WATER RESOURCES

OF THE

PEEL VALLEY

SURVEY OF THIRTY TWO N.S.W. RIVER VALLEYS

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WATER RESOURCES OF THE PEEL VALLEY

PREFACE

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MINISTER FOR CONSERVATION

NEW SOUTH WALES

In accordance with the policy of the New South Wales Liberal-Country Party Government announced prior to its election to office at the May, 1965 State Elections, I directed the Water Conservation and Irrigation Commission to undertake a survey of the State's water resources on an individual valley basis to enable the formulation of a balanced and soundly based programme of water conservation.

The survey, which is the largest and most comprehensive study of its type ever undertaken, involves the preparation of twenty eight reports covering thirty two major river valleys of the State.

In the survey, studies are being made of the physiography, climate, groundwater potential and surface water resources of each valley. In addition to reviewing current water requirements, assessments are being undertaken of possible future water development.

Reports are being prepared progressively and those issued to date have covered twenty one major valleys and a number of minor valleys. This report on the water resources of the Peel Valley is the seventeenth to be issued.

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March, 1970.

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WATER RESOURCES OF THE PEEL RIVER VALLEY

1. INTRODUCTION.

The most essential natural resource available to mankind, with the exception of air, is water. It has been estimated that the continuous minimum daily requirement of an adult is less than one gallon, however the average per capita consumption in a large modern city may approach 300 gallons per day. Such averages may be somewhat misleading as water demands due to industry, home gardens, parks and public services are included in determining the average demand.

Nevertheless industrial requirements can be relatively high when compared to domestic needs. About 300 tons of water are used in the production of a ton of steel, a ton of paper requires about 60 tons of water and about 2½ tons of water are used in growing the grain and producing a loaf of bread. It has been estimated that over thirty tons of water are required to produce a normal daily diet for an adult.

In comparison with industrial or domestic requirements, irrigation demands are comparatively high. The annual water requirements of most crops vary from about two to three feet depth and during a drought period it is necessary to provide a major proportion of this demand by irrigation. The relative size of this requirement can be assessed when it is realised that a depth of three feet over an area of only one acre is equivalent to more than 800,000 gallons (over 3,500 tons).

The gross water resources of a country are normally considered to be the total amounts of precipitation, in the forms of rain, hail or snow, which fall on the land surfaces. The surface water resources are usually regarded as the amounts of water in rivers and lakes.

In comparison with all the other continents Australia has the least average annual precipitation, the average rainfall being only about 1½ feet whereas Africa, Asia, Europe and North America all receive about 2 feet and South America receives an average of nearly 4½ feet.

The natural processes of evaporation, transpiration and seepage deplete the gross water resources of all countries to some degree and when these losses are subtracted from the average rainfalls of the continents, the residuals (or surface water resources) indicate that Australia has a runoff much less than indicated by the average rainfalls. It has been estimated that the average

annual surface water resources of the Australian mainland are of the order of 240 million acre feet which is equivalent to a depth of less than 2 inches over the area of the continent. Comparative runoffs for the other continents are about 7 inches in Africa, 9 inches in Asia and Europe, 11 inches in North America and about 19 inches in South America.

The overall topography of the Australian continent is relatively flat and therefore there are no areas which are permanently covered by snow. As a result, streamflows in Australia are mainly dependent on the occurrence of runoff producing storms and therefore tend to exhibit a great variability in flow.

In addition to the low average annual runoff, major droughts are of prolonged duration in Australia and it is therefore necessary to construct relatively large water conservation storages if assured water supplies are to be provided over the full period of each drought.

The water resources of a nation are of prime importance to the national economy, the welfare of the community depending to a large extent on their proper development and use. Water conservation in Australia is therefore a service of major national importance increasing the standard of living and overall national wealth.

There is no doubt that in the future many more water conservation storages will be constructed in Australia and it will be necessary to ensure that the regulated flows provided by these and existing storages are used effectively and with minimum wastage.

The surface water resources of the Peel River Valley (above the Namoi River junction) have been assessed as averaging about 26[illegible],000 acre feet per annum. As the average annual rainfall over the valley is about 31 inches the surface water resources are equivalent to a runoff of about 9 percent.

On a square mile basis the surface water resources of the Peel River Valley are about 4½ times the average for inland areas of New South Wales and are more than 1½ times the average for the State.

2. PHYSIOGRAPHIC FEATURES.

In this report the external boundary of the Peel River Valley has been adopted as the catchment area of the Peel River at Carroll Gap, which is located close to the Peel River and Namoi River junction.

The extent of the Peel River Valley, in relation to the principal streams and towns is indicated at Figure 1, the total catchment area of the valley being about 1,800 square miles.

Bordered in the north and east by the Moonbi Range, in the south-east by the Great Dividing Range and in the south and south-west by the Peel Range, the Peel River flows in a general north-westerly direction for its entire length to Carroll Gap.

The Moonbi Range extends from just above Attunga in the northern section of the catchment to the headwaters of Dungowan Creek in the south, and the major peak of this range is Whites Sugarloaf of elevation 4,710 feet, located about 22 miles south-east of Dungowan. Most of the runoff producing streams in the valley commence in this range and drain directly to the Peel River or to the Cockburn River.

The average elevation of the Moonbi Range along the border of the valley is about 3,000 feet above sea level. Due to the uplifting of air masses by this range and the consequent production of orographic rainfall, this area contributes largely to the runoff of the catchment.

Rising in steep heavily timbered country to the east of Crawney Pass, the Peel River flows in a northerly direction through mountainous country bordered by river flats until its junction with Dungowan Creek at Dungowan. Between Dungowan and Tamworth the mountainous country continues on the northern side of the river, but flattens out into fertile river plains on the southern side.

Three miles upstream of Tamworth the Peel River is joined by the Cockburn River. The main tributary of the Cockburn River, Mulla Creek, rises in elevated country just north of Whites Sugarloaf and flows through rocky mountainous country in a north-westerly direction to its junction with the Cockburn River about two miles above Kootingal. All other tributaries of the Cockburn River rise in the western slopes of the Moonbi Range and these creeks exhibit comparatively high runoff characteristics. From Kootingal to Tamworth the Cockburn River flows through river flats of about five miles average width.

The Goonoo Goonoo Creek enters the Peel River in Tamworth after flowing through undulating to flat country due south of Tamworth. Goonoo Goonoo Creek rises on the steep northern slopes of the Great Dividing Range about three miles west of Crawney Pass, but quickly loses elevation as it flows north to the fertile undulating plains around Goonoo Goonoo. Flat country prevails on the catchment of Goonoo Goonoo Creek between Goonoo Goonoo and Tamworth.

From Tamworth the Peel River flows in a general north-westerly direction through flat fertile plains which extend to Carroll Gap where the country becomes more undulating to hilly. Between Tamworth and Carroll Gap the Peel River is joined on both sides by a number of minor tributaries. These tributaries contribute relatively little to the overall runoff of the entire catchment even though this area represents approximately 35 percent of the Peel River Valley catchment.

As indicated on Figure 2 landslopes in the Peel River Valley are predominantly mountainous, about 51 percent of the total area of the valley having slopes of 15 degrees or more. Undulating to hilly and hilly to steep areas of the valley comprise 11 percent and 5 percent respectively of the total area whilst flat areas comprise the remaining 33 percent.

The main economic activity in the upper reaches of the Peel River Valley is the grazing of sheep for wool, though this is often supplemented by poultry raising and dairying. Around Tamworth extensive irrigation is carried out for the production of fodder and grain crops with dairying and pig raising also of some importance. Below Tamworth extensive wheat and fodder crops are grown together with the grazing of sheep for wool and mutton.

3. CLIMATIC FEATURES.

Rainfall.

Average annual rainfall over the Peel Valley generally increases with elevation. Annual median rainfalls over the headwaters of the river above 3,000 feet are between 35 inches and 45 inches, the greater values being along the higher peaks of the Divide which forms the south-east boundary of the river valley. (The median is the rainfall equalled or exceeded on 50 percent of occasions.) To the north-west in the vicinity of the junction of the Peel and Namoi Rivers, annual median rainfalls are approximately 23 inches. The distribution of annual

median rainfalls is shown at Figure 3, whilst the monthly median rainfall distributions, which follow a generally similar pattern to the annual distribution, are shown in Figures 4 to 15 inclusive.

