in southerly squall off Broken Bay		Loney Atlas NSD
	Southerly gale	Tweed R	17 Jan Recorded by Pilot		Keats 1999:68

	Bad weather	Hastings R	21 Jan <b>Richmond</b> iron steamer 240t driven ashore and wrecked on rocks Hasting R trying to get to sea in bad weather		Richards 1996:29,167 Loney, Atlas, NSD
	SE gale and heavy seas	Richmond R	23 Jan <b>Lismore</b> steamer 339t leaving river and struck by heavy sea, fires extinguished and ashore North Head. Wreck refloated and abandoned 10 May 1885		Murray 1983:137 Loney, Atlas 10 May 1885
Late Jan 1884	<b>Tropical Cyclone</b>	NQ – C NSW	29 Jan Extensive damage to buildings and boats at Bowen, only 3 houses left standing, buildings damaged Ravenswood, surge estimated at 3m, severe flood Mackay. <b>Fiado</b> steamer was beached. Many small boats lost.	Not in BB PH	JC
	Cyclone	Keppel Bay	26 Jan <b>Adventurer</b> schooner 14t left Keppel Bay and disappeared in cyclone		Loney
			27 Jan <b>Alice Jane</b> schooner 80t ashore Manning R bar, refloated and lost Jan 1888		Loney
			30 Jan <b>Day Dawn</b> cutter 17t lost off Bowen		NSD
	Cyclone	Cape Upstart	Late Jan <b>Duke of Richmond</b> barque 310t lost off Cape Upstart in cyclone <b>Catherine James</b> barque 378t lost at same time (NSD lost 7 March)		Loney NSD
c10–15 Feb 1884	<b>Storm, wind and rain</b>		Steamer sheltering behind island at Coffs Harbour for 5 days waiting to cross Bellinger R bar	Not in BB PH	Yeates 1990:35
			11 Feb <b>Advance</b> schooner 38t lost off North Head, Sydney Harbour		Atlas NSD
21–22 Feb	<b>TC Cooktown</b>	FNQ	3 ships lost in heavy gale Cooktown		Loney NSD
5–12 March	<b>TC</b>	NQ – M NSW	Heavy seas	Cat A N–M NSW	BB
			9 March <b>Alfred Vittery</b> schooner 122t lost Brampton Shoal in gale		NSD
			Mid March <b>Pizarro</b> ship 1439t lost off FNQ coast		Loney NSD April
			13 March <b>Lady Robinson</b> schooner 106t lost at Hook Pt, Wide Bay bar		NSD
2–4 April	<b>Gale</b>	N – C NSW	Heavy seas and continuous swells from early April to early May	Cat B N NSW	BB
			6 April <b>Industry</b> schooner 68t left Sydney for Newcastle and disappeared		Loney Atlas, NSD
23–30 Apr	<b>Low</b>	N – C NSW	Low moving NE from C NSW, wind over 40kts	No Cat N NSW, more intense and impacts further N PH	BB
	Gale	Bellinger R	23 April <b>Emily T</b> ketch 38t sank in gale Bellinger R		Loney Atlas
			24 April <b>Emu</b> wood paddle steamer 44t lost in gale on north spit Bellinger R when struck by ketch <b>Emily T</b>		Loney NSD
	Heavy gale	Seal Rocks	29 April <b>India</b> wood steamer 1049t ran into heavy gale and abandoned off Seal Rocks, passengers and crew survived		Loney Atlas NSD 29 May



	Gale	Richmond R	April <b>Bannockburn</b> schooner ashore and lost south spit Richmond R in gale		Loney
1–3 May 1884	Low off N NSW	N – M NSW		Cat B N–M NSW	BB
			1 May <b>Brilliant</b> schooner 140t driven ashore and lost on Brunswick R bar		Brokenshire 1988:7 Atlas, NSD
			6 May <b>Cushat Doo</b> schooner 31t left Batemans Bay for Sydney and disappeared		Loney Atlas, NSD
			6 May <b>Oscar Robinson</b> schooner 61t lost at Macleay R Heads		Atlas NSD
14 May 1884	Shallow bar	Bellinger R	14 May <b>Prosper Coulan</b> schooner 74t struck Bellinger R bar under tow from <b>Despatch</b> paddle steamer, both lost ashore		Atlas, NSD Loney 16 June
4–5 July	Tasman Low?	M NSW – Bass Strait	Heavy seas Port Macquarie to Bass Strait	Cat B M–C NSW	BB
Early Oct	Gale	SEQ – C NSW		Not in BB PH	
			6 Oct <b>Madjus</b> iron steamer 400t sprang a leak and beached in bad weather near Port Macquarie, broke up, all survived		Atlas Loney
			Oct <b>Susan Francis</b> ketch 20t lost near mouth of Brisbane R		Loney NSD
1885					
1885	Clarence entrance works		Sir John Coode proposed substantial works for the Clarence, twice as expensive as Shellshear and different to Moriarty's original scheme		Coltheart 1997:56
Around 1885	Storm face	Rainbow Bay	<b>Photo</b> looking S to Snapper Rocks shows storm face cut to mature vegetation	Face from 1883–4 storms has slumped and beach profile appears raised PH	Longhurst 1996:1
Around 1885	Storm debris	Burleigh Beach	<b>Photo</b> shows evidence of past storms, (1883–4) logs piled at the top of the beach, foredunes reformed, but not vegetated and recent small berm cut		Longhurst 1995a:10
Late Dec 1885	Eroding shoreline	Western shore Stradbroke Is	<b>Photo</b> showing roots of mature trees exposed and fallen trees on beach from ongoing erosion	Erosion face not fresh PH	Nolan and Longhurst 1996:18
Jan 1885	Gale	SEQ – C NSW		Possibly tropical storm PH	Not in BB PH
			Jan <b>Bortoni</b> iron steam schooner 399t aground and abandoned on bar leaving Manning R. Salvaged (renamed <i>Lawrence</i> ) and wrecked New Zealand 29 April 1891		Richards 1996:75 Atlas NSD
			15 Jan <b>Wild Wave</b> ketch 27t lost N of Burnett R mouth. Possibly refloated and reported lost Burnett R 1886		NSD
	Flood	Mary R	Extensive damage to cane lands		Maryborough 1998:15

11–14 March	TC		Low well offshore and heavy seas with no wind	Cat C N NSW	BB
			19 March <i>Lilly</i> steamer 19t lost at Morna Pt, Port Stephens	Possibly longer than BB PH	Atlas NSD
8–10 Apr	Low off SEQ		Heavy seas	Cat C N NSW	BB
17–18 April	Low	C NSW – Bass Strait	Low moved E off coast and deepened, heavy sea and gales S of Sydney	Cat A M – S NSW	BB
Early May	Gale	N – C NSW		Not in BB PH	
			8 May <i>Budgaree</i> schooner ashore in gale Manning R		Loney
	Gale	Manning R	8 May <i>Trusty</i> schooner 61t ashore and lost in gale Manning R		Loney Atlas
			10 May <i>Sea Nymph</i> ketch 93t lost on the Manning R bar		Atlas NSD
	Heavy seas	Richmond R	10 May <i>Lismore</i> iron steamer 339t attempting to cross Richmond R bar struck by heavy seas that put out the engine fires, beached Shaws Bay		Murray 1983:134, 137 Loney Richards 1996:163 Atlas, NSD
Early June	Low S NSW?			Not in BB PH	
1885			3 June <i>Josephine</i> steamship 16t lost Port Macquarie bar		Finkel 1987:38 NSD
	Big seas (not storm)	Clarence R	6 June <i>Cahors</i> steam ship 1254t wrecked South Evans Reef in big swell. Big seas struck <i>SS Dione</i> (rescue vessel returning from wreck) crossing Clarence R bar, one lost overboard		Mack 1998:7 Loney Atlas 10 June
			8 June <i>Daisey</i> ketch left Sydney for Port Stephens and disappeared		Loney
7–9 July	Low in Tasman Sea	SEQ – S NSW	Low in Tasman moved N, heavy seas along whole coast	Cat B C NSW	BB
			9 July <i>Naiad</i> brig 297t lost Elizabeth Reef	More intense to north? PH	NSD
Early Oct	Bushfire	Coffs Harbour	Bushfire on Upper Orara Road		Yeates 1990:23
Oct 1885	Inspection of river bar	Richmond R	Sir John Coote and Public Works party recommend training walls. Report tabled May 1888, 326 000 pounds allocated		Murray 1983:138
1 Dec	Fresh	Brisbane R	<i>Transit</i> steam ferry 39t sank in flood	Not in BoM PH	Loney, NSD
1886					
1886	Channel movement		1886 first survey of Amity Pt, shoreline has eroded some 300m since then. Dramatic change at Amity Pt from channel realignment. Photos erosion of 'timbers reach'	The channel realignment coincides with the period of erosion on the open coast PH	Carter and others 1999:16, 25–7

13–15 Jan	TC Coral Sea	NQ – N NSW	S wind to 50kts N NSW	Cat C N NSW	BB
			13 Jan <i>Mary Bunnatyne</i> brigantine 116t aground and lost on spit inside Clarence R bar		Atlas, NSD Mack 1998:9 Feb
2–5 March 1886	TC	NQ – N NSW		Cat C N NSW	BB
			1 March <i>Glossariel</i> schooner 86t sank off Manning R Heads, crew saved		Loney Atlas
8–10 March	TC	Q – M NSW	TC Coral Sea moved S then E	Cat A N–M NSW	BB
			13 March <i>Ann</i> ketch 28t went ashore and lost Stockton		NSD Loney July 1887
10–14 Apr	Gale	M – S NSW		Cat A/B M–S NSW	BB
	Gale	Cape Hawke	Mid-April <i>Champion</i> ketch 36t driven ashore in gale Cape Hawke, later salvaged and lost 1892	Records agree PH	Atlas, NSD Loney
27 May – 2 June	ECL Coral Sea	NQ – all NSW	Coral Sea low moved slowly SE with very heavy seas to coast. Wind (N NSW) N/NE to S then W. Low moved SE from N NSW PH	Cat A N NSW	BB
	Heavy seas	Green Cape	30 May <i>Ly-ee-Moon</i> steamer 1202t, Melbourne to Sydney, aground Green Cape, 71 lost		NSD ESA
25–26 June	ECL	Q – M NSW	Low in Coral Sea	Cat C N NSW	BB
			27 June <i>Mayflower</i> schooner 149t aground Lady Elliot Island, salvaged and refloated	Impacts further N PH	NSD
Early July	Rough seas	Coffs Harbour	c 7 July Tugboat <i>Ranger</i> sheltered in Coffs Harbour waiting to cross Bellinger Bar	Not in BB PH	Yeates 1990:36
26–29 July	Low	NQ – all NSW	Low off C NSW moved NE, strong SE gradient	Cat C M–S NSW	BB
			26 July <i>Jane</i> brig 160t wrecked on Tallow Beach	Impacts more severe and further N than BB PH	Ryan and Smith 2001:99, Atlas, NSD
			28 July <i>Comet</i> steamer lost on north head Richmond R bar		Atlas NSD
Mid Aug 1886	Gale?	CQ – C NSW	13 Aug <i>Hugh Ewing</i> schooner 192t lost on Swains Reef, crew rescued by <i>Rachel</i>	Not in BB PH	NSD Loney 1 Aug
			14 Aug <i>Condong</i> schooner 72t capsized in squall off Port Stephens, two lost		Loney Atlas, NSD
Early Sept	Gale	SEQ – N NSW	5 Sept <i>Heka</i> steamship 32t Brisbane to Townsville lost on Breaksea Spit	Not in BB PH	NSD Williams 2002:147
			11 Sept <i>Siskin</i> ketch ashore in gale Brunswick R		Loney

27–29 Sept		SEQ – C NSW	Low off C NSW moved NE	Cat B most NSW	BB
15–18 Oct	Low	M–S NSW	Low from inland deepened off coast and moved SE	Cat B M–S NSW	BB
Early Nov	<b>Strong NE wind</b>		Delayed loading of <i>SS Brunswick</i> at Coffs Harbour by several days of strong NE		Yeates 1990:36
Nov 1886	<b>Shallow bar</b>	Tweed R	E and S gales caused shoaling of bar <i>Kalara</i> steamer struck bar loaded with timber for Brisbane and sank offshore		Longhurst 1996:64
18–22 Dec	<b>ECL</b>	SEQ – C NSW	Heavy seas SEQ to Newcastle	Cat A N–M NSW	BB
			18 Dec <i>Brunswick</i> iron steamer 174t ashore and lost entering Manning R		Keats 1999:207 Richards 1996:158 Loney, Atlas, NSD
<b>1887</b>					
1887			Jan Clement Wragge appointed Q government meteorologist		Buchanan 1999:55
1887	<b>Entrance works</b>	Clarence R	NSW government received Sir John Coode's report 1887 and (after Moriarty's retirement) C W Darley commenced the implementation of Coode's scheme in 1888		Coltheart 1997:57
1887	<b>Jetty damaged</b>	Byron Bay	Jetty under construction was damaged and repair work had to be done		Ryan and Smith 2001:56
19–21 Jan	<b>Heavy gale</b>	SEQ	TC formed N of Fraser Is, then crossed coast near Hervey Bay, slow moving NE of Brisbane. 992hPa recorded in lull (eye?) when wind changed from SE hurricane force to NE gale force Double Is Pt. Shoreline damage Sandgate. Very heavy rain, extensive damage and some 70 lives lost in storm and floods. Brisbane 465mm in 24hr, all time daily record rainfall	Not in BB PH	JC
23–25 Jan. 1887	<b>Major floods</b>	Brisbane R and SEQ	Jan 1887 Floods in <b>Mary and Burnett R. Major floods in the Brisbane, Nerang and Coomera R.</b> Serious flooding in <b>Logan R</b> inferred from Welby's comments. Around Moreton Bay area floods damaged crops, oyster beds, and deposited mud and silt		Salter 2002: 31, 44 Keats 1999:69 Neil 1998:15 JC
1887	<b>Major flood</b>	Flood breach of North Spit Clarence R	Broke through the north spit and stone training wall, cutting a channel 18ft [5.5m] deep		Coltheart 1997:57
1887	<b>Flood</b>	Richmond R	Flood breach south spit		Ferguson 1995
	Three entrances	Richmond R	T W Keele, Public Works engineer arrives in Ballina to prepare for training wall construction and notes three entrances caused by flood breaches.		Murray 1983:134
8–12 Feb 1887	<b>Low in N Tasman Sea</b>	SEQ – C NSW	SE to ESE gale with long fetch and heavy seas. Shipping delayed and ketch 17t lost Wide Bay bar	Cat A S NSW More intense and impact further N than BB PH	JC BB

			10 Feb <b>Sarsfield</b> brigantine 175t while under tow aground and lost south spit Richmond R bar		Loney Atlas NSD
			12 Feb <b>Scout</b> steamer 77t lost at Byron Bay		Atlas NSD
	Very heavy E swell, turning to SE	Southport	13 Feb <b>Scottish Prince</b> barque 950t ashore near Southport Bar from 3 Feb, broke up in heavy SE weather	Wreck 450m off beach at Sea World, then position of bar	Thomson 1967 Loney Salter 2002
	E gale	Macleay R	13 Feb <b>Ranger</b> tug 40t driven ashore, lost S of Macleay R entrance in E gale, 2 lost		Atlas, NSD Loney
			Feb <b>Aurora</b> brigantine 138t sank off NSW north coast		Loney Atlas
22–23 Feb	TC	CQ – N NSW	TC off MacKay. SE gale Hervey Bay and heavy rain SEQ		JC Loney
			24 Feb <b>Freddy</b> schooner 80t ashore in cyclone Cape Upstart, refloated		Loney NSD
			29 Feb <b>Energy</b> schooner 185t lost north of Clarence R entrance		EAS, Atlas, Mack 1998:9 NSD, Loney 29 March
27 Feb	Major floods	Hervey Bay	Mary and Burnett Rivers		JC
2–7 March	TC	N NSW	Fresh SE winds	Cat C N NSW	BB
			5 March <b>Lizzie Iredale</b> ship 711t left Newcastle for San Francisco and disappeared		AE EAS
May 1887	Bar bound	Tweed R	Vessels bar bound since early in year. In May <b>Tweed</b> steamer forced to leave without cargo after waiting three weeks	Bar silted despite flood rains PH	Longhurst 1996:64
1–6 June	Low	All NSW	Persistent heavy seas in Tasman Sea during June PH	Cat B C – S NSW	BB
1887	Gale	Bulli	6 June <b>Waratah</b> steamer 550t driven ashore North Bulli		Loney Atlas, NSD
			9 June <b>Fanny</b> cutter capsized off Port Stephens		Loney Atlas, NSD
14–20 June	Tasman Low	S NSW	Very heavy seas, wind to 50kts	Cat A/B, M – S NSW	BB
			26 June <b>Ann and Mary</b> barquentine 202t sank in heavy SE gale, Bass Strait, 2 lost		EAS Love 2007
Late July 1887	Gale?	N NSW		Not in BB PH	
			21 July <b>Reliance</b> schooner 74t sprang a leak and sank off Brunswick R, crew survived		Loney Atlas
			28 July <b>Comet</b> 85t tug from river lost Richmond R bar		NSD EAS
			29 July <b>Collector</b> paddle steamer 24t swept out to sea in storm and disappeared off Tweed R		Loney, NSD Keats 1999:96
12–13 Aug	ECL	Whole coast	Heavy seas, E/SE wind to 52kts	Cat A all NSW	BB

			Aug <b>Terrigal</b> ketch 22t lost off Round Hill Head S of Gladstone. Brisbane 124mm (12) record Aug daily rainfall. Bundaberg 111mm (12) record daily Aug rainfall.		Loney, NSD 23 Aug
13 Aug	Heavy rain		Local flooding Brisbane		BoM
15–20 Sept	ECL	N – C NSW	Light wind with heavy seas	Cat B M NSW	BB
			14 Sept <b>Wistaria</b> barque 387t lost Capricorn Group, GBR		NSD
11–12 Oct	Tasman Low		SE wind to 49kts		BB
8–9 Nov	Tasman Low	N – C NSW	Heavy seas	Cat B M – S NSW	BB
			Nov <b>Joker</b> ketch 28t ashore on North Beach Port Stephens		Atlas
27–29 Dec	Low on trough	SEQ – C NSW	Low deepened off N NSW, storm (50kts) and very heavy seas	Cat A/B, N-C NSW	BB
			29 Dec <b>Lizzie Frost</b> ketch 52t ashore on North Beach entering Brunswick R		Loney, NSD Atlas Jan 1888
1888					
1888	Entrance works	Clarence R	PWC established and heard evidence from shipowners that the bar was generally navigable, but high insurance rates and delays in crossing the bar kept freight charges high. The PWC recommended that only the inner works be carried out. This proposal was rejected by Public Works (Darley) and lobby groups described the proposal as ‘an unrecognisable bastard’ which ‘would cause permanent damage to the entrance’		Coltheart 1997:57
1888	Jetty completed	Byron Bay			Coltheart 1997:59 PWC 1890
17 Feb 1888	TC	Mackay	TC recurved east of Mackay, buildings damaged, flooding Rockhampton, enormous seas off Fraser Island		JC
			17 Feb <b>Geelong</b> steamer 431t beached and lost in gale near MacKay, all survived		EAS
			17 Feb <b>Eastminster</b> iron ship 1208t left Maryborough for Sydney and disappeared in a rising gale		Loney NSD
			17 Feb <b>Kate</b> schooner 85t disappeared in cyclone off Mackay		Loney NSD
			18 Feb <b>Golden Isle</b> schooner 78t lost in Broadsound		NSD
2–3 March	Low	S NSW	Low NE of Newcastle S wind to 49kts	Cat A M–S NSW	BB
March	Fresh	Brisbane R	<b>Flora</b> schooner 130t sank at Victoria Bridge during flood	Flood not in BoM, maybe fresh? PH	NSD Loney April

Mid April	Tropical Storm?	SEQ – M NSW		Not in BB PH	
			14 April <b>Speedwell</b> barque 350t wrecked Norah Head Reef in 'current'	Not storm?	Atlas, Bateson 1972 Loney 1884, NSD
			14 April <b>Pilot Chief</b> cutter wrecked Scarborough		Loney
			19 April <b>Tweed</b> steamer 240t ashore Tweed R entrance. Broke up 4 June		Richards, Loney Atlas, NSD
Early June	Gale	N – C NSW		Not in BB PH	
			4 June <b>Tweed</b> steel steam ship 240t broke up on Tweed R bar (aground since 19 April)		Keats 1999:96 NSD
	SE gale	Newcastle	5 June <b>Berbice</b> ship 760t arrived at Newcastle in a SE gale and wrecked trying to enter port		Loney NSD
July 1888	Coach service on beach	Gold Coast	July 1888 coach 3 times a week and by December a daily service from Southport (Meyer's Ferry) and along the beach to Tweed Heads. Required low tide crossings of Currumbin and Tallebudgera Creeks	Photo Coach on beach at Burleigh Heads 1890	Longhurst 1996:62–66
8–11 Oct	<b>ECL</b> off Gold coast	SEQ – C NSW	Cyclone moved E across Coral Sea, SE gales and heavy seas. Very heavy rain along coast. 10 Oct, Yamba 137mm record daily Oct rainfall.	Cat A M–N NSW	JC BB
	E gale	Coffs Harbour	Oct <b>Eliza</b> ketch 57t ashore and wrecked Corindi in easterly gale, 4 lost		Loney NSD
	Gale	Crowdy Bay	9 Oct <b>Emu</b> wood steamer 165t ashore and lost in gale north of Crowdy Bay		Loney, NSD, Atlas, Finkel 1987:40 6 Oct
			Oct <b>Envy</b> ketch lost Bellinger R		Atlas, NSD
1889					
1889	Storm year		The whole of the eastern side of Australia suffering... loss of ships and lives		Thomson 1967:339
March 1889	Breakwater works commenced	Trial Bay	Originally proposed in 1866 and gaol built from 1877. The breakwater to create a 'harbour of refuge' was designed to be 1 400m from Laggies Point		Coltheart 1997:55, 77
Early Jan	Marine silting	Tweed Bar	'The Tweed bar is worse now than it has been for years' During the 1880's 'negotiating the narrow silted channels in the flats to go upstream to load, had become too hazardous' The flats (max depth 4ft (1.2m)) and bars were a real hindrance to sugar industry development. Dredging began mid Jan 1889		Keats 1999:77–8, 86, 94
	Marine silting	Richmond R	Entrance completely blocked, passengers went by coach to Harwood and produce carted by bullock teams to Clarence R		Coltheart 1997:59
6–9 Feb	Tasman Low?	S NSW – Bass Strait	Low deepened off S NSW	Cat A S NSW	BB

March	Flood	Brisbane R	March <i>Flirt</i> schooner 10t sank in Brisbane R during flood		NSD
Early May	Gale?	C NSW		Not in BB PH	
			Early May <i>Ripple</i> lugger lost at Seal Rocks		Atlas, NSD
			8 May <i>Shamrock</i> ketch 34t sank off Port Stephens, crew survived		Loney Atlas, NSD
25–29 May 1889	ECL off Q 'the great gale'	Whole coast	Extreme event, ECL approached from N, strong S gales and heavy seas, damage Sydney and Kiama. Sydney City 212mm record May daily rainfall (28 May)	Cat X/A, all NSW	JC BB
			1 June <i>Kangaroo</i> steamer 48t sank in Brisbane R		NSD
			6 June <i>Hesketh</i> steamer lost on Wide Bay bar and may have been refloated	Swell? PH	NSD
	Storm erosion face	Sydney area and S NSW	Erosion scarp between 1876 and 1912 storm faces		Andrews 1916 in Chapman & others 1982:116
25–27 June	Tasman Low	S NSW – Bass Strait	Large depression in S Tasman Sea, S gales and heavy seas	Cat A C–S NSW	BB
17–19 July 1889	ECL <i>Fawn Storm</i> Many vessels lost in 'unexpected easterly'	N – C NSW	'Winter Cyclone' near Rockhampton 17 July and Brisbane 18 July then moved east. Gales and heavy seas NSW coast. Vessels lost Fraser Is to Coffs Harbour. Byron Bay – five sailing ships anchored in the bay sheltering from the gale had been 'battered for days by gale force winds ... from the south [SE] ... on the night of 16 July the winds swung around to the east and big seas began to break in the Bay'	Low off Brisbane Heavy seas Cat A N–M NSW  Existing gradient (SE) gales when ECL formed on trough around Pt Danger	JC BB Ryan and Smith 2001: 95
	'terrific easterly gale'	Moreton Island	13 July <i>Gerd Heye</i> Danish barque 850t departed Rockhampton for Samoa in calm seas with light wind. 15 July wind from SE to very strong NE with heavy rain, ran under bare poles and beached ocean side of Moreton Is night of 16 July		Thomson 1967:294, 340 NSD 15 July
			16 July <i>Hoolet</i> ketch 31t lost off Mooloolabah R		Loney NSD May
	Easterly gale	Byron Bay	17 July <i>Fawn</i> brig 216t anchored in Byron Bay and disappeared without trace.	In 1956, wreck site found in Byron Bay and ships bell 'Fawn 1862' recovered	Ryan and Smith 2001:95 Loney NSD
			17 July <i>Spurwing</i> schooner 90t sheltering in Byron Bay waiting to enter Richmond R with coal from Wollongong. Driven ashore and lost		Ryan and Smith 2001:95 NSD 7 July
			17 July <i>Hastings</i> schooner 88t sheltering in Byron Bay with timber from Richmond R to Sydney. Lost in surf		Ryan and Smith 2001:95, Loney NSD
			17 July <i>Bannockburn</i> brig 111t sheltering in Byron Bay after leaving Richmond R with timber. Beached and lost		Ryan and Smith 2001:95, NSD Loney, Atlas



			17 July <b>Agnes</b> schooner 80t sheltering in Byron Bay and beached. Later refloated and lost off Brunswick R 12 March 1890		Ryan and Smith 2001:96, PWD 1978
			19 July <b>Lady of Lorn</b> ketch 56t sawn hardwood from Nambucca to Sydney, driven ashore Coffs Harbour, one lost		Loney Atlas NSD
	Gale	Fraser Island	July <b>Florence Peat</b> schooner 61t abandoned in a gale off Double Island Point, wreck found Inskip Point		Loney, NSD Williams 2002: 147
	Gale	Evans Head	17 July <b>Jessie Matilda</b> brigantine 88t driven ashore in gale Evans Head		Loney, NSD Atlas 21 July
	Gale	Cape Cleveland	21 July <b>Fleetwing</b> schooner 33t lost off Cape Cleveland in gale, 6 passengers and crew lost		NSD Loney Dec
			21 July <b>Mallsgate</b> iron barque 1073t Newcastle to California with coal and lost Middleton Reef, 10 crew reached Noosa		Loney, NSD Brown 2000: 183
22 July	End of gale		Crew of <b>Mallsgate</b> sailed from Middleton Reef to Noosa in two boats		Loney Brown 2000: 183
17–19 July	<b>Major Flood</b>	Brisbane R and SEQ	Floods south of Bundaberg and major flood Brisbane R		BoM
1889	<b>Flood</b>	Richmond R	After entrance being 'closed' earlier in year, flood breach south spit		Ferguson 1995 Coltheart 1997:58
26–27 July	<b>Low</b>	SEQ – C NSW	Low off N NSW moved to SE	Cat B N NSW	BB
	Gale	Seal Rocks	29 July <b>Nicola</b> schooner 110t sprang a leak and abandoned in rough weather off Seal Rocks		Loney Atlas NSD <i>Nicolai</i>
3–6 Aug	Low Coral Sea	N – M NSW	Low in Coral Sea and strong gradient. 6 Aug Yamba 231mm, record Aug daily rainfall. 6 Aug Lismore 125mm record Aug daily rainfall	Cat B N NSW	JC BB
<b>1890</b>					
1890	<b>Breakwater construction</b>	Clarence R Trial Bay (Byron Bay deferred)	Despite 30 years work on Moriarty's Clarence R works extensive shoals covered the Clarence R mouth. Trial Bay breakwater began at end of 1889 and during 1890 206ft (63m) was constructed. A proposal for a breakwater at Byron Bay investigated and approved by PWC but Bill lapsed in Legislative Council when the Colony's access to loan funds from London investors was closed off in the economic collapse of the 1890's		Neil 2001:11 PWC 1890 Coltheart 1997:59, 63
1890	<b>Entrance works</b>	Richmond R	Approved in 1889 work commenced during 1890 on the north breakwater using Sir John Coode's design for an entrance south of North Head	<b>Plans</b> pre works 1889 and near completed 1902	Coltheart 1997:63–64, 66 Murray 1983:138
13–16 Jan	Heavy Rain	Byron Bay	Heavy rain, Wind SE swinging NE. <b>SS Augusta</b> lying away from jetty Byron Bay.		Ryan and Smith 2001: 20 (Wareham Diaries)

28 Jan – 3 Feb 1890	TC off FNQ and low off N NSW, both moving south	NQ – all NSW	28 Jan TC off Townsville 996hPa and to SEQ by 1 Feb, heavy rain and floods. Very rough weather along entire east coast	Cat X N NSW to Cat B C NSW	JC BB
			Schooners <i>Kent</i> 104t and <i>Sussex</i> 97t lost N NSW after leaving Sydney for Tweed R mid Jan. Seen off Richmond R 31 Jan. Wreckage reported Seven Mile Beach and Surfers Paradise. Some newspapers reported that 'the weather had not been rough'	Great confusion surrounds the loss of <i>Kent</i> and <i>Sussex</i> . Not all newspaper reports are correct PH	Loney 1978:77 Atlas, NSD Keats 1999: 97, 98, 193 Keats 1988:209
	Severe gale	Newcastle	Late Jan <i>Summer Rose</i> schooner 83t left Newcastle 23 Jan and lost in severe gale. Wreckage found Yamba 6 Feb		Atlas Loney 1978:76
7 Feb	End of storm		7 Feb <i>Fanny Dent</i> from Sydney arrived Tweed R and <i>tug</i> searches 10 miles offshore for <i>Kent</i> and <i>Sussex</i>		Keats 1999:209
Early 1890's	Flood	Tweed R	Big floods in Tweed threaten to break out onto south beach	Flood breach of Letitia Spit prevented by emergency work	Keats 1999:87
Jan	Flood	Mary R	River rose to 30ft (9.1m) washing away houses, crops and plantations along the river bank		JC Maryborough 1998: 17
25 Jan	Flood	Brisbane R			JC, BoM
Feb 1890	Road eroded	Kirra	During Feb the road at 'the Cut Hill' (Kirra) subsided	Photo of road in 1899	Longhurst 1996:61, 69
18–19 Feb	TC	CQ – C NSW	TC off Q coast, SSE gales, heavy seas	Cat B N NSW	BB
	Gale	Fraser Island	Feb <i>Evelyn</i> schooner 61t dismasted and abandoned in gale off Fraser Is, crew rescued by steamer <i>Quetta</i> , wreck ashore Fraser Is		Loney NSD Williams 2002:147
8–13 March 1890	TC	SEQ – C NSW	7 March TC developed off central Q coast. 9 March Maryborough pressure dropped from 996hPa to 985hPa. Severe storm 10 March and crossed SEQ coast, recurved inland to move seawards near Sydney 12 March. SMH reported severe storms 11/12 March. very heavy rain and floods	Cat A N NSW	JC BB
	Easterly gale	Tweed R	12 March <i>Agnes</i> schooner 80t Sydney to Tweed R driven ashore 10km north of Brunswick Heads in E gale, no survivors		NSD, Loney 1978:77 Ryan and Smith 2001: 96
10–13 March	Floods	SEQ	Minor flood Brisbane R, Mary R, Gympie 14.3m		JC BoM
	Flood	Clarence R	12 March <i>Clarence</i> iron paddle steamer 18t abandoned and washed out to sea in flood. Photo Big flood Grafton 1890		Loney 1978:77, Richards 1996:33, 159, Atlas, NSD
	Flood	Richmond R	Flood breach south spit PH		Ferguson 1995
	Flood	Manning R	Major flood?		Gill 1998:26
	Flood	Macleay R	<i>Kirribilli</i> paddle steamer 12t lost in flood		NSD

24–28 March 1890	TC and low	TC NQ and low C NSW	Crossed coast near Cardwell and recurved over Fraser Is 28 March. Heavy wind damage, heavy rain and disastrous floods over much of Q and N NSW. Carwell only 4 houses left standing, storm surge Herbert R. Townsville extensive building damage, surge almost 2m. 12 people killed or drowned. <i>Eleanor</i> and <i>Snowdrop</i> lost. <i>Mary Ellen</i> schooner wrecked in Herbert R. <i>Martha Reid</i> schooner dismasted Keppel Bay. 24–25 March Low off C NSW, E gales and heavy seas M to S NSW		JC BB
28 March	Flood	Brisbane R			BoM
15–17 April	Gale	S NSW		Cat B M NSW	BB
	Gale	Batemans Bay	17 April <i>Jules Vogel</i> schooner 56t ashore and lost in gale Batemans Bay	Good agreement between records PH	Atlas, NSD Loney
25–28 June	Tasman Low	S NSW – Tas	Lows in S Tasman Sea. S gales and rough seas	Cat A S NSW	BB
Mid July	Gale	N – M NSW	16 July <i>Zodiac</i> barque 316t struck gale, badly damaged, leaking and abandoned off Port Macquarie, crew rescued by <i>Koonoowarra</i>	Not in BB PH	Loney 1978:77 Finkel 1987:39 lost Lake Cathie NSD 26 June
19–21 Nov	Severe gale	C – S NSW	Low off C NSW moved E, strong S wind and heavy seas. <i>Rainbow</i> schooner 320t supposed lost in this gale between Melbourne and Clarence R	Cat A/B S NSW	BB, Atlas, NSD
1891					
1891	Coffs Harbour and Woolgoolga jetties		From late 1890 until August 1892 Coffs Harbour jetty under construction and 'bad weather sometimes hampered construction and violent storms damaged the partially built structure'	Jetty damaged during construction 1891 PH	Yeates 1990:45
1891	Training walls	Tweed R	Terranora wall and dredging commenced. Plan of Darley's proposed work		Coltheart 1997:61, 62
1891	Entrance breakwaters	Richmond R	In Jan northern breakwater 692ft [211m] out from Pilot Point		Murray 1983:138
1891			Weather records commenced at Double Island Lighthouse		Brown 2000:182
1891	Proposal for inland road Access along beach road restricted since 1884	Seven Mile and Tallow Beaches	In 1891 Byron Bay Progress Association proposed an inland coast road around the back of the Three Mile Scrub (Broken Head) across the heath and inland of Lake Ainsworth [present road alignment] as 'people ... had not had access by [the beach] road to either town for six or seven years'	1884–1891 erosion period on beaches north of Richmond R pre dates breakwater construction PH	Murray 1983: 189

ca 1891	Erosion face	Greenmount Beach	<b>Photo</b> looking S shows deeply indented beach, storm face from southern rocks, beach profile appears low and attached spit is well below high tide	Compare to survey plan 1883–4 shows attached spit and 1923 <b>Photo</b> shows lagoon inside spit	Longhurst 1996:2, 33, 167
Mid Jan	Gale	CQ – SEQ	9 Jan <i>Perseverance</i> schooner 163t abandoned Northumberland Islands, GBR in gale		Loney NSD
			16 Jan <i>Tasman</i> ketch 79t lost off Sandy Cape		Loney
7 Feb	Shallow bar	Richmond R	<i>Anne Theresa</i> schooner 64t grounded on Richmond R bar, sprung a leak and beached Byron Bay		NSD Loney Atlas
14 Feb	Shallow bar and heavy seas	Nambucca R	<i>Helena Davies</i> schooner 54t capsized and sank on Nambucca R bar in heavy seas	Heavy seas not in BB	Atlas, NSD Loney 1978:78
10–12 March	TC	SEQ – M NSW	TC Southern Qld parallel to coast and severe at Lord Howe Is	Cat A N NSW	BB
			<i>Rose M</i> barque 366t NZ to Melbourne wreckage ashore 16 March at Crowdy Head		Loney 1978:78
	Storm surge	Southport	'Terrific sea' on Southport Bar and 'the tide was the highest ever known' and serious damage Southport		<i>The Logan Witness</i> 14 March in Salter 2002: 84
May 1891	Quicksand on beach road	Gold Coast	In May coaches forced to cross Currumbin and Tallebudgera Creeks high up to avoid 'quicksand' near the mouth, 'quicksand' also problematic at Coolangatta Ck		Longhurst 1996:66–7
1–5 June	Low off C NSW coast		Gales over whole Tasman Sea	Cat A/B C–S NSW	BB
	Gale	Bellinger R	2 June <i>Avon</i> paddle steamer 115t lost in gale Bellinger R		Loney 1978:79 NSD
			2 June <i>Fernmount</i> wood steamer 269t ashore Bellinger R bar in gale		Loney 1978:79 NSD Trial Bay
	Gale	Jervis Bay	Early June <i>Taramung</i> steamship 1281t Newcastle to Melbourne lost off Jervis Bay, wreckage ashore, 23 lost		Loney Atlas NSD
9–10 June 1891	ECL <i>Hurricane Brisbane</i>	SEQ – M NSW	8 June Considerable wind damage, floods Gympie and Brisbane. Many coastal vessels driven onto beach NSW coast by E–SE gale, very rough seas	Cat A/B N–M NSW	JC BB Loney 1978:79
			8 June <i>Alice Templeton</i> ketch 81t lost Trial Bay, refloated and broken up 1920		Keats 1999: 206
	Gale	Bellinger R	9 June <i>Venus</i> schooner 83t left Clarence River for Sydney sails blown out and lost Bellinger R		Loney 1978:79 Atlas NSD
			June <i>Georgina Davies</i> ketch 62t ashore in gale on beach Bellinger R, refloated		Loney 1978:79 NSD
			June <i>Sea Nymph</i> schooner ashore in gale on beach Bellinger R, refloated		Loney 1978:79
			June <i>Jessie Sinclair</i> ketch 74t ashore in gale near Bellinger R, refloated		Loney 1978:79 NSD

			Early June <b>Prince Alfred</b> ketch 56t S NSW to Sydney, seen off Jervis Bay 1 June and possibly lost off Wollongong		Loney Atlas
11 June	<b>Fresh</b>	Brisbane R	Floods Mary R and SEQ		BoM
June 1891	Facilities damaged	Ballina	Severe storm destroyed Ballina Baths built in 1886		Murray 1983:264
	<b>South Spit eroded and breached</b>	Richmond R	Richmond R channel broke through the southern spit moving in one day a distance of nearly 3 000ft [915m]. Thought to be 'caused by the construction...of the northern breakwater, blocking the old channel and training the waters of North Creek on the ebb-tide scour'	Southern river training wall constructed to prevent future breaches PH	Coltheart 1997:63 'spring', no storms in BB PH
2-27 June	<b>ECL</b>	SEQ – all NSW	Extensive low off N NSW moved S and E	<b>Cat A</b> whole NSW coast	BB
1891	Easterly gale	Batemans Bay	23 June <b>Budgaree</b> ketch 87t lost Batemans Bay in easterly gale		Atlas
			23 June <b>Moses Fletcher</b> ketch 42t ashore and lost Moruya Heads		Loney Atlas
			24 June <b>Ranger</b> schooner 88t driven ashore in squall Stockton Beach		NSD
	Southerly gale	Nambucca R	26 June <b>Bertha</b> schooner 87t wrecked Nambucca Heads in southerly gale		Loney 1978:79 NSD 26 July
			26 June Wreck of <b>Fernmount</b> washed onto wreck of <b>Avon</b> and destroyed it. Both wrecks on Bellinger bar since 2 June storm		Loney 1978:79
	Coffs Harbour jetty damaged		Coffs Harbour jetty under construction 'one particularly violent storm washed away 300 feet (90m) of the partially built structure, as well as valuable gear ...Mr Lawson (contractor) said the storm cost him 1 500 pounds'	Probably one of the June storms above? PH	Yeates 1990:45 Pitman 2001
Early July	<b>Gale</b>	Coral Sea	Early July <b>Ellen</b> barque 499t left Newcastle for Noumea and abandoned 6 days out in gale. After 9 days in boat several died, 2 washed overboard and 3 lost in surf Seal Rocks, one survived	Not in BB PH	Loney 1978:79 Herald NSD
Early Oct	<b>Gale</b>	Newcastle	5 Oct <b>Jonathon</b> ketch 43t damaged in gale and lost Newcastle	Not in BB	Loney 1978:79 NSD
1892					
1892	Construction of training walls	Richmond R	March work began on the south wall with punts carrying stone from the quarry at Rileys Hill. <b>North Creek rapidly shoaled</b> and dredging started in 1893. By 1896 punts could no longer carry sugar to the Broadwater Mill and new canal cut		Murray 1983:138-141 Coltheart 1997:64
1892			During 1892 100ft [30m] washed from Trial Bay breakwater		Neil 2001:11
2 Jan	<b>Low</b>	S NSW	High seas and gales. Waves splashed over cliff 14m high, Eden. Thunderstorm Brisbane.	<b>Cat A</b> S NSW	BB BoM

Mid Feb	Gale?	N NSW	14 Feb <i>Endeavour</i> wood steamer 115t driven ashore and lost Brunswick R bar (previously <i>Rose of Sharon</i> )	Shallow bar? Steamer drew 2.1m PH	Atlas, NSD Loney 1978:80 (78t) Brokenshire 1988:8
Late Feb	Heavy weather	M NSW	24 Feb <i>Queen</i> schooner 71t disappeared off Port Macquarie in heavy weather	Not in BB PH	Loney 1978:80, Atlas Finkel 1987:39
30 March – 2 April 1892	TC off SEQ	SEQ – M NSW	2 April TC recurved over Brisbane 991.5hPa, wind 60–70kts and heavy rain. Extensive damage Brisbane to Tweed Heads 1 April Southport SW wind then SE and E. 2 April extensive wind damage, waves over Esplanade and sea wall damaged	Cat B N–M NSW	JC BB
	'hurricane'	Jumpinpin, Stradbroke Island	2 April <i>Bellinger</i> schooner 100t, left Danger Bay in SE wind that intensified and shifted E, driven ashore on ocean beach at Jumpinpin. Salvaged cargo moved over the narrow dune ridge to Oyster (Swan) Bay	Before breakthrough PH	Neil 1998:15 cites Welsby 1907 Thomson 1967:294 NSD
	Flood	Richmond R			Ferguson 1995
3 May	Calm	Tallow Beach	<i>Tweed</i> loading pine logs Tallow Beach		Ryan and Smith 2001: 99
Late May	Heavy weather	Coral Sea	27 May <i>Waireka</i> schooner 99t driven ashore in heavy weather and lost Chesterfield Reef	Not in BB PH	NSD
Early June	Shallow bar?	Richmond R	3 June <i>Grace Lynn</i> schooner 93t ran aground and swamped while under tow entering Richmond R		Loney
June	Shallow bar	Noosa R	5 June <i>Sylvania</i> ketch lost on Noosa R bar		NSD
Early July	Gale	C NSW	7 July <i>Mystery</i> ketch 32t sprang a leak and sank in gale off Norah Head, crew survived in boat	Not in BB PH	Bateson 1972 Loney, Atlas, NSD 11 July
Late Aug	Gale	C NSW	21 Aug <i>William and Alexander</i> ketch 58t driven ashore and lost in easterly gale Terrigal	Not in BB PH	Loney 1978:81 Atlas, NSD Bateson 1972
23–24 Sept 1892	ECL	M – S NSW	Low moved SW to off C NSW. Gales and high seas. <i>Minnie Young</i> schooner 138t left Newcastle 22 Sept for Townsville and disappeared, 8 lost	Cat X/A/B most NSW	BB  Loney 1978:81 Atlas NSD
16–18 Oct	Low	S NSW	Strong S wind, heavy seas	Cat B S NSW	BB
12 Nov 1892	ECL	SEQ – N NSW		Cat A N NSW	BB

			11 Nov <b>Wellington</b> iron steamer 182t lost on rocks Nambucca R bar. Marine Board Inquiry blamed heavy seas for loss		Loney, Atlas, NSD Richards 1996:30,170 3 Dec
1893					
1893	Entrance works	Richmond R	Dredging of shoaling in North Ck		Coltheart 1997:64
Jan – March	Very wet period Record floods	SEQ	First three months of 1893 record floods Mary, Noosa, Brisbane and Nerang Rivers in Qld and Manning and Macleay Rivers in NSW		Longhurst 1996:71
1–7 Jan	Very Severe storm	N – M NSW	Low formed over SEQ, crossed to sea Cape Byron and moved S with S gales and tremendous seas 2–5 Jan	Cat A N–M NSW	BB
			Late Dec <b>Agnes Rose</b> ketch 35t left Sydney for Port Stephens and disappeared, wreckage later ashore Broken Bay		Atlas NSD Loney
	Seas breaking over Julian Rocks		1–2 Jan 'a violent storm lashed the coast for days ... the waves were breaking over the Julian Rocks ... [Lismore] experienced the wildest night ever'		Ryan & Smith 2001:96
	Wind shift to east	Byron Bay	3 Jan The next morning 'brought the dreaded wind shift' and 3 steamers sheltering in the Bay put to sea, the <b>Tweed</b> was wrecked		Ryan & Smith 2001:96
			3 Jan <b>Tweed</b> wood steamer 285t steering failed when attempting to get to sea and was driven ashore in heavy seas, Byron Bay, wreck destroyed by waves 21 Jan		Ryan & Smith 2001:96 Loney 1978:81 27 Jan, NSD 22 Jan
Jan	Storm surge  Southerly gale and heavy seas  'greatest submersion for years'	Ballina	<b>Photo</b> storm surge river St, Ballina <b>Northern Star</b> , Jan 1893 when 'without rain and under a clear sky, Ballina had its greatest submersion for years brought about by the southern gale and heavy sea during two days and a spring tide' The sea did some damage to the southern training wall 'it broke right over the bridge at the mouth of North Creek, which Mr Denning is constructing and sank his punt'	Previous surges, possibly in mid 1880's? PH	Murray 1983:35–6
14–16 Jan	Gradient	SEQ – Mid NSW	Long SE fetch to coast, heavy seas	Cat C N NSW	BB
			17 Jan <b>Jessie</b> brigantine 259 t lost Chesterfield Reefs		NSD
21–23 Jan 1893	Tropical Cyclone	SEQ – M NSW	21 Jan TC recurved over Brisbane at Hervey Bay wind S in am, west pm and cyclonic NW in evening, rough seas SEQ	Cat C N NSW Impact possibly underestimated PH	JC BB
			21 Jan <b>Belmore</b> wood paddle steamer 66t ashore at Coffs Harbour. Attempts at refloating failed and broke up March 1893		Loney, NSD Atlas, Richards 1996 March
			21 Jan Wreck of <b>Tweed</b> ashore on beach Byron Bay since 3 Jan broke up		Ryan & Smith 2001:96, Loney



