

FLOODING IN THE FIJI ISLANDS BETWEEN 1840 AND 2009



OCTOBER 2010

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Destroyed buildings at Rarawai Mill, Ba, after the disastrous flood of February 1931. The loss of life from this event exceeded 200 people, mostly in the Ba and Lautoka districts. (Photo source: CSR, 1931).



FOREWORD

Flooding is a regular occurrence in the Fiji Islands. Floods bring some benefits such as increasing the fertility of floodplains. But floods have caused a great deal of damage to buildings, infrastructure, agriculture and livelihoods, and many people have drowned. This research report lists floods known to have affected the Fiji Islands from 1840 to 2009, together with a summary of their meteorological causes and damaging consequences. An extensive bibliography enables the interested reader to pursue further information. The report will be useful for residents, shop-keepers and students interested in their local flood history, for researchers of the environmental history of the Fiji Islands, and for flood risk managers.

This research report updates and extends FMS Information Sheet No. 125 dated 15th August 2001, which listed floods occurring in the Fiji Islands from 1840 to 2000. The original flood series was compiled largely by Simon McGree. Information for the period 2001 to 2009 has been compiled by Swastika Devi and Simon McGree. Dr Stephen Yeo has added figures, arranged entries geographically and contributed a good deal of information from various sources: literature and reports addressing flooding in Fiji; Government records at the Fiji National Archives in Suva; research of the Colonial Sugar Refining (CSR) Company's correspondence stored at the Australian National University in Canberra; and newspaper articles – principally the *Fiji Times* – available at the National Library of Australia and the State Library of NSW. Information about a few floods was sourced from Risk Frontiers, Macquarie University, Sydney.

Thanks are extended to the Fiji Government for granting permission to access the Fiji National Archives, and to the CSR Company for granting permission to access their archives at the Noel Butlin Archives Centre. We are grateful to the shopkeepers interviewed for this project who provided information about the height of the January 2009 flood. Thanks also to the following Risk Frontiers' personnel: John McAneney and Paul Somerville for reviewing the draft report and Carol Robertson for design.

The authors would welcome any information about floods or the consequences of floods in Fiji that is not described in this report, so that this information may be incorporated into revisions of this resource for the benefit of future generations.



INTRODUCTION

A flood may be defined as 'a body of water which rises to overflow land which is not normally submerged' (Ward, 1978, p.5). The focus of this research report is on flooding from rivers and streams following heavy rain, while some reports of inundation of coastal areas due to storm surge are also included.

Floods following heavy rain are regular occurrences in Fiji, happening almost every Wet season (November to April) and occasionally in the Dry season especially during La Niña years. The seasonality of flooding based on the entries in this report is shown in **Figure 1**. Most have occurred in January, February and March at the height of the Wet season. Whilst few have occurred from June through to October, they can still cause much damage, especially if infrastructure is damaged interrupting the supply of sugarcane to the mills. Major floods tend to be associated with episodes of severe weather phenomena, such as tropical cyclones and tropical depressions that are characterised by high intensity rainfall. Most rivers and streams in Fiji are relatively small in size (**Table 1** lists the largest) and flow from steep mountainous terrain. The small and steep watercourses together with high intensity rainfall lead to swiftly rising and falling water levels. The time between rainfall and floods can be as short as a few hours, which is characteristic of 'flash floods'.

Figure 1: Monthly distribution of floods in Fiji, 1840-2009

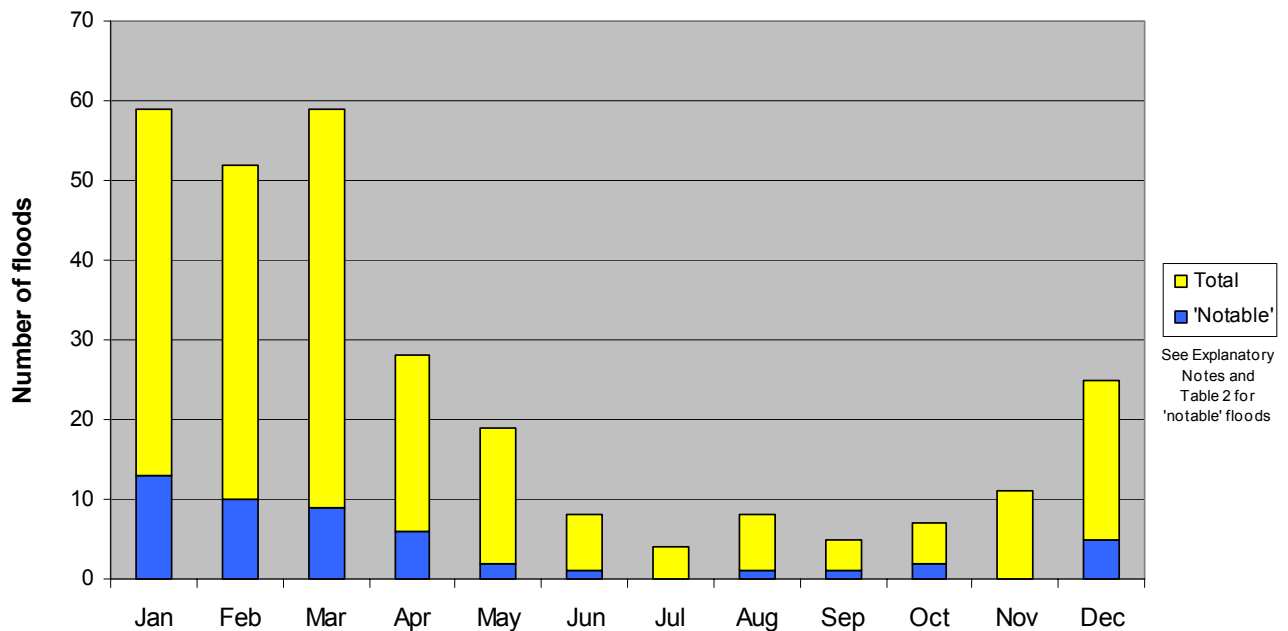




Table 1: Basin (catchment) areas for the major Viti Levu river systems

River basin	Approx. basin area (km ²)
Ba	930
Nadi	490
Navua	1,070
Rewa	2,920
Sigatoka	1,450

Meteorological Causes of Flooding in Fiji

The flood record described in this report shows that major floods in Fiji have resulted from several different meteorological phenomena or combinations of meteorological phenomena. These include but are not limited to:

- tropical disturbances (tropical cyclones and depressions);
- a southwestward displaced South Pacific Convergence Zone (SPCZ);
- embedded tropical depressions in a trough or the SPCZ;
- merging synoptic systems over Fiji e.g. SPCZ and cold front, or trough and cold front; and
- synoptic systems retrogressing over the country.

Tropical disturbances quickly passing over or very close to the country, in the absence of slow moving nearby synoptic systems, usually result in high magnitude short duration floods. More devastating, prolonged, high magnitude flooding is usually associated with prolonged soil saturation caused by looping or slow moving tropical disturbances in the vicinity of Fiji, successive tropical disturbances passing close to Fiji over a short period of time, or tropical depression(s) passing over Fiji after prolonged southwestward SPCZ displacement. Flooding is particularly severe in delta regions when high tide (especially a spring high tide) coincides with the passage of the tropical disturbance over Fiji. During La Niña years there is often the added complication of higher than normal sea level.

Fiji's rainfall records show marked interannual variability with prolonged dry and wet spells occurring quite often. Prolonged dry spells that occur are usually less than a year, but sometimes as long as two years and have been found to occur almost simultaneously with the El Niño. More than 80% of El Niño events result in meteorological drought. Likewise, prolonged wet spells of a similar timeframe occur almost simultaneously with La Niña events (McGree, 2007). During 1989 and 1999-2000 for example there was a marked increase in flooding and landslides (FMS, 1990a; 2000a; 2001a). The absence of a 'dry season' was particularly noticeable in 2000:

'a significant feature in 2000 was the increased influence compared to previous years of eastward moving troughs and the SPCZ located closer to Fiji than normal. The anomalous behaviour of two systems had a significant effect on the country's rainfall statistics enhanced to the occasional passage of tropical cyclones and depressions' (Year 2000 Annual Weather Summary).



Interannual variability of tropical cyclone activity specifically for the Fiji, Samoa and Tonga (FST) region is examined by Chand and Walsh (2009).

During El Niño events, the highest tropical cyclone density is centred over the northern part of Fiji and tropical cyclone genesis occurs mainly between 6° and 18°S, 170°E and 170°W. Tropical cyclones that form during the El Niño phase take three characteristic paths.

- 1) Tropical cyclones forming poleward of 10°S west of the dateline are frequently steered southeastward into the northern part of the Fiji and Tonga region;
- 2) Tropical cyclones forming east of the dateline are usually steered north of the Samoa region;
- 3) Tropical cyclones that, on average, are generated in the mean northeasterly flow regime between 5° and 10°S, 170°E and 180° recurve west-southwest of Fiji.

In the La Niña phase, fewer tropical cyclones are observed in the FST region compared to the El Niño phase. The genesis locations are displaced southwestward relative to their El Niño counterparts, with the maximum density centred near 15°S, 170°E. Tropical cyclones that form during La Niña are often steered over Fiji and Tonga with relatively little or no threat to the Samoa region.

During the neutral phase, maximum genesis occurs immediately north of Fiji with enhanced genesis south of Samoa. TC tracks during the neutral phase are very similar to those in the El Niño phase except for slight poleward displacement. This accounts for enhanced activity south of Fiji and Samoa (Chand & Walsh, 2009).

Flood Warning

The Water Authority of Fiji is responsible for river flow monitoring and flood forecasting. Its Hydrology Section maintains and operates a systematic flood forecasting system for the Rewa River. In recent years funding provided by the European Union to the Pacific Islands Hydrological Cycle Observing System Program managed by the Pacific Islands Applied Geoscience Commission (SOPAC) has enabled a number of river and TB3 rain gauges to be installed in the Navua and Rewa river catchments. When operational, data is transmitted via HF radio and the internet to the Hydrology Division's Suva Office with a copy sent to the FMS HQ in Nadi. Instrumentation and software installed by the National Institute of Water and Atmospheric Research Ltd (New Zealand) are based on flood monitoring systems which operate in New Zealand. A flood forecasting system for these rivers has not been developed but will be introduced as soon as a reasonably long river discharge data record is in existence. Local and overseas agencies have expressed interest in funding flood warning systems for the Ba, Nadi, Sigatoka and Labasa rivers in the coming years especially after the devastation caused by the January 2009 floods.

The Fiji Meteorological Service (FMS) issues forecasts for heavy rainfall and advises the public on prospects for flooding from extreme weather events like tropical cyclones. It also compiles reports on major flooding incidents, covering primarily the meteorological aspects, and keeps a database of rainfall and other important parameters.



EXPLANATORY NOTES

Please read the following notes to best understand how to use this resource:

1) Flood listings are based on information derived from written historical sources and are not complete. There is a spatial bias towards the main population centres located on rivers, and especially towards the town of Ba which was the subject of a detailed survey (Yeo, 1998). It is believed that most floods since about 1980 have been included in this database. Prior to that time, the coverage is believed to be 'patchy', with the exception of Ba from 1892 to 1972. For the pre-1980 era, it is likely that flooding not associated with tropical cyclones is under-reported here. Selective investigation of the *Fiji Times* in the 1970s was undertaken for this report.¹ Additional research is required to derive a more complete historical listing. Opportunities include a systematic reading of the *Fiji Times* and further investigation of the CSR correspondence especially for Lautoka, Nausori and Penang Mills.

2) Nunn (2001) observes the potential for myths and traditions to extend environmental histories earlier than the arrival of Europeans. One flood legend from Fiji is reported in Anonymous and Rodda (1995), who interpret the legend as a flash flood on the Navua River resulting from the bursting of a landslide dam. An account of a great Rewa River flood preceded by a great cyclone in about 1793 is described in Thomson (1908, p.137). The floodwater reportedly 'rose over the housetops, hundreds were swept away, and the silt left by the receding waters raised the alluvial flats of the Rewa River several feet'. These flood traditions are not recorded in the detailed listing.

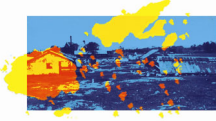
3) In several cases, the entry would be better described as a 'fresh' rather than as a 'flood' since the water may not have escaped the river banks. This is especially so for the Ba River where all events known to reach the level of the Rarawai rail bridge or the old Government road bridge (below the level of the river bank) were included.

4) Sometimes different sources of information record contradictory information. We have endeavoured to report what is believed to be the most accurate information, and where this is not known, both sets of information are listed. It is prudent to remember that what is often described as the 'worst' flood may not prove to be so under close scrutiny.

5) Flood *levels* refer to a known datum generally mean sea level. These are derived from surveyed benchmarks. Flood levels reported for Ba Town are based on the Ba Benchmark, whereas levels for Rarawai Mill upstream are based on a temporary benchmark at Rarawai rail bridge and a survey conducted by the then Drainage and Irrigation Division in July 1995. Some flood levels at Rarawai Mill were estimated by transferring the level from Ba Town (see Yeo et al., 2007). Benchmarks for the major riverside centres in Viti Levu are:

- Ba Benchmark W740: (BM = 4.388m above mean sea level)
- Nadi Benchmark: (BM = 5.552m above mean sea level)
- Nausori (Bridge) Benchmark: (BM = 0.665m below mean sea level)
- Sigatoka Benchmark: (BM = 5.276m above mean sea level)

¹ S. Yeo scanned issues for 1973 (Mar-Apr), 1974 (Jan-Jun), 1975 (Nov-Dec) and 1976 (Jan, Mar) in attempt to detect floods associated with the mid-1970s La Niña events.



6) Flood levels tend to vary even over short distances. At Ba, measurements of three floods (Jan 1993, Mar 1997, Jan 1999) indicated that flood levels at Rarawai Mill were about 0.5-0.6m higher than at the Morris Hedstroms store downstream. At Nausori, measurements of two floods (Oct 1972, Apr 1980) indicated that flood levels at the pump house were about 0.4m higher than at the (old) Rewa River bridge downstream. For precise comparisons between flood events, the *same* site should be used.

7) Descriptions of consequences of flooding in this report focus on buildings, building contents, infrastructure and loss of human life. Even minor floods can cause extensive damage to crops planted on river banks, so this kind of damage is generally not included here. Any financial losses are reported in original Fiji dollars unless otherwise stated.

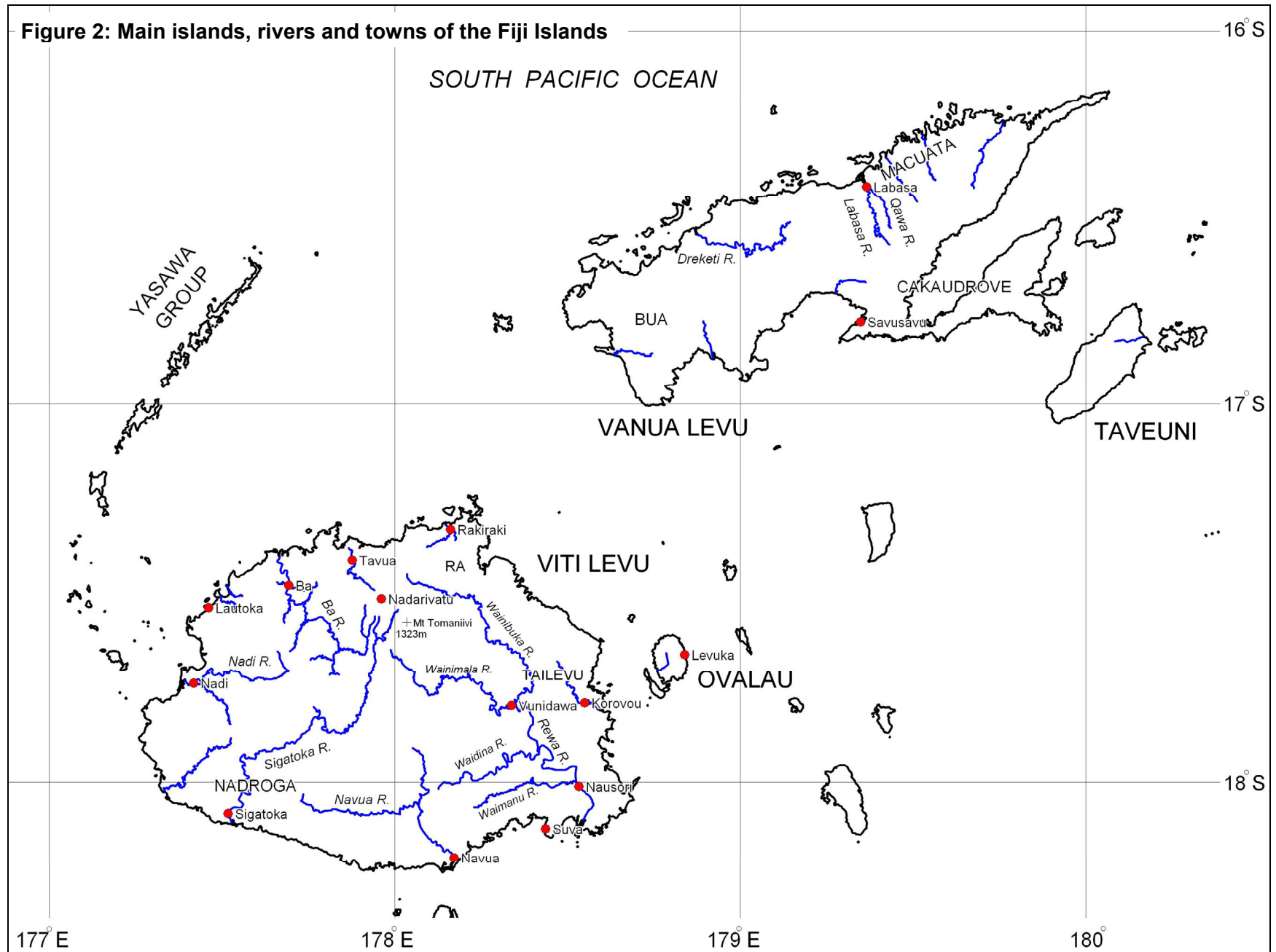
8) **Table 2** presents a subjective assessment of known 'notable' floods for the main population centres. These flood events are characterised by their high magnitude and/or severe consequences. Readers with an interest in a particular town may look up this table to learn the date of the 'worst' known events, then turn to **Table 3** for more information.

9) **Table 3** presents a detailed listing of known flood events in chronological order. The information under 'flood description and areas affected' is arranged in the following order:

- General comments (including any reference to storm surge);
- Towns, districts or rivers in Viti Levu island arranged alphabetically;
- Towns, districts or rivers in Vanua Levu island arranged alphabetically; and
- Other locations in Fiji arranged alphabetically.

A map showing the main population centres, districts and rivers referred to in this database is provided in **Figure 2**.

Figure 2: Main islands, rivers and towns of the Fiji Islands



NOTABLE FLOODS

Table 2: List of known notable flood events by town/river

Prepared by S. Yeo

Note: The 'top ten' flood rankings by descending flood level are estimated for Ba, Nadi and Nausori. The Ba rankings are for the period from 1892 and are adapted from Yeo et al. (2007). The Nadi rankings are for the period from 1931 and are presented in Appendix A. The Nausori rankings are for the period from 1929 and are presented in Appendix B.

Island	Viti Levu											Vanua Levu		Other		
	Town/area															
Flood year/ month	Ba	Nadi	Nausori (Rewa R.)	Navua	Rakiraki	Sigatoka	Suva/Lami/Nasinu	Tavua	Waidina R.	Waimanu R.	Wainibuka R.	Wainimala R.	Labasa	Other areas	Levuka, Ovalau	Taveuni
1840 Feb																
1848 Jan																
1866 Jan																
1869 Mar																
1871 Mar																
1875 Jan																
1889 Jan																
1891 Apr																
1892 Dec																
1901 Feb																
1906 Aug																
1910 Mar																
1911 Jan																
1912 Jan																
1914 Dec																
1918 Feb	4															
1924 Jun																
1926 Sep																
1929 Dec			2													
1930 Nov			9													
1931 Feb	1	?	1													
1933 Mar																
1938 Oct																
1938 Dec	9															
1939 Jan	7	6														
1941 Feb																
1946 Jan																
1950 Feb																
1955 Mar																
1956 Jan	3	?	=6													
1956 Mar	8															
1964 Mar		7	8													
1965 Feb		4	3													

Island	Viti Levu											Vanua Levu		Other		
Town/area	Ba	Nadi	Nausori (Rewa R.)	Navua	Rakiraki	Sigatoka	Suva/Lami/Nasinu	Tavua	Waidina R.	Waimanu R.	Wainibuka R.	Wainimala R.	Labasa	Other areas	Levuka, Ovalau	Taveuni
Flood year/ month																
1972 Oct		5	4													
1980 Apr			=6													
1983 Mar		9														
1985 Apr																
1985 May																
1986 Apr		10	10													
1986 Dec																
1991 Feb																
1993 Jan	6		5													
1993 Feb		3														
1997 Mar	10	8														
1997 May																
1999 Jan	5	2														
2000 Apr																
2003 Jan																
2004 Apr																
2007 Feb																
2009 Jan	2	1														