The monthly rainfall distribution throughout the year is bimodal with a primary maximum in January and a secondary maximum in June. On the average these months receive about 12 percent and 9 percent respectively of the annual rainfall.

May is the driest month receiving only about 5 percent of the annual rainfall while August, which is the driest month in the second dry period of the year, receives only 6 percent of the annual rainfall.

In the wettest month, January, median rainfalls vary across the river basin from 4 inches to less than 2½ inches while in May, the driest month, the corresponding figures are 2½ inches and 1 inch.

Actual monthly rainfalls recorded at Bective, Bendemeer, Goonoo Goonoo, Manilla, Nundle, Prestwich and Tamworth are given in Appendices 1 to 7 inclusive.

Very high monthly totals similar to those recorded on the eastern slopes of the Divide are not experienced over the Peel River Basin. Highest monthly totals on record for stations in the catchment are from 11 to 14 inches and usually occur in the months December, January or February when a depression forms to the north of the river valley. These depressions which may cause a moist northerly airflow west of the Divide usually form in a trough extending from north of the continent to South Eastern Australia. Under these conditions high daily rainfall totals may result. The highest total on record for a 24 hour period ending 9 a.m. is 8.70 inches which occurred at Bective on 19th February, 1928.

The tables at Appendix 8 show on a monthly and yearly basis for Bective, Bendemeer, Goonoo Goonoo, Manilla and Nundle the following data

(i) the highest and lowest rainfall totals on record;

(ii) the 10th, 30th, 50th, 70th and 90th percentiles;

(a rainfall observation less than the 10th percentile value can be expected once every ten years on the average. Similarly, a rainfall observation less than the 70th percentile can be expected in seven years out of ten or alternatively a rainfall observation greater than the 70th percentile can be expected on an average of three years in ten.)

Minimum recorded rainfalls at Bendemeer and Manilla are shown in the tables at Appendix 9. These tables indicate the minimum cumulative rainfall at selected stations commencing in any month of the year and continuing for up to twelve months.

Dry spells occur over the basin from time to time. Only rarely, however, do these dry spells exceed about six months. On 90 percent of occasions 6 inches of rain or more are received in any six consecutive months of the year while in any consecutive twelve monthly period the corresponding figure is 16 inches.

Temperature.

The temperature regime of the lower part of the river basin is represented by the averages and extremes listed for Tamworth in Table 1. Over the higher parts of the basin above 3,000 feet temperature averages would, in general, be about 8 to 10 degrees cooler than the values given for Tamworth in Table 1.

TABLE 1.

TAMWORTH (Elevation 1240 Feet)

Average Temperature (°F) Based on 31 years of Record.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average Maximum	91.0	89.5	84.6	76.9	69.1	62.0	60.4	64.2	71.6	78.5	85.1	88.5	76.8
Average Minimum	63.4	62.9	58.2	50.4	43.2	38.6	36.8	37.8	42.3	49.7	56.2	60.9	50.0
Average Daily	77.2	76.2	71.4	63.7	56.1	50.3	48.6	51.0	56.9	64.1	70.7	74.7	63.4
Highest on Record 113.0°F							Lowest on Record 20.0°F						

Very hot days are experienced over the river basin on occasions in summer. Tamworth averages about 55 days per year with maximum temperatures of 90 degrees Fahrenheit or more and about 6 days per year with maximum temperatures over 100 degrees Fahrenheit, although there can be a considerable departure from this figure in some years. These hot spells are associated with north-westerly winds which cause hot dry air from central Australia to flow over the river valley.

On occasions of calm clear nights, very low overnight temperatures may occur in winter. Tamworth experiences about 65 nights per year in which the temperature falls below 36 degrees Fahrenheit. Extreme temperatures as low as 15 degrees Fahrenheit can be expected to occur on rare occasions over the higher parts of the valley.

Frosts.

Frosts have occurred over the entire river valley in the cooler months of the year. Light frosts on the average occur from mid March to early November over the higher parts of the basin. The frost season starts a month later and finishes a month earlier over the lower reaches of the valley. Severe frosts are usually confined to the months June to August and vary from about 20 to 50 per season depending on the elevation and topography of the area concerned. They may occur, however, as early as the end of March and as late as mid October over the higher parts of the basin.

Sunshine.

Estimates of the average number of hours of bright sunshine per day in each month are shown in Table 2. These estimates are based on cloud observations.

TABLE 2

Average Duration of Sunshine in Hours per Day.

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
9.8	9.2	8.4	7.7	7.3	6.0	6.6	7.4	8.3	9.0	9.7	9.7	8.3

Evaporation.

Estimates of the average monthly and annual evaporation from an Australian Standard sunken tank are shown in Table 3 together with estimates of standard deviations. These estimates are based on radiation, air temperature and humidity considerations.

TABLE 3

Estimated Average Monthly and Annual Evaporation In Inches for the Peel Valley

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Evaporation	7.0	5.2	4.8	3.3	2.7	1.7	1.4	2.5	3.1	4.1	6.0	7.0	48.8
Standard Deviation	1.0	0.9	0.8	0.5	0.3	0.3	0.3	0.4	0.6	0.8	1.1	1.2	5.2

Wind.

Wind speeds over the river basin are mainly only light to moderate. Violent gusts, however, may be experienced over limited areas on rare occasions in association with thunderstorms or active cold frosts. The extreme wind gusts likely to be experienced in association with these phenomena are shown in Table 4 for various return periods.

TABLE 4

Estimated Extreme Wind Gusts to be Expected with Given Return Periods

Return Period (Years)	10	20	50	100
Extreme Wind Gust Equalled or Exceeded (Miles per Hour).	25	80	90	100

4. GROUNDWATER POTENTIAL.

The Peel River Valley is an elongated structure trending in a general north-westerly direction till it joins the Namoi River upstream of Carroll. The valley is enclosed by elevated country up to 4,700 feet above sea level.

Hard rocks of various types form the higher areas and these weather to form the alluvial material which is transported to and deposited along the valley to form the river and creek flats. The type of alluvium thus depends on the type of rocks occurring in the catchment areas.

The geological map at Figure 16 indicates that most of the area consists of Palaeozoic rocks ranging in age from Carboniferous to Silurian with Tertiary basalts forming cappings in the southern part of the area. The younger Palaeozoic rocks (i.e. Carboniferous) occur in the western part of the valley giving way in succession to older rocks to the east where Silurian sediments and metamorphics outcrop. This area represents part of the eastern flank of the Werrie Basin and contains several smaller structures including the Goonoo Goonoo Anticline and its neighbour the Marsden Park Syncline. Associated with these are a number of major faults with a north or north-north-west trend. The main rock types present in this area range from sandstones, shales and conglomerates to slates, quartzites and tuffs. Granite outcrops in the north-eastern part of the valley and on the eastern fringe and basalt in a small area in the southern highlands.

A large variety of rocks is thus represented in the Peel Valley and these, for convenience, are divided into two groups, jointed and porous rocks. The groundwater potential of the area may then be related to:-

a. Jointed Rocks where water is stored in the open spaces formed by joints, cracks, bedding planes etc.

b. Porous Rocks which contain water in pore spaces between the individual grains as in porous sandstones.

c. Alluvium where water is found in unconsolidated porous material, mainly sands and gravels, which has been transported by river action.

Groundwater is of great importance in the Peel River Valley for both irrigation and stock use. Intensive irrigation is undertaken along the Peel River and tributaries mainly from wells, and also there are few properties in the sloping country which do not have at least one stock bore. These bores in the main obtain water in rocks which belong to the Jointed Rocks category.

(a) Jointed Rocks.

The groundwater potential of the jointed rocks is quite considerable from a stock watering viewpoint. Water is obtained in these rocks in joints and fractures and any other open space which may be present. Stock supplies of water are normally struck at depths of the order of 100 feet but some deeper bores have been failures due to very hard rock or elevated sites, or a combination of both.