			21 Jan <b>Darcy Pratt</b> brigantine 155t Rockhampton to NZ, lost Polmaise Reef, Capricorn Group		NSD
1-4 Feb	<b>Tropical Cyclone Dicky Storm</b>	CQ – M NSW	Crossed coast Yeppoon 969hPa and moved S. <b>Extensive wind damage</b> and <b>very heavy rain</b> , Crohamhurst (Stanley R) 907mm in 24 hrs (3 Feb). A <b>15.2m wall of water</b> Stanley gorge. Maryborough 251mm (31 Jan) record daily Jan rainfall	Not in BB PH	BoM JC
			1 Feb <b>Dicky</b> steamer 226t left Fitzroy R in heavy beam sea and strong N wind. 4 Feb heavy W gale shifted to NE with very heavy seas, driven ashore Caloundra. Passengers and crew rescued	Hull visible on beach for 100 years  <b>Photo</b> Hull of wreck on beach 1900	JC, NSD Thomson 1967:294 Loney 12 Feb Longhurst 1995b:8
5 Feb	<b>Record flood</b>  'the worst flood ... ever seen'	Mary R	3-7 Feb <b>Major flood</b> Brisbane R. <b>9.25m</b> post office gauge. Peaked <b>5 Feb</b> bridges and 150 houses washed away, many drowned. <i>Elamang</i> and <i>Paluma</i> carried into Botanical Gardens. Over 20 people lost. Channel in bar which had been dredged to 20ft (6m) shoaled to 8.5ft (2.5m) <b>Photos</b> record flood Brisbane 1893	Estimated to be of similar stage height to 1841 flood, and both considerably higher than 1974.	Maryborough 1998:18, 20 Brown 2000:134, 167,174 Williams 2002:98
	<b>Record flood</b>	Noosa R	Record floods in February and March Sunshine Coast. Noosa R lakeshore inundated to 2m buildings and sawmills damaged		Brown 2000: 134, 167,174
1893	<b>Flood</b>	Nerang R	Southport baths washed away		Neil 1998:15 Longhurst 1994:17
1893	<b>Severe flood</b>	Tweed R			Coltheart 1997:61
1893	<b>Flood</b>	Richmond R			Ferguson 1995
1893	<b>Major flood</b> breach of barrier dune	Macleay R	Great gale flooded Macleay R and river <b>broke out 10km south</b> of Grassy Head		Neil 2001:11 Coltheart 1997:76- 77 winter flood
1893	<b>Major flood</b>	Manning R	Dredge washed on to Goat Island and severe upstream silting		Gill 1998:32 Coltheart 1997:84
10-11 Feb	<b>Tropical Cyclone</b>	CQ – all NSW	Short lived TC crossed coast Bustard Head 982hPa	Not in BB PH	BoM JC
	NE gale	S NSW	9 Feb <b>White Cloud</b> ketch 35t ashore and lost in NE gale Broulee		Loney Atlas, NSD
			10 Feb <b>Daphne</b> schooner 95t capsized off Wide Bay and lost Inskip Point		JC, NSD Williams 2002:148
			14 Feb <b>Shelbourne</b> ketch 61t sprang a leak and lost off Crowdy Head		Atlas, NSD Finkel 1987:40 1892
13 Feb	<b>Flood</b>	Brisbane R	Second flood Brisbane R		BoM
17 Feb 1893	<b>Tropical Cyclone</b>	SEQ – M NSW	Crossed coast at Bundaberg, tornado Moreton Bay, small boats lifted out of water. Floods Rockhampton to Grafton	Not in BB PH	JC
	Gale	Coffs Harbour	<b>Buster</b> barquentine 310t lost ashore in gale near Woolgoolga jetty (after mooring broke?)		Atlas NSD
17-19 Feb	<b>Major Flood</b>	Brisbane R	Third flood, 25cm below record flood of 5 Feb. <i>Elamang</i> and <i>Paluma</i> floated off from Botanical Gardens.		BoM
			19 Feb <b>Tadorna Radjah</b> 21t sank in Brisbane R during flood		Loney, NSD Williams 2002:95



	<b>Major Flood</b>	Mary R			BoM
8–10 March	Low off coast, SE gales	SEQ – C NSW	Low developed and moved off coast, SE gales, very rough seas	Cat C N NSW	BB
			8 March <b>Hebe</b> brig beached in gale and broke up quickly near Port Stephens		Loney 1978:81 NSD
			<b>Belmore</b> ashore Coffs Harbour since 21 Jan broke up		Richards 1996:28
	<b>Record Flood</b>	Noosa R	Second record flood Noosa R (following Feb floods)		Brown 2000:167
1893	<b>Record Flood</b>	Hunter R	Severe floods in Hunter R, highest recorded, eroded banks and washed away levees		Coltheart 1997:92
May			General economic depression hits Q and continues into 1890's.	Following floods and severe damage to businesses and infrastructure built in flood plains? PH	Brown 2000:167, 169
9–12 June 1893	<b>ECL SEQ</b>	SEQ – M NSW	Low moved SE from central Q, crossed coast and moved E. Gales and very heavy rain SEQ and N NSW. Maryborough 209mm (9) record June daily rainfall	Cat B N–M NSW	JC BB
	Gale	Coffs Harbour	12 June <b>Saucy Jack</b> brigantine 156t Newcastle to Johnston River and driven ashore 2km south of Coffs Harbour, crew rescued off Trial Bay		Loney schooner Atlas 24 June
10–12 June	<b>Minor Flood</b>	Brisbane R			BoM
	<b>Major Flood</b>	Mary R	June 1893 Mary R rose again to a lesser height than the record flood in Feb		Maryborough 1998:18
5–7 July	<b>Low</b>	S NSW	Rough seas	Cat B S NSW	BB
Late Aug	<b>Shallow bar?</b>	Brunswick R	25 Aug <b>Cairo</b> ketch 94t lost at Brunswick Heads, refloated. Maryborough 103mm (22 Aug) record Aug daily rainfall. Brisbane 57mm (22 Aug), 28mm (23 Aug). Lismore 20mm (24 Aug)		JC, Atlas, NSD Gordon et al 1978:16 20 Aug
Sept	<b>Shallow bar?</b>	Maroochy R	Sept <b>Gneering</b> brigantine 62t mouth of Maroochy R		NSD
28–30 Oct	<b>Low SEQ</b>	SEQ – N NSW		Cat B N NSW	BB
Mid Nov	<b>Heavy seas</b>	Clarence R	20 Nov <b>Lennie</b> steamship lost in heavy seas while working on Clarence R breakwater		Loney NSD Jan
28–30 Dec	<b>Tasman Low</b>	S NSW – Bass Strait	Southerly gales with rough to high seas. Gabo Is 142mm (29 Dec) record Dec daily rainfall	Cat A S NSW	JC BB

1893	Erosion face	Gold Coast	Suggested date for storm erosion face, Gold Coast. During 1893 120ft (36m) washed off Trial Bay breakwater	Could be 1895 PH	Smith and Jackson 1990 Neil 2001:11
1894					
1894			<i>Oakland</i> steamer aground Richmond R breakwater and later refloated	Photo	Olivieri 1999
Late Jan	Tropical Storm	CQ – C NSW		Not in BB PH	
			29 Jan <i>Sea Foam</i> ketch 66t driven ashore Shoal Bay, Port Stephens		Loney 1978:82 Atlas, NSD
			Jan <i>Borough Belle</i> brigantine 210t lost on Bellona Reef		
			6 Jan <i>Summer Rose</i> schooner 83t left Sydney for Tweed R and disappeared		Keats 1999:211
18–19 Feb 1894	TC	SEQ – M NSW	TC passed E of Brisbane, moved S off coast then to Lord Howe Is, storm surge 0.58m Moreton Bay	Cat A N NSW	BB JC
1894	Severe storm	Double Is Pt	Damaged lantern and houses Double Is Pt Lighthouse		Brown 2000: 182
11–15 March	Tropical Cyclone	SEQ – N NSW	TC passed E of Cape Moreton with hurricane force wind, every house on Cape Moreton damaged. S gales, rough seas.	Cat B N NSW	BB Thomson 1967:361
1894			11 March <i>Forest Queen</i> ketch 51t beached ashore after losing sails in squall, Seal Rocks		Loney Atlas NSD
			13 March <i>Tuggerah</i> cutter 62t unloading bricks at Byron Bay jetty when big seas caused both anchors to drag. Driven ashore and lost with wreck on the beach for some years		PWD 1978:19 Ryan and Smith 2001: 99, NSD Loney 1978:83
	Hurricane force winds	Moreton Bay	14 March <i>Grace Darling</i> schooner 69t dragged anchor and driven ashore Comboyora Pt, Moreton Is		Thomson 1967:294
6–8 Apr 1894	TC <i>Zeta</i>	FNQ	Severe low in north Coral Sea. Damage and flooding FNQ	First cyclone named by Clement Wragge	JC BoM
18–19 Apr	Low	N – C NSW	Low from N deepened off NSW coast	Cat B M NSW	
			20 April <i>Mary Warner</i> schooner 65t sprang a leak and abandoned Kiola		Loney Atlas
			20 April <i>Mabel White</i> schooner 84t sprang a leak and abandoned off Richmond R		Atlas Loney
Early May	Gale	SEQ – C NSW		Not in BB PH	
			5 May <i>Maggie</i> smack lost ashore Broughton Is		Atlas NSD
			6 May <i>Caledonia</i> schooner 46t sprang a leak and lost off Norah Head		NSD
			7 May <i>Kenilworth</i> schooner 113t, Rockhampton to NZ, dismantled E of Cape Moreton and towed to Moreton Bay		Loney EAS

5–6 June	Low	S NSW	Low moved ND into Tasman Sea	Cat B S NSW	BB
Late Aug	SE gale and heavy swell		From Tasmania <i>Cambus Wallace</i> 'had experienced nothing but boisterous seas with gales and rains'	Low off S NSW? PH	Hanlon 1935:229
			3 Sept <i>Cambus Wallace</i> barque 1651t from Glasgow to Brisbane 'rain and gale force southerly winds drove her off course ... lifted by the force of the waves to the second line of breakers' (200 yards [180m]) offshore at Stradbroke Is, 5 lost	At the site of future Jumpinpin breach	Neil 1998:15 Salter, 2002:32, 93 Loney 2 Sept Carter and others 1994:75
Winter 1894	Jetties damaged	Coffs Harbour, Woolgoolga	Open ocean jetties seriously damaged in severe winter gales	Severe gales not in BB PH	Coltheart 1997:72
1894	Dune ridge  Pre breach but later cut 1895–8	Jumpinpin	<b>Photo</b> Dune ridge looking north. Ocean beach narrow but no recent erosion scarp, ridge 10.5m high, with mature dune vegetation and some blow outs PH <b>Photo</b> Sept 1894 Memorial erected to sailors lost in <i>Cambus Wallace</i> shipwreck, on seaward side of dune ridge		Nolan and Longhurst 1996:31 Curvengen 1982
Mid Sept	W wind? PH		13 Sept <i>Isabella Gollan</i> schooner 69t lost at Bulwer Point, Moreton Bay	Not in BB	Loney, NSD Keats 1999:208
			15 Sept <i>Trio</i> ketch 90t sank off Port Stephens		Loney, Atlas, NSD
Late Sept	Heavy weather	C NSW	24 Sept <i>Rob Roy</i> ketch 41t lost north of Port Stephens in heavy weather	Not in BB	Loney, NSD Atlas
Mid Nov	Shallow bar?	Richmond R	15 Nov <i>William Langford</i> tug 20t swamped and lost ashore while towing ketch <i>Sir George</i> into Richmond R		Atlas, NSD Loney 25 Sept
1895					
1–4 Feb	Low	SEQ – C NSW	Low moved SE, gales and rough seas to coast	Cat A/B N–C NSW	BB
	Gale and heavy seas	Trial Bay	31 Jan <i>Margaret Jane</i> schooner 68t driven ashore and lost in gale with heavy seas Trial Bay, crew rescued	Implies E gale possible tropical storm to N PH	Loney Atlas NSD
			3 Feb <i>Goodiron</i> wood lighter 40t sank off Richmond R		Atlas NSD
1895	Flood	Richmond R			Ferguson 1995
1895	Flood	Manning R			Gill 1998:32
1895	Major flood	Macleay R	Flood breaches of barrier dune north of Half Tide Rocks		Halligan 1906

Early 1895	<b>First washover at Jumpinpin</b>  Strong easterly gales	Stradbroke Is	Wash over of 10m high scrub covered barrier dune '...during the easterly gales experienced in the early part of the year [1895] the sea made a breach of about 350 yards (320 m) in extent through Stradbroke Island; this has since extended and at high water spring tides the water now washes over into Swan Bay. <b>Should the erosion continue Stradbroke Island will be divided</b> ' Capt Almond Sept 1895 (Marine Department Report 1894–95)	Suggests storm very intense in SEQ PH	Almond cited in Neil 1998:15  Salter 2002: 93 breach in 1896  Beasley 1948 breach in 1894
Mid Feb	<b>Heavy Seas</b>	Hastings R	16 Feb <b>Candidate</b> ketch 86t capsized in a heavy sea entering Hastings R, 5 crew lost, refloated and lost May 1912	Not in BB. Possible tropical storm to north? PH	Atlas NSD
Early Aug	SE gale	Seal Rocks	8 Aug <b>Catterthun</b> ship 2179t struck rock and lost off Seal Rocks in SE gale with heavy seas and rain. Some passengers and crew survived, 58 lost	Not in BB PH	Loney Atlas NSD
Late Sept	<b>Gale</b>	Broken Bay	27 Sept <b>Gem</b> coal hulk 480t sank while under tow off Broken Bay in gale, 2 lost	Not in BB PH	Loney Atlas, NSD
Late 1895	<b>Little beach mining</b>	N NSW	BB suggests few storms and Carne from observation notes prior to late 1895 'For a considerable time past ... little beach mining ... <b>owing to the absence of any gales of consequence</b> '.	Small timber vessel <b>Tuggerah</b> on the beach at Byron Bay implies no severe storms N NSW from March 1894 to early 1896 PH	Carne 1896:150 BB
1896					
1896	<b>Breakwater commenced</b>	Macleay R	Construction of breakwaters near the site of the 1895 flood breach	Flood breach shown on plan of works PH	Coltheart 1997:77, 80
1896	<b>Entrance works</b>	Richmond R	May reported that shoaling had made it impossible for cane punts to carry cane from North Ck to the Broadwater Mill		Murray 1983:139
26 Jan 1896	<b>TC Sigma Gale</b>	FNQ – C NSW	Severe TC NE of Townsville, extensive damage Townsville, flood and surge 1.8m inundated suburbs that became 'an inland sea with large waves', very rough seas and heavy rain, many drowned. 29 Jan, Rockhampton 288mm record Jan daily rainfall	Not in BB PH	JC
			27 Jan <b>Wollumbin</b> wood steamer 231t ashore at Norah Head. Salvaged 13 Feb		Atlas, NSD, Bateson 1972 28 Feb
			29 Jan <b>Heather Belle</b> steamer 78t lost Townsville Harbour		NSD
			Jan <b>Fate</b> lost Magnetic Is in Sigma Gale		NSD
			Jan <b>Orara</b> wood steamer 66t lost prop shaft, drifted ashore and lost Woolgoolga		NSD, Loney, Atlas 21 Dec 1895 Richards 1996:165 30 Dec 1895
	Minor Flood	Brisbane R			BoM

Feb	Flood	Fitzroy R, Rockhampton	8.92m Some 100 homes flooded, 300 people evacuated		Webster
Early 1896	Second washover of Jumpinpin  Strong SE gales	Stradbroke Is	<b>Photo of washover</b> Assumed 1896 photo shows trees that appear to have been dead for some time, possibly since 1895? PH		Curvengen 1982 Tomlinson and McCaulay 2001 Chapman and others 1982:116 cite Beasley 1948
Late Feb	Gale	Keppel Bay	23 Feb <b>Violet</b> ketch 37t lost in gale Cape Capricorn, Keppel Bay	May have impacted SEQ? PH	NSD
Late March	Gale	CQ – M NSW		Not in BB PH	
	Heavy seas	Bellinger R	20 March <b>Harrington</b> wood steamer 51t stranded on Bellinger R bar and destroyed by heavy seas	Probable tropical storm to N? PH	Loney Atlas NSD
			24 March <b>Burdekin</b> steamer 80t lost Woodlark Island		NSD
12–15 May	Tasman low	M NSW – Bass Strait	Low developed in Bass Strait and moved N along NSW coast then E over N Tasman Sea, S gales and rough seas	Cat A/B M–S NSW	BB
May 1896	Gale	Port Stephens	23 May <b>Condong</b> schooner 103t forced ashore in Port Stephens	Not in BB PH	Loney Atlas, NSD
			24 May <b>Karoola</b> barquentine 201t lost Morna Point in same gale		Loney 1978:86 Herald, NSD
			24 May <b>Byron</b> wood steam ship 145t sprang a leak, abandoned and sank off Newcastle	Richards 1996	Loney, NSD, Keats 1999: 207 Richards 1996:32
1–2 June	ECL		Low developed off C NSW and moved NE	Cat A/B C–S NSW	BB
12–16 June	ECL		Formed near Lord Howe Is, moved W and deepened off Sydney	Cat X/A C–S NSW	BB
19–24 June	Tasman low		Low off S NSW slowly moved E and intensifying over Tasman Sea	Cat A S NSW	BB
	Shallow bar?	Clarence R	10 June <b>Favourite</b> steamer 29t lost on north spit Clarence R, crew saved		Loney NSD
	Shallow bar	Tweed R	9 Sept <b>Chindera</b> wood steamer 186t lost Tweed Bar. Pilot's report on wreck Keats 1999:138. Swell (but not rough as tug crossed bar) bar had silted up to 2.1m [ship drew 3m]		Richards 1996:159 Longhurst 1996:75 NSD Atlas 9 Dec
27–29 Aug	Tasman low	S NSW – Bass Strait	Deep 'cyclonic' low formed in Bass Strait. Tremendous seas.	Cat X S NSW	BB
1896	Breakwater damage	Wollongong	Heavy gales damaged breakwater, which was strengthened during later repairs		Coltheart 1997:105
1897					

1897			During 1897 100ft (30m) washed from Trial Bay breakwater		Neil 2001:11
	Shallow bar?	Nambucca R	21 Feb <b>Alpha</b> schooner 82t lost Nambucca R bar		Loney NSD
31 May – 1 June	ECL	M–S NSW	Low well off coast, SE to E gales, 3 ketches lost Cape Hawke	Cat A M NSW	BB
	Gale	Cape Hawke	31 May <b>Favourite</b> ketch 50t lost ashore Cape Hawke when anchors dragged		Atlas NSD
			31 May <b>Bell Bird</b> ketch 57t lost at Cape Hawke in gale		Atlas NSD
			31 May <b>Ability</b> ketch 48t ashore and lost Cape Hawke		Atlas NSD
			1 June <b>Osprey</b> ketch 64t lost in heavy water, Cape Hawke		EAS
22–24 April	Tasman low	C NSW – Bass Strait	Low developed in S Tasman Sea, S gales and rough seas	Cat A/B C–S NSW	BB
31 May – 1 June	ECL		Low developed well offshore. E–SE gales	Cat A M–C NSW	BB
			31 May <b>Favorite</b> ketch dragged anchor and ashore, Cape Hawke Bay. <b>Bell Bird</b> and 2 other ketches ashore		EAS
10 July 1897	Shoreline erosion (during last 7 years)	Currigee, western shoreline of South Stradbroke Is	<b>School building moved.</b> In Aug 1890 the school was built 'on a sandhill facing the Broadwater' The school yard was three chains [60m] from the water. Seven years later it was moved as the building was right on the beach with the front door near the water	Rapid shoreline movement around 40 m in 7 years before Jumpinpin opening. Channel re alignment? PH	Salter 2002:53–54
25–26 July	ECL	SEQ – N NSW	Low from Q moved to sea near Port Macquarie	Cat A M–C NSW, impacts to SEQ PH	JC BB
			25 July <b>Mikado</b> tug lost at Trial Bay		Atlas, NSD
	Gale	Gold Coast	25 July <b>Heroine</b> schooner 122t anchored Coolangatta and on 26 July waves breaking over ship. Anchor slipped, beached and lost Coolangatta Creek, crew survived	Wreck high up on beach, storm surge? Similar to loss of <i>Coolangatta</i> 1846 PH	Loney Atlas NSD Longhurst 1996:75
	Gale	Byron Bay	26 July <b>Candidate</b> driven ashore north of the Byron Bay jetty at height of gale, later refloated		JC Ryan and Smith 2001:99
July 1897	Breakwater damaged	Macleay R	Furious easterly gale swept away part of the breakwater, dredge <b>Jupiter</b> forced to sea, and tender <b>Mikado</b> sheltering under the breakwater was lost when the outer part of the structure was carried away		Coltheart 1997:79
Late Dec	Big Sea	Southport	20 Dec <b>Mystery</b> small steamer 43t capsized Southport Bar 'she reached the first line of breakers ... observed to broach being immediately overwhelmed by a big sea'		Keats 1999:103 Salter 2002:34 NSD
	Heavy seas	Broken Bay	Late Dec <b>Minora</b> brig 249t lost in heavy seas off Broken Bay, 7 lost, 2 survived	Reported Jan, lost late Dec? PH	Loney, Atlas, NSD Herald 1 Jan

1898					
Early Jan	Gale	Bundaberg, SEQ	11 Jan <b>Ranelagh</b> steamer 836t lost at Burnett Heads in gale		NSD, EAS Loney
24–25 Jan	TC	SEQ – M NSW	SE gales and heavy weather along coast	Cat B N – M NSW	BB
4 Feb 1898	<b>TC Eline</b>	NQ	984hPa extensive wind damage Mackay, Pioneer R cut flood path to sea (4.8km shorter)		JC
12–14 Feb	TC	CQ – all NSW	Continental monsoon cyclone crossed to sea Brisbane 998hPa and moved S along NSW coast. Many ships and lives lost, 500ft of Bellambi jetty washed away	Not in BB PH	JC
	Gale	Illawarra	13 Feb <b>Amy</b> brig 221t driven ashore and broke up in gale Illawarra coast, 7 crew lost		Loney, Atlas, NSD
	Gale	Port Hacking	13 Feb <b>Marion Fenwick</b> steamer 97t ashore in heavy weather Port Hacking		Atlas NSD
			12 Feb <b>Atacama</b> barque 1312t Newcastle to San Francisco sprang a leak, abandoned and sank 120km off Jervis Bay, 5 rescued from boat, 13 lost		NSD Atlas 9 Feb JC 500nm off coast
			Mid Feb <b>Malcolm</b> brigantine 182t sank at Bulli jetty in wild weather that battered NSW coast. 6 crew lost.		Loney, EAS, Atlas, AE NSD
			<b>Mary Peverill</b> schooner beached in Whitsunday Passage	Widespread influence to N PH	JC
	Flood	Mary R	Feb <b>Marioness of Lorne</b> schooner 78t sank in Mary R during flood		NSD Loney
	Flood	Richmond R			Ferguson 1995
Feb	Flood	Fitzroy R	8.23m		Webster
6–8 March	<b>TC Luita</b>	SEQ – N NSW	TC off SEQ passed E of Brisbane to SE. SE gales and very high seas along coast	Cat B N NSW	BB JC
5–7 May 1898	<b>MAITLAND GALE</b>	Whole coast	Low formed off N NSW and deepened before moving SE. Vessels lost in severe SE gales, reported to be the most severe storm for 30 years (since Carrawa Storm 1866) Nobbys 182mm record May daily rainfall (6 May)	Cat A/B Underestimated PH	BB Herald JC
		Broken Bay	6 May <b>Maitland</b> iron paddle steamer 880t left Sydney in 'severe gale', and suffered damage before leaving Heads. 'Enormous seas' caused further damage and extinguished the fires. Driven onto rocks and immediately broke up Maitland Bay, 21 lost and some 60 survived		Richards 1996:43 Loney 1978:88 NSD
			5 May <b>Coral</b> ketch 60t ashore in gale Newcastle		Loney 1978:88 Atlas
	SE gale 40kts		6 May <b>Hereward</b> iron clipper 1513t driven ashore Maroubra Beach	Photo attempting salvage	Birrell 1987:2 NSD, Loney, Atlas
			6 May <b>Isobell</b> schooner 69t beached and broke up quickly Crowdy Bay		Atlas, Loney 1978:88 <i>Isabell</i>
			6 May <b>J G Kondio</b> schooner 92t lost in gale Nambucca to Sydney		Atlas NSD



			6 May <b>Ethel</b> fishing boat 33t lost at Newcastle near <i>Coral</i>		Loney 1978:88 NSD
	Enormous seas	Newcastle	<b>Merskworth</b> steamer 270t abandoned after fires extinguished by enormous seas off Newcastle, 3 crew survived, 10 lost		Loney 1978:88 Herald, NSD, AE EAS
			May <b>Adelaide</b> schooner 217t left Newcastle for Gisborne, NZ and disappeared in 'Maitland Gale'		A E, NSD Atlas
	Gale	Trial Bay	6 May <b>Philip Palfrey</b> schooner 96t dragged anchors and ashore in gale Trial Bay		Atlas, NSD Loney 1978:88
			7 May <b>Fido</b> barquentine 525t lost off Newcastle in gale		Atlas NSD
	<b>Tombolo Breached</b>	<b>Point Stephens</b>	Solid broad sand spit, vegetated with low bushes, 200m wide. Wash over breach 600m wide.	Washed over several times since PH	Herald April 8 2008
Early May 1898	<b>Channel cut Jumpinpin</b>  Strong SE gales and a mountainous sea from <b>Maitland Gale</b>  Two TC's earlier in year and big swell from Maitland Gale completed the breach which commenced as wash-overs in 1895 and 1896	<b>Stradbroke Is divided</b> into North and South sections  Diminished tidal flow to south channel and Southport bar	'during the recent gales ... a channel has been cut right through Stradbroke Island at Jumpinpin ... the break is about 700 yards (640m) wide ... and the sea is now breaking... onto the mangroves inside the Bay ... a bar is forming outside'.  Hanlon observed 'the break-through at the narrow neck of Jumpinpin ... [when] ... mountainous seas, a king tide and high tide on the ocean side with low tide inside culminated 'to form a difference of levels of the ocean and bay's waters'. 'The fury of the gale drove a trickle of water right across the dividing neck ... the incoming waters, pouring down the precipitous inner bank in a cataract, soon made a channel for the sea to cascade into the bay'. '... the ever-encroaching seas seemed to melt the sand, with scrub standing on it, as though it was sugar – large areas collapsing in one sweeping surge'	Spring high tide and wave run up on ocean side overtopped low dunes from previous washovers. Spring low tide on the bay side explains 'the cataract' and 'the sea pouring into the bay'. At the next low tide on the ocean side the bay would have been high tide. The ebb flow flowing directly to sea would have scoured the channel PH	Neil 1998:15 cites <i>Brisbane Courier</i> 18 May 1898 Hanlon 1935:226
1898	Log wall	Byron Bay	Log wall constructed to protect jetty abutments from further erosion		Decker collection historic photographs
6–8 June	<b>ECL</b>	SEQ – M NSW	Very severe storm at Lord Howe Is, SE gales and heavy weather to coast	<b>Cat B N – M NSW</b>	BB
			June <b>Merlin</b> ketch 73t lost Morna Point, Port Stephens		Atlas Loney
21–22 June	<b>Low</b>	SEQ – C NSW	Deep low moved E to NZ by 24 June, SE to E gales and rough to heavy seas to coast	<b>Cat A/B N–C NSW</b>	BB
17–18 July	<b>Low</b>			<b>Cat B C NSW</b>	BB
			18 July <b>Liffey</b> schooner 102t ashore on north head Richmond R when under tow		Loney Atlas
			19 July <b>Macleay</b> steamer 398t stranded on Hastings River bar refloated by tug <i>Thistle</i>		Loney



			20 July <b>Wendouree</b> steamship 1640t lost on Oyster Bank leaving Newcastle, crew survived		Loney Atlas
July	Shallow bar?	Hastings R	31 July <b>Jessie Sinclair</b> ketch 74t swamped under tow and aground Hastings R bar		Loney NSD
Early Aug	Gale?		4 Aug <b>Mary Adkins</b> ketch 120t sprang a leak, beached and broke up Crowdy Bay	Not in BB	Atlas, NSD Loney 28 Sept Finkel 1987:40
9 Dec	S gale and heavy seas	Sydney	9 Dec <b>Hereward</b> ashore since 6 May broke up in heavy seas Maroubra Beach	Not in BB	Birrell 1987:5 NSD, Loney
1899					
1899	Breakwater	Trial Bay	After ten years work on the Trial Bay breakwater it was 721ft (220m) long. In that time 684ft (209m) had been destroyed by seas	Similar to early construction on Clarence R breakwater PH	Neil 2001:11
1899	Wharf protection	Byron Bay	Wing walls with stone extended to protect jetty approaches from subsidence after heavy seas		Coltheart 1997:71
1899	Entrance works	Richmond R	'No matter what changes were made... southerly weather washed huge quantities of sand around the end of the breakwater into the river mouth. Work on the northern breakwater was stopped in April 1899 to speed up progress on the southern breakwater. For 2 years 200 men worked night and day until in May 1901 when it reached 7 542ft [2 300m] the night shift returned to work on the northern breakwater'		Coltheart 1997:64
Feb	Shallow bar	Tweed R	16 Feb <b>Orara</b> wood steamer 298t struck bar and lost north shore Tweed R bar <b>Photo</b> <b>Orara</b> aground on rocks north shore of Tweed R		Atlas, NSD Richards 1996:32, 165 Longhurst 1996:75
4–5 March 1899	<b>TC Mahina</b> <b>Bathurst Bay Hurricane</b>	FNQ	Extreme TC crossed Princess Charlotte Bay with <b>eye 914hPa</b> (lowest barometer reading in Queensland), <b>huge storm surge 14.6m</b> on Barrow Is. Some <b>100 vessels</b> and over <b>350 people lost</b> , Bodies and wreckage formed long drifts in the sea and on beaches. Dolphins found 15m up cliffs on Flinders Is and sharks up to 40 km inland. Shredded 64km of coastline, cut grass to ground leaving the skeletons of trees, knocked down Cape York telegraph line	Est. Cat 5	JC NSD List of vessels lost see Kerr 1985:236 Townsend 2008
4 April	Low	S NSW	Developed near Jervis Bay, moved NE, SE gales and rough seas	Cat B C NSW	BB
13–16 June	ECL	SEQ – S NSW	Developed off N NSW moved S and deepened before moving E	Cat B N NSW	BB

26 June – 4 July	ECL Off Yamba	SEQ – S NSW	Low developed off Clarence R and expanded over the whole Tasman Sea, extending to NZ (The Bluff 976hPa). A 'storm of vast dimensions and great intensity' very strong gradients to NSW coast	Cat X/A most NSW	BB
	Flood	Richmond R			Ferguson 1995
10–13 July	ECL Off SEQ	SEQ – C NSW	Low off SEQ, strong high over Tasmania. Gradient, long SE fetch	Cat B N – M NSW	BB
July 1899	Bad weather	Wide Bay	31 July <i>Helena</i> schooner 126t lost Hook Point, Wide Bay bar in bad weather		NSD EAS
5–19 Aug	Low	SEQ – all NSW	Deepening low off S NSW, moved N and NE, SE to S gales, very long period swell	Cat X/A/B M–S NSW	BB
			10 Aug <i>Isabel</i> schooner 19t lost in Whitsunday Islands		NSD
23–25 Aug	Low CQ	CQ – C NSW	Moved south along NSW coast, SE to E gales	Cat A/B M–C NSW	BB
Late 1899	<b>Federation drought</b>	East coast	Elsewhere in Australia drought began in 1895	On coast from late 1899 PH	BoM
1900					
1900	<b>Federation drought continues</b>	East coast			BoM
1900–09	Low storm and erosion period	NSW	1899–1909 No erosion noted on NSW coast		Chapman and others 1982: 116
1900–1905	No severe storms	Queensland	No severe Tropical Cyclones (except for FNQ 1903) and no ECL's 1900–1911		JC
1900–1910	Water hyacinth	Clarence R	Weeds in side creeks and parts of Richmond R completely choked and navigation impeded		Coltheart 1997:69 Ferguson 1995
1900	Breakwater construction	Tweed R	Darley's plan (1896) funded in 1899. In the recession of 1904 work was suspended short of design length. In June 1909 the dredge <i>Tethys</i> was defeated by 'immense' quantities of shifting sand, and the bar was 'almost as bad as before work began'		Coltheart 1997:62–3
27 March	Shallow bar?		<i>Sarah Fenwick</i> steamer 94t (formerly <i>Corio</i> ) struck bar lost steering and ashore on north breakwater Richmond R bar		Loney Atlas
26 May	ECL		Brief low off S NSW. Local Flooding	Cat B S NSW	BB
6–8 June	<b>Harvester Gale</b>	SEQ – all NSW	Low off Sydney deepened and moved ENE, intense at Lord Howe Is. S gales and heavy seas to coast	Cat A/B M–S NSW	BB
			6 June <i>Jane</i> schooner 51t lost at Port Stephens when caught in storm		Loney, Atlas NSD 8 June

	Shallow bar?		5 June <b>Henne de Fraine</b> schooner 96t leaking and sank after crossing Camden Haven bar		Atlas, NSD Finkel 1987:40 3 July, Loney 4 May
			8 June <b>Gleaner</b> schooner 115t lost ashore at Bawley Pt		Loney NSD 18 May
			8 June <b>Harvester</b> barquentine 1499t Newcastle to Cape Town and lost north of Forster		NSD
25 June 1900	Shallow bar?		<b>Confidence</b> small schooner (oyster boat) carrying oyster spat to Moreton Bay. Seen on Wide Bay bar, wreckage ashore Inskip Pt		Loney Kerr 1985:190
4–6 July	Low		Developed off Newcastle moved E, E – SE Gales, local flooding	Cat A/B C–S NSW	BB
23 July	ECL Off N NSW	SEQ – C NSW	ECL formed off N NSW coast, tracked E, with SE to E gales, very rough seas	Cat A/B N – C NSW	BB
	Heavy seas	Forster	23 July <b>Empress of India</b> schooner 62t lost Forster bar in heavy seas	Shallow bar?	NSD
29 Nov 1900	Shallow bar with 'heavy swell and an easterly wind'	Macleay R	<b>Coraki</b> iron steamer 326t struck bar heavily and carried on to southern breakwater in heavy swell and sank blocking channel. Wreck blown up Dec	Not in BB PH	Richards 1996:34, 160 Atlas, NSD Loney
1901					
1901 and 1902	<b>Federation drought</b> Disastrous drought and bushfires	East coast	Cooloolo 'was an oasis when the whole of southern Queensland was a vast Sahara'	Intensity compared to the 2001–2 drought PH	Brown 2000:176
Summer 1901	Water hyacinth		During Federation Drought weeds choked many northern rivers, including Lavender Ck, Murwillumbah's drain to Tweed R. Drain bypassed and creek filled in		Coltheart 1997:62–3
20–21 June	Low	S NSW	Low developed off S NSW, moved E, heavy seas	Cat A S NSW	BB
28 June – 4 July	ECL	SEQ to N NSW	Low formed off Moreton Is, moved SE and deepened	Cat B N NSW	BB
			1 July <b>Protector</b> paddle steamer 158t capsized in heavy seas attempting to cross Richmond R bar in a gale, 6 lost		Loney, EAS Atlas NSD <i>Protector</i>
			1 July <b>Alexander Berry</b> wood steamer 62t lost ashore Kiama when anchor parted	Impacts to S PH	Atlas, EAS NSD
30 July	Tasman Low	S NSW	Brief strong gales, very rough seas	Cat B S NSW	BB
	Shallow bar	Nambucca R	9 Aug <b>Thistle</b> tug 64t aground Nambucca R bar, refloated		Atlas, NSD Loney Sept 1901

20–23 Aug	Low	S NSW	Low developed off Sydney, stationary	Cat B S NSW	BB
	Shallow bar	Richmond R	28 Aug <b>Oakland</b> steamship 398t hit Richmond R bar and forced ashore on south breakwater, later refloated		Richards 1996 Loney
30 Sept – 1 Oct	Low		Low formed off S NSW, SE–S gales, heavy seas.	Cat A/B C – S NSW	BB
29–30 Nov	Strong north wind		29 Nov <b>Unique</b> steam tug 35t stranded attempting to cross Camden Haven Bar, later broke up	N gale and shallow bar? PH	Loney Atlas NSD
	Strong NE winds	N NSW	30 Nov Official party travelling to Byron Bay on Government steamer delayed by strong NE winds		Ryan and Smith 2001:57
1902					
1902	<b>Federation drought</b> continues	East coast	1902 Big drought over whole of Australia was in its third year '... near the coast occasional storms gave some relief' and cane was cut for inland fodder. An 18 year old plantation destroyed by bushfires		Maryborough 1998:24, 56
1902	Severe drought	Baffle Ck			Graham & Jodvalkis 1996
26 April – 2 May	ECL off N NSW	SEQ – S	Low off N NSW, moved ESE to NZ, S gales, heavy to tremendous seas	Cat A most NSW	BB
Mid 1902	Shallow bar	Manning R	<i>Electra</i> steamship could not cross bar		Linton 2004:67
8–12 July	Low		Low S NSW moved NE	Cat A, C–S NSW	BB
12–16 Aug	Low		Low off S NSW moved to Norfolk Is	Cat B C– S NSW	BB
1903					
			Relatively calm year except for two major events		
1903	Breakwater abandoned	Trial Bay	Commenced in 1889, after 14 years the wall was 300m [original design 1 400m] after being continuously damaged by heavy seas. There was extensive shoaling inside and the wharf was could not be used	Wharf now in sand dune PH	Coltheart 1997:81
	Federation drought Ends on coast		Drought at Baffle Ck not broken until 1905 flood		Graham & Jodvalkis 1996
	Rain	SEQ	Wet season rain but no heavy rain until 1908		BoM

Early 1903	Shallow Bar	Manning R	Despite numerous dredging attempts at the bar, it could not be kept clear and <b>large amounts of sand from the south beach carried up to 3km into the river</b>		Linton 2004:64
13 Feb	Shallow Bar	Hasting R	<b>Triumph</b> ketch 83t sank off Port Macquarie after striking bar, crew rescued by tug		Loney Atlas, NSD
9 March	TC <b>Leonta</b>	Townsville	TC 965hPa recurved over Townsville. Hurricane force winds SW to S caused extensive damage and 10 deaths		JC
March	Shallow Bar	Richmond R	9 March <b>City of Grafton</b> steamer lost on Richmond R bar, refloated		Atlas NSD late Sept
14 April	Low		Low off S NSW moved quickly E	Cat B S NSW	
24–27 May 1903	<b>Oakland storm</b> Intense low on trough off lower north coast, moved away to east	C – S NSW Heavy swell N NSW following days? PH	25 May Newcastle – heavy sea (but no gale) conditions. Camden Haven – heavy sea and strong SW wind (low forming off Cape Hawke PH). During night ‘icy cold’ full gale off Port Stephens with violent seas 26 May ‘Blowing hard from SE all day ... tremendous breakers Port Stephens bar, <b>Bellinger</b> unable to enter, after rescue of survivors from <b>Oakland</b> , anchored under lee of Broughton Is. During night two anchors dragged with ‘engines going all night sometimes at <b>full steam</b> ’, 27 May moderating	Cat A C – S NSW	BB Richards 1996: 38 – 42
			26 May <b>Oakland</b> steamship 398t sank in whole gale off Cabbage Tree Is, near Port Stephens, 11 lost (most from exposure), 7 saved by <b>Bellinger</b>		Loney, Atlas Richards 1996:34 NSD
1–3 June	Low Coral Sea	SEQ to C NSW	Low formed in trough off SEQ on 31 May deepened off N NSW and moved to NZ. Strong gales and rough to very high seas	Cat X/A N–C NSW	BB
June	Flood	Nambucca R	Scoured channel but within four months the bar was as shallow as ever		Coltheart 1997:74
July	Shallow bar?	Tweed R	3 July <b>Annie</b> steam launch 43t lost at Tweed R bar		Loney Atlas, NSD
17–20 Sept	Low	C to S NSW	Continental low deepened rapidly off coast 10 Sept <b>Maruma</b> schooner left for south coast and lost in a sudden storm that lasted a week	Impacts further N than BB PH	BB Loney
			7 Sept <b>Oceana</b> steamer 34t lost on the Manning R bar		Atlas, NSD
27 Sept	ESE wind	Port Stephens	27 Sept <b>Oimara</b> iron barquentine 1417t ran ashore and lost at Morna Point, Port Stephens in ESE wind. Nobbys 157mm record Sept daily rainfall (28 Sept)	Not in BB PH	Atlas NSD JC
1904					

1904–5	Beach gold rush 1904–5	Tugun	Small beach gold rush 1904–5 and leases pegged over beach between Currumbin and Coolangatta Cks		Longhurst 1996:110–111
6–13 Feb	Low		Low from inland deepened off S NSW (989hPa). Emily F Whitney experienced a damaging 'whirlwind' off Newcastle.	Cat A C–S NSW	BB
20–23 Feb	ECL off Tweed R	SEQ to C NSW	Low formed off Pt Danger and moved slowly E, severe conditions S on coast	Cat A/B N–C NSW	BB
15–19 April	ECL off SEQ	SEQ to all NSW	Low formed off SEQ and moved slowly S	Cat B N–M NSW	BB
8–11 July 1904	<b>Nemesis Storm</b> Low off Newcastle	C to S NSW	Low crossed coast Newcastle, fresh SE gale, rough seas, very heavy rain all day, numerous ships delayed in Sydney Harbour. 'one of the fiercest gales to hit the east coast' ... <b>compared to the Maitland Gale</b> [May 1898]	Cat A C–S NSW	BB
	S gale 'seas of extraordinary height'	Illawarra	9 July <b>Nemesis</b> steamship 1392t left Newcastle for Melbourne, last seen off Wollongong in a southerly gale with high seas, distress signals off Port Hacking and coast littered with wreckage, 32 lost	Suggests more severe than BB PH	Loney Atlas NSD
1904	Breakwater damaged	Nambucca R	Northern breakwater damaged by heavy seas was not repaired		Coltheart 1997:75
1904	Breakwater damaged	Camden Haven	The end of the southern wall washed away in heavy seas		Coltheart 1997:88
22–25 July	Gradient		Strong Tasman Sea high (1036hPa) and trough off SEQ. Fresh SE gales, rough seas	Cat B C NSW	BB
20–21 Sept	Low		Low near Tas moved NE, rough seas, vessels sheltering	Cat B C–S NSW	BB
27–30 Sept			Low SWQ moved to cross C NSW coast, S – SW gales and heavy seas.	Cat A/B C–S NSW	BB
Sept	Large waves	Newcastle	30 Sept <b>Adolphe</b> , 4 masted barque (French) 3204t from Antwerp aground on Oyster Bank and battered by large waves	Masts still standing 1906 PH	AE, Herald, NSD Coltheart 1997:104 photo
Oct 1904	Spit breached	Hastings R	Huge waves cut through north sand spit, and over the next eight months levelled the spit to low water, depositing sand in the river and forming a sand bank to the end of the southern wall by June 1905. By Oct 1905 the spit had rebuilt		Coltheart 1997:85
			11 Nov <b>Maud Weston</b> steam collier 130t sprang a leak and beached near Terrigal. Broke up later in rough seas	Not in BB PH	Loney Atlas NSD
1905					

1905	Northern breakwater completed	Richmond R	Work on northern wall completed 71ft [22m] short. Work ceased in 1910		Murray 1983:141 Coltheart 1997:65
1905	Beach gold mining	Sandon R			Biddle 2001
c1905	<b>Sand blows</b>	Byron Bay	<b>Photo</b> Byron Bay jetty shows wide beach, no storm cut, partly vegetated foredunes, paling fences almost completely buried and sand blowing into town and community concern over drifting sand. Between 1905 and 1912 brush fencing and grass planting on foredunes	Similar to 1919 photo PH	Ryan and Smith 2001:30
1905	<b>Foredunes vegetated</b>	Buddina Beach, Sunshine Coast	<b>Photo</b> Looking S from Point Cartwright Shows 1898 storm face well inland of foredunes covered in beach pinifex, with a small recent cut on beach face. Open sandy area between beach and Mooloolah R, also vegetated PH	Compare to oblique aerial photo 1962 that shows active sand movement between the beach and river PH	Longhurst 1995b:27, 35
24 Jan 1905	<b>Strong north wind</b>		<b>Violet Doepel</b> schooner 127t sprang a leak and sank in rough weather Coffs Harbour. From Sydney to Bellinger R battered by 'atrocious weather' for 59 days	N winds, passage normally 7 days PH	Loney Atlas NSD
1906					
1906	<b>Low flow</b>	Richmond R	River tributaries blocked with water hyacinth		Coltheart 1997:66
27–28 Jan	<b>TC</b>	FNQ Cairns	Hurricane force wind and extensive damage Cairns		JC
22 Feb	<b>Bushfires</b>	Victoria	<b>Speke</b> ship 2800t drifted ashore in bushfire smoke Phillip Is and broke up in heavy seas		EAS
19–23 March	<b>TC Norfolk Is</b>	SEQ to N NSW	TC moved from New Caledonia to Norfolk Is, heavy swell to coast		BB
3–5 May	<b>TC</b>	FNQ to CQ	4 May crossed coast Cairns, extensive damage from Mackay north		JC
30 May – 2 June	<b>Low</b>	S NSW – Bass Strait	Low from Vic crossed S NSW coast, moving slowly E, SE–S gale and rough seas	<b>Cat B S NSW</b>	BB
30 July – 2 Aug	<b>Tasman Low</b>	C NSW – Tas	Low moved NE into Tasman Sea, S gales and rough seas	<b>Cat A/B C–S NSW</b>	BB
7–10 Aug	<b>ECL Norfolk Is</b>	SEQ to N NSW	Deep low N of Norfolk Is and heavy swell to N NSW	<b>Cat C NSW</b>	BB
30–31 Aug	<b>Low</b>	C NSW – Bass Strait	Low moved from S NSW into Tasman Sea, S gales and high seas.	<b>Cat A C–S NSW</b>	BB
			32 Aug <b>Jones Brothers</b> schooner 141t entering Newcastle under tow swept onto wreck of <b>Adolphe</b> broke up quietly in big seas, 7 crew lost		EAS

30 Aug – 1 Sept	Low		SEQ Tropical low moved S with SE gales and rough seas	Cat A S NSW	BB
6–7 Sept	Low	S NSW – Bass Strait	Low off S NSW moved E	Cat B S NSW	BB
24–26 Sept	ECL Norfolk Is	SEQ to N NSW	Extended heavy swell to N NSW	Cat C NSW	BB
17–19 Oct	Low	C NSW – Bass Strait	Low crossed coast Jervis Bay, heavy swell to coast	Cat B S NSW	BB
1907					
19 Jan	TC	Cape York	TC crossed coast N of Cooktown. Extensive wind damage, many buildings destroyed, 9 deaths		JC
Early Feb	Gale	Lord Howe Island	<i>Maelgwyn</i> barque 1276t abandoned and lost in gale off Lord Howe Island	Not in BB PH	NSD
			13 Feb <i>Thistle</i> steamer 50t capsized and lost on bar Forster	Shallow bar? PH	Atlas NSD
26 Feb	ECL Port Macquarie	SEQ to all NSW	Rapidly deepening low formed off Smoky Cape and moved S along coast with 'violent southerly gales, and high seas'	Cat A M–S NSW Impacts further N PH	BB
28 Feb	Fresh	Brisbane R	First fresh in river, water hyacinth washed down river		BoM
16–18 March	ECL	M to C NSW	Small low off C NSW, strong winds and heavy seas	Cat C M NSW	BB
June 1907	Marine infilling River dredging		In the last 12 months five million tons of sand had been dredged from 16 coastal river mouths to keep them open. Wade, Chief Engineer, PWD, reported 'the trouble at the entrances is a mainly due to the ingress of sand from the ocean beaches ... frequent shoaling of some of the entrances is to be expected' but this could be addressed by 'concentration of tidal and river flows by breakwaters'		Coltheart 1997:109
1907	Entrance shoaled	Nambucca R	Between Jan and May shoals formed inside the northern breakwater and spread right across the entrance forcing the channel to the south side		Coltheart 1997:75
24–26 June	ECL off N NSW	SEQ to C NSW	Small low formed off N NSW, very high seas	Cat A/B N–M NSW	BB
13 Sept	Heavy seas	Richmond R	13 Sept <i>Tomki</i> steamer 590t ashore and lost in heavy seas leaving Richmond R bar. Steering failed and struck breakwater	Not in BB PH	Loney, Atlas Richards 1996:43 NSD
16 Oct	Shallow bar	Hastings R	16 Oct <i>Trilby</i> steamer 129t struck bar and ashore north side Hastings R bar		Atlas, Loney NSD