DETAILED FLOOD LISTING

Table 3: Detailed listing of known historical flood events

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1840 Feb 27	(hurricane) Rewa and Northern Viti Levu.	<ul style="list-style-type: none"> Rewa River: flood inundated many houses at Rewa and Rewa Mission; people retreated to shelves built under roofs of the <i>bures</i> with their goods; reported to be worst flooding for four years (Calvert, 1858; Dickson, 1976); 'high' flood covering the Rewa flats (Derrick, 1946).
1848 Jan 16	(hurricane) Vanua Levu.	<ul style="list-style-type: none"> 'Nadi' Mission, southern coast of Vanua Levu: severe flood; many houses inundated; one girl died from exposure two weeks later (Calvert, 1858).
1856 Aug 21-22		<ul style="list-style-type: none"> Waidina River: flood affected an expedition up the river; bank erosion observed (McDonald, 1857).
1866 Jan 7-8	(hurricane) Centre passed between Viti Levu and Vanua Levu and across Ovalau.	<ul style="list-style-type: none"> Rewa River(?): river rose 35 ft (10.7m); some houses filled with water to the roofs; cotton plantations in Rewa District destroyed (TM, 3/5/1866); more than 25 years since a similar flood was known (TA, 26/5/1866).
1866 Mar 10-12	(hurricane) Southwest of Vanua Levu.	<ul style="list-style-type: none"> Rewa River: cotton plantations along the Rewa flats inundated; food gardens and coffee plantations buried in silt (Derrick, 1946). Bua Province, Vanua Levu: excessive floods (Holmes, 1877).
1869 Mar*	(hurricane)	<ul style="list-style-type: none"> General: storm surge raised sea levels by more than 3m devastating all the low-lying areas (Parry, 1989). Navua: flood left all the flat land 'nearly smooth, and with 12 inches of deposit in some places' (Derrick, 1951).
1871 Mar 20-21	(hurricane) Entire Fiji Group affected. Centre over Western Fiji. 380mm rain at Delanasau, Bua, for 24 hrs ended 5 p.m. 20 th (Holmes, 1877).	<ul style="list-style-type: none"> Ba River: several labourers on McIntosh's cotton plantation drowned (Yeo & Blong, 2010; FTs). Nadi: houses carried away in river (Yeo, 1998). Navua: highest known flood by settlers to that date; little damage (FTs). Rewa River: in Upper Rewa river rose 50-60 ft (15.2-18.3m) destroying nearly all houses and cotton crop; one planter lost 5 labourers and another 12 either drowned or due to the 'inclemency of the weather'; Fijians reported great loss of life higher up the river; one European drowned; regarded as highest flood since the oldest inhabitant was a child when there was a heavier flood (SMH, 24/4/1871). Sigatoka: 'the severest flood which has been known for years entirely sweeping away the broad beach at the entrance and carrying away 150 ft of the high bank' (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Bua Province, Vanua Levu: Bua town flooded (SMH); Lekuta River on northern coast had 'tremendous floods in places' (FTs). Taveuni: domestic animals carried out to sea (Parry, 1989).
1875 Jan 7	(hurricane)	<ul style="list-style-type: none"> Rewa District: considerable flood though not extraordinary; some cattle washed out to sea (SMH, 10/2/1875). Levuka, Ovalau: all the lower and flat parts of Levuka inundated due to heavy rain in mountains; Totoga Creek rose to great height; all backyards overflowed to depths of 1½ -2 ft (0.45-0.6m); many houses flooded; Royal Hotel flooded to 2 ft (0.6m); pigs and poultry carried out to sea; largest flood known to European residents of Levuka (SMH).
1875 Mar-Apr*	(hurricane) may be associated with hurricane of Mar 12-13.	<ul style="list-style-type: none"> General: Incessant downpour of rain in March-April (Levuka) (SMH, 29/5/1875). Rewa District: much more extensive and damaging flood than Jan 1875; 40,000 bricks on Waimata Creek destroyed (SMH). Levuka, Ovalau: 'another rather heavy flood' but happened at low tide so water quickly ran off into the harbour; the two bridges over Totoga Creek totally destroyed (SMH).
1875 Jun 13		<ul style="list-style-type: none"> Levuka, Ovalau(?): one European drowned when torrent suddenly washed through creek gorge (TM, 30/7/1875).
1879 Dec 11	(hurricane) Entire Fiji Group affected especially Northwestern Fiji.	<ul style="list-style-type: none"> General: storm surge recorded at Nadi flats, Sabeto, Ba, Nanunu; one European drowned at Sabeto attributable to storm tide (Yeo, 1998; FTs). Lautoka: town flooded (Blong, 1994).
1886 Jan 4-5	(cyclone) West coast of Fiji.	<ul style="list-style-type: none"> General: storm surge at Tavuki in Kadavu (TM, 11/2/1886). Ba: river rose considerably, but no damage reported at Rarawai Mill (Yeo, 1998). Rewa River: overflowed banks in upper reaches (FTs). Sigatoka: Nadroga regarded as centre of storm (FTs), so likely flood (Yeo, 2010). Suvaswa Bay(?): flood carried away wire fencing (SMH, 5/2/1886).
1886 Mar 4	(hurricane) Centre passed over Taveuni. Levuka ruined. (See McLean, 1977).	<ul style="list-style-type: none"> General: severe storm surge at Rabi with four fatalities when labour lines washed away (SMH, 18/3/1886, 19/3/1886); one fatality at Vuna, Taveuni, from storm surge (TA, 5/4/1886); severe storm surge at Gau, 18 ft (5.5m) high as approached shore at Vanuaso, several villages washed away (Holmes, 1887; Campbell, 1984); storm surge also reported at Koro and Savusavu (TA); severe damage from storm surge at Nairai, Batiki and Moturiki in Lomaiviti (SMH, 15/4/1886); Matuku, Totoya and Moala also hit by storm surge (Holmes, 1887).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Ba: a 'fresh' felt when river rose several feet; no crops flooded (Yeo, 1998; TA). Nausori: experienced 'very severe gale' (CSR) but only a 'light flood' (TA). Suva: most houses flooded (SMH). Levuka, Ovalau: storm surge; later when the tide was out all the low lying lands flooded with stormwater from the hillsides (SMH).
1889 Jan 20-26	(hurricane) Taveuni and Lau. Parts of Vanua Levu experienced as much as 1500mm rain in one week (Campbell, 1984).	<ul style="list-style-type: none"> General: widespread flooding and landslides; Viti Levu: sustained torrential rains (Campbell, 1984, p.69). Ba: rivers and creeks running bank high but flood within well-known limits (TA, 25/2/1889). Rakiraki: rivers and creeks running bank high but flood within well-known limits (TA). Rewa River: river rose 23 ft (7.0m) in Rewa district; highest flood since at least 1871; many towns above Viria flooded; enormous damage to sugar plantations and mill (TM, 22/2/1889; BC, 16/3/1889; TA).
1891 Mar 16-17		<ul style="list-style-type: none"> Rewa River: in heavy flood (SMH, 7/4/1891).
1891 Apr 25		<ul style="list-style-type: none"> Suva: after 11 a.m. without warning, huge volumes of water came pouring down from the hills; 'torrents from one to three feet [0.3-0.9m] running through every street'; stores on low ground swamped; cottages washed off their piles; culverts torn up; only one bridge out of a dozen left standing; one 'Polynesian' woman drowned when bridge she was crossing collapsed (TA, 26/5/1891).
1892 Dec 15	(cyclone) North coast of Vanua Levu and over Yasawas.	<ul style="list-style-type: none"> Ba: flood peak estimated at 6.16m a.m.s.l. at Rarawai Mill, 2 ft (0.6m) in mill (Yeo et al., 2007); buildings damaged; loss to mill and crop estimated at £6,000 (Yeo, 1998; CSR). Rewa River: rose considerably higher than normal; lower floor of Waimanu Hotel flooded; severe flood (TA, 16/1/1893). Sigatoka River: exceptional flood, highest known to 'natives', in some places by 25 ft (7.6m); nearly all villages flooded; 12 tons of harvested tobacco swept away; 1½ ft (0.45m) of sludge deposited (SMH, 13/1/1893; TA). Labasa, Vanua Levu: CSR property damaged (TA).
1895 Jan 6-7	(hurricane) East coast of Vanua Levu and Viti Levu. Suva ruined.	<ul style="list-style-type: none"> General: storm surge swept through many villages in Rewa delta for six miles up the river; contaminated crops (BC, 24/1/1895; Campbell, 1984, p.70). Ba: no serious flooding (CSR). Nausori: flood (CSR). Navua: big fresh in the river (BC).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1898 Apr*		<ul style="list-style-type: none"> Nadroga: 'rather severe floods' (SMH, 11/5/1898).
1901 Jan 27		<ul style="list-style-type: none"> General: storm surge washed away houses on beach at Kadavu (Anon, 1932).
1901 Feb 16-17		<ul style="list-style-type: none"> General: 'greatest flood since 1874' (?) (written by correspondent at Suva, probably referring to Rewa River) (SMH, 6/3/1901). Ba (precise date uncertain): flood peak estimated at 5.85m a.m.s.l. at Rarawai Mill, 1 ft (0.3m) in mill (Yeo et al., 2007). Nausori: large lower Rewa town under water; some CSR punts lost (SMH). Rewa River: flooding from its source; native villages almost swept away (SMH). Kadavu: torrents of rain (Anon., 1932).
1901 Mar 13-14	(hurricane) Eastern Fiji.	<ul style="list-style-type: none"> Levuka, Ovalau: storm surge washed coastal vessels into main street (TA, 21/3/1901).
1904 Jan 11		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.19m below the 1931 peak at Rarawai rail bridge; Navatu flats flooded for a week, with substantial damage to cane (Yeo, 1998; CSR).
1904 Jan 21	(hurricane) Central Fiji.	<ul style="list-style-type: none"> Navua: 6 ft (1.8m) storm surge; all low-lying lands under water (Holmes, 1905; Blong, 1994). Rewa River: great floods (Holmes, 1905).
1904 Feb 21-22	(hurricane)	<ul style="list-style-type: none"> Rewa River: major floods (D'Aubert, 1994).
1904 Feb 29 - Mar 5*		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.42m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1906 Aug 6-7	Intense local storm at Suva from 6 p.m. on 6 th to 7 a.m. on 7 th ; Government gauge overflowed at 26½ inches (673mm); unofficial gauge near Suva harbour overflowed three times for at least 37 inches (940mm) in 13 hours (Holmes, 1907).	<ul style="list-style-type: none"> Suva: considerable damage to town; one of main bridges on Victoria Parade washed away; buildings in the low-lying lands completely swamped; 'entire city in a state of flood' (SMH, 30/8/1906; 26/10/1906); 20 inches (0.5m) water through office of Western Pacific Herald destroying printing material (Holmes, 1907).
1906 Dec 26		<ul style="list-style-type: none"> Ba: two drownings at Nadrou bridge (Yeo, 1998; CSR).
1907 Jan 25		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.42m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1908 Mar 23	(hurricane) West and South Viti Levu.	<ul style="list-style-type: none"> Ba: two drownings in Ba River at Vunisamaloa (Yeo, 1998; CSR).
1908 Aug 29		<ul style="list-style-type: none"> Ba: damaging floods down Elevuka and Navisa Creeks; Rarawai flats flooded (Yeo, 1998; CSR).
1909 Feb 7		<ul style="list-style-type: none"> Ba: flood peak 5.85m a.m.s.l. at Rarawai Mill, 1 ft (0.3m) in mill (Yeo et al., 2007).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1910 Mar 5		<ul style="list-style-type: none"> • Yaqara (between Tavua and Rakiraki): one drowning in Yaqara River (CSR). • Dreketi River (Vanua Levu): sawmill 'visited by a disastrous flood destroying a lot of the mill property and washing away a large quantity of timber'; worst flood in 20 years according to Fijian knowledge (CSR). • Labasa/Macuata Province, Vanua Levu: Qawa River flood peak estimated at 1.07m below 1929 peak at Labasa Mill (Yeo, 2001); 4 inches (10cm) over mill office floor which was 5 ft (1.5m) higher than river bank; within 1.75 ft (0.5m) of the sugar floor; 'for five consecutive days the greater part of the Labasa, Batanikama, Vuo and Wainikoro estates were under water'; Wailevu bridge submerged to depth of 2 ft (0.6m) (CSR).
1910 Mar 25	(hurricane) Over Vanua Levu and across Viti Levu passing close to Levuka.	<ul style="list-style-type: none"> • Ba: flood peak estimated at 3.27m below the 1931 peak at Rarawai Mill; mill yard flooded (Yeo, 1998; FSC, 1986); one drowning at Rarawai (CSR). • Navua: extensive flooding from river and storm surge; heavy damage to launches, lighters and 'floating stores' (Duaibe, 2008). • Rewa River: rose 35 ft (10.7m) at 'Viti'; serious damage to the floating stock; major flooding (SMH, 7/4/1910; D'Aubert, 1994). • Labasa: the Qawa River overflowed its banks on evening of 25th (CSR).
1910 May 9		<ul style="list-style-type: none"> • Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1911 Jan 16-17	(hurricane)	<ul style="list-style-type: none"> • Ba: flood peak estimated at 5.85m a.m.s.l. at Rarawai Mill, 1 ft (0.3m) in mill (Yeo et al., 2007); Rarawai rail bridge damaged; second peak on 20th (CSR). • Tavua: believed to be record flood at time; Nasivi bridge wrecked (CSR).
1911 Feb 9		<ul style="list-style-type: none"> • Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1911 Feb 21-28*		<ul style="list-style-type: none"> • Ba: minor flooding (Yeo, 1998). • Macuata Province, Vanua Levu: Wainikoro River flooded on 21st (CSR).
1911 Aug 10		<ul style="list-style-type: none"> • Ba: flood peak estimated at 4.42m below the 1931 peak at Rarawai rail bridge at 3 p.m. on 10th; two piers of Rarawai rail bridge carried away, interrupting transport of cane to mill resulting in suspension of crushing for about 12 days (Yeo, 1998; CSR). • Tavua: Nasivi bridge completely swept away (CSR).
1912 Jan 28-29	(hurricane) Entire Fiji	<ul style="list-style-type: none"> • Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge on the 29th (Yeo, 1998). • Nausori: high floods in the Rewa (Campbell, 1984). • Navua: high flood (Campbell, 1984). • Labasa/Macuata Province, Vanua Levu: Qawa River flood peak 0.91m below 1929 peak at Labasa

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		Mill at 2 p.m. on 28 th (Yeo, 2001); described as the biggest flood ever seen to that date; several feet deep in mill; maximum force of hurricane fortunately occurred earlier – between 4-8 a.m. on 28 th ; rafts used to rescue people but one drowning from CSR lines; bridge over Bucaisau River disappeared; extensive damage to reclamation walls suggests severe storm surge (CSR).
1913 Jan 14		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge, within riverbanks (Yeo, 1998).
1913 Feb 28		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.68m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1913 Mar 21	(hurricane) Southeastern Viti Levu.	<ul style="list-style-type: none"> Ba: flood peak estimated at 3.51m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1914 Dec 24-25	(hurricane) Southern Lau Group, Levuka and northeast Fiji.	<ul style="list-style-type: none"> General: nine Indians drowned (three near Vunidawa); many cattle drowned (FTs). Nausori: river rose 20 ft (6.1m) (TM, 28/12/1914); reported to be highest flood in Rewa district for 28 years; still high on 25th (FTs). Navua: floods (FTs). Rakiraki: damaging floods at Penang estate (FTs). Rewa River: river rose no less than 60 ft (18.3m) at Viria (TM, 28/12/1914); substantial bank erosion (FTs). Sigatoka: heavy floods (FTs). Suva: many houses and shops flooded on 24th (FTs). Tavua: flood on 24th (CSR).
1917 Jan 1-17*		<ul style="list-style-type: none"> Ba: flood peak estimated at 3.96m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). Tavua: flood (CSR).
1917 Mar 15		<ul style="list-style-type: none"> Tavua: flood (CSR).
1918 Feb 7		<ul style="list-style-type: none"> General: storm surge swept West Coast with considerable damage to houses but no loss of life (SMH, 9/3/1918). Ba: flood peak 7.37m a.m.s.l. at Rarawai Mill, over mill floor and 1 ft in lab and sugar floor, 1.0m below 1931 flood (Yeo et al., 2007); regarded as the highest flood recorded to that date (Yeo, 1996); damage to mill, punts anchored alongside and labour lines; that there were no casualties at the mill was attributed to the river's rise during the day (CSR; Yeo, 2010); several Indian homes washed away; six Indians drowned at Kadson and many others rescued (FTs; SMH). Rewa River: heavy flood in upper river reaching 45 ft (13.7m) in places, severe damage to food crops upstream from Viria including to banana plantations, though not as severe as in 'record flood' of 1914(?) (FTs).
1918 Dec*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1919 Feb 9	(hurricane) Yasawas	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1921 Jan 8		<ul style="list-style-type: none"> Ba: flood peak estimated at 3.51m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1921 Jan 26-27		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge; Rarawai rail bridge damaged (Yeo, 1998; CSR).
1921 Apr 20		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1921 Dec 17		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.88m below the 1931 peak at Rarawai rail bridge; crushing at mill disrupted when water injection pit flooded (Yeo, 1998).
1922 Apr 4-5		<ul style="list-style-type: none"> Ba: flood peak estimated at 2.90m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). Tavua: believed to be record flood at time (CSR).
1922 May 2		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.11m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1923 Jan 5-6		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.04m below the 1931 peak at Rarawai Mill, mill yard flooded (Yeo, 1998; CSR).
1923 Mar 30		<ul style="list-style-type: none"> Ba: flood peak estimated at 2.83m below the 1931 peak at Rarawai rail bridge, mill yard flooded (Yeo, 1998; CSR).
1924 Mar 4		<ul style="list-style-type: none"> Ba: Rarawai rail bridge flooded; Rarawai and Navatu flats underwater (Yeo, 1998; CSR).
1924 Jun 23		<ul style="list-style-type: none"> Rewa River: suffered little from the effects of the floods (BC, 31/7/1924). Savusavu, Vanua Levu: Yanivai River rose 40 ft (12.2m) as marked by debris; some houses swept away; timing in afternoon prevented loss of life (BC).
1924 Aug*		<ul style="list-style-type: none"> General: unusually heavy rain in eastern Viti Levu with serious flooding especially along the Wainibuka River, causing damage to the banana industry (BC, 30/9/1924).
1925 Mar		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge, within riverbanks (Yeo, 1998; CSR).
1926 Sep 24		<ul style="list-style-type: none"> Levuka, Ovalau: floodwaters swept through business section along waterfront after 7 inches' rain (178mm) fell in 90 minutes; five bridges washed away; landslides recorded (WA, 28/9/1926; CT, 7/10/1926).
1927 Feb 9		<ul style="list-style-type: none"> Ba: flood peak estimated at 3.51m below the 1931 peak at Rarawai rail bridge; Navisa Creek rose 30 ft (9.1m) (Yeo, 1998; CSR). Nadi: flood (CSR). Tavua: flood (CSR).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1927 May 24-25		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1927 Nov*		<ul style="list-style-type: none"> Rewa River: flooded; two children rescued (SMH, 6/5/1930).
1928 May 25		<ul style="list-style-type: none"> Ba: minor flood (Yeo, 1998).
1929 Jun*		<ul style="list-style-type: none"> Rewa River: floods inflicted heavy damage on the banana industry (BC, 20/7/1929). Wainibuka River: damaging flood (FTs). Wainimala River: damaging flood (BC).
1929 Dec 11-12	(hurricane) Wide spread and slow moving. Moved Southwest to Rotuma, recurved to Southsoutheast passing over Eastern Viti Levu, Makogai and Gau.	<ul style="list-style-type: none"> General: 'unprecedented' floods in several rivers caused considerable damage to livestock and property, with 20 flood fatalities plus 5 missing (FNA, 1930a). Ba: no serious flooding, though supply of cane to Rarawai Mill slowed (Yeo, 1998; CSR). Korovou, Tailevu: bridge damaged by debris carried down river (FNA, 1930b). Nausori: considered by oldest residents to have been the highest Rewa River flood to that date; 0.9m below 1931 flood; 7 fatalities; hundreds rescued; 800 head of cattle lost by one owner on Wainibokasi (Yeo & Blong, 2010; BC, 2/1/1930; FNA, 1930a; Derrick, 1951). Navua: 'an exceptionally heavy flood'; higher than 1931 flood; many houses inundated and some swept away; 10 people drowned; 2½ spans carried away from Deuba bridge and 4 additional spans badly damaged (FNA, 1930a,b; Derrick, 1951). Sigatoka: highest flood on record to that date; 2 ft (0.6m) higher than previous highest in 1897(?) (CSR); 'very heavy flood'; many houses swept away; 40m of CSR railway bridge across Sigatoka River destroyed (FNA, 1930a). Tavua: flooding interrupted cane supply (CSR). Wainimala River: flood rose 62 ft (19m) at Government Station at Vunidawa, no loss of life (FNA, 1930). Labasa/Macuata Province, Vanua Levu: Qawa River flood peak 3 ft (0.9m) above 1912 peak at Labasa Mill (Yeo, 2001); major flooding of the Wainikoro, Bucaisau, Qawa and Labasa Rivers (possibly still records for the Qawa R. and Labasa R.) (Yeo, 2001); floodwater extended 22.5km inland at Labasa (Derrick, 1951); 6 people reported drowned (CSR); 3 people drowned and one died from exposure (FNA, 1930a). Kanacea and Cicia, Lau: exceptional flooding due to intense rainfall in Nov (<i>sic</i>) 1929 hurricane (McLean, 1977).
1930 Nov 22-23	(hurricane) Rapid moving. Northeast coast of Viti Levu, Lomaiviti and Levuka.	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). Nausori: Rewa River rose to 18 ft (5.5m) at Nausori Mill, with some damage (CSR); many thousands of new banana trees washed out to sea; several country bridges washed away (SMH, 5/12/1930).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Tavua: flats flooded (CSR). Yaqara: flood (CSR).
<p>1931 Feb 21-Mar 2</p>	<p>(hurricane) Labasa, Western Viti Levu and Southern Lomaiviti Group. Looped near Yasawas. (There are two flood peaks due to the looping of the hurricane, the first peak was on Feb 21-22 and the second on Mar 1-2). (Some sources do not agree with the above interpretation and state there may have been two hurricanes).</p> <p>Nadarivatu experienced increasingly heavy rain from 17th February, culminating in 518mm rain on 21st and 615mm on 22nd (FLC, 1931; Yeo & Blong, 2010).</p>	<ul style="list-style-type: none"> General: Fiji's worst natural disaster with at least 225 fatalities during the hurricane, mostly from record flooding on the night of Saturday 21st February (Yeo & Blong, 2010); a second, lesser flood peak was recorded at Ba on 25th Feb (CSR); major floods (not as high as on 21st-22nd Feb) were experienced in eastern Viti Levu on 1st-2nd Mar, when the hurricane passed to the north of Penang in a south-easterly direction (FNA, 1931). Ba mill: record flood, 8.37m a.m.s.l. (9.25 ft i.e. 2.8m over mill floor) at Rarawai Mill; note that the 1931 flood obelisk was surveyed to a level of 7.33m a.m.s.l., which is regarded as unreliable given the levels calculated from heights reported above the mill floor (8.37m a.m.s.l.) and rail bridge (8.49m a.m.s.l.) (Yeo et al., 2007). Ba town (about 900m downstream from Rarawai Mill): flood peak 7.92m a.m.s.l. (5 ft i.e. 1.5m over floor) at courthouse (Yeo et al., 2007); note this differs from a level of 8.53m a.m.s.l. reported in PWD (2000), the source of which is unknown, and which appears too high in view of other surveyed levels (Yeo, 2010). Ba valley: at least 126 fatalities; note that the 111 fatalities listed on the 1931 obelisk was based on an early report, which was superseded by better information; hundreds of houses destroyed (Yeo & Blong, 2010). Lautoka: complete flooding of the flats, Teidamu and Vitogo Creeks met 'for the first time within Fijian knowledge'; 85 fatalities in district including 16 at the mountain village of Naqaqa (or Nagaga?) when a dam temporarily formed by a landslide gave way, flooding the village (Yeo & Blong, 2010). Nadi: floods reportedly the highest and severest ever experienced in Nadi to that date; 5 ft (1.5m) deep in Nadi town, in some instances up to 9 ft deep (2.7m); Nadi River rose 35 ft above normal level; 3 people drowned (FNA; FTs; FNA, 1931); floods reportedly reached tramway tracks in Namaka (Robert Kennedy, pers. comm.). Nausori: record Rewa River flood, about 0.9m higher than the Dec 1929 flood (Yeo & Blong, 2010); flood peak 25 ft (7.6m) above normal at Nausori Mill on afternoon of 22nd, still 22 ft (6.7m) above normal on 24th, 17 ft (5.2m) above normal on 27th, 5 ft (1.5m) above normal on 1st, 20 ft (6.1m) above normal on 2nd, relief from floodwaters on 5th (CSR); at peak 6 ft (1.8m) water in Nausori Mill; entire river flat from Naduruloulou to the sea covered (Derrick, 1951); several buildings washed away at Navuso Agricultural School which was subsequently relocated to higher ground (SMH, 3/4/1934). Navua: lower than record flood of Dec 1929 but within 2 ft (0.6m) (FNA, 1931; FTs). Rakiraki: river at Penang Mill reported to have overflowed seven times but damage mainly confined to crops, roads and damaged livestock (FMS, pers. comm.). Sigatoka: flood regarded as the highest on record with a rise of 60 ft (18.3m); higher than Dec 1929; hundreds of houses in valley destroyed; Korosigana village 'utterly demolished'; Sigatoka bridge carried away at 11 a.m. on Sunday 22nd; sandbanks at river mouth broke on Sunday evening (FNA;