The Carboniferous rocks consist mainly of tuffs, sandstones, mudstones and andesites and form the elevated range in the western part of the valley extending down to the foothills. Stock supplies are generally obtained in bores at selected sites and varying in depth from 50 to 200 feet. Few failures are recorded, and in fact one bore in the Winton area was tested at 6,000 gallons per hour at a depth of 60 feet and has been used for irrigation.

The Devonian rocks are mainly shales, conglomerates, greywackes and sandstone with subordinate limestones. Numerous bores have been constructed in these rocks and the majority yield stock supplies of water at depths from 50 to 300 feet. Most of these however, are of the order of 100 feet in depth. Several are known to yield irrigation supplies (4,500 to 13,000 gallons per hour) at depths of 40 to 78 feet in sandstone and shale. Strata samples from two of these bores indicate that the rock is not porous, and considerable fracturing and/or jointing must be present to allow these supplies to be pumped.

Silurian slates, quartzites, phyllites, etc. outcrop in the more elevated eastern part of the catchment. These rocks normally yield stock supplies of water at selected sites at depths of 100 to 200 feet. However, interbedded

lavas occur in places and these should be avoided where possible. The best sites are usually in drainage lines and depressions in slatey rock or quartzites. Similar conditions are found in serpentine which occupies a small area in the north-western part of the valley.

Granite occurs to the north of Tamworth in the Kootingal-Moonbi area and around the north-eastern edge of the watershed. Stock supplies of water are usually available at selected sites in granite at depths of 50 to 150 feet. Here again elevated areas should be avoided as the prospects of successful boring usually decrease with elevation and difficult drilling is likely due to very hard rock.

Basalt outcrops occur as cappings in a limited area near the south and south-east margins. Boring in basalt is usually successful in the lower areas at depths of 60 to 120 feet yielding stock supplies of water. However, few bores are recorded in this area possibly due to the elevation and the availability of alternative supplies.

(b) Porous Rocks.

There are few known occurrences of porous rocks in the Peel River Valley and they have minor groundwater potential. It is possible that one or more of the irrigation bores mentioned earlier may be in porous sandstone but due to a lack of strata details this cannot be substantiated.

(c) Alluvium

The rivers and creeks of the valley are entrenched in relatively elevated country and so the alluvium or flats are restricted both in width and depth. However, the flats have considerable groundwater potential and irrigation is carried out from wells along the Peel River and many of the tributary rivers and creeks.

The greatest development is in the central part of the valley from near Tamworth downstream to Attunga. The flats are at their widest in this section of the Peel River and fairly intensive irrigation is undertaken from wells. Some distance downstream of Attunga the flats become narrower and irrigation supplies are difficult to obtain.

The alluvium along the river reaches a maximum thickness of about 50 feet and a maximum width of some two miles between Tamworth and Attunga. Test bores sunk near Tamworth for a city water supply indicated a depth to rock of from

32 to 45 feet. Irrigation supplies of water are obtained from wells along the Peel River varying in depth from 20 feet near Woolomin to 38 feet downstream of Somerton. The supplies are stated to range from 5,000 to 40,000 gallons per hour, but it is known that many of these were considerably reduced by a general fall in the water table during the recent drought period. It was necessary to deepen a number of wells in an attempt to restore the original yields and this was particularly noticeable in the upstream part of the river. The distribution of gravels along the river is often rather variable and test boring may be required to locate suitable water bearing strata and so the best site for the construction of a well. However, despite this it is felt that there is still room for more intensive development of the use of groundwater for irrigation along the Peel River flats.

Irrigation is also carried out from wells on the northern tributaries of the Peel, including the Cockburn River, and Moore and Attunga Creeks. The depth and width of alluvium here again restricts the supplies obtainable, but they are still of considerable importance particularly in times of low flow in the streams. In their upstream sections where the alluvium is shallow, the well supplies show a fairly rapid response to drought conditions and if a prolonged drought occurs, may become too small for irrigation use.

The main eastern tributary is Dungowan Creek and here the alluvium probably does not exceed 30 feet in depth. A number of wells up to 20 feet deep yield supplies ranging from 5,000 to 30,000 gallons per hour. However, these decline rapidly in dry times and in some cases yield only stock supplies. The flats are generally narrow and about 9 or 10 miles upstream become too restricted to be of any consequence from a groundwater viewpoint.

Goonoo Goonoo Creek is the main southern tributary and drains a large catchment in the southern part of the valley. The flats along the creek are up to ½ mile wide in places and the maximum depth of alluvium is probably about 35 feet. There are a number of irrigation wells and bores on the flats up to 30 feet in depth and yielding supplies of 7,000 to 30,000 gallons per hour. The latter supply would probably be in normal rainfall seasons only and may be considerably less in drought times. Irrigation supplies are also obtained along some of the tributary creeks such as Spring and Middlebrook Creeks. In some cases, wells are sunk in the sandy creek bed and capped to prevent flood damage.

Useful supplies are often obtained in this way with cheaper pumping due to low suction lift than if the wells were sunk on the flats. Recharge conditions also are much better.

The smaller southern tributaries of the Peel River such as Sandy Creek, Reedy Creek, Tangaratta Creek etc. have some groundwater potential and irrigation supplies are obtained in places along the flats from shallow wells. Stock supplies are normally available along the creek flats in wells or bores, wherever sufficient thickness of alluvium is present.

Summary.

The Peel River Valley has considerable groundwater potential with regard to both stock and irrigation supplies of water. Fairly intensive irrigation is carried out from wells along the central part of the Peel River and also on the lower sections of the major tributaries. However, the deposition of gravels has been rather variable and test boring is often necessary to determine the most suitable site for an irrigation well.

The alluvium in the valley is relatively shallow with a probable maximum depth of 50 feet and the flats are generally narrow reaching their greatest width of about 2 miles some distance downstream of Tamworth. Both these factors restrict the possibility of future large scale development of the use of groundwater for irrigation in this area. However, it is expected that a more intensive use of shallow supplies for irrigation would be possible, but test boring may be necessary to locate these. At present the wells are from 20 to 38 feet in depth yielding from 5,000 to 40,000 gallons per hour.

Irrigation is carried out from wells on some of the tributary creeks but here the yield and reliability of the supplies are often restricted by the shallow nature of the alluvium particularly in the upstream section of the streams.

Stock supplies of water are commonly obtained in both the jointed and porous rocks as well as the alluvium and these are often of great value in drought times when surface water is not available. The depths of bores in rock vary from 40 to 300 feet but generally yield stock supplies of water (100 to 500 gallons per hour) at a depth of the order of 100 feet. However, several bores in rock yield irrigation supplies of the order of 4,500 to 13,000 gallons per hour at depths of 40 feet to 78 feet in sandstone and shale but these are rare occurrences.

5. STREAM GAUGING STATIONS

Streamflow is a governing consideration in the engineering and economic aspects of schemes for the development of water resources and proper appraisal of each scheme is largely dependent upon the adequacy of the basic streamflow data.

Streamflow measurement involves two basic steps, the first being the measurement of river height in relation to a fixed datum and the second being the correlation of measured height with stream discharge.

River heights may be measured visually with the use of a graduated scale (or staff gauge) or by means of a continuous record produced by a float or pressure-actuated recorder. Individual measurements of stream discharge are obtained by the use of a current meter to measure flow velocities, in conjunction with survey methods to determine the area of effective flow. The combination of flow velocities, in feet per second, and effective discharge areas, in square feet, gives the discharge of the stream in cubic feet per second or cusecs. Discharge at a stream gauging station is usually expressed in terms of cusecs, one cusec flowing for one day being approximately equal to two acre feet.

Using graphical methods, relations are established between gauge heights and corresponding discharges using streamflow measurement data obtained at the gauging station and, in stable channels, these relations tend to be relatively constant. During periods when gauge heights, but not measured discharges, are available for the station, the derived gauge height - discharge relations are used to estimate the discharge. Therefore continuous streamflow records may be derived for any gauging station using gauge height data and the gauge height - discharge relationship for the particular station.