1908					
1–2 Feb	Low		Low crossed S NSW coast	Cat A/B M–S NSW	BB
23–24 Feb	TC off N NSW	N to C	Small TC off N NSW, SE gales with long fetch, rough seas to coast. Nobbys 253mm record Feb daily rainfall (24 Feb)	Cat A M NSW	JC BB Not BoM
1908	Photo waves over seawall	Broadwater, Southport	Storm surge and seawall damaged Concrete seawall constructed in 1901–2 for 1km south of the jetty after severe storms in the 1890's. Following construction the sandy beach along Marine Pde 'quickly disappeared' exposing rocks along the foreshore. In the 1870's tree stumps exposed at low tide along beach	1890's the Southport Bar was east of Marine Pde exposing the shoreline to storm waves PH	Longhurst 1994:26, 33 Neil 1998:33 Davenport 1986
6–12 March	TC	CQ – N NSW	TC formed N of Lord Howe Island and crossed coast St Lawrence, 12 March. Extensive wind damage St Lawrence. Southport 281mm, wettest March day on record. 284mm Brisbane City record daily March rainfall	Cat C N NSW	JC BB BoM
13–17 March	Moderate flood	Brisbane R	Local flooding in catchment. Heaviest rain since 1903		BoM
March	Flood	Fitzroy R	7.26m		Webster
April	Shallow bar	Richmond R	9 April <i>Sophia Ann</i> wood steamer 165t and <i>Rescue</i> tug 144t both lost on inner south spit Richmond R bar Photo of wrecks Date as 4 Sept 1908 incorrect PH		Loney Atlas NSD Olivieri 1999
Early May	Rough seas	Coffs Harbour	Rough seas fishing boats hauled onto jetty	Not in BB PH	Yeates 1990:125
28–29 July	ECL		Low in trough moved off coast to NE	Cat B, S NSW	BB
1–5 Aug	Low		Low from inland crossed coast near Sydney and rapidly intensified, S gales and high seas.	Cat X/A, C – S NSW	BB
Aug	Shallow bar	Manning R	22 Aug <i>Kincumber</i> steamer 137t lost after striking Manning R breakwater, two lost		NSD Atlas Loney 28 Aug
Late Aug	Drought	Baffle Ck	Saltwater intrusion into freshwater creek		Graham & Jodvaskis 1996
30 Sept – 2 Oct	Low		Low intensified off S NSW, S gales and high seas	Cat B, S NSW	BB
Late Dec 1908	Gale	N to C NSW		Not in BB PH	
1908			24 Dec <i>Samson</i> wood stern paddle steamer 101t abandoned and sank off Crowdy Head		Loney Atlas

			25 Dec <b>Advance</b> tug 181t sank off Catherine Hill Bay after colliding (in rough weather?) with barque <i>Inverna</i> , one survivor		Loney Atlas NSD
	Gale	Clarence R	26 Dec <b>Frederick Davies</b> steamer 61t abandoned and sank in gale at Wooli		Loney, Atlas, NSD Mack 1998:9
1909					
1909	Marine infilling	NSW coastal rivers	'a long period has elapsed since floods have occurred in the coastal rivers may account...for the acute trouble experienced at the entrances last year...[the] cause is...that breakwaters have not been extended on the side of the entrance from which the sand travels into the estuaries ...[consequently]... enormous volumes of sand... [have been carried]... into the estuaries...[and accumulated as 'inside bars']...a source of constant and ever increasing obstruction to navigation'. E de Burgh, Chief Engineer for Harbours, PWD	de Burgh wanted the breakwaters to be far enough out to sea to 'divert...the sand that is in motion on the beach into the deep water of the ocean current'	Coltheart 1997:109
1909	Entrance bar shoaling	Richmond R	Bar shoaling causing problems for shipping and dredging continued	Three years for offshore bar to form PH	Murray 1983:142
	Shallow bar?	Tweed R	Jan <b>Murwillumbah</b> wood steamer 49t lost Tweed Heads		Loney Atlas, NSD
Jan	Hot summer	Gold Coast	One of the hottest summers on record		Longhurst 2000:15
3–5 Feb	TC Coral Sea	SEQ – C NSW	TC from Coral Sea moved to Norfolk Is, rough weather on coast	Cat B N NSW	BB
	Gale	C NSW	3 Feb <b>Narooma</b> wood steamer 105t driven ashore and lost in gale Maitland Bay, crew survived. Near wreck of <i>Maitland</i> (6 May 1898)	Impacts to south not assessed in BB PH	Loney, Atlas Richards 1996:90 NSD, EAS
March	Shallow bar?	Manning R	<b>Burrawong</b> steamer aground at entrance	Photo	Coltheart 1997:84
19–20 May	ECL		Trough formed into low	Cat A/B C–S NSW	BB
9–10 June	ECL	SEQ – all NSW	Low formed in trough and moved S intensifying, SE gales, rough weather and very heavy rain to coast	Cat X/A, C–S NSW Impacts to N not assessed in BB PH	BB
			<b>Seestern</b> steamer 589t left Brisbane (3 June) for PNG and 'believed to have foundered in a heavy gale' off SEQ, wreckage ashore around 5 June.		EAS, AE Loney April
26–28 Sept	ECL	SEQ – all NSW	Low moved S along coast then E, shipping delayed	Cat A/B most NSW	BB
Late 1909	Breakwater subsided	Richmond R	From 1909 end of southern breakwater subsided but work continued		Coltheart 1997:65
1910					

29–31 Jan	TC	Q – M NSW	27 Jan TC crossed coast Cairns, then recurved to west and back to sea. 30 Jan 991hPa Mackay. Heavy seas and floods on coast. Major flood MacKay. 28 Jan, ESE whole gale Sandy Cape. Heavy gale and tremendous seas, Cairns.	Cat B N NSW	BB JC
			Flash flood Brunswick R, river boat sunk		Brokenshire 1988:71
Early 1910	Breakwater damaged	Richmond R	When southern wall was within 60ft [18m] of its designed length, very heavy seas washed away 30ft [9.15m], the end was repaired but work abandoned on both walls		Coltheart 1997:65
23–25 Feb	ECL	SEQ – N NSW	Coral Sea gale to coast	Cat C NSW	BB
Feb	Flood	Fitzroy	8.15m		Webster
10–14 March	Low Tasman Sea	SEQ to C NSW	Low moved from Coral Sea to Tasman Sea	Cat C N NSW	BB
March	Local floods	Brisbane R	In catchment		BoM
5–7 May	ECL	SEQ – M NSW	Low near Lord Howe Is, rough seas to coast. Twewantin 268mm record daily June rainfall	Cat C N NSW	JC BB
2–3 June	ECL off Q	SEQ – M NSW	Low near Lord Howe Is, rough seas to coast	Cat B N–M NSW	BB
18–19 July	Low formed off N NSW	NSW coast	Low moved S along coast, 999hPa at Sydney, heavy gales and property damage	Cat A/B M–S NSW	BB
	Erosion	C NSW	Tremendous storm 'hurricane' off South Head		Chapman and others 1982:116
July	Breakwater damage	Port Kembla	Most severe storm recorded at Port Kembla and huge seas caused serious damage to the breakwaters rolling the biggest stones into the sea		Coltheart 1997:107
26 Aug	Heavy seas	Coffs Harbour	Shipping delays, but still operating	Not in BB PH	Yeates 1990:126
28–30 Oct	Low		Low off S NSW	Cat A/B C–S NSW	BB
			28 Oct <i>Wyoming</i> steamer 258t ashore and abandoned Kiola Beach		EAS
12–13 Dec	Low		Low moved SE and deepened. Southport 247mm (12) record Dec daily rainfall	Cat A/B C–S NSW	BB
1910	Water hyacinth	Richmond R	Introduced in 1895 to 'beautify' farm dams, infestation spread and by 1910 blocked many side creeks and the main river		Ferguson 1995
1911					

11–14 Jan	TC	SEQ – all NSW	TC from Gulf to inland NSW, crossed coast Wollongong then E. Severe gale to coast, ships could not enter Moreton Bay and Sydney gusts over 70kts	Cat X/A/B NSW BB underestimates impact to N PH	BB JC
	New south channel breached	Jumpinpin	Between 1904 and 1911 inlet migrated north. Spit was probably breached to the south in the 1911 cyclone, forming a new channel		Tomlinson and McCauley 2001
	Shallow Bar	Bellinger R	<i>Rosedale</i> stranded on Bellinger R bar for three weeks before being refloated. <b>Photo</b> <i>Rosedale</i> 'on the beach' near Bellinger R bar in an earlier stranding		Richards 1996:60
10–11 Feb	TC	FNQ	Passed east of Port Douglas causing damage and heavy rain. 432mm rain in 24hrs Redlynch. Daily record Feb rainfall Cairns 385mm (11 Feb)		BoM JC
Feb	Flood	Fitzroy R	7.9m		Webster
	Shallow bar?	Macleay R	20 Feb <i>Australia</i> schooner 112t lost on north spit Macleay R entrance		Atlas NSD
16 March	Severe Tropical Cyclone	FNQ	Crossed coast near Port Douglas 960hPa. Extensive damage Cooktown to Cairns. Most buildings Port Douglas and Mossman destroyed.		JC BoM
23 March	<i>TC Yongala</i>	NQ	Northern side of Cape Upstart swept clean of trees <i>Yongala</i> ship 3664t sank off Townville, 120 lost. Wreck site protected		JC BoM EAS
10–12 May	Low		Low developed off coast	Cat A/B M–S NSW	BB
19–20 June	Low		Low off Gabo Is, moved E	Cat B S NSW	
12–14 July	Low off S NSW	M to S NSW	Low moved to NZ, S gales and rough seas for a long period	Cat A/B M–S NSW	BB
			July <i>Inca</i> barquentine 950t lost off Port Stephens with crew, wreckage ashore	Swell to N NSW PH	Herald, NSD Loney, Atlas Sept
23–26 Aug	ECL	SEQ to S NSW	Low moved E with S to SE gales	Cat A N–M NSW	BB
			Aug <i>Laura</i> barque 192t lost Tasman Sea, wreckage ashore Cronulla and Lord Howe Island		NSD, EAS (July) Loney, Atlas Sept
15–16 Sept 1911	<i>Rosedale Gale</i>	N to C NSW	Severe southerly gale during the night 15 Sept and all day 16 Sept then moderated	Not in BB PH	Richards 1996: 59–60
	'whole gale'	Smoky Cape	16 Sept <i>Rosedale</i> steamer 274t left Nambucca R for Sydney, seen off Crowdy Head in southerly gale and heavy seas. Wreckage sighted off Smoky Cape 19 Sept, 30 lost	<i>Rosedale</i> survived many storms and had been stranded six times before	Richards 1996: 59–60 Loney, Atlas NSD EAS

Nov	Gale	C NSW	5 Nov <b>Port Stephens</b> steamer 118t lost ashore north of Norah Head	Not in BB	Atlas, NSD Loney
1911–1916	Dune accretion Before 1912 and until 1916	Byron Bay	Sand blowing into town <b>Photo</b> Jan 1916 shows 'the brush and paling fence almost completely buried'		Ryan and Smith 2001:30
1911	Sand blows	Gold coast	<b>Photos</b> c 1911 and 1916 Dunes and Marine Parade Coolangatta	Sand blows, fore-dunes vegetated no storm cut PH	Longhurst 1996:100, 122
1912					
1912	South causeway	Coffs Harbour	Work began to connect South Coffs Island		Coltheart 1997:73
1912			<i>Fitzroy</i> operating to Woolgoolga jetty	Last use of jetty? PH	Yeates 1990:68
Early 1912	Shallow bar	Bellinger R	Bellingen R bar shoaled to 4 feet [1.2m], <i>Nerong</i> (draft 8 feet [2.4m]) unable to cross for 3 weeks, tug bar bound, and on 26 April <b>Bellinger</b> steamship 229t lost Bellinger R bar, all saved		Richards 1996:63 Loney, Atlas NSD
9 Feb	Gale	C NSW	9 Feb <b>Paris</b> schooner 79t Forster to Sydney, capsized in gale off coast, hull found off Newcastle 12 Feb	Not in BB PH	Loney Atlas NSD
23–24 June 1912	ECL Coral Sea	CQ to SEQ	Very severe E–NE gales, SEQ shipping delayed and some masters considered the night of 24 June 'was the worst they had encountered'	Not in BB PH	JC
14–17 July	Low	M to C NSW	Low from NT crossed coast Newcastle 999hPa and deepened. S gales, very rough seas, 235t boulder carried onto Bondi Beach	Cat X/A/B most NSW	BB
			12 July <b>Candidate</b> ketch 88t left Camden Haven for Sydney and disappeared in southerly gale		Loney NSD
16 July	Shoreline damage	Sydney Harbour	Andrews describes shoreline damage and waves breaking over a kilometre offshore inside Sydney Harbour. 50 kg boulders from retaining walls 'tossed like corks' and lifted 3m above HWM. Beach with storm profile and over 3m face in dune 'much like an ocean beach' in a storm		Andrews 1916 in Thom 1974
17 July	Storm surge & erosion	Newcastle	Stockton Beach eroded, breakwaters damaged and 'damage inside harbour waves' and 'exceptionally high tides' at Newcastle		Moratti 1997 Herald in DLWC 1995
	Erosion	C NSW	Severe erosion summary below		
24–26 July	Low off south NSW	C to S NSW	Low on inland trough deepened, S gales and very rough seas	Cat A C–S NSW	BB
15–17, 24–26 July 1912	Severe erosion	C to S NSW	Two major storms cut erosion face. Andrews 1916 considers that for Sydney this erosion face was seaward of three older faces from 1857, 1876 and 1889		Andrews in Chapman and others 1982:116 Thom 1974

1912	Spit washed over	Manning R	Damaged breakwater and 'flattened all the sand dunes on the southern side of the river'		Coltheart 1997:86
15-16 Aug	ECL Off SEQ	SEQ to N NSW	Low off coast, gales and high seas S of Sandy Cape	Not in BB PH	JC
Late Nov	Heavy seas and shallow bar	Tweed R bar	29 Nov <b>Friendship</b> steamer 214t ashore on S beach after grounding on Tweed R bar and swamped in heavy seas 29 Nov		Loney Atlas NSD
1913					
16-17 Jan	TC East of Bowen	NQ – SEQ	Gales and huge seas, shipping delayed along Q coast, very heavy rain and floods Hervey Bay. Bundaburg 781mm in 41hrs (254mm in 8 hrs), 430mm (16) all time record daily rainfall since 1883		JC
	Flood	Baffle Ck	68in [1.73m] of rain in three days		Graham & Jodvarkis 1996:80
22 Jan	Tropical Cyclone		TC NE of Cooktown. Heavy seas off Cairns and parts of town submerged.		JC
31 Jan	TC	FNQ	Crossed coast near Cairns 990hPa, extensive flooding and building damage, many destroyed. Storm surge. Green Is denuded of vegetation. <i>SS Innamincka</i> grounded. Daily Jan rainfall record (1882–1957) Cairns 354mm (31)		JC
			29 Jan <b>Dancing Wave</b> schooner 67t lost in cyclone near Fitzroy Island		Loney
7-9 March	TC Coral Sea		TC from Coral Sea to N of Lord Howe Is then moved S, 9 March Sydney winds over 50kts. 10 March yacht <b>Thelma</b> 26t overwhelmed by large waves and battered into matchwood, Dobroyd Pt, one lost	Cat A all NSW coast	BB JC
6-11 April	TC from Coral Sea to N NSW	CQ – all NSW	TC 988hPa moved S off coast then moved away NE	Cat A/B N-M NSW	BB BPA 1989
5-7 May	Low	C NSW – Bass Strait	Low in SW Tasman moved to Lord Howe Is.	Cat A/B C-S NSW	BB
13-15 May	Low over SEQ deepened into 'cyclone'	SEQ – S NSW	Tropical depression over S Qld moved S and off coast developing into cyclone, very rough on coast with severe SE gales, coastline damage	Cat A N NSW X M-C NSW	BB Chapman and others 1982:116
			22 May <b>Ellerslie</b> steamer 252t struck by big seas attempting to leave Bellinger R aground on S wall		Loney Atlas NSD
May 1913	Severe erosion	C and S NSW	Bondi seawall and Manly beach facilities damaged		Chapman and others 1982:116
Winter 1913	Breakwater damaged	Manning R	Heavy gales damaged the breakwater washing 40ft [12m] off the end		Coltheart 1997:86

10–11 June	ECL S Coral Sea	SEQ – N NSW	Rough seas	Cat C N NSW	BB
28–30 June	ECL		Low off Port Macquarie moved SE, gales rough seas, heavy rain. Bega 196mm (30) record June daily rainfall. Moruya Heads 155mm (29) record June daily rainfall	Cat A/B M–S NSW	BB
14 July	Low		Gales and rough seas, shipping delayed	Cat B M–S NSW	BB
19 Oct	Heavy seas	C NSW	19 Oct <b>Euroka</b> iron paddle steamer 170t sprang a leak in heavy seas off Lake Macquarie and lost Long Reef, crew lost		Loney Richards Atlas, EAS, NSD
1914					
16 April 1914	Big seas	C NSW	<b>Wallarah</b> steamer 633t ashore and lost in big seas Catherine Hill Bay		Atlas Loney
17–19 June	ECL	SEQ – C NSW	Low formed off coast and moved E, S gales and rough seas	Cat A/B N–C NSW	BB
			16 June <b>Alfred Flenning</b> ketch 74t left Sydney and disappeared, crew lost		Loney, Atlas, NSD, Keats 1996: 206
	Southerly gale	Point Plomer	17 June <b>Aleda</b> schooner 79t lost ashore in southerly gale Pt Plomer, 6 crew lost		AE 15 June NSD
	Gale	Lake Macquarie	17 June <b>Novelty</b> steamer 194t struck breakwater and lost Lake Macquarie in gale		Loney Atlas NSD
	'Worst storm for many years'	Coffs Harbour	Extensive damage and shoreline erosion Coffs Harbour		Yeates 1990: 83
24–25 June	Low off FNQ		Coast gales, Mackay to Rockhampton		JC
21 July	<b>Inca Storm</b>		Yamba 185mm, record daily July rainfall		JC
21–24 Sept	Low in NQ		Gales east of Brisbane		JC
			24 Sept <b>Dugong</b> barge 177t lost on Wide Bay bar		Williams 2002: 148, Loney
8–10 Oct 1914	Low off Q coast	CQ to SEQ	Low moved S along Q coast, gales and torrential rain SEQ. Two ships wrecked		JC
18–20 Oct	Small intense storm	N to C NSW	Small low in trough intensified off coast, SE gales and very rough seas. Port Macquarie 151mm record Oct daily rainfall (18 Oct)	Cat A/B most NSW	BB
			17 Oct <b>Rozelle</b> schooner 98t wrecked near Cape Three Points		Atlas NSD
			c19 Oct sudden storm destroyed all 6 fishing boats Coffs Harbour	More impact on N NSW than Cat B PH	Yeates 1990:126
1915					
Dec 30 – Jan 2	Tropical low	M – S NSW	Low moved from inland Q crossed coast Newcastle, southerly gales and rough seas	Cat A/B M – S NSW	BB

9–11 Feb	TC <b>Brisbane</b>	NQ to N NSW	Moved parallel to coast from NQ to SEQ crossed Fraser Is then tracked SE. CP 970hPa, very rough seas, buildings damaged, floods from Mackay south. Bundaberg SE gales 8–9 Feb, then W hurricane force on 9 Jan 983hPa. Moreton Bay boats swept ashore, sea wall damaged, <b>storm surge 0.58m</b>	Cat A most NSW	JC BB BPA 1989
	Shoreline damage	SEQ			JC
5–9 May	ECL off C NSW	N – S NSW	Low in trough moving S then E. High seas disrupted shipping	Cat A M – C NSW	BB
	Floods	Hunter and Manning R			BB
5–7 Oct	ECL		Low formed off M NSW, moved SW then S and away to E	Cat B C NSW	BB
10 Dec	TC	Mackay, NQ	970hPa in Coral Sea		BoM
Mid Dec	Heavy seas	S NSW	15 Dec <b>Wandra</b> wood steamer 164t lost on Beecroft Peninsular in heavy seas, crew saved	Not in BB PH	Loney Atlas, NSD
1916					
1916	Sand blows	Gold Coast	Photo Marine Parade, Coolangatta shows vegetated dunes with sand blows onto Parade. Tweed R training walls in background with break across bar		Longhurst 1996:122, 12
1916	Sand blows	Byron Bay	Byron Bay Courthouse in danger of being covered by drifting sand prompted calls for a new building on a new site. Belongil Ck entrance frequently blocked by high berm causing flooding of the town		Ryan and Smith 2001:30
11–14 Feb	TC E of Lord Howe Is	SEQ – all NSW	TC east of Lord Howe 992hPa rough seas	Cat B N – M NSW	BB
26–28 Feb	Low		Inland low crossed coast to move S	Cat B C NSW	BB
4–6 May	Low over N Tasman	SEQ – C	Southerly gales	Cat C N NSW	BB
24–27 May	Low off Sydney	All NSW	Low deepened off coast and moved S then E. Southerly gales and rough seas	Cat B M NSW	BB
	Gale	Nambucca R	24 May <b>Premier</b> ketch 135t ashore and lost at Nambucca Heads in gale	Impact on all NSW coast under-estimated in BB PH	BB Loney Atlas, NSD
	Flood	Richmond R			Ferguson 1995
Early 1916	Local flooding	SEQ			BoM



June 1916	Sand spit washed away	Manning R	South spit Manning R almost completely washed away		Coltheart 1997:86
1916	Breakwaters damaged	Port Kembla	The repaired walls from 1910 damage again washed over by heavy seas		Coltheart 1997:107
1–3 Aug	ECL N Tasman Sea	SEQ – M NSW	Gales and rough seas	Cat C NSW	BB
23–28 Sept	Continental low	SEQ to all NSW	Low passed out to sea and deepened, very heavy rain and gales to whole coast	Cat B S NSW BB underestimates impact to N NSW PH	JC BB
4–6 Oct	Low		Low, E gales, rough seas, local flooding	Cat A M – S NSW	BB
9 Dec 1916	Shallow bar	Macleay R	<i>Belmore</i> schooner 189t stranded on bar and driven onto south spit entering Macleay R	N wind? PH	Atlas NSD
27–28 Dec	TC	CQ	Crossed coast near Proserpine 985hPa, serious floods Fitzroy R, 62 lives lost, Clermont, damage Whitsunday Islands. Townsville record daily Dec rainfall 167mm (31 Dec)		JC
1917					
1917	Jumpinpin partly closed		D'Arcy 1940 (in Kelley 1984) notes that the entrance may have closed in 1917. Tomlinson and McCauley 2001 consider that in 1917 'a channel must have been present' and was probably to the south		Kelley 1984 Neil 1998:16 Tomlinson and McCauley 2001
c1917	Sand blows	Marine Pde, Coolangatta	Photo looking to Kirra shows 1890's storm face almost completely buried by reforming foredunes. Sand blowing into properties blamed on removal of vegetation and the impact of visitors		Longhurst 1996:129
31 Jan – 1 Feb	ECL	SEQ – C NSW	Moving SE, southerly gales and flood rains N NSW	Cat A/B N – M NSW	BB
1917	Flood	Richmond R			Ferguson 1995
Jan	Flood	Fitzroy R	8.18m		Webster
March	Flood	Fitzroy R			Webster
10–12 April	ECL		Low in trough off C NSW away to SE	Cat B, C NSW	BB
21–23 June	Low off S NSW	All NSW coast	Complex lows along coast, SW to SE gales and high seas, shipping delayed	Cat A C – S NSW	BB
			<i>Aurora</i> steam schooner 580t lost off Solitary Islands. Left Newcastle (20 June) for Auckland, wrecked Q coast.	Possibly SW and little impact N NSW PH	Atlas NSD

Winter 1917	Continuing spit erosion	Manning R	Sand spit [eroded in mid 1916] had not reformed by winter 1917 when a gale took away the main dune from the southern shore, complete with trees which were swept upstream		Coltheart 1997:87
18–20 Sept	Severe ECL	All NSW coast	Very severe low moved S along coast, then E, SE–S gales, shipping delayed, damage Sydney to Newcastle	Cat X/A/B most NSW	BB
	Very heavy weather	Norah Head	19 Sept <b>Nerong</b> steamer 219t sank off Norah Head 'in very heavy weather' 3 died in boat before crew rescued by <i>Canonbar</i>		NSD, Atlas Richards 1996: 164 Loney
8–10 Nov	ECL		Low off N NSW, SE gales, rough seas, torrential rain, flooding. Lismore 144mm record Nov daily rainfall (4 Nov)	Cat A/B all NSW	BB
15 Dec	TC	N to CQ	Crossed coast south of Bowen 996hPa, gales and heavy rain.		JC
1918					
			'Nothing untoward happened [on NSW coast] in 1918'		Richards 1996:69
20–21 Jan 1918	Severe TC <b>'Mackay Cyclone'</b> Mackay to Rockhampton	NQ to CQ	21 Jan Very large TC crossed coast N of Mackay 933hPa, at 5am 'a wall of water 7.6m high swept over the beaches towards the town... 2.7m waves breaking in the centre of Mackay, one survivor floated on debris for 4hrs. Storm surge 3.6m and over 7m wave surge on coast, 3 steamers sunk and 3 others aground. Very extensive damage (Mackay, all buildings damaged and 1000 destroyed), widespread flooding and 30 lives lost, severe flood Rockhampton and shoreline damage Yeppoon		JC
	Major flood	Fitzroy R	10.11m		Webster, JC
	Shoreline damage	Yeppoon			JC
30 Jan – 1 Feb	Low		Tropical low deepened off Sydney (31 Jan) SE–S gales, shipping delayed	Cat A/B C–S NSW	BB
14–15 Feb	TC	CQ to C NSW	New Caledonia S to Tasman Sea, rough seas	Cat B N NSW	BB

10 March 1918	Severe TC <i>The most severe cyclone to hit a populated area of Queensland</i>  Innisfail	FNQ	Crossed coast at Innisfail below 926hPa and estimated storm surge 4.65m Maria Ck and 2.6m Flying Fish Pt, Babinda. A 'tidal wave was seen surging in from the east to Bingle Bay and the bridge 400m inland swept away and all buildings in Bingle Bay destroyed'. Mission Beach inundated hundreds of metres inland and debris up to 7m in trees. Ships in harbour lost and almost all buildings in Innisfail damaged or destroyed. Severe damage Cairns to Mission Beach, 100 lives lost		BoM
17–19 March 1918	TC	SEQ to M NSW	TC tracked between Norfolk and Lord Howe Is (985hPa) SE–S gales, rough seas	Cat A N NSW	BB
	Recent storm cut	Sunshine Beach	Photo looking S from Paradise Caves shows minor storm cut in Spinifex covered fore dunes	Older major storm cut at mature vegetation line? PH	Longhurst 1995b:68
26–28 July	Low	M to S NSW	Low moved ENE, S gales, very rough seas	Cat A/B most NSW	BB
	Flood	Richmond R			Ferguson 1995
Aug 1918	Swell from severe south Tasman Low		Tembo on route to Marshall Is sheltering in Danger Bay, north of Pt Danger	BB Swell only to S NSW PH	BB Longhurst 1996:125
5–6 Sept	Gale		Southerly gales to S NSW, rough seas	Cat A S NSW	BB
	Heavy swell and shallow bar	Macleay R	5 Sept <i>Bellinger</i> wood steamer 240t lost on Manning R bar, crew saved. Photo around south of new entrance	No impact on N or M NSW in BB PH	NSD, Richards 1996 Atlas, Loney Coltheart 1997:84
Mid Dec 1918	Bushfires	S of Sydney			Gleeson 1993:86
1919					
Jan	Sand blows	Byron Bay	Photo 26 Jan 1919 Byron Bay jetty shows wide beach with no storm cut, partly vegetated fore dunes. Brush and paling fences almost completely buried	Similar to 1905 photo PH	Ryan and Smith 2001:53
3–7 March	TC	CQ – C NSW	Crossed coast Maryborough and recurved to sea again at Ballina 988hPa, strong E–S, rough seas	Cat B N NSW	BB JC BPA 1989
14–16 April	ECL	SEQ – N NSW	Low moved E	Cat C N NSW	BB
April 1919	Extreme spring tides	Manning R	Extreme flood tides washed away half of the repaired wall built to repair the south spit		Coltheart 1997:87
15–21 May	ECL over Coral Sea	SEQ to S NSW	Low in trough Coral Sea, moved S then E. Strong E to SE wind and rough seas	Cat X/A/B all NSW Cat A N NSW	BB

	Heavy seas	Sydney	17 May <b>Tuggerah</b> steamer 749t forced to leave Bulli, capsized and sank in heavy seas off Port Hacking, 6 lost, 11 survived		Loney NSD EAS
21–24 May	Low		Inland low Q crossed coast and moved SSE, gales and rough seas.	Cat B C–S NSW	BB
28–31 May	ECL off SEQ	SEQ to C NSW	Low in trough off SEQ. E to S gales and high seas	Cat A/B most NSW	BB
1919			25 May <b>Wave</b> schooner 60t lost South White Cliffs, Fraser Island	W–NW gale, Hervey Bay PH	Loney, Williams 2002: 148 1922
1919	Breakwater damaged	Coffs Harbour	Eastern breakwater commenced in late 1918 and during construction despite 30t blocks the 'wall was completely washed away several times by heavy seas'	Also damaged in 1920 and 1921	Coltheart 1997:132 Yeates 1990:88
26–29 July	ECL		Low passed S between Q and New Caledonia, secondary low off S NSW moved N then E. S gales and high seas	Cat A/B C–S NSW	JC BB
26–29 Aug	Low		Low from SWQ crossed coast near Newcastle, S gales and rough seas	Cat A/B C–S NSW	BB
5–7 Sept	Low		Low from Q crossed C NSW, moved SE, the E, strong S–SW wind	Cat A C NSW	BB
	Heavy swell and Shallow Bar	Manning R	Southerly gales to S NSW, rough seas 5 Sept <b>Bellinger</b> wood steamer 240t lost on Manning R bar	No impact on N–M NSW in BB	BB NSD, Richards Atlas, Loney
2–3 Oct	Low		Intense low (southern cyclone) moved E, strong high to S, secondary low C NSW moved NE.	Cat B C–S NSW	BB
Nov	Shallow bar	Bellinger R	3 Nov <b>Doris</b> wood steamer 90t struck bar and lost ashore north spit Bellinger R		Atlas, Loney NSD
1920					
1881–1919	End of record overlap		1881 to 1919 overlap between historic accounts and observed weather records.		PH
1920	Calm year		from Feb to Nov PH		BB
22–23 Jan	ECL	SEQ to N NSW	Low moved from SEQ to Norfolk Is, rough seas	Cat B N NSW	BB
2–3 Feb	Severe Tropical Cyclone		Small intense TC crossed coast N of Cairns. Port Douglas demolished (962hPa). Severe building damage Cairns. Injuries from flying debris. 1.2m surge over esplanade. Shipping in harbour damaged. Extensive damage, most houses unroofed Kurand, Mt Molloy. Widespread floods and extensive cattle losses.		JC

10–11 Dec	ECL		Low in trough off C NSW, deepened and moved S. 'Hurricane-like winds' strong SE gales Seas washed into sandhills, Stockton	Cat X/A C – S NSW	DLWC 1995 (TC) BB
1921					
4–8 Jan	Gradient	SEQ N	Deep low in trough with high to S Fetch across Tasman Sea, 25kts for 48hrs.	Cat B N NSW	BB
1 April	Tropical Cyclone		TC crossed Cape York, boats sunk and damaged at Princess Charlotte Bay. Heavy floods		JC
5–8 April 1921	Tropical Cyclone Very rough seas	Yeppoon to all NSW	5 March TC off Yeppoon (979hPa) moved S over Bundaberg, Hervey Bay and along coast to Newcastle (994hPa). Pre existing long fetch, ESE gales and very rough seas. Severe damage Bundaberg and Hervey Bay. Sandy Cape 193mm (6), record daily April rainfall. Bundaberg 205mm (6) record daily April rain	Cat A Whole coast	BB JC BPA 1989
	Erosion	Hervey Bay	Storm surge reported and shoreline damage Pialba and W coast of Fraser Is		JC
14–16 May	ECL	SEQ to N NSW	E gales with long E fetch. Yamba 273mm (15 May) record may daily rainfall. Lismore 320mm record May daily rainfall (16 May)	Cat B N NSW	BB
1921	'a gale blew up suddenly from the east'		14 May <i>Wollongbar</i> steamship 2005t due to sail for Sydney later that night 'In the morning ... she was tied to the jetty in favourable weather conditions, early in the morning light rain began to fall with little wind, wind and rain increased at dawn and by 11am gale from E–NE ... the sea was fairly high'. The ship pulled away from the jetty ... large waves pounded her several times ... dropping [her stern] heavily onto the sea bed ... damaging her stern gear and her propeller ... side on to the gale she was driven ashore (200m west of the jetty) ... where her remains are still to be seen at low tide'		PWD 1978:20 Ryan and Smith 2001:99 NSD
			14 May <i>Glengarry</i> large fishing boat, wrecked Byron Bay after moorings snapped. Poulson Fisheries ran a cannery in Fletcher St and the loss of <i>Glengarry</i> forced it to close		PWD 1978:20
	'The Wreck'	Byron Bay	1921 Photo <i>Wollongbar</i> on beach. Shows movement of beach over the last 80 years	Now popular surf break PH	Ryan and Smith 2001:98
24–26 June 1921	ECL Heavy SE gale Developed suddenly off coast	S SEQ? to C	Low from NE to N NSW coast then recurved SE, severe floods SEQ to N NSW	Cat B N NSW Cat X M NSW	BB JC

			25 June <b>Fitzroy</b> steamer 623t southbound from Coffs Harbour and sank in gale off Cape Hawke 22 lost, 4 survived	PM 25 June strong SW gale blowing but sea was not rough. Ran into rapidly worsening SE gale	Richards 1996:102 Yeates 1990:147 NSD
	Hurricane force squalls		25 June <b>Our Jack</b> wood steamer 272t sank after encountering heavy seas off Manning Heads, 9 rescued by <b>Brundah</b> , 5 lost <i>Brundah</i> described weather as 'the worst experienced for years ... cyclonic in character and was accompanied by squalls of almost hurricane force'	Over 60kts (110km/hr) waves +10m? PH	Richards 1996:101–2 Yeates 1990:147 NSD
			June <b>Canastota</b> ship 4904t lost Wellington to Sydney		Atlas
1921	Floods	SEQ to N NSW	Flood Richmond R		JC, Ferguson 1995 Olivieri 1999
1921	Severe erosion Storm face cut	South Stradbroke Is and Southport Spit	At Southport Spit 'after a particularly severe south easterly gale the sandhills washed away and unveiled the solid oak remains of a sailing ship' (Longhurst considers dated 1728). Others consider it was <b>Salamanda</b> lost in the 1850's.  <i>Salamander</i> lost on Main Beach 21 Jan 1868 was an iron vessel PH	<b>Photo</b> Storm erosion face cut in hind dune, trees slumped to beach. Smith and Jackson 1990 suggest heavy metal lens Gold Coast 1923, possibly 1921 PH	Salter 2002:31 photo Longhurst 1996:2
2 July	Low off Q moved to Sydney	Mid to C	Rough seas	Cat B C–M NSW	BB
22–24 July	ECL off Q	SEQ to S NSW	Heavy SE gale and huge seas along whole coast. 996hPa Clarence R. Dorigo 373mm in 24hrs (23). Southport 240mm (23) record daily July rainfall	Cat X/A/B all NSW	BB
July	Breakwater damaged	Coffs Harbour	Huge seas severely damaged the two thirds completed northern wall (completed to Mutton Bird Is in 1924)		Coltheart 1997:132
1921	Breakwaters damaged	Newcastle	Storms caused severe damage to breakwaters		Coltheart 1997:114
2–6 Oct	ECL	Coral Sea	Severe gales moved south		JC
1922					
1–3 Jan	ECL	SEQ to C	S along coast, 987hPa, high seas E swell	Cat A/B N – C NSW	BB
1–10 Jan	Fresh	Brisbane R			BoM
Jan	Flood	Fitzroy R	6.48m		Webster
17–20 Jan	TC	SEQ to N NSW	Formed near New Caledonia, long fetch, heavy swell	Cat B N NSW	BB
			21 Jan <b>Helen B Sterling</b> 4 mast schooner 1608t dismasted in Tasman Sea, 22 crew rescued by <b>HMAS Melbourne</b>		Atlas Loney
16–20 Feb	TC	SEQ to N NSW	TC tracked NE off Fraser Is, strong gradient across Tasman, heavy swell	Cat B N NSW	BB BPA 1989
Feb	Flood	Fitzroy R	7.87m		Webster

23–18 July	ECL		Low moved S, SE–E gales, very rough seas, long ESE fetch, floods S NSW.	Cat A/B M – S NSW	BB
13–14 Sept	ECL	SEQ to M NSW	Low moved SE from Q to M NSW, intense to S	Cat B S NSW Swell N NSW? PH	BB
1923					
11–13 Jan	TC New Caledonia	SEQ – C NSW	Rough seas	Cat C N NSW	BB
26 Jan	Low		Low (998hPa) with N – S axis off N NSW moved S, short period very strong S.	Cat B M – C NSW	BB
21 Mar - 2 April	Very severe Tropical Cyclone		Severe TC developed E of Cape York, moved WSW devastating Torres Strait, crossed Cape York and intensified in Gulf. 26 Mar Steamer <i>Douglas Mawson</i> sunk, 20 lost	Torres Strait relatively cyclone free	JC EAC
26–30 April	TC	CQ – C NSW	TC tracked S along coast, SE gales, high seas	Cat A most NSW	BB BPA 1989
25–28 June	Continental Low	SEQ – S NSW	Formed off M NSW and moved NE	Cat X/A all NSW	BB
	Gale	Port Macquarie	26 June <i>Sumatra</i> steamer 584t sank off Port Macquarie in gale, 46 lost		Loney, Atlas NSD
	SE gale	Sydney	26 June <i>Belbowrie</i> steamer driven ashore in fierce SE gale Cronulla Beach		Birrell 1987:29
6–7 July	Low		Low moved from Gabe Is to Lord Howe Is, strong SSW then SE as low moved offshore.	Cat B C–S NSW	BB
6–7 Aug	Low		Low in trough moved NE, SE gales and rough seas	Cat B M–C NSW	BB
5–7 Sept	Low		Low (995hPa) in trough developed C NSW, gales and high seas.	Cat B S NSW	BB
1924					
21–23 Jan	TC Lord Howe Is	S SEQ – C	1000hPa CP strong S wind on coast	Cat C N NSW	BB
4–11 Feb	Local flooding	Brisbane R			BoM
1–2 March	ECL	SEQ – N NSW	Low Coral Sea, heavy swell, long fetch to coast	Cat C N NSW	BB
			21 Feb <i>Kiltobricks</i> wood steamer 272t wrecked in gale at Shellharbour		Atlas NSD
			28 Feb <i>Columbyne</i> ketch capsized and lost Tallow Beach		NSD <i>Columbythe</i> , Atlas
			5 March <i>Benandra</i> wood steamer 345t lost in big seas Moruya Heads, one lost		Atlas, Loney
					NSD

2–7 April	Low Tasman Sea	SEQ – C NSW	Strong gradient with long fetch	Cat B whole coast	BB
			7 April <b>Astral</b> wood steamer 157t struck by giant waves and sank off Broken Bay		Loney NSD
21–22 April	Low		Low moved NNE from Bass Strait, S gales, rough seas	Cat B S NSW	BB
12–14 June	ECL		Low moved S from Coral Sea then E	Cat B N NSW	BB
22–23 July	Low		Low developed from N trough off Cape Byron, moved slowly E, heavy rain.	Cat B NSW	NN
24–25 Nov	Low		Low developed off M NSW, moved S to NZ	Cat B C NSW	BB
Dec			Three periods of gales in Dec 7, 23, 26–28.	All Cat C C–S NSW	BB
1925					
			Photo Oblique aerial c1925 of sand accretion behind Coffs Harbour breakwater		Yeates 1990:90
26 Feb	Tropical Cyclone		TC crossed coast between Cooktown and Cairns. Some building damage		JC
3–5 March	Low off C NSW	SEQ – Bass Strait	Shallow low off C NSW, moved N, long fetch from developing high to S. Gales, high seas, shipping delayed	Cat A Whole coast	BB
16–18 March	Flooding	SEQ	Coastal rivers flooded		BoM
1–5 April	Gradient	SEQ to mid NSW	Strong high NZ, long fetch from NZ, strong SE gale.	Cat B N – M NSW	BB
8–11 May		SEQ to S NSW	Intense low off NSW, strong gales for short period. Deepened as moved S (998hPa) 45kts for 8hrs S NSW.	Cat A/B whole coast	BB
25–26 May	Low	M NSW – Bass Strait	Low inland trough, NE Sydney, moved SSW to off Jervis Bay. Gales along coast, floods S NSW. Moruya Heads 275mm (27) record daily rainfall since 1875.	Cat X/A C – S NSW	BB
19–23 June	ECL	SEQ – C NSW	19 Jan Low from Coral Sea crossed coast Port Clinton CP 999hPa and recurved over Double Island Point. E/NE gales to S. Shipping delayed	Cat A/B SEQ to C NSW	BB JC BPA 1989
18–22 June	Flooding	SEQ – NSW	Floods Most coastal SEQ rivers and many NSW rivers		BoM BB
11–14 July	Low	M NSW – Bass Strait	Low off S NSW, intensified and moved NE, swell to coast, 45 kts for 15hrs S NSW	Cat X/B M – S NSW	BB
10–13 Aug		SEQ – N NSW	Coral sea low to NZ, moved to N NZ, long fetch, heavy seas, SE gales.	Cat A/B N – M NSW	BB



1926					
1–8 Jan 1926	Local flooding	SEQ	Local heavy flooding in coastal rivers Mackay to Brisbane		BoM
9–10 Feb	Tropical Cyclone		TC recurved E of Townsville. Crop damage and floods Herbert and Tully R. Townsville 24hr rainfall 291mm (10)		JC
25–26 March	Low	M to S NSW	Low in trough from NT to Port Macquarie. Wind damage, Sydney, shipping delayed, Manly Ferry stopped.	Cat X M to C NSW	BB
	Heavy seas	Sunshine coast	1 April <i>Dorrigo</i> steamer 683t flooded and capsized in gale off Double Island Point, 22 lost, 2 survived	Gale and heavy seas SEQ. No Cat N NSW BB underestimates impact to north PH	Richards 1996: 112
1926	Breakwaters damaged	Coffs Harbour	During inspection by Sir George Buchanan the partly built north and eastern breakwaters suffered considerable damage in a heavy gale		Yeates 1990:89 Coltheart 1997:132 1925
	Later erosion	Hook Point, Fraser Is	Grave at Hook Point of one seaman from <i>Dorrigo</i> has had to be moved twice 'due to water inundation'	Probably in 1930's PH	Williams 2002:148, Photo 155
18–20 April	Tasman Low	M NSW – Bass Strait	Low in Tasman Sea moved SW, S gales, shipping delayed	Cat A/B M–S NSW	BB
16–20 May 1926	ECL 'Longest and severest storm on north [NSW] coast for 20 years'	Whole coast	17 May, Coral Sea Low passed E of Double Island Pt and intensified while moving SE to Lord Howe Is (985hPa). Shipping badly delayed, ships in difficulty and local flooding central Q. 999hPa at Gold Coast. Sandy Cape 254mm (17 May) record May daily rainfall. Maryborough 202mm (17 May) record May daily rainfall.	Cat X most NSW Most severe storm since July 1904 PH	JC BB BPA 1989
2 June	Continental Low	SEQ to N NSW	SE gale, short fetch	Cat C N NSW	BB
Mid Dec to early Jan 1927	Rain and local flooding	Brisbane valley	28 Dec Low moving NE from S NSW. Nobbys 177mm record Dec daily rainfall (29 Dec)		BoM BB
1927					
27–28 Jan	Low		Off S NSW moved NE, S gales and rough seas	Cat B S NSW	BB
			27 Jan <i>Alice</i> steamer 352t ashore and lost Port Stephens		Loney NSD
15–31 Jan	Fresh	Brisbane R	Local flooding Brisbane valley		BoM
9 Feb	Tropical Cyclone		TC crossed coast N of Cairns 971hPa. Buildings damaged. Extensive flooding Innisfail, Ingham, Tully. 47 lives lost. Extensive stock lost.		JC

14 March	ECL	SEQ to M NSW	Low off Cape Byron (998hPa) short period gales.	Cat B M NSW	BB
5–14 March	Local flooding	Sunshine Coast			BoM
1–2 April	Severe TC	SEQ – C NSW	Low off Gold Coast, moving SE weakening. Strong gale, shipping delayed Flash flooding combined with Spring tides and <b>record high tide Gold Coast</b> . Heavy seas and erosion Gold Coast 50kts for 6hrs N NSW	Cat A/B N–C NSW	BB JC
1–2 April	Heavy local flooding	SEQ			BoM
	Severe erosion	SEQ Gold Coast	Major erosion on parts of southern Gold Coast further landward than later erosion in 1950. <b>Photo</b> of Currumbin beach 1927 shows 'high water mark appeared ... to lie west of the present road'	2 houses lost on Palm Beach subdivision (1923) and 2 others moved back	Chapman and others 1982:117 Kindler and O'Connor 1951:14 McGrath and Robinson 1972:159
15–19 April Easter 1927	ECL 'terrific gales'	SEQ to S NSW	Low formed off N NSW, redeveloped and intensified off Port Macquarie with ' <b>terrific gales</b> ' (1000hPa). Nobbys 231mm record April daily rainfall (16 April)	Cat X/A C–S NSW	BB
24–26 April	Local flooding	Brisbane valley			BoM
	Severe erosion	Sydney to north coast	Myall Spil, Port Stephens breached and has not re-built, exposing areas inside Port Stephens to ongoing erosion. Newport beach breakthrough	Jimmy's Beach exposed and continuing erosion.	Chapman and others 1982:117 Thom 1974
5–7 May	Low		Low off M NSW, S gales, very rough seas, shipping delayed.	Cat B C–S NSW	BB
23–27 July	Low		Shallow cut off low SW Tasman Sea (982hPa)	Cat X/A C–S NSW	BB
16–19 Sept	ECL		Low moved to Lord Howe Is, strong gradient, S gales, very rough seas	Cat B C–S NSW	BB
1–4 Oct	Local flooding	SEQ	Heavy local flooding SEQ		BoM Watson 2000
29–30 Nov	ECL	SEQ – N NSW	Tropical low moved SE in Coral Sea with strong gradient to Sandy Cape, then moved south. Heavy seas along SEQ coast	Cat B N NSW More severe to north PH	JC BB
1928					
14–15 Feb	TC Crossed coast Brisbane JC	CQ – NSW	Small TC off SEQ crossed coast Moreton Bay. 992hPa short period of gales. 14 Feb Severe gale border region wind veered NE to E–SE. Extensive damage, heavy rain and flooding Brisbane	Cat A/B N–M NSW	JC BB BPA 1989
13–22 Feb	Fresh	Brisbane R			BoM

15–16 March	Low		Low off C NSW moved inland. 1005hPa, strong gradient	Cat B S NSW	BB
Late March	Heavy weather	S NSW	27 March <i>Merimbula</i> steamship 1111t ashore in heavy weather, Beecroft Head, all survived	Not in BB PH	Loney Atlas, EAS NSD
18–24 April 1928	TC	Whole coast	Recurved near Mackay to cross coast at Broadsound. Moved to sea at Keppell Is and crossed Fraser Is. Gradient from N Coral Sea low with long fetch. Extensive flooding central to SEQ, low parts of Brisbane flooded. Maleny 394mm (19) record April daily rainfall. Rockhampton 348mm (21) record April daily rainfall	Cat B N NSW	BB JC BPA 1989
18–24 April	Fresh	Brisbane R	Low lying areas inundated. Houses washed away 9 drowned.		BoM
April	Flood	Fitzroy R	8.27m		Webster
13–14 June 1928	Continental low <i>White Bay Storm</i> 'one of the severest (storms) ever'	Whole coast	Rapidly developing low formed in eastward moving trough <i>Nambucca</i> sheltered in Broken Bay. Steamers <i>Canonbar</i> and <i>Corrimal</i> driven to sea in gale and missing for several days. Storm on night of Wed 13 and during Thurs 14, still rough but abating Friday 15. Waves reported to exceed 12m, storm winds (50kts for 18hrs)	Cat X/B all NSW	BB Richards 1996:115–117
			13 June <i>White Bay</i> collier 134t driven on to Morna Pt, Port Stephens capsized in surf and broke up, 7 lost		Richards 1996:116 NSD
			13 June <i>Uralla</i> steamer 529t left Newcastle for Sydney 'weather deteriorated steadily ...[near Broken Bay] ...the little coaster was struck by the full force of the gale'. Put about and ran before gale till off Newcastle when struck by 'a mountainous sea' which damaged the steering gear, run ashore Stockton Bight		Richards 1996:116 NSD
	Storm surge		<b>Photo</b> <i>Uralla</i> (drew 2.6m) on Stockton Beach 'she was carried high and dry' and possible to walk around at low tide		Richards 1996:117
1928	Floods	NSW coast	'the whole coast was lashed by gales' and 'unusually heavy rain all over the coast'. Destructive flooding on Clarence and Richmond R		Richards 1996:115
15 June	Dune Erosion	Stockton Beach	'the storm tossed sea came over the sandhills'		Moratti 1997 DLWC 1995
1928	Erosion		"Timber Reach" along Broadwater end of South Stradbroke Island	Erosion of western shore from surge April 1927 PH	Salter 2002:86
26 June	ECL		Low off M NSW (997hPa), brief period of severe weather.	Cat A/B M – C NSW	BB
25–26 July	Low		Inland low moved off C NSW. Heavy weather, shipping delayed.	Cat B C NSW	BB
1929					