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<p>FTs); one fatality reported (FNA, 1931).</p> <ul style="list-style-type: none"> Tavua: record flood with water up to Nabuna stables; Tavua telephone switchboard broken beyond repair (CSR). Waimanu River: flood peak 4 ft (1.2m) higher than Dec 1929 at Sawani (FTs). Wainibuka River: highest known flood; devastating effects; second flood on 1st Mar swept away temporary shelters (FNA; FTs). Wainimala River: severe effects; people sheltered in caves or used banana punts (FNA; FTs). Yaqara: record flood, bridges smashed (CSR).
1932 Jan 26		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge, the bridge collapsed as eight piers were carried away; 6 ft (1.8m) over old Gov't road bridge, tons of debris had to be removed (Yeo, 1998; CSR; FNA).
1932 Feb 5-6		<ul style="list-style-type: none"> General: heavy flooding in all the main rivers (source unknown). Ba: flood peak estimated at 2.90m below the 1931 peak at Rarawai rail bridge (Yeo, 1998); Ba River rose 2.1m above old Gov't road bridge (Blong, 1994); 8 piers of Rarawai rail bridge carried away (CSR). Tavua: flood (CSR).
1932 Dec 13-16		<ul style="list-style-type: none"> Tavua: flood (CSR).
1933 Mar 27		<ul style="list-style-type: none"> Ba: flood peak 6.16m a.m.s.l. at Rarawai Mill, 2 ft (0.6m) in mill (Yeo et al., 2007); several houses flooded just above floor level at Varoka (FNA). Nadi: township flooded but no serious damage (FNA). Navua River: flooded (PIM, 1933a). Rewa River: flooded (PIM, 1933a). Semo village, located between Cuvu River and a creek (SW Viti Levu): extremely deep and fast-flowing floodwater washed away all buildings in village, leaving only two half-houses; people survived by climbing mango trees (PIM, 1933b). Sigatoka: four fatalities reported (PIM, 1933b); river rose 37 ft (11.3m) during night; main road to Burns Philp store flooded (PIM, 1933c).
1933 Apr 26-28		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge (Yeo, 1998); Nadrou tramline bridge lost pier (CSR).
1934 May 22-23		<ul style="list-style-type: none"> Nausori: Rewa River 6 ft (1.8m) above normal high water mark on afternoon of 23rd (FTs). Wainibuka River: 3.5 ft (1.1m) floodwater on the Overland Road (FTs). Waimanu River: overflowing on road near Sawani (FTs).
1935 Jan 25		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.42m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1935 Mar 27		<ul style="list-style-type: none"> Ra: flood covered the station 'Rara' (FNA).
1935 Nov-Dec*		<ul style="list-style-type: none"> General: continuous severe weather throughout Viti Levu caused much damage to the Overland Road, some parts being underwater; several bridges down and many culverts washed away (SMH, 17/12/1935; PIM, 1935). Suva: homes of Indians at Suva Point suffered severely from floods (SMH, 25/12/1935).
1936 Mar 16-23*		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.57m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1937 Feb 13-20*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1938 Feb 27	(cyclone) Western Viti Levu.	<ul style="list-style-type: none"> General: moderate flooding in the West (D'Aubert, 1994) Ba: flood peak 6.46m a.m.s.l. at Rarawai Mill, 3 ft (0.9m) over mill floor (Yeo et al., 2007); water over the Ba Bridge and into Morris Hedstrom Ltd causing £900 loss; no casualties (CSR).
1938 Oct 22	Torrential rain at Levuka from 7-9 p.m. (FTs).	<ul style="list-style-type: none"> Levuka, Ovalau: embankment walls of Totogo Creek gave way flooding shops and stores on lower levels; damage estimated at £500; water mains broken; 'not as severe as the previous flood' (date unknown) (FTs). Ovalau: native towns inundated but no loss of life (FTs).
1938 Dec 22	(cyclone) West to Southwest of Viti Levu. 36½ inches (927mm) rain recorded at Nadarivatu Timber Mill for 24 hours ended 22 nd (CSR).	<ul style="list-style-type: none"> General: main roads blocked by landslides and washouts in Western Viti Levu (D'Aubert, 1994). Ba: flood peak 6.95m a.m.s.l. at Rarawai Mill on 22nd, over mill floor but below sugar floor (Yeo et al., 2007); second peak 6 ft (1.8m) lower than first at 3 a.m. on 25th; Nadrou tramline bridge lost pier (CSR); Delailagi Catholic Mission Station forced to close after boys' school fell into river and church basement was left only 6 ft (1.8m) from river's edge after flood (i.e. riverbank erosion) (Anon., 1991; Yeo, 2010). Nausori: flood peak 3 ft (0.9m) above level of Jan 1939 (FTs). Labasa: Qawa River rose 4.5 ft (1.4m) above high tide level; two punts broke away (CSR).
1939 Jan 21	(hurricane) Passed over Viti Levu, then moved to Western Viti Levu on 21 st . Centre passed over Kadavu.	<ul style="list-style-type: none"> General: damage to roads and bridges across the country due to flooding (D'Aubert, 1994). Ba: flood peak 7.03m a.m.s.l. at Rarawai Mill, over mill floor and over sugar floor (Yeo et al., 2007); over Rarawai rail bridge for about 60 hours (CSR); Ba township flooded to about 2.5 ft (0.8m) (FNA); Chinese stores and picture theatre had deposits of slime (Yeo, 1998); boxing and wrestling stadium washed away (FTs). Nadi: flood 4 ft (1.2m) deep in shops and houses (FTs). Nausori: flood peak reached height of 13.5 ft (4.1m) above normal; peak 3 ft (0.9m) below level of Dec 1938 flood (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> • Navua: heavy flood - reportedly largest in living memory(?) (FTs). • Rakiraki: flood waist deep in Penang Mill (FTs). • Sigatoka: heavy flood - reportedly largest in living memory(?) (FTs). • Tavua: flood (CSR). • Vatukoula: one flood fatality (FTs).
1939 Feb 14		<ul style="list-style-type: none"> • Ba: flood peak estimated at 2.83m below the 1931 peak at Rarawai Mill, not in mill (Yeo, 1998).
1939 Mar 16		<ul style="list-style-type: none"> • Ba: flood peak 6.16m a.m.s.l. at Rarawai Mill, 2 ft (0.6m) in mill (Yeo et al., 2007). • Tavua: flooded (FNA). • Labasa: no flooding experienced at Labasa Mill (CSR).
1939 Apr 5-6	(cyclone) Rotuma and West Fiji.	<ul style="list-style-type: none"> • Ba: flood peak estimated at 3.81m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). • Labasa: Qawa River overflowed into Labasa River; kitchens at CSR lines flooded, precise date unknown (CSR).
1939 May 7-8		<ul style="list-style-type: none"> • Ba: flood peak estimated at 4.57m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1939 Dec 27-28	(cyclone) Southwestern Viti Levu.	<ul style="list-style-type: none"> • Ba: no flood (CSR).
1941 Feb 20-21	(hurricane) Central Lau, Lomaiviti and Viti Levu.	<ul style="list-style-type: none"> • General: storm surge on Tailevu coast and 1.8m storm surge at Navua on 20th (Kerr, 1976; Blong, 1994). • Ba: flood peak estimated at 4.42m below the 1931 peak at Rarawai rail bridge on the 21st; Rarawai rail bridge damaged (Yeo, 1998; CSR). • Nausori: Rewa River in flood (SMH, 22/2/1941). • Navua: severe flooding (Kerr, 1976; D'Aubert, 1994); carried away spans of Deuba bridge (Duaibe, 2008).
1941 Dec 25-26	(cyclone) From Northwest passed near Savusavu and Taveuni.	<ul style="list-style-type: none"> • Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). • Navua River: flooded (FMS, 1997a).
1942 Feb 3		<ul style="list-style-type: none"> • Macuata Province, Vanua Levu: Vuni Cui Cui bridge submerged to depth of 10 ft (3.0m) and carried away (CSR).
1943 Jan 1-3*	(hurricane) Vanua Levu and Lau.	<ul style="list-style-type: none"> • General: flood damage recorded across the country (FMS, 1997a). • Labasa: flooding in places (Kerr, 1976); Qawa River overflowed for a few hours on 1st (CSR); flooding in places on the 3rd (Blong, 1994). • Savusavu: flooding in places (Kerr, 1976).
1944 Jan 9	(cyclone) Crossed Viti Levu from west to east just south of Nadi	<ul style="list-style-type: none"> • Macuata Province, Vanua Levu: damaging floods in Wainikoro and Bucaisau Rivers (CSR).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1944 Mar 20	(hurricane) Passed 50 miles west of Lautoka from west of Wallis Is.	<ul style="list-style-type: none"> Ba: flood peak estimated at 3.81m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). Tavua: flood (CSR).
1945 Apr 22-23		<ul style="list-style-type: none"> Labasa: Qawa River overflowed at Labasa Mill; Qawa flat underwater for 24 hours; damage to seawalls (CSR)
1946 Jan 30	(cyclone) Western and southern Fiji Group.	<ul style="list-style-type: none"> Ba: flood peak 5.85m a.m.s.l. at Rarawai Mill, 1 ft (0.3m) in mill (Yeo et al., 2007). Tavua: floodwaters reached level comparable to 1931 flood (CSR). Rewa River: rose 40 ft (12.2m) (SMH, 2/2/1946). Wainibuka River: rose 70 ft (21.3m) (SMH, 2/2/1946).
1946 Feb 12		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.27m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1946 Mar 28		<ul style="list-style-type: none"> Ba: flood peak estimated at 3.51m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1946 Apr 10		<ul style="list-style-type: none"> Navua: flood; not as high as 1935 flood (Duaibe, 2008).
1947 Feb 8		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.11m below the 1931 peak at Rarawai rail bridge (Yeo, 1998). Tavua: flats badly flooded (CSR). Yaqara: Yaqara River flooded (CSR).
1948 Jan 7		<ul style="list-style-type: none"> Labasa: Qawa River rose about 3 ft (0.9m) above spring tide level at Labasa Mill; covered practically whole of Qawa flat; under main office to depth of 2 ft (0.6m); no rise in Labasa River (CSR).
1948 Jan 31 - Feb 4	(hurricane) Rotuma, Western Viti Levu and Kadavu.	<ul style="list-style-type: none"> General: Viti Levu rivers in high flood (Kerr, 1976; D'Aubert, 1994).
1948 Dec 7	(hurricane) Rotuma, east of Vanua Levu and Lau; Taveuni had more than 350mm rain in two days (Campbell, 1984).	<ul style="list-style-type: none"> Naitauba island: all buildings flooded (Kerr, 1976).
1949 Jan 8		<ul style="list-style-type: none"> Tavua: heavy flood (CSR).
1950 Jan 3		<ul style="list-style-type: none"> Labasa/Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flooding not severe at Wainikoro. - Qawa River flood peak 2 ft (0.6m) below 1929 peak at Labasa Mill at 7-8 a.m.; water lapped over main office floor; 2 ft (0.6m) deep over mill floor; estimated 12 knot current at mill; Batanikama pump house completely submerged. - flooding in Labasa River much less severe than in Qawa River. - flooding of Wailevu flats. - one drowning at Vulovi. (Yeo, 2001; CSR).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1950 Feb 25 - Mar 1	(storm) Lau, between Vanua Levu and Viti Levu, west of Viti Levu. Prolonged heavy rain as rate of movement slowed down when turned south near Yasawas (Kerr, 1976).	<ul style="list-style-type: none"> Ba: flood peak 5.55m a.m.s.l. at Rarawai Mill, at mill floor level (Yeo et al., 2007). Tavua: major flood (CSR). Labasa/Macuata Province, Vanua Levu: <ul style="list-style-type: none"> flood peak higher than 1929 flood for Wainikoro district, possibly higher than ever before; floodwaters estimated 12 ft (3.7m) over Wainikoro office floor; 'water-spout and whirl-wind' on 27th destroyed 12 houses; many breaks to seawalls in Wainikoro district. flood peak higher than 1929 flood for Bucaisau district, possibly higher than ever before. flood peak higher than 1929 flood for Vuo district, possibly higher than ever before. Qawa River flood peak 0.56m below 1929 peak at Labasa Mill; peak on 26th 2 inches (5cm) higher than Jan 1950 flood; lapped over main office floor; over 2 ft (0.6m) deep throughout mill; Batanikama pump house completely submerged again; less damage at mill than Jan 1950 flood because more warning and better prepared. (Yeo, 2001; CSR).
1950 Mar 13		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1950 Mar 30	(storm) Moderate. Southern Viti Levu.	<ul style="list-style-type: none"> Labasa/Macuata Province, Vanua Levu: <ul style="list-style-type: none"> significant flood damage in Wainikoro and Bucaisau districts; flood 2 ft (0.6m) over Wainikoro office floor. Qawa River rose to depth 3 ft (0.9m) under main office at Labasa Mill; not in mill. (Yeo, 2001; CSR).
1951 Feb/Mar*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1951 May 23		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.15m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1952 Jan 24	(cyclone) Minor cyclone on 24 th , South-eastern Vanua Levu and Lau Group.	<ul style="list-style-type: none"> Labasa/Macuata Province, Vanua Levu: major flooding of Labasa, Bucaisau and Wainikoro Rivers; possible confusion with Feb 1950 flood (Yeo, 2001).
1952 Jan 28	(hurricane) On 28 th , passed over Northern Yasawas and crossed the coast of Viti Levu near Rakiraki.	<ul style="list-style-type: none"> Ba: no flooding - the river level remained under Rarawai rail bridge (CSR); the high level at Ba town reported by PWD (2000) is a confusion with the Jan 1956 flood (Yeo, 2010). Navua River: flood occurred at about midday on 28th when dam formed by landslide burst, sweeping away three villages in Namosi – Namosi, Rukunibua and Waivaka; no fatalities there (FTs). Rewa River: serious flooding (source unknown). Wainibuka River: severe flooding (source unknown). Yasawas: severe storm surge at Yasawa and Nacula Islands, with (at least) 3 fatalities (FTs).
1953 Jan 13		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.15m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1954 Jan 15-19*	(hurricane) Northwest of Fiji.	<ul style="list-style-type: none"> General: some flood damage on Viti Levu (FMS, 1997a).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1954 Mar 8*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1954 Mar 30		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.15m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1955 Mar 8		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1955 Mar 8		<ul style="list-style-type: none"> General: flooding extended from Rakiraki to Korotogo via western Viti Levu (PIM, 1955). Ba: flood peak estimated at 4.23m a.m.s.l. at Ba town i.e. almost 3 ft (0.9m) over old Gov't road bridge (Yeo, 1998). Lomawai bridge, Queens Road (south of Nadi): six flood fatalities on 20th when a taxi fell into the swollen river (PIM, 1955). Nadi: Flood reportedly the worst for 23 years; shops flooded (PIM, 1955).
1956 Jan 30-31	Minor. Approached Fiji from the Northwest passed western Fiji; Vatukoula had 664mm rain on 30 th (24 hours) (FNA).	<ul style="list-style-type: none"> General: 3 fatalities in flooded rivers reported (FNA). Ba: flood peak 7.66m a.m.s.l. at Rarawai Mill, 2 ft 4 inches (0.7m) below 1931 flood, mill flooded, highest level since 1931 record flood (Yeo et al., 2007); flood peak 6.85m a.m.s.l. at Ba town (Yeo et al., 2007; PWD, 2000); 10 ft in Ba town (FNA); severe damage to Rarawai Mill (£13,670) and to shops (£62,000) (Yeo, 2000); original wooden Ba mosque broke up on second day of flood (Yeo, 1998); Namosau Creek contributed to flooding at Yalalevu (Yeo, 1998). Ba valley: flood destroyed five houses at Toge (Yeo, 1998). Nadi: highest flood since 1938-39; higher than 1955 flood; heavy loss of merchandise (FTs). Nausori: Rewa River rose 15.25 ft (4.6m) above normal high water mark at township; highest level since 1931 record flood; peak 5.5 ft (1.7m) below level of 1931 flood; 3 ft (0.9m) deep in town on 31st Jan; floodwater reached floor of hospital (FTs; Blong, 1994). Rakiraki: severe flood with 2 ft (0.6m) in Penang Mill (FNA). Tavua: Nasivi River flood peak 2 ft (0.6m) above 1931 flood (FTs). Waidina River: unexceptional flooding (FNA). Waimanu River: unexceptional flooding (FNA). Wainibuka River: very bad flooding (FNA). Wainimala River: bad flooding (FNA).
1956 Feb 25 - Mar 1	Minor cyclone on 16 th affecting Northern Fiji then hurricane on 25 th affecting Southern Western Viti Levu.	<ul style="list-style-type: none"> Ba: Rarawai rail bridge flooded from 25th to 29th, subsided on 1st (CSR); flood peak estimated at 4.30m a.m.s.l. at Ba town i.e. 0.9m over old Gov't road bridge (Yeo, 1998). Sigatoka: Girl drowned (FTs). Tavua: flats flooded for about a week (CSR). Labasa: flooding on 23rd, 2.5 ft (0.8m) over engine room of radio station (FTs).
1956 Mar 6	Minor to moderate. South-western and South-eastern Viti Levu and Kadavu.	<ul style="list-style-type: none"> General: severe flooding on Viti Levu (FMS, 1997a). Ba: flood peak 6.97m a.m.s.l. at Rarawai Mill, mill flooded, 4 ft 7 inches (1.4m) below 1931 flood (Yeo et al., 2007); market place flooded (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Nadarivatu area: river bank at Koro-O collapsed and carried away stock from Nadarivatu Timber Company (FTs). Nadi: flooded (FNA). Labasa: flooding (FNA; FTs).
1957 Jan 16		<ul style="list-style-type: none"> Ba: flood peak 5.55m a.m.s.l. at Rarawai Mill, at mill floor level (Yeo et al., 2007); heavy flood down Nadrou Creek destroyed Nadrou tramline bridge, water rose an estimated 25 ft (7.6m) in one hour (CSR).
1958 Nov 28 - Dec 6*	(hurricane) Rotuma, Yasawas, Northern and Eastern Fiji.	<ul style="list-style-type: none"> General: heavy rain particularly on the north coast of Viti Levu, led to flooding (Kerr, 1976). Nausori: water rose to 0.6-1.0m in a few houses in the area (Kerr, 1976; Blong, 1994; D'Aubert, 1994). Rakiraki: Penang Mill flooded (Kerr, 1976). Tailevu: flooding (FTs).
1959 Jan 20		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.72m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1959 Mar 14		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1959 Mar/Apr*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1959 Dec 30	(hurricane) Southeastward, passed south of Viti Levu.	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1960 Feb 24		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1960 Mar 4		<ul style="list-style-type: none"> Ba: flood peak estimated at 2.92m below the 1931 peak at Rarawai Mill; mill yard flooded; water about to enter mill (Yeo, 1998; CSR).
1961 Feb 4		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge; Kings Road impassable to most traffic at Navatu flat (Yeo, 1998; CSR).
1962 Jan 9-10		<ul style="list-style-type: none"> Ba: minor local flooding in Rarawai district (CSR). Yaqara: considerable flooding (CSR).
1964 Feb 24		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.33m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1964 Mar 22	(storm) West of Nadi.	<ul style="list-style-type: none"> Ba: flood peak 6.62m a.m.s.l. at Rarawai Mill, 3.5 ft (1.1m) in mill; peak 6.19m a.m.s.l. at Morris Hedstroms in Ba town (Yeo et al., 2007); flood rose in day and peaked in afternoon, allowing shopkeepers to elevate stock (Yeo, 1998); second peak on 25th did not enter mill itself (CSR). Ba valley: 2 bure fell into river when bank eroded at Nawaqarua (Yeo, 1998). Korovou, Tailevu: damage more severe than Feb 1965 flood (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Nadi: flood peak 6.72m a.m.s.l. (PWD, 2000); 18 ft (5.5m) in main street on night of 21st (FTs); temporary bridge over Nadi River destroyed (FNA, 1966). Navua: flood reminded farmer of Dec 1929 flood; water 1 ft+ (0.3m+) deep in Navua Hotel bar (FTs). Rakiraki: Penang Mill flooded; one flood fatality in Ra (FTs). Rewa River: devastation compared to Feb 1931 flood but this flood rose faster in Rewa delta; hundreds of evacuations (FTs). Sigatoka: completely flooded from hill to hill; severe damage in valley; part of Sigatoka bridge destroyed (FTs). Wainibuka River: 14 bures destroyed by flooding at Lutu (FTs). Wainimala River: highest level in living memory (?) (FTs). Labasa: one flood fatality (FTs).
1964 May*		<ul style="list-style-type: none"> Waidina River: devastating flood, worse than Mar 1964 (FTs).
1964 Dec 18-22	(hurricane) Western Viti Levu.	<ul style="list-style-type: none"> General: roads and villages flooded; communications disrupted; food crops damaged (Kerr, 1976; D'Aubert, 1994). Ba: river swollen but no flooding (CSR).
1965 Jan 19		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1965 Feb 9-12	(hurricane) One of the largest, most intense hurricanes on record in the Fiji area. North coast of Vanua Levu, Western Viti Levu, Northern Yasawas and Southwestern Kadavu. The very slow movement of the hurricane meant prolonged heavy rain and widespread floods, which in some areas eclipsed the floods of March 1964 (Kerr, 1976).	<ul style="list-style-type: none"> General: severe flooding on the main islands caused heavy stock and crop losses and claimed 11 lives (Kerr, 1976; D'Aubert, 1994). Ba: flood peak 6.31m a.m.s.l. at Rarawai Mill, 1 ft (0.3m) below Mar 1964 flood, mill flooded (Yeo et al., 2007); water 6 ft (1.8m) over old Gov't road bridge and 2-3 ft (0.6-0.9m) in lower areas of township (FTs); PWD (2000) list peak of 6.5m a.m.s.l. at Ba town, which is regarded as suspect (Yeo, 2010); relatively light damage to Ba commercial district (Yeo, 1998). Korovou, Tailevu: damage not as severe as in Mar 1964 flood (FTs). Nadi: higher than Oct 1972 flood (Harris, 1972); regarded as the highest flood on record at the time and much higher than Mar 1964 flood (FTs); severe damage to shops; Narewa village severely damaged (FTs). Nausori: flood peak 0.13m above Oct 1972 peak at Nausori Pump Station i.e. 7.24m (Harris, 1972); note that Raj (1986) estimates lesser discharge in Feb 1965 compared to Oct 1972 at Nausori bridge, which conflicts with Harris (1972); Feb 1965 Rewa River flood flow gauged and estimated at 350,000 ft³/s (~9,900 m³/s) (FNA, 1966); most shops flooded with losses of £25,000 (FTs). Rewa River (see Nausori entry also): floodwaters broke over northern bank of river at Navuso Agricultural School for first time since 1931 flood; the school suffered losses of £5,000-£6,000; Rewa delta flooded; Toga Island evacuated; at least several feet higher than Mar 1964 flood (FTs). Sigatoka: parts of township flooded; flood depth in valley 1.5 ft (0.5m) less than Mar 1964 flood (FTs); major flood (Parry, 1987). Waidina River: many houses washed away at Korovou village (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Waimanu River: flood fatality near Sawani (FTs). Wainibuka River: major flood (FTs). Wainimala River: major flood (FTs). Labasa: more than half town flooded with depths up to 3 ft (0.9m) in some shops (FTs).
1965 Mar 2		<ul style="list-style-type: none"> Ba: flood peak 4.30m a.m.s.l. at Ba town, 0.9m over old Gov't road bridge (Yeo, 1998; CSR).
1965 Apr 2		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.36m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1966 Mar 16		<ul style="list-style-type: none"> Yaqara: flash flood (CSR).
1967 Jan 20		<ul style="list-style-type: none"> Tavua: Nasivi River in flood (CSR). Yaqara: Yaqara River in flood (CSR).
1967 Mar 21		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.15m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1968 Mar 21		<ul style="list-style-type: none"> Ba: flood peak over both Rarawai and old Gov't road bridges (Yeo, 1998; CSR).
1970 Feb 13-16*		<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1970 Dec 17	<i>Priscilla.</i> (gale) Yasawas, Mamanucas, Vatulele, Southwest Viti Levu, and Kadavu.	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1971 Mar 8	<i>Thelma.</i> (gale) Western and Southwestern Viti Levu.	<ul style="list-style-type: none"> Ba: flood peak over both Rarawai and old Gov't road bridges (Yeo, 1998; CSR).
1972 Jan 14		<ul style="list-style-type: none"> Ba: flood peak over both Rarawai and old Gov't road bridges (Yeo, 1998; CSR).
1972 Oct 24-25	<i>Bebe.</i> (hurricane) Whole of Fiji affected.	<ul style="list-style-type: none"> General: storm surge recorded near Natunuku on Ba coast (Yeo, 1998). Ba: flood peak estimated at 6.36m a.m.s.l. at Rarawai Mill, mill flooded (Yeo et al., 2007); Rarawai rail bridge severely damaged, interrupting transport of cane to mill (FSC, 1986; Yeo, 1998); production at mill suspended for about 8 days (Yeo, 1998); peak about 3 ft (0.9m) below Jan 1956 flood in Ba town (Harris, 1972); Ba town flooded to 5 ft (1.5m) (Blong, 1994); shops in market subdivision flooded (Yeo, 1998). Lautoka: flooding in Vitogo and Namoli, 2-4 ft (0.6-1.2m) deep in places (Blong, 1994). Nadi: flood peak 1.37m deep at ANZ bank on 24th, somewhat lower than the Feb 1965 flood (Harris, 1972); 8 ft (2.4m) in town (Blong, 1994); about 500 houses damaged (source unknown). Nausori: Rewa River flood peak 7.11m (= 6.45m a.m.s.l.) at Nausori Pump station on 25th, 0.13m below Feb 1965 flood (Harris, 1972); flood peak 6.72m at old Nausori bridge (MAFF); Nausori town