The measurement of streamflow in the Peel River Valley commenced in 1915 when a gauging station was established on the Peel River at Bowling Alley Point. This was followed by the establishment of stations on the Peel River at Carroll Gap in 1923, at Tamworth in 1925 and at Attunga in 1936. In 1952 the station established on the Peel River at Attunga was discontinued. Due mainly to unstable channel conditions the gauging station at Tamworth was discontinued in 1953 being replaced, in the same year, by a more suitable station at Paradise Weir.

At the present time the Water Conservation and Irrigation Commission is operating nine gauging stations in the valley of which seven are equipped with automatic pressure recorders and two equipped with automatic float recorders. These gauging stations are so located as to measure streamflows in the Peel and Cockburn Rivers and Duncans, Mulla and Goonoo Goonoo Creeks, and provide a complete coverage of the overall runoff from the Peel River Valley.

The current density of gauging stations in the Peel Valley of about 4.4 stations per thousand square miles is nearly three times greater than the average density for inland New South Wales (1.5 stations per thousand square miles) and about nine times greater than the average density for the Australian mainland (0.5 stations per thousand square miles).

The location of all gauging stations in the Peel River Valley are shown at Figure 17 and relevant details concerning each station are given in Table 5.

TABLE 5

Stream	Station	Catchment Area (Square Miles)	Type of Gauge	Period of Operation
Peel River	Bowling Alley Point	120	Pressure Recorder	1915 to date
Peel River	Dam Site	157	Manometer Servo Pressure Recorder	1968 to date
Peel River	Piallamore	440	Pressure Recorder	1936 to date
Peel River	Paradise Weir	930	Float Recorder	1953 to date
Peel River	Tamworth *	1190	Staff Gauge	1925 to 1953
Peel River	Attunga *	1540	Float Recorder	1936 to 1952
Peel River	Carroll Gap	1800	Manometer Servo Pressure Recorder	1923 to date
Duncans Creek	Woolomin	55	Pressure Recorder	1965 to date
Cockburn River	Mulla Crossing	350	Float Recorder	1936 to date
Mulla Creek	Bullimball	107	Pressure Recorder	1965 to date
Goonoo Goonoo Creek	Timbumburi	194	Pressure Recorder	1965 to date

* Discontinued Station.

6. CATCHMENT YIELDS

The regular recording of streamflow in the Peel River Valley has resulted in a substantial volume of hydrologic data being available for estimation of water yield, or runoff, from the various sections of the valley. The water yield of a natural catchment, whilst dependent primarily on the precipitation over the catchment, is also related to a number of other factors including the geology, topography and type of vegetation of the catchment.

In relation to many other areas of the State, the stream gauging stations in the Peel River Valley have relatively long periods of records. Streamflow stations in the valley for which more than thirty complete years of records are available include Bowling Alley Point, Piallamore and Carroll Gap on the Peel River and Mulla Crossing on the Cockburn River. The stream gauging station on the Peel River at Bowling Alley Point has the longest period of records, extending from 1915 to date.

The second longest period of streamflow records are those for the Peel River at Carroll Gap, where records commenced in 1923. This station has a catchment area of 1,800 square miles and measures the entire runoff of the Peel River Valley. Over the period of 45 years of complete records, the average annual discharge at Carroll Gap has been about 262,000 acre feet per annum or 360 cusecs (135,000 gallons per minute).

At Piallamore, which has a catchment area of about 25 percent that of Carroll Gap, the average flow over the period of 32 complete years of record commencing in 1936 has been about 103,000 acre feet per annum or 141 cusecs (53,000 gallons per minute).

Details of monthly maximum, minimum and mean flows for the gauging stations located on the Peel River at Bowling Alley Point, Piallamore, Paradise Weir, Tamworth and Carroll Gap, and on the Cockburn River at Mulla Crossing are tabulated in Appendices 10 to 15 inclusive.

A comparison of the recorded yields of the Peel River at Bowling Alley Point, Piallamore, Paradise Weir, Tamworth, Attunga and Carroll Gap, and the Cockburn River at Mulla Crossing, where records are available for periods in excess of 15 years is given in Table 6..

TABLE 6

Stream	Station	Complete Years of Computed Records	Yield		
			Acre Feet per Annum	Cusecs	Gallons per Minute
Peel River	Bowling Alley Point	53	52,000	71	27,000
Peel River	Piallamore	32	103,000	141	53,000
Peel River	Paradise Weir	15	222,000	297	111,000
Peel River	Tamworth *	27	187,000	256	96,000
Peel River	Attunga *	10	89,000	122	46,000
Peel River	Carroll Gap	45	262,000	360	135,000
Cockburn River	Mulla Crossing	32	82,000	112	42,000

* Discontinued Station

7. AVERAGE ANNUAL RUNOFF

The current estimate of the long term average annual runoff for the Peel River Valley has been based on a streamflow correlation with the gauging station on the Namoi River at Gunnedah for which streamflow records are available from 1892.

On this basis the average long term runoff for the Peel Valley has been assessed as being of the order of 260,000 acre feet per annum which is equivalent to an average rate of flow of about 360 cusecs (135,000 gallons per minute). In terms of catchment area, the average runoff from the valley is equivalent to about 145 acre feet per annum per square mile.

On a square mile of catchment area basis, the resources of the Peel Valley are about 4½ times the average annual runoff per square mile for inland New South Wales and more than 1½ times the average for the whole of the State.

In Table 7, details are given of the estimated long term average annual runoff from the entire Peel Valley, from the Cockburn River above its junction with the Peel River, and from the Peel River above the junction of the Cockburn River. The table also indicates the long term average annual runoff estimates for the adjacent catchments of the Upper Hunter, Manning and Namoi Valleys.

TABLE 7

Valley	Catchment Area in Square Miles	Estimated Long Term Average Annual Runoff		
		Acre Feet per annum	Acre Feet per Annum per Square Mile	Percentage Runoff
Peel Valley	1,800	260,000	145	9%
Cockburn River above Peel River Junction	400	83,000	206	12%
Peel River above Cockburn River Junction	530	110,000	206	12%
Manning Valley	3,250	1,800,000	554	23%
Upper Hunter Valley above Maitland	6,750	800,000	119	8%
Namoi Valley (excluding the Peel Valley)	14,800	410.000	28	2%

From Table 7 it can be seen that the majority of the annual runoff of the Peel Valley is contributed from the catchments above the confluence of the Peel and Cockburn Rivers. The yield from these catchments, on a square mile basis, is identical as are the percentage runoff estimates for the two areas. The contribution of runoff from the lower section of the valley is considerably less than from the more elevated headwater regions mainly because of the much lower rainfalls experienced in these lower sections.

As indicated by the details given in Table 7 the runoff per square mile from the Peel Valley is more than five times that from the remainder of the Namoi Valley which has a catchment area of about eight times that of the Peel Valley. Although the runoff per square mile within a valley normally decreases with increasing catchment area the substantial difference between the estimates for the Peel Valley and the remainder of the Namoi Valley is at least partly attributable to the higher annual rainfall normally experienced over the Peel Valley and the flatter topography which exists over a large proportion of the Namoi Valley.

8. VARIABILITY OF STREAMFLOWS

Average annual flows do not indicate the surface water resources available in any one particular year, nor do they indicate the extent to which a valley's surface water resources may be utilised without the provision of storage works.

An indication of the variability of streamflows at selected gauging stations in the Peel River Valley is given at Table 8. This table shows the maximum, minimum and mean flows which have been recorded at these gauging stations over their periods of operation.

TABLE 8.

Stream	Station	Period of Operation	Recorded Discharges		
			Maximum	Minimum	Mean
Peel River	Bowling Alley Point	1915 to 1968	30,000 cusecs (11,200,000 g.p.m.)	0	71 cusecs (27,000 g.p.m.)
Peel River	Piallamore	1936 to 1968	32,000 cusecs (12,000,000 g.p.m.)	0	141 cusecs (53,000 g.p.m.)
Peel River	Paradise Weir	1953 to 1968	47,400 cusecs (17,700,000 g.p.m.)	0	297 cusecs (111,000 g.p.m.)
Peel River	Tamworth*	1925 to 1953	26,500 cusecs (9,900,000 g.p.m.)	0	256 cusecs (96,000 g.p.m.)
Peel River	Carroll Gap	1923 to 1968	193,000 cusecs (72,200,000 g.p.m.)	0	360 cusecs (135,000 g.p.m.)
Cockburn River	Mulla Crossing	1936 to 1968	42,500 cusecs (15,900,000 g.p.m.)	0	112 cusecs (42,000 g.p.m.)