22–23 Jan	TC		Moved toward coast and recurved NE of Townsville, 992hPa Yeppoon. Flooding Townsville to Bundaberg		JC
12–13 Feb	ECL	Whole coast	Low on trough moved slowly S then to NZ. Heavy rain and flooding.	Cat B S NSW	BB
			8 Feb <b>Annie M Miller</b> steamship 706t capsized and lost in gale off South Head, Sydney, 6 rescued, other boat lost		Loney Atlas, AE NSD
22–23 Feb 1929	TC	FNQ to SEQ	Moved towards coast and recurved to sea E of Bowen. Heavy rain. Bridges and crops damaged and 2 drowned. Rockhampton 389mm (21) all time daily rainfall since 1871		JC
	Flood	Fitzroy	Peaked at 7.6m		Webster
28 Feb – 2 March 1929	TC	CQ to M NSW	26 Feb TC crossed coast near Mossman then recurved to SE and redeveloped 28–29 Feb, 986hPa Double Island Pt moved to Cape Byron. Huge seas, Kirra Surf Club flooded.	Cat A N – M NSW	JC BB BPA 1989
	Floods	Northern NSW rivers	Floods Southport to minor flood Lismore.		BB Ferguson 1995
1929	Major floods	Manning R	Major floods east coast rivers		Richards 1996: 17
	Beach erosion	Gold Coast			JC
	Jetty damaged	Byron Bay	28 Feb 'Very heavy seas running. The heaviest ever', waves over jetty, raker piles were washed out of the almost completed new jetty (opened in May 1929) and sheds damaged on old jetty		Ryan and Smith 2001:90 Coltheart 1997:135
4 April	Continental Low	C NSW – Bass Strait	NE gales. Deep inland low Q to Bass Strait (900hPa), NE gales.	Cat B C – S NSW	BB
			4 April <b>Wanderer</b> fishing boat 15t went ashore in storm Coffs Harbour		Atlas, Loney NSD
April	Flood	Fitzroy R	7.37m		Webster
18–21 April	Fresh	Brisbane R			BoM
25–26 May	Low	CQ	Trough from Tasman Low, severe S gales.	Cat B C–S NSW	BB
15–17 June	ECL recurved SE off central Q		Local flooding Fitzroy R. Sandy Cape 215mm (17), record June daily rainfall. Rockhampton 174mm (16) record June daily rainfall		JC
29–30 June 1929	ECL 'Hurricane'	Whole coast	Low formed off SEQ and intensified moving S. Ship sank at Ballina, widespread damage. Low recurved to SE of Cape Moreton. Damage Sandgate and floods Pine and Nerang R	Cat X whole coast Ship not found PH	BB JC
			29 June <b>Australia</b> wood steamer lost in Tweed R		Atlas

	Severe erosion and property destruction	Gold Coast	SMH (3 July) Erosion at Gold Coast at places deep into private property and retaining walls broken 'reconstruction on the old site would be impracticable [and] there is a general desire to move business establishments back at least 20 feet, and to hand over the land between the new frontage and the old street alignment to the council for road construction'		Chapman and others 1982:117 McGrath and Robinson 1972
			Photos Pacific Pde, Currumbin washed away	2m high cut in dune face PH	Longhurst 1996:171, 173
29 July	Continental Low	SEQ to M NSW	Inland low deepened off coast. SSE-SE gale, shipping delayed	Cat B N-M NSW	BB
11 Aug	Low		Small low off C NSW moved S crossed coast Eden. Moruya Heads 133mm (12 Aug) record Aug daily rainfall.	Cat B S NSW	BB
25 Aug	Low		Low off C NSW strong gradient	Cat B C NSW	BB
9-12 Sept	Low	SEQ - S NSW	Low moved NE with intense gradients	Cat A/B M-S NSW	BB
	Gale	Smoky Cape	11 Sept <i>Acielle</i> ketch 40t lost south of Smoky Cape in gale		Loney Atlas, NSD
	Gale	Port Stephens	11 Sept <i>Pappinbarra</i> steamship 518t ashore and lost in gale Port Stephens		Loney, Atlas, NSD, Richards 1996:120
1930					
5-9 Jan	Tropical Cyclone		TC crossed coast at Cape Flattery. Small vessels lost. Wind 74kts, bar 987hPa. Flooding Cookstown to Townsville		JC
20 Jan	Tropical Cyclone		TC crossed coast Mossman, 1000hPa. Floods over much of Q. Several drowned		JC
28-31 Jan	TC		20 Jan TC crossed coast near Mossman then recurved east of Mackay (28 Jan), tracked ESE to 300km N of Fraser Is (31 Jan). Floods over much of Q		JC BPA 1989
1-3 June	Low		Inland low deepened near Port Macquarie, moved S to Newcastle (995hPa) Gales to S	Cat A/B M-S NSW	BB
17-20 June	ECL		Low in trough off N NSW, very heavy seas, shipping delayed. Port Macquarie 189mm record June daily rainfall (19 June)	Cat B M-C NSW	BB
29 Dec	Low		Low in NW Tasman Sea, SE gales	Cat B C NSW	BB
1931					
19 Jan	TC	CQ - SEQ	Off Q coast 982hPa Gold Coast		BPA 1985

1–8 Feb	<b>Tropical Cyclone</b>	FNQ to N NSW	TC entered Coral Sea near Cooktown, moved slowly S to loop around Hervey Bay (982hPa) before tracking N and again S. Long fetch, gales and heavy seas, flooding NQ to SEQ. Storm <b>surge Moreton Bay 0.76m</b> , severe beach erosion Gold Coast. Cape Moreton record Feb daily rainfall 215mm (5 Feb), Southport 426mm (6 Feb) all time daily record rainfall (since 1881). Brisbane 270mm (6 Feb) record Feb daily rainfall. Maryborough 360mm (5 Feb) all time daily rainfall record (since 1870). Bundaberg 372mm (5 Feb) record Feb daily rainfall	<b>Cat A N NSW</b>	JC BB BPA 1989
	<b>Floods</b>	NQ - SEQ	Floods from Herbert R to Brisbane R		BoM
2–8 Feb	<b>Major flood</b>	Brisbane R	First major flood since 1908. Flood in Breakfast Ck exceeded 1893		BoM, JC
	<b>Flood</b>	Richmond R			Ferguson 1995
	<b>Severe erosion and floods</b>	Gold coast	Curumbin Ck breached, Kirra pavilion undermined, Curumbin Beach severely eroded, Curumbin and Tallebudgera Ck bridges damaged		JC Longhurst 1996:168
	<b>Photo</b>		Curumbin Ck bridge washed away		Longhurst 1996:169
21–24 April	<b>ECL</b>		Low NW Tasman in Sea, gales and heavy rain	<b>Cat B M–S NSW</b>	BB
27–28 May	Tasman Low	N to S NSW	Low moved away with gales and heavy seas. 2 April <b>Malabar</b> ship 4512t ashore in fog, broke up two days later (4 April) in heavy seas	<b>Cat B M–C NSW</b>	Loney Atlas NSD BB
6–8 July	<b>ECL</b>	Whole coast	7 July Low developed SEQ and moved SE, strong winds Brisbane Long fetch to whole coast Damage in Sydney, city 198mm record July daily rainfall (7 July)	<b>Cat X/B M – S NSW</b>	BB JC
14 Sept	<b>Low</b>		Inland low deepened of C NSW (998hPa)	<b>Cat A/B C–S NSW</b>	BB
<b>1932</b>					
19 Jan	<b>Tropical Cyclone</b>		TC from Gulf to E of Townsville. Flooding between Mackay and Cairns. 2 drowned. Stock lost and crops damaged. Houses inundated in Innisfail and Tully.		JC
Feb	Strong NE winds	Sydney	22 Feb <b>Northern Firth</b> steamship 1954t struck rocks off Brush Is and driven ashore in strong NE winds		Loney NSD
			26 Feb <b>Eldriss</b> ketch 25t driven ashore Port Stephens		NSD Atlas
27–29 June	<b>Low</b>	Whole coast	Secondary on trough, gales and rough weather.	<b>Cat B M–C NSW</b>	BB
7–13 July	<b>Two severe lows</b>	S NSW	7–8 July Low severe S gales, low persisted	<b>Cat X/A M–S NSW</b>	BB

	<b>Jetty damaged</b>	Byron Bay	Storms caused substantial damage to jetty	Big swell to N NSW PH	Coltheart 1997:135
2–3 Aug	<b>Tasman Low</b>		Low in SW Tasman Sea SSE gradient, gales	Cat B C NSW	BB
8–10 Sept	<b>Tasman Low</b>		Low moved W from Tasman Sea to N NSW, gales, shipping delayed.	Cat B M NSW	
17 Sept	Continental Low		Off N NSW coast (1006hPa), easterly gales and rough seas, shipping delayed	Cat B N–M NSW	BB
<b>1933</b>					
1930–37	<b>Erosion</b>	Cronulla	Reduced beach width and dune cliffs		Foster and others in Thom 1974
1933 – 1936	<b>Severe erosion</b>	SEQ – Sydney	Period of major erosion See Robinson and Paterson 1975		Chapman and others 1982:117
1936–37	<b>Erosion</b>	Gold Coast			McGrath and Robinson 1971 (in Thom 1974)
1930's	<b>Breakwaters damaged</b>	Richmond R	Constant repairs to walls from storm damage		Coltheart 1997:1137
21–26 Jan	<b>Gradient</b>		Prolonged E weather, heavy swell, shipping delayed	Cat B M – S NSW	BB
20–21 Feb	<b>Tasman Low</b>		Low central Tasman Sea (980hPa). Very severe cold outbreak, strong gales, heavy swell.	Cat B S NSW	BB
7–17 March	<b>TC</b>	NQ to C NSW	7 March TC formed Coral Sea 200km off Fraser Is moved slowly SE to Lord Howe Is Rough seas, persistent heavy E swell	Cat A/B N – M NSW	BB BPA 1989
30 March – 1 April	<b>ECL</b>	Whole Coast	Low off Q coast moved S, easterly swell, high to S, persistent to S NSW on 1 April.	Cat B N – M NSW	BB
4–6 April	<b>ECL</b>	N to C NSW	Low in trough off M NSW. Big swell (5 June), shipping delayed	Cat B M NSW	BB
18–20 May	<b>ECL</b>	M NSW – Bass Strait	Low near Lord Howe Is, moved S and E, shipping delayed.	Cat X/A/B M – S NSW	BB
4–8 June		N to C NSW	Intense Low formed off coast on trough then moving SE, SE Gales, heavy swell, shipping delayed	Cat A/B N – C NSW	BB
10–11 July	<b>ECL</b>	C to SEQ	Low over Broadsound and Rockhampton. Floods central Q. Rockhampton 293mm (11 July) record July daily rainfall		JC
25–28 July	<b>ECL</b>	Whole coast	Low in Coral Sea Easterly gales and shipping delayed	Cat A/B N – C NSW	BB
26 Oct	<b>Low</b>	N to C NSW	Low on Inland Trough (1000hPa), temporary gales	Cat B M NSW	BB

Dec	TC moved SE from CQ		990hPa Yeppoon		BPA 1985
1934					
6–8 Jan			Bega 193mm (8) record daily Jan rainfall. Moruya Heads 207mm (8) record Jan daily rainfall		JC
23 Jan	<b>Tropical Cyclone</b>		TC crossed coast between Cairns and Innisfail on 23. Buildings damaged, some unroofed. 2 serious landslides over railway line. 1 drowned		JC
1–3 Feb 1934	<b>Severe Tropical Cyclone</b>	Whole coast	TC tracked from gulf to NSW coast, floods central and SEQ. Heavy N gales and large waves, storm surge in Hervey and Moreton Bays. <b>Moreton Bay gauge, largest recorded storm surge 1.16m</b> Intense gradients to 988hPa Southern Tasman. Very severe coastal storm. Heavy swell on all beaches. 12m waves at Sydney	Cat X/A all NSW	JC BB
1934	<b>Severe erosion, spit breached</b>	Gold Coast	Kirra to Coolangatta Creek 'the sea... reached almost west to the highway'. At Jumpinpin the entrance had migrated N from 1917, a new channel breached the spit at site of the 1890's breakthrough		Kindler and O'Connor 1951:14 Tomlinson and McCauley 2001
21–22 Feb	<b>Low</b>		Low on trough off M NSW, NE–E gales	Cat A C–S NSW	B
11–13 March	<b>TC Cape Tribulation</b>	FNQ	TC crossed coast N of Port Douglas, extensive damage. Huge seas wrecked pearling luggers, 75 lives lost		BoM
22–25 March	<b>TC</b>	SEQ	Crossed coast Double Island Pt	.	JC
7–9 May	<b>ECL formed on Coral Sea dip</b>	N NSW to M NSW	Long easterly fetch, severe floods on N NSW	Cat B N NSW	BB
			7 May <b>Nambucca</b> wood steamer 415t swept on south beach and lost when towline to tug parted Nambucca R bar. Broke up by late May		Richards 1996:124 Loney, Atlas NSD
29–30 July	<b>ECL</b>	N NSW to M NSW	Small intense low off Cape Byron, (1008hPa) gales	Cat A/B N – M NSW	BB
31 Aug – 3 Sept	<b>ECL Coral to Tasman Seas</b>	SEQ to all NSW	Low 999hPa passed E of Brisbane and intensified S of Lord Howe, very strong winds to NSW coast Shipping delayed and small vessels sunk	Cat A/B all NSW	BB JC
1935					



1935-6	Severe erosion	SEQ to Sydney	Major damage reported from Gold Coast, Ballina, Newcastle and Sydney with erosion at all beaches. Major damage reported at Coogee, Balmoral, and Broken Bay		Chapman and others 1982:117
1935	Bar shoaling	NSW north coast	Inclement weather conditions caused silting of river bars at Hastings, Nambucca and Tweed Rivers	Sand movement across and into river mouths in storms PH	Richards 1996:125
25 Feb – 10 March	Gradient	SEQ to M NSW	Gradient with persistent easterly weather from stationary S Tasman high, rough seas and heavy easterly swell	Cat B N NSW	BB
27 May	ECL		Low in trough near Lord Howe Is, moved S to central Tasman Sea	Cat B M NSW	BB
18-20 June	Severe low	Whole coast	Huge low from south moved north and developed over east Tasman Sea, huge seas, small vessel sunk, 5 lost	Cat X/A/B all NSW	BB DLWC 1995
	Erosion and storm surge extensive shoreline damage and storm surge	Sydney	SMH 19 June water and rocks were carried into surf clubhouse 30 feet above sea level. SMH 20 June Sydney Harbour residents found 'the sea had risen to heights which they had not believed possible and had swept away their lawns and gardens'		Chapman and others 1980:126
8-10 July	ECL <i>Maheno Cyclone</i>	Central Q – N NSW	Low recurved over Shoalwater Bay, Yeppoon 1002hPa then moved SE. Gales and floods central Q and tight gradient to SEQ and N NSW	Cat B N NSW	JC BB
	Fierce cyclone	Fraser Is	8 July <i>Maheno</i> liner 5323t under tow for scrap, went ashore on the ocean beach, Fraser Island in fierce out of season cyclone		Loney
Aug 1935	Severe erosion	Greenmount Beach	'the furthest westward movement in recent years'	Photo	Kindler and O'Connor 1951:17
31 Aug			Port Macquarie 142mm record daily Aug rainfall (31Aug)	Associated with storm that caused erosion at Greenmount? JC	JC
25 Dec	Low	S NSW – Bass Strait	Low in trough off C NSW (997hPa)	Cat B S NSW	BB
1936					
21-25 March 1936	TC Fraser Is to Lord Howe Is	CQ – C NSW	22 March TC recurved E seawards 250km off Fraser Island. Very large cyclonic circulation NE of Fraser Is, 992hPa, winds to 60kts and huge seas. Moved S then SE with continuing gales and heavy swell	Cat B N NSW	JC BB BPA 1989

	<b>Severe and extensive erosion, Southport Spit breached</b>  'seas breaking at Kirra... claimed as the heaviest in living memory'	CQ and SEQ, especially Gold Coast	Seas over walls at Yeppoon. Jumpinpin further breached. Surge at Southport, 100m further inland than normal high tide, estimated at 4ft [1.2m]. Southport Spit, breached new channel between Southport SLSC and Sheraton Mirage, 12m wide, 1.3m deep 'through which some waves washed even at low tide'. Protective timber walls constructed at Coolangatta, Kirra, Narrowneck and Currumbin. Damage to old and new Kirra SLSC. In Moreton Bay houses damaged Cribb Island, the sea flooded over retaining walls Wynnum and into low lying areas	<b>Photos</b> waves breaking into Kirra SLSC  <b>Photos</b> taken in 1951 show 1936 erosion line, several metres into private property	Kindler and O'Connor 1951:14, 27, [photos] 37-38 JC Tomlinson and McCauley 2001
1936	<b>Wreck of Coolangatta exposed</b>	Gold Coast	Timber schooner lost on beach July 1846 landmark until mid 1880's and ribs exposed 1936 and 1970's		Longhurst 1996:26, 176
Autumn 1936	<b>Jetty Damage</b>	Byron Bay	Unusually heavy seas and storms undermined the piles and repairs took four years		Coltheart 1997:135
13-15 April	<b>ECL</b>		Low in trough near Lord Howe Is, gales and big seas, shipping delayed	Cat B N – M NSW	BB
24-25 May	<b>ECL Tasman Sea</b>	N NSW to Mid	Extensive low in north Tasman Sea, gales and high seas, shipping disrupted	Cat B N NSW	BB
23-25 June	<b>ECL</b>	M NSW – Bass Strait	Active Low on trough off C NSW (998hPa) moved rapidly S, shoreline damage	Cat A M – S NSW	BB
28 Aug	<b>Low</b>		Inland low intensified off coast (998hPa)	Cat B M – S NSW	BB
Oct 1936	<b>Breach</b>	Jumpinpin	Jumpinpin breakthrough after being partly closed for 19 years (since 1917)		Neil 1998:16 Tomlinson and McCauley 2001
<b>1937</b>					
16-20 Feb	<b>TC</b>	Q to whole NSW	TC 992hPa extensive damage around Bowen, moved S to off Cape Byron very intense 20 Feb. Damage to coast and shipping	Cat X/A most NSW	BB
	<b>Erosion?</b>	Ballina	Dressing sheds at Ballina baths destroyed in a gale in late 1930's		Murray 1983:266
Feb	<b>Breakwaters damaged</b>	Coffs Harbour	110ft [33m] at the end of the eastern breakwater demolished, completed Oct 1939		Coltheart 1997:133
Feb	<b>Jetty damaged SE gale</b>	Woolgoolga	After extensive repairs and rebuilding 240ft [73m] at the end from 1936 storms. SE gale washed away the new work, crane and shed. Jetty not back in use until 1940, continuing extensive repairs until 1942, and finally closed in 1952	From 1890's Woolgoolga jetty damage similar to Byron Bay	Coltheart 1997:135

15–16 March	TC tracked from Kimberleys to SEQ	SEQ – C NSW	Widespread gales and flooding. <b>Haiping</b> steamer abandoned in heavy seas off Sandy Cape, crew rescued. Sea broke over retaining wall at Manly		JC
5–6 Apr	ECL	SEQ – M NSW	Off Lord Howe Is, long and pre-existing fetch from mid March TC	Cat C N NSW	BB
14–15 April	Tasman Low		Deep low developed in Tasman Sea, SSE–S gales	Cat B S NSW	BB
6 June	ECL	Q to M NSW	Low moved S from Coral Sea, moved E. Gales to SEQ	Cat A/B N–M NSW	BB
19–23 June	Severe ECL worst storm since April 1927	SEQ to S NSW	Low in trough off N NSW. Intense low (995hPa)	Cat X M – S NSW No Cat N NSW Impact to N under-estimated PH	BB
1937	Flood	Richmond R			Ferguson 1995
1937	Severe erosion	Gold Coast	Most westward erosion at Palm Beach prior to 1951, some areas to N had eroded further inland in the late 1920's		Kindler and O'Connor 1951:14
June 1937		Narrow Neck	Aerial <b>Photo</b> of severe erosion compared to later erosion in 1951		Kindler and O'Connor 1951:14
1937–38	Near break-through	Narrow Neck			Salter 2002: 84 cites Tomlinson
22 Aug	Tasman Low		Low east of S NSW 990hPa	Cat B S NSW	BB
1938					
19–21 Jan	TC crossed coast Hervey Bay and seaward over N NSW	Central Q to N NSW	Large TC with long east fetch, 992hPa Gold Coast, storm tide flooded southern parts of Stradbroke Is, waves breaking 1.6km off Kirra Pt, waves over retaining walls in Moreton Bay, surge at Pile Light Moreton Bay 0.52m, coastal buildings damaged Hervey Bay. Dorrigo 141mm (19 Jan), 213mm (20 Jan), Coffs Harbour 121mm (20 Jan)	Cat B N NSW	JC BB BPA 1989
	Flood	Richmond R	Minor flood Lismore, moderate flood Coraki		JC, Ferguson 1995
	Severe erosion	Gold Coast			JC
21–22 Feb	ECL Coral Sea	Q to NSW	Low moved west from Coral Sea with pre existing fetch, shipping delayed	Cat B N – M NSW	BB
24–30 March 1938	TC	Central to SEQ	TC recurved east of Bowen (992hPa) SEQ, gales, high seas and torrential rain	Cat B N – M NSW	JC BB BPA 1989
	Severe erosion	Gold Coast			JC

Early 1938	Erosion	Southern end of South Stradbroke Is	Serious erosion, inundation and breach southern end of South Stradbroke Is. 'The worst erosion occurred in 1938 when the sea broke right through the island, creating a small sand island – 'Tragedy Island'. The township of Moondarewa 'disappeared under the sea'		Salter 2002: 86
4–5 April	Tropical Depression	SEQ to C NSW	Degenerating TC over east Tasman Sea, strong SSE gradient	Cat B N–M NSW	BB
9–14 April	ECL	SEQ to C NSW	Stationary low over Coral Sea moved slowly to Tasman Sea, gales to coast	Cat B most NSW	BB
25 Aug	ECL		Low developed in trough (1000hPa)	Cat B M–C NSW	BB
1939					
13 Jan	Black Friday bushfires	Victoria			
1939 – 1950	Low erosion period		Principally period of fine weather and little cut on Gold Coast 1937–1945 in Brooks 1937–1950 in Chapman & others	Should be 1939 as significant erosion 1937–8 PH	Beasley 1948, 1950 Brooks 1953 Chapman & others 1982:118
Jan	TC	CQ to C NSW	995hPa Yeppoon, crossed coast	Not in BB	BPA 1985
	Heavy seas	Sydney	16 Jan <i>Belbowrie</i> wood steamer 218t lost ashore Sydney, boats smashed in heavy surf, crew saved		AE, Loney Atlas Birrell 1987:30
27–29 Jan	TC in NQ Tasman low M NSW	Central Q – SEQ	27–29 Jan Low moved offshore S of Mackay developed into slow moving TC. Shipping delayed and floods Dawson R	Cat A/B most NSW	JC BB
2–7 March	TC	SEQ – whole NSW	TC moved S close to coast at Cape Byron 993hPa, then rapidly SSE, 40kt gales. Shipping delayed. Dorrigo rainfall 92mm (5 March), 216mm (6 March)	Cat A/B all NSW	JC BB BPA 1989
23–26 March	Low		Low in Tasman Sea, strong gradient, gales, heavy swell	Cat B M–S NSW	BB
1940					
Feb – April	TC's	FNQ	Four TC's in FNQ		BoM
18 Feb	Tropical Cyclone		TC crossed the coast near Cardwell (965hPa). Townsville, huge seas and storm surge, streets under water 1–1.5m deep. Extensive building and crop damage at Ingham, Innisfail and Tully.		JC
6 March	Tropical Cyclone		TC crossed the coast N of Cooktown, 349mm of rain in 24hrs. Railway line washed away between Kuranda and Mareeba. Flooding in Northern Interior		JC

17–19 March	ECL	CQ to C NSW	Trough Gold Coast 987hPa to Port Macquarie 1002hPa, strong gales N NSW TC crossed coast near Mackay with little damage.	Cat A N NSW	JC BB
March	Floods	SEQ to N NSW	Floods SEQ and damage to Grafton		JC
March	Flood	Fitzroy R	7.92m		Webster
23 March	Tropical Cyclone		TC crossed Cape York. Flooding in Gulf and FNQ		JC
7 April	Tropical Cyclone		TC crossed coast near Townsville (993.2hPa). Bowen 356mm rain fell in 18hrs. 3 deaths. Disastrous flooding central Q coast		JC
26 April	Low		Low E Bass Strait, moved E	Cat B S NSW	BB
23 Sept	Low		Low formed briefly	Cat B M NSW	BB
28–30 Sept	Secondary low	Whole NSW	Low east of Tasmania then moved to off Coffs Harbour, then ESE, 60kt max gust Sydney	Cat A/B all NSW	BB
15–16 Nov	Low		Deep low over W Tasman Sea (992hPa), SE–S gradient	Cat A/B M–S NSW	BB
1941					
April	TC	CQ	Off CQ coast, 1002hPa at Yeppoon		BPA 1985
28–29 April	Tasman Low		Low moved towards S NSW then NE	Cat A C – S NSW	BB
30–31 May	ECL crossed Q coast	CQ to M NSW	Low crossed coast near Seventeen Seventy then to sea and moved SE before weakening. Gales, local heavy rain CQ	Cat A/B N – M NSW	JC BB
May	TC		997hPa Yeppoon, crossed coast		BPA 1985
1942					
5–11 Feb	TC and High to S	N NSW	8 Feb Inland TC crossed coast to sea N of Rockhampton, wind damage, floods Gradient and long persistent fetch to NSW coast	Cat B N NSW	BB JC BoM BPA 1989:14 Feb
Feb	Flood	Fitzroy R	7.24m		Webster
18–20 Feb	TC off Q coast	CQ to N NSW	TC 996hPa moved SE 150km off Fraser Is, gales to coast	Cat B N NSW	BB BPA 1989
8–10 March	TC	SEQ to whole NSW	TC close to SEQ to Cape Byron 996hPa then deepened to Lord Howe (992hPa). Strong S gale	Cat A/B most NSW	BB
19 March	Low		Low off C NSW. Sydney City 281mm record March daily record (28 March)	Cat B M–C NSW	BB

27–28 March	Low		Deep low off C NSW moved NE	Cat A C–S NSW	BB
Mid July 1942	Heavy sea	South Passage	13 July <b>Rufus King</b> US liberty ship 7181t broke in two after grounding and lost South Passage bar in rain and strong SE wind, with heavy sea running	Navigational error, entrance closed to ships since 1856	Carter and others 1994: 78–9 Loney 7 July
Aug – Sept	Calm weather	Moreton Bay	Calm weather as military supplies salvaged from wreck of <b>Rufus King</b>		Carter and others 1994: 78–9
12–15 Oct	ECL Very severe storm	SEQ to all NSW	Intense low E of Brisbane moved slowly S. Extreme gradient 30hPa N NSW to Sydney. <b>Comara</b> lost rudder off Smoky Cape	Cat X/A all NSW	BB
Winter/spring	Severe damage	Sydney	Beaches eroded, damaged wall North Cronulla		Chapman and others 1982:117, Thom 1974
22–23 Oct	Low		Low on S trough about 157°E, S gales	Cat B C – S NSW	BB
22–24 Nov	Low		Inland low Nowra, Strong SE gradient	Cat B S NSW	BB
22 Dec 1942	ECL	SEQ to C NSW	Low off SEQ. Strong short-term gales to N NSW	Cat B N – M NSW	BB
1943					
31 Jan	TC	Yeppoon	999hPa crossed coast Shoalwater Bay and moved inland. Lady Elliot Is 454mm (31) all time (since 1939) record daily rainfall		JC BPA 1989
Feb	Flood	Fitzroy	7.16m		Webster
16–17 May	ECL	Tasman Sea	World War II convoy scattered in rough weather. <b>Cites Service Boston</b> US tanker 9348t lost at Bass Pt. Nowra 190mm (16) record May daily rainfall	Cat B M – C NSW	JC, Loney, BB Atlas NSD
19–23 May	ECL		Low formed in NSW and intensified moving S, very heavy rain Sydney, NSW	Cat A/B M – S NSW	BB
23–29 May	Gradient	SEQ to all NSW	Heavy easterly swell with trans Tasman fetch	Cat B N NSW	BB
10 Oct	Low		Inland low moved off M NSW (1004hPa) gales	Cat B C NSW	BB
5 Dec	Tasman Low	S NSW – Bass Strait	Low in Tasman Sea strong gales S NSW	Cat B S NSW	BB
16 Dec	Tropical Cyclone		TC crossed coast at Princess Charlotte Bay causing gales and shipping delays. Severe structural damage at Coen		JC

29–30 Dec	<b>Small TC</b>	SEQ	30 Dec Small TC located N of Cape Moreton, heavy rain SEQ		BoM
1944					
1944–1955	<b>Abundant sand supply</b>	Jumpinpin	Consumption of littoral drift sand in building the recurved spit halted migration of the northern channel. In the 1940's there was a long period of calm weather that assisted growth of the spit. 'Sand must have been in abundant supply' as despite later severe weather in the early 1950's closure of the second channel was complete by 1955		Tomlinson and McCauley 2001
9 March	<b>TC</b>	CQ – SEQ	Off CQ coast, 996hPa tracked to SE	Not in BB	BPA 1989
28 March	<b>Tropical Cyclone</b>		TC crossed the coast near Townsville. Flooding		JC
13–15 April	<b>Low</b>		Low in trough, cut off strong gales S coast SW wind C NSW	<b>Cat A S NSW</b>	BB
23–24 May	<b>Low</b>		Inland low deepened off M NSW, strong gales	<b>Cat A/B C – S NSW</b>	BB
10–11 Aug	<b>Low</b>		Inland low redeveloped M NSW, strong SE gradient	<b>Cat B C NSW</b>	BB
Aug	<b>Gale</b>	Byron Bay	<b>Tassie II</b> lost at Byron Bay in easterly gale.	No gales in BB between late May and early Aug	Atlas, July EAS, Aug NSD no month
24–25 Aug	<b>ECL</b>		Small low on trough moved SE. Dorrigo rainfall 131mm (24 Aug), 274mm (25 Aug). <b>Tassie II</b> lost around this time. Coffs Harbour 183mm record Aug daily rainfall (24 Aug)	<b>Cat B M NSW</b>	BB
16 Oct	<b>Low</b>		Intense Low (1001hPa) moved rapidly NE, brief gales	<b>Cat B S NSW</b>	BB
1945					
Early 1945	<b>Bushfires</b>	Brunswick Valley	'worst outbreak in memory', fires devastated a large area		Brokenshire 1988: 243
1945–6	<b>Severe erosion</b>	Gold Coast to Sydney	10m cut Gold Coast and north NSW coast		Beasley in Chapman and others 1982:118
31 Jan	<b>Tropical Cyclone</b>		TC crossed the coast near Cooktown		JC
17–18 March	<b>TC <i>Sibigo</i></b>		17–18 March Small deep TC <i>Sibigo</i> crossed coast S of Cooktown, 978hPa, wind over 80kts 'air was full of spray and spume'. <i>Sibigo</i> steamer abandoned and sank off Port Douglas, 13 rescued, 72 lost		JC

March	TC	NQ	Off Q coast, 997hPa Yeppoon		BPA 1985
7–8 April	ECL		Low N of Sydney. Moruya Heads 271mm record April daily rainfall		JC
16–19 May	Secondary low	Whole NSW	Low moved along coast from S gale and rough seas	Cat B M–S NSW	BB
10–13 June	ECL Severe storm	SEQ – whole NSW	Strong SE/S gradient (persistent high in S and low off SEQ deepened as it moved S, stationary 24hrs, then slowly SE. Floods. Dorrigo rainfall 194mm (11 June), 387mm (12 June). Lismore 202mm record June daily rainfall (11 June)	Cat X SEQ – NSW	BB DLWC 1995
			11 June <i>Coweambah</i> wood steamer 76t capsized sheltering in off Trial Bay, 2 lost.		Atlas, EAS NSD
	Floods	N NSW	Richmond R		BB, Ferguson 1995
Early June	Severe erosion	M to C NSW	Major property damage at Collaroy: 8 houses damaged (3 beyond repair, land later resumed), road undermined and property threatened at Stockton		Chapman and others 1982:118
13 June	Severe erosion	Stockton Beach	Heavy seas and high tides ... swept away part of Dalby Oval and dressing sheds. Councillor Soper claimed that 'tank traps, erected by the military authorities were responsible for the erosion'. Some residents feared the sea would undermine their properties unless a retaining wall is erected		Moratti 1997:467 DLWC 1995
15–17 July	ECL	SEQ – M NSW	Low off SEQ moved south and deepened N NSW and away to ENE. Heavy rain	Cat A/B N – M NSW	BB
28–29 Aug	Tasman Low	S NSW – Bass Strait	Low off coast, S winds rough seas.	Cat B S NSW	BB
1946					
1946	Severe Drought	Baffle Ck	Drought conditions from early 1940's		Graham & Jodvalkis 1996:30
Jan	TC	FNQ	Crossed NQ coast 999hPa Townsville		BPA 1985
	Floods	SEQ	23 Jan Heavy rain, local flooding		BoM
2–3 March	TC	FNQ	TC recurved over Cairns and Townsville (983hPa at Cairns and Innisfail). Heavy seas. Wind damage to buildings. Recorded flooding in Burdekin R. 10 died. Townsville March daily rainfall record 366mm		BoM JC
4–10 March	TC	CQ – whole NSW	Slow south moving TC from Coral to Tasman Sea. Very heavy swell SEQ and all NSW	Cat B all NSW	BB BPA 1989



24–26 March 1946	TC Over coast Fraser Is to Cape Byron	CQ – C NSW	Slow moving TC (998hPa) crossed coast Double Island Pt and to sea Cape Byron 992hPa then SE. Moreton Bay <b>surge 0.73m</b> , at low tide. Gales and very heavy seas. Delays to shipping and aircraft. Dorrigo rainfall 64mm (23 March), 53mm (24 March), 160mm (25 March) 165mm (26 March)	Cat X/A N–C NSW	JC BB BPA 1989
			25 March <b>Fleetwing</b> schooner 13t lost off NSW coast		Atlas
	<b>Floods</b>	N NSW	Northern rivers, Richmond R		JC, Ferguson 1995
	<b>Beach erosion</b>	Sydney and NSW coast	Combination of high tides and heavy seas affects much of eastern Australian coast		Thom 1974
3–5 Apr 1946	TC off Yeppoon	CQ to C NSW	Small TC E of Yeppoon 998hPa moved S to SEQ and away to SE. 4 April TC passed to E of Fraser Island and heavy rain to SEQ, fresh Brisbane R and local flooding	Cat A/B N–M NSW	JC BB BoM BPA 1989
16–18 Apr	ECL	N NSW – central	Low off M NSW gale force wind. Record rainfall C to M NSW, severe flood Hunter R	Cat A N NSW	BB
19 May	Low		Inland low over NE Tas, strong gradient 62kts Sydney, structural damage.	Cat A/B C–S NSW	BB
5–7 June	Tasman Low		Low off NSW coast, strong squall, SE–S winds, rough seas.	Cat B S NSW	BB
19–20 June	Low		Low E Bass Strait moved NE deepening off C NSW	Cat B C NSW	BB
<b>1947</b>					
5 Jan	ECL	SEQ – M NSW	Low 998hPa SE over Coral Sea	Cat B N NSW	BB
21 Jan	Small ECL	SEQ – N NSW		Cat C N NSW	BB
23–24 Jan	TC Sunshine Coast	SEQ – M NSW	23 Jan crossed coast Caloundra 990hPa, heavy gales and high seas, waves broke into beach pavilion Coolangatta, surge Moreton Bay 0.55m, 3.5km seawall destroyed Margate	Cat A N NSW Probably more intense SEQ PH	JC BB
	<b>Floods</b>	SEQ	Heavy rain and record floods in SEQ creeks		JC BoM
	<b>Erosion</b>	SEQ	Sunshine and Gold Coasts, Moreton Bay		JC
3–6 Feb	Complex low over FNQ	SEQ? to N NSW	Strong ridge to N NSW	Cat B N NSW	BB
10–15 Feb 1947	TC Q Low SEQ	CQ – whole NSW	10 Feb TC crossed coast at Broomsound, over Hervey Bay (12 Feb) and weakened to S. Complex lows SWQ to SEQ, strong high Tasman Sea. Floods in most coastal rivers and shipping delayed	Cat A/B most NSW	JC BB BPA 1989
	<b>Erosion</b>	North coast	Damage to N NSW property [erosion?]		JC

	<b>Beach erosion</b>	Fraser Is SEQ	Coffee rocks exposed on coast N end of Fraser Is and South Stradbroke Is with 'continuous dune cliffs ranging up to 20 feet [6m]'		Connah 1948
3–4 April	ECL		Low moved south from Coral Sea	Cat C most NSW	BB
Mid 1947	<b>Shoreline erosion</b>	Amity Point, Stradbroke Island	<b>Photo</b> of building falling into sea <b>Photo</b> Kiosk at Amity Point sliding into sea 1947	Following series of storms above PH	Carter and others 1994:38, 132
10 Oct	<b>Tasman Low</b>		Low formed S of Lord Howe Is, moved away quickly	<b>Cat B C NSW</b>	BB
10 Dec	<b>Gradient</b>		Low in Q, high to S, gradient to NSW coast. Smokey Cape 194mm record Dec daily rainfall (9 Dec)	Cat C most NSW	BB
<b>1948</b>					
1948	Bar Shoaled	Tweed R	From 1948 shoaling closed Tweed R to shipping. Bar dredged in 1959		Coltheart 1997:136
3 Jan	<b>Low</b>	NSW	Low in trough	Cat C N – NSW	BB
7 Jan	<b>Tropical Cyclone</b>		TC moved towards SE across Cape York with heavy flooding between Cooktown and Cardwell. Storm surge Saibai Is.		JC
15–18 Jan	<b>Tasman Low</b>		Low off S NSW, stationary deepened	<b>Cat A/B, C – N NSW</b>	
27–30 Jan	<b>Severe TC Off Moreton Bay</b>	CQ – N NSW	28 Jan severe TC passed east of Brisbane, surge 0.46m Moreton Bay, 1.5m on foreshore, long SSE fetch, 96kt gusts Lord Howe Is (30 June)	Cat C N NSW More severe than BB PH	JC BB
3–4 Feb	Gale	Bustard Head	30kts SE		Buchanan 1999:53
24–25 March	<b>TC touched Fraser Island then away to SE</b>	CQ – C NSW	24 March TC recurved over Fraser Is 990hPa, gales and high seas caused severe beach erosion SEQ, flooding in coastal streams	<b>Cat A/B N – M NSW</b>	BB JC BPA 1989
1948	<b>Heavy flooding rain</b>	Mary R and Wide Bay	Cane toads washed to Fraser Is		Williams 2002:119
	<b>Storm surge and severe beach erosion</b>	SEQ	Severe beach erosion. Worst erosion ever recorded at Tewantin. Storm surge Stradbroke Is caused a <b>high tide</b>		JC Salter 2002: 68
			<b>Photos</b> Cyclone damage at Kings Beach, Caloundra		Longhurst 1995b:24–5
7–8 April	<b>Gradient</b>		High moved E intensifying	<b>Cat B N NSW</b>	BB

30 April – 4 May	TC	CQ – all NSW	TC crossed coast Gladstone 1002hPa moved inland. Secondary low formed off N NSW and both moved S. Heavy rain NSW coast. Rockhampton 108mm (1 May) record May daily rainfall	Cat A N NSW	BB
	Severe erosion	Gold Coast and N NSW	Southport Spit <b>breached near break-through</b> at Narrowneck and closed by dumping		Kindler and O'Connor 1951 in Chapman and others 1980:118
	Severe erosion and damage	Byron Bay and Ballina	Byron Bay heavily damaged [erosion] Fishing boats lost at Byron Bay (14) and Ballina		PWD 1978:22
15–17 June	Continental Low	North Coast	14–16 June complex low moved S from Double Island Pt to Coolangatta then seaward. Gales and flooding SEQ Low crossed and deepened dramatically near Cape Byron then moved S. Floods northern NSW rivers	Cat A/B all NSW	BB JC DLWC 1995
	Flood	Richmond R			Ferguson 1995
July	Erosion	Stockton Beach	Continuing erosion raising the possibility of a breach into the Hunter R. 800t of slag dumped in May was eroded and increased amounts of slag dumped on beach		Moratti 1997:467 DLWC 1995
17–19 July	Tasman Low		Deep low near Norfolk Is, moved SW deepened then moved E	Cat A/B C – S NSW	BB
2 Oct	Tasman Low	S NSW – Bass Strait	Low from Bass Strait deepened	Cat B S NSW	BB
1949					
			'In the later half of 1949 and all 1950 the [NSW] coast was lashed by gales and unprecedented wet weather'		Richards 1996:150
31 Dec – 1 Jan	Low		Inland low crossed coast near Sydney, deepened moving rapidly S.	Cat A/B C – S NSW	BB
1–13 Jan	Low		Low deepened off C NSW, moving NE continuing to deepen.	Cat A/B C – S NSW	BB
27 Jan	Tropical Cyclone	C – SEQ	TC in eastern Coral Sea strong gradient to N NSW	Cat C. N NSW	BB
10 Feb	Tropical Cyclone		TC crossed N of Cooktown with much devastation. 12 of 125 houses intact, 30 flattened. 300 homeless. Wind increased from SE 60kts to ESE 80kts. Big seas. 1 drowned		JC
16 Feb	Tropical Cyclone		Rapidly moved SE parallel to coast 100km off Fraser Is		BPA 1989
22–23 Feb	Tasman Low		Deep low off S NSW, S gales	Cat A/B C – S NSW	BB
			22 Feb <b>Bombo</b> steamer lost with 12 crew		EAS

1–4 March 1949	TC crossed coast Gladstone	Central Q – M NSW	2–3 March, TC from Coral Sea crossed coast Gladstone and moved over Rockhampton (960hPa) wind gust 87kts, extensive wind damage, including Bustard Head telephone line, heavy seas. Breaksea Spit light ship aground and ports closed	Cat B N NSW	JC BB  Buchanan 1999:156 BPA 1989 1002hPa
	<b>Floods</b>	CQ – C NSW			BB, JC
24–28 March	<b>Tropical Low</b> Gradient to N NSW	SEQ – M NSW	Low in Coral Sea, strong high to S. Persistent fetch to N NSW, rain and floods	Cat B N NSW	BB
4–6 Apr	<b>Tropical Low</b> Gradient to N NSW	SEQ – mid NSW	Low in Coral Sea moving S, Persistent high to S, long fetch to N NSW	Cat C N NSW	BB
4–5 June	<b>Tasman Low</b>		Low off S NSW (990hPa) moved NE and deepened	Cat B M–S NSW	BB
16–19 June	<b>Record rain</b>	C NSW coast south	Low off M NSW moved S then E, deepening	Cat A C–S NSW	BB
25–27 Aug	<b>Low</b> Off N NSW		Low moved ESE with gradient and heavy swell to NSW coast. Major floods. Dorrigo rainfall 210mm (26), 151mm (27), 83mm (28). Coffs Harbour 127mm (26). Smokey cape 216mm record Aug daily rainfall (27)	Cat B M NSW	JC BB
24–25 Oct	<b>Low</b>		Low over E NSW moved to E Bass Strait (25), Maryborough 284mm record Oct daily rainfall (25), Brisbane 136mm, Smokey Cape 52mm (25)		JC
22–23 Nov	<b>Low</b>		Intense low moved from Melbourne to SE of Gabo Is. Flinders Is 93mm (23) record Nov daily rainfall, 32mm Eddystone Pt (23)		JC
1950					
	<b>Storm Year</b>	Regular coastal shipping to N NSW ends during decade	1950 'the coast was lashed by gales and unprecedented wet weather' and floods. Siltation in Macleay R from floods meant vessels could no longer reach Kempsey		Richards 1996:150–151
15 Jan	TC near Cairns	FNQ	Gales and floods Q coast		JC
16–19 Jan 1950	<b>TC</b>	SEQ and whole NSW	16–19 Jan TC tracked from Gulf to Sydney, high winds, NE gales. Moreton Bay 2m waves and <b>surge 0.58m</b> , houses damaged Sandgate. Very rough seas, long fetch from NE Coral Sea <b>Record low pressure Sydney 988hPa</b>	Cat X/A most NSW	JC BB
	<b>Floods</b>	SEQ to Sydney			JC, BoM

7–8 Feb	Low		Inland low developed off coast. Gabo Is 126mm (8) record Feb daily rainfall	Cat B M NSW	JC BB
18–24 Feb	Low on trough	SEQ to M NSW	Low in Coral Sea deepened and moved towards SEQ on 24 Feb. East to SE winds N NSW for several days (18–24 Feb)	Cat B N NSW	BB
26–28 Feb	TC	Central Q	TC 998hPa recurved over Gladstone and inland to Bundaberg, floods SEQ		JC BPA 1989
7–11 March	TC	CQ – N NSW	TC crossed coast twice, FNQ and Shoalwater Bay. Persistent E fetch	Cat C N NSW	JC BB BPA 1989
5 May	ECL	SEQ – M NSW	Low 1008hPa developed near Lord Howe Is and moved away to SE	Cat B M NSW	JC BB
9 May	Tasman Low		Low off S NSW (1000hPa) moved NE, weakened.	Cat B S NSW	BB
15–19 June	Tasman Low		Low formed in Tasman moved NE deepening off M NSW then E.	Cat B C NSW	BB
23–26 June 1950	Severe storm Double ECL <i>Fairwind Storm</i> Double low off SEQ moved S to mid NSW then away E	SEQ and all NSW	15/16 June Low developed near Newcastle, on 19 June second low developed near Ballina and on 23 June moved toward Gold Coast and back out to sea and then slowly S along NSW coast. Wind over 50kts Moreton Bay and 10 to 15m waves offshore, wind hurricane force (60kts) and 15m waves NSW coast. Very heavy rain and severe floods Hunter to SEQ	Cat X/A most NSW	JC BB
	Storm	Coffs Harbour	17 June 1950 <i>Fairwind</i> navy ship 250t lost with crew off Coffs Harbour, referred to in local histories as 'cyclone'		BB
			24 June <i>Bangalow</i> coastal steamer 648t blown ashore at Coffs Harbour	Photo in Richards suggests storm surge? PH	Richards 1996:149
	Major floods	SEQ – Hunter R	Disastrous floods on north coast. Rivers silted up and restricted navigation Richmond R	Clarence R cut flood channel to sea JC	Richards 1996:150 Ferguson 1995
June	Severe erosion	Gold Coast	Houses relocated near Surfers Paradise, Spit breached, Pacific Highway threatened at Narrow Neck, protection dumped	SEQ to N NSW	SMH 25 June in Chapman and others 1982:118
June	Severe erosion	SEQ – Sydney	Major damage to Sydney beaches and facilities, seawall collapse at Balmoral, Manly, Nielson Park and Cronulla (surf club collapsed into sea) and extensive damage to foreshore structures along NSW coast		Chapman and others 1982:118 Thom 1974 JC
	Erosion	Brunswick Heads	In 1938 the Surf Club protested that the proposed building was too far 'from the water', but by 1950 the building was undermined by erosion. Photo Storm erosion, surf club south beach (before breakwater) Brunswick Heads, 1500 sandbags placed		Brokenshire 1988:210