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<p>flooded by 0.9-1.1m water near bus station and Nausori Airport had a similar depth of water at the terminal building (Harris, 1972); 18 ft (5.5m) above normal (Blong, 1994).</p> <ul style="list-style-type: none"> • Navua: water lapped doorstep at Navua Hotel; floodwater entered some low-lying shops; 70 year old Queens Road bridge collapsed (Harris, 1972); river rose to 20 ft (6.1m) above normal at Navua (Hackett, n.d.). • Navua River: flood peak 10.88m at Nakavu on 24th (Harris, 1972); river rose to 60 ft (18.3m) above normal at Namuamua; river burst its banks at Waidova, Calia and Naitata (Hackett, n.d.). • Rakiraki: floodwater about 3 ft (0.9m) deep in Penang Mill (Maurice Abrahams, former Mill manager, pers. comm., 11 Sep 1996). • Sabeto River: severe flood, Nadele flooded, village moved to Korobebe (Yeo, 1998). • Sigatoka: disastrous flood (Blong, 1994). • Waidina River: flood peak 8.51m at Nabukaluka (Harris, 1980; Raj, 1986); reached 10.1m over deck of Naqali bridge on 25th, about 0.5m below Feb 1965 flood (Harris, 1972). • Waimanu River: flood peak 7.91m at Pump Station (Raj, 1986). • Wainibuka River: flood peak 17.4m at Nayavu on 24th, about 3.0m below Feb 1965 flood (Harris, 1972); note that Raj (1986) lists peak as 19.0m but this appears to be a conversion error. • Wainimala River: flood peak 17.36m at Vunidawa (Raj, 1986).
1973 Mar 2-6		<ul style="list-style-type: none"> • General: five flood fatalities – two in Rewa area, two in Ba area, one in Nadi area (FTs). • Ba: flood peak estimated at 4.24m a.m.s.l. at old Gov't road bridge ('nearly 3 ft' - say 0.85m - deep) (FTs; Yeo, 2010); Nagan Engineering factory at Yalalevu under more than 3 ft (0.9m) of water; schoolboy drowned in flooded Namosau Creek on 5th; second body found trapped against Ba bridge; broken water mains disrupted supply; Rarawai rail bridge badly damaged (FTs). • Kings Road: closed from Tavua to Rakiraki on 4th (FTs). • Nadi: about 2½ ft water (0.8m) in business district, flooding shops; low-lying approaches to Nadi bridge under 3 ft water (0.9m), closing road to traffic; one man drowned attempting to cross Mulomulo River on 5th (FTs). • Nausori area: Bau, Nakelo and Wainibokasi Roads flooded on 4th; Nausori Airport terminal building flooded on 5th (FTs). • Navua: Navua River 6 ft (1.8m) above normal and Waidradra flats 2 ft (0.6m) under water on 4th (FTs). • Queens Road: bridge at Cuvu 2 ft (0.6m) under water; bridge at Togavula 3 ft (0.9m) under water (FTs). • Rewa delta: four houses flooded in Suva Lailai village on 4th; most houses in Nukutubu flooded; houses in Vunisinu flooded; 1,250 evacuated on 5th (FTs). • Sigatoka: Sigatoka River rose 10-12 ft (3.0-3.6m) on night of 4th; Lawaqa Creek swelled and flooded children's park with 8-9 ft water (2.4-2.7m); Queens Road cut near Koromunu hospital (FTs). • Suva: Wailoku River burst banks about 7.30 p.m. on 2nd and receded about 2 a.m. on 3rd; some homes flooded; regarded as a frequent 'minor' flood; not as bad as 1949 flood (?) (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Tavua: houses flooded in Nabuna village (FTs). Waimanu River: one fatality at Sawani (FTs). Macuata Province, Vanua Levu: Wainikoro, Vunimoli and Korotari Roads flooded on 4th and closed to traffic; floodwaters rose 4 ft (1.2m) at Korowiri (FTs).
1973 Mar 13		<ul style="list-style-type: none"> Queens Road: cut at Waidoi (3ft = 0.9m) and Navua (4ft = 1.2m) (FTs).
1973 Apr 25		<ul style="list-style-type: none"> General: flooding in Rewa delta, Queens Road at Deuba, Kings Road at Nayavu, Kings Road near Rakiraki (FTs).
1974 Jan 10-12		<ul style="list-style-type: none"> General: flooding in Western Division closed many roads (FTs). Nadi-Sigatoka: bridge at Tunalia under 2 ft (0.6m) floodwater on 12th (FTs). Rakiraki: flood 3 ft (0.9m) deep at Naqoro flats near Vaileka on 10th; flood 2 ft (0.6m) deep at Navolau bridge on 11th; flooding at Waimare bridge (FTs). Yaqara: 1 ft (0.3m) flooding on 11th (FTs).
1974 Feb 25-26		<ul style="list-style-type: none"> General: flooding in western division especially Ba. Ba: flood peak estimated at 4.61m a.m.s.l. at old Gov't road bridge (4 ft i.e. 1.2m deep) on morning of 26th (FTs; Yeo, 2010); shopping centre in Kings Road flooded up to 3 ft (0.9m) and most shops had water inside; homes at Namosau flooded; one student drowned when attempting to cross flooded creek at bridge at Rarawai (FTs). Ba delta: some homes flooded at Votua, Nawaqarua and Natutu villages (FTs). Lautoka: floods swept away about 300 ft (~90m) of 12 inch (0.3m) cast iron pipe from the Varaqi water intake on 26th; river level in gorge about 75 ft (20+ m) above normal (FTs). Nadi: approach to Nadi bridge from Lautoka under 3 ft (0.9m) of water (FTs). Rakiraki: Naqoro flats and Kings Road between Wairuku and Rakiraki under several ft (0.6+ m) of water; flooding at Navalau; FSC Mill not flooded (FTs). Sabeto: roads flooded (FTs). Sigatoka valley: culvert washed out near Mavua closing Valley Road (FTs). Tavua: homes in Nabuna and Rukuruku villages under 3+ ft (0.9+ m) of water. Labasa: many roads closed to light traffic on night of 25th (FTs). Savusavu: Buca Bay road temporarily closed due to flooding (FTs).
1974 Mar 12-14		<ul style="list-style-type: none"> Ba: flood peak estimated at 4.00m a.m.s.l. at old Gov't road bridge (2 ft i.e. 0.6m deep) on evening of 12th (FTs; Yeo, 2010); no flooding in town (FTs). Nadi: serious flooding on 14th, about 5 ft (1.5m) deep at old bus station; Queens Road closed on Navo Flats and near Namotomoto village on Lautoka side (FTs). Nadi-Sigatoka: Semo bridge under 2 ft+ (0.6m +) water on night of 13th (FTs). Rakiraki: Kings Road closed to traffic due to flooding on 12th; Naqoro flats flooded to depth of 1½ ft

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1974 Apr 24-26		<p>(0.45m) (FTs).</p> <ul style="list-style-type: none"> Ba: old Gov't road bridge under 3 ft (0.9m) and closed to all traffic on 24th; old market area under 3 ft (0.9m) on 26th (FTs). Korolevu, Coral Coast: Komave Creek flooded and changed course, washed away a section of Queens Road (FTs). Lautoka: near fatality when girl slipped and fell into drain, rescued by passer-by (FTs). Nadi: near fatality when villager attempted to cross Nadi River; approach to Nadi bridge on Lautoka side washed away (FTs). Navua: Navua River burst its banks on night of 25th; in some areas flood levels were only 9 inches (0.2m) below 'Bebe' flood of Oct 1972; build up of debris threatened the temporary bridge that had replaced the old Navua bridge which had been wrecked in the 'Bebe' flood (FTs). Rakiraki: large areas of cane and rice growing land underwater (FTs). Rewa delta: no flooding reported (FTs). Waidina River: Naqali bridge under more than 13.5 ft (4.1m) floodwater (FTs). Wainibuka River: Nayavu bridge on Kings Road under 20 ft (6.1m) water and Wailotua bridge under 30 ft (9.1m) water (FTs). Wainimala River: flooded; village in lower part of Vunidawa district reported under 1 ft (0.3m) water (FTs).
1974 May 15		<ul style="list-style-type: none"> Moala, Lau: swollen creek following a torrential downpour swept through part of Naroi village, damaging houses, kitchens, latrines and a suspension bridge (FTs).
1975 Nov 17-20		<ul style="list-style-type: none"> Ba: 4 ft (1.2m) over old Gov't road bridge on 20th; Rarawai Mill cut off from Ba Town (FTs). Nadi: bus station flooded on 17th (FTs). Navua: waist-high floodwaters on Queens Road (FTs). Rakiraki: 4 ft (1.2m) at Naqoro flats on 20th (FTs). Tavua: roads flooded (FTs). Waidina River: Naqali bridge flooded by 7 ft (2.1m) water on afternoon of 17th (FTs). Waimanu River: flooded (FTs). Labasa: Labasa Mill flooded from Qawa River; Boubale Irish crossing of Qawa River damaged; Korowiri Road flooded; water up to 8 ft (2.4m) deep at Bulileka (FTs).
1976 Jan 21-22		<ul style="list-style-type: none"> Labasa: Labasa Mill flooded from Qawa River on about 22nd (FTs).
1976 Mar 4		<ul style="list-style-type: none"> Ba: debris accumulated on old Gov't road bridge (FTs). Kings Road: bridge across Naqia River between Rakiraki and Suva badly damaged (FTs). Lautoka: farms flooded at Drasa (FTs). Rakiraki: Naqoro flats under 5 ft (1.5m) water; six shops flooded; Drauniivi bridge washed away (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> • Yaqara: flats under 4 ft (1.2m) water (FTs).
1977 Feb 4*		<ul style="list-style-type: none"> • Ba: flood peak estimated at 6.08m a.m.s.l. at Rarawai Mill, mill probably flooded (Yeo et al., 2007); shops in market subdivision sustained heavy losses when flood came after midnight; shops on Kings Road flooded (Yeo, 1998); 0.58m deep in house in Yalalevu, compared to 0.97m in Apr 1986 and 1.65m in Jan 1993 (Yeo, 2010). • Waimanu River: floodwaters cut road traffic (FTs).
1977 Mar 15*		<ul style="list-style-type: none"> • Navua River: flooding (FTs). • Suva: flooding at Vatuwaqa (FTs).
1978 Dec 29-30	<i>Fay.</i> (storm) Rotuma, Eastern Vanua Levu, Taveuni, Lau Group.	<ul style="list-style-type: none"> • General: major flooding in Vanua Levu and Taveuni (FMS, 1997a).
1979 Mar 26-28	<i>Meli.</i> (hurricane) Southern Islands of Fiji, Southern and South-eastern Viti Levu.	<ul style="list-style-type: none"> • General: severe storm surge at Nayau (Campbell, 1984); major flooding around Viti Levu (FMS, 1997a).
1979 May 9		<ul style="list-style-type: none"> • Rewa River: 10 ft (3.0m) above normal (source unknown). • Waimanu River: about 0.6m below Apr 1980 flood at Sawani (Harris, 1980).
1980 Apr 3-5	<i>Wally.</i> (gale) Korolevu, Yasawas, Southern Viti Levu, Navua, Vatulele, Kadavu and Beqa. The cyclone passed along the south of Viti Levu, generating exceptionally high rainfall along the coast.	<ul style="list-style-type: none"> • General: almost all the coastal rivers on Viti Levu from Korolevu to Nausori flooded, causing extensive damage to the main highway, considerable loss of livestock, pasture and crops (FMS, 1997a). • General: 15 fatalities associated with Cyclone Wally, 3 drowned and 12 in landslides; Queens Road closed for 8 weeks (Wither, 1980). • Galoa, west of Deuba: flood coincided with low tide causing severe erosion of sandspit on which school built (Howorth et al., 1981). • Korovisilou: extreme flooding (Harris, 1980). • Lami River: approx. 0.8m over Nasevou Road (Harris, 1980). • Nabukavesi Creek: peak 0.80m above May 1979 peak (Harris, 1980). • Nausori: Rewa River flood peak 6.55m (= 5.89m a.m.s.l.) at Nausori Pump station, 0.56m below Oct 1972 flood (Harris, 1980); flood peak 6.18m at old Nausori bridge (MAFF). • Navua: flood reached 0.70m above floor of PWD Office at Navua, 0.44m above Oct 1972 peak (Harris, 1980); peak floodwaters 1.0-1.5 deep on Navua floodplain (Howorth et al., 1981); estimated 1,000 cattle lost in Navua area (Wither, 1980). • Navua River: extreme flooding; flood peak 12.00m at Nakavu on 4th, 1.12m above Oct 1972 peak; return period estimated at 70 years (Harris, 1980); only two dwellings survived on flat at Namuamua village (Johnson, 1981). • Rewa River (see Nausori entry also): experienced a high flood with return period estimated at about 10 years; most of delta inundated but levels were below Oct 1972 (Harris, 1980).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> • Savura Creek: peaked at 3.61m at Casade, 0.51m above May 1979 peak; water was 1.51m deep in Wailoku Health Centre, at least 0.5m above May 1979 peak; estimated return period of 70 years (Harris, 1980). • Sigatoka River: major flooding (Parry, 1987). • Veisari Creek: flowed about 0.2m over highway (Harris, 1980). • Waidina River: flood peak 8.29m at Nabukaluka, 0.22m below Oct 1972 peak; return period estimated at 40 years in upper reaches decreasing to 15 years in Nabukaluka area (Harris, 1980). • Waimanu River: extreme flooding; flood peak 9.31m at Pump Station, 0.07m above May 1979 peak; 0.6m above May 1979 peak at Sawani; return period estimated at 100 years (Harris, 1980); flooding of pump station affected Suva water supply for several days (Howorth et al., 1981). • Wainibuka River: moderate to high flood level (not a major contributor to Rewa) (Harris, 1980); flood peak 8.66m at Nayavu (Raj, 1986). • Wainimala River: moderate to high flood level (not a major contributor to Rewa) (Harris, 1980). • Wainaboro Creek: peak 0.19m in treatment plant (Harris, 1980).
1981 Jan 29	Front passed over Fiji from the west on 25 th .	<ul style="list-style-type: none"> • Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1981 Apr 12-13	Trough moved over Viti Levu from the west, rain-bands reached the southwest part of the island by midday on 12 th .	<ul style="list-style-type: none"> • Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998); flood peak for Ba River at Toge recorded at 0100hrs on 13th (PWD, 2000).
1982 Jan 23-31*	<i>Hettie</i> . (storm) Mamanucas and Western Viti Levu.	<ul style="list-style-type: none"> • General: extensive flooding in Northern, Western and Central parts of Viti Levu and Vanua Levu (FMS, 1983). • Ba: minor flooding on 30th (PWD, 2000). • Nadi: flood peak 5.86m a.m.s.l. (PWD, 2000); 4 ft (1.2m) water at Nadi bus station (Blong, 1994); one flood fatality (FTs). • Sigatoka: rose 4m at Nacocolevu (Blong, 1994). • Labasa: flooding in many areas (Blong, 1994); one flood fatality (FTs).
1983 Feb 28 - Mar 2	<i>Oscar</i> . (hurricane) Viti Levu, Yasawas, Lomaiviti, Southern Lau and Kadavu.	<ul style="list-style-type: none"> • General: heaviest flood damage in western and southwestern Viti Levu (source unknown). • General: 2m storm surge reported near Vuda, Nadi and southwest coast of Viti Levu, with some reports suggesting 3-4m at Momi and Beqa Island (FMS, 1984; Blong, 1994). • General: overall damage for the country (including flood) amounted to approximately (1998)F\$148 million (World Bank, 2000). • Ba: flood peak estimated at 5.93m a.m.s.l. at Rarawai Mill, mill probably flooded (Yeo et al., 2007); flood peak 5.37m a.m.s.l. in Ba town (PWD, 2000).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Nadi: flood peak 6.61m a.m.s.l. on 2nd (PWD, 2000); 12 ft (3.7m) of water in the market (Blong, 1994); Nadi Council estimated their damages to exceed \$300,000 (FTs). Navua: heavy flood losses to Consolidated Agriculture Fiji Ltd (FTs). Sigatoka: flood peak 3.90m a.m.s.l. on 2nd (PWD, 2000); one metre in Morris Hedstroms building (FTs); floodwater reached the Valley Road, some houses washed away (Blong, 1994).
1984 Mar 16-18	<i>Cyrl.</i> (gale) Western Division.	<ul style="list-style-type: none"> General: significant flooding in Northern and Western Vanua Levu and Viti Levu (source unknown). Ba River: flood peak at Toge recorded at 1300 hrs on 18th (PWD, 2000). Nadi: small storm surge observed in Nadi Bay with sea level estimated to have been 0.3m above normal on 16th (FMS, 1985a); flood peak 5.62m a.m.s.l. in Nadi town on 18th (PWD, 2000); 1m of floodwater at the Nadi bus station (Blong, 1994).
1985 Jan 17	<i>Eric.</i> (hurricane) Yasawas, Mamanucas, whole of Viti Levu and Southern Lau.	<ul style="list-style-type: none"> General: crop and livestock losses in Western Viti Levu (FMS, 1997a). General: overall damage for the country (including flood) amounted to approximately (1998)F\$64 million for the country (World Bank, 2000). Nadi: flood peak 4.56m a.m.s.l. (PWD, 2000).
1985 Jan 19	<i>Nigel.</i> (hurricane) Southern Yasawas, Mamanucas, Northern half of Viti Levu, and Lomaiviti and Southern Lau.	<ul style="list-style-type: none"> General: storm surge recorded in Western Fiji (FMS, 1997a); storm surge recorded near Natunuku on Ba coast (Yeo, 1998). Ba: flood peak estimated at 4.30m a.m.s.l. at Ba town; 3 ft (0.9m) over old Gov't road bridge (Yeo et al., 2007). Lautoka: localised flooding (Blong, 1994). Nadi: flood peak 4.74m a.m.s.l. (PWD, 2000).
1985 Mar 5-7	<i>Gavin.</i> (storm) Western and Southwestern parts of Viti Levu.	<ul style="list-style-type: none"> General: serious flooding in the Ba, Nadi, Sigatoka and Rewa valleys (FMS, 1986a, 1997). Ba: flood peak estimated at 6.23m a.m.s.l. at Rarawai Mill on 6th, mill probably flooded (Yeo et al., 2007); peak 5.67m a.m.s.l. at Ba town (PWD, 2000); water entered every shop in the market subdivision and entered shops on Kings Road for the first time since 1977 (Yeo, 1998); flood rose in day and peaked in afternoon, allowing shopkeepers to elevate stock (Yeo, 1998). Nadi: floods (Blong, 1994). Nausori: flood peak 4.43m (= 3.77m a.m.s.l.) at Nausori bridge on 7th (Raj, 1986; Blong, 1994; cf. PWD, 2000). Sigatoka: flood peak 3.5m a.m.s.l. on 6th (PWD, 2000). Wainibuka River: peaked at 18.04m at Nayavu (Raj, 1986). Wainimala River: peaked at 11.4m at Vunidawa (Raj, 1986). Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 3.93m for Wainikoro River at Nasasa;[#] - flood peak 5.41m for Bucaisau River at Qelemumu; - flood peak 3.94m for Dewala River (tributary of Labasa R.) at Nakorotari;