* Discontinued Station

Based on a period of records of 45 years for the Peel River at Carroll Gap, the annual flow at this station has varied from about 5 percent to about 450 percent of the recorded annual average flow. At the upstream stations on the Peel River at Piallamore and Cockburn River at Mulla Crossing, the variations in annual flow over a period of 32 years at each station have been of the order of 3 percent to 450 percent at Piallamore and 3 percent to 435 percent at Mulla Crossing.

During the flood month of February 1955 the total monthly flows of the Peel River at Carroll Gap and Paradise Weir were about 645,000 acre feet and 210,000 acre feet respectively. These flows are equivalent to about 2½ times and about the same as, the respective average annual flows at these stations. The peak discharges at these stations during the same month were about 193,000 cusecs (about 72 million gallons per minute) and 47,400 cusecs (about 18 million gallons per minute).

The distribution of the annual discharges for the Peel River at Carroll Gap and Piallamore and the Cockburn River at Mulla Crossing are shown at Figure 18. As indicated on this figure, the highest annual runoff over the period of records occurred in the years 1950, 1955 and 1956 whilst in the years 1965 to 1966 very low runoffs were recorded.

Hydrographs of the recorded monthly discharges for the Peel River at Bowling Alley Point, CarrollGap and Tamworth are given at Figure 19 whilst similar hydrographs for the Peel River at Piallamore and Paradise Weir and the Cockburn River at Mulla Crossing are shown at Figure 20.

Reference to Figures 19 and 20 indicates the wide variability in monthly streamflows in the valley and shows that while the monthly flow during November 1924 was the highest on record at Bowling Alley Point, being slightly greater than the February 1955 flood at that location, the highest recorded monthly flow at Carroll Gap and at Paradise Weir occurred during February 1955. At the stations located on the Peel River at Piallamore and on the Cockburn River at Mulla Crossing the maximum recorded monthly flow occurred in November 1950.

Figure 21 indicates the average monthly rainfalls for each month of the year, at Bective, Nundle and Tamworth. From these details it may be seen that the Peel Valley generally experiences its lowest rainfalls during the months of April, May, July, August and September.

9. PERSISTENCE OF STREAMFLOWS

Streamflows in the Peel River Valley exhibit a moderate degree of persistence during prolonged dry periods. This would appear to result from the inability of the groundwater storage in the valley to sustain low flows in the streams during extended periods without significant rainfall.

Streamflow persistence may be shown graphically by flow duration curves. These curves indicate the percentages of time that discharges have varied from the minimum flow (which in many streams in Australia is zero) up to the maximum discharge or any other selected flow. Flow duration curves may be constructed on two alternative bases; showing the percentages of time that flows were either equal to, or greater than, any selected flow or alternatively equal to, or less than, the selected flow. In this report flow duration curves correspond to the percentages of time that flows were equal to or greater than any selected flow.

Flow duration data has been compiled for the gauging stations on the Peel River at Carroll Gap, Paradise Weir and Bowling Alley Point and for the Cockburn River at Mulla Crossing.

The flow duration curve for the Peel River at Carroll Gap is given at Figure 23 and the flow persistence statistics are summarised in Table 9.

TABLE 9.

Percentage of Time Flow Equalled or Exceeded	Corresponding Flows	
	Cusecs	Gallons per Minute
10%	640	240,000
30%	175	65,000
50%	80	30,000
80%	15	5,500
90%	0	0
100%	0	0

The duration curve of discharge for the Peel River at Paradise Weir is given at Figure 24 and flow frequency data corresponding to the curve are given in Table 10.

TABLE 10

Percentage of Time Flow Equalled or Exceeded	Corresponding Flows	
	Cusecs	Gallons per Minute
10%	630	236,000
30%	185	69,000
50%	85	32,000
80%	10	3,750
85%	0	0
100%	0	0

At Figure 25 the flow duration curve for the Peel River at Bowling Alley Point is shown and flow frequency statistics for the curve are given in Table 11.

TABLE 11

Percentage of Time Flow Equalled or Exceeded	Corresponding Flows	
	Cusecs	Gallons per Minute
10%	97	36,000
30%	28	10,500
50%	13	4,900
70%	6	2,200
90%	2	750
95%	1	375
100%	0	0

The duration curve of discharge for the Cockburn River at Mulla Crossing is given at Figure 26 and flow frequency statistics corresponding to this curve are shown in Table 12.

TABLE 12

Percentage of Time Flow Equalled or Exceeded	Corresponding Flows	
	Cusecs	Gallons per Minute
10%	185	69,000
30%	46	17,000
50%	18	6,700
70%	9	3,400
90%	4	1,500
95%	2	750
100%	0	0

While the flow duration curves shown at Figures 23 to 26 inclusive show flow frequencies for the particular stations they do not readily permit a comparison to be made of the various flow characteristics of the various sub-catchments in the Peel River Valley.

To permit such comparisons to be made, the flow duration curves for the four selected stations have been re-plotted in the form of duration curves of flow per square mile of catchment area and are shown at Figure 27.

Examination of Figure 27 indicates that, of the four streamflow stations, the station located on the Peel River at Bowling Alley Point exhibits the best flow persistence per square mile of catchment area and that the Peel River at Carroll Gap shows the least flow persistence. This result is to be expected as flow persistence per square mile tends to decrease with an increase in catchment area and the Bowling Alley Point station has the least catchment area of the four stations and the Carroll Gap station the greatest catchment area.

10. OCCURRENCE OF FLOODING

Flooding in the Peel Valley usually results from heavy rainfalls over the high and rugged ranges along the southern and eastern borders. The upper reaches of the Peel River, and its main tributary, the Cockburn River, are located in mountainous terrain and flood damage in these regions is mainly confined to the inundation of farm lands and minor flats adjacent to the river channels and the disruption of communications and road services.

The majority of damage to residential development and commercial activities in the valley occurs in the town of Tamworth. Floodwaters tend to be widespread and have entered the business centre of the town as well as damaging housing in the outer residential areas.

An indication of the frequency and magnitude of flooding in the Peel River Valley may be obtained from examination of Figure 28 which indicates the peak levels of floods since 1925 which have exceeded 14 feet (about 8000 cusecs) on the river gauge at Tamworth. The gauge height of 14 feet is considered to be the danger height of the Peel River at Tamworth and represents the height at which flood warnings are issued to surrounding areas.

Twenty nine floods exceeding this level have occurred in the forty-four year period commencing in 1925. The longest interval without floods of this magnitude was the seven year period from the commencement of records in 1925 to 1931. However, this interval could have been of longer duration, as the gauge height at Tamworth may have been less than 14 feet for a number of years preceding the commencement of streamflow records in 1925. The most severe sequence of floods occurred in the seven year period from 1950 to 1956, when twelve floods in excess of 14 feet were experienced.

The highest flood recorded at Tamworth since the installation of the gauging station in 1925, occurred in February 1955 and reached a peak level of 23 feet 6 inches, equivalent to a flow of about 86,000 cusecs. The next highest flood at this station occurred in 1950, when a maximum height of 20 feet, equivalent to a discharge of about 27,000 cusecs, was recorded.

The maximum discharge recorded over the period of records at the current gauging stations in the valley, with the exception of the Mulla Crossing, occurred during the February 1955 flood. The maximum discharge at Mulla Crossing occurred in January 1962, when a maximum discharge of about 42,500 cusecs was recorded.

A comparison of the February 1955 flood behaviour at Carroll Gap, Tamworth, Paradise Weir, Piallamore, Bowling Alley Point and Mulla Crossing is given in Table 13.