20 Oct	Low		Inland low developed off S NSW (998hPa) moved E	Cat B S NSW	BB
17 Nov	ECL	SEQ	16 Nov Tropical low formed off SEQ and moved SE, structural damage. Smokey Cape 147mm record Nov daily rainfall	Cat C N NSW	BB JC
24–27 Dec	ECL		Low Coral Sea to Lord Howe Is, strong gradient	Cat B C NSW	BB
1951					
10–24 Jan	TC	Gulf	Looping TC in Gulf country. Mackay 511mm (12 Jan) all time (since 1950) daily record rainfall		JC
18–21 Jan	Tropical Cyclone Off N NSW	SEQ – all NSW	1000hPa low on trough developed quickly off N NSW and moved slowly S, rough seas 19 Jan <i>Kiama</i> collier lost off The Entrance, some crew saved, 6 lost	Cat A all NSW	BB EAS
25–30 Jan 1951	TC Fraser Island	SEQ to N NSW	25 Jan TC 994hPa formed Gladstone looped to sea around Fraser Is and recrossed Hervey Bay then weakened and moved inland. Tight gradient to SEQ and NSW coast, 50–60kts Moreton Bay, boats lost and structural damage, Southport Spit breached, severe erosion Gold Coast. Storm surge	Cat A/B N–M NSW	JC BB BPA 1989
Late Jan 1951	Flooding	SEQ	Very heavy rain, fresh in Mary and Brisbane Rivers, severe local flooding SEQ		BoM
	Severe erosion  Southport Spit breached	Gold Coast	Channel formed to Broadwater just north of Jubilee Bridge through which waves washed at high tide. Closed with bulldozer. Floods and surge caused evacuation of Macintosh Island, breakers on Nerang R, boulders moved across road at Currumbin	Similar but not as strongly 'washed over' as breach in March 1936 PH	Kindler and O'Connor 1951:14 JC
17–18 March	TC Hervey Bay and preceding SE fetch	SEQ to M NSW	19 March TC from Coral Sea 996hPa crossed coast Wide Bay near Maryborough, heavy rain SEQ	Cat A/B N – M NSW	JC BB BPA 1989
23–25 May	Low		Low crossing Southern Australia intensified in Tasman. Flinders Is 89mm (24) record daily May rainfall, Gabo Is 46mm (24)		JC
8–9 June	ECL	Coffs Harbour	Low 992hPa rapidly developed off Port Macquarie, crossed coast Coffs Harbour and moved to Darling Downs, heavy rain	Cat X/A M – S NSW	JC BB
1951	Flood	Richmond R			Ferguson 1995
21–22 June	Tasman low		Low off C NSW, strong SE – S wind	Cat B M–S NSW	BB

24–26 Sept	Low		Inland low moved slowly E, deepening off C NSW	Cat A C–S NSW	BB
Late 1951	Bushfires	Brunswick Valley	Wilsons Creek 'another memorable outbreak' with flames in tree tops	Drought starts late in year? PH	Brokenshire 1988:243
1952					
16–18 March	Gradient		1028hPa high moved into Tasman with a tropical low in Coral Sea. Strong easterly gradient. Maryborough 344mm (17) record March daily rainfall. Lady Elliot Is 80mm (17), 91mm (19). Sandy Cape 61mm (16), Bundaberg 138mm (17) 55mm (18)		JC
22–25 March	Low		Low off C NSW, stationary, 24 hrs moved E	Cat B C–S NSW	BB
26 April	Low		Trough deepened, low formed off S NSW, very rough seas, floods C – S NSW	Cat A C–S NSW	BB
11–13 May	Tasman Low		Small low of C NSW moved slowly NE, SE–S gales, rough seas.	Cat B M–C NSW	BB
24–25 May	Tasman Low		Low S Tasman Sea, long fetch, very long seas	Cat B S NSW	BB
14–15 June 1952	Continental Low	SEQ to whole NSW	Complex lows deepened inland NSW E/NE gales whole coast. Flooding and structural damage, small craft damaged in harbours	Cat X/B all NSW	BB DLWC 1995
June	Jetty damaged Severe storm	Byron Bay	Destroyed fifteen fishing boats and severely damaged the jetty.		PWD 1978 Coltheart 1997:170
	Washover	Stockton	Washover and sand deposit Stockton		DLWC 1995
24–28 July	Tropical Trough	SEQ to whole NSW	Small low formed and deepened off M NSW stationary for 3 days, before moving to N NSW on 28 July. Shipping delayed, flooding and erosion C NSW. Nobbys 119mm record July daily rainfall (28)	Cat A/B all NSW	BB JC
4–7 Aug	Low	Whole NSW	Low in trough off C NSW, then along NNE. Gale force SE wind, serious flooding Hunter and Manning R	Cat B M – S NSW	BB
13 Aug	Low		Inland low off C NSW moved NNE, strong high to S, brief tight gradient.	Cat B C NSW	BB
10–11 Sept	Tasman Low		Low in Tasman Sea moved slowly, long SE–S fetch, heavy swell.	Cat B M – S NSW	BB
Late 1952			Decrease in sugar production	Dry conditions? PH	Richards 1996
1953					

14–16 Jan	TC		TC made landfall near Burketown (14 Jan), still in S Gulf (16 Jan), Cape Cleveland 356mm (16 Jan) all time record daily rainfall (1927–1987)		JC
21–23 Feb	TC	Whole NSW	Small TC from Coral Sea moved SE over several days with SE gales and heavy rain to coast	Cat B N–M NSW	BB
	Major floods	N NSW	Major flooding Richmond and Macleay R		BB, Ferguson 1995
March	TC	CQ	Yeppoon 1009hPa, crossed coast		BPA 1985
25–26 March	Secondary low	Whole NSW	Low off south NSW coast moved NE. Gale in central swell to N NSW	Cat B C–S NSW	BB
3–8 May	Low		Complex lows in trough, one centre off M NSW, moved S then NE, then N, heavy rain, floods, damage to railway, heavy seas, SE–S gales. Williamtown 95mm record May daily rainfall (2)	Cat A/B C–S NSW	BB JC
10 July	Tasman Low		Low off C NSW moved NE, brief S gales, rough seas	Cat B C NSW	BB
26–27 Aug	Tasman Low		Very heavy swell from large S depression	Cat B S NSW	BB
29 Aug	ECL	Central Q	Low crossed coast Rockhampton then moved back to sea, wind to 50kts		JC
1954					
2–5 Jan	Tasman Low		Low formed Southerly Buster, Port Kembla, and moved N along coast to Cape Byron, S gales, very rough seas.	Cat X/A/B all NSW	BB
7–9 Jan	TC Coral Sea	SEQ to C NSW	TC central Coral Sea (992hPa) moved between Lord Howe Island and coast. Storm to gale force SE/S winds, rough seas and heavy swell	Cat A N NSW	BB
7 Feb	Tropical Cyclone		TC crossed coast S of Townsville. Heavy flooding		JC



19–22 Feb 1954	<b>Severe Tropical Cyclone</b>  Tremendous seas SEQ and north NSW coast	SEQ to whole NSW	20 Feb TC in south Coral Sea (985hPa) moved along Q coast and crossed coast Coolangatta, eye 972hPa, very strong wind, heavy rain, big seas and surge. Eye over Condong Sugar Mill for two hours, then moved S just inland of coast. Extensive structural damage Sunshine to NSW north coast and 28 died. Storm surge Moreton Bay 0.64m, foreshore inundation, boats in tree tops Beachmere, <b>waves 2m deep over highway Kirra</b> . 271mm Yamba (21 Feb) record daily Feb rainfall, Dorrigo rainfall 809mm (21 Feb) all time record daily rainfall (since 1905). Lismore 334mm record all time daily rainfall since 1884(21 Feb)	<b>Cat X</b> from SEQ to whole NSW  S/SE gales N NSW rough seas and heavy swell	JC BPA 1985: 24 BB BPA 1989
	<b>Floods 'worst in history'</b>	N NSW	Disastrous floods Tweed, Richmond and Macleay R. Severe flood at Lismore, flood waters 11km wide with large waves	Record flood Lismore, until 1974 PH	JC BB Ferguson 1995
Feb	<b>Flood</b>	Fitzroy R	9.26m		Webster
	<b>Severe erosion</b>	SEQ to north coast	Extensive cut SEQ, severe erosion Byron Bay and north coast beaches.	Erosion further south? PH	Chapman and others 1982:118
	<b>Severe erosion</b>	South Stradbroke Island	Extreme weather with severe erosion at South Stradbroke Island and near breakthrough at Narrow Neck		Salter 2002: 84 quotes Tomlinson
	<b>Outer 180m section of jetty lost</b>	Byron Bay	Byron Bay postmaster describes that the jetty lost 40 rows of piles from the outer section (600ft [183m]), two cranes and 23 fishing boats ...heavy seas prevented Belongil Creek from clearing ... local flooding and Ewingsdale road closed. Beachfront houses damaged Sheltering Palms and New Brighton	Remains of jetty used for whaling operations until 1963. Damaged jetty remains removed 1972	Ryan and Smith 2001:115, 140 Coltheart 1997:170
	<b>Storm surge flooding</b>	Byron Bay	Sea broke into and inundated parts of Byron Bay. <b>Photo</b> storm surge flooding		Ryan and Smith 2001:124
12–13 June	<b>ECL</b>	SEQ to N NSW	Low near Lady Elliot Is moved slowly S then E	<b>Cat B</b> N NSW	BB
11–14 July	<b>ECL</b> Off Fraser Is	SEQ to M NSW	11–13 July complex low crossed coast Bundaberg, recurved SE off SEQ then S. S/SE gales, Floods in northern NSW. Hurricane force winds S of Bundaberg, wind damage and hundreds of boats lost Moreton Bay. Waves off coast reported at 21m. Maryborough 137mm (12) record July daily rainfall. Bundaberg 278mm record July daily rain	<b>Cat A</b> N – M NSW	JC BB
2–3 Aug	<b>Low</b>		Low on Southerly Buster off Sydney moved slowly E, deepening.	<b>Cat B</b> C NSW	BB
19–21 Sept	<b>ECL</b> Complex low of NSW coast		Low off M NSW moved S and secondary low off SEQ. Shipping delays	<b>Cat A/B</b> most NSW	BB
27 Sept	<b>ECL</b>	SEQ – N NSW	Low near Lord Howe Is	<b>Cat C</b> N NSW	BB

1955					
2–4 Feb	ECL?	SEQ – C NSW	Tropical low gradient and swell to coast	Cat C most NSW	BB
16–17 Feb	<b>Tasman Low</b>		Low W of Tasmania, complex lows to N, small near Newcastle, max gust Sydney 49kts SSE/SE, 'seas worst seen in harbour'.	<b>Cat A/B</b> C–S NSW	BB
22–26 Feb	Monsoon depression Very heavy rain		Deep depression near Normanton moved south into central NSW. Extensive floods inland and Hunter R	<b>Cat B</b> M NSW	JC BB
	<b>'Maitland Flood'</b>	Hunter R	Houses destroyed and 14 died		JC
6–18 March 1955	<b>Severe Tropical Cyclone</b>	CQ – N NSW	7 March Very intense TC moved W from Coral Sea crossed coast Sarina, eye 963hPa, 50–80kt wind central Q coast, major flood Flinders, Burdekin and Fitzroy R. Moved back out to sea near Townsville (12 March) before making landfall again near Cairns (17 March). Mackay 182mm (8 March), 183mm (18 March)	Cat C N NSW	JC BB
27–28 March	<b>TC</b>	SEQ	Crossed coast N of Bundaberg (985hPa) then recrossed coast Cape Moreton to SE. Structural damage, highest flood Mary R and flood Brisbane R. Rainfall Brisbane Airport 224mm (28 March) record daily March rainfall	Cat C N NSW	JC BPA 1989
	<b>Record flood</b>	Mary R	Highest flood (37ft [11.3m]) since 1893 8 houses washed away.		JC
	<b>Flood</b>	Brisbane R			JC, BoM
	<b>Moderate flood</b>	Richmond R			BoM Ferguson 1995
5–6 April	ECL		Low off Brisbane (1001hPa) moved ESE, tight gradient	<b>Cat B</b> N NSW	BB
26 April – 1 May	<b>Gradient</b>		Low off Q moving S to E of Sydney, high (1038hPa) E of Tas, E winds, long fetch. Port Macquarie 180mm record daily May rainfall (1 May). Sydney Airport 166mm record daily May (1 May)	<b>Cat A/B</b> all of NSW	BB JC
20–23 May	<b>Tasman Low</b>		Deep low (c960hPa) near S NZ, low SE Tasman Sea, rotated around each other for several days. Wind SW–W, but heavy SE for 3 days	<b>Cat A</b> C NSW	BB
25–26 May	<b>Low</b>		Low developed inland Q. Mackay 319mm, record daily May rainfall		JC
28–29 May	ECL		Low moved east to Lord Howe Is. Heavy swell to N to C NSW. Ships ashore, Sydney	<b>Cat B</b> M NSW	BB

May 1955	Erosion	SEQ to Sydney	Many storms caused widespread scarping and minor property damage, esp. Kurnell, Balmoral, Manly (Fairy Bower), Newcastle and north NSW		Chapman and others 1982:119
5–6 June	Tasman Low		Low central Tasman Sea, long fetch heavy SE swell	Cat B C–S NSW	BB
31 June – 1 July	Tasman Low		Deep low, strong S gradient, heavy swell	Cat B S NSW	BB
2 Oct	Tasman Low		Intense low off S NSW moving E, SSE–S gales, shipping difficult, small vessels lost	Cat A/B C – S NSW	BB
9–10 Dec	ECL		Deep Coral Sea low, moved to E Lord Howe Is, strong SE winds, heavy swell.	Cat B most NSW	BB
1956					
23–26 Jan	TC Coral Sea		Long period of SE wind with long fetch due to two TC's off Q coast	Cat C, NSW	BB
9–11 Feb	ECL		Low developed N then C NSW, deepened (992hPa) off C NSW, NE–E Wind, record rain from Sydney to S. Dorrigo 141mm (11 Feb) Brisbane 134mm (8 Feb) 78mm (9 Feb) Southport 58mm (8 Feb), 97mm (9 Feb) Sydney gusts SE 43kts and 208mm (10 Feb), 95mm (11 Feb).	Cat A/B C–S NSW	JC BB
16–19 Feb	Tropical Low off SEQ	SEQ to C NSW	Small low off SEQ crossed coast near Brisbane and moving down M NSW. Dorrigo 101mm (18 Feb), 173mm (19 Feb), Brisbane 80mm (18 Feb), Southport 267mm (18 Feb). Sydney 40mm (18 Feb), 47mm (19 Feb) 38mm (20 Feb)	Cat A/B N–M NSW	JC BB
26 Feb	TC Coral Sea	NQ to C NSW	Large and intense TC moved from New Caledonia across Coral Sea to Townsville (961hPa) E–SE gales, 'mountainous seas', flooding C NSW.	Cat A/B most NSW	BB
6 March	TC <i>Agnes</i>	NQ – CQ	Large TC crossed coast Townsville, severe damage Cairns to Mackay		BoM
1956	Flood	Richmond R			Ferguson 1995
1956	Minor flood	Brisbane R			BoM
1956	Continuing erosion	SEQ and N NSW	Severe erosion central Gold Coast and N NSW		Chapman and others 1982:119
	Erosion	North Stradbroke Is	Skeletal remains exposed at Point Lookout believed to be one of the crew of <i>Prosperity</i> wrecked 1902		Carter and others 1994:76
15–17 March	TC			Not in BB	PWD 1978:130

20 March	Low		Low in S Tasman Sea, small low off S NSW	Cat B S NSW	BB
10–13 May	Low		Inland low intensified off S NSW moving quickly away	Cat B M NSW	JC BB
1–2 June	Low		Low off C NSW deepened moved NW, high in Tasman Sea, short period gales	Cat B C NSW	BB
9–10 June	Low		Complex inland lows moved off NSW coast 8–9 June. Intense stationary low formed off Jervis bay, SE–S gales, coastal damage. Sydney gust 73kts (June record), Moruya 77mm (10 June)	Cat X/A C–S NSW	JC BB
10 June	Storm surge	Sydney	'highest tide on record'		BB
24–25 June	Tropical Low		Tropical low moved SE from inland NSW, strong high Tasman Sea, strong NE–E gradient, gales, rough seas. Complex lows formed near coast.	Cat A/B M–C NSW	BB
12 July	Low		Deepening inland low moved off S NSW quickly	Cat A S NSW	BB
5–6 Dec	ECL off SEQ	SEQ to N NSW	Low off SEQ moved SE then back towards SEQ, SE fetch and heavy swell	Cat B N NSW	BB
21–23 Dec	TC Coral Sea	C to SEQ	TC formed off Sunshine Coast tracked N close to Fraser Is (CP 998hPa) then away to E. Brisbane Airport 153mm (22 Dec), record Dec daily rainfall. Maryborough 194mm (22 Dec), record Dec daily rainfall		JC BPA 1989
1957					
Jan	TC Coral Sea	CQ	994hPa Yeppoon		BPA 1985
18–23 Feb	TC Six day gale Sydney	SEQ and all NSW	19 Feb long lived TC moved from Willis Is (gust 109kts) crossed NSW coast S of Port Macquarie 992hPa. Extensive damage to shipping, harbours and foreshores. Dorrigo 167mm (14 Feb)	Cat X most NSW	JC BB
20–22 June	Low		Inland low crossed coast S of Sydney, intensified, strong E gales	Cat A/B C–S NSW	BB
8–11 July			Moruya Heads 166mm (11 July) record daily July rainfall. Sydney Airport 133mm record July daily rainfall (10 July)		JC
30–31 July	Low		SE–E gales, shipping and trains disrupted Sydney, damage	Cat A C–S NSW	BB
22–24 Aug	Tasman Low		Intense low off NSW coast, strong NE gusts 50kts Sydney, 22 Aug. Then SE–E gales, rough seas, widespread damage. Bega 162mm (23 Aug) record Aug daily rainfall	Cat X C–S NSW	JC BB

14–16 Sept	ECL		Tasmania Hobart City 156mm (15) record daily rainfall. SW gust 56kts		JC
1958					
8–12 Feb	ECL		Small low near Sydney then major development of a Tasman Low (996hPa), Sydney 123mm (9 Feb), 27mm (10 Feb)		JC
20 Feb	Tropical Cyclone		Long lived TC crossed coast S of Ayr and moved back out to sea. Heavy flooding and 24hr rainfall: Finch Hatten 878mm, Mt Pelion 864mm (292mm in 2.5hrs and 589mm in 6.75hrs). Houses damaged and 3 lives lost.		JC
9–11 March	ECL		Heavy seas and erosion C NSW. Heavy rains, landslides, floods, shipping delayed. Sydney Airport 102mm (10) 134mm (11) gusts to 48kts	Cat X/B C – S NSW	BB
1–2 April	Tropical Cyclone		Small intense TC hit Bowen. Gusts observed to 98kts until anemometer disabled. 77 buildings destroyed and many damaged. <b>2m storm surge</b> . Mackay 305mm (2 April), record April daily rainfall		JC
14–19 April	Secondary low	All NSW	Gales on south coast, 14–15, Sydney 16, N NSW 19 April, rough seas	Cat B N NSW	BB
8–10 June 1958	ECL	CQ to M NSW	8–12 June Large intense Coral Sea low passed 640km east of SEQ to NZ, SE gales, very heavy rain and floods. <b>Venturer</b> schooner lost Lady Musgrave Is, other vessels damaged, floods and severe beach erosion	Cat A/B N–M NSW	JC BB
	Severe beach erosion	SEQ coast			JC
19–20 June	ECL SEQ	SEQ – NSW	Low off Q coast. E to SE gales	Cat A/B N–M NSW	BB
29 June – July	Low		Intense low formed off Newcastle, moved to central Tasman Sea, SE–E gales, shipping delayed, heavy rain S NSW, damage.	Cat X/A C–S NSW	BB
5 Aug	ECL	SEQ – N NSW	Small low off N NSW, rough seas	Cat C	BB
15–17 Aug	Low		Flinders Is 70mm (16 Aug) record daily Aug rainfall. Fingal, Tas 74mm (16 Aug) record Aug daily rainfall. Helens, Tas 117mm (16 Aug) record Aug daily rainfall.		JC
10–11 Oct	ECL		Low Gabo Is. Flinders Is 82mm (11 Oct) record daily Oct rainfall		JC

1959					
2–6 Jan	ECL	SEQ – M NSW	Low off N NSW, moved to Lord Howe Is, rough seas. Smokey Cape 179mm record Jan daily rainfall.	Cat B N NSW	BB
20–24 Jan 1959	TC <i>Beatrice</i> from New Caledonia	CQ – all NSW	21 Jan TC crossed NSW coast Cape Byron, 986hPa, rough to high seas. Severe beach erosion SEQ and N NSW, flooding N NSW, <i>Natone 1</i> sank off Double Island Point. Dorrigo 104mm (21 Jan), 571mm (22 Jan). Coffs Harbour 160mm (22 Jan)	Cat X/A/B all NSW	JC BB
	Severe beach erosion	SEQ and N NSW	Shoreline buildings damaged Point Danger, 90m concrete wall undermined Coolum		BB JC
16–20 Feb	TC <i>Connie</i> Bowen	CQ to M NSW	TC crossed coast Guthalungra, CQ 948hPa and moved S, severe wind damage, gusts to 100kts Bowen. Gales and floods central Q to N NSW, beaches eroded.	Cat A N NSW	JC BB
1959	Flood	Richmond R			Ferguson 1995
18 Feb	Local flooding	Brisbane valley			BoM
14–17 March	ECL Tasman Sea	All NSW	Low moved from N over Tasman Sea. High seas onto coast, damage to small craft and beaches. 9 m waves through dance hall at Bronte Beach	Cat A M – C NSW	BB
10–14 April	Low		S gales, very rough seas	Cat A S NSW	BB
20–27 July	Complex Lows		Low developed off Sydney (990hPa), E–SE gales, shipping delayed, storm surge. Low reformed S NSW. June gales continued. On 26 July, low moved NE, heavy swell, surge, coastline damage. Sydney Airport 100mm (21 July)	Cat X/A C–S NSW	BB JC
16–17 Aug	Tasman Low		S gales 52kts, rough seas	Cat B M – S NSW	BB
19–21 Sept	Low		Low moved NE from S NSW, S gales and heavy swell. Fingal Tas 64mm (21 Sept) record daily Sept rainfall. St Helens, Tas 102mm (20 Sept) record Sept daily record. Eddystone Pt 35mm (20 Sept) 48mm (21 Sept)	Cat B S NSW	JC BB
3–5 Oct	Tasman Low		Rapidly developing low M NSW Sydney 47kts, Sydney SSE 50kts, sea wall lost Dee Why, small vessels sunk. Port Macquarie 62mm (5 Oct)	Cat X/A/B most NSW	JC BB

20–25 Oct	Low		Low deepened off S NSW moving NE, heavy swell, flooding, and foreshores damaged.	Cat A S NSW	JC BB
11–12 Nov	ECL	SEQ to C NSW	Low off coast, E gales, very rough seas. Local flooding SEQ	Cat B N – M NSW	BB BoM
1959–64	Erosion	Byron Bay	On-going erosion		Hopley 1967 in Thom 1974
1960					
18 Feb	Gradient	SEQ – all NSW	Low intensified S NSW, moved ENE, long fetch to N NSW. 18–19 Feb Byron Bay wind to 50kts, heavy swell to 6m	Cat A/B all NSW	BB Gordon & others 1978:132
3–6 March	TC	SEQ to C NSW	TC moved S, 600 km off Brisbane. SE gales, very rough seas. 1–3 March Byron Bay wind to 44kts, heavy swell to 4–6m	Cat A/B most NSW	BB Gordon & others 1978:132
21–22 April	ECL		Tasmania St Helens 161mm (22 April) record April daily rainfall (since 1890). Eddystone Pt 211mm (22 April) all time highest on record since 1908. Hobart Airport 63mm (22 April) 130mm, record April daily rainfall since 1958 (23 April) Hobart RO 132mm (23 April), Hobart City gusts SSE 50kts (22 April), 45mm (22 April), S 42kts and 132mm record April daily rainfall (23 April),		JC
22–23 May 1960	Tsunami	Sydney Harbour	9.5 Richter scale earthquake Chile. Generated small tsunami on Australian east coast, boats torn from moorings in Sydney Harbour		Mitchell in ABC 2004
26–27 May	ECL	SEQ to C NSW	24–26 May Small deep low off SEQ and high in Tasman Sea. Gales, heavy seas, heavy rain, beach erosion and shipping delayed. 26–29 May Byron Bay wind to 37kts, heavy swell to 6m	Cat B N – M NSW	JC BB PWD 1978:132
	Beach erosion		Extensive damage to Gold Coast beaches		JC
7 June	ECL	SEQ? All NSW	Low moved NE of Lord Howe Is, moved slowly ESE, high in S Tasman Sea with long ESE fetch. 5–7 June Byron Bay wind to 18kts, heavy swell to 4m	Cat B N – M NSW	BB PWD 1978:132
25–27 June	Secondary Low off S NSW	SEQ? All NSW	Deep low S Tasman Sea, strong gradient, swell to coast. 26–29 June Byron Bay wind to 18kts, heavy swell to 4m. S NSW fishing fleet in port.	Cat A/B all NSW	BB PWD 1978:132
8–9 Sept	Low		S gales, small vessels driven ashore.	Cat B S NSW	BB JC
18–19 Sept	Low		S gales, rough seas	Cat B S NSW	BB

3–5 Dec	Low		Low off C NSW, very heavy swell, storm surge Sydney, vessels lost, several drowned.	Cat A C–S NSW	BB JC
16–19 Dec	Low		Low off S NSW, gales, floods	Cat B C–S NSW	BB
1961					
5 Jan	TC		TC 993hPa from Coral Sea to 200km N of Fraser Is then away to N		BPA 1989
3–4 March	ECL		Low off the S NSW. Bega 385mm (4 March) record March daily rainfall		JC
21–22 March	TC	SEQ to M NSW	TC passed to Lord Howe Island, heavy swell to coast	Cat B N NSW	BB
2–3 April	Tasman Low		Very deep low S Tasman Sea, heavy swell	Cat B C–S NSW	BB
3–7 May	Low		Very intense (985hPa) and large Tasman low. Long fetch, E gales, heavy swell, shoreline damage, ships in difficulty at Port Kembla.	Cat A/B M–S NSW	BB JC
30–31 May	ECL	SEQ to N NSW	Deep trough off Q coast, SE gales, heavy swell Byron Bay wind to 44kts, long heavy swell 4–6m	Cat B N–M NSW	BB PWD 1978:132
5–6 June 1961	Complex Lows	SEQ to all NSW	5–7 June Deep complex low east of Brisbane and another low off S NSW moved NE over Tasman Sea to Lord Howe Is. Gales and big seas to SEQ, harbours closed	Cat A/B all NSW	BB JC
Late June – mid Sept			5 Tasman Lows generated gales and rough seas S NSW	Cat B/C S NSW	BB
22–23 July	ECL		Low in E Bass Strait. Flinders Is 95mm (24 July) record daily July rainfall. Gabo Is 46mm (24 July)		JC
16–26 Aug	Low		Prolonged low in Tasman with major developments on 17 and 24. Nowra gusts SE 52kts (21), SSE 45kts (22). Sydney SSE 47kts and 30mm (21), SSE 45kts and 35mm (22). Williamstown SSE gust 50kts and 23mm (22). Moruya 75mm and gales (21)		JC
6–7 Oct	Tasman high and trough off central Q		Heavy flooding central Q and wind damage		JC



18–20 Nov	Gradient		Strong NE gradient with small coastal low. Gales to 50kts Sydney, heavy swell. Sydney Airport ESE gusts 42kts and 109mm (18 Nov), 62mm (19 Nov)	Cat A C – S NSW	JC BB
4–5 Dec	TC	CQ to C NSW	TC moved from Coral Sea to N of NZ	Cat C most NSW	BB
1962					
7–9 Jan	ECL		Low develops and moves off S NSW. Port Macquarie 275mm record Jan daily rainfall (8 Jan)		JC
15–20 Feb	Low		S gales after Southerly Buster, shipping delayed.	Cat B C–S NSW	BB
6–8 April	ECL	SEQ to C NSW	Intense low off N NSW, flood rains, gales and heavy seas. Yamba 200mm (7 April) record April daily rainfall	Cat A most NSW	JC BB
1962	Flood	Richmond R			Ferguson 1995
	Coastal erosion	Port Stephens	Retaining wall destroyed		BB
10–11 April	Low		Strong SE–E wind, heavy swell.	Cat B C NSW	BB
9–14 May	Low		Coral Sea low then ECL (12 May) N NSW. Sydney 101mm (13 May), 70mm (14 May). Smokey Cape 65mm (12 May), 124mm (13 May). Coffs Harbour 162mm (11 May), 116mm (12 May)		JC
8–11 July 1962	ECL off coast	SEQ – all NSW	9–11 July Low NE of Fraser Is moved to Byron Bay. Winds to 70kts, boats lost, local flooding Gold Coast, heavy SE swell, extensive flooding N NSW. Two waterspouts came ashore Port Macquarie Byron Bay winds to 52kts, long heavy swell 6–9m. Dorrigo rainfall 176mm (10 July) 451mm (11 July). Lismore 216mm record July daily rainfall (10 July)	Cat A N–M NSW	JC BB
	Severe erosion	Gold Coast	Extensive beach erosion Gold Coast		JC
	Severe erosion	Byron Bay	During the early 1960s severe erosion 'much of the foreshore ... disappeared'		Dening 1966
24–25 July	Low		Low moves into E Bass Strait. Fingal Tas, 94mm (25 July) record July daily rainfall. Flinders Is 37mm (25 July)		JC
15–16 Sept	ECL		Low C NSW, Bega 130mm record Sept daily rainfall (16 Sept)		JC
28–30 Oct	Low		Large Tasman low developed and occupied whole Tasman Sea		JC
Dec	TC	CQ to SEQ	Crossed SEQ 978hPa at Gold Coast		BPA 1985

Dec	TC	SEQ to C NSW	TC 995hPa crossed coast		BPA 1985
31 Dec			TC <b>Annie</b> develops NE of Fraser Is. Bundaberg 204mm in 24hrs		JC
1963					
31 Dec – 2 Jan	TC <b>Annie</b>	Yeppoon to M NSW	1 Jan TC rapidly developing to cross S Fraser Is (978hPa) extensive wind damage, <b>surge Moreton Bay 0.76m</b> (low tide) local flooding. Cruiser lost Tweed Heads. ESE gales and heavy swell to N NSW, Byron Bay wind to 37kts, short heavy swell 6–9m. Gradient from strong high in S Tasman Sea	Cat A N NSW Parallel track to TC's below	JC BB PWD 1978:132 BPA 1989
31 Dec – 1 Jan	TC		Second TC (987hPa) formed to the north of TC Annie off Capricorn Group and crossed coast Hervey Bay		BPA 1989
3–4 Feb	Low		S gales and rough seas	Cat B C – S NSW	BB
3–8 Feb	ECL	Coral Sea	Low near Noumea and ECL, at Byron Bay 3–8 Feb, 6–7 Feb 19kts, short heavy swell		JC PWD 1978:130, 132
16–19 March	ECL		Small low off SEQ, SE gales, heavy rain. Maleny 260mm (17 March) record March daily rainfall, Double Is Pt 116mm (15 March), Cape Moreton 74mm (17 March)	Cat B C NSW	JC BB
25–26 March	Low		Monsoon low in Gulf made landfall near Normanton, Mackay 340mm (25) 390mm (26), record March daily rainfall		JC
31 March	TC		TC in Coral Sea SE 200km off Fraser Is		BPA 1989
20–30 April 1963	TC	CQ to all NSW	24 April TC moved S from Coral Sea 500km off SEQ coast. E gales, N NSW with rough seas and surge. US Navy ship damaged in 13m waves, beach erosion. Byron Bay wind to 40kts, heavy swell 4–6m. Nowra 246mm record all time daily rainfall since 1942 (29 April), Williamtown gusts S 52kts and 126mm (28 April), Sydney gusts SW 50kts and 95mm (29 April). Port Macquarie 298mm all time record daily rainfall since 1840 (28 April). Smokey Cape 344mm all time record daily rainfall since 1939 (28 April). Coffs Harbour 405mm all time record daily rainfall (28 April)	Cat A/B all NSW	JC BB PWD 1978:132 BPA 1989
	Beach erosion		Large swells impacted over 1 000km of coast with varying degrees of beach erosion		JC
7–8 May	ECL	SEQ to C NSW	Small low off Tawantin moved SE to sea, SE gales, rough seas, storm surge. <b>Very heavy rain</b> and local flooding. Byron Bay wind 44kts. Smokey Cape 228mm record May daily rainfall (8)	Cat B N – M NSW	JC BB PWD 1978:130
	Floods	N NSW	Floods Richmond and Clarence R		BB, Ferguson 1995

18–19 May	Low		Very rapid development of low at Gabo Is. Beg 126mm (20 May)		JC
4 June	Low		Intense low off coast, rough seas	Cat B C NSW	BB
27 June 1963	ECL	SEQ to C NSW	Low formed on trough 27 June, deepened off N NSW, 50kts winds. Byron Bay wind to 52kts, short heavy swell 4–6m	Cat X/A N–M NSW	BB PWD 1978:132
1963	Jetty damaged		Further storm damage and jetty closed. Closure of the whaling operation due to fall in whale numbers and oil		Coltheart 1997:170 Ryan and Smith 2000:115
28–30 Aug	Low		Tasman low developed, very large system. Extensive fetch. S gales, very rough seas, shipping delayed, Sydney gusts 45–52kts and 26mm (29 Aug), S gust 59kts and 112mm (30 Aug).	Cat A/B C–S NSW	BB JC
22–23 Sept	Low		Low on trough off S NSW moved NE, SE–S gales, rough seas.	Cat B M–C NSW	BB
7–8 Nov	Low		Low off M NSW, moved NE, SE–E gales, very rough seas	Cat B C NSW	BB
16–17 Nov	ECL	CQ – N NSW	Low off SEQ, moved rapidly E	Cat C, N NSW	BB
Late 1963 – Nov 65	Drought		Drier than average on coast during 1960s		BoM 1997, 1999
1964					
1964–5	Drought years	Baffle Creek	Locally compared to the Federation drought 1901–3		Graham and Jodvalkis 1996:80
7–14 Jan 1964	TC <i>Audrey</i>	SEQ – M NSW	TC tracked from Gulf to Coffs Harbour 988hPa, and moved E then rapidly away. Extensive wind damage SWQ and N NSW, very heavy rain and floods inland Q to N NSW	Cat A/B N–M NSW	JC BB
27–30 Jan	ECL	SEQ – N NSW	SE gales. 29–30 Jan tight gradient, heavy swell.	Cat B N–C NSW	BB
22–24 Feb	ECL		Intense low developed E of Tasmania. Fingal, Tas 107mm (23 Feb) record Feb daily rainfall, Flinders Is 50mm (23 Feb), Eddystone Pt 66mm (23 Feb), Ormley 71mm (23 Feb), St Helens 78mm (23 Feb), Bicheno 89mm (23 Feb)		JC
9 March 1964	ECL Off N NSW	SEQ to CNSW	Low off M NSW moved N, gales to coast. Boats damaged Coffs Harbour	Cat A/B N – M NSW	BB

26–30 March	ECL	SEQ to CNSW	Low deepened 27 March and moved SE, gales and rough seas. Beaches closed. Byron Bay wind to 37kts, confused to short heavy swell 4–6m	Cat A/B most NSW	BB PWD 1978:132
3–4 April	TC <i>Henrietta</i> Coral Sea	SEQ to NSW	TC over E Coral Sea, very heavy swell until 9 April	Cat B N – M NSW	BB
15–16 April	TC <i>Gertie</i>	NQ	TC 999hPa recurved to NE of Whitsunday Islands, floods in NQ		JC
8–12 June	ECL		Low in E trough off Port Macquarie. SE–S gales, rough seas, major inland floods. Smokey Cape 89mm (8 June), Williamtown 111mm (10 June), Sydney gusts SSE 47kts and 77mm (10 June), Nowra 70mm (11 June) 111mm (12 June)	Cat B M–C NSW	JC BB
2–4 July	Low		Low near Fraser Is becomes absorbed into a rapidly 990hPa low E of Bass Strait. Sandy Cape 178mm (3 July) record July daily rainfall. Lady Elliot Is 182mm (3 July) record July daily rainfall		JC
23–25 Aug	Low		Low moved over Wollongong and deepened in Tasman. Sandy Cape 111mm record daily Aug rainfall. Lady Elliot 144mm (24 Aug) record Aug daily rainfall. Sydney gusts NW 50kts, Nowra gusts NW 43kts (24 Aug) 41mm (25 Aug), Bega 104mm (25 Aug)		JC
30 Dec	Severe thunderstorm	N NSW	'Hundreds homeless' as houses unroofed. 160 km S–SW winds. Tents at Brunswick Heads camping area blown away		Northern Star
6 Dec	Tropical Cyclone		TC from Gulf entered Coral Sea near Innisfail and moved ESE. Cape Cleveland gusts 75kts. Severe flooding and wind damage.		JC
1965					
30 Jan – 5 Feb	TC <i>Judy</i>	SEQ to CNSW	Long lived TC moved from Gulf 30 Jan, crossed coast Innisfail then S in Coral Sea to 200 nm off N NSW and moved rapidly ESE. SE to S gales, floods NQ and large swells caused beach erosion in SEQ. Byron Bay 4–5 Feb wind to 30kts, heavy swell 4–6m	Cat B N–M NSW	JC BB PWD 1978:130, 132
	Beach erosion	SEQ			JC
22–24 June	Low		Rapid development of low near Sydney. S gale of 33°S. Sydney Airport gusts SW 50kts and 51mm (23 June)	Cat A/B C–S NSW	JC BB

24–28 June	ECL	SEQ to N NSW	Low developed off Sunshine Coast and moved to New Caledonia, S wind 60kts off Fraser Is, rough seas and heavy floods Mary R to N NSW. Byron Bay wind to 25kts, heavy swell 4–6m	Cat B N NSW	JC BB PWD 1978:132
1965	Flood	Richmond R			Ferguson 1995
18–21 July 1965	ECL	SEQ – C NSW	Low near Brisbane moved N to Fraser Island then S over Brisbane to Yamba and then to sea. Floods, gales and very rough seas. Wind damage, boats lost Moreton Bay and heavy rain – snow Central Highlands to Darling Downs. Byron Bay wind to 44kts, short heavy swell 4–9m. Brisbane City 193mm (20 July) record July daily rainfall, Brisbane Airport 218mm record July daily rainfall. Williamtown 73mm record July daily rainfall.	Cat B most NSW	JC BB PWD 1978:132
9–12 Sept	ECL		Southport 80mm (12) record Sept daily rainfall		JC
16–20 Oct	ECL		Stationary low, gales very rough seas, damage. Sydney gusts S 52kts, 54mm (18 Oct)	Cat A S NSW	JC BB
Before 1966	<b>Houses lost, continuing erosion</b> From early 1960s	Byron Bay	At Byron Bay there was a 'row of seven cottages [between the two jetties]...well back from the sea front. The sea kept encroaching and the terrace [dune] where the cottages stood had gone by 1966. The cottages were removed...over a 100yds (90m) in depth of this foreshore had gone at this time'	Construction of car park walls? PH	Dening 1966
16 Nov	Low		Prolonged Southerly Buster, gales and rough seas.	Cat B C NSW	BB
1966					
17–19 Feb	Low		990hPa low developed in Tasman. Gales, heavy seas, shoreline damage, vessels in difficulty. Sydney Airport gusts S 46kts and 41mm (18 Feb) S 45kts (19 Feb)	Cat A/B M–S NSW	JC BB
26–27 March	Secondary Low	SEQ – all NSW	Low near Lord Howe Is, heavy seas and gales, erosion C NSW, damage Illawarra.	Cat A/B all NSW	BB
24–26 April 1966	ECL		Very rapid development of a low between Cape Byron and Lord Howe (993.4hPa 25 April). S gales developed, gusts to 122 km/h		JC
20–21 May	ECL		Intense low off S NSW, moved NE. Gales and rough seas, vessels sunk and damaged, storm surge 0.38 m Sydney	Cat X C – S NSW	JC BB

9–14 June	ECL SEQ	SEQ to all NSW	Low developed near Fraser Is moved S along coast then to Lord Howe Is (989.9hPa, E gales to 113km/hr), rough seas, storm surge Sydney 0.51m (996.7hPa)	Cat A/B most NSW	JC BB
30 April 1966	ECL		Very large deep low developed in Tasman Sea. 0.40 m storm surge, Sydney tide gauge		JC
2–14 Nov	Low		Rapid development of low E Nowra. Rain depression deepened E of Jervis Bay, gales (8–14 Nov) deepened in Tasman Sea, shipping delayed.	Cat A/B C–S NSW	JC BB
1966	Beach stability	Gold Coast	Towards the end of 1966 Gold Coast beaches were generally 'wider, higher and carried more sand than they had for a number of years'		McGrath 1968
6–10 Dec	Low		Rain depression moved E developed Tasman Sea. SE gales and swell	Cat B M–S NSW	BB
1967					
6 Jan	ECL	SEQ to NNSW	Low off Cape Moreton	Cat B N NSW	BB
28–31 Jan 1967	TC <i>Dinah</i> Very severe Cat 4	Yeppoon to all NSW	28–30 Jan recurved S from Coral Sea over Sandy Cape (945hPa Fraser Island) then to Lord Howe (968hPa). <b>High water mark 10m further inland</b> (wave run up on ocean coast). Extensive wind damage Rockhampton to Grafton. Byron Bay wind to 50kts, long heavy swell 6–9m. Coffs Harbour 266mm record Jan daily rainfall (30 Jan)	Cat X/A all NSW	JC BB PWD 1978:130,132 BPA 1989
	Record storm surge and severe erosion	Central Q – N NSW	Surge Hervey Bay to S, inundated cane farms and <b>Hastings St, Noosa knee deep</b> . Sandgate seawater in houses up to 1.5m, one washed away, Cribb Is. <b>Surge, Gold Coast, 1.5m above HAT</b> (up to deck of Jubilee Bridge) similar Tweed coast, Fingal isolated, Esplanade lost Surfers Paradise		JC
21–22 Feb 1967	TC <i>Barbara</i>	SEQ – M NSW	TC crossed coast at Cape Byron, 22 Feb 982hPa, moved inland, wind damage Gold Coast. Byron Bay wind to 31kts, short heavy swell 6–9m	Cat X/B N – M NSW	BB JC PWD 1978:130,132
6–9 March	Continental Low	SEQ – CNSW	Low moved off coast from inland 6 March. Byron Bay no wind, heavy NE swell 4–6m	Cat C N NSW	BB PWD 1978:132

14–18 March 1967	TC <i>Elaine</i>	CQ – CNSW	TC developed east of Cairns and moved SSE past SEQ to Lord Howe. Long E fetch, extensive and severe flooding NQ, Brisbane creeks and Logan R, further beach erosion	Cat B most NSW	BB JC
	Erosion	SEQ	Further beach erosion		JC
2–4 April	TC <i>Glenda</i>	SEQ to MN NSW	TC moved south 500km E of Brisbane 981.6hPa, wind to 70kts, gales, Gold Coast 16m waves and very severe erosion SEQ Byron Bay wind to 31kts, short heavy swell 4–6m	Cat B N NSW	BB JC PWD 1978:130,132
	Severe beach erosion	SEQ	Gold Coast beaches completely eroded, erosion to within 20m from new Coolangatta SLSC and building damaged, six lost from two boats in 16m waves		JC
11–12 April	Gradient	Q to N NSW	High S Tasman Sea, Gradient to coast	Cat C	BB
6–8 May	ECL	Q to N NSW	Tight gradient to N NSW. Brisbane 67mm (7 May), Byron 113mm (7 May)	Cat C	JC BB
8–13 June	ECL	Central Q to central NSW	Low moved from Coral Sea to Fraser Island and Moreton Bay then to sea, (1009hPa) off N NSW and moved S close to coast. Mackay 110mm (7 June) record June daily rainfall. Southport 261mm (12 June) record June daily rainfall. Brisbane City 282mm (12 June) record July daily rainfall. Bundaberg 269mm (10 June) record June daily rainfall. Cape Moreton gusts 80kts, very heavy rain and serious flooding to Clarence R. Extensive flooding of canal estates Broadbeach. Byron Bay wind to 44kts, short to long heavy swell 4–6m	Cat A N – M NSW	BB JC PWD 1978:132
12 June 1967	Minor local flooding	Brisbane and Mary valleys			BoM
	Flood	Richmond R			Ferguson 1995
	Serious beach erosion		Southport houses washed away and huge seas added to earlier erosion		JC
21–22 June	ECL	Coral Sea	Willis Is down coast to Fraser Island then SE over Lord Howe Island 40kt wind to SEQ and minor flooding		JC
25–28 June 1967	Severe ECL Storm of record? Heavy seas, severe erosion, crop and property damage	Fraser Is to C NSW Storm chart and account in BB 1985, Appendix 5.3: 229 Fig 32	Low developed east of Brisbane (25 June 1002hPa), moved slowly N to E of Double Island Pt and 26 June deepened to 992hPa then slowly SE. Hurricane force wind Cape Moreton, buildings damaged, boats swept off moorings, <i>Sydney J</i> trawler and skipper lost Tewantin. Byron Bay wind to 60kts, long heavy swell 6–9m	Cat X/A/B all NSW  Flooding not as extreme as 10–13 June	JC BB PWD 1978:132

	<b>Storm surge and severe erosion</b>  <b>Dune breached</b> into Marshalls Ck (North arm Brunswick R)	SEQ and north coast NSW	26 June Two houses lost Mermaid Beach, esplanade lost Surfers Paradise, 28 June esplanade lost Main Beach, 5 houses lost Palm Beach/ Nobbys, many houses badly damaged. An army of 5 000 volunteers placed 100 000 sand bags 'Seas batter Gold Coast 'considered to be <b>'the worst erosion problem in history'</b> . More than 20 km coastline damaged and 5 houses lost. <b>Seas breach into north arm of Brunswick R and 27m eroded from properties at Sheltering Palms</b> , houses damaged. Waves topped dunes but no damage noted at Byron Bay	Dune braches continued until dune reinforced by PWD in 1976. Erosion at Sheltering Palms continued into the 1970's when village abandoned PH	BB JC Northern Star 27-28 June McGrath 1968
July 1967	<b>Erosion</b>	Lennox Head	<b>Photo</b> placing of tea-tree logs Lennox Head		Murray 1983:302
27-28 July	<b>ECL</b>	Fraser Island to M NSW	Low from Coral Sea well offshore	<b>Cat A N-M NSW</b>	BB
6-7 Aug	<b>Trough</b>	Q to all NSW	Intense low in trough, fetch from New Caledonia. Secondary low on central coast. 50kts	<b>Cat A/B all NSW</b>	BB
Winter - Spring 1967	<b>Severe erosion</b>	SEQ to Sydney	<b>Worst erosion recorded</b> on Gold Coast, severe erosion Byron Bay and Lennox Head. Damaged houses at Byron Bay later removed. Erosion and property damage Sydney coast, houses threatened Collaroy and seawall collapsed at Manly Retaining walls later constructed on property line at Gold Coast	Extensive erosion along whole coast PH Heavy metal lenses.	Chapman and others 1982:119 Northern Star 6 Aug Thom 1974 Smith and Jackson 1990
4-6 Sept	<b>ECL</b>		Low from inland, intense off Newcastle (another low to E). Nowra 134mm record Sept daily rainfall (6 Sept), Sydney gusts SE 47kts (6 Sept)	<b>Cat X C-S NSW</b>	JC BB
19-21 Oct	<b>Low</b>		Low on trough off C NSW	<b>Cat B M-C NSW</b>	BB
14-16 Nov	<b>Tasman Low</b>		Low developed and involved with transition of TC <i>Annie</i> . Very heavy seas and storm surge C NSW. Sydney Airport gusts S 45kts (14 Nov), SSW 50kts (15 Nov) 46kts (16 Nov)	<b>Cat A C-S NSW</b>	JC BB
9-12 Dec 1967	<b>ECL off Cape Byron</b>	SEQ to M NSW	Low moved S from Coral Sea to off Cape Byron.	<b>Cat B N NSW</b>	BB
Late 1967	<b>Beach accretion</b>	Lennox Head	<b>Photo</b> of tea-tree fence Lennox Head showing beach development from early August		Murray 1983:303
<b>1968</b>					