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> - flood peak 4.06m for Wailevu River at Nakama; - flood peak 5.97m for Dreketi River at Natua (PWD Hydrology records; Yeo, 2001; Terry et al., 2004).
1985 Mar 16-17	<i>Hina</i> . (hurricane). Yasawas, Mamanuca, Viti Levu and parts of the Lomaiviti Group	<ul style="list-style-type: none"> • General: widespread flooding about northern and western parts of Viti Levu, the Mamanucas, Kadavu and Vatulele; several river crossings about interior of Nadi and Sigatoka washed away including Draiba bridge; about 1m storm surge reported along Viti Levu's Southwest coastline on the 16th, especially between Vuda and Momi Bay (FMS, 1985b). • Ba: flood peak variously recorded as 4.87m a.m.s.l. (PWD cited in Yeo, 1998) or 5.03m a.m.s.l. (PWD, 2000) at Ba town on 17th. • Nadi: flood peak 5.38m a.m.s.l. in Nadi town on 17th (PWD, 2000); 1-2 metres of flood water in Nadi town (Blong, 1994). • Rewa River: flooding (FMS, 1986a). • Sigatoka River: flooding (FMS, 1986a). • Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 3.20m for Wainikoro River at Nasasa;[#] - flood peak 4.81m for Bucaisau River at Qelemumu; - flood peak 3.64m for Dewala River (tributary of Labasa R.) at Nakorotari; - flood peak 4.44m for Wailevu River at Nakama; - flood peak 4.47m for Dreketi River at Natua (PWD Hydrology records; Yeo, 2001; Terry et al., 2004).
1985 Apr 12	The combined effect of a trough of low pressure to the west of Fiji and an active SPCZ centred just northwest of the Group brought widespread rainfall on 12 th . Extremely heavy rainfall received on Ovalau and around Tailevu, near which a localised trough had developed.	<ul style="list-style-type: none"> • Korovou, Tailevu: floodwater about a metre high in the township; Kings Road between Korovou and Rakiraki flooded in a number of places; damage to roads and bridges; livestock losses reported (FMS, 1985c). • Levuka, Ovalau: for the 24hrs ending 9 a.m. on 13th a total of 453mm of rainfall was received at the Levuka Post Office, the highest 1-day fall since 1926; at St John's College in Cawaci, some distance away, 637mm of rainfall was recorded from 0800 to 2230hrs on 12th when the gauge overflowed - it was estimated another 150mm of rainfall would have fallen before the event finally ceased around 0400hrs on 13th; massive landslides occurred in some areas; the effect of the floods and landslides on Levuka was severe with an estimated \$0.25M damage (FMS, 1985c); flash floods and landslides damaged shops; thousands of dollars of damage at Ranchod's supermarket (FTs).
1985 May 1-2	Trough of low pressure approached Fiji from the west preceded by a moist easterly airstream, which brought widespread rain and warm humid conditions. Very heavy prolonged rain received in southeast Viti Levu.	<ul style="list-style-type: none"> • Korovou, Tailevu: Kings Road flooded at Nadaro flats (FTs). • Nadaro village, Tailevu, 5km from Nausori: a river burst banks on afternoon of 1st; 12 out of 20 houses flooded; reported by village elder that this was first time whole village flooded (FTs). • Suva: Government House in Suva recorded 369mm of rain in the 24hrs to 9a.m. on 2nd, highest 1-day fall since May 1949 (FMS, 1985d); on 2nd, flooding in low-lying areas including Disraeli Road, Lemeki Street and Vatuwaqa (30 homes flooded); Nabukalou Creek in Suva City broke banks and flooded

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Greig Street damaging shops; flooding attributed to heavy rain, high tide and poor drainage (FTs). Waidina River: road closed at Naqali bridge (FTs). Waimanu River: road closed near Sawani bridge (FTs). Levuka, Ovalau: flash floods damaged shops; Beach Road under 1m of water at 9 a.m. on 2nd; Bureta-Levuka Road flooded in 8 places and closed to all traffic (FTs).
1986 Apr 10-11	<p><i>Martin</i>. (storm) Northern Lau, Taveuni, Vanuabalavu and northern two-thirds of Vanua Levu. The flooding on Viti Levu cannot be attributed to the cyclone which had a very distinct identity (FMS, 1986b).</p>	<ul style="list-style-type: none"> Ba: flood peak estimated at 6.46m a.m.s.l. at Rarawai Mill on 10th, mill flooded (Yeo et al., 2007; FS); shops near market and eastern end of town flooded (Yeo, 1998); more than 200 shops and houses flooded (FS). Lautoka: surrounding areas in Drasa, Vitogo, Natabua, Velo Velo, Vaivai, Saweni and Lomolomo (3-4m deep in houses) flooded; city not flooded; Namoli Creek flooded (FS). Nadi: flood peak 6.53m a.m.s.l. on 11th (PWD, 2000); town completely cut off (FS); water 1.5m deep at southern end of town (Blong, 1994); heavy losses to shops (FS). Naitasiri: one drowning in swollen creek at Nataveaira village, Lomaivuna (FS). Nasinu: one drowning in drain near Laqere River at Narere (FTs). Nausori: 5m above normal on 11th (FS). Rakiraki: Penang Mill flooded; heavy losses at Vaileka town market and shops; one drowning (FS; FTs). Sigatoka: flood peak 3.5m a.m.s.l. on 11th (PWD, 2000); parts of town underwater (Blong, 1994). Tavua: extensive flooding; shops flooded (FS). Labasa: one drowning at Batinikama on 12th (FTs). Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 3.00m for Wainikoro River at Nasasa;[#] - flood peak 5.19m for Bucaisau River at Qelemumu; - flood peak 9.60m for Dewala River (tributary of Labasa R.) at Nakorotari; - flood peak 3.30m for Labasa River at Civic Centre; - flood peak 6.17m for Wailevu River at Nakama (PWD Hydrology records; Yeo, 2001; Terry et al., 2004). Savusavu: Savudrodro flats flooded; one drowning on 12th (FMS, 1986b; FTs). Taveuni: flooding in northern part of island (FS).
1986 Apr 17-20	<p>Trough associated with Cyclone <i>Martin</i> drifted back over Fiji and became stationary close to Suva.</p>	<ul style="list-style-type: none"> General: widespread flooding and landslides caused the deaths of 8 people and extensive damage in the tributaries of the Rewa River (FMS, 1987). Lami: many factories, shops and homes flooded, up to 2.5m deep; Qauiya village flooded, many houses up to roofs, peak at about noon on 17th, reportedly worst flood there; one drowning at Wailada (FS; FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Nasinu: one drowning at Four Miles (FTs). Nausori: Rewa River flood peak 5.66m (= 5.00m a.m.s.l.) at Nausori bridge on 19th and was over 5.0m on gauge from 2330 hours on 17th to 2300 hours on 20th (Raj, 1986); peak discharge was in the order of 6,200 cubic metres per second, which is far below the discharges of each of the floods of 1972, 1973 and 1980; floodwaters from each of the Rewa tributaries reached Nausori alternatively causing a long period of inundation rather than a higher peak submerging a much greater area for a longer period (Raj, 1986). Suva: one drowning at Nabua (FS; FTs). Waidina River: peaked at 7.54m at Nabukaluka (Raj, 1986). Waimanu River: peaked at 10.48m at Pump Station (Raj, 1986); road closed (FTs). Wainimala River: peaked at 12.1m at Vunidawa (Raj, 1986). Wainibuka River: peaked at 12.84m at Nayavu (Raj, 1986).
1986 Dec 28-30	<i>Raja</i> . (hurricane) Rotuma, Northeastern Vanua Levu, Lau and Koro.	<ul style="list-style-type: none"> Labasa: Labasa River experienced worst flood since 1929 (Yeo, 2001); Labasa town's main street under 1m of water for the first time since 1929 (Blong, 1994); Naodamu Housing Subdivision had water up to ceilings (Yeo, 2001); Raj (1987) attributed flooding in Labasa to choked drainage system and exceptionally high tides, and suggested flooding would have been higher were it not for the soil moisture deficiencies. Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 3.03m for Wainikoro River at Nasasa;[#] - flood peak 5.34m for Bucaisau River at Qelemumu; - flood peak in Qawa River estimated 'moderate' since Labasa Mill not quite flooded; - flood peak 3.72m for Labasa River at Civic Centre (major); - flood peak 5.91m for Dewala River (tributary of Labasa R.) at Nakorotari; - flood peak 7.85m for Wailevu River at Nakama (major); - flood peak 10.26 (PWD survey) for Dreketi River at Natua pump house (highest flood since PWD records commenced). (PWD Hydrology records; Yeo, 2001; Terry et al., 2004).
1987 Apr 1	Trough of low pressure, which had developed over Fiji in late March moved eastwards over the Group from 1 st to 3 rd .	<ul style="list-style-type: none"> Waidina River: Naqali bridge under 3m of water (FTs). Waimanu River: Sawani flats flooded (FTs).
1987 Apr 10	Slow-moving area of low pressure southwest of Fiji responsible for a moist northeasterly windflow from 10 th to 14 th . Marked rainfall on 10 th .	<ul style="list-style-type: none"> Levuka, Ovalau: heavy local rain; flash floods similar to May 1985 but without landslides; several shops affected by floodwaters but only a few centimetres deep (FTs).
1988 Feb 25*	<i>Bola</i> . (hurricane) Mamanucas, Kadavu and Southwest Viti Levu.	<ul style="list-style-type: none"> Labasa: flooding in area (Blong, 1994).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1988 Dec 22-28*	<i>Eseta</i> . (storm) Yasawas, Mamanucas and Southwestern Viti Levu.	<ul style="list-style-type: none"> • General: northwestern parts and interior of Viti Levu received very heavy rain; flooding experienced over many areas; minor damage to roads and crops (FMS, 1989). • Ba: flood peak 3.39m a.m.s.l. at Ba town on 24th, to level of old Gov't road bridge (FTs; Yeo, 1998). • Northern Division (Vanua Levu): widespread flooding (Blong, 1994).
1989 Feb 9-15*	Tropical Depression developed just to the Southwest of Fiji on the 6 th , later moved slowly eastward.	<ul style="list-style-type: none"> • General: nine flood-related deaths reported (FMS, 1990a). • Ba: flood peak estimated at 5.5m a.m.s.l. at Rarawai Mill on 11th, mill not flooded (Yeo, 2010); Elevuka Creek burst its banks flooding the market (FTs); some shops near market flooded to depths of 0.45m on 13th (Blong, 1994). • Nadi: waist deep water at the bus station on 13th (Blong, 1994).
1989 Mar 29 - Apr 2	<i>Kerry</i> . (storm) Western Viti Levu, Kadavu.	<ul style="list-style-type: none"> • Ba: flood rose to old Gov't road bridge, cut Kings Hwy (Blong, 1994).
1989 May 28-30	Tropical Depression to the far west of Fiji. Associated broad cloud band persisted over Fiji from the 27 th to the 31 st .	<ul style="list-style-type: none"> • General: from the 28th low lying areas of Northern and Western Viti Levu were flooded (FMS, 1990a). • Ba: flood peak 4.39m a.m.s.l. at Ba town, 1m over old Gov't road bridge on 30th, several shops in Ba market subdivision flooded (FTs; Yeo, 1998). • Nadi: knee deep water at bus station on 30th (Blong, 1994).
1989 Oct*		<ul style="list-style-type: none"> • Suva: flooding around Carnarvon Street (Blong, 1994).
1990 Mar 21-22*	<i>Rae</i> (storm) Most of the Fiji Group affected. Torrential rain fell over most parts of the country.	<ul style="list-style-type: none"> • General: major flooding of Nadi and Ba towns (FMS, 1990b); three lives lost due to drowning in flooded rivers, minor damage to crops and vegetation (FMS, 1996a); closure of roads and bridges all over the country (FMS, 1997a). • Ba: flood peak estimated at 6.05m a.m.s.l. at Rarawai Mill on 21st, mill probably flooded (Yeo et al., 2007); peak 5.49m a.m.s.l. at Ba town on 21st (PWD, 2000). • Lautoka: shallow flooding in Vitogo Parade (Blong, 1994). • Nadi: flood peak 5.93m a.m.s.l. (PWD, 2000); PWD's reported timing of flood peak on 29th suspect (Yeo, 2010). • Nausori: Rewa River flood peak 4.99m (= 4.33m a.m.s.l.) at Nausori bridge on 22nd (Blong, 1994; PWD, 2000). • Rakiraki: one flood fatality (FTs). • Sigatoka: flood peak 3.03m a.m.s.l. (PWD, 2000); PWD's reported timing of flood peak on 29th suspect (Yeo, 2010). • Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 4.31m for Wainikoro River at Nasasa;[#] - flood peak 5.59m for Bucaisau River at Qelemumu; - flood peak 5.61m for Dewala River (tributary of Labasa R.) at Nakorotari;

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> - flood peak 3.05m for Labasa River at Civic Centre; - flood peak 5.27m for Wailevu River at Nakama (PWD Hydrology records; Yeo, 2001; Terry et al., 2004).
1990 Jun 9	Low-pressure system developed and moved over Fiji (4-5 th). On 9 th a second trough associated with a deep area of low pressure moved over the Group from the far south.	<ul style="list-style-type: none"> • Ba River: flood peak at Toge recorded at 2100hrs on 9th; highest discharge rate for the year (PWD, 2000). • Suva: flooding around market (Blong, 1994).
1990 Nov 27-28	<i>Sina</i> . (hurricane) Southern Fiji.	<ul style="list-style-type: none"> • General: overall damage for the country (including flood) amounted to approximately (1998) F\$33 million (World Bank, 2000); most damage seems to have been caused by wind, since no major flooding (FMS, 1992; Yeo, 2010); coastal erosion reported on west and south coasts of Viti Levu due to storm surge (Holden, 1992). • Ba: river high but within banks (FTs).
1991 Jan 10	Shallow low pressure passed southwards just to the west of Viti Levu on 9 th . The shallow low-pressure area had been in Fiji's vicinity since 4 th . Significant rainfall received in the Ba Valley in the preceding days.	<ul style="list-style-type: none"> • General: Sugar cane harvesting and carting delays forced the closure of the country's sugar mills on 10th (FMS, 1991a). • Ba: Old Gov't road bridge under water and closed to traffic when the Ba River rose to 4m above normal (FMS, 1991a). • Tailevu: flooding on Kings Road (FMS, 1991a). • Labasa: roads closed (FMS, 1991a).
1991 Feb 6	Significant rainfall received from a trough and cold front that had been near Fiji from the start of the month.	<ul style="list-style-type: none"> • General: disruption to cane harvesting and more damage to roads, already in poor condition in many parts of the country following heavy rain in January. Many bus services cancelled. • Levuka, Ovalau: flash flooding from Totogo Creek (from 174mm of rainfall in the previous 24hrs) caused thousands of dollars worth of damage to shops at the northern end of town (FTs).
1991 Feb 12	Persistent moist northerly winds.	<ul style="list-style-type: none"> • Suva: flooding in parts of the city following 87mm of rainfall received in the afternoon (FMS 1991b).
1991 Feb 21	Area of low pressure drifted over the Group from the far west.	<ul style="list-style-type: none"> • Ba River: flood peak at Toge recorded at 1600hrs; highest discharge rate for the year (PWD, 2000).
1991 Jul 4	Trough of low pressure moved over Fiji.	<ul style="list-style-type: none"> • Suva: flooding around market (Blong, 1994) and of roads (FTs) following very heavy rainfall (156mm at Government House and 122mm at Lucile Bay, FMS, 1991c).
1992 Dec 10-11	<i>Joni</i> . (hurricane) Yasawas, Mamanucas, Southwestern Viti Levu and Kadavu.	<ul style="list-style-type: none"> • General: flooding of rivers in Viti Levu, especially the Rewa Delta; significant loss of livestock due to flooding (FMS, 1997a); overall damage for the country (including flood) amounted to approximately (1998) F\$2 million (World Bank, 2000). • Ba: flood peak 4.30m a.m.s.l. at Ba town on 11th (PWD cited in Yeo, 1998); flood peak for Ba River at Toge recorded at 0500hrs on 11th (source unknown). • Nausori: flood peak 4.32m (=3.66m a.m.s.l.) at Nausori bridge on 11th (Blong, 1994; PWD, 2000).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1993 Jan 3	<i>Kina</i> . (hurricane) Yasawas, Northern and Eastern Viti Levu, Southern Vanua Levu, Lomaiviti and Southern Lau.	<ul style="list-style-type: none"> • General: prolonged heavy rain with a combination of factors including high tide and heavy seas blocked mouths of major rivers resulting in extensive flooding (FMS, 1996a). • General: overall damage for the country (including flood) amounted to approximately (1998) F\$188 million (World Bank, 2000); almost complete loss of crop in the Sigatoka, Navua and Nausori areas, major loss of livestock (FMS, 1997a). • General: nine flood fatalities (Yeo, 2010). • Ba: flood peak 7.11m a.m.s.l. at Rarawai Mill, 0.33m in Mill Personnel Officer's building, mill flooded; 1.3m below 1931 flood; flood peak 6.52m a.m.s.l. in Ba town (Yeo et al., 2007; FTs; PWD, 2000); estimated F\$13.7 million <i>direct</i> damage in Ba comprising F\$4 million in the Ba commercial district (est. by Ba Town Council) and F\$9.7 million at Rarawai Mill (Yeo, 2000); Rarawai rail bridge lost piers; old Gov't road bridge (built 1915) destroyed (Yeo, 1998), replaced by Bailey bridge on 30 July 1993 (FTs). • Ba valley: dam formed by landslide on Savatu Creek burst at 11 p.m. on 2nd, heard at Koro village, contributing to very high flood levels in the upper Ba valley; one drowning at Koronubu reported; several houses damaged at Toge and Nasolo; six houses fell into river at Nawaqarua due to bank erosion (Yeo, 1998). • Korovou, Tailevu: bridge destroyed by floodwaters, replaced by Bailey bridge (FTs). • Nadi: no significant flooding (Terry & Raj, 1999). • Nausori: Rewa River flood peak 6.66m (= 6.00m a.m.s.l.) at Nausori bridge (Blong, 1994; PWD, 2000) (there is some conflicting information but this seems to be the most accurate figure); peak discharge at Nausori estimated at 18,000m³/s with about 15,000m³/s flowing under the Rewa bridge, and the remainder as floodplain flow (Raj, 1995); severe damage to shops e.g. Mahesh Syndicate estimated \$80,000 loss when flooded by 2-3 ft (0.6-0.9m); Nausori Airport terminal flooded; four flood fatalities reported (FDP; FTs). • Navua: health centre and hospital flooded with damage estimated at \$1.1 million; one flood fatality reported (FTs); erosion of road embankment of Queens Road especially near abandoned river channel; 3-4m high storm surge on eastern side of Navua delta (Howorth et al., 1993). • Navua River: flood peak 11.3m (at Nakavu?), higher than Oct 1972 but lower than Apr 1980 (Holland, 2008). • Rakiraki: Penang Mill flooded (FTs). • Rewa River (see Nausori entry also): flood level reportedly 3 ft 7 inches (1.1m) higher than Oct 1972 flood at residence in Koronivia (FTs, 5/1/1993); much damage occurred where development had taken place within flood channels associated with the five delta lobes (Howorth et al., 1993). • Sigatoka: peak flood level of 4.82m a.m.s.l. which is the highest on PWD records (PWD, 2000) (note, records do not extend back to the 1931 flood); 133 metres of Sigatoka bridge washed away, severing water, electricity and telephone connection to Korotogo area (FTs; PIM, 1993). • Suva area: 27 houses on banks of Wailoku River flooded from 1.30 a.m. to 10.30 a.m. on 3rd (FTs). • Waidina River: 38 out of 40 homes flooded at Nauluvatu village, several washed away (FTs); one

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<p>flood fatality reported at Naqali bridge (Yeo, 2010).</p> <ul style="list-style-type: none"> Waimanu River: Sawani bridge and village flooded (FTs). Wainibuka River: heavy flood; 11 houses destroyed at Nasautoka village when flooded about 2.30 a.m. on 3rd; severe damage at Wailotua village; Lutu Co-operative Dairy Farm lost entire stock of 90 milking cows (FTs). Wainimala River: heavy flood – contributed about 9,000 m³/s to Rewa River at its peak (Raj, 1995); Matainasau bridge along Monasavu Road washed away cutting access to upper Wainimala and Wailoa Power Station (FTs); average floodwater depth of 2-3m over the floodplain near Vunidawa (Howorth et al., 1993); the 10m high Vunidawa bridge broken in half (FTs). Bua Province, Vanua Levu: Nabouwalu jetty damaged by waves; floodwaters damaged bridges (FTs). Labasa: one flood fatality reported (FTs). Savusavu: one flood fatality reported (FTs).
1993 Jan 17-18		<ul style="list-style-type: none"> Labasa area, Macuata Province: heavy flood on Korotari River from about 11 p.m. on 17th to 1 a.m. on 18th; worse than Kina flood; significant loss of farm animals including bullocks and goats (FTs).
1993 Feb 4	Moist airstream covering Fiji at the start of the month caused heavy rainfall in the southeastern parts of the larger islands on 2 nd and 3 rd .	<ul style="list-style-type: none"> Navua: minor flooding; several families evacuated (FTs). Waidina River: Naqali bridge under 1.2m water (FTs).
1993 Feb 17	<i>Oli.</i> (gale) Yasawas, Mamanucas, Southern Viti Levu, Kadavu and Ono-I-Lau.	<ul style="list-style-type: none"> General: some damages to bridges in the Ba and Sigatoka areas (FMS, 1997a). Ba: Navatu flats flooded; temporary footbridge in Ba Town which cost F\$120,000 damaged; Naboutolu crossing damaged (Yeo, 1998; FTs). Nadi: Qeleloa bridge closed to all traffic (FTs). Navua: some areas flooded (FTs). Labasa area: Qawa River bridge near Bulileka flooded (FTs). Kadavu: flooding reported at Navuatu village (FTs).
1993 Feb 26-27	Active trough of low-pressure linked to Tropical Cyclone <i>Polly</i> extended onto the Group. Some extremely heavy falls occurred in the interior and western parts of Viti Levu.	<ul style="list-style-type: none"> General: three lives lost; significant damage to crops, property and disruption to transportation (FMS, 1993). Ba: flood peak estimated at 6.54m a.m.s.l. at Rarawai Mill on 26th, probably in mill (Yeo et al., 2007); peak 5.98m a.m.s.l. in Ba town (PWD, 2000); market subdivision 1.5m under water; temporary footbridge swept away (FTs); car swept off Naboutolu crossing (FTs); Nadrou tramline bridge destroyed (Fiji Sugar Corporation, pers. comm.). Lautoka: Natabua Flats flooded (FTs). Momi Back Road: under 1.2m water (FTs). Nadi: flood peak 7.06m a.m.s.l. on 27th (PWD, 2000); floodwater 1.7m deep in Roshni store; very severe damage to businesses; worse than Kina flood (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1993 Mar 14-15		<ul style="list-style-type: none"> Ba: flooding damaged Naboutolu crossing and disrupted work on Bailey bridge at Ba (FTs). Waidina River: Naqali bridge under 1.2m water on 15th (FTs).
1994 Jun 4-5	Weak trough of low-pressure on 2 nd . An active trough followed with widespread rain on 3 rd and 4 th . Some sites on Viti Levu experienced their average June rainfall in one day.	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge (Yeo, 1998).
1994 Nov 13-14	Tropical Cyclone <i>Vania</i> traversed to the west of Fiji.	<ul style="list-style-type: none"> Tailevu: severe flooding; the whole valley was flooded causing intensive damage to vegetable farms; over 100 hectares of crops and several horses and cattle worth over \$250,000 perished during the flooding (FMS, 1995a).
1995 Jan 28-30	Trough approached Fiji from the northeast on 28 th and moved westwards across the Group over the next few days bringing widespread rain.	<ul style="list-style-type: none"> Ba: flood peak estimated at 5.03m below the 1931 peak at Rarawai rail bridge on 30th (Yeo, 1998); flood peak for Ba River at Toge recorded at 1200hrs on 30th (PWD, 2000). Naitasiri: floods, hundreds of people stranded (FMS, 1996b). Rakiraki: floods (FMS, 1996b). Tailevu: shops and parts of Kings Road flooded (FMS, 1996b).
1995 Feb 19	Second trough of the month affected the Group from the 18 th to 22 nd . Widespread rain received during this period.	<ul style="list-style-type: none"> General: Flooding and landslides in several parts of the country, especially Labasa, Ba, Naitasiri and Tailevu (FMS, 1995b). Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 2.2m above Irish crossing for Qawa River at Bulileka (Terry et al., 2004). At Labasa, 197mm of rainfall was received on 19th. Schools closed in the area (FMS, 1995b).
1995 Mar 13-19	Second trough of the month affected Fiji from 13 th to 19 th , initially moving south across the Group then moving north on 16 th .	<ul style="list-style-type: none"> Nadi: floods (15th or later) damaged over 250 tonnes of cane (FMS, 1996b). Labasa: floods due to 178mm on rainfall on 13th and 155mm on 14th (FMS, 1995c).
1996 Feb 22	Shallow depression moved just Northwest of Yasawa-i-Rara on 22 nd . The system slipped southwards away from the Group late on 23 rd .	<ul style="list-style-type: none"> General: flooding in low-lying areas around the country; schools closed in Ra and parts of the Kings Road were inaccessible (FMS, 1997b). Waidina River: Naqali bridge collapsed (source unknown). Bua Province, Vanua Levu: a couple of bridges in the southwest tip of Vanua Levu underwater (FMS 1997b).
1997 Jan 19 - Feb 2	Tropical Cyclones <i>Evan</i> and <i>Freda</i> and several other low pressure systems dominated Fiji's weather.	<ul style="list-style-type: none"> General: traffic disruption and schools closed in the Western Division; several low bridges and roads under water with an Irish crossing in Nadi washed away; crushing at the Labasa and Lautoka Mills temporarily suspended (FMS 1998).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Ba: Rarawai rail bridge under water for about two weeks (Joe Osborne, Mill manager, pers. comm., 4 Mar 1997); flood peak at Toge on 27th Jan (PWD, 2000); flood peak in Ba town estimated at 4.56m a.m.s.l.; flood closed Ba market on 1st Feb (Yeo, 1998; FTs). Lautoka: 'freak' floods on night of 29th Jan, damage worth more than \$150K in Namoli industrial area (FTs). Waidina River: Naqali bridge under water (FTs).
1997 Feb 18-19	Tropical Depression formed to the northeast of Fiji and tracked southwestward. An active trough moved across the country, causing widespread rain and squally thunderstorms.	<ul style="list-style-type: none"> Labasa: severe flooding in low-lying areas (FMS, 1998).
1997 Mar 8	<i>Gavin.</i> (hurricane) Yasawas, Mamanuca, Western Viti Levu.	<ul style="list-style-type: none"> General: northern coast of Vanua Levu badly affected by storm surge, with sea walls breached in 10 places (Terry & Raj, 1999); storm surge recorded near Natunuku on Ba coast (Yeo, 1998); storm surge at Namara village on Waya island in Yasawas (FSP). General: overall damage for the country (including flood) amounted to approximately (1998)F\$35 million (World Bank, 2000). Ba: flood peak 6.81m a.m.s.l. at Rarawai Mill, 0.03m in Mill Personnel Officer's building, mill flooded; 1.6m below 1931 flood; peak 6.26m a.m.s.l. in Ba town (Yeo et al., 2007); estimated \$6.0 million damage in Ba, comprising \$2-3 million in the Ba Commercial district and \$3-4 million at Rarawai Mill (Yeo, 2000); damage at Ba market probably worse than for Kina flood (Yeo, 1998); one drowning reported (FTs). Lautoka: flooding at Viseisei village (FSP). Nadi: flood peak 6.66m a.m.s.l. (PWD, 2000). Rewa River: the Wainimala and Wainibuka tributaries produced the most runoff in the Rewa system because of the high rainfalls in the highlands and on the northern coast; below the confluence of the tributaries the main Rewa River was able to contain the maximum 4.52m rise in water level (Terry & Raj, 1999); Baulevu in Rewa delta flooded (FTs). Sigatoka: flood peak 3.44m a.m.s.l. (PWD, 2000). Wainibuka River: severe flooding at Wailotua village (FTs). Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 4.43m for Wainikoro River at Nasasa;[#] - flood peak 5.27m for Bucaisau River at Qelemumu; - flood peak 1.3m above Irish crossing for Qawa River at Bulileka; - flood peak 4.17m(?) for Labasa River at Civic Centre (mainly due to storm surge blocking exit of river flood); - flood peak 5.39m for Wailevu River at Nakama; - flood peak either 9.75m (PWD) for Dreketi River at Natua pump house