TABLE 13

Stream	Station	Catchment Area (Square Miles)	February 1955 Flood		
			Peak Discharge		Estimated Flood Volume (Acre Feet)
			Cusecs	Cusecs per Square Mile	
Peel River	Carroll Gap	1800	193,000	107	529,000 (7 Days)
Peel River	Tamworth *	1190	86,000	72	279,000 (7 Days)
Peel River	Paradise Weir	930	47,400	51	210,000 (7 Days)
Peel River	Piallamore	440	32,000	73	109,000 (7 Days)
Peel River	Bowling Alley Point	120	30,000	250	52,000 (6 Days)
Cockburn River	Mulla Crossing	350	23,500	67	110,000 (6 Days)

* Discontinued station.

February 1955 Flood.

During the period from 22nd to 28th February 1955, abnormally heavy rainfalls were experienced over the Peel River Valley, causing rapid rises of stream heights in all streams in the valley. The floodwaters generally reached maximum heights throughout the valley on the 25th of February and, although the peak heights were maintained for only short periods, continued rainfalls in the following days resulted in a prolonged falling stage of the floodwaters.

At Bowling Alley Point, the maximum height recorded was 16 feet 3 inches which was only one inch below the maximum flood level of 1874. Although the river was for most parts confined within its banks in the vicinity of Bowling Alley Point, some public roads were inundated.

The floodwaters below Bowling Alley Point, were intensified by runoff from Duncans and Dungowan Creeks. At Piallamore, located below the junction of these tributaries, a height of 16 feet 9 inches was recorded and this was equivalent to a discharge of 32,000 cusecs. During the course of floodwaters to Piallamore, large areas of land adjacent to the streams were inundated, destroying fences, roads and river flats.

Further contribution of runoff from the Cockburn River, which enters the Peel River about six miles upstream of Tamworth, added considerably to the magnitude of the flood. At Mulla Crossing, on the Cockburn River, a maximum height of 17 feet 0 inches was recorded, equivalent to an estimated discharge of about 23,500 cusecs.

Below the junction of the Cockburn River the floodwaters were widespread and covered hundreds of acres of river flats.

At Tamworth, the Peel River eclipsed the 1910 flood height by 9 inches, and as previously stated, reached a maximum height of 23 feet 6 inches, equivalent to a discharge of 86,000 cusecs. The floodwaters at Tamworth were widespread, entering the main shopping centre of the town.

From Tamworth to Carroll Gap, the floodwaters increased both in intensity and volume, reaching a maximum height at Carroll Gap of 34 feet 1 inch which corresponds to an estimated maximum discharge of 193,000 cusecs.

This large increase in discharge was due to the contribution of runoff from the intermediate area of 640 square miles between Tamworth and Carroll Gap on which the average rainfall was about 10.5 inches compared to the average rainfall of about 8.8 inches above Tamworth.

The percentage runoff from sub-catchments within the Peel Valley was fairly high, ranging from about 50% runoff from the catchment above Piallamore to about 85 percent runoff above Mulla Crossing. The percentage runoff from the entire Peel Valley during this flood was about 60 percent.

January 1968 Flood.

During January 1968 above average rainfalls fell over most of the northern and central inland districts of New South Wales. In the Peel River Valley, heavy to flood rains during the first two weeks of January resulted in extensive flooding throughout the valley.

The monthly rainfall of 10.89 inches at Tamworth during January 1968 was the highest monthly total recorded since February 1955 when 13.68 inches was recorded and was also the highest January rainfall since 1910 when 13.13 inches was recorded.

At Bowling Alley Point, a peak river height of 11 feet 3 inches was reached in January 1968 and this corresponds to a discharge of 12,100 cusecs.

At Paradise Weir, which is situated about three miles upstream of Tamworth, the peak discharge during this month was about 31,400 cusecs. At Tamworth, a peak height of 18 feet 9 inches was reached which is the fifth highest flood recorded at the Tamworth gauge. Floodwaters entered the lower areas of Tamworth and a number of families were evacuated.

At the downstream end of the catchment at Carroll Gap, the peak flow during the January 1968 flood was about 17,800 cusecs, which is equivalent to a gauge height of 16 feet 3 inches.

11. DROUGHT PERIODS

The term "drought " is difficult to define as the criteria used for assessing whether an area is suffering drought conditions, vary widely with geographical location, average rainfall and normal crop requirements. However an area is generally accepted as being under drought conditions when the soil moisture is insufficient for the majority of crops for an extended period during the growing season and when available water supplies are insufficient for domestic, stock and commercial purposes.

Normally a diminished or exhausted rate of streamflow is a prime indicator of drought conditions.

Details of the annual rainfalls which have been recorded at Bective, Nundle and Tamworth from 1882, 1891 and 1878 respectively are given at Figure 29. As indicated on this figure, the lowest recorded annual rainfalls at each of the three stations occurred in 1965.

In 1965 Bective received a rainfall of only 1,117 points whilst at Nundle and Tamworth totals of 1,842 points and 1,410 points respectively were recorded. In each case the rainfall during 1965 was only about half the respective average annual value.

Figure 29 also indicates that the period from 1935 to 1940 was generally the most prolonged sequence of below average annual rainfalls which has been recorded in the Peel Valley. However some areas in the extreme west of the valley experienced below average annual rainfalls from 1895 to 1902 inclusive.

Available streamflow records indicate that all streams in the valley have ceased flowing for extended periods of time during droughts. On the Peel River at Piallamore the longest recorded period of zero flow was 223 days during the period from January to August 1966 whilst downstream at Carroll Gap where records have been obtained since 1923, the longest period of zero flow was 98 days during February to May 1966.

Details of the minimum recorded discharges for periods of thirty days, six months and twelve months at selected stream gauging stations in the valley are given in Table 14.

TABLE 14

Stream and Station	Years of Computed Records	Minimum Recorded Discharges in Acre Feet		
		Thirty Consecutive Days	Six Consecutive Months	Twelve Consecutive Months
Peel River at Bowling Alley Point	53	0 (Feb.-Mar. 1920)	537 (Jan.-June 1966)	3,633 (Aug. 1965 - July 1966)
Peel River at Piallamore	32	0 (Jan.-Feb. 1966)	0 (Jan.-June 1966)	1,493 (Aug. 1965 - July 1966)
Peel River at Paradise Weir	15	0 (Feb.-Mar. 1965)	187 (Nov. 1957 - Apr. 1958)	7,218 (Aug. 1965 - July 1966)
Peel River at Carroll Gap	45	0 (Feb.-Mar. 1966)	518 (Jan.-June 1966)	11,111 (Aug. 1965 - July 1966)
Cockburn River at Mulla Crossing	32	0 (Feb.-Mar. 1966)	481 (Jan.-June 1966)	2,519 (Jan.-Dec. 1946)

12. THE 1964 to 1967 DROUGHT.

In common with many other areas of the State, the Peel Valley experienced particularly low rainfall during much of the period from 1964 to 1967. Although relatively high rainfalls occurred in December 1965, the rainfall in many areas of the valley in 1965 was the lowest which has been recorded in a calendar year.

The minimum twelve monthly rainfalls which were recorded during the 1964 to 1967 drought were lower than the 1965 annual rainfalls. However at some locations in the valley the minimum twelve monthly rainfalls during the 1964 to 1967 drought were higher than had been recorded in a twelve months period in earlier droughts.

At Goonoo Goonoo during the twelve month period from November 1964 to October 1965, a total rainfall of only 1,177 points was recorded and this rainfall was the second lowest twelve monthly rainfall recorded at this location since 1874, being only 30 points greater than the twelve monthly rainfall of 1,147 points recorded from December 1901 to November 1902.

At Bective, the rainfall recorded from November 1964 to October 1965 of 850 points was also the second lowest on record, the lowest twelve monthly rainfall of 834 points occurring from October 1901 to September 1902.

At both Nundle and Tamworth the lowest twelve monthly rainfalls recorded since the commencement of records in 1891 and 1878 respectively, occurred during the period 1964 to 1965. At Nundle the twelve monthly rainfall during the period from November 1964 to October 1965 was 1,525 points, being 61 points less than the previous minimum twelve monthly rainfall which was recorded in the period from September 1918 to August 1919 whilst at Tamworth the minimum twelve monthly rainfall of 1,235 points from December 1964 to November 1965 was 148 points less than had previously been recorded for a twelve month period.