9–12 Jan 1968	Monsoon Low	SEQ	Weak tropical low (formed Dec 1968) moved from Coral Sea overland and merged with a deep monsoon low near Mt Isa. Widespread light to moderate rainfall in SEQ 6 Jan, moderate to heavy falls 7–13 Jan. Mary R peaked at Gympie on 10 Jan and all coastal roads from Brisbane to the north of Bundaberg were impassable to traffic for several days. Widespread evacuation Gympie and other centres one life was lost		JC
14–19 Jan	Pressure Gradient	SEQ – M NSW	Tight SE gradient. Very heavy rain SEQ	Cat C N NSW	BB
10 Jan	<b>Severe flood</b>	Mary R			BoM
15 Jan	Minor flood	Brisbane R	Flood not as high as 1974		Cossins 1990:58
15–16 Feb	Pressure Gradient	SEQ to N NSW	Strong gradient and extreme fetch	Cat C N NSW	BB
13–15 May	<b>Low</b>		Intense low off S NSW moved N, winds 50–60kts Sydney, 75kts N NSW, long fetch	Cat X/A M–S NSW	BB
May–July	<b>Severe beach erosion</b>	Sydney	Severe storms in May and July		Chapman and others 1980:119
1–2 June	<b>Low</b>		Low rapidly moving E, severe gales	Cat A S NSW	BB
7 June	<b>Low</b>		Low in S Tasman Sea moved ENE	Cat B S NSW	BB
21–22 June	<b>Low</b>		Inland trough low developed C NSW (1000hPa)	Cat A/B M – C NSW	BB
23–24 July	<b>Low</b>		Tasman Low, strong SSE gradient, shoreline damage	Cat X/A M – C NSW	BB
12–14 Aug	<b>Continental Low</b>	SEQ to C NSW	Low deepened near Brisbane 13 Aug and moved to Tasman Sea passing N of Lord Howe Is 994hPa, 98km/hr 14 Aug. Dorrigo rainfall 224mm (14 Aug), Coffs Harbour 100mm (14 Aug), SSE gusts 42kts. Smokey Cape 69mm (14 Aug)	Cat A N NSW	JC BB
Aug 1968 – Jan 1970	Drought	SEQ			BoM
1968	Waverider buoy	Gold Coast			Thom 1974, Allan and Callaghan 2000
1969					
2–5 Feb	<b>TC Colleen</b>	SEQ – C NSW	TC moved S over E Tasman, swell to coast	Cat B N – M NSW	BB
	Erosion	Sydney area	Local damage in Sydney area		Thom 1974
15–16 April	<b>Low</b>		Inland low developed off C NSW	Cat B C NSW	BB

7 May	Pressure gradient	SEQ – CNSW	Large high Bass Strait, moving slowly E, fetch to coast	Cat C N – M NSW	BB
29–30 May	<b>Low</b>		Low developed E Bass Strait. Fingal, Tas 98mm (30 May) record daily May rainfall. ESE gales. Eddystone Pt 36mm (30 May)		JC
4–6 June	ECL		Coffs Harbour 126mm (5 June) Port Macquarie 118mm (5 June)		JC
24–25 Aug	<b>ECL</b>	SEQ to C NSW	Low off N NSW, 1016hPa, small centre	<b>Cat X M NSW</b> <b>Cat B N NSW</b>	BB
			25 Aug <i>Noongah</i> ship 1954t lost in gale off Smoky Cape, 21 lost, 5 survivors rescued		Loney NSD
13–14 Nov	ECL		Sydney 143mm (14 Nov)		JC
<b>1970</b>					
3–18 Jan	<b>TC Ada</b>	CQ	Small TC (962hPa) passed through Whitsunday Islands, extensive building damage, flooding Mackay to Bowen, 14 deaths, storm surge		BoM JC
29–30 Jan	<b>Gradient</b>		Strong E gradient	Cat B C NSW	BB
31 March – 1 Apr	<b>Low</b>	SEQ – CNSW	Low off N NSW, gradient and gales 3 –1 April storm influence Byron Bay. Wind to 25kts, long heavy SE–E swell 4–6m	Cat A N–M NSW	BB PWD 1978:132
2–3 Sept	<b>ECL</b>		Low N Tasman Sea, gradient	Cat B M NSW	BB
28 Sept	<b>Low</b>		Inland low deepened off S NSW	Cat B S NSW	BB
7–10 Dec	<b>Severe Low</b>	S NSW	Complex lows on inland trough off C NSW moved S. Flinders Is 73mm (10 Dec) record Dec daily rainfall. Sydney City 126mm record Dec daily rainfall. Eddystone Pt 40mm (10 Dec) 45mm (11 Dec). East Sale 67mm (10 Dec) Gabo Is 110mm (10 Dec), Moruya 82mm (10 Dec) 74mm (11 Dec). Wollongong 149mm record Dec daily rainfall (9 Dec)	Cat X S NSW	JC BB
28–29 Dec	<b>Low</b>		Intense low developed E of Bass Strait. Eddystone Pt gusts S 44kts (29 Dec). King Fisher B Oil Rig recorded Hsig 9–10m (one of largest swells recorded there)		JC
<b>1971</b>					
1971	Automatic waverider buoy	Botany Bay	Established by Maritime Services Board		Coltheart 1997:174 Thom 1974 (Early 1971)

20–21 Jan	Low		Low on trough moved SE to M NSW	Cat A C NSW	BB
Early Feb 1971	Flood	Baffle Creek	Monsoon troughs, heavy rain in catchment. Daily totals 176mm		JC, Graham & Jodvalkis 1996:80
16 Feb	TC <i>Gertie</i>		TC crossed coast at Cardwell. Flooding and crop damage.		JC
17 Feb	TC <i>Dora</i>	SEQ – N NSW	TC crossed coast Moreton Is, 993hPa, gales and rough seas, wind damage and local flooding. Byron Bay wind to 44kts, short heavy SE swell 4–6m	Cat B N NSW	JC BB PWD 1978:132 BPA 1989
20–26 Feb	TC <i>Fiona</i> CQ to Coral Sea and TC <i>Ida</i> Coral Sea	Yeppoon to M NSW	20–22 Feb <i>Fiona</i> tracked from Gulf to Coral Sea and crossed coast near Rockhampton 995hPa and moved E to N of Fraser Is flooding Burdekin and Fitzroy R, wind damage and surge 0.6–0.9m Gladstone to Bundaberg. TC <i>Ida</i> also in Coral Sea and strong high to S with long SE fetch	Cat B N NSW	JC BB BoM BPA 1989
4–8 March	Gradient	SEQ – NNSW	Gradient with long fetch	Cat B N NSW	BB
16 March	TC <i>Lena</i>		From Coral Sea recurved to SE 150km off Fraser Is		BPA 1989
21–22 May	ECL		Low formed off M NSW, deepened moving S. Nobbys gusts SSE 50kts and 50mm (22 May)	Cat B C NSW	JC BB
14–17 June	ECL		Small stable low over W Tasman Sea, high developed to S. Coffs Harbour 70mm (16 June) 80mm (17 June). Nobbys gusts SSW 40kts and 40mm (14 June), SSE 44kts and 52mm (15 June)	Cat B C NSW	JC BB
22–25 July 1971	Continental Low	SEQ to all NSW	Low off Coffs Harbour moved to Lord Howe Is, stationary and deepened with strong winds. Nobbys SSW 46kts, gusts 70kts Hsig 5.4m H peak 9.4m ESE swell. PWD estimates 1:1 year storm	Cat X N NSW to M NSW	JC, BB PWD 1977
	Serious erosion	M NSW			BB
	Erosion	S NSW	Foredunes cut and lakes opened		Thom 1974
15 Nov	Low		Low off N NSW, gales	Cat B C–S NSW	BB
15–17 Dec	Low		Low in Tasman Sea moved SE, gales	Cat A/B M–C NSW	BB

24–28 Dec	TC <i>Althea</i>	NQ and SEQ	Crossed coast north of Townsville 952hPa, 106kt gusts, extensive damage and surge 2.9m Townsville and 3.66m further north, major flood Burdekin R. Recrossed coast Fraser Is and moved E 984hPa. Cape Cleveland 203mm (24 Dec) record daily Dec rainfall		JC BPA 1989
1972					
1972	Continuing erosion and damaged jetty removed	Byron Bay	Cyclones caused severe erosion along the coast and resulted in the destruction of property. Continuing severe erosion at Sheltering Palms. Second jetty at Byron Bay (damaged in 1954) was removed in 1972	Erosion from late 1960's to early 1970's PH	PWD 1978:24
7–9 Jan	TC <i>Bronwyn</i>		TC from Gulf moved S. Heavy rain, Palum 1270mm in 48hrs. Serious flooding		JC
13–15 Jan	Low		Inland low moved SE to off C NSW, strong wind to S	Cat B C NSW	BB
6–7 Feb	TC <i>Wendy</i>	SEQ to M NSW	TC moved S in central Tasman, rough seas north of Port Macquarie, pre-existing swell from S Tasman Low	Cat B N–M NSW	BB
10–13 Feb 1972	TC <i>Daisy</i>	Yeppoon to central NSW [very long duration?]	11 Feb TC (959hPa) moved from Coral Sea then along coast from Sandy Cape to Moreton Is (968.8hPa), <b>3m storm surge</b> west coast Fraser Is, extensive wind damage and flooding SEQ. Gold Coast peak wave 8.3m, severe erosion Byron Bay wind to 55kts, long and short heavy NE–E swell 4–9m. Brisbane Airport 210mm (12 Feb) record Feb daily record.	Cat A N – M NSW Pre-existing seas (from TC <i>Wendy</i> ) conditions and TC (984hPa) off Q coast. Ships delayed	JC PWD 1978:132 BPA 1989
Mid Feb	Severe local flooding	Brisbane R valley			BoM
1972	Flood	Richmond R			Ferguson 1995
	Severe erosion	SEQ to N NSW, especially Sunshine and Gold Coasts	Tallebudgera Creek silted up causing severe inundation upstream, severe erosion west coast Fraser Is and Gold Coast to Brunswick Heads	In July 1972, Deputy Prime Minister (Doug Anthony) inspected erosion damage at Byron Bay.	JC Chapman and others 1982:119
1972?	Wreck of <i>Coolangatta</i> exposed by erosion	Gold Coast	Timber schooner lost on beach July 1846 1863 track (from Terranora) reached beach near wreck at 'Coolangatta' creek 1879 wreck still a landmark on the beach 1883 new town named after wreck 1885 ribs exposed 1936 ribs exposed 1970's ribs exposed	Photo of exposed ribs on beach 1972? PH	Longhurst 1996:25–26, 176
7–9 March	Tropical Low	CQ – all NSW	Tropical low developed into an intense low 994hPa E of Sydney, Airport 83mm (6 March) 94mm (7 March). Nobbys gusts ESE 48kts (7 March) SSW 52kts (9)	Cat B all coast Swell continued until late March	BB JC

21- 23 March	TC <i>Yolande</i>		TC moved from Noumea to Lord Howe. Long E fetch. Byron Bay wind to 35kts, heavy SE swell 4–6m. Newcastle S 40kts, Hsig 3.7m H peak 7.8m.	Cat B C–S NSW	JC BB PWD 1977 PWD 1978:132
1–3 Apr 1972	TC <i>Emily</i> Very Severe	Yeppoon – M NSW	31 March TC formed in Coral Sea moving SW 2 April 948hPa crossed coast SE of Gladstone and weakened. Generated cyclone wind 112kts Bustard Head and huge seas CQ to SEQ, 8 lost at sea when yacht <i>Istria</i> sank Breaksea Spit, trawler <i>Kotoka</i> ashore Lady Musgrave Is, trimaran <i>Australian Maid</i> driven ashore Jenny Lind Creek. Lady Elliot Is 184mm (2) record April daily rainfall. Maryborough 168mm (3) record April daily rainfall	Cat A/B N–M NSW	JC BB BPA 1989 Buchanan 1999:179
23 June	Low		Low SW Tasman Sea moved quickly	Cat A C–S NSW	BB
23–25 Nov	ECL		Low in Bass Straits moves into Tasman, Eddystone Pt 101mm (25 Nov)		JC
1973					
12–14 Feb	ECL	SEQ – NNSW	Small low off coast, strong SE wind. Byron Bay wind to 37kts, short heavy SE swell 4–6m	Cat C N NSW	BB PWD 1978:132
22 Feb	Flood	Baffle Creek	Essendean Bridge washed away Baffle Ck		Graham & Jodwalkis 1996:81
26 Feb – 1 March	TC <i>Kirsty</i>	SEQ – NNSW	TC formed central Coral Sea (996hPa 26 Feb) and moved S around 155E, then to Lord Howe Is 995hPa 1 March	Cat B N NSW	JC BB PWD 1978:130
4 March	TC <i>Madge</i>		TC crossed the coast N of Cooktown. Flooding		JC
5–8 July 1973	ECL <i>Cherry Venture Storm</i>	SEQ – CNSW	Low developed east of Mackay moved S off Sunshine Coast, then N to east of Yeppoon and then S from Coral Sea, then SE. Tight gradient, E to SE gales and long fetch. 50–60kt winds, gusts off Gold coast 74kts, South Nobby wave Hsig 5.2m, peak 8.7m, widespread wind damage, heavy rain and flooding Mary R (Gympie) 19.6m. Byron Bay wind to 52kts, short heavy swell 6–9m. Cape Moreton 187mm (7) record July rainfall. Dorrigo 382mm (6), 189mm (7). Tewantin 195mm (8) record July daily rainfall. Bundaberg 137mm (6), Maleny 335mm (8) record July daily rainfall	Cat A N NSW	JC BB PWD 1978:132 BoM
	'cyclone'	Fraser Is	8 July <i>Cherry Venture</i> ship 1609t lost ashore in cyclone S of Double Island Point		Loney
6–10 July	Severe flood	SEQ	Very heavy rain and severe local flooding		BoM

4–5 Nov	ECL		Low off S NSW, Bega 189mm record Nov daily rainfall (5 Nov), Nobbys gusts WNW 54kts and 41mm (4 Nov), Moruya Heads 46mm (4 Nov), 143mm record Nov daily rainfall(5 Nov), Merimbula 91mm		JC
12–13 Dec	Genesis of TC <i>Una</i>		Genesis of TC near Cairns, 230mm (13 Dec) record Dec daily rainfall		JC
20–21 Dec	<b>TC <i>Una</i></b>	Q – N NSW	19 Dec TC <i>Una</i> crossed coast east of Townsville, wind damage and major flooding south to Burnett R Ex-TC moved inland and seaward at Cape Moreton. Brief NE/E gales. Rockhampton 271mm 920) all time record daily rainfall (since 1939)	Cat B N NSW	JC BB
1974					
1974	Extreme erosion year		Severe erosion of coastal beaches Feb Currumbin Creek silted and dredging commenced		BB Northern Star 4 Feb 1974
24–27 Jan	<b>TC <i>Wanda</i></b>	CQ – N NSW	24 Jan weak TC 996hPa crossed coast Fraser Is (Maryborough) and moved inland to Brisbane (995hPa). Wind increased with gradient from large high in Tasman Sea. +50kt easterly Cape Moreton, five days of torrential rain, major floods Brisbane R, SEQ and N NSW. Hsig 4.5m Sth Nobbys, <b>max surge Noosa/Double Is Pt 1.0m</b> Shoreline damaged and landslip North Stradbroke Is. Cape Moreton 340mm (26 Jan) record daily rainfall since 1869. Southport 225mm (26 Jan) record Jan daily rainfall. Brisbane Airport 307mm record all time daily rainfall (since 1949). Tewantin 448mm (25 Jan) record Jan daily rainfall. Maleny 332mm (24 Jan) record Jan daily rainfall.	Cat A/B N–M NSW	BB JC Carter and others 1994:122 BoM BPA 1989
29 Jan	<b>Major Flood <i>Australia Day Flood</i></b>	Brisbane R, SEQ and N NSW rivers	Brisbane R at 5.5m <b>not as high as floods in 1841 and 1893</b> . Very serious property damage, 14 died	Probable Maximum Flood estimate of around 20m	Cossins 1990:58–60 BoM
	Flood	Mary River			Maryborough 1998: 241
1974	<b>Major Flood</b>	Richmond R	Record flood Lismore, higher than previous 1954 record		Ferguson 1995
	Storm surge and severe beach erosion	SEQ and N NSW	Heavy seas caused severe beach erosion from Fraser Island to N NSW. Flood and storm surge inundated Gold Coast. <b>2 500 people evacuated from canal estates</b> , Nerang R 9.91m		JC

4–7 Feb	<b>TC Pam</b>  Details of TC Pam in BB Appendix 5.2: 222–229	CQ – all NSW  Appears to have had a greater impact in SEQ than N NSW? PH	Very large intense TC formed 28 Jan E of Fiji, moved W to New Hebrides 2 Feb then Port Vila 3 Feb (965hPa), then New Caledonia (929hPa) 4 Feb, then SSW to 500km east of Gold Coast. <b>Surge 0.68m plus spring tide, record reading 3.13m Moreton Bay gauge,</b> flooding low lying areas of Brisbane. Heavy swell with serious coastal erosion. Sth Nobbys Hsig 3.8m with 13.1sec period. Storm surge Brisbane and Gold Coast. (Brisbane River wind set-up on 7 Feb 0.5–0.6 m) Gold Coast 6 Feb severe flooding and evacuations as huge 6m waves (HAT) pound coastal homes. Byron Bay wind to 30kts, long heavy NE swell 2.5m Brunswick Heads surge 0.5m	<b>Cat A/B</b> all NSW  Indian high water spring tide (perigee – syzygy) 6 Feb, 2.44m (1.07m above MHW) Coffs Harbour	JC BB PWD 1978:130,132
6–7 Feb	<b>Severe erosion</b>  Barrier dune breached, Marshall's Creek, Brunswick R	SEQ – C NSW	Severe erosion: on Gold Coast (Kirra cut 15 m), similar on Sunshine Coast. Beach and property damage, Gold Coast eroded for almost entire length, Southport Spit breached, Palm Beach waves overtopped 6.2m wall and surged through premises. Properties evacuated and <b>30 houses left to their fate</b> Brunswick Heads and Sheltering Palms, Byron Bay surf club threatened, serious erosion Belongil Spit. <b>Sheltering Palms village abandoned</b> because of severe erosion in 1967, 1972 and 1974 the land was purchased under the NSW Coastal Lands Protection Scheme.	'By morning we had to leave as the waves were washing around the back of the house' Former resident account PH	Chapman and others 1982:119 PWD 1978:26 JC Northern Star 7 Feb
10 Feb	<b>TC Yvonne</b>		TC crossed coast near Dunk Is. Wind damage to buildings and vegetation		JC
20–22 Feb	<b>Low</b>		Inland low developed off C NSW, gales	<b>Cat A/B</b> C–S NSW	BB
11–13 March 1974	<b>TC Zoe</b>	CQ – C NSW	9 March moved S from Coral Sea (968hPa) 13 March cross coast Coolangatta (984hPa) then recurved back to sea, extensive flooding Brisbane creeks, major flooding N NSW. Severe beach erosion Gold coast, Hsig Sth Nobbys 3.8m. Byron Bay wind to 35kts, heavy NE swell 4–6m. Sandy Cape 265mm (12 March), record March daily rainfall. Port Macquarie 260mm record daily March rainfall (12 March), Coffs Harbour 256mm record daily March rainfall (11 March), Cape Byron 350mm all time record daily rainfall (11 March). Lismore 246mm record daily March rainfall	<b>Cat A/B</b> most NSW  Last TC to cross the Gold Coast between 1974 and 2004 PH	JC BB PWD 1978:130,132 BPA 1989
	<b>Severe beach erosion</b>	Gold Coast	Erosion of Gold Coast beaches		JC

22 March 1974	<b>TC Alice</b>	Fraser Island – C NSW	TC moved slowly S over Tasman. Brief gale and heavy seas.	Cat B N – M NSW	BB
19–20 April	<b>Low</b>		Developed S NSW moved E	Cat B S NSW	BB
1 May	<b>Low</b>		Intense low off S NSW moved ENE	Cat A/B C – S NSW	BB
24–27 May 1974	<b>Severe storm Sygna Storm</b>	SEQ – all NSW	986hPa, 92kt, storm surge. Severe erosion of beaches C NSW coast	Cat X/A C – S NSW	BB (Storm details Appendix 5.3: 221) PWD 1977 DLWC 1995
	Compared to <i>Cawarra Storm</i> July 1866		26 May <i>Sygna</i> Norwegian ship 53 000t (largest ship to be lost on the Australian coast) driven ashore Stockton Beach. Wind gusts to 170km/hr, houses and cars blown away C NSW, several lives lost		Herald
	Surfs Up		Surfers' anecdote, all time swell SEQ. During swell surfers travelled from Sydney to Noosa for surfable waves		PH
	<b>Severe erosion</b>	C NSW	Seas damaging water front houses Ongoing erosion along coast	C NSW	BB DLWC 1995
3–5 June	<b>ECL</b>		Moved S along coast	Cat B N–M NSW	BB
8–14 June	<b>Secondary Low</b>	SEQ – all NSW	Low over Tasman with heavy swell and severe erosion. Legendary surf on North Coast PH	Cat X/A/B most NSW Very heavy swell to N	BB
May – June 1974	<b>Most inland erosion face</b>	SEQ and all NSW	Additional cut on Gold Coast further inland than Feb (TC Pam). <b>Ongoing very severe erosion</b> entire NSW coast, some north coast beaches <b>cut up to 33m</b> .	Extreme winter storm swells PH	Chapman and others 1982:119
5–6 Aug	<b>Low</b>		972hPa Tasman low. Sydney Hsig 5.2m		JC
25–29 Aug	<b>Low</b>		Low off C NSW	Cat B C–S NSW	JC BB
26 Sept	<b>Tasman Low</b>		Tasman Sea low second low near Newcastle	Cat B C NSW	BB
27–28 Nov	<b>Low</b>		984hPa low rapidly developed off S NSW. Williamtown 100m record Nov daily rainfall (28 Nov), Nobbys gusts SW 52kts and 82mm (28 Nov)		JC
22–24 Dec	<b>Secondary Low</b>	SEQ – CNSW	Low over Tasman Sea, brief gales	Cat B M–C NSW	BB
<b>1975</b>					
18 Jan	<b>TC Gloria</b>	Coral Sea	Moved SE 375km off Fraser Is		BPA 1989



2–3 March	ECL	SEQ – M NSW	Rough seas and heavy swell N NSW. Rainfall Dorrigo 159mm(2 March), Coffs Harbour 88mm (2 March), 57mm (3 March)	Cat B N NSW	BB
12–13 June	Low		Small low developed E of Sydney and moved up passed Newcastle and over to Lord Howe Is. SSW 80kt gust at Nobbys. Hailstorm at Williamtown around this time with 111mm in 24hr.	Cat B C NSW	JC BB
20–27 June	Low	SEQ – M NSW	Newcastle NE 58kts, Hsig 7.4m, Hpeak 13m. Severe storm C NSW. Low moved from S coast to NZ. Nobbys gusts ESE 77kts and 190mm (21 June). Williamtown gusts ESE 61kts and 84mm (21 June), Nowra gusts SE 62kts and 165mm (21 June). Wollongong gusts SE 54kts and 115mm (21 June), SE 55kts (22 June). Sydney gusts E 55kts and SSW 59kts. 989.4hPa and storm surge 0.44m Sydney Harbour.	Cat A/C C–S NSW	BB PWD 1977
3–5 July	Low		Low near Moree moved out to sea near Coffs and then into Tasman. Wollongong 199mm record July daily rainfall (4)		JC
11–13 Aug	Low	SEQ – all NSW	Low off S coast deepened over central Tasman Sea	Cat B most NSW	BB
3–4 Sept	Low		Low rapidly develops. 3 Sept Nobbys gust 53kts, Williamtown W 46kts		JC
24–26 Oct	Low		Low near Adelaide deepened to 976pHa east of Tasmania. Nobbys gusts WNW 68kts. Williamtown gusts NW 51kts		JC
11–14 Nov	Low	SEQ – M NSW	Inland low moved off Cape Byron then E. Dorrigo 191mm (13 Nov), 165mm (14 Nov), 102mm (15 Nov)	Cat B N–M NSW	JC BB
1976					
18–20 Jan 1976	TC <i>David</i>	NQ – M NSW	19 Jan Very large TC crossed coast N of St Lawrence, 970hPa, gales from PNG to Lord Howe Is and N NSW. Wind gusts to 95kts at Pine Is, huge swells and high tides. Breakwater and boats destroyed Rosslyn Bay, surge (c1.0m) caused flooding Hervey to Moreton Bays, Hsig 5.8m, peak 8.9m Double island Point. Byron Bay wind to 40kts, heavy SE–E swell to 4m	Cat A N NSW	JC BB PWD 1978:132
Jan	Local flooding	SEQ			BoM
1976	Flood	Richmond R			Ferguson 1995
	Berm cut	SEQ to N NSW	Berm cut on beaches, no property damage		Chapman and others 1982:120

1976	New River mouth	Brunswick R	Breakthrough into North Arm (Marshall's Ck) of Brunswick R at Sheltering Palms in 1976, PWD constructed 'temporary holding works' under the dune. PWD note 'that the treat of further breakthroughs into the north arm of the Brunswick exists at this and other locations near New Brighton' and that with two river mouths the existing entrance would not be navigable	The location of this breakthrough at Sheltering Palms, a coastal village, abandoned due to severe erosion in 1960's and early 1970's	PWD 1978:26,29
1 Feb	TC <i>Alan</i>		TC crossed NQ coast near Bloomfield and caused no structural damage. Became intense Monsoon depression and had central pressure of 989hPa. Recurved near Birdsville and moved out to sea near Byron Bay. Widespread flooding near Warwick		JC
11–12 Feb	Continental Low From ex-TC <i>Alan</i>	SEQ – CNSW	1 Feb TC <i>Alan</i> crossed coast near Bloomfield R and over next ten days moved inland and crossed coast near Byron Bay with intermittent gales	Cat C N NSW	BB JC
21–22 Feb 1976	TC <i>Beth</i>	CQ – SEQ	22 Feb Very asymmetric TC 996hPa crossed coast N of Bundaberg with a band of hurricane force wind on the southern flank, winds intensified by high to south. Widespread wind damage Hervey Bay area, heavy seas, Hsig 5.4m, peak 10.0m Double Island Point	Cat B N–M NSW	JC BB BPA 1989
27 Feb	TC <i>Gwen</i>		Gwen passed directly over Gulf moving SE becoming a rain depression. Heavy rain, 500mm fell in 24hrs in Herbert. Gales at Townsville 59kts		JC
2–5 March 1976	TC <i>Colin</i>	CQ all NSW coast	4 March TC moved south 400km off Fraser Island along coast to Gabo Island. Generated large waves. Hsig 6.4m, peak 9.6m Double Island Pt, 12m waves off Sydney Heads. Byron Bay wind to 30kts, swell to 9m	Cat A/B all NSW	JC BB PWD 1978:130,132
5–7 March 1976	TC <i>Dawn</i>	NQ – C NSW	TC developed NQ 988hPa and moved S along coast crossing Shoalwater Bay and Fraser Is, damage and flash flooding. Newcastle wind S 35kts, Hsig 4.1m, Hpeak 6.2m	BB Low on dip off N NSW Cat C N NSW	JC BPA 1989 BoM PWD 1977
12–17 March	TC <i>George</i>	SEQ – C NSW	TC moved E to 155E, then S and weakened	Cat B N NSW	BB
25–27 March	ECL		Low developed near Fraser Is and moved south parallel to coast, 0.35m storm surge at Coffs Harbour 26 March. 52kt at Nobbys	26 March Cat B S NSW	JC BB
7–8 April	ECL		Slow moving low S of Lord Howe Is, moved E, 51kt gust at Nobbys	Cat B C NSW	JC BB

25 Apr	<b>TC <i>Watorea</i></b>	NQ – N NSW	TC (970hPa) moved rapidly SE from north Q coast 150km off Fraser Is	Cat C N NSW	BB BPA 1989
15–18 June	<b>ECL</b>	SEQ – C NSW	Low in central W Tasman	Cat C N NSW	BB
20–23 June	<b>ECL</b>	SEQ – M NSW	Easterly fetch from 157E to Brisbane	<b>Cat B</b> N–M NSW	BB
14–16 July	<b>Secondary Low</b>	SEQ – C NSW	Low off M NSW, strong S/SE winds, moved rapidly away and deepened. 67kt gust Nobbys	<b>Cat B</b> N NSW.	JC BB
6–13 Aug 1976	<b>Tasman Low</b>	SEQ to all NSW	Deep low moved from Tasmania to develop into a major deep low in the central Tasman Sea, CP < 980hPa, 9– 11 Aug then to NZ. Lord Howe Is 993.2hPa, W wind gusts to 98km/h. Sydney 0.32m storm surge 9 Aug	<b>Cat B</b> most NSW Swell to coast no strong wind	JC BB
24 Aug	<b>Low</b>		Intense low moved to S Tasman Sea, with brief secondary low of C NSW	<b>Cat B</b> C–S NSW	BB
9–10 Sept	<b>Low</b>		Deep low moves from Bass Strait into Tasman. Nobbys gusts WNW 54kts (8 Sept) 52kts (9 Sept)		JC
24 Sept	<b>Gradient</b>		Complex low SE Tasman Sea, strong gradient to coast	<b>Cat B</b> C NSW	BB
14–19 Oct	<b>Low</b>		Inland low developed off C NSW, high to SW. On 16 Oct, low regressed C NSW deepening. Remained off coast till 19 Oct. Severe SE–S wind S NSW. Merimbula 88mm, record daily Oct rainfall (15 Oct), Bega 135mm (15 Oct), Moruya Heads 88mm (14 Oct) 104mm (15 Oct), Nowra 157mm record Oct daily rainfall (17 Oct), Sydney 76mm (17 Oct) 71mm (18 Oct). Williamtown 106mm record Oct daily rainfall (19 Oct)	<b>Cat B</b> C–S NSW	JC BB
19 Dec	<b>TC <i>Ted</i></b>		TC in Gulf of Carpentaria 950hPa, Burketown and flooding southern Gulf. Townsville record daily Dec rainfall 160mm (21 Dec)		JC BoM
<b>1977</b>					
31 Jan – 1 Feb	<b>TC <i>Keith</i></b>		Townsville 318mm (1 Feb), record daily rainfall		JC
22–23 Feb	<b>Continental Low</b>	SEQ – N NSW	Small brief low off Gold Coast. Nowra 208mm record daily Feb rainfall (23 Feb)	<b>Cat B</b> N NSW	JC BB

3–4 March	ECL	SEQ – C NSW	Tight gradient on coast. Norah Head 148mm (4 March) record March daily rainfall. Nobbys gusts ESE 56kts (3 March), ENE 48kts and 66mm (4 March), Sydney 90mm (4 March)	Cat C N NSW	JC BB
9–10 March	Ex-TC <i>Otto</i>	SEQ – N NSW	TC <i>Otto</i> moved from Gulf to Cape Tribulation and S to Bowen. Ex-TC moved S, strong winds N of Yamba. Floods and heavy seas, Hsig 3.8m, peak 6.3m Double Island Point	Cat C N NSW	JC BB
16 March	Gradient	SEQ – M NSW	Strong SE winds from high in south and TC Norman east of Norfolk Is. Coffs Harbour surge 0.32m	Cat B N NSW	JC BB
7–9 April	ECL		Low developed NSW S coast and moved E Nobbys gust SSW 52kts (7 April), 54kts (8 April)		JC
11 April	Secondary Low	SEQ – M NSW	Swell from distant intense E Tasman Low	Cat B N NSW	BB
15–19 May 1977	ECL Cape Byron	SEQ – all NSW	Low off central NSW coast moved NE along coast to Cape Byron 996hPa, very tight gradient and gales E to SE, Coffs Harbour surge 0.49m 18 May. Nobbys SSE gust 55kt. Dorrigo 266mm (17 May), 167mm (18 May), 201mm (19 May)	Cat A/B most NSW	JC BB
	'a real cyclone'		17 May <i>Elay</i> fishing boat lost in huge waves with crew Sandon R		Biddle 2001
4–6 June	Low		Intense low stationary over NZ	Cat B C NSW	BB
15–20 June	Low		Low moved NE from Bass Strait	Cat B C–S NSW	BB
18–20 June	Secondary Low	SEQ – all NSW	Low NE from Bass Strait, then along coast, then to Lord Howe Is. NW gust 56kt, Nobbys	Cat B most NSW	JC BB
24–27 July	Low		Deep low moves just to the SE of Hobart Nobbys gusts WNW 48kts (24 July) 60kts (25 July) 53kts (26 July). Williamstown gust WNW 53kts		JC
3–4 Sept	ECL		ECL developed E of Sydney and moved E. Nobbys SSW gust 56kt	Cat B N – M NSW	JC BB
28 Dec	Strong Gradient	SEQ – M NSW	Strong gradient behind front	Cat B N NSW	BB
1978					
1978	Photos of erosion face	Byron Bay	1978 to 1996 no severe storms N NSW PH		PWD 1978:28, 30

5–8 Jan	<b>TC <i>Bob</i></b>	SEQ – M NSW	Moving SW from near Fiji, swell to SEQ and NSW coasts	Cat A N NSW	JC BB
27–31 Jan	<b>Low</b>		Monsoon low moved from gulf to near Townsville and Inland low developed off Newcastle (997hPa). Rockhampton 219mm (31 Jan) record daily Jan rainfall. Norah Head 235mm (29 Jan) record daily Jan rainfall. Sydney gust SSW 55kts and 43mm (29 Jan). Nobbys gusts WNW 54kts (27 Jan), SSW 49kts and 30mm (28 Jan), 56kts and 79mm (29 Jan)	Cat A/B C–S NSW	JC BB
18–24 March	<b>ECL</b>	SEQ – all NSW	Low from Coral Sea moved SW and crossed coast at Cape Byron (1000hPa). On 24 March low recrossed M NSW coast and deepened moving quickly to E	Cat X M–C NSW Cat B N–S NSW	BB
13–17 April	<b>ECL</b>	SEQ – C NSW	Low moved S at 158E, SE gradient to coast	Cat B N–M NSW	BB
10–11 May	<b>Low</b>		Deep low developed rapid E of Bass Strait. Nobbys gust WNW 52kts (10 May)		JC
18 May	<b>Low</b>		Low intensified briefly near Eden	Cat B S NSW	BB
20–22 May	Continental Low	SEQ – all NSW	Intense low off Eden, moved slowly N along coast, then NE to Lord Howe Is. East Sale 106mm record May daily rainfall (20 May), Gabo Is 207mm record May daily rainfall (20 May)	Cat A C–S NSW	JC BB
30 May – 3 June	<b>Low</b>		Low moves down NSW coast 1–3 June to S NSW. Merimbula 135mm (3 June) with SE 40kts, King Fisher B Oil Rig Hsig 9–10m (one of the biggest swells recorded there)	Cat X C–S NSW	JC BB
1–3 June			Norah Head 151mm (2 June) record June daily rainfall. Merimbula 135mm record June daily rainfall (3 June), Bega 126mm (3 June)		JC
1978	Flood	Richmond R			Ferguson 1995
15–16 June	<b>Low</b>		Low from Bass Strait moved NE	Cat A C–S NSW	BB
18–21 June	Secondary low	SEQ – all NSW	Low off S NSW moved N then E and deepened, very long fetch from SE, rough seas, heavy swell, storm surge, houses undermined on high tide	Cat B all NSW	BB
25–27 June	<b>Low</b>		Small low moved NNE and combined with xx central Tasman Sea, long fetch	Cat B C NSW	BB

Winter 1978	<b>Erosion</b>	C NSW coast and Sydney	Winter storms cut Sydney and C NSW beaches. Some property damage on C NSW. Houses lost Wamberal Beach	<b>Photo</b> Houses lost Wamberal Beach	Chapman and others 1982:120 Watson and Lord 2001
2–5 July	<b>Low</b>		Deep low moves offshore S NSW. Nobbys gusts NW 60kts (3 July) 57kts (4 July) 58kts (5 July)		JC
20–28 Aug	<b>ECL</b>	SEQ – C NSW	Deep Low SE Lord Howe, long S/SSE gradient. Secondary low formed SE Tasman Sea 27–28 Aug. Nobbys S 54kt and SSW 65kt gust	<b>Cat A/B</b> most NSW	JC BB
23–25 Sept	<b>Tasman Low</b>		Low crossed Tasman Sea	<b>Cat B S</b> NSW	BB
19–20 Oct	Secondary Low	SEQ – C NSW	Deep low central Tasman	Cat C N NSW	BB
10–11 Nov	<b>ECL</b>		Low developed E of Sydney. Nobbys gusts SSW 54kts		JC
<b>1979</b>					
1976–2004	<b>Low erosion period</b>	N NSW and SEQ	Except for TC David 1976 and minor erosion in 1983, 1992 Fraser Is and 1996, generally low erosion	Except for Fraser Is 1992, generally no new terminal storm faces cut after 1974 PH	Chapman and others 1982:120 PH
1–2 Jan	<b>TC <i>Peter</i></b>		TC moved from Gulf to Cairns. Record rainfall 1947mm in 48hrs Mr Bellenden Kr. Flood damage and 2 deaths		JC
10–28 Jan	Pacific swell	SEQ – M NSW	Pressure gradient 10 Jan, ECL 21–22 Jan and gradient 28 Jan.	<b>Cat B C</b> NSW	BB
11 Jan	<b>TC <i>Greta</i></b>		TC moved from Gulf and crossed to Princess Charlotte Bay. Flood rains over Northern Cape York		JC
5 Feb	<b>Severe TC near NZ</b>	Q – N NSW	TC S from Fiji to NZ, swell to coast	Cat C N NSW	BB
5–7 Feb	<b>Tropical Low</b>		Low near Townsville moved inland. Bowen 122mm (5 Feb), 134mm (6 Feb), Mackay gusts E 45kts and 303mm (6 Feb), Townsville 109mm (5 Feb)		JC
8 Feb	<b>ECL</b>	SEQ – N NSW	Low formed E of Fraser Island, long pre-existing gradient.	<b>Cat B N</b> NSW	BB
13 Feb – 6 March	<b>TC <i>Kerry</i></b>	CQ – N NSW	TC from Solomon Is crossed Coral Sea (955hPa) crossed coast near Mackay, slow moving with long fetch to coast. Lasted 21 days, <b>longest lived TC recorded in Australia</b>	<b>Cat B N</b> NSW	BB BoM BPA 1989

25 March	<b>Secondary Low</b>	SEQ – N NSW	Central Tasman Sea low moved N and NE. SSE gradient	<b>Cat B N NSW</b>	BB
22–26 May	Secondary Low		Low SE Lord Howe Is, to deep depression N NZ, SE swell, gradient	Cat C N NSW	BB
31 May – 1 June	Secondary Low	SEQ – M NSW	Deep low moved NE across Tasman Sea Nobbys gusts SSW 52kts (31 May) SSE 49kts (1 June)	<b>Cat B N–M NSW</b>	JC BB
21–23 June	<b>Low</b>		Nobbys SSW 61kts (21 June) 54kts (22 June)		JC
26–27 July	<b>Tasman Low</b>		Low development Nobbys gusts WNW 50kts (25 July)		JC
29 July – 1 Aug	<b>ECL</b>	SEQ – C NSW	Small low developed NE of Fraser Is and moved S east of Brisbane then deepening across Tasman Sea. Hsig 4.7m, peak 8.7m	<b>Cat B N–M NSW</b>	BB JC
14 Aug	<b>Low</b>		Deep low S NZ, second over N Tasman Sea	<b>Cat B C NSW</b>	BB
21 Aug	<b>Low</b>		Low off coast, W Tasman Sea	<b>Cat B C NSW</b>	BB
1 Sept	<b>Secondary Low</b>	SEQ – N NSW	Long swell from central Tasman low	<b>Cat B N NSW</b>	BB
22–24 Sept	<b>Secondary Low</b>	SEQ – all NSW	Small low off M NSW moved NE, long S/SE fetch. SSW 55kts, SSE 42kts (23 Sept) gust Cruiser <i>Nocturn</i> and 2 crew lost in 55kt wind, seas 5–10m, 3 others rescued by RAAF helicopter. Pilot Houston reported 'we have never flown over seas in these conditions'	<b>Cat B most NSW</b>	JC BB <i>Weekend Australian</i> 23 April 2005
23–25 Nov	<b>ECL</b>		Low near Gabo Nobbys gusts WNW 61kts (22 Nov) 44kts (23 Nov) S 48kts (25 Nov)		JC
<b>1980</b>					
8–9 Jan 1980	<b>TC Paul</b>	CQ – M NSW	7–8 Jan from Gulf to St Lawrence 989hPa then moved rapidly SE to central Tasman Sea and deepened. Heavy rain and record flood Don R (cut flood channel near Bowen), large swell to SEQ coast, Brisbane wave Hsig 4.3m, peak 9.8m	Cat C N NSW	JC BB
15–17 Feb	<b>TC Ruth</b>	CQ – C NSW	12–14 Feb Over Coral Sea moved S over E Tasman Sea, heavy NE swell on coast. Brisbane Hsig 4.0m, peak 6.3m. Highest astronomical tide for 10 years, coast damage Heron Is to Gold Coast		JC BB

24–28 Feb	TC <i>Simon</i>	SEQ	Rapidly intensifying TC 960hPa moved toward Port Clinton, eye 35km, Heron Is gust 93kts, Sandy Cape 92kts, and ship at sea recorded +100kts, huge swell ashore on neap tides, some wind damage and flooding. Burnett Heads Hsig 4.5m Hpeak 8.9m. Sandy Cape 432mm (27 Feb) all time record daily rainfall (since 1871). Lady Elliot Is 340mm (26 Feb) record Feb daily rainfall.		JC BPA 1989
6–10 May	ECL Severe storm	Fraser Island – central NSW	6–9 May Low in trough off Fraser Island moved E then moved slowly S to Cape Byron. Wind 45kts, Brisbane Hsig 5.7m, peak 8.1m, flooding SEQ. Nobbys gusts ESE 56kts (8), ESE 52kts (9). Cape Moreton 174mm (7), record daily May rainfall. Brisbane City 149mm (9), record May daily rainfall	Cat A/B N – M NSW	JC BB Allen and Callaghan 2000
1980	Flood	Richmond R			Ferguson 1995
	Local flooding	SEQ			BoM
	Storm assessment by BB ends and LT starts		Storm defined as event with Hsig >2.5m and meteorological records examined to identify source of occurrence. It is likely that more storms in the less extreme categories of B and C will be identified compared to BB	June 1980 to Dec 1985 most Cat C events recorded as swells in year summary PH	BB LT
3–6 June	Secondary Low	SEQ – all NSW	Low E of Bass Strait, deepened and moved to central Tasman Sea, later NZ 980hPa	Cat B C–S NSW	LT
18–19 June	Secondary Low	SEQ – all NSW	Low in SW Tasman Sea, ridge to central Q.	Cat C all NSW	LT
27–29 June	Low		Deep low develops E of Bass Strait. Nobbys gusts NW 65kts (27 June) 61kts (28 June) Sydney gusts WNW 53kts		JC
22–23 July	Secondary Low	SEQ – all NSW	Deep low S Tasman Sea, to NZ	Cat C all NSW	LT
31 July	ECL	Yeppoon – N NSW	Low off central Q, moved to Norfolk Island	Cat C N NSW	LT
3–4 Nov	Secondary Low	SEQ – all NSW	Bass Strait low moved to Lord Howe, then NZ.	Cat B N–C NSW	LT
30–31 Dec	Trough	SEQ – all NSW	Complex lows in trough along coast.	Cat B C NSW	LT
1981					
8 Jan	Gradient	SEQ – N NSW	Fetch from NZ	Cat B N NSW	LT



31 Jan – 2 Feb	<b>ECL</b>	SEQ – M NSW	Low moved slowly S from New Caledonia	<b>Cat B N NSW</b>	LT
10 Feb	<b>TC <i>Eddie</i></b>		TC crossed coast at Princess Charlotte Bay with only minor impact. 0.64m storm surge. Minor flooding		JC
12–14 Feb	<b>TC <i>Cliff</i></b>	SEQ – N NSW	Moved from New Hebrides across Coral Sea to cross coast at Fraser Is (CP985hPa) to Bundaberg. Surge and severe flooding Hervey and Moreton Bays, water into streets of Urangan, surge on <b>Gold Coast 0.7m</b> , surge of water into Currumbin Ck, one drowned, Brisbane wave Hsig 4.3m, peak 7.2m	<b>Cat A/B N–M NSW</b>	JC LT BPA 1989
26 Feb	<b>TC <i>Freda</i></b>	CQ to N NSW	26 Feb TC moved from near Cooktown into central Coral Sea then NE.	Cat C N NSW	LT
2–3 April	<b>ECL</b>		Low off Q moved S then inland NSW Nobbys gust SSE 53kts. Dorriggo 240mm (3 April)	<b>Cat B M NSW</b>	JC LT
10–13 Apr	Secondary low	SEQ – all NSW	Intense storm N of NZ	Cat C N NSW	LT
22–25 May	<b>ECL</b>	CQ – all NSW	21 May large low Mt Isa moved to NW NSW, small low off Cairns moved S along coast (most intense at Coolangatta). Local flooding CQ, Brisbane Hsig 3.8m, peak 5.2m. Lakes Entrance 204mm all time daily rainfall record (25 May), Gabo Is 148mm (25 May)	<b>Cat B N–M NSW</b>	JC LT
2–9 June	Secondary low	All NSW	Low in SW Tasman Sea. Nobbys gusts WNW 52kts (1 June), 48kts (2 June) NW 54kts (6 June)	<b>Cat A most NSW</b>	LT JC
19–20 June	<b>ECL</b>	SEQ – CNSW	Low formed E of Cape Byron, moved E and deepened.	<b>Cat B N NSW</b>	LT
7–11 July	<b>Low</b>		Low in Southern Ocean	<b>Cat A/B most NSW</b>	LT
20–22 Aug	<b>Low</b>		Rapid development of deep low E of Tasmania. Nobbys gusts WNW 64kts (20 Aug)		JC
2–4 Nov	<b>ECL</b> Fraser Island	SEQ – C NSW	Stationary low off Fraser Is moved S 4 Nov. Local flooding SEQ	Cat C N NSW	LT BoM
<b>1982</b>					
26–28 Jan	<b>TC <i>Abigail</i></b>	Yeppoon? – M NSW	W of New Caledonia, moved S then WNW	<b>Cat A/B most NSW</b>	LT
12–15 March	<b>ECL</b> Coral Sea	SEQ – C NSW	Coral Sea low moved S at 160E, then NW	<b>Cat B most NSW</b>	LT

March – April 1982	<b>Volcanic eruption</b>		El Chinchon		Johnson 1993
Apr 82 – Feb 83	<b>Drought</b>		El Nino related, dust storms and bushfires		BoM 1997, 1999
6–9 April	<b>TC <i>Bernie</i></b>		TC moved SE for Coral Sea, passing close to Norfolk Is	<b>Cat B NSW</b>	LT
26–27 April	<b>Low</b>		Low (996hPa) moves out into Tasman Sea, E of Bass Strait. Nobbys gusts WNW 46kts (27 April)		JC
29–30 April	<b>Low</b>		Deep low in E Tasman Sea, near S NZ, strong gradient	<b>Cat B M NSW</b>	LT
1–5 June	<b>Secondary low</b>	SEQ – all NSW	Deep complex low over central NSW moved NE, to E Tasman Sea. Nobbys gusts SSW 50kts (31 May) 52kts (1 June) WSW 44kts (2 June) SSW 46kts (3 June)	<b>Cat A/B most NSW</b>	LT JC
13–16 July	<b>Gradient</b>	SEQ – all NSW	Tight SSE gradient from S ocean to whole coast	<b>Cat B N – M NSW</b>	LT
19–21 July	<b>Secondary Low</b>	SEQ – all NSW	Complex lows over Tasman Sea to NZ	<b>Cat B all NSW</b>	LT
19–23 Sept	<b>ECL Coral Sea</b>	SEQ – all NSW	Low E of Bass Strait Nobbys gusts SSE 48kts and 35mm (19 Sept), SSE 48kts and 29mm (20 Sept) 45kts (21 Sept). Norah Head 134mm (20 Sept) record daily Sept rainfall. Sydney 82mm (20 Sept),	<b>Cat B All NSW</b>	LT
30 Sept – 1 Oct	<b>Low</b>		Low in front Bass Strait, moved to central Tasman Sea, second low off NSW	<b>Cat A/B all NSW</b>	LT
4–6 Oct	<b>Low</b>		Small low E Bass Strait moved NE to E of Lord Howe Is	<b>Cat B all NSW</b>	LT
9–11 Oct	<b>Low</b>		Inland low over SEQ moved off M NSW coast then inland NW	<b>Cat B M–C NSW</b>	LT
8–9 Dec	<b>ECL</b>		Low near Gabo Is. Nobbys gusts NNW 46kts (8 Dec). Average winds 45kts at Eddystone Pt, Tasmania and 24hr rainfall 115mm. Fingal, Tas 101mm (9 Dec) record daily Dec rainfall. Flinders Is 40mm (9 Dec)		JC
<b>1983</b>					
1983	<b>Continuing drought</b>		El Niño event. 10 Feb Ash Wednesday bushfires SA and Victoria	Drought ended during year	BoM 1997, 1999