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		(PWD Hydrology records; Yeo, 2001; Terry & Raj, 1999; Terry et al., 2004).
1997 Apr 26	Trough of low-pressure drifted towards Vanua Levu from the northeast on 26 th . Freak storm affected the eastern and southeastern parts of Viti Levu.	<ul style="list-style-type: none"> • General: flash flooding and landslides in Eastern and South-eastern parts of Viti Levu led to the temporary closure of parts of Kings and Queens Road (FMS, 1998).
1997 May 3-5	<i>June.</i> (storm) Significant rainfall over most parts of the Fiji Group.	<ul style="list-style-type: none"> • General: severe flooding in Taveuni and Vanua Levu; also flooding in Tailevu (FTs). • General: overall damage for the country (including flood) amounted to approximately (1998) F\$1 million (World Bank, 2000). • Navua: houses at Vakabalea destroyed (FTs). • Waimanu River: Naqali bridge closed (FTs). • Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 4.68m for Wainikoro River at Nasasa;[#] - flood peak 5.27m for Bucaisau River at Qelemumu; - flood discharge for Qawa River higher than Mar 1997; - flood peak 4.81m for Wailevu River at Nakama; - flood peak 6.20m for Dreketi River at Natua (PWD Hydrology records; Yeo, 2001). • Taveuni: during the cyclone, rainfalls were record breaking at Matei airport, causing localised flooding on the northern coast and consequent damage to infrastructure and property; local hydrologists reported that stream levels for the island were some of the highest in living memory (Terry & Raj, 1999).
1998 Jan 21	A trough that developed over the Lau Group moved to the west of Fiji on 21 st , but later moved back over the Group.	<ul style="list-style-type: none"> • Ba River: flood peak at Toge recorded at 1700hrs (PWD, 2000).
1998 Nov 11-13	The third and most significant trough of the month developed to the west of Fiji on 11 th and moved slowly eastwards. Associated cloud bands and moist northerly winds produced widespread heavy rain with occasional squally thunderstorms for the next few days.	<ul style="list-style-type: none"> • General: flash flooding in some areas, especially in Western Division (FMS, 1999a).
1998 Dec 24-25	<i>Cora.</i> (hurricane) All parts of the Group received heavy rainfall.	<ul style="list-style-type: none"> • General: flooding in Labasa and Northwestern Viti Levu (FMS, 1999a).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
1999 Jan 18-19	<p>A third trough for the month this time a westward moving system approached the Lau Group on 16th. By 17th, the trough lay over the Lau Group and extended northwards to Rotuma. The trough continued to move westwards on 18th with the SPCZ over Rotuma also drifting south. This low-pressure system produced heavy rain across most of Vanua Levu and the Lomaiviti Group.</p> <p>On the night of 18th, the trough drifted onto Viti Levu and stalled for nearly 12 hours causing a strong convergence of winds and vigorous thunderstorm activity over the area. This resulted in very heavy rain overnight and during most of the following day over northwestern Viti Levu. The trough moved to the west of Fiji on 21st.</p>	<ul style="list-style-type: none"> • General: code named 'Manumanu' or 'The Beast' at Ba (Yeo, 2000). • General: Government estimated agricultural, infrastructural and utilities losses at about \$10 million (Yeo, 2000); 6 flood fatalities (Yeo, 2010); \$F8 million allocated by the Government in relief funding (source unknown). • Ba: flood peak 7.34m a.m.s.l. at Rarawai Mill based on level in GM's office; mill flooded; 1.0m below 1931 flood; peak 6.80m a.m.s.l. at MH store in Ba town (Yeo et al., 2007; LWRMD, 1999; PWD, 2000); flood entered houses in Yalalevu about 5 a.m. (Yeo, 2000); estimated F\$15 million <i>direct</i> flood damage in Ba, comprising F\$7-8 million at Rarawai Mill (including F\$2 million for riverbank protection works) and F\$7.5 million in the Ba Commercial district; businesses lost an average of 14 days production/trade; estimated <i>indirect</i> losses of F\$3.6 million (Yeo, 2000). • Lautoka: bridge over Vitogo River carried away (FTs). • Nadi: flood peak 7.30m a.m.s.l. at Nadi bridge and 7.25m a.m.s.l. in town (LWRMD, 1999 cf. PWD, 2000); about 80% shops damaged while 50% lost nearly all stock (FTs); damage in Nadi town estimated at \$12 million to the business sector and \$2 million to private vehicles (FTs). • Rakiraki: floodwaters from Nakauvadra Creek and Penang River overtopped banks and flooded Penang Mill, town, flats approaching town, Kings Road from Rakiraki bridge to the Police Post and the whole Penang Reclamation Scheme; flood levels 4.37m a.m.s.l. at Penang Mill, 5.30m a.m.s.l. at Rakiraki town and 2.62m a.m.s.l. at Kings Road (LWRMD, 1999). • Sigatoka: flood peak 3.40m a.m.s.l. (PWD, 2000). • Tavua: Nasivi River spilled banks, Kings Road cut at Nabuna flats from Korovou to the approach of Tavua; Nabuna village under 1.7m of water (LWRMD, 1999); one flood fatality and several near misses (FTs). • Labasa: serious flooding; photos show flooding at Newtown and Bulileka (FTs).
1999 Jan 28-29	<p>From 21st, a series of low pressure systems mostly associated with tropical cyclones to the west of Fiji moved towards the Group and became slow-moving just west of Viti Levu. Associated cloud and rain bands affected the country.</p>	<ul style="list-style-type: none"> • Labasa: flooding (FTs).
1999 Feb 12	<p>SPCZ dragged south over Fiji.</p>	<ul style="list-style-type: none"> • General: several instances of flash flooding in the Northern and Eastern Divisions from 9 to 18th (FMS, 1999b). • Lautoka: two brothers drowned in flooded drain (FMS, 2000a).
1999 Apr 19-22	<p>Trough between Fiji and Rotuma moved south over western Viti Levu on 16th. Heavy falls and thunderstorms over western Viti Levu on 16th and 17th. On two occasions, 18th and 23rd, this trough was</p>	<ul style="list-style-type: none"> • General: flooding in low-lying areas; people and livestock forced to move to higher ground in the South-eastern and Western parts of Viti Levu; this event coincided with 4m high sea swells and the local high tide (FMS, 2000a). • Nausori: floodwater about 60cm deep at Waituri (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	<p>pushed northwards to lie over the Group affecting mostly the northern and eastern parts of the country.</p> <p><i>On the morning of 19th, parts of southwestern Viti Levu were inundated by heavy sea swells up to 4m high. These swells were generated out of a deep low-pressure system in the Tasman Sea. Their arrival coincided with a high tide. Severe coastal damage reported along Coral Coast. Little if any rainfall associated with this event.</i></p>	
1999 May 22	Southward movement of a Tropical Depression to the west of Fiji dragged a trough over Fiji.	<ul style="list-style-type: none"> • General: flash flooding in Rakiraki, southern Vanua Levu and Taveuni (FMS, 2000a).
1999 Sep 23	A trough developed to the west of Fiji. The SPCZ to the north also drifted south.	<ul style="list-style-type: none"> • General: flash flooding caused the closure of roads in the Central Division and parts of Nausori were under water (FMS, 2000a).
1999 Oct 17	SPCZ frequency traversed over Fiji from 16 th to 20 th .	<ul style="list-style-type: none"> • General: localised flooding especially in Vanua Levu, Northern Lau and the eastern coastal areas of Viti Levu (FMS, 2000a).
1999 Dec 6-10	Trough that was lying over the Group towards the end of November continued to affect the country in early December. With moist northerly winds persisting over Fiji, there was continuous rain in several parts of the country with some heavy falls recorded.	<ul style="list-style-type: none"> • General: three people reported missing in the Central Division, while another drowned while crossing a river in Rakiraki; cane harvesting interrupted repeatedly during the month (FMS, 2000a).
2000 Jan 17-26	From 12 th to 15 th , two westward moving troughs drifted over Vanua Levu and Rotuma, bringing heavy rain to these areas. The troughs became slow-moving between Rotuma and Vanua Levu but continued to intensify. On 22 nd , a tropical depression developed to the northwest of Fiji. The system was later named Tropical Cyclone Jo when it was approx. 240 miles west of Nadi. Heavy rain received from	<ul style="list-style-type: none"> • General: two bridges washed away in the interior of Ba on 17th and 24th; flooding experienced in northern Viti Levu from 24th to 26th (FMS, 2000b).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
2000 Feb 16-18	24 th to 26 th . Showers and thunderstorms occurred in the afternoon and evening. A trough moved over the Group from the north on 19 th .	<ul style="list-style-type: none"> • General: reports of flash floods on 16th (FMS, 2000c). • Lautoka: a man swept away on 18th (FMS, 2000c). • Vanua Levu: reports of flooding in low lying parts of Labasa and Savusavu during the month especially on 19th (FMS, 2000c).
2000 Mar 2	Slow moving trough of low-pressure lay over the Group from 1 st . Western Viti Levu and Northern Vanua Levu received significant rainfall on 1 st . From midday on 2 nd , the trough underwent rapid intensification close to western Viti Levu.	<ul style="list-style-type: none"> • Nadi: vehicle washed away by raging flood (FMS, 2000d).
2000 Mar 12	SPCZ lay over Fiji from 9 th . Occasional heavy rainfall between 9 th and 12 th .	<ul style="list-style-type: none"> • Labasa: vehicle washed away by raging flood (FMS, 2000d)
2000 Mar 17	Second trough of the month developed to the northwest of Fiji on 15 th and extended over the country. The trough remained over the Group from 16 th to 18 th causing showers about the main islands, Yasawa and Lau Groups.	<ul style="list-style-type: none"> • General: flooding in the Western Division (FMS, 2000d). • Nadi: a man drowned in a flash flood (FMS, 2000d).
2000 Apr 14-15	Series of low-pressure systems developed along a trough near Fiji between the 3 rd and 16 th . One of these formed into a Tropical Depression over the Northern Lau Group on the 13 th then further developed into Tropical Cyclone <i>Neil</i> on the 16 th . Areas affected by the cyclone were mostly Kadavu and the Southern Lau Group.	<ul style="list-style-type: none"> • General: flooding in Macuata Province and Northern Division caused damage to infrastructure and agriculture (FMS 2000e). • Bua Province, Vanua Levu: no significant flooding (PWD, pers. comm.). • Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak in Lagalaga River (same as Nakula River?) estimated 'major' since damaged houses at Nakelikoso village; - flood peak 9.56m for Wainikoro River at Nasasa (highest flood since PWD records commenced);[#] - flood peak 8.44m for Bucaisau River at Qelemumu (highest flood since PWD records commenced), one flood fatality near Nayarabale village; - flood peak in Qawa River estimated 'major' since Labasa Mill flooded, possibly highest event there in 50 years; - flood peak 1.95m for Labasa River at Civic Centre, minor flood here since houses in Naodamu Housing Subdivision flooded by only a few centimetres (compare to Dec 1986 flood); - flood peak 6.17m for Wailevu River at Nakama; - estimated financial loss F\$3 million (Yeo, 2001).
2000 May 2-4	A low pressure system developed along a trough over the Lomaiviti Group which	<ul style="list-style-type: none"> • General: flooding in the northern and western areas of Viti Levu in the first week of the month resulting in damages to infrastructure (FMS, 2000f).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	drifted northwestward initially then curved southwest between 2 nd and 3 rd .	<ul style="list-style-type: none"> Ba Valley: flooding in Navala and Toge areas disrupted traffic on night of 2nd (FTs). Lautoka: flash flooding on 2nd and 4th (FTs). Nadi: flash flooding on 4th (FTs).
2000 May 24-25	Active trough of low pressure developed to the west of Fiji and gradually moved across the Group on 24 th and 25 th .	<ul style="list-style-type: none"> Rakiraki: flash flooding with reports of water approximately 2m above the road level (FMS, 2000f).
2000 Jun 16-18	SPCZ north of the Fiji Group moved southwards and was over the Group on the 16 th .	<ul style="list-style-type: none"> Rakiraki: flash floods led to a drowning incident (FMS 2000g).
2000 Jun 23-26	Trough moved over the Group from the west and combined with the SPCZ just to the north of Vanua Levu.	<ul style="list-style-type: none"> Central Division: numerous reports flash floods (FMS, 2000g).
2000 Dec 7-12	Tropical Depression passed over the Group from the Northwest.	<ul style="list-style-type: none"> General: flooding in the Western and Eastern Divisions. Ba: Ba market and nearby shops flooded on 7th and 10th from Elevuka Creek; FSC compound flooded on 7th; evacuations at Votua; one fatality at Namosau Creek (FTs). Baulevu near Nausori: severe damage to crops (FTs). Lautoka: Natabua Flats flooded (FTs). Nadi: Qeleloa bridge under 0.9m of water on 7th; no major flooding at Nadi town (FTs). Rakiraki: evacuations and two people drowned (FMS 2000h; FTs). Sigatoka: severe damage to crops (FTs). Tavua: Nasivi River flooded on 7th; evacuations (FTs). Waidina River: Naqali bridge under 3.3m of water on 8th (FTs). Wainibuka River: one fatality (FTs).
2001 Feb 19	A trough of low pressure approached Fiji from the northeast.	<ul style="list-style-type: none"> Nadi: Flooding in the Narewa area. A child drowned while trying to cross a flooded river.
2001 Feb 28 - Mar 1	TC <i>Paula</i> approached Fiji from the west while moving in a southeasterly direction. An associated trough affected the Group and significant rainfall was received on 1 st and 2 nd .	<ul style="list-style-type: none"> Nadi: Qeleloa River flooded. Sabeto River and low-lying areas between Lautoka and Nadi flooded on 28th. Sigatoka River: A man lost his life while trying to cross on 1st.
2001 Apr 22	The SPCZ became active to the northeast of Fiji then moved south onto the Fiji Group. A low-pressure system formed along the SPCZ to the west of Nadi. Heavy rain received from 14 th to 27 th .	<ul style="list-style-type: none"> Levuka, Ovalau: Flooding reported at Silana. Part of Levuka town under 2 ft (0.6m) water on 22nd.
2001 Oct 1-3	A low-pressure system deepened over	<ul style="list-style-type: none"> Waidina River: Naqali bridge under 0.5m of water.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	Vanuatu, which led to the development of an active trough of low pressure over Fiji.	
2001 Oct 21-23	Trough of low pressure moved onto Viti Levu from the west ahead of an eastward moving frontal system located just south of New Caledonia.	<ul style="list-style-type: none"> Ba: A man drowned while crossing a flooded creek at Tuvu. Nadi: Qeleloa bridge under approx. six feet (1.8m) of water on evening of 22nd. Nadi bus station flooded.
2001 Nov 6	A trough developed over the Lau Group on 5 th then moved over the rest of the country before weakening on 8 th .	<ul style="list-style-type: none"> Tavua: Low-lying areas flooded.
2002 Feb 18-22	A trough with an associated low pressure system moved over the eastern parts of the Group from the northeast. The low pressure system moved to the southeast of Ono-i-Lau on 18 th while the trough moved west across the main islands. Heavy rainfall with thunderstorms was experienced over Vanua Levu and Taveuni between 18 th and 22 nd and about the eastern parts of Viti Levu on 19 th .	<ul style="list-style-type: none"> General: Flooding of low lying areas in the Central and Northern Divisions between 18th and 22nd and in the Eastern Division on 19th. Suva: Flooded farms around Waila on 19th around 3.30 a.m. Waimanu River: Sawani bridge area flooded. Water rose almost 12 ft (3.6m). Labasa/Macuata Province, Vanua Levu: Siberia, Bulileka and Wainikoro areas flooded. Vunivau, Soasoa and Nakama Roads closed. All Saints Secondary School badly affected by Qawa River flooding. Savusavu: A baby disappeared in flood waters.
2002 Feb 23-24	A weak tropical depression developed west of the Yasawa Group on 23 rd . The system initially moved slowly westwards then turned south-eastwards later in the day while slowly deepening. Heavy rain affected western Viti Levu and the Yasawa Group on 23 rd and 24 th .	<ul style="list-style-type: none"> General: Some bridges in Nadi, Lautoka, Ba, Tavua and Ra under water. Extensive damage to crops in these areas and in other parts of the Western Division. Coral Coast: Low-lying areas around Namatakula village flooded as the nearby river burst its banks.
2002 Mar 7-11	On 7 th , the monsoon trough moved north towards the Fiji Islands bringing the SPCZ onto the Group. Heavy rainfall received for the next four days.	<ul style="list-style-type: none"> Nadi: Qeleloa River flooded.
2002 Apr 21-22	The SPCZ moved south over Fiji on 21 st . Heavy rain experienced over the northern and eastern parts of the Group.	<ul style="list-style-type: none"> Korovou, Tailevu: Low lying areas flooded. Suva: Knee deep water reported in the Wailea Settlement. Tailevu: Reports of approx. 20 cattle washed out to the sea from Waivou farm on 22nd, later recovered. Driti Village in Dawasamu flooded. Waidina River: flooded at Naqali. Wainibuka River: flooded at Nayavu.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
2002 Nov 12-14	The SPCZ moved over the Group on 12 th resulted in rain about the northern parts of the Group and heavy afternoon showers in western Viti Levu. Heavy rain continued in the Eastern Division until 14 th .	<ul style="list-style-type: none"> • Ovalau: Reports of flash flooding. • General: Wainibuka, Nayavu and Waidina River at Naqali flooded.
2003 Jan 14	TC <i>Ami</i> passed over eastern Vanua Levu during the early hours of 14 th and later passed over the western parts of Taveuni. The cyclone then moved in a south-southeast direction, passing through the Lau Group and later turned southeast leaving the Fiji Group around midnight on 14 th .	<ul style="list-style-type: none"> • General: strong storm surge along northern coast of Vanua Levu, combined with severe river floods, led to record flooding at Labasa (Terry et al., 2004). • General: causeways made from trees, rocks and soil by loggers acted as small dams in flood, then collapsed exacerbating the volume (Lal, 2003). • General: 17 people drowned (12 from Korotari upstream of Labasa, one from storm surge in Lakeba) (NDMO, 2003; Lal, 2003). • General: overall damage for the country (including flood) amounted to approximately F\$104 million (NDMO, 2003); farmers lost an estimated 200,000 tonnes of sugar cane worth F\$10 million to floods (source unknown). • Cakaudrove Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 9.80m for Nasekawa River at Bagata; phenomenal discharge of 6,139m³/s for catchment area of 104km²; Vunivesi bridge damaged, crippling movement between Savusavu and Labasa for several days (NDMO, 2003; Terry et al., 2004). - flood on Wairiki-i-Cake which rose more than 10 ft (3.0m) and claimed ~10 houses at Suweni village; river created new course close to village (FTs; Lal, 2003, pp.32-33). • Labasa: floodwater 6 ft (1.8m) deep in Labasa town on 14th; nearby residential areas at Naodamu experienced severe flooding; water reached Subrail Park (sources unknown); inundation to depths of 3-4m above floodplain over a wide area around Labasa; large infrastructure and property damage; many shops flooded; Labasa Chamber of Commerce estimated damage at F\$12 million (NDMO, 2003; Terry et al., 2004). • Macuata Province, Vanua Levu: <ul style="list-style-type: none"> - flood peak 4.24m for Lagalaga River (same as Nakula River?) at Nakelikoso; - flood peak 5.70m for Wainikoro River at Nasasa;[#] - flood peak 5.59m for Bucaisau River at Qelemumu; - flood peak 4.0m above Irish crossing for Qawa River at Bulileka; - flood peak 9.92m for Labasa River at Korotari (highest event since PWD records commenced); - flood peak 9.22m for Wailevu River at Nakama (highest event since PWD records commenced); - flood peak 6.94m for Dreketi River at Natua pump house (Terry et al., 2004).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Savusavu: many shops flooded (NDMO, 2003); massive destruction to vegetables and root crops (source unknown). Taveuni: many shops flooded (NDMO, 2003).
2003 Jan 27	A depression moving in a southeasterly direction passed over Vanua Levu early on 27 th and over the Northern Lau Group later that morning. By midday the depression had intensified into TC <i>Cilla</i> just north of Lakeba.	<ul style="list-style-type: none"> Vanua Levu: flooding reported.
2003 Mar 13-14	Rain accompanying a depression to the northwest of Fiji received from 9 th in the western parts of the Group. By 11 th the depression had intensified into TC <i>Eseta</i> . It passed south of Ono-i-Lau on 13 th . Strong and gusty winds and rain continued until 14 th .	<ul style="list-style-type: none"> General: Numerous reports of flooding and crop damage in the Western Division. Nadi: Qeleloa bridge under 1.5m of water on 13th.
2003 Apr 25-30	On 25 th a trough to the south of Fiji retrogressed over the Group resulting in further rainfall being received in most parts of the country. The trough remained slow moving over the Group for the rest of the month. The Eastern Division experienced continuous heavy rainfall during this period.	<ul style="list-style-type: none"> General: Rivers flooded in eastern and southeast Viti Levu. Waidina/Wainimala Rivers: burst their banks; some bridges along these rivers were closed for a few days; Naqali bridge covered by 5 ft (1.5m) of water; Waima bridge, between Vunidawa and Nakorosulu, covered by 2 ft (0.6m) of water on 28th.
2003 May 18	An active trough of low pressure moved across the country from the west and merged with another trough just north of Vanua Levu to produce heavy rainfall throughout the country. Showers continued on 19 th and 20 th as the trough lingered over the eastern parts of the Group.	<ul style="list-style-type: none"> General: Reports of flooding in the Central Division and Naselai, Nakelo area.
2003 Jul 11-12	Heavy rain received in the Central Division from 6 th to 8 th and 11 th to 12 th due to a cold front moving onto the country from the west.	<ul style="list-style-type: none"> Korovou, Tailevu: Roads closed in the area.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
2004 Feb 6-14	A weak trough developed over the Group resulting in heavy rain initially being received about the interior and western parts of the main islands. Rain continued about the eastern and western parts of the Group for the next few days. On 10 th an active trough to the north of the Group drifted south and brought further rain on 11 th . A depression formed along this trough west of Nadi on 12 th , which later moved southwards. Heavy rain received until 15 th .	<ul style="list-style-type: none"> • Ba valley: Reports of flooding at Balevuto. • Lautoka: Reports of flooding in Navula, Toge and Saru. • Nadi: Qeleloa River flooded.
2004 Apr 7-8	A tropical depression developed along a southward moving trough about 220km northwest of Labasa. The depression intensified rapidly as it approached Vanua Levu and passed over the Vanua Levu coastline early on 7 th . The depression was accompanied by heavy rain, which resulted in flooding parts of Vanua Levu. This depression continued to move rapidly southeast and was southeast of the Lau Group by midnight on 7 th . A second depression formed along the above-mentioned trough 280km north-northwest of Nadi. On 8 th at 1.30p.m, the depression reached the Viti Levu coastline near Rakiraki and moved rapidly across Viti Levu. This depression cleared the Group on 9 th at midday.	<ul style="list-style-type: none"> • General: Flooding in parts of Vanua Levu and northern and eastern Viti Levu. Several millions of dollars of damage reported in the Central and northern parts of the Western Division. Probably 12 flood fatalities (Fiji Government Online, 2004; Yeo, 2010). • Korovou, Tailevu: Flats under 2 ft (0.6m) of water. • Navua: Flooding on 8th. • Rakiraki: River flooded, houses in the area swept away. Rakiraki Police Station also flooded. Veileka Township under approx. 4 ft (1.2m) of water. • Suva: Floodwaters swept away two houses in a squatter settlement beside the Ratu Mara Road in Nabua. • Tavua: Yaladro flats under 4 ft (1.2m) of water. • Vatukoula: Matanagata Road closed. • Waidina River: Flooded at Naqali. • Waimanu River: Flooded at Sawani. • Wainibuka River: A landslide forced a bus into the flooded Wainibuka River on 8th, with the loss of six lives. Wailotua, Malabi, Nasautoka, Navaicovatu and Nabouva villages severely affected in the Wainibuka district with 35 houses destroyed and seven washed away. • Savusavu, Vanua Levu: Wailevu settlement under 10-20 ft (3-6m) of water.
2004 Apr 15	A third tropical depression formed along a trough of low pressure NE of Vanua Levu but remained north of the country. The trough had been in the vicinity of the Fiji Group from 5 th . On 13 th the trough moved over the Group for the next two and a half days. A considerable amount of rainfall was received across the country before	<ul style="list-style-type: none"> • Nausori: Flooding on 15th. • Navua: Flooding on 15th. Navua town submerged by more than 6 ft (1.8m) of water (DP). Flood came at 5 to 6 a.m. 29 lean-to buildings totally destroyed. Navua Hospital flooded and closed for several weeks. Overall losses estimated to be around F\$13 million including \$6.7 million household losses and \$3.0 million business losses (Holland, 2008). • Navua River: Flood peak 10.1m (at Nakavu?), estimated to be between a 1 in 10 to 1 in 20 year event on average (Holland, 2008).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	the trough moved SW of Viti Levu around midnight on 15 th .	
2004 Jun 4-10	On 3 rd , a trough of low pressure moved over Vanua Levu and merged with a front that has been over the Lau Group. The trough remained over the country until 14 th , causing rainfall over most places with heavy falls recorded about the main islands. A weak low developed along the trough which later moved southeast over the Group from 11 th to 13 th .	<ul style="list-style-type: none"> • Korovou, Tailevu: Reports of flooding in town (2-4m) and in the greater Tailevu and Naitasiri province. Roads in the area closed. Damage to infrastructure and root crops reported. Kings Road at Viwa flats, Lodon Road and Mati flats past Korovou Town flooded. Deep Water Road and Burerua village also flooded. • Wainibuka and Rewa Rivers: Rose considerably and landslides reported at Veisari on 7th and at Nairukuruku.
2004 Aug 1-2	A trough moved across Fiji during the first three days of the month resulting in heavy rain and flooding in northern and central Viti Levu.	<ul style="list-style-type: none"> • General: Flooding in the Western and Northern Divisions. • Ba: Flooding reported at Koronubu, Namau, Korovuto, Rarawai, Toge, Vaqia, Vunisoqoloa, Namaqa, Varadoli, Balevuto and Nukuloa. Namosau Creek flooded close to Govind Park. Ba Muslim Primary, Koronubu Indian, DAV Primary, Namosau Methodist, St Teresa's School and Xavier College closed. • Suva: Flash flooding in early hours of 2nd. • Tavua: Yaladro flats and Balata Road closed.
2004 Aug 23-29	A slow-moving front moved over the country from the west on 17 th . This front later combined with a trough that approached from the west, resulting in widespread rain and occasional heavy falls on 21 st and 22 nd . Wet conditions continued until 29 th .	<ul style="list-style-type: none"> • General: Flooding prevented cane supply to the Viti Levu sugar mills from 23rd to 25th. • Levuka, Ovalau: Flash flooding in parts resulted in the closure of some roads.
2005 Mar 1-2	An active trough with embedded tropical disturbance was located to the north of Fiji on 1 st . It later drifted over the country on 2 nd . Rainfall received across Fiji especially eastern Viti Levu. The trough gradually weakened as it moved south on 4 th .	<ul style="list-style-type: none"> • General: Reports of flash flooding in the Central Division. • Suva: River Road settlement, Narere flooded as the nearby river broke its banks.
2005 Apr 18-20	On 15 th a monsoonal trough intensified and moved northwards over Fiji. Heavy rain continued until 20 th .	<ul style="list-style-type: none"> • General: Flooding in the Western, Northern and Central Divisions. Schools and roads closed around the country. A total of about 47 roads around the country closed or partially washed away. • Korovou, Tailevu: Roads closed due to flooding. • Lami: Wainadoi River flooded. • Nadi: Qeileoa bridge under 3m of water. Newly built Qeileoa bridge partially washed away. Residents of Qeileoa, Togo, Togomasi, Vuniyasi and Dratabu stranded. Nadi bus station and surrounding areas flooded. Nadi hospital and Andrews Road junction under 3 ft (0.9m) of water on 20th.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Rakiraki: Dranayavuta River flooded. A man drowned while trying to cross the river near the Dranayavatu bridge, one of two people who drowned in Rakiraki on 21st and 22nd. Waidina River: Naqali bridge closed. Wainibuka River: Waiwatu bridge also under water including the Delailasekau Road. Labasa: Korotari River in Labasa flooded. Vegetable and sugarcane farms destroyed. Kadavu: Roads to Tavuki, Muani, Levuka, Ravitaki, Cevai and Kabariki closed. Koro: Roads to Nasau, Sinuvaca, Namacau, and Nakodu closed.
2005 Sep 25 -30	<p>On 25th and 26th a trough just north of Vanua Levu intensified and drifted south over the country. Widespread rainfall received over the Group with particularly heavy falls in the eastern and southern parts of the larger islands overnight on 28th. Rain eventually cleared from the west on 30th as the trough continued to move east whilst weakening.</p>	<ul style="list-style-type: none"> Navua River: Galoa settlement, Lobou and Wainadoi village underwater. Navua town and surrounding areas flooded. Patients at Navua Hospital evacuated to the Suva CWM hospital. Suva: Man clearing flooded drain in Suva fell into culvert and drowned. Wailoku flats, Wailea River and Milverton Road as well as parts of Koronivia and Narere flooded. Waidina River: Flooded and road/bridge at Naqali closed. Waimanu River: Flooded at Sawani. Villagers evacuated to Adi Cakabau School. Sawani Road closed.
2005 Oct 26 -30	<p>On 22nd a weak cold front drifted west away from Fiji. Around this time a trough with associated active cloud and rain bands moved towards the Group from the north. By 26th the cold front, which had become almost stationary to the west moved back onto the Group to merge with the trough. Widespread rainfall, heavy at times and accompanied by squally thunderstorms recorded in places. Rainfall continued until the end of the month, though mostly over the northern half of Fiji as the system responsible moved northwards.</p>	<ul style="list-style-type: none"> General: Flooding of low-lying areas reported in the interior, eastern and southeastern parts of Viti Levu. Korovou, Tailevu: River flooded. Reports of flooding along the Vuci Road and Raralevu stretch. Vuniniudrovu village also flooded. Namosi: Wainikovo River flooded and Wainikovo bridge washed away.
2005 Nov 8-23	<p>A series of troughs and the SPCZ passed close to Fiji resulted in widespread rainfall over the country.</p>	<ul style="list-style-type: none"> General: Flooding reported in low-lying areas in the eastern Viti Levu. Ba River: flood level reported as 1.5m above ground at Navala. 'Varadoli River' (Elevuka Creek?) flooded.
2005 Dec 26	<p>The SPCZ was close to Fiji from 20th to 24th and 28th to 30th. Moderate to heavy rainfall recorded during this period.</p>	<ul style="list-style-type: none"> Labasa: Flash flooding on 26th. Water in seven shops and an arcade in the township.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
2006 Jan 28-29	A combination of an active monsoonal trough associated with TC <i>Jim</i> to the far west of Fiji and a strong SPCZ produced substantial rain over the country from the 24 th to 31 st . Torrential rain received on the 28 th in north and northwest Viti Levu.	<ul style="list-style-type: none"> • General: Flooding in the northwestern parts of the Western Division on 28th and 29th. Parts of Ba Town, Lautoka and Rakiraki flooded. • Ba: Some shops flooded including Central Supermarket Bookshop and Ba Book Centre (FTs). 'Koronubu River' (Navisa River?) flooded. The Irish crossing at Veisaru Back Road, Rarawai cemetery Road, Itatoko Road and Toge Road under water. 'Balevuto River' (Waisali Creek?) flooded and Babriban bridge washed away. • Lautoka: Flooding at Vunato village at 2 a.m. Sun 29th. Reports of flooding along Sukanaivalu Road. • Vatukoula Back Road from the Kings Road junction up to Navatu Street closed.
2006 Feb 4	TC <i>Jim</i> drifted south into Fiji's area of responsibility on 1 st . Associated westerlies with the SPCZ to the west of Fiji brought rain over most parts of the Group during the first week of the month. The SPCZ drifted over Vanua Levu on 4 th .	<ul style="list-style-type: none"> • Nadroga: One fatality when man tried to cross flooded Tuvu River on 1st (FTs). • Cakaudrove Province, Vanua Levu: Vatukuca, within Vaturova district flooded, six homes swept away (FTs). • Labasa: Flooding in the area. Labasa, Waiqele, Vunivatu, Naduna, Makomako, Korosomo, Tabia, Naduri, Wairiki, Vunicuicui, Waidamudamu, Delaikoro and Soasoa Roads closed. One fatality when man tried to cross flooded Waiqele River on 5th.
2006 Sep 29	Trough moved back over Fiji from the north.	<ul style="list-style-type: none"> • Suva: Muslim League squatter settlement at Nabua flooded. 20 businesses in Nabua affected by flooding in afternoon of 29th. Narere River Road squatter settlement flooded. Parts of Ratu Mara Road closed due to flooding. Wailea Creek in Vatuwaqa flooded (FTs).
2007 Feb 4-12	At the beginning of the month a tropical depression moving southwest was identified north of Rotuma. Almost simultaneously an associated trough of low pressure with extensive cloud and rain east of Fiji moved towards the Group. The depression later passed over Vanua Levu and the Lau Group on 4 th . The trough lingered in a weaker state across the northern parts of the Group for the next few days then re-intensified and drifted south on 8 th . Widespread heavy rain received until 13 th .	<ul style="list-style-type: none"> • General: Extensive flooding reported in northern Vanua Levu on 4th and in the Western Division on 12th. • Ba: Balevuto Road, Vutoni bridge and the road from Toge to Navala closed. Damage at Nadrou Treatment Plant resulted in water shortages at Namosau, Tauvegavega and Voroko. Ba River at Ba town did not burst banks (FTs). • Nadi River: flood peak at Nadi town reported as 6.2m a.m.s.l., with significant flooding on Monday 12th. Roads on both ends of town under 5 ft (1.5m) of water. Some houses in Namotomoto village completely submerged. • Sigatoka River: flooded and parts of the Sigatoka Valley Road closed. Narata bridge under 4 ft (1.2m) of water. • Cakaudrove Province, Vanua Levu: Vaturova tikina badly affected. Nine homes damaged at Lekutulevu village, which planned to relocate (FTs). • Labasa: Flooded on Sunday 4th with 3 ft (0.9m) water in Labasa town. About 500 families evacuated. One fatality reported during the flooding (source unknown, fatality not reported in FTs). Disruptions to power supply, water and telecommunications in the main CBD. Serious damage to businesses. Labasa Health Centre flooded to depth of 1½ ft (0.45m). Eight schools flooded; All Saints Secondary School and Gurunanak Primary schools the worst affected, with damaged buildings, furniture and