The recorded monthly rainfalls for the rainfall stations at Bendemeer, Goonoo Goonoo, Nundle and Tamworth from November 1964 to December 1968 are shown in Table 15.

TABLE 15

Month		Rainfall (Points)			
		Bendemeer	Goonoo Goonoo	Nundle	Tamworth
November	1964	175	163	163	150
December	1964	138	125	225	185
January	1965	90	75	89	51
February	1965	126	27	43	82
March	1965	40	34	13	25
April	1965	99	160	171	86
May	1965	63	9	33	21
June	1965	73	85	166	85
July	1965	85	40	114	28
August	1965	159	111	159	128
September	1965	147	212	155	215
October	1965	269	136	194	234
November	1965	246	271	223	95
December	1965	382	404	482	360
January	1966	93	33	25	54
February	1966	141	163	126	95
March	1966	302	84	136	178
April	1966	42	22	33	24
May	1966	157	104	136	88
June	1966	205	213	296	190
July	1966	101	54	92	41
August	1966	407	415	414	317
September	1966	199	149	148	160
October	1966	392	383	296	264
November	1966	619	339	612	524
December	1966	325	425	538	246
January	1966	367	350	194	186
February	1967	109	24	57	97
March	1967	495	418	383	442
April	1967	18	2	2	2
May	1967	198	140	188	151
June	1967	184	222	N.R.	176
July	1967	52	47	N.R.	32
August	1967	286	212	315	197
September	1967	125	66	126	42
October	1967	593	401	448	381
November	1967	19	3	40	19
December	1967	261	242	332	193
January	1968	692	858	997	1089
February	1968	121	26	49	36
March	1968	270	144	218	82
April	1968	54	N.R.	71	17
May	1968	611	504	698	483
June	1968	60	62	78	21
July	1968	291	294	350	249
August	1968	651	472	474	394
September	1968	267	236	305	320
October	1968	153	145	134	116
November	1968	286	150	206	111
December	1968	195	N.R.	418	229
Annual Rainfalls	1964	3730	2898	3615	3049
	1965	1779	1564	1842	1410
	1966	2983	2384	2852	2181
	1967	2707	2127	N.R.	1918
	1968	3651	N.R.	3998	3147
Average Annual Rainfall		3166	2615	3343	2641
Minimum Twelve Monthly Rainfall since November 1964		1464 Nov.1964 to Oct.1965	1177 Nov.1964 to Oct.1965	1525 Nov.1964 to Oct.1965	1235 Dec.1964 to Nov.1965
Minimum Recorded Twelve Monthly Rainfall prior to November 1964		1199 June 1919 to May 1920	1147 Dec.1901 to Nov.1902	1586 Sept.1918 to Aug.1919	1383 May 1922 to Apr.1923

N.R. - No Record.

As indicated by Table 15, drought conditions in the Peel Valley were somewhat relieved by the occurrence of useful rainfall in December 1965 when most rainfall stations recorded more than 3½ inches. However, following these rains, conditions were again comparatively dry until about August 1966.

Useful rainfall was received in most areas of the valley over the remainder of 1966 and until March 1967. However following extremely low rainfalls in April 1967 conditions again commenced to deteriorate.

Some relief was obtained by good falls in October 1967 but it was not until January 1968 that the drought was finally broken.

During 1965 all streams in the Peel Valley ceased to flow for long periods and discharges over the twelve month period from August 1965 to July 1966 were in some cases the lowest which have been recorded since commencement of records. In Table 16 the total flow of the Peel River at Carroll Gap over the twelve month period from August 1965 to July 1966 is compared with the minimum twelve monthly flows recorded at the station during other droughts.

TABLE 16

Twelve Month Period	Total Volume in Acre Feet	Average Flow	
		Cusecs	Gallons per Minute
August 1965 to July 1966	11,110	15	5,700
January 1946 to December 1946	12,670	17	6,500
February 1927 to January 1928	20,870	29	10,500
November 1939 to October 1940	34,540	47	17,700

The Peel River at Carroll Gap ceased to flow for a period of 98 consecutive days from February to May 1966 which is four times the duration of the next most severe recorded period of 24 days of no flow in November 1940.

At Paradise Weir the Peel River ceased to flow for 143 consecutive days from February to June 1965 and again in the period March to May 1966 for a period of 80 consecutive days.

Over the period of available record since 1915 the Peel River at Bowling Alley Point has ceased to flow on several occasions, the most prolonged period being in March and April 1920 when the river was dry for 69 consecutive days. During the 1964-1966 drought, flow ceased at Bowling Alley Point for 28 days in February and March 1966. In addition, for a period of 166 days commencing in December 1965 the flow at this station only exceeded 1.6 cusecs (600 gallons per minute) on a total of seven days, the maximum flow recorded during this period being only 6 cusecs.

Records for the Cockburn River at Mulla Crossing which commence in January 1937, indicate that a period of 38 consecutive days of no flow occurred during December 1941 and January 1942. This period of no flow was equalled in February and March 1966 during a prolonged dry period in which the flow only exceeded 0.3 cusecs on 3 days in a period of 153 days.

At Table 17 details are given of the twelve monthly flows of the Peel River at Bowling Alley Point, Piallamore, Paradise Weir and Carroll Gap and the Cockburn River at Mulla Crossing for the period from August 1965 to July 1966. During this period, the minimum twelve monthly flow during the 1964-1967 drought at each of the stations was recorded.

TABLE 17

Stream	Station	Twelve Month Flow August 1965 to July 1966			
		Acre Feet	Average Discharge		Percentage of Average Annual Flow
			Cusecs	Gals./Min.	
Peel River	Bowling Alley Point	3,633	5.0	1,860	7%
Peel River	Piallamore	1,493	2.0	750	1½%
Peel River	Paradise Weir	7,218	9.9	3,700	3½%
Peel River	Carroll Gap	11,111	15.2	5,700	4 %
Cockburn River	Mulla Crossing	6,415	8.8	3,300	8 %

A comparison of the minimum flows for periods of one month, six months and twelve months during this period for the stations at Bowling Alley Point, Piallamore, Paradise Weir, Carroll Gap and Mulla Crossing is given at Table 18.

TABLE 18

Stream	Station	Minimum Total Flow During 1964-66 (Acre Feet)		
		One Month	Six Months	Twelve Months
Peel River	Bowling Alley Point	0	537	3,633
Peel River	Piallamore	0	0	1,493
Peel River	Paradise Weir	0	206	7,218
Peel River	Carroll Gap	0	518	11,111
Cockburn River	Mulla Crossing	0	481	6,415

The occurrence of substantial rainfall during December 1965 helped alleviate the dry conditions which had prevailed in the valley since November 1964. However, by the beginning of 1966 streamflows had again receded to below average values and in many instances had ceased to flow.

Particularly low flows continued until June 1966 when rainfalls of about 2 inches were experienced over the whole valley. Streamflows recommenced following these rainfalls and continued at generally satisfactory rates until November 1966. Streamflows generally declined after November 1966 although minor rises occurred in January, March and June 1967.

In January 1968, monthly rainfalls of the order of 8 inches were recorded in many areas of the valley, producing flooding in all streams in the valley. Peak flows of 12,100 cusecs in the Peel River at Bowling Alley Point, 31,400 cusecs in the Peel River at Paradise Weir and 17,800 cusecs in the Peel River at Carroll Gap were recorded and, at Tamworth, the peak height of 18'-9" which was reached was the fifth highest flood which has occurred at that location since 1925.

Streamflows again decreased from February to April 1968 with the Peel River at Paradise Weir registering zero flow for the entire month of April. Good rainfalls in May improved flows in all streams in the valley and further above average rainfalls in August maintained streamflows at reasonable levels for the remainder of 1968.

13. WATER REQUIREMENTS FOR CURRENT DEVELOPMENT

Agricultural activities within the Peel Valley mainly comprise sheep grazing for wool and mutton and the growing of wheat. Poultry farming, dairying and beef raising are also undertaken and small areas of fodder crops are cultivated in regions of suitable topography and soil types.