1–2 Jan	ECL	SEQ – MNSW	Trough and E fetch over Coral and Tasman Seas	Cat B N–M NSW	LT
9–10 Jan	Gradient	SEQ – MNSW	Gradient across Tasman, long fetch	Cat B N–M NSW	LT
11 Feb - 4 March	TC <i>Elinor</i>	CQ	Long lived TC crossed coast Carmilla, 1m surge Broomsound. Wind damage and heavy rain Yeppoon. Rockhampton 172mm record March daily rainfall		JC
8–9 March 1983	ECL		Low from Bass Strait developed E of Tasmania, moved ESE, second low off Newcastle. Nobbys max gust SSW 50 knots 8 March 1983	Cat B C–S NSW	JC LT
19–23 March	Low		Drought breaking low from Kimberley Ranges W Q, passed through NSW to E of Tasmania. Bundaberg 221mm (21 March), Bega 119mm (21 March) 83mm (22 March), Merimbula easterly gales and 92mm (21 March) 41mm (22 March)		JC
25–30 April	Tasman Low		Tasman low then ECL in N NSW. Rainfall 155mm (29 April)		JC
2–4 May	Trough		Broad trough over E Australia. Developed into deep low E Bass Strait. Lady Elliot 309mm (3 May) record May daily rainfall. Brisbane 98mm (2 May) 41mm (3 May), East Sale 52mm (3 May) 58mm (4 May)		JC
3–6 June	ECL Coral Sea	CQ – all NSW	3–5 June small low NE of Cape Moreton and severe low near New Caledonia. Very strong gradient from large high 1041hPa to S, storm force winds to SEQ, gusts to 70kts, Brisbane Hsig 5.6m	Cat B N NSW	JC LT Allen and Callaghan 2000
17–23 June	ECL	Fraser Is – M NSW	20–23 June Low in Coral Sea moved to Hervey Bay, back to sea and deepened off Stradbroke Is. Gusts to 60kts, heavy rain, wind and flood damage, severe beach erosion. Brisbane Hsig 5.5m. Maleny 235mm (22) record June daily rainfall	Cat B N NSW	JC LT Allen and Callaghan 2000
1983	Flood	Richmond R			Ferguson 1995
	Beach erosion		SEQ		JC
7–9 July	Continental low	SEQ – all NSW	Low deepened Gabo Island (990hPa), moved E to NZ.	Cat B N – M NSW Cat X/A C–S NSW	LT
21 July	ECL	SEQ – C NSW	Coral Sea low moved S to Lord Howe	Cat B N NSW	LT
1–3 Aug 1983	ECL		Low developed in Tasman and deepened near NZ. Nobbys Gusts 50knots 1240UTC 1 August and SSW 55 knots at 0830Z 2 August		JC
3–4 Aug	Secondary Low	SEQ – all NSW	Low on trough deepened and moved to NZ. Long fetch from SSE	Cat B all NSW	LT

4–5 Oct 1983	<b>Gradient</b>	SEQ – all NSW	Complex lows in Tasman Sea. Low moved SE off N NSW followed by another low off N NSW coast on the 6 Oct which combined into a 992hPa low in the central Tasman on the 7 Oct. Nobbys gust SSW 58 knots, 5 Oct	<b>Cat B</b> all NSW	JC LT
1984					
17 Jan	<b>TC <i>Grace</i></b>		250km off Fraser Is		JC, BPA 1989
18 Feb	<b>Small intense low</b>	Wollongong	Twenty four hour rainfall 796.5mm Dapto with severe flooding damage. Storm face winds, Port Kembla		JC
26–29 Feb	<b>TC <i>Ingrid</i></b>	SEQ – all NSW	Moved SW from Coral Sea	Cat C N NSW	LT
8 March	<b>TC <i>Jim</i></b>		TC crossed coast nr Cape Grenville uprooting moderate trees		JC
19 March	<b>TC <i>Kathy</i></b>		TC crossed coast nr mouth of Pascoe River. Slight tree damage		JC
19–21 March 1984	<b>ECL</b>		Low developed E of Newcastle and moved NE into Coral Sea. Nobbys wind gusts SSW 46kts, 18 March, SSW 48 knots 19 March and S 55 knots (20 March) Nobbys 24hr rain 30mm (20 March), 97mm (21 March), 78mm (22 March)		JC
7–10 Apr 1984	<b>TC <i>Lance</i></b>	NQ – all NSW coast	Low formed NE Mackay, moved SSE to 50nm off Cape Byron (990hPa). Rapid transition E of Brisbane, winds to 60kts, damage to western side of islands, boats driven ashore and lost Moreton Island. Extensive wind damage, huge seas Gold Coast, Brisbane wave Hsig 5.1m, peak 8.8m, small vessels lost at sea	<b>Cat X/A/B</b> most NSW	JC LT ECL
	<b>Shoreline erosion</b>	SEQ	Western shores of barrier islands		JC
20–21 April	<b>Low</b>		Low develops E of Tasmania, 96mm E Sale (21 April)		JC
28 April – 1 May	<b>Gradient</b>	SEQ – all NSW	Strong Tasman high	<b>Cat B</b> N–M NSW	JC LT
5–9 May	<b>Low</b>		Strong Tasman Sea low S of Tas moved to NZ	<b>Cat A/B</b> most NSW	LT
18–21 May	<b>TC</b>	CQ – all NSW	Depression N of New Caledonia moved SW to deepen near Norfolk Is	<b>Cat A/B</b> N–M NSW	LT

17–22 June	ECL	CQ – all NSW	Low off Fraser Island moved SSE to Lord Howe, major Tasman storm. Nobbys gust SSW 48kts 18 June, SSW 54kts (19 June). Lord Howe Is gust SE 91 km/hr (18 June)	Cat B all NSW	JC LT
26–30 June	Low		Nobbys WSW gust 50kts (29 June)		JC
3–5 July	ECL	CQ – all NSW	Low rapidly deepened near Lord Howe Is, 987.1hPa. Ships reported storm force winds and 0.34 metre storm surge at Coffs Harbour 5 July. Nobbys WSW gust 50kts 3 July, SSW 53kts 4 July	Cat A/B all coast	JC LT
4–7 July	Secondary low		Low S Tasman, (980hPa), long SE fetch	Cat B N NSW	LT
1984	Flood	Richmond R			Ferguson 1995
27–28 July JC 23–25 July	ECL	CQ – all NSW	Low off Fraser Is moved S deepening to intense low off Jervis Bay. Structural damage from strong winds northern beach suburbs, Sydney (27 July), wind gusts to 42m/s (82kts) south coast. Yacht <i>Warlock</i> 12m was wrecked on reef southern NSW coast (28 July) two crew rescued by helicopter and a man drowned in rough seas near Jervis Bay (29 July). Major flooding in SE Australia.	Cat B all NSW	JC LT
10–12 Aug 1984	ECL		Deep low moves across Tasmania into the Tasman Sea. Nobbys gusts WNW 55kts (9 Aug), WNW 42kts (10 Aug), WNW 47kts (11 Aug)		JC
4–6 Sept	ECL		Southern NSW low, Nobbys gusts NNW 48kts (4 Sept)		JC
28–30 Sept	Secondary Low	SEQ – all NSW	Subsidiary of Southern Ocean low developed “major proportions” and moved E to NZ. 980hPa from 29–30. Nobbys gust SSW 71kts (28 Sept), SSW 44kts (29 Sept), Sydney gust 50kts (29 Sept)	Cat A/B most NSW	LT
21–22 Oct			Wollongong 106mm record daily Oct rainfall (21 Oct)		JC
24–28 Dec	Low		Low developed Bass Strait and moved to Tasman. Nobbys gusts SSW 49kts (24 Dec), NNE 62kts (25 Dec), SSW 44kts (26 Dec), SSW 48kts (27 Dec)		JC
30 Dec	TC <i>Monica</i>	CQ – all NSW	TC W New Caledonia, moved S to form deep low (970hPa) central Tasman Sea	Cat B all NSW	LT
1985					
7–9 Feb 1985	ECL		Low off N NSW. Nobbys gust S 56 knots (7 Feb) SSW 44 knots (8 Feb) SSW 44knots (9 Feb)	Cat C all NSW	JC LT

22–23 Feb	<b>TC <i>Pierre</i></b>	CQ – SEQ	TC crossed coast Shoalwater with local flooding Bay and moved S to Capricorn Group, GBR and then E	Cat C most NSW	BoM BPA 1989
1 April	<b>TC <i>Tanya</i></b>		TC crossed coast nr Coen. Minor vegetation damage		JC
5–6 April	<b>ECL</b>		Low S NSW, Gabo Is 125mm record April daily rainfall (6 April), Merimbula 75mm (6 April)		JC
12–13 April	<b>Low</b>		Low in Tasman east of N NSW. Nobbys gust SSW 47kts (12 April)		JC
23–27 April	<b>ECL</b> Coral Sea	SEQ – MNSW	Coral Sea low and intense S High	<b>Cat B N NSW</b>	LT
29 April – 2 May	<b>Low</b>		Low developed E of Fraser Is. Nobbys gusts SSE 46kts (29 April), SSE 58kts (30), 50kts (1 May)		JC
19–22 May	<b>ECL</b>	SEQ – all NSW	Low in W Tasman moved N Surge Coffs Harbour 0.37m (5 May) Nobbys gust S 85kts (19 May), S 60kts (20 May). Williamtown S gusts 60kts (19 May), Sydney gusts 51kts (19 May)	<b>Cat A/B all NSW</b>	JC LT
3–7 June	<b>Low</b>		Low developed of S NSW coast and moved NE up to Lord Howe and then SE to NZ. Nobbys gust NNW 50kts (3), WNW 46kts (5), SSW 56kts (5)		JC
9–11 July	<b>ECL</b>	SEQ – all NSW	8–10 July low on Sunshine Coast moved S to Brisbane, 1001hPa, NE 38kts Cape Moreton, ENE 50kts, gusts to 65kts Cape Byron, moved SE and deepened to Lord Howe Is. Surge Coffs Harbour 0.43m (7 July) Nobbys gusts ESE 47kts (7 July) SSE 54kts (8 July) SSE 58kts (9 July)	<b>Cat X/A/B all NSW</b>	JC LT
1–6 Sept	Secondary Low	SEQ – all NSW	2–3 Sept Large low developed in Tasman Sea 990hPa east of Sydney and deepened moving SE. Westerly winds Brisbane 50kts, 3m waves Moreton Bay Nobbys gusts SSW 56kts (1 Sept)	<b>Cat B all NSW</b>	JC LT
13–15 Oct	<b>ECL</b>		Norah Head 112mm (14 Oct) record Oct daily rainfall. Nobbys gusts SSE 54kts (13 Oct), 50mm (14 Oct)		JC
23–25 Oct	<b>Low</b>		Deep low moved off the S NSW coast and moved E. Nobbys gusts NNW 45kts (23 Oct), SSE 49kts (24 Oct), SSE 48kts (25 Oct)		JC
11–12 Nov	Gradient	SEQ – CNSW	Tight SE gradient across Tasman Sea	<b>Cat B N NSW</b>	LT

18–23 Nov	Low		Low from Bass Strait intensified and persisted E Tasman Sea	Cat B most NSW	LT
1–2 Dec	Gradient	SEQ – C NSW	Extended SE fetch over Tasman Sea	Cat B N NSW	LT
9–11 Dec	ECL		Low S NSW coast. Nobbys gusts ENE 54kts (8 Dec), WNW 42kts (9 Dec), WNW 44kts (10 Dec)		JC
	End of storm compilation		Storm assessment by Lawson and Treloar for NSW Public Works ends. From 1986 records from BoM, JC and PH notes		LT
1986					
1 Feb	TC <i>Winifred</i>	NQ – CQ	Crossed coast S of Innisfail with eye 41km, CP 958hPa, gusts to 83kts, but on ridge est. 145kts, surge 1.6m Clump Pt. Widespread structural and crop damage. 4 deaths, near record flood Herbert and Tully R		BoM
10–11 March 1986	TC	Coral Sea	Rapid cyclogenesis Central Tasman. Nobbys gusts SSW 56knots 1650Z 9 <sup>th</sup> SSW 49knots 0550Z 10 <sup>th</sup>		JC
May 1986			Boat overturned, Southport Bar, 1 lost		Salter 2002:34.
15–17 June	ECL		Low off SEQ. Sandy Cape 100mm (16 June) 209mm, record June daily rainfall (17 June)		JC
8–10 July 1986	Low	Tasman Sea	Development of 972hPa low in Tasman. Nobbys gusts WNW 43 knots (7 July) WNW 49knots (8 July) WNW 42knots (9 July)		JC
4–11 Aug	ECL	Sydney	Nobbys gusts ESE 47kts (4), S 52kts (5), 58kts (6), SSE 52kts (7) <b>Most intense rain observed in Sydney since European settlement.</b> Sydney Observatory 328mm record all time daily rainfall since 1858 (5). Sydney Airport 207mm record Aug daily rainfall (6). System also developed in a reverse shear configuration. After it moved seawards it produced very large waves and storm surge with measured wave run up levels to 6m above MSL at North Steyne and 7.2m at Narrabeen.		JC
13–17 Sept	Lows		Series of two Tasman Lows. Nobbys gusts NW 46kts (12 Sept), W 57kts (16 Sept)		JC

19–22 Nov	ECL	Sydney	Sig wave heights to almost 7m and to 6m Batemans Bay, sustained sly winds to 93km/h at Pt Perpendicular, 115mm rain at Nowra on 19 <sup>th</sup> Nobbys gusts WNW 63kts (17 Nov), WNW 44kts (18 Nov), SSW 58kts (19 Nov) SSW 43kts (20 Nov), SSE 49kts (22 Nov)		JC
12–13 Dec	ECL		Nobbys gust WNW 48kts (11 Dec)		JC
16–20 Dec	Tasman Low		Tasman Low and TC Patsy out to east generating swell for east coast. Nobbys gusts WNW 47kts (16 Dec)		JC
1987					
4–6 March	Gales	SEQ – NNSW	Brisbane 132mm(5 <sup>th</sup> ), Coolangatta 149mm (5 <sup>th</sup> ) 212mm (6 <sup>th</sup> ), Gales Byron Bay 140mm (5 <sup>th</sup> )		JC
9–10 May	ECL and gradient	Gold Coast	Small low on Gold Coast and large high Tasman Sea, flooding Gold Coast, N NSW several lives lost		JC
1987	Flood	Richmond R			Ferguson 1995
	Minor erosion		Beach scarp cut Tallow Beach		PH
2–4 Aug	Low		Low developed off C NSW coast and moved E. Nobbys gust WNW 46kts (2 Aug)		JC
31 Aug – 1 Sept	Low		Rapid development of 987hPa Low in Tasman. Nobbys gust WSW 60kts (30 Aug)		JC
16–20 Oct	Low		Series of ECL's, first off S NSW and second off N NSW. Nobbys gusts NNW 58kts (15 Oct), NW 50kts (16 Oct), SW 43kts (19 Oct), WSW 46kts (20 Oct)		JC
20–21 Oct	Gales offshore	Wollongong	99mm (20 Oct) 91mm (21 Oct)		JC
24–26 Oct	Low		Low developed near Lord Howe Is, ENE gusts 53kts (25 Oct), Sydney 90mm (25 Oct)		JC
11–13 Nov	ECL		Sydney wave buoy Hsig 6.75m, Hmax 11.8m SE [Hsig >3m for 53hrs] Nobbys gusts SSE 64kts (10 Nov), SSE 68kts (11 Nov), rainfall 104mm Nov daily record (12 Nov).		JC
1–2 Dec	Low		Deep low moved across Vic into Tasman. Nobbys gusts WNW 51kts (31 Nov), WNW 54kts (1 Dec)		JC
1988					



16–18 Jan			Sydney City 191mm record Jan daily rainfall		JC
14–15 Feb	<b>ECL</b>		Low off SEQ. Smokey Cape 159mm record daily Feb rainfall (15 Feb)		JC
1 March	<b>TC Charlie</b>	NQ	TC made landfall at Upstart Bay while rapidly intensifying (981hPa). Average wind 75kts. 2m deep flood water, houses unroofed, crop losses. Peak Hsig 5.6m. 804mm – 912mm rainfall in 24hrs, Carmila. Beach erosion and flooding NQ. Tidal inundation over 1800ha grazing land.		JC
4–7 April	<b>ECL</b> Sunshine Coast	SEQ – M NSW	Small low off Sunshine Coast, to Fraser Is, Gympie, to sea then west of Brisbane. Very heavy rain and flood damage Gold Coast, Hsig 4.28m		JC
10–11 April	<b>ECL</b> Fraser Island	SEQ – N NSW	Small low moved south, gales Fraser Is to Yamba. Wind 50kts, extensive damage, heavy rain and floods, huge seas Brisbane Hsig 4.1m, 1m waves on Broadwater		JC
	<b>Minor erosion</b>	Tallow Beach	Scarp cut in foredunes Tallow Beach		PH
29–30 April			Wollongong: 122mm (29) 212mm (30) Sydney: 65mm (29), Sydney Airport 174mm record April daily rainfall (30)		JC
4–6 June	Low	NSW	Small low ran down the east coast from NQ to Sydney as major low developed over Bass Strait, Gales Cape Moreton		JC
4–8 July	<b>Low</b>		Low moves S through NSW and Vic as a small intense low, moves down the east coast circulating around the main inland low. Average winds as Cape Moreton NE/42kts with 94mm rain in 24hrs. Nobbys gusts ESE 75kts (4 July), ESE 64kts (5 July)/ Mackay 170mm (5 July) record daily July rainfall. Bega 179mm record July daily rainfall (7 July), Nowra 128mm record July daily rainfall (6 July)		JC
6–10 Aug	Low		Low develops east of Gabo Island and deepens as it moves towards NZ. 0.32m surge at Coffs Harbour. Nobbys gusts W 52kts (5), SSW 58kts (7)		JC
23–24 Aug	<b>Low</b>		Low developed S of Lord Howe Is. Nobbys gusts SW 50kts (23)		JC
14–16 Sept	<b>ECL</b> Cape Moreton	SEQ – N NSW	Moved slowly to sea. Gales SEQ and N NSW, Brisbane Hsig 4.62m. Lismore 171mm record Sept daily rainfall (15 Sept), Storm force winds Smoke Cape and 53mm (15 Sept), 49mm (16 Sept).		JC

15–17 Nov	ECL		Nobbys NW 56kts (15 and 16 Nov) MSLP down to 987.1hPa at Sydney (17 Nov) 80mm in 24hrs at Merimbula (17 Nov)		
14–18 Dec	Tropical low	Q coast	Developed near Willis Is moved S and crossed coast Gladstone. Gales SEQ, Brisbane Hsig 4.98m, Gladstone flooded. Bundaberg 257mm (18) record Dec daily rainfall		JC
1988	Flood	Richmond R			Ferguson 1995
1989					
27–30 Jan	Low		Coral Sea low moved S near Lord Howe and deepened. Yamba 114mm (29 Jan)		JC
13–22 Feb	TC <i>Harry</i>		TC moved towards NZ. Nobbys gusts SSW 51kts (19). Large waves along coast		JC
3–4 Apr	TC <i>Aivu</i>	NQ	Crossed coast near Ayr. Eye 30km, CP 959hPa, wind damage, flooding and 3m surge Cape Upstart. 2 April flood rains SEQ and N NSW as TC approached coast. Tewantin 312mm (3 April) record daily April rainfall		JC BoM
23–26 Apr	ECL Severe storm	SEQ – N NSW	Developed near Yeppoon and moved S to Gold Coast. Damage from gale to storm force winds, surge Brisbane 0.5m, Hsig 6.5m, flooding and erosion. Brisbane Airport 170mm record April daily rainfall, City 190mm (26 April) record April daily rainfall		JC Allen and Callaghan 2000
Late April	Flooding	SEQ			BoM
1989	Flood	Richmond R			Ferguson 1995
	Beach erosion		Severe erosion Sunshine to Gold Coasts		JC
26–29 May	Low	C Qld	Low developed off Central Qld coast at Gannet Cay (to 45kts mean winds), Frederick Reef and Lady Elliot Is. Moved east and by 29 May, developed an eye as viewed from satellite imagery just NW of New Caledonia		JC
9–11 June	ECL		Low forms east of Wollongong. Nobbys NW 52kts (9 June), gales S NSW coast.		JC
21–23 June	ECL	N NSW and Lord Howe Is	ECL deepened off Coast with gales N NSW coast and Lord Howe Is where max gust of 128km/hr was recorded Nobbys gusts SSE 51kts (19 June), SE 54kts (20 June), SE 48kts (21 June)		JC
10–11 July	Low		Rapid deepening of a low east of S NSW (more than 20hPa in 24hrs). Nobbys gusts NW 55kts (9 July) and NW 52kts (10 July)		JC

24–26 July	ECL		Low developed E of Wollongong and moved ENE across Tasman. Nobbys gusts S 54kts (24). Gales on S NSW coast		JC
5–6 Aug	Low		Rapidly forming low, cyclogenesis east of Bass Strait. Nobbys gust NW 52kts (4 Aug), NW 47kts (5 Aug)		JC
18–23 Aug	Low	CQ	Low developed off coast. Gales at Greta Keppel Is, Lady Elliot Is, Cape Moreton, Double Is Pt and Sandy Cape. Cato Is a mean wind of 60kts reported, moved to NZ. Tewanin 72mm (19 Aug) record Aug daily rainfall		JC
1990					
1990		NSW	State Coastal Policy introduced to control haphazard coastal development		PH
2–4 Feb	TC <i>Nancy</i>	SEQ to N NSW	Crossed coast Cape Byron, then seawards again. Wind 60kts, peak 73kts at Cape Moreton Lighthouse near Brisbane, 982.7hPa Cape Moreton. Heavy rain (up to 530mm in 24hrs and 132mm in 3hrs) occurred between the coast and ranges south from Brisbane causing flash floods and drowning 6 people (5 in NSW and one in Q). Nobbys gusts S 50kts (2 Feb), S 57kts (3 Feb), WNW 50kts (4 Feb). Norah Head 246mm (3 Feb) all time record daily rainfall. Sydney Airport 216mm all time daily record since 1929 (3 Feb). Sydney City 244mm record Feb daily rainfall. Williamtown 276mm daily record (3 Feb)		JC BoM
	Flood	SEQ	Heavy rain and flooding of Gold Coast hinterland		BoM
1990	Flood	Richmond R			Ferguson 1995
9–11 Feb	ECL		Low N NSW. Nobbys gusts S 48kts (9 Feb) SW 48kts (10 Feb)		JC
6–9 March	TC	West of New Caledonia	TC Hilda explosively transformed into a deep low pressure system near Lord Howe Is. 8 March 0.39m surge at Coffs Harbour Nobbys gusts SSE 64kts (6 March), SSE 50kts (7 March)		JC
19 March	TC <i>Ivor</i>		TC crossed coast Princess Charlotte bay. Sustained winds of 114.5kts measured by <i>Mustique</i> , ships barometer fell to 928hPa. Extensive coral damage. Moved down central coast and unofficial 24hr rainfalls of 1000mm reported near Yeppoon. Flash flooding and extensive damage in Yeppoon area. Stripped bark from trees.		JC

20–22 April	Low		Low moved SE over Gabo, deepened to 993hPa. Merimbula 81mm (21 April)		JC
26–29 April	Low	Tasman	990hPa low formed in the Tasman Sea 0.45m storm surge, Sydney		JC
27–30 May	ECL		Low N NSW, Cape Byron 141mm (28 May), Dorrigo 125mm (29 May), Coffs Harbour 103mm (29 May), Smokey Cape 128mm (29 May)		JC
6–9 June	Severe ECL  <i>Rockini Robin Storm</i>		Severe low developed off N NSW. Sloop <i>Rockini Robin</i> 10m in Coral Sea (927km off Bundaberg) radioed May Day (8 June). Rescue aircraft dropped a life raft for crew of 4 but were never seen again. Two crew of 11m sloop <i>Banshee</i> dismasted after being rolled by two large waves 556km east of Rockhampton (7 June), rescued by a Taiwanese freighter after a long unsuccessful air search was abandoned. Two crew yacht <i>Squizz</i> were rescued by surf rescue boat in the open ocean, near Brisbane.		JC
1–4 July	Low		Deep low moved into Tasman E of Tasmania. Nobbys gusts NW 52kts (30 June) WNW 57kts (1 July) WNW 54kts (2 July) 59kts (4 July)		JC
1–3 Aug	ECL?		Sydney wave rider buoy Hsig 7.19m Hmax 11.81m from 135deg. Hsig>3m for 41hrs. Nowra rainfall 141mm (1 Aug) 126mm (2 Aug) Sydney max gust 115km/h (4 Aug). Williamstown 101mm record Aug daily rainfall (2 Aug)		JC
13 Aug	ECL	Sydney	0.38m storm surge and max gust S 115km/h (3 Aug)		JC
24–27 Aug	Low		Tasman Sea low well offshore. Sydney Hsig 6–28m, Hmax 11.63m, Hmax >3m 64hrs		JC
Mid 1990 – 1995	Drought				BoM 1997, 1999
13–15 Sept	ECL		Low N NSW. Nobbys gusts SE 50kts (13 Sept) S 48kts (14 Sept)		JC
10–11 Dec	Low		Low developed east of Gabo Is. Nobbys gusts SSW 48kts (9 Sept)		JC
22–29 Dec	TC <i>Joy</i>		TC intensified as it approached Cairns. Green Is gusts of 97kts. Lost intensity by 24 Dec and crossed coast near Townsville as a much weaker system. Extensive wind damage. 6 lives lost. Mackay 314mm (29 Dec), record Dec daily rainfall.		JC

1991					
March	TC <i>Joy</i>	FNQ	Affected coast from Cairns to Rockhampton		BoM
25–27 April	Low		Low developed S NSW coast and moved into Tasman. Nobbys gusts WNW 46kts (25) SSW 51kts (26)		JC
11–12 June	Heavy rain		Wollongong: 225mm record June daily rainfall (11 June), 169mm (12 June), Sydney 151mm record June daily rainfall (11 June), 88mm (12 June), Nowra 175mm record June daily rainfall (11 June).		JC
15 June 1991	Volcanic eruptions Pinatubo	Philippines	Mt Pinatubo, Philippines (and July Mt Hudson, Chile) eruptions combined to diffuse aerosol plume around the world in following months. Mean temperatures decreased by as much as 0.5 degrees C over the next two years.		Johnson 1993
9–11 July	ECL		Low NSW. 11 July Moruya 102mm, Bega 69mm		JC
17–20 Sept	Low		Low moved into Tasman E of Bass Strait. Nobbys gusts NW 58kts (16 Sept) WNW 56kts (17 Sept)		JC
13–15 Dec	Low		Low developed in SEQ 11–12 Dec, before moving S. Maleny 396mm (12 Dec), record Dec daily rainfall. Moruya Heads 122mm record Dec daily rainfall (14 Dec), Merimbula 102mm (14 Dec). Coffs harbour 230mm record Dec daily rainfall. Lismore 176mm record Dec daily rainfall (13 Dec)		JC
1992					
9–15 Jan	TC <i>Betsy</i> off Fraser Is	CQ – SEQ	Large TC passed 450km to sea, very large swells and severe erosion Noosa		JC
	Severe erosion	Hervey Bay – N NSW	Severe beach erosion from Bundaberg to Gold Coast, all sand washed from Noosa	Cut new erosion face Fraser Is	JC PH
9–10 Feb	Wind and Heavy rain		Wollongong: 101mm (9 Feb) 224mm record Feb daily rainfall (10 Feb) Sydney: Ap Max Gust SSE 85km/h with 120mm (9 Feb) Ap Max Gust ESE 78km/h with 124mm (10 Feb)		JC
21–22 Feb	Monsoon Low	CQ	Crossed coast near Yeppoon and secondary low Hervey Bay. Flash flooding and severe floods SEQ. Tewantin 732mm (22 Feb), record all time daily rainfall (since 1895). Bundaberg 258mm (21 Feb), Maleny 490mm (22 Feb) all time record daily rainfall since 1915.		JC

24 Feb	<b>Flood</b>	Mary R	9.48m, sixth highest since 1893		Maryborough 1998:243
	Local floods	SEQ			BoM
16 March	<b>TC <i>Fran</i></b>	CQ	Crossed coast Agnes Waters and back to sea Fraser Is. Great Keppel Is peak gust 76kts, extensive damage, Hervey Bay surge flooded into houses, marina damage Burnett Heads, flooding Burnett R. Coast damage Heron Is to Gold Coast. Bundaberg 249mm record March daily rainfall.		JC
	<b>Severe erosion</b>		Sunshine and Gold Coasts. Fresh erosion face cut on parts of W coast of Fraser Is further inland than 1974 face. Severe erosion Kenfield Beach (Baffle Ck) on the western shore of Hervey Bay		JC PH Graham & Jodvalkis 1996:81 (Photo)
22–24 May	<b>Low</b>		Very intense low developed over Lord Howe Is and moved N of NZ. Nobbys gusts SW 46kts (21 May). Lord Howe Is gusts WSW 80kts (22 May), SSW 47kts (23 May) average winds W 53kts, 991.9hPa		JC
27–28 June	<b>Low</b>		Tasman low developed. Nobbys gusts SSE 50kts (28)		JC
12–14 Aug	<b>Low</b>		Low develops off S NSW and moves to NZ. Nobbys gusts WNW 49kts (11 Aug), W 73kts (12 Aug) 51kts (13 Aug), WNW 48kts (14 Aug)		JC
23–26 Aug	<b>Low</b>		Low developed E of Sydney and moved across Tasman. Nobbys gusts SW 46kts (23 Aug) SSW 53kts (25 Aug)		JC
25–27 Sept	<b>Low</b>		Low develops near Sydney and moves east to the N tip of NZ. Nobbys gusts WNW 53kts (25 Sept)		JC
20–22 Oct	<b>Low</b>		Rapid deepening of Tasman low. Nobbys gusts SSW 52kts (20 Oct) SSW 65kts (21 Oct)		JC
11–13 Nov	<b>Low</b>		Low deepens in central Tasman. Nobbys gusts SSW 48kts (12 Nov)		JC
28 Nov – 2 Dec	<b>Low</b>		Low developed near Lord Howe Is and moved SE. Nobbys gusts SSW 50kts (29 Nov), WSW 52kts (30 Nov) SSW 46kts (1 Dec)		JC
4–8 Dec			Merimbula 252mm all time record daily rainfall (6 Dec), Bega 235mm record Dec daily rainfall (6 Dec)		JC
<b>1993</b>					

17–20 March	<b>TC Roger</b> Largest waves between 1977–1997	Coral Sea off Fraser Is	Large circulation and ridge developed extensive area of gale/storm winds Extensive wind damage SEQ and N NSW, N, NE and E rough seas 13m, Port of Brisbane closed (first time since TC David in 1976), <b>surge 0.74m</b> Gold Coast Seaway Hsig 7m		BoM JC Allen and Callaghan 2000
	<b>Beach erosion</b>	Sunshine Coast			JC
4–6 Aug	<b>Low</b>		Low intensified and moved over Lord Howe. Nobbys gusts S 52kts (4 Aug), 52kts (5 Aug). Lord Howe gusts ESE 59kts (6 Aug), rainfall 50mm (6 Aug)		JC
10–12 Aug	<b>Low</b>		Low intensified and moved over Lord Howe Is, gusts WSW 56kts (11 Aug), SSW 46kts (12 Aug), Nobbys gusts NW 63kts (10 Aug)		JC
13–16 Sept	Heavy rain		Wollongong: 102mm record Sept daily rainfall (14 Sept). East Sale: 62mm (15 Sept) 52mm (16 Sept) Sydney: 79mm (14 Sept) Nowra: 80mm (14 Sept) Deepened to gales out at sea.		JC
22–29 Dec	<b>ECL</b>		Series of lows developed S NSW and E of Tasmania. Nobbys gusts NW 62kts (26 Dec), WNW 48kts (27 Dec), 49kts (28 Dec), St Helens 190mm all time record daily rainfall since 1890 (23 Dec), 65mm (27 Dec) 64mm (28 Dec). Eddystone Pt S gales (27,28 Dec) Hobart 56mm and gusts S 45kts (27 Dec)		JC
<b>1994</b>					
20 Jan	<b>TC Rewa</b>	Coral Sea	100km off coast. Rough seas and local flooding Brisbane		JC
10–12 March	<b>Low</b>		Low developed off S NSW coast and formed an extensive Sly wind fetch in the western Tasman. Nobbys gusts SSW 59kts (10 March), SSE 60kts (11 March), rainfall 79mm (12 March)		JC
12–14 April	<b>Low</b>		Low developed E of Nowra and moved E. Nobbys gusts SSW 42kts (12 April), SSE 62kts (13 April). Williamstown gusts SSE 46kts (14 April) with rainfall 51mm. Sydney gusts S 56kts (13 April) with 65mm rainfall. Nowra rainfall 64mm (13 April), 71mm (14 April)		JC
9–13 June	<b>Low</b>		Intense low 988hPa developed offshore in C Tasman. SSE waves Hsig 4.7m Crowdy Head	<b>Cat A C NSW</b> <b>Cat B M NSW</b>	JC Moratti 1997
	<b>Beach erosion</b>	Stockton	Storm surge		DLWC 1995

27–28 Sept	<b>Low</b>		Deep (982hPa) low developed in the Tasman moving E. Nobbys gusts WSW 59kts (27 Sept)		JC
20–22 Oct	<b>Low</b>		Low moved off the N NSW coast and moved E. Nobbys SSW 44kts (20 Oct), 48kts (21 Oct)		JC
3–7 Nov	<b>Low</b>		Low off S NSW coast, moved over to NZ then a series of lows came N into the Tasman. Nobbys gusts: WNW 46kts (5 Nov), 57kts (6 Nov). Canberra gusts: WNW 61kts (6 Nov), W 53kts (7 Nov). Williamstown gusts: WNW 49kts (5 Nov), 54kts (6 Nov), NW 54kts (7 Nov). Sydney: WNW 49kts (6 Nov), W 49kts (7 Nov). East Sale: W 60kts (6 Nov), W 54kts (7 Nov). Melbourne: W 47kts (5 Nov), 63kts (6 Nov), 54kts (7 Nov). Wollongong: W 47kts (5 Nov), 54kts (6 Nov), 43kts (7 Nov). Nowra: W 47kts (5 Nov), 63kts (6 Nov), 54kts (7 Nov). SEQ, unprecedented bushfires causing massive damage to State Forestry resources.		JC
25–26 Dec	<b>ECL</b>		Weak low off N NSW. Nobbys gusts S 43kts (25 Dec) 42kts (25 Dec)		JC
<b>1995</b>					
28–29 Jan	<b>ECL</b>	E Bass Strait	Fingal, Tas 111mm (29 Jan) record Jan daily rainfall. Eddystone Pt 79mm (29 Jan)		JC
14–16 Feb	<b>ECL</b> Severe storm off SEQ	CQ – NSW	Developed off central Q and crossed Sunshine Coast. Storm force wind S of centre, flash floods, Brisbane Hsig 6.42m		JC Allen and Callaghan 2000
1–4 March	<b>ECL</b>		Low developed off N NSW coast and then TC <i>Violet</i> came close to the coast near Byron Bay on 7 March, while weakening below tropical intensity. Earlier it passed to Lord Howe Is, where gusts reached 66kts with tree damage. Heavy swells caused severe beach erosion near Evans Head.		JC
1–13 March 1995	<b>TC Violet</b>	SEQ – N NSW	From near Lord Howe Is weakened and closed coast, windy but weakened near Byron Bay. Heavy swell, beach erosion Evans Head and to south strong gradient to NSW coast. Crowdy Head E swell Hsig 7.3m, Newcastle Hsig 5m Nobbys gusts SSE 57kts (1 March), SSE 50kts (2 March), SSE 52kts (3 March), SE 57kts, (3 March), E 55kts (5 March), Lord Howe Is gusts E 66kts (6 March), 64kts (7 March), Dorrigo 276mm (7 March)	Cat X M NSW	JC Moratti 1997 DLWC 1995



	Beach erosion	N – C NSW coast	Severe at Evans Head and at erosion Stockton Beach		JC DLWC 1995
11–13 March	Low		Tropical low developed in Coral Sea and moved SE down to NZ as a front moved up NSW coast. Nobbys gusts S 60kts (12 March), SSE 46kts (12 March)		JC
8–11 April	Lows		Pair of complex lows moved NNE up through the Tasman. Nobbys gusts WSW 50kts (8 April), W 42kts (8 April), 43kts (10 April), S 47kts (11 April)		JC
17–19 May	Heavy rain and wind		Wollongong: 155mm record daily May rainfall (18 May) Sydney: Max gust SSE 78km/h, 28mm		JC
11–12 June	Low		Low developed E of Tasmania. Nobbys gusts W 52kts (11 June)		JC
16–19 June	Low		Low developed off N NSW coast and moved ESE. Nobbys gusts SSW 63kts (16 June), 50kts (17 June), SW 44kts (17 June)		JC
24–26 Sept	Heavy rain and wind		Sydney Airport: 115mm record daily Sept rainfall, max gust 102km/h (25 Sept), S 85km (26 Sept). Nowra: 122mm 74km/h max gust (25 Sept). Wollongong: max gust SSW 78km/h, 95mm, sustained winds SSE 45 knots at Point Perpendicular. Gales S Coast. Nobbys gusts SW 66kts (25 Sept), 65kts (25 Sept)		JC
22–24 Oct	Low		Low moved into Tasman near Nowra and moved E. 23 Oct: Nobbys gusts WNW 56kts, S 51kts		JC
6–8 Nov	ECL		Low near Gabo Is. Nobbys gusts WNW 47kts (6 Nov), 46kts (7 Nov). East Sale gusts E 40kts (5 Nov) with 39mm rainfall (6). Gabo Is E gales with rainfall 49mm (5 Nov), 43mm (6 Nov), Merimbula 174mm record daily Nov rainfall (5 Nov)		JC
23–24 Nov	Low		Rapid deepening low near Lord Howe Is (998.3hPa) Nobbys gusts SSW 51kts (23),		JC
6–7 Dec	Low		Rapid deepening of a low near Gabo Is as it moved SE. Nobbys gusts W 51kts (6)		JC
17–20 Dec	ECL		Low Gabo Is (998.3hPa), mean winds to 48kts. Nobbys gusts WNW 47kts (18 Dec), WSW 45kts (19 Dec). Rainfall: 62mm Hobart (19 Dec), 77mm Fingal, Tasmania (19 Dec).		JC
1996					

27 Jan	<b>TC <i>Barry</i></b> Hervey Bay	CQ – SEQ	From Gulf through CQ with trough to east coast. Hervey Bay wind gusts to 70kts and surge of 1m		JC
27 Jan	<b>TC <i>Celeste</i></b>	NQ	Developing TC off Bowen, gusts 64kts		
14–17 Feb	<b>ECL</b> Severe storm	Coral Sea	Developed near New Caledonia and moved past Brisbane. Very short steep 10m swell, wind 50kts and Brisbane Hsig 6.19m. Flooding up Brisbane R at Newstead. Nobbys gusts S 48kts (13 Feb), SE 41kts (14 Feb), SE 51kts (15 Feb), 46kts (16 Feb)		JC Allen and Callaghan 2000
12 March	<b>TC <i>Ethel</i></b>		TC moved across Cape York from Gulf, turned back and intensified before making landfall at Cape Melville. Winds of 50–60kts recorded		JC
2–7 May 1996	<b>ECL</b> Severe storm	Q coast	Low developed off Townsville intensified and moved south. Wind, wave and flood damage SEQ. Peak wind Cape Moreton 65kts, Brisbane Hsig 6.9m, surge 0.51m Gold Coast Seaway. Brisbane Airport 163mm (2) record daily May rainfall	Local flooding Byron Bay PH	JC BoM Allen and Callaghan 2000
	Minor flood	Brisbane R			BoM
7 May	<b>Minor erosion</b>	North coast NSW	Cut foredunes, car bodies dumped at Belongil Spit in 1974 exposed by erosion. Severe erosion Woolli	<b>Photo Woolli</b>	PH Watson and Lord 2001 Moratti 1997
23–24 June	<b>Low</b>		Low over Victoria, moves into the Tasman and deepens. Nobbys gusts W 79kts (23 June), 43kts (23 June). Williamtown gusts WNW 51kts (23 June)		JC
18–19 June	<b>Tasman low</b>		Rapid development of low. Nobbys gusts WNW 45kts (18 June), S 62kts (19 June)		JC
30 Aug – 1 Sept		Sydney	Wave rider buoy Hsig 6.04m Hmax 11.2m Hsig>3m for 53hrs. Sydney rain 108mm, max gust 108km/h (30 Aug). Nobbys gusts S 49kts (30 Aug), WNW 47kts (30 Aug). Norah Head 113mm (31 Aug) record daily Aug rainfall		JC
17–18 Nov	<b>Low</b>		Rapid development of 980hPa low east of Gabo Is. Williamtown gusts NW 47kts (17)		JC
22–25 Nov	<b>ECL</b>		Low SEQ, Coffs Harbour 93mm and SW 52kts (23 Nov), 168mm record Nov daily rainfall (24 Nov). Smokey Cape 71mm (23 Nov), 135mm (24 Nov) 89mm (25 Nov)		JC
<b>1997</b>					

7–10 Jan	<b>Low</b>		Low formed SW of Lord Howe Is involved with interaction of TC <i>Drena</i>		JC
24 Feb	<b>TC Ita</b>		TC crossed near Cunggells in Bowling Green Bay. Flooding and wind damage. Highest 24hr rainfall 375mm, Dalrymple Heights		JC
2–4 March	<b>ECL</b>		Low S NSW. Merimbula 181mm record daily March rainfall (3 March) Bega 235mm (3 March)		JC
9 March	<b>TC Justin 1</b>	Coral Sea FNQ	Large waves and surge Cooktown to Bundaberg. Hsig (peak) 4.8m (8.45m). Severe beach erosion and inundation along coast between Townsville and Bundaberg. Extensive agricultural damage, major flooding	Very large TC, FNQ	JC
12 March	<b>TC Ethel</b>	FNQ	TC moved from Gulf crossed Cape and then intensified making landfall Cape Melville, wind 50–60kts		JC
22 March	<b>TC Justin 2</b>	FNQ	TC crossed coast near Cairns rapidly intensifying (994.6hPa). 2 killed. Extensive crop and infrastructure damage. Large landslides and major flooding		JC
9–13 May	<b>Gale</b>	C NSW	Sydney Hsig 9.9m, Hmax 13.8m [ <b>largest recorded</b> ] Hsig >3m 79hrs SE. Crowdy Head Hsig 6.3m	Cat X M – C NSW	JC Moratti 1997
4–5 Sept	<b>ECL</b>		Weak low C NSW. Flinders Is 50mm (8 Sept) record daily Sept rainfall		JC
2–4 Oct	<b>Low</b>		Low developed E of Tasmania and moved rapidly east to NZ. Nobbys gusts NNW 54kts (2 Oct), WNW 63kts (3 Oct).		JC
6–9 Oct	<b>Low</b>		Low moved S into NSW from southern inland Q then turns E into Tasman Sea. Nobbys gusts E 47kts (6), ENE 53kts (6), WNW 49kts (7).		JC
9–11 Dec	<b>Low</b>		Low rapidly moves E over Lord Howe Is. Nobbys gusts SSW 47kts (9), Lord Howe SW 50kts (10), SE 44kts (11)		JC
<b>1998</b>					
10–11 Jan	<b>TC Sid</b>		Ex TC crossed from Gulf and intensified to a severe monsoon low near Townsville, 549mm rain in 24hrs (120mm in 1hr). Extensive flooding and damage. Wave action and storm surge caused severe damage and erosion. 7 vessels sunk in Townsville harbour		JC

24–27 Jan	Low		Nobbys gust SW 46kts (25 Jan). Flinders Is 107mm (26 Jan) record daily Jan rainfall		JC
6–8 March	Tasman Low		Central Tasman Low developed. Nobbys gusts SSW 52kts (7 March), SSW 42kts (8 March)		JC
26 March	TC <i>Yali</i>	CQ – NSW	Moved S 500km off Brisbane Wind gusts +50kts, rough seas 6m, and surge 0.3m Moreton Bay. Wave heights 6.0m Hsig, peak 11.5m. Beach erosion		JC
	Beach erosion		Sunshine Coast to N NSW		JC
17–19 May	ECL	N NSW	ECL developed off coast and moved S, 116mm Sydney (19 May) Nobbys gusts WSW 57kts (18 May), S 55kts (18 May) Lord Howe Is ENE 52kts		
24–26 May	Low		Low east of Bass Strait intensified as it moved towards NZ with extensive Sly fetch on western flank. Nobbys gusts SSW 47kts (25 May)		JC
7–8 June	Low		Low moved off S NSW coast into Tasman Sea. Nobbys gust NW 45kts (7 June)		JC
23 June		Newcastle	Nobbys sustained winds 40–58kts, from 6am to 6pm, max gust NW 82kts. Many buildings suffered structural damage and roofs were blown off. SES received 1200 calls for assistance. Lithgow: two houses were unroofed and 300 calls for assistance to SES. East Gippsland: more than 1000 houses flooded, at least 12 bridges swept away. Club Terrace Post Office recorded 284.6mm of rain in 24hrs, the heaviest one-day total for rain ever officially recorded in East Gippsland.		JC
30 June – 1 July	Low		A 1004hPa low off Coffs Harbour deepened to 982hPa in 24 hrs as it moved to the south of Lord Howe Is. Nobbys gusts SSW 54kts (30 June), WSW 42kts (1 June)		JC
8–10 July	Low		Low developed Central Tasman, Nobbys gusts W 47kts (9 July)		JC
21–22 July	Low		1005hPa Low S NSW deepens to 989hPa in Tasman in 24hrs. Nobbys gust to NW 60kts (21 July)		JC

5–9 Aug	ECL	Sydney	This system was responsible for heavy rain in the Sydney area and produced a 62kt gust at Mascot. SES workers around NSW attended 2000 jobs and the Fire Brigade more than 850. Botany Bay and Port Jackson were closed to commercial shipping movements. Nobbys gusts SSW 54kts (6 Aug), NW 46kts (7 Aug), SSW 71kts (8 Aug), S 50kts (9 Aug). Nowra 170mm record Aug daily rainfall (8 Aug)		JC
17 Aug	Low		Small low northern Illawarra with very sever flooding. Bulli Pass 210.5mm in 3 hrs. Wollongong 316mm record daily rainfall.		JC
29–30 Aug	Low		Low formed in Coral Sea. Mackay 104mm, record Aug daily rainfall. Townsville 134mm record Aug rainfall		JC
31 Oct–1 Nov	Low		Rapid development of a low off the N NSW coast as it moved SE into Tasman. Nobbys gusts S 46kts (31 Oct), SSW 52kts (1 Nov)		JC
18–20 Nov	Low		Low well east of Brisbane moves SE and intensifies to 990hPa between Lord Howe Is and Norfolk. Nobbys gusts S 53kts (18 Nov), S 48kts (19 Nov), Lord Howe SSW 52kts (19 Nov), Norfolk WNW 45kts (20 Nov)		JC
25–27 Dec	<b>Sydney Hobart Storm</b>	Bass Strait	Intense low battered Sydney Hobart yacht race fleet, several yachts and crew lost Wilsons Promontory 92kts. <b>Record gust</b> for this notoriously windy part of Bass Strait. Waves to 140ft (42.5m <b>a world record</b> ) were measured by the radio altimeters on rescue helicopters, 6 yachtsmen lost		JC PH
1999					
4–5 Feb	ECL Fraser Island	SEQ to N NSW	Developed off SEQ coast and moved S. Peak wave Southport 6.7m, Hsig 3.5m, fishing boat lost and 2 crew, Breaksea Spit		JC
8–10 Feb	ECL <b>TC Rona</b> in NQ	SEQ	Small low developed off Double Island Pt and 11 Feb TC <b>Rona</b> severe 983hPa, gusts to 83kts, surge 1.4m with major damage and floods FNQ to Gold Coast. Wind gusts to 63kts, Double Is Point peak wave Gold Coast 8m		JC BoM
	Floods	Mary R	Mary R (Gympie) peaked at 21.95m highest level for over 100 years	Local floods SEQ	JC BoM
	Minor erosion	Belongil Spit	Houses threatened and 'ad hoc' protective works carried out. Car bodies dumped in 1974 exposed and later removed		PH