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<p>books. Flood damage estimated to be \$15 million. The PRB (Public Rental Board) flats in Vunimoli and Naodamu in Labasa worst affected (FTs).</p> <ul style="list-style-type: none"> • Macuata Province, Vanua Levu: Nacula, Nakorowiri, Wasavulu Settlement, Bulileka, Korotari and Namara damaged (FTs). • Seaqaqa: Koronivuli River near Seaqaqa flooded and the bridge reported as being under water for a period of time.
2007 Mar 9-14	A trough to the south of Fiji moved back over the southern parts of the Group and continued further north. Heavy rainfall received in the northern and western parts of Fiji.	<ul style="list-style-type: none"> • General: Flooding reported in the Western and Northern Divisions. • Ba: Koronubu, Vutuni and Babriban areas flooded. Ba River at Ba town did not burst banks. • Nadi: A man went missing while swimming in the flooded Nadi River. • Rakiraki: 6 ft (1.8m) of water in parts of the town on 9th. Naqoro Flats, Qelesa and Nadugu Settlements, Raiwasa bridge, parts of Veileka Town, Vunisogaloa and the road leading to the Rakiraki FSC compound flooded. Galau Road and Korotale bridge in Rakiraki under 3 ft (0.9m) of water and closed on 13th. • Tavua: A man drowned while trying to cross the flooded Nasivi River. • Labasa: The Qawa River burst its banks at about 5pm on 10th. Vaturekuka, Bulileka, FSC Compound and Valebasoga Tropik Mill flooded. 3 fatalities when people tried to cross floodwater. All Saints Secondary School flooded again, to a level higher than Feb 2007.
2007 Mar 20-25	On 20 th , a trough of low pressure moved onto the Group and became stationary for a week. Widespread heavy rain with heavy falls recorded during this period. On 22 nd a depression was identified to the northwest of Fiji while moving toward the Group. The depression was closest to the Group on 24 th and 25 th . Strong and gusty winds experienced in the Northern and Western Divisions.	<ul style="list-style-type: none"> • Ba: Govind Park and house in Xavier Street flooded from Namosau Creek at 1 a.m. on 25th. Ba River at Ba town did not burst banks (FTs). • Korovou, Tailevu: Waibula River caused flash floods in low-lying areas of Korovou Town on 23rd. Viwa flats under 3 ft (0.9m) water (FTs). • Lautoka: flooding from Namoli Creek at Vunato on outskirts of Lautoka on 25th (FTs). • Nadi: Bus stand under 4 ft (1.2m) floodwater at peak. Ratu Nemani Memorial School flooded (FTs). • Namosi: Wainadoi flats under almost 2 ft (0.6m) water and Lobau Village under 3 ft (0.9m) water (FTs). • Navua: Naitonitoni Road under 0.5m water. • Rakiraki: 2-3 ft (0.6-0.9m) of floodwater reported. • Serua: Vakabalea, Nasasa, Wainiveidio, Naitonotoni, Tokotoko Back Road, Rovadrau and Waikalou affected (FTs). • Tailevu: Rowadrau Junction is under about 5 ft (1.5m) water. Deepwater Road closed (FTs). • Waidina River: Naqali bridge flooded on Saturday 24th preventing access to Suva market (FTs).
2007 Apr 4-5	A tropical disturbance located to the northwest of Fiji moved towards the country along a slow moving trough of low pressure on 1 st . The disturbance intensified into TC <i>Cliff</i> on 4 th , when it was just east of Udu Point. TC <i>Cliff</i> later	<ul style="list-style-type: none"> • General: Significant flooding in parts of Viti Levu and Vanua Levu. • Nadi: One fatality when woman tried to cross flooded Logi Irish crossing at Nawaicoba at 8 p.m. on 3rd. • Taveuni: Roads into Somosomo from Matei Airport flooded.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	tracked southeast through the Lau Group.	
2007 Oct 23	SPCZ drifted back onto Fiji on 21 st .	<ul style="list-style-type: none"> Wainadoti River (west of Suva): 17 families evacuated when village flooded on night of 23rd (FTs).
2007 Dec 4-9	During the first three days of the month the SPCZ with an embedded tropical depression lay just north of the country bringing rainfall to the northern parts of the Group. Further rainfall received as TC <i>Daman</i> formed to the northeast of Rotuma and moved towards the Group. The system later changed direction moving in an easterly direction directly over Cikobia Island.	<ul style="list-style-type: none"> General: Flood damage reported in the northern parts of Viti Levu and Vanua Levu. Rakiraki: Roads closed due to flooding. Parts of the King's highway flooded and the Raiwasa bridge closed. The flooded river reached the bottom of Vaileka bridge and Qalema residents were forced to move to higher ground. Ellington, Barotu and Namuaimada also flooded. Parts of Galau, Vaileka, Qelema, the bus stand and Fiji Sugar Corporation Roads closed.
2008 Jan 3	A deep tropical depression located far to the west of Fiji extended a trough onto the Group. Heavy rain received across most of the country.	<ul style="list-style-type: none"> General: Substantial flooding reported in northwestern Viti Levu, especially Rakiraki and Nadi. Ba: Bus station, market and some shops closed. Koroqaqa settlement in Savara flooded. About 23 families affected. Vutuni bridge under 4 ft (1.2m) water, Toge bridge and Namau/Qerelevu junction under 5 ft (1.5m) water. Koronubu Road underwater. Lautoka: Drasa Dam bridge under 5 ft (1.5m) water. Drasa and Vaivai bridges closed. Rakiraki: Naqoro flats flooded. Man drowned after attempting to cross flooded creek in Ra on 2nd.
2008 Jan 16-19	A depression affecting the eastern part of Fiji developed into TC <i>Elisa</i> on 10 th as it moved southeast of Fiji. TC <i>Funa</i> developed on 17 th and passed to the west of Fiji. Being embedded in the SPCZ and moving south, both cyclones dragged the SPCZ over the country bringing with them an enormous amount of rainfall to the Northern and Eastern Divisions.	<ul style="list-style-type: none"> General: Flooding in most parts of the Northern Division. Nausori: Ankle deep water in Vuci South on 17th.
2008 Jan 28-30	A tropical depression approached Fiji from the northeast and developed into TC <i>Gene</i> just south of Vanua Levu. The cyclone continued moving in a west to southwest direction passing over northern Viti Levu overnight on 29 th . The core of the system passed over Central and Western Division.	<ul style="list-style-type: none"> General: Flooding experienced across most of Viti Levu, especially Tavua, Rakiraki and Sigatoka. Preliminary wind and flood damage estimated to be \$29 million. Three out of six fatalities from TC <i>Gene</i> may be attributed to flood – two drowned while swimming in flooded areas and one was unable to get to hospital to receive medical care (Yeo, 2010). Agricultural crops and infrastructure severely affected. Monasavu Road bridge swept away.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
2008 Feb 25	The SPCZ merged with a frontal system over Fiji.	<ul style="list-style-type: none"> • General: Severe flooding in northwestern Viti Levu. • Rakiraki: For two days access to the small township was disrupted by flooded roads.
2008 May 20	The SPCZ while over Fiji intensified as a cold front approached from the south. Widespread rain received until 20 th .	<ul style="list-style-type: none"> • Vaileka Town: 2 ft (0.6m) floodwater in the town area late on 20th. A majority of the schools in the area closed. Reports of flooding in the Naqoro flats and other low-lying areas. A woman drowned while trying to cross the Vitiri River in Ra on 20th.
2008 Jun 4-6	Following a front, which developed over the southern parts of the Group and produced significant rainfall, the SPCZ drifted south and brought rainfall to the northern parts of the Group from 4 th -6 th .	<ul style="list-style-type: none"> • General: Roads closed in the Central Division including those to Sawani, Monasavu and Vunidawa. • Tailevu: A major portion of the Dawasamu Road washed away on 6th. • Waidina River: Naqali bridge underwater. • Levuka, Ovalau: Roads closed for three days because of flooded bridges, washed away crossings and roads. • Kadavu: Roads closed for three days because of flooded bridges, washed away crossings and roads.
2008 Jul 7	A trough moved over Viti Levu from the west on 5 th and continued moving eastwards for the next two days. A weak front followed the trough eastward. Extensive rainfall received over the country on 5 th and 6 th . Rainfall confined mainly to the Northern Division on 7 th .	<ul style="list-style-type: none"> • Cakaudrove Province, Vanua Levu: Flash flooding affected low-lying villages. Bagata and Kubulau worst affected with newly planted dalo farms washed away. Roads also closed.
2009 Jan 7-14	<p>A vigorous monsoonal trough and SPCZ hovered over Fiji from 7th to 14th. Rainfall was intense and persistent during this time, especially in the Western and Northern Divisions. There was a short respite in the weather as the trough moved over northern parts of Fiji on 11th and 12th. However conditions deteriorated again as the trough drifted south on 13th and 14th.</p> <p>A tropical depression (TD) located to the west of the Group closed upon Fiji on 8th with torrential rain and flooding on the night of 8th. Many sites received 200-300mm rain for 24hrs ended 9 a.m. 9th (284mm at Rarawai Mill in Ba, 281mm at</p>	<ul style="list-style-type: none"> • General: Repeated severe flooding occurred in parts of Viti Levu and Vanua Levu. Severe flooding in Western Division in areas close to major rivers between Rakiraki and Sigatoka. Long duration of flooding damaged sugarcane. • General: 7 flood fatalities plus 4 in landslides. The locations of the flood fatalities were: 1) near Rarawai Mill, Ba, 2) Wailoa River, Monasavu, 3) Johnson Road, Lautoka, 4) Tubu village, Wainibuka River, 5) Nawaka village, Nadi, 6) Nasivi River, Vatukoula, 7) Labasa (NDMO). • General: Gov't estimated preliminary losses of F\$113 million, excluding most losses to households and business centres (Ambroz, 2009). Later estimated at F\$175 million (FTs, 25/12/2009). Losses in the sugar belt especially Rarawai and Lautoka Mill areas estimated at about F\$24 million, including \$13.4 million to growers (incl. a loss in cane output of about \$8.0 million) and \$7.5 million to the Fiji Sugar Corporation (Lal et al., 2009). Total losses much higher if commercial and private sector damage is included (see Ba and Nadi entries). More than 11,000 people forced to evacuate their homes. School facilities and homes in many parts of the Western Division without water and electricity for several days. Bridges used to transport sugarcane were washed away and mills flooded. • Ba mill: Flood peak 2.5-3.0m in Rarawai Mill, likely to be the worst since 1931 (note no surveyed data available at time report prepared). FSC lines flooded and some 'washed away' (?); residents rescued by Police.

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	<p>Nadi Airport, 241mm at Penang Mill in Rakiraki (FMS, 2009). Note that 928mm was recorded at Tikituru gauge high on the divide between the Sigatoka and Navua catchments (920m a.m.s.l.) for 24hrs on 9th (midnight to midnight) (Turner, 2009).</p> <p>The trough associated with the first TD neared the Fiji Group on 10th, causing continuous heavy rain over Viti Levu with extensive flooding. Highest 24hr rain recorded was 493mm at Koronubu Sector Office (and 386mm at Monasavu Dam) (FMS, 2009).</p> <p>A second TD approached Fiji from the west on 12th, with widespread heavy rain. Highest 24hr rain recorded was 378mm at Nabouwalu, Bua (and 321mm at Udu Point). This produced the third major flooding for the period (FMS, 2009).</p> <p>From 15th to 17th, the trough and SPCZ hovered over the northern parts of Fiji. Several centres recorded heavy rainfall during this time (FMS, 2009).</p> <p>New 5-day rainfall records were set at Rarawai Mill, Nadi Airport and Nacocolevu (Sigatoka) (FMS, 2009).</p>	<ul style="list-style-type: none"> • Ba town: Flood peak estimated at 1.9m over floor at RC Manubhai (7.22m a.m.s.l.) (business interview by S. Yeo; level based on flood mark) (note no surveyed data available at time report prepared). (Note this compares to 7.92m a.m.s.l. at courthouse in Feb 1931 flood). Damage in Ba town estimated at F\$86 million (households F\$31 million; business F\$56 million of which 43% direct damage from lost assets and 44% indirect damage from business interruption) (Ambroz, 2009). Kings Road cut either side of Ba bridge on Sat 10th. HART homes in Namosau, and Yalalevu flooded. Ba water supply plant badly damaged with dam filled with silt (FS). • Ba valley: Nasolo, Votua, Nawaqarua, Wailailai, FSC Lane, Tavarau, Balevuto, Toge, Nailaga Mortuary, and the Koronubu, Yalalevu and Moto bridges closed due to flooding. The Nasa bridge, Rarawai flats, Veisaru back road, Ba town on the Tavua end. Moto bridge (over Nadrou Creek?) approaches damaged (FTs). Nailaga mortuary flooded (FTs). • Korovou, Tailevu: Flats flooded and closed to all traffic on 10th (FS). • Lautoka: HART homes in Lovu, and Navoka settlement flooded. Some flooding near Churchill Park on Tues 13th. Drasa seawall damaged by floodwaters (FS; FTs). • Nadi: Flooding here could be the highest on record. Flood peak estimated at 1.2m over floor at Jack's of Fiji despite raised floor. Note this compares to about 0.4m over Jack's floor in Jan 1999 flood (business interview by S. Yeo; level based on recollections), which was recorded as 7.25m a.m.s.l. in town, meaning that the Jan 2009 flood would have a peak of about 8.05m a.m.s.l. in town (note no surveyed data available at time report prepared). Nadi town, Nadi back road and Sabeto bridge closed due to flooding. Waimalika and Lomaimalika roads in Namaka also closed due to flooding. Damage in the greater Nadi region estimated at F\$244 million, about 5% of GDP (households F\$14.5 million; business F\$229.5 million of which 37% direct damage from lost assets and 32% indirect damage from business interruption) (Holland, 2009). Flooding at Nawakalevu and Nawijikuma settlements, outside Nawaka, in early hours of Fri 9th. Severe damage at Narewa village when flooded on nights of Sat 10th and Mon 12th (FS). HART homes at Navakai flooded at least up to picture frames (FTs). Nadi water supply badly disrupted (FTs). • Nausori: floodwater within 1m of town (FS). • Rakiraki: Naqoro flats and Vaileka market flooded Fri 9th. Flood stricken villages included Barotu, part of Nalalawa, and settlements were Malau, Colase, Raiwasa Mid Road and Qalau. Penang Mill flooded (FS; FL). • Rewa area: Waila, Nayala Sub-division, Navuso, Toga and Baulevu flooded after high tide on night of Sat 10th (FS); Burebasaga village flooded about 5 a.m. Sun 11th. Nasali village flooded (FS; FTs). • Sigatoka: Town flooded on night of Sat 10th. Old Sigatoka bridge (Melrose bridge) partly washed away on the Suva end about 4 p.m. Sun 11th, breaking the sewer and water pipelines that utilised the bridge. Market and residential area of Nayawa and Gov't quarters underwater on morning of 12th. Queens Road cut at Lawaqa. Laselevu village underwater (FS; FTs). • Sigatoka valley: Severe damage to export crops along Valley Road and in Barara Plains (FTs). About 48 houses submerged for days at Vunaqoru village, worst flooding in memory (FTs). Nabitu

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<p>settlement badly flooded, biggest since Kina (1993) (FTs). Kavanagasau and Nadromai bridges, Nawamagi flats, Mavua Crossing, Raiwaqa bridge, Semo and Vatudradra closed due to flooding. Up the Sigatoka Valley, the Tabarua, Draiba, Matawale bridges were closed due to flooding.</p> <ul style="list-style-type: none"> • Tavua: More than 6 ft (1.8m) floodwater at Nabuna and Vanuakula villages, with more than 500 people evacuated (FTs). Korovou, Yaladro, Toko, Rabulu, Vatukoula and Viti Vanua also experienced severe flooding (FTs). • Vatukoula: Nasivi River flooded (FS). • Waidina River: Naqali bridge under 3.5m water on Sat 10th (FS). Waisomo and Waivaka (?) Irish Crossings washed away (FTs). • Waimanu River: About 30 homes flooded on Sawani Road completely underwater on Mon 12th (FS). • Wainibuka River: Severe and prolonged flood. Wailotua village flooded on night of Wed 7th, closing Kings Hwy. 60+ houses flooded in Wailotua/Wailotua Two/Malabi. 50+ houses flooded at Lutu village. Few houses structurally damaged (FS; FTs). • Wainimala River: Wailoa River flooded (FS). Rewasau badly flooded (FTs). Vunidawa Hospital damaged by floodwaters (FTs). <ul style="list-style-type: none"> • Bua Province, Vanua Levu: roads flooded around Nabouwalu on Tues 13th (FTs). • Cakaudrove Province, Vanua Levu: several villages in Wailevu West flooded on Tues 13th. Yanawai River flooded Dawara village. Houses threatened by riverbank erosion at Suweni village in Wairiki District (FTs). • Labasa: Labasa and Qawa Rivers flooded. Labasa town and the lower suburbs including Naodamu, Namara, Bulileka, Batinikama, Korovatu badly hit on night of Tues 13th (FS; FTs). Labasa town under 4 ft (1.2m) of water on morning of Wed 14th (FTs). Naiyaca Subdivision flooded from Qawa River (FTs). FSC Mill flooded. Flood waters reached waist height along Bulileka Road and 5 ft (1.5m) along Korotari Road (FTs). • Macuata Province, Vanua Levu: 5 ft (1.5m) of water in houses in Rauriko village at Dogotuki as the Nasavu River broke its banks on Tues 13th (FTs). • Yasawa island: 10 families forced to evacuate when houses flooded in Yasawa-i-Rara village (possibly storm surge) (FTs).
2009 Jan 28-29	TC <i>Hettie</i> developed on 28 th while located to the southeast of Fiji. A trough extended over the Group.	<ul style="list-style-type: none"> • General: Severe flooding reported in the interior and southeastern parts of Viti Levu and in the Eastern Division on Jan 28th-29th. • Lami: Qauia River flooded about 20 houses at about 7 a.m. on 29th, fifth flash flood since 1998 (FTs). • Navua: Navua Hospital compound and three staff quarters flooded at about 10 a.m. on 29th. Raiwaqa bridge flooded (FTs; FL). • Suva: Flooding in Tamavua and Wailoku areas (FL). • Waidina River: Naqali bridge flooded (FTs).
2009 Feb 20	Trough moved eastward than	<ul style="list-style-type: none"> • Labasa: Flash flooding due to heavy local rain and blocked drains (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
	retrogressed across the country between 18 th and 24 th .	
2009 Mar 14	Trough re-developed and moved south over Fiji between 12 th and 16 th while a slow-moving front passed over the southern parts of the Group.	<ul style="list-style-type: none"> • Nausori area: Waituri, Vuci South and Waila roads flooded (FTs). • Waidina River: Naqali bridge flooded by 2m (FTs).
2009 May 18	Trough of low pressure with some thunderstorm activity.	<ul style="list-style-type: none"> • Rakiraki: roads and sugarcane farms flooded (FTs).
2009 Jul 7	Second trough of the month developed to the west of the country and moved over the Group on 6 th .	<ul style="list-style-type: none"> • Korovou, Tailevu: Town threatened by floodwater (FTs). • Tailevu: Bridge damaged by flooding at Naivicula village (FTs).
2009 Aug 7	Trough with associated frontal system moved across Fiji from the west on 6 th .	<ul style="list-style-type: none"> • Cakaudrove Province, Vanua Levu: Vatukuca within Vaturova district flooded (FTs).
2009 Sep 18	On 16 th an active front to the west of Fiji rapidly approached the country. An associated moist easterly flow caused heavy rainfall in parts of eastern Viti Levu. The active front moved across Fiji on 17 th and cleared the Group by 18 th . Heavy rainfall recorded in parts of the country.	<ul style="list-style-type: none"> • Naitasiri: Flooding recorded in the province on 18th.
2009 Dec 14-15	TC <i>Mick</i> affected Fiji from 13 th -15 th . The cyclone passed over the Yasawa and Mamanuca Groups before reaching the Viti Levu coastline on the afternoon of 14 th . After passing directly over Viti Levu, TC <i>Mick</i> took a gradual eastward path across the central and southern parts of Fiji.	<ul style="list-style-type: none"> • General: Low-lying areas on Viti Levu flooded especially the deltas of Ba, Nadi, Navua and Rewa. Sigatoka Valley severely affected. Crops severely affected. Wind and flood damage estimated at \$39 Million. • General: Two flood fatalities while crossing river, one in Lawaki River, Tailevu, one in Nasivikoso, Ba. • Navua: Homes, businesses and Navua Hospital affected by floodwater. Water supply damaged (FTs). • Navua River: Flooding at Namuamua village on 14th. Damaged houses on Navua coast from storm surge (FTs). • Rewa delta and Tailevu south: More than 20 villages flooded. Water supply disruptions when main on bottom of Rewa River broken (FTs). • Suva: Flooding at squatter settlement in Wailea Street, Vatuwaqa (FTs). • Wainibuka River: Flooding of 15 villages along new Kings Highway from Wailotua to Nabulini. Lutu nursing station underwater (FTs). • Wainimala River: Farmer lost 30 cows and house inundated in flood on 14th. Naivucini and Vunidawa bridges damaged (FTs). • Bua Province, Vanua Levu: Flooding reported in Nabouwalu area. Some flooding ay Namau and Wairiki (FTs).

Date of Peak	Reason for High Rainfall	Flood Description and Areas Affected
		<ul style="list-style-type: none"> Taveuni: Flooding reported at northern end of island.

Notes

a.m.s.l. = above mean sea level

SPCZ = South Pacific Convergence Zone

* = Actual date of flood peak uncertain

= Nasasa gauge was shifted on 28/9/1993 with a changed datum. Readings before and after that date are not directly comparable.

1 foot = 0.3048 metres.

1 inch = 2.54 centimetres.

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## APPENDIX A – PRELIMINARY RANKING OF KNOWN FLOOD PEAKS FOR NADI RIVER AT NADI FROM 1931

Prepared by S. Yeo

| Date      | Name    | Nadi town  |        | Other                                                                                                                                                                                                  | Source                    | Comment                                                              | Rank<br>1 = highest |
|-----------|---------|------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------|---------------------|
|           |         | m a.m.s.l. | Source |                                                                                                                                                                                                        |                           |                                                                      |                     |
| 1931 Feb  |         | ?          |        | Floods reportedly the highest and severest ever experienced in Nadi to that date; 5 ft (1.5m) deep in town, in some instances up to 9 ft deep (2.7m); Nadi River rose 35 ft (10.7m) above normal level | FNA, FTs                  | Description of river rise sounds too high given other levels.        | ?                   |
| 1939 Jan  |         | 6.77?      |        | 4 ft (1.2m) deep in shops and houses.                                                                                                                                                                  | FTs                       | Est. ½ ft (0.15m) lower than Oct 1972                                | 6                   |
| 1956 Jan  |         | ?          |        | Highest flood since 1938-39; higher than 1955 flood; heavy loss of merchandise                                                                                                                         | FTs                       |                                                                      | ?                   |
| 1964 Mar  |         | 6.72       | PWD    | 18 ft (5.5m) in main street                                                                                                                                                                            | FTs                       | Description of depth in main street sounds too high for quoted level | 7                   |
| 1965 Feb  |         | 7.02?      |        | Highest flood on record at the time and much higher than Mar 1964 flood                                                                                                                                | FTs                       | Est. 0.3m higher than Mar 1964                                       | 4                   |
| 1972 Oct  | Bebe    | 6.92?      |        | 4½ ft (1.4m) deep at ANZ Bank; somewhat lower than 1965; 8 ft (2.4m) in town                                                                                                                           | Harris, 1972; Blong, 1994 | Est. 0.1m lower than Feb 1965                                        | 5                   |
| 1982 Jan? | Hettie? | 5.86       | PWD    | 4 ft (1.2m) at Nadi bus station                                                                                                                                                                        | Blong, 1994               |                                                                      |                     |
| 1983 Mar  | Oscar   | 6.61       | PWD    | 12 ft (3.7m) in the market                                                                                                                                                                             | Blong, 1994               |                                                                      | 9                   |
| 1984 Mar  | Cyril   | 5.62       | PWD    | 1m at the Nadi bus station                                                                                                                                                                             | Blong, 1994               |                                                                      |                     |
| 1985 Jan  | Eric    | 4.56       | PWD    |                                                                                                                                                                                                        |                           |                                                                      |                     |
| 1985 Jan  | Nigel   | 4.74       | PWD    |                                                                                                                                                                                                        |                           |                                                                      |                     |
| 1985 Mar  | Hina    | 5.38       | PWD    | 1-2m in town                                                                                                                                                                                           | Blong, 1994               |                                                                      |                     |
| 1986 Apr  | Martin  | 6.53       | PWD    | 1.5m at southern end of town                                                                                                                                                                           | Blong, 1994               |                                                                      | 10                  |
| 1990 Mar  | Rae     | 5.93       | PWD    |                                                                                                                                                                                                        |                           |                                                                      |                     |
| 1993 Feb  | Poly    | 7.06       | PWD    | 1.7m in Roshni store                                                                                                                                                                                   | FTs                       |                                                                      | 3                   |
| 1997 Mar  | Gavin   | 6.66       | PWD    |                                                                                                                                                                                                        |                           |                                                                      | 8                   |
| 1999 Jan  |         | 7.25       | PWD    | 8 inches (0.2m) higher than 1964                                                                                                                                                                       | Interview                 | 1964 probably confused with 1965?                                    | 2                   |
| 2009 Jan  |         | 8.05       |        | 0.8m higher than 1999 flood at Jack's of Fiji                                                                                                                                                          | Interview                 |                                                                      | 1                   |

**Note:** italics represent calculated levels based on the described information; question marks indicate poorly constrained levels.

## APPENDIX B – PRELIMINARY RANKING OF KNOWN FLOOD PEAKS FOR REWA RIVER AT NAUSORI FROM 1929

Prepared by S. Yeo

| Date     | Name   | Nausori Pump Station |               |              | Nausori Bridge |               |        | Other                                                                                                                                                      | Source                                                   | Comment                                                         | Rank<br>1 = highest |
|----------|--------|----------------------|---------------|--------------|----------------|---------------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|---------------------|
|          |        | m                    | m<br>a.m.s.l. | Source       | m              | m<br>a.m.s.l. | Source |                                                                                                                                                            |                                                          |                                                                 |                     |
| 1929 Dec |        |                      | 6.66          |              |                |               |        | a) About 3 ft (0.9m) below 1931<br>b) 4 ft (1.2m) below 1931                                                                                               | a) CSR<br>b) FTs, 23/2/31 p.8                            | CSR rated more highly than FTs. Calculated as 3 ft below 1931.  | 2                   |
| 1930 Nov |        |                      | 5.44          |              |                |               |        | Rose 18 ft (5.5m) at Nausori Mill                                                                                                                          | CSR                                                      | Calculated as 7 ft below 1931.                                  | 9                   |
| 1931 Feb |        |                      | 7.57          |              |                |               |        | a) 25 ft (7.6m) at Nausori Mill<br>b) 27 ft (8.2m) at Nausori, 6 ft (1.8m) in Mill<br>c) Est. 25 ft (7.6m) at Water Supply                                 | a) CSR<br>b) FTs, 23/2/31 p.8<br>c) Hasan, 1986, Fig. 22 | CSR rated more highly than FTs. Calculated as 3¼ ft above 1965. | 1                   |
| 1938 Dec |        |                      | 4.97          |              |                |               |        | 3 ft (0.9m) above 1939                                                                                                                                     | FTs, 23/1/39, p.4                                        | Calculated as 3 ft above 1939.                                  |                     |
| 1939 Jan |        |                      | 4.06          |              |                |               |        | 13.5 ft (4.1m) above normal; 3 ft (0.9m) below 1938                                                                                                        | FTs, 23/1/39, p.4                                        | Calculated as 11½ ft below 1931.                                |                     |
| 1956 Jan |        |                      | 5.89          |              |                |               |        | a) 20 ft (6.1m) rise at Nausori<br>b) 15¼ ft (4.6m) above normal high water mark at town; highest level since 1931; peak 5½ ft (1.7m) below level of 1 931 | a) FTs, 2/2/56, p.1<br>b) FTs, 16/2/31, p.5              | Calculated as 5½ ft below 1931.                                 | =6                  |
| 1964 Mar |        |                      | 5.74          |              |                |               |        | Est. 19 ft (5.8m) a.m.s.l. at Water Supply                                                                                                                 | Hasan, 1986, Fig. 22                                     | Calculated as 2¾ ft below 1972.                                 | 8                   |
| 1965 Feb |        |                      | 6.58          |              |                |               |        | a) 0.13m above 1972 at Nausori Pump Station<br>b) ~21¼ ft (6.6m) a.m.s.l. at Water Supply                                                                  | a) Harris, 1972<br>b) Hasan, 1986, Fig. 22               | Calculated as 0.13m above 1972.                                 | 3                   |
| 1972 Oct | Bebe   | 7.12                 | 6.45          | Harris, 1972 | 6.72           | 6.06          | PWD    |                                                                                                                                                            |                                                          | Level recorded at two sites.                                    | 4                   |
| 1980 Apr | Wally  | 6.55                 | 5.89          | Harris, 1980 | 6.18           | 5.52          | PWD    |                                                                                                                                                            |                                                          | Level recorded at two sites.                                    | =6                  |
| 1985 Mar | Gavin  |                      | 4.81          |              | 4.43           | 3.77          | PWD    |                                                                                                                                                            |                                                          | Pump Station est. 0.38 above Bridge.                            |                     |
| 1986 Apr | Martin |                      | 5.38          |              | 5.66           | 5.00          | PWD    |                                                                                                                                                            |                                                          | Pump Station est. 0.38 above Bridge.                            | 10                  |
| 1990 Nov | Sina   |                      | 4.57          |              | 4.85           | 4.19          | MAFF   |                                                                                                                                                            |                                                          | Pump Station est. 0.38 above Bridge.                            |                     |
| 1992 Dec | Joni   |                      | 4.04          |              | 4.32           | 3.66          | PWD    |                                                                                                                                                            |                                                          | Pump Station est. 0.38 above Bridge.                            |                     |
| 1993 Jan | Kina   |                      | 6.38          |              | 6.66           | 6.00          | PWD    |                                                                                                                                                            |                                                          | Pump Station est. 0.38 above Bridge.                            | 5                   |

**Note:** italics represent calculated levels based on the described information.



## AUTHOR BIOGRAPHIES

Simon McGree grew up in Sigatoka and has over 20 years of personal experience with tropical cyclones and floods in Fiji. Highlights include witnessing the collapse of the Sigatoka Bridge in the TC Kina (1993) flood and the severe Nadi floods in 2009. He was awarded a Masters degree from the University of Auckland in 2007 for his investigation into El Niño Southern Oscillation impact on climate scale precipitation extremes in Fiji. From 2000, he was employed by the Fiji Meteorological Service, in his last four years as principal climatologist. Simon has recently taken leave from the Fiji Meteorological Service to join the AusAID Pacific Climate Change Science Program as a Climate Data Scientist with the Australian Bureau of Meteorology where he is currently rehabilitating Pacific Islands and Timor Leste climate data and examining trends in these records. He continues to pursue his interest in meteorological extremes in the Pacific Islands.

Stephen Yeo was awarded a doctorate from Macquarie University in 1999 for his investigation of flooding in Fiji's Ba River Valley. He interviewed hundreds of residents and shopkeepers about flooding and experienced the TC Gavin (1997) flood in Ba. In 1999-2000 he worked as a disaster mitigation adviser with the Pacific Islands Applied Geoscience Commission (SOPAC) and was subsequently engaged to report on the effects of flooding in Macuata Province in 2000. He has worked as a lecturer at several Australian universities and given guest lectures at the University of the South Pacific. Stephen currently works as a flood management expert with Bewsher Consulting in Sydney, is an Associate with Risk Frontiers, and continues to pursue his interest in flooding in Fiji.