Feb – May	High rainfall	Byron Bay	Minor local flooding	Tallow Creek opened PH	PH
April	Severe Hailstorm	Sydney	Very large hailstones, widespread damage, estimated \$2.3bn (\$1.7bn insurance claims)		JC
28 April			Max gust at Point Perpendicular AWS Jervis Bay SSW 139km/h		JC
20 May	Coral Sea low	SEQ – N NSW	Passed near Lord Howe Is 400nm off coast (975hPa). Wind 60kts, gusts to 80kts, and large swell to coast		JC
10–15 June	Tasman Low		Long lived Tasman Low down to 982hPa Williamstown WNW gusts 44kts (14 June), Lord Howe gusts W 47kts (14 June), WSW 104kts (15 June) 49kts (16 June) 72mm (11 June) Norfolk Is 41mm (13 June)		JC
June – July	Minor ongoing erosion	Byron Bay	3 June An emergency meeting of Byron Shire Council approved the use of sand bags to protect vulnerable houses at Belongil Spit. During July spring high tides and minor swells continued to erode Belongil Spit. 31 July Council warns of danger from steep walls created by beach erosion		Northern Star PH
13–15 July	ECL	N NSW	Large area of gales over Tasman Sea to S. Smokey Cape 164mm record July daily rainfall (14) Coffs Harbour 138mm record July daily rainfall		JC
24–26 Oct	Low		Low develops near Sydney and moves SE. Heavy rain Wollongong: 93mm (24 Oct) 43mm (25 Oct) Gales Pt Perpendicular		JC
8–11 Nov	Low		A 1003hPa low near Coffs Harbour deepens to 988hPa in 12 hrs, as it moves SE and deepens to 982hPa in the Tasman. Lord Howe gust NE 56kts (9 Nov)		JC
27–28 Dec	Low off Yeppoon		992hPa off Sandy Cape High tide 28 Dec covered beach on Fraser Is and beach erosion		JC
	Severe beach erosion	SEQ	Sunshine Coast, less severe Gold Coast		JC
2000					
	Severe drought				PH
5–7 Jan	Low		Low deepens east of Gabo and moves into the central Tasman.		JC

27–28 Feb	TC <i>Steve</i>	NQ	TC crossed coast at Cairns (984.6hPa). Gusts 85kts Green Is. Surge Cairns 1m, Building and infrastructure damage. 1 lost		JC
17 March	Tropical Low		Low originated S of Honiara moved W. NE and E gales. Record flooding S of Townsville		JC
3–4 April	TC <i>Tessi</i>		Widespread wind damage and flooding. Magnetic Is gusts E 59kts. Records at Townsville: max wind gusts 70kts, max daily rainfall 271.6mm, Townsville 272mm (4 April) record daily rainfall		JC
28 April – 3 May	Tropical low	CQ – N NSW	Formed in Coral Sea with High (1034hPa) over Auckland. Huge area of gales directed to east coast low 999.5hPa Cato Is winds +40kts weakened towards coast and caused little damage. Big seas on Q coast, Brisbane peak 9.7m with erosion		JC
	Beach erosion	SEQ – N NSW	Beach erosion Fraser Island to N NSW coast		JC
27–29 May	Low		Deep low south of Tasmania moves NE into the Tasman. Nobbys gust WNW 50kts (27 May), 60kts (28 May)		JC
1–2 June	Low		982hPa low deepens SE Tasman and 5–6 June 996hPa low develops central Tasman. Nobbys gusts S 55kts (2 June), WNW 50kts (5 June)		JC
22 June	Tsunami		8.2 Richter scale earthquake Peru generates small tsunami across Pacific Ocean that reached east coast in 27.5 hours, 100mm wave recorded on Rosslyn Bay gauge		Mitchell in ABC 2004
29 June – 2 July	Low		A low east of Gabo deepened as it moved NE passing close to Lord Howe. Due to its large size it produced a storm surge in SEQ. Nobbys gusts W 54kts (29 June), SSW 52kts (30 June), S 55kts (1 July), SSE 42kts (2 July). Due to large size of storm, high tide on 2 July at storm surge 0.33m caused flooding of Gold Coast buildings. A similar storm surge hit the Sunshine Coast. 24hrs later, both centres again suffered inundation, while a 0.3m surge affected Gladstone on 4 July 2000.		JC
14–19 July	Low		Low deepens in the NE Tasman to 988hPa and remains stationary generating huge seas. Nobbys gusts S 48kts (17 July), W 51kts (19 July), W 49kts (19 July)		JC
16–18 Aug	Low		Low deepens to 986hPa in eastern Tasman (large in size). Nobbys gusts SSE 52kts (16 Aug)		JC

23–26 Aug	Low		Low moves from near Adelaide into SW Tasman. Nobbys gusts SSE 52kts (16 Aug)		JC
30–31 Oct	Tropical Low	CQ – SEQ	Developed S of Mackay (1002hPa) heavy rain. Local flooding, wind Cape Moreton gust 55kts, Brisbane Hsig 5.1m H peak 10.7m		JC
	Beach erosion		Sunshine and Gold coasts		JC
2001					
	Severe drought		Very hot in Tasmania during Jan and Feb		BoM
31 Jan – 2 Feb	Tropical Low	CQ – NSW	Surface low off Rockhampton and upper level low off Brisbane. Storm force wind SEQ, 10m seas, heavy rain, some flooding, but impact reduced by prolonged drought. Coffs Harbour 169mm (1 Feb), 83mm (2 Feb), Cape Byron 68mm (1 Feb) with easterly gales, 124mm (2 Feb).		JC
24 Feb	TC <i>Abigail</i>		Crossed coast NW of Cairns. Max wind 40kts, 992.7hPa, some flooding and vegetation damage		JC
5–8 March	ECL Cyclone like 'The Duck' (equivalent to Cat 2 TC)	SEQ – N NSW	Low off east Coral Sea crossed coast Ballina, then NW to E of Brisbane before moving SW. Its period of intensification occurred near the coast when it assumed a tropical cyclone like structure although the most serious wind damage was well south of the eye on the radar, 0.45m surge. Wind damage N NSW, especially Yamba and Iluka, 75kts gust Evans Head	Estimated 70kt gust dropped trees in front drive bringing down power lines at Broken Head PH	JC
	Beach erosion	SEQ	Serious beach erosion Sunshine and Gold Coasts Erosion Belongil Spit	Photo	JC Watson and Lord 2001
5–13 April	TC <i>Sose</i>	SEQ	East Coral Sea and high over NZ Generated long period east swell to coast, 4.8m waves, 16 sec period. 11–13 April extra tropical transition of TC with extensive Sly fetch developing through Tasman Sea. Nobbys gusts SSE 54kts (11 April) S 57kts (12 April)		JC
	Beach erosion	SEQ	Large seas and tides		JC
21–22 April	ECL		Low S NSW. Merimbula 101mm (22 April), Gabo Is 98mm (22 April). E gales Eddystone Pt		JC
6–9 May	Low		Low developed near Lord Howe Is. Nobbys gusts SE 70kts (6) 58kts (7)		JC



28–29 May	Low		Low develops near Lord Howe Is and moves E. Nobbys gusts S 48kts (29)		JC
4–7 July	<b>BIG SWELL</b>  No wind and sunny weather PH		Severe low formed S of Noumea tracked to Norfolk Is (990hPa) winds to +60kts Enormous ESE long period swell to east coast from Fraser Island to Cape Howe. Period 15.9 sec and peak wave height 7.9m. <b>Just Cruising</b> cruiser and three crew lost Spitfire Bank, other yachts, crews and rock fishers lost	Possibly largest swell to N NSW since 1974? PH	JC
	<b>Minor erosion</b>	Byron Bay	Fore dunes cut on beaches, Belongil Spit further eroded and extensive protection works carried out PH	No surge, neap tides meant run-up did not top dunes, storm cut bench in foredunes PH	PH
27–29 July		Sydney	AP 100km/h gust (28 July) Significant wave height from 4–6m		JC
26–28 Aug	Low		992hPa low developed in Tasman Sea SW of Lord Howe Is		JC
7–9 Oct	Low		Low developed E of Bass Strait and intensified to 999hPa and moved to E Tasman		JC
12–14 Nov	Low		Low in Bass Strait moved E and intensified to 988hPa low in Cooks Strait NZ		JC
19–22 Nov	ECL		Williamstown gusts S 46kts (19 Nov) 42kts (20 Nov). Sydney Airport gusts S 47kts (18 Nov), SSE 47kts (19 Nov), 46kts (20 Nov), S 44kts (21 Nov)		JC
Dec – Jan 02	Fire	Shoalhaven	Destructive fires continued from Christmas 2001 into early January		BoM
Late Dec	Heatwave		Worst in SEQ since great heatwave of 1903		BoM
2002					
12–14 Jan	Low		Low E of Tasmania developed into a 988hPa low near the centre of the Tasman. Williamstown S gusts 42kts (12 Jan)		JC
5–6 Feb	ECL		Low near Brisbane. Port Macquarie 212mm record Feb daily rainfall (6 Feb)		JC
11–13 Feb	Low		Low in the Tasman as TC <i>Claudia</i> moved SE across the Coral Sea		JC
March – Dec	<b>Drought</b>	East coast	Severe drought over much of SE Australia. Most severe since Federation drought 1901		BoM PH

19–21 May	Low		Low E of Bass Strait moved SE and deepened 984hPa. Williamtown gusts NW 45kts (20 May) WNW 43kts (21 May)		JC
2–4 June	Middle atmosphere low		Developed over SEQ with large high in Tasman Sea generating gale force winds C Q to N NSW coasts, with very heavy rain Yeppoon area. Large seas with sustained 45kts winds, 2 yachts lost		JC
15–17 June	Low		Low developed E Bass Strait, moved E with large band of SE gales		JC
28–30 June	Low		982hPa low developed in the eastern Tasman with a very large band of S gales on western flank		JC
3–5 Aug	Low		Rapid development of low E of S NSW and moved E. Williamtown gusts NW 65kts (3 Aug)		JC
23 Oct	Dust Storm	Q and NSW	Severe dust storm reaching Sydney and Brisbane. Dust storms in second half of year particularly in September and October		BoM
Oct – Dec	Fire		Several fire outbreaks, property destroyed, 2 deaths		BoM
Dec	Wind Storm and property damage	Ballina and inland		SE Winds > 100 km	PH
2003					
	Drought		Extremely dry January with many long-standing records broken, maximum temperatures 1 – 2°C. Drought slowly eases across eastern Australia; Queensland remains the worst affected state		BoM
2–5 Feb	TC <i>Beni</i>	Coral Sea	5m waves to SEQ beaches closed		JC
Feb	Canberra bush fires				
28 April	Heavy rain	Byron Bay	Local flooding. Local low, 300mm rain in pm at Cape Byron		PH
4 May	Gale	C – N NSW	Pressure gradient. Gale to 50 knots, moderate swell		PH
June – Sept		Tasmania	Wettest June – September period and driest November on record		BoM

25–26 June	Severe ECL		Low formed in Coral Sea (23 June) moved SE, off Moreton Bay intensified at Lord Howe Is (25 June) to severe low (26 June) off C NSW, 991.6hPa wind gust 90kts.		JC
23–25 August 2003	Gales	C NSW – Tas	Widespread severe gales over Southeast and Central NSW Sunday		BoM
24 August 2003	Intense Low	Tas	Intense low over Tasmania brought widespread gales across NSW 24 Aug. One person was killed when a tree fell on his car St Ives, Sydney. Numerous reports of injuries. Thousands of homes were left without power. The NSW SES 7000 requests for assistance. Significant gusts: Bellambi 76kts, North Head and Wollongong 65kts, Nowra 64kts, Sydney Airport with 61kts, Montague Island 59kts, Mount Boyce 58kts, Fort Denison 59kts, Kiama 56kts, Penrith, Cabramurra 55kts and Braidwood, Nobbys 54kts		JC
9–12 Oct	Low		Low developed E of Tasmania and moved towards NZ. Nobbys gusts S 44kts (11), Gabo gusts SSW 49kts (10), Eddystone Pt gust S 55kts (10)		JC
25–26 Oct	Severe Storms		Major outbreak of severe thunderstorms. Many reports of large, damaging hail including the deaths of many creatures at Currumbin Wildlife Sanctuary		BoM
28–29 Oct	Dust storms		Dust storms generated by strong westerly winds		BoM
23–25 Nov	Low		Low developed near Lord Howe Is and moved E. Nobbys gusts S 40kts and 41mm (24 Nov), Sydney 75mm over 5 days		JC
2004					
Jan – May			Very dry in southeastern Australia		BoM
28–29 Jan	ECL		Low S NSW, Floods in Tasmania following heavy rain: St Helens 124mm all Jan daily record (29 Jan), 56mm (30 Jan), Bicheno 71mm (29 Jan), 66mm (30 Jan), Sheffield 90mm (28 Jan), 47mm (29 Jan), Low Head 106mm (28 Jan) 38mm (29 Jan), Devonport 95mm (28 Jan), 45mm (29 Jan)		JC
Feb	Heatwave	SE Australia	Max temp 5–7° above average. Local records of max temp, night temp, dramatic increase in heat related medical emergencies.		NCC 2004
11 Feb	TC <i>Fritz</i>		TC crossed FNQ. Landslides caused major damage. Flash flooding		JC

24–26 Feb	ECL		Very intense low with possible hurricane force winds offshore (from satellite winds). Port Macquarie 165mm (25 Feb) Nobbys 77mm (25 Feb), Coffs Harbour: 107mm (24 Feb) 59mm (25 Feb), Hsig 6.2m		JC
27 Feb – 2 March	TC <i>Monty</i>				BoM
5–6 March	TC	Q coast	Hybrid cyclone generated very large long period waves, crossed over SEQ. NE swell 7m (peak 14m) period 13sec, surge Gold Coast surge est.1m, Moreton Bay 3.5m waves and 0.7m surge, wind +30kts, gust to 67kts, floods and damage		JC
	West coast erosion	Fraser Island	N and NW coast fresh erosion faces Continuing erosion Belongil Spit		PH
16–28 March	TC <i>Fay</i>				BoM
19–24 March	TC <i>Grace</i>	FNQ	Gales and large waves central and SEQ wind 50kts. Widespread damage to roads and property between Cooktown and Cairns.		JC BoM
25 March	Severe wind gusts	Tasmania	Severe wind gusts – five locations had gusts over 130km/h. The highest was 178km/h at Droughty Hill		BoM
26 March 2004	Beach erosion	Gold Coast	Severe erosion Duranbah Beach. Erosion due to sand from Tweed bypass being pumped further north		Northern Star 26 March R. Tomlinson pers. comm.
	Drought breaks		Late summer rain		BoM
23–25 April	ECL		Low E of Bass Strait. East Sale gusts SW 42kts and 109mm record April daily rainfall (24 April). Eddystone Pt gusts S 60kts (23, 24 April)		JC
April – Sept			Very dry along east coast and in southwest WA		BoM
18–20 July	ECL	Sydney	Wave rider buoy Hmax 6.66, Hmax 10.28m from 167 deg Hmax>3m for 49hrs. Sydney Max Gust 100km/hr		
3–4 Aug	Low		Low developed E of Tasmania. Nobbys gusts WNW 50kts (3 Aug), NW 46kts (4 Aug) W 44kts (14 Aug) Sydney gusts WNW 45kts (3 Aug). Green Cape gust SSW 47kts (14 Aug), S 80kts and 15mm (15 Aug). Eddystone Pt gusts W 53kts (12 Aug), SSE 52kts and 23mm (14 Aug)		JC

13–15 Aug	Low		Second low formed E of Tasmania. Nobbys gusts W 44kts (14 Aug). Green Cape gust SSW 47kts (14 Aug), S 80kts with 15mm (15 Aug). Eddystone Pt gusts W 53kts (12 Aug), SSE 52kts with 23mm(14 Aug)		JC
21 Aug	Wind gust	Mt. Wellington	Wind gust 193km/h, the second strongest recorded in Tasmania.		BoM
Sept	Drought returns	SEQ – N NSW	Severe drought and bushfires		PH
1–2 Oct	ECL	Off C NSW	997hPa low developed E of Sydney. Big seas. Nobbys gusts SSW 51kts (1 Oct)		JC PH
19–22 Oct	ECL		Flood caused evacuation of 4 houses in Bellingen. Flash flooding in Tweed, 120mm at Banora Pt in 1hr. Coffs Harbour, SE gusts 48kts (20 Oct). Gusts greater than 60kts reported. Widespread wind damage. Coffs Harbour: ESE gust 41kts and 76mm (19 Oct), SE gust 48kts with 51mm (20 Oct) 111mm record Oct daily rainfall (22 Oct) Hsig just under 6m. Nobbys gusts SE 45kts (20 Oct). Wollongong 106mm (21 Oct) 43mm (22 Oct)		JC
27 Oct	Severe hailstorm	Taroom	Severe hailstorm with stones as large as tennis balls		BoM
28–29 Oct	ECL	Off Coffs Harbour	Flooding Coffs to Manning R		JC, PH
2–3 Nov	ECL		Low E of Tasmania. Nobbys gusts WNW 52kts (2 Nov)		JC
8–11 Nov	ECL		Low developed N NSW. Port Macquarie 175mm (9 Nov)		JC
5–14 Dec	Severe thunderstorms		Widespread in east Australia		BoM
27–29 Dec 2004	Low S of Tasmania	Swell to N NSW	Half Sydney Hobart fleet retires	Minor cut to beach berm Tallow Beach	PH
2005					
3–15 Jan	TC <i>Kerry</i>		TC remained offshore in Coral Sea. Impact from long period waves Hsig 3m along S Q and N NSW. 1 drowned.		JC

19–25 Jan	Low		Low moved from Coral Sea to Cape York before moving back and down to Tasman Sea. Heavy rains and flooding. 8 lives lost. Unofficial but reliable report of 642mm of rain in 24 hrs W of Townsville (23).		JC
2–3 Feb	ECL	Melbourne	Intense low near Gabo Is, moved W to Melbourne. Eddystone Pt gusts S 71kts with 69mm (3 Feb). St Helens gusts SSE 53kts and 67mm (3 Feb). Melbourne 113.4mm, record daily rainfall since 1855. Melbourne Airport 139mm record daily rainfall and gusts W 55kts. Severe winds, especially in northern Tas		JC
6–17 March	<b>TC Ingrid</b>		The first cyclone to reach category 3 in three states. 445mm of rain in 24hrs at Emma Gorge and <i>Ingrid</i> made final landfall in WA		BoM
12–17 May	Low		Low develops N NSW and moved over Lord Howe Is. Yamba 36mm (12), 94mm (13). Coffs Harbour 126mm and 40kt gusts (13), Lord Howe SW gusts 56kts and 44mm (14) 76mm (15), gusts E 47kts (16) MLSP 989.3hPa		JC
June – Aug	Low elevation snow		N NSW and S Qld on 22 and 23 June. Monaro district NSW on 8 and 9 July. Tas and S Vic on 10 and 11 Aug. This was first widespread snow to sea-level in Victoria since Aug 1951		BoM
29–30 June	Extreme rain	SE Qld N NSW	Extreme local rainfall on Gold Coast and N NSW. Several 24hr totals over 500mm; highest 587mm at Loder Creek Dam. Yamba 250mm (30 June) record June daily rainfall. Port Macquarie 87mm (30 June)		JC BoM
9–10 July	Low		Low developed off S NSW. Gabo Is 132mm record June daily rainfall (10 July)		JC
8–10 Oct	Low		989hPa low developed E of Tasmania. Nobbys gusts NW 46kts (8 Oct), Gabo gusts WSW 49kts (9 Oct)		JC
12–13 Oct	Hailstorm	SE Qld	7cm hail on the Gold Coast on the 12 Oct with widespread damage		BoM
15–17 Nov	Low		Low developed near Newcastle and moved NE over Lord Howe. Nobbys gusts S 52kts (15 Nov), 48kts (16 Nov)		JC
21 Dec	Heatwave		Many monthly site records broken, especially on 30 and 31 in SA, Vic. Melbourne had its hottest Dec day since 1898 with 42.9°C on 31		BoM
2006					

6–9 Jan 2006	ECL	SEQ – M NSW	ECL developed east of Brisbane. On the 7 Jan, an 18 year old was with a group of young people walking along rocks at Grassy Head, SE of Macksville, when they were dragged into the ocean by a large wave. Nobbys gusts ESE 46kts, 52kts (7 Jan), Coffs Harbour 113mm (6 Jan), 68mm (7 Jan), Yamba 62mm (9 Jan).		JC
26 Jan – 2 Feb	TC <i>Jim</i>		TC developed near Lucinda. Heavy rains between Ingham and Townsville. Flooding. 24hr rainfall 258mm, Home Hill, 211mm, Lucinda		JC
22–24 Feb	TC <i>Kate</i>		TC developed E Torres Strait. Added to erosion caused by gales the previous July and <i>Ingrid</i>		JC
3–5 March	Hybrid Low		Tropical low deepened and moved E of Fraser Is. Intense gradient to N NSW. 4 March gale force winds E of coast. Cape Moreton gusts 53kts (3). S Q wind damage, boats damaged and ripped from moorings Moreton Bay, Hsig 7.2m. Storm surge		JC
17–21 March 2006	Severe TC <i>Larry</i>	NQ	Reached Cat 5 intensity offshore before it made landfall near Innisfail on 20 March. It was the strongest cyclone at landfall (cat 4) in Q since 1918. Devastated, major impacts on wet tropics rainforest.		BoM
17–21 April	TC <i>Monica</i>		TC made landfall E of Cape York. Lockhart R guts 109km/h. 986hPa. Largely flood damage		JC
1 May 2006			91mm Green Cape NSW		JC
22–25 May	ECL		Low formed S NSW. Gabo Is gusts SSW 43kts and 64mm (24 May), Mallacoota 39mm (24 May), 50mm (25 May)		JC
17–18 July	Low		Low formed off S NSW moved ESE and intensified. Nobbys gusts S 45kts (18 July), Gabo Is 38mm (17 July), 23mm (18 July)		JC
6–8 Sept 2006	ECL		Low developed E of Sydney with storm force winds, 80mm Sydney 7th Max gust S 96 km/h at the airport. Nobbys gusts S 59kts and 80mm (7 Sept), Norah Head gusts SSE 56kts and 40mm (7 Sept)		JC
Dec	Bushfires		Hot weather in SE Australia fanned numerous bushfires, including longest lasting fire in Vic history at 69 days.		BoM
2007					

8 March	<b>TC George</b>		Made landfall as Cat 5 system east of Port Hedland on 8 <sup>th</sup> March. Est. wind gusts of 275km/h. 3 lives lost. Flooding, Darwin had 3 consecutive days with rain totalling 100mm or more for the first time in any month.		BoM
8–10 June	<b>ECL</b>	NSW	Coast buffeted by several ECL in rapid succession. Most significant low 8–10 June. Major flooding in Newcastle/Hunter region. Williamtown 147mm record daily June rainfall (9) Nobbys 210mm record daily June rainfall (9)		JC BoM
19–20 June 2007	<b>ECL Pasha Storm</b>	C NSW – Bass Strait	Low deepened 400 km east of Sydney (980hPa) on 20 June. C – S NSW reported sustained wind speeds over 90 km/h, maximum wind gusts reported 93 km/h at Green Cape and Point Perpendicular, 80 km/h Wollongong, 85 km/h Sydney and 78 km/h Newcastle. Waves offshore from Port Kembla to 6 metres with maximum waves exceeding 10 metres. Rainfall in the 24 hours to 9am 20th included 64mm at Eden	<i>Pasha Bulker</i> collier ashore Nobby Beach. Later salvaged	JC
27–29 June	<b>ECL</b>	Vic	Gippsland floods		BoM
21–25 Aug	Torrential rain		Torrential rain in Sunshine Coast/Wide Bay; daily falls of 772mm at Coops Corner and 529mm at Rainbow Beach on 24 Aug. Widespread flash flooding. Tewantin 310mm (24 Aug) record Aug daily rainfall, 191mm (25 Aug). Maleny 176mm (24 Aug) record Aug daily rainfall. Port Macquarie 109mm (21 Aug)		JC BoM
5–7 Sept	<b>Trough</b>		Trough formed in Coral Sea and deepened to low over New Caledonia. Large high 1042hpa in Tasman. Lady Elliot Is 96mm (6 Sept) record Sept daily rainfall		JC
14–20 Nov	<b>TC Guba</b>	Qld	Reached Cat 3, making it strongest Nov cyclone on record to threaten coastal Q		BoM
28 Dec – 5 Jan 2008	<b>Low</b>		Low deepened as it moved SW to Fraser Is. Intense pressure gradients S of low. Gale to storm force winds. Large waves, 3000 campers evacuated from Fraser Is. Extreme rainfall SEQ and N NSW, 364mm fell in four hours, major flooding.		JC
2008					



13–18 Jan	Low		Low moved E from Gulf of Carpentaria, then to Coral Sea. Proserpine 24hr rainfall 353mm. Low moved towards Townsville and reached cyclone intensity after landfall. Wind damage. Charters Towers average winds est. 53kts, with MSL pressure of 993hPa. Torrential rain and flash flooding		JC
11–12 Feb	Tropical low		Low moved from Gulf of Carpentaria to Townsville, intensifying over land. Wind damage, extremely heavy rainfall, 24hr totals reached 400mm		JC
15–21 Feb	Monsoon trough	MacKay	Ridge strengthened along E coast S of Monsoon trough with embedded low. Extreme rainfall 177mm in last hour, SE trades. Devastating flooding. Low intensified as moved S to Lord Howe Is, large swells. Lord Howe Is gusts E 57kts (20 Feb) E 77kts (21 Feb)		JC
2 June 2008	ECL		A low developed off SEQ coast causing flash flooding and large seas		JC
20–22 July	Low		Low deepened to below 980hPa as passed over Tasmania towards NZ. Wilsons Prom gusts SW 88kts (21 July), 55kts (22 July), Tasman Is gusts SSW 70kts (21 July), Gabo Is gusts WSW 65kts (21 July), SW 51kts (22 July). Eddystone Pt gusts 46kts and 46mm (21 July), Nobbys gusts NW 53kts (21 July)		JC
24–26 July	Low		Low developed off C Q and rapidly intensified as it moved towards Norfolk Is and Auckland. Gales at Heron Is, Gannet Cay and Cato Is. Intensified to a majors storm near NZ with widespread damage and loss of life		JC
23–24 August 2008	ECL		Rapid developing low produced storm force S to SW winds off NSW coast between 35°S and 32°S before deepening to 993hPa in eastern Tasman. 24hr rainfall totals NSW generally less than 50mm. Swell at Brisbane buoy reached Hsig 6m (12m max). Extreme conditions. <i>Blessed Bee</i> disappeared in area with crew of 2		JC
6–8 August 2008	ECL		Low deepened to 1008hPa by 8 Aug 24 hr rainfall 50–100mm		JC
4–6 Sept	ECL		Low developed SEQ and moved S to E of Newcastle. Very heavy rain SEQ, 5 deaths on roads. Gales near Brisbane. 24 hr rainfall: 143mm Dorrigo, 174mm Comboyne. Hsig 6m Sydney		JC
			END		



## REFERENCES

- Australian Encyclopaedia** 1955 Grolier Society of Australia, Halstead Press, Sydney
- Allen, M A and J Callaghan 2000 **Extreme wave conditions for the south east Queensland coastal region** Environment Technical Report No. 32, Environmental Protection Agency, Brisbane
- Andrews, E C 1916 Further notes on the shoreline topography of Botany Bay **J. Proc. R. Soc. N.S.W.** 50: 37–40
- Bateson, Charles 1972 **Australian Shipwrecks, Volume I (1622 – 1850)** Reed, Sydney
- BB – see Public Works Department (PWD) 1985
- Beach Protection Authority (BPA) 1985 **Storm Tide Statistics Methodology**, Blain Bremner and Williams Pty Ltd. Brisbane
- Beach Protection Authority (BPA) 1989 **Hervey Bay Beaches** The Authority, Brisbane
- Beasley, A W 1948 Heavy Mineral Beach Sands of Southern Queensland, Part 1 – The Nature, Distribution and Extent, and Manner of Formation of the Deposits **Proc. Roy. Soc. Qld.** 59(4): 109–140, Plates 1–1V
- Beasley, A W 1950 Heavy Mineral Sands of Southern Queensland, Part 11 – Physical and Mineralogical Composition, Mineral Descriptions, and Origin of the Heavy Minerals **Proceedings of the Royal Society of Queensland** 61: 59–104 & Plates I–VI
- Berry, Greg 1994 **Shipwrecks of the New South Wales Central Coast: Volume 1: 1800 – 1899** The author
- Biddle, Bill 2001 **The Sandon: A remote coastal settlement** Sandon River Ratepayers Association
- Bingle, John 1822 **Log of Sally** Mitchell Library (Copy, John Oxley Library)
- Birrell, W K 1987 **The Manning Valley: Landscape and Settlement 1824 – 1900**, Jacaranda Press, Brisbane
- Boak, E H, Jackson L A, McGrath, J E and Brosnan, M P 2002 An overview of Gold Coast coastal management 1960–2001 **Coast to Coast Conference 2002**, Tweed Heads
- Brokenshire, Jim 1988 **The Brunswick. Another river and its people** Brunswick Valley Historical Society, Mullumbimby
- Brooks, J H 1953 Stradbroke Island Erosion and Broadwater Silting Southport, **Queensland Government Mining Journal**, August 1953, 566–569
- Brown, E 2000 **Cooloola coast**, Queensland University Press, Brisbane
- Buchanan, Stuart 1999, **Lighthouse of tragedy**, Coral Coast Publications, Samford, Queensland
- Callaghan, Jeff (unpub) **Tropical cyclone impacts along the Australian east coast from November 1858 to 2000** Bureau of Meteorology, Brisbane
- Callaghan, Jeff (unpub) **List of impacts from East Coast Lows** Bureau of Meteorology, Brisbane
- Callen, Terry 1986 **Bar Dangerous. A Maritime history of Newcastle** Newcastle Region Maritime Museum, Runciman Press, Newcastle
- Carne, J E 1896 Report on the auriferous sands of the Esk River and Jerusalem Creek in the Parish Esk County Richmond **Ann. Rept. Dept. of Mines NSW for 1896** Appendix 14: 149–160
- Carter, Paddy, Durbridge, Ellie and Cooke-Bramley, Jenny (eds) 1994 **Historic North Stradbroke Island** North Stradbroke Island Historical Museum Association, Dunwich
- Chapman, D M, Geary, M, Roy, P S and Thom, B G 1982 **Coastal Evolution and Coastal Erosion in New South Wales** Coastal Council of New South Wales, Sydney
- Clarence River Historical Society 1998 **Early Days on the Clarence** Clarence River

- Historical Society, Grafton
- Coleman, Roger, Covacevich, Jeanette and Davie, Peter (eds) 1984 **Focus on Stradbroke: New Information on North Stradbroke Island and Surrounding Areas, 1974–1984**, Boolarong Publications, Brisbane
- Coltheart, Lenore 1997 **Between land and water: A history of the ports and coastal waterways of New South Wales** Department of Land and Water Conservation and Hale & Iremonger
- Coltheart, L, and Fraser, I (eds) 1987 **Landmarks in public works: engineers and their work in NSW 1844–1914**, Hale and Iremonger, Sydney
- Connah, T H 1948 Reconnaissance survey of black sand deposits, south-east Queensland **Queensland Government Mining Journal 49**: 223–245
- Cooke-Bramley, Jenny, Durbridge, Ellie and Shields, Margaret (eds) 1999 **Amity, North Stradbroke Island** North Stradbroke Island Historical Museum
- Cossins, G 1990 Surface hydrology: Water supply and flooding in P Davie, E Stock and D Low Choy, **The Brisbane River, a sourcebook for the future** Australian Littoral Society and the Queensland Museum, Brisbane
- Craig, W W 1925 **Moreton Bay Settlement of Queensland before separation, 1770–1859: together with a brief account of the rise of the colonies of Australasia**, Watson Ferguson, Brisbane
- Curvengen, J 1982 The history of European settlement of southern Moreton Bay **Operculum 5**: 169–175
- Dalkin, W J 1938 **Whalemen Adventurers** Sirius Books, Angus and Robertson
- Daley, L T 1966 **Man and a river** Melbourne University Press, Melbourne
- Davenport, W 1986 **Harbours and Marine – Port and Harbour Development in Queensland from 1824 to 1985** Department of Harbours and Marine, Brisbane
- Davie, P, Stock, E and Choy, D L 1990 **The Brisbane River, a sourcebook for the future** Australian Littoral Society and Queensland Museum, Brisbane
- Dening, S J 1966 **History of Byron Bay from 1850–1966** Richmond River Historical Society (Reprinted, Mary Aspinall, 2002)
- Department of Land and Water Conservation 1995 **Stockton Beach. Coastline hazard study** Publication HO/25/95
- Dowse, T 1846 **Thomas Dowse Diaries** John Oxley Library, Brisbane
- Edwardson, W 1822 **Report to Sir Thomas Brisbane, NSW Governor** John Oxley Library, Brisbane
- Favenc, Ernest 1888 **The history of Australian Exploration. From 1788 to 1888**. Turner and Henderson, Sydney, Facsimile Edition
- Ferguson, A 1995 **Long period climatic variations and their relationship to local hydrology and environmental impacts in the Richmond river catchment** Unpub Hons Thesis, Department of Resource Science and Management, Southern Cross University, Lismore
- Finkel, I D 1987 **Port Macquarie: The Port That Was: A Maritime History** Royal Australian Historical Society, Sydney
- Fisher, R and J Harrison (eds) 2000 **Brisbane: Squatters, Settlers and Surveyors**. Brisbane, Brisbane History Group
- Flannery, T 2000 **Terra Australis: Matthew Flinders' Great Adventures in the Circumnavigation of Australia** Text Publishing, Melbourne
- Gill, D 1998 **The Jones Island Story: Tales and stories about Croki, Jones Island and Lower Manning** The author, Taree
- Gleeson, Max 1993 **The Vanished Fleet of the Sydney Coastline** The author, Sydney
- Gosling, M 2000 Thomas Dowse: Brisbane's Samuel Pepys in Fisher, R and Harrison, J

- (eds) **Brisbane: Squatters, Settlers and Surveyors.**) Brisbane History Group, Brisbane: 102–110
- Gregory, H 1996 **The Brisbane River story, Meanders through time**, Australian Marine Conservation Society, Brisbane
- Graham, Diane and Jodvalkis, Christeen 1996 **Gosen, The Promised Land: Parish of Baffle Creek and Surrounds**, St Pauls Lutheran Church, Baffle Creek
- Grove, R. (2005). Revolutionary weather: the climate and economic crisis of 1788 – 1795 and the discovery of El Nino, in Sherratt, T, Griffiths, T and Robin, L (eds) **A Change in the Weather: Climate and Culture in Australia** National Museum of Australia Press, Canberra
- Halligan, G H 1906 Sand movement on the New South Wales coast **Proceedings: Linnaean Society of NSW 31**: 619–640
- Hanlon, W E 1935 The early settlement of the Logan and Albert Districts **Historic Society of Queensland 2**: 208–262
- Harrison, J 2000 Simpson's settlers in R. Fisher and J. Harrison (eds) **Brisbane: Squatters, Settlers and Surveyors** Brisbane History Group, Brisbane: 64–75
- Hastings District Historical Society 1983 **The History of Port Macquarie** Hastings District Historical Society, Port Macquarie
- Helman, P 2002 Gold Rush to Gold Coast **Coast to Coast 2002 Conference**, Tweed Heads
- Heritage NSW 1995 **Shipwreck Atlas of NSW** 2<sup>nd</sup> edition Department of Urban Affairs and Planning, Sydney
- Howard, Francis 1884 Cape Byron Bay **New South Wales Legislative Assembly**: 437–440
- Huxley, P J 1948 **Red Cedar, the story of the North Coast** Dymocks, Sydney
- Jeans, D N 1972 **An historical geography of New South Wales to 1901** Reed Education, Sydney
- Johnson, R W 1993 **Volcanic eruptions and atmospheric change** Australian Geological Survey Organisation, Department of Primary Industries and Energy, Canberra.
- Keats, N C 1988 **Wollumbin. The creation and early habitation of the Tweed, Brunswick and Richmond Rivers of NSW** The author
- Keats, W D 1999 **McGregor and Cooloon** Lower Tweed River Historical Society
- Kelley, R A 1984 Previously Unpublished Notes and Photographs on the Jumpinpin Breakthrough, in R Coleman and others (eds) **North Stradbroke Island Focus on Stradbroke** Boolarong Publications, Brisbane
- Kerr, Garry 1985 **Craft and craftsmen of Australian fishing 1870–1970** Mains Books, Portland, Victoria
- Kerr, J E 2001 **Flinders in Moreton Bay: A Bicentenary Review 1799–1999** Royal Historical Society of Queensland, Brisbane.
- Kindler, J E and O'Connor, C 1951 **Report on erosion of beaches of the Town of South Coast** Co-ordinator General's Department, Queensland
- King, Jonathan 1984 **The First Settlement: the convict village that founded Australia 1788–90** Macmillan, Melbourne
- King, Phillip Parker 1817–1822 **Narrative of a Survey of the Intertropical and Western Coasts of Australia** Mitchell Library
- LT see Public Works Department (PWD) 1986
- Linton, Rebecca 2004 **Crossing the Bar: A History of Harrington Gateway to the Manning Valley** Focus Publishing, Bondi Junction
- Logan, D 1988 **Where Two Rivers Run: A history of Kilkivan Shire**
- Logan, P 1830 Private Letter Book 1826–1830 (Commandant of Moreton Bay Penal

- settlement 1827) **Oxley Memorial Library** Brisbane
- Loney, J K 1978 **Wrecks on the New South Wales North Coast** Marine History Publications, Geelong
- Loney, J K 1980 **Australian Shipwrecks Volume 2 (1851–1871)** Reed, Sydney
- Loney, J K 1982 **Australian Shipwrecks Volume 3 (1871–1900)**
- Loney, J K 1987 **Australian Shipwrecks Volume 4 (1901 – 1986)**
- Loney, J K 1990 **Australian Shipwrecks Volume 5 (1622 – 1990 Update)**
- Loney, J K 2001 **Wrecks on the New South Wales Coast** Lonestone Press, Yarram, Vic.
- Loney, J K and Stone, P 1980 **Australia's Island Shipwrecks** Neptune Publishing, Belmont, Victoria
- Longhurst, Robert 1994 **Southport: Images of Yesteryear 1880–1955** Gold Coast City Council, Southport
- Longhurst, Robert 1995a **Gold Coast. Our heritage in focus** State Library of Queensland Foundation, Brisbane
- Longhurst, Robert 1995b **Sunshine Coast. Our heritage in focus** State Library of Queensland Foundation, Brisbane
- Longhurst, R 1996 **From Tallebudgera to the Tweed** Gold Coast City Council
- Longhurst, Robert 2000 **Preserving lives, preserving values, A history of surf life saving in Queensland** Surf Life Saving Queensland, South Brisbane
- Lourensz, R S 1969 **Tropical cyclones in the Australian region July 1909 to June 1969** Bureau of Meteorology
- Ludlow, Peter 2000 **Moreton Bay Letters** The author, Brisbane
- Mack, F 1998 **The wreck of the SS New England** Clarence River Historical Society
- Mackaness, G 1979 **The Discovery of Moreton Bay and the Brisbane River Vol. 2 1799–1823** The author
- Mackey, N M 2001 **European settlement in the Clarence district before 1850** Grafton Family History Centre
- Maryborough 1998 **A history of Maryborough Queensland 1842 – 1997** Maryborough, Wide Bay and Burnett Historical Society
- McArthur, Kathleen 1972 **A Living Beach** The author, Caloundra
- McGrath, B L 1968 Erosion of Gold Coast Beaches, 1967 **Inst. Engrs. Aust. 40: 7, 8, 155, 156**
- McGrath, B L and Robinson, D A 1972 Erosion and Accretion of Gold Coast, Queensland, Beaches **Civ. Eng. Trans. I. E. Aust. CE14(2): 158–163**
- McLachlan, I 1988 **Place of Banishment: Port Macquarie 1818–1832** Hale and Iremonger, Sydney
- McLeod, G R 1984 The South Passage and the Amity Point Pilot Station in R J Coleman and others (eds) **Focus on Stradbroke: New Information on North Stradbroke Island and Surrounding Areas** Boolarong, Brisbane
- McLeod, G 1990 Some aspects of the history of the Brisbane River in P Davie, E Stock and D L Choy (eds) **The Brisbane River. A source-book for the future** Australian Littoral Society and Queensland Museum: 191–202
- McKeon, G M, Hall, W B, Yee Yet, J, Stone, G S, Crimp, S J, Peacock, A, Richards, R, Tynan, R W, Watson, I W and Power, S B 2000 Learning from history: land and pasture degradation episodes in Australia's rangelands in S B Power, W Wright and P Della-Marta (eds) **Conference on Managing Australian Climate Variability** CVAP and Bureau of Meteorology: 64–67
- Miller, David 1995 **The Wreck of the Isabella** Naval Institute Press, Maryland
- Mills, F 2000 **From forest and farm** Brunswick Valley Historical Society

- Mitchell, B 2004 Historic Australian Tsunamis ABC News  
[www.abc.net.au/pm/stories/s321264.htm](http://www.abc.net.au/pm/stories/s321264.htm)
- Moratti, M 1997 Stockton Beach Erosion, Monitoring and Management ***Pacific Coasts and Ports '97 13th Australasian Coastal and Ocean Engineering Conference and 6th Australasian Port and Harbour Conference***, Christchurch, New Zealand
- Morley, I W 1981 ***Black sands: A history of the mineral sand mining industry in eastern Australia*** University of Queensland Press, Brisbane
- Moyes, J and Mant, G 1993 ***A Town Called Port*** Moyman Books, Taree
- Murray, C 1983 ***Across three bridges*** Ballina Shire Council
- NLA National Library of Australia database <http://southseas.nla.gov.au/journals/>
- NSD National shipwreck database [www.eied.deh.gov.au/nsd/](http://www.eied.deh.gov.au/nsd/)
- Neil, David T 1991 Time of breaching of the south Queensland sand barriers: evidence from the early navigators ***Proc. R. Soc. Qld* 101**: 91–100
- Neil, David T 1998 Moreton Bay and its catchment: Seascape and landscape, development and degradation in I R Tibbetts, N J Hall, and W C Dennison (eds) ***Moreton Bay and Catchment***, University of Queensland, Brisbane:3–54
- Neil, M H 2001 ***Trial Bay Gaol: Public Works Prison and Wartime Detention Camp*** Macleay River Historical Society, Kempsey
- New South Wales Parliament see Public Works Committee (PWC) 1890
- Nolan, C and Longhurst, R (eds) 1996 ***Brisbane's Moreton Bay. Our heritage in focus***. Brisbane, State Library of Queensland Foundation
- Olivieri, K 1999 ***Early shipping photographs***, Richmond River Historical Society, Lismore
- Oxley, J 1818 Logs of *Mermaid* 1818–19, 1823 and *Amity* 1824 John Oxley Library, Brisbane
- Pitman, M 2001 ***From forest to founding a city: The Coffs Harbour story*** Coffs Harbour Historical Society and Museum
- Pixley, A J 1970 Shipwrecks in Queensland and Adjacent Waters ***Journal of Royal Queensland Historical Society* 9(1)**
- PWC (NSW Public Works Committee) 1890 ***Report and minutes of evidence relating to the proposed breakwater at Byron Bay***, Vol 1, NSW Parliamentary Committee on Public Works, Sydney
- PWD Public Works Department, NSW 1977 ***Sediment movement in Newcastle Bight***, Report 206, Department of Public Works NSW, Sydney
- PWD Public Works Department, NSW 1978 ***Byron Bay – Hastings Point erosion study***, Report 78026, Department of Public Works NSW, Sydney
- PWD Public Works Department 1985 ***Elevated ocean levels and storms affecting the New South Wales coast 1880 to 1980***, Report 85041, Coastal Section, Public Works Department NSW, Sydney
- PWD Public Works Department 1986 ***Elevated Ocean Levels. Storms affecting NSW Coast 1980 – 1985*** Report 86026, Public Works Department NSW, Sydney
- Richards, M 1996 ***North Coast Run. Men and ships of the NSW north coast*** 3rd Edition, Turton and Armstrong, Sydney
- Rivière, M S 1996 ***Discovery of the Brisbane River*** ***Royal Historical Society of Queensland Journal* 16(4)**: 143–188
- Rivière, M S 1998 ***Discovery of the Brisbane River, 1823: Oxley, Uniacke and Pamphlet, 175 years in Retrospect*** Royal Historical Society of Queensland.
- Rous, H J 1828 ***Log HMS Rainbow*** Richmond River Historical Society
- Ryan, M and Smith, R 2001 ***Time and tide again. A history of Byron Bay*** Northern Rivers Press, Lismore
- Salter, L 2002 ***South Stradbroke Island*** The author

- Sellick, Douglas R G (Ed) 2005 **Survivors: great open boat voyages** Freemantle Arts Centre Press
- Sheehan, C 2000 *The fifty-mile limit* in R Fisher and J Harrison (eds) **Brisbane: Squatters, Settlers and Surveyors (Papers No. 16)** Brisbane History Group, Brisbane: 40–47
- Sheehan, C 2000 *Too good a site for a gaol* in R Fisher and J Harrison (eds) **Brisbane: Squatters, Settlers and Surveyors** Brisbane History Group, Brisbane: 1–12
- Smith, A W and Jackson L A (1990 Assessment of the past extent of cyclone beach erosion **Journal of Coastal Research** 6(1): 73–86
- Stone, Peter 2006 **Encyclopedia of Australian Shipwrecks** Ocean Enterprises. Australia.
- Thom, B G 1974 Coastal erosion in eastern Australia **Search** 5(5): 198–209
- Thomson, A K 1967 **Collected Works of Thomas Welsby** Two volumes Jacaranda Press, Brisbane
- Tomlinson, Roger 2001 **Vanishing beaches – perception or reality?** Research report 7 Griffith Centre for Coastal Management, Griffith University, Southport
- Tomlinson, R B and McCauley, E K 2001 The evolution of Jumpinpin: a case study of the stability of multiple inlet systems **15th Australasian coastal and ocean engineering conference**, September 2001
- Townsend, Ian 2008 **The Weather Man** *Courier Mai*, Q Weekend Oct 4–5: 27–29
- Trundle, Gwen 1958 **Early Caloundra days** The author, Caloundra
- Wales, M 2000 *Shepherds on the Stanley* in R. Fisher and J. Harrison (eds) **Brisbane: Squatters, Settlers and Surveyors** Brisbane History Group, Brisbane: 54–62.
- Watson, P 2000 Jimmys Beach, Port Stephens, NSW. An Expensive Learning Experience in Coastal Management **Coastal Engineering 2000**, Sydney
- Watson, P and Lord, D 2001 Coastal hazard definition for planning purposes using photogrammetric data **15th Australasian Coastal and Ocean Engineering Conference**, Gold Coast
- Webster, B nd **A timeline of change on the Fitzroy River, 1855 to 1965, focusing on the Port of Rockhampton**, Coastal CRC/CQU Rockhampton
- Welsby, T 1907 **Early Moreton Bay: recollections** Outridge, Brisbane
- Wilkins, I 2001 Hydrographic Surveying in Matthew Flinders' Era in J E Kerr (ed) **Flinders in Moreton Bay: A Bicentennial Review 1799–1999**, Royal Historical Society of Queensland: 17–26
- Williams, Fred 1982 **Written in Sand: A History of Fraser Island** Jacaranda Press, Milton
- Williams, Fred 2002 **Princess K'Gari's Fraser Island** The author, Brisbane
- Williams, N n.d. **Where the rivers meet. Coraki 1840 – 1915** Mid-Richmond Historical Society, Coraki
- Yeates, N 1982 **Woolgoolga: the history of a village, North Coast, NSW** The author, Woolgoolga
- Yeates, N 1990 **Coffs Harbour. Pre-1880 to 1945** Coffs Harbour City Council