Since 1944 the area authorised for irrigation by license under the Water Act has increased from about 1,770 acres to more than 8,000 acres at June 1969 which represents an increase of over 300 percent since 1944. The corresponding number of licenses for irrigation has increased from 104 at June 1944 to 272 at June 1969. A graph showing details of the variation in number of licenses and authorised area for irrigation, is given at Figure 31.

The increase in the total area authorised for irrigation and the number of licenses issued since 1944 was at a relatively constant rate until 1964, when a rapid increase resulted in the area authorised for irrigation increasing by over 100 percent from 3,824 acres in 1964 to 8,021 acres in 1969. The number of licenses in this period increased from 189 in 1964 to 272 in 1969.

The average area per license remained relatively constant from 1944 to 1957, being about 16 acres in this period. However, a general increase occurred after 1957, a maximum of about 30 acres per license being reached at 30th June 1969.

The estimated total current requirements of the Peel Valley for irrigation under license, water supply and riparian usage, and excluding transmission losses, are shown in Table 19.

TABLE 19

Requirement	Estimated Current Demand	
	Cusecs	Gallons per Minute
Irrigation under License (8,021 acres at 2.0 feet per season)	33.0	12,100
Town and Commercial Water Supplies	13.6	5,100
Riparian Usage	23.4	8,800
Totals	70.0	26,000

As indicated in Table 19, the demand for town, industrial and stock water supply purposes amounts to 13.6 cusecs and represents about 20 percent of the total water requirement from the various streams in the valley. Eleven water supply licenses were current at the 30th June 1969 and comprise the majority of this demand, diverting up to 4,850 gallons per minute or 12.8 cusecs. The remaining 0.8 cusecs are pumped from works on Attunga Creek and the Cockburn River, which were commissioned prior to November 1930 and are therefore not required to be licensed under the Water Act.

The only significant water storage in the valley is a dam on Dungowan Creek which has a capacity estimated at 1,300 million gallons (4,800 acre feet). This storage is operated by the Tamworth City Council as a town water supply for Tamworth and the villages of Nemingha and Dungowan and is capable of diverting a maximum flow of 2,000 gallons per minute (5.4 cusecs).

In Table 20 a comparison is given of the areas authorised for irrigation and the estimated total current water requirements, including water supply and riparian usage but excluding transmission losses, on the various streams in the valley at 30th June 1969.

TABLE 20

Stream	Area Authorised for Irrigation (Acres)	Estimated Total Current Requirements	
		Average Cusecs	Gallons per Minute
Peel River above Bowling Alley Point	193	1.6	600
Peel River between Bowling Alley Point and Tamworth	1,518	7.3	2,700
Dungowan Creek	735	12.6	4,700
Cockburn River and Tributaries	781	13.8	5,200
Goonoo Goonoo Creek and Tributaries	290	3.2	1,200
Peel River below Tamworth	3,433	15.1	5,600
Timbumburi Creek	170	1.4	500
Moore Creek	368	2.2	800
Attunga Creek and Tributaries	139	2.3	800
Miscellaneous Tributaries	394	10.5	3,900
Totals	8,021	70.0	26,000

The foregoing requirements given in Table 20 do not include any allowance for transmission losses due to evaporation and seepage. Such losses may be substantial and are directly related to flow levels within the streams and

groundwater conditions. Therefore these losses vary widely depending on antecedent meteorological conditions.

14. POSSIBLE IRRIGATION DEVELOPMENT.

Extensive areas of potentially irrigable land are located along the Peel River and its tributaries. This land is highly fertile and that portion which is now being irrigated is devoted principally to the growing of lucerne and fodder crops for sheep and cattle raising. Much of the irrigable land is at river bank level and is subject to occasional inundation by floods which assist in maintaining the fertility of the soil.

Topographically suitable land varies in width throughout the length of the Peel River. Upstream of Bowling Alley Point irrigable areas occupy a narrow strip bordering the river. The valley is somewhat wider from Bowling Alley Point to three miles below the Dungowan Creek junction where it spreads out considerably attaining a width of 1½ miles near the junction with the Cockburn River. Below this point it narrows to about ¾ mile wide to Tamworth, then widens to an average width of 1 mile to a point 5 miles below Attunga Creek junction. From here to the Namoi Junction the valley reduces to half the above width.

On tributaries, areas suitable for irrigation are generally of less extent than on the Peel River, averaging ½ mile in width and less, except on the Cockburn River, Dungowan Creek and on tributaries of Goonoo Goonoo Creek where such areas are comparable in width to areas on the main river.

Although the area authorised for irrigation has about doubled during the recent drought period there is still limited demand for irrigation in the Peel Valley. Development of the full irrigation potential of the valley has been restricted by the lack of an assured water supply. During dry periods the river frequently ceases to flow and supplies for irrigation are first restricted and then cease altogether with subsequent loss of crops. There is thus a need for established irrigation to stabilise production on farms.

The provision of head storages on the Peel River and tributaries could be anticipated to result in a very considerable increase in the total area authorised for irrigation in the valley.

A dissection of potential irrigable areas between the Peel River and its tributaries is given in Table 21. From the total of 60,000 acres of irrigable land in the Table, 33,000 acres are on the Peel River and 27,000 acres are on tributaries.

TABLE 21

Stream	Approximate Areas Suitable for Irrigation from Streamflow (Acres)
Peel River above Bowling Alley Point	700
Peel River between Bowling Alley Point and Tamworth	10,300
Dungowan Creek	1,700
Cockburn River	2,700
Goonoo Goonoo Creek and tributaries	3,600
Peel River below Tamworth	22,000
Timbumburi Creek	2,500
Moore Creek	2,200
Attunga Creek	1,000
Miscellaneous tributaries	13,300
Total	60,000

The assessment of irrigable areas is based on local identification and on the definition from aerial photographs of topographically suitable land in proximity to the river.

Irrigation is already well established in the valley particularly along the Peel River and the satisfactory response of the soils to water is evidence of the agricultural suitability of the areas for irrigation.

The topography of the valley provides a considerable number of suitable areas for the construction of farm dams. In addition, due to the temporal pattern of rainfall, farm dams could provide an economic source of water for supplemental irrigation in these areas and therefore it could be expected that such storages will provide significant supplies of water for irrigation in the future.

15. INVESTIGATION OF STORAGE PROPOSALS

Any substantial increase of irrigation development in the Peel River Valley is dependant upon the construction of a major water conservation dam. The long periods of low discharges, which result in cease-to-flow conditions occurring during irrigation periods, has retarded irrigation development for many years. The gradual increase in the area authorised for irrigation has caused a corresponding decrease in the reliability of supply so that restrictions on pumping for irrigation have been a regular occurrence in summer months.

During 1968, detailed investigations were commenced of the Bowling Alley dam site situated 3 miles downstream of Bowling Alley Point near the upper limit of irrigable lands (Figure 31). This site, which is the best suitable for a large storage dam, was first inspected in 1914.

In conjunction with the investigations of storage proposals within the Namoi Valley above Keepit Dam, various methods to augment the water supply to the City of Tamworth were also examined. The methods investigated involved diversion of water from the Namoi River at Manilla using regulated flow from a proposed storage above Keepit Dam and the provision of the required water supplies from a storage on the Peel River at Bowling Alley Point.

In respect of the Peel River storage site at Bowling Alley Point, geological investigations have shown that although the foundations are unsuitable for a concrete dam they are satisfactory for an earth and rockfill structure. However, the depth of up to 49 feet of alluvium in the river bed and the existence of highly weathered rock in the only possible spillway site would necessitate extensive removal of unsatisfactory material resulting in an unfavourable cost-benefit relationship for a storage at this site.

Other possible dam sites on the Peel River, both upstream and downstream of Bowling Alley, have been inspected but none appear to offer better prospects for irrigation development on the Peel River than the Bowling Alley Site.

Inspection of the Cockburn River has failed to reveal a suitable site for a major storage dam. This stream is so steep above the confluence of Mulla Creek that no worthwhile storage can be obtained at an economic cost. Whilst several possible sites exist about 2 miles below the confluence of Mulla Creek construction of a dam in this location would necessitate the deviation of the Great Northern Railway through difficult terrain. As the cost of this deviation would constitute a large proportion of the total cost of all works further consideration of these sites is not warranted.

The construction of weirs in the Peel River and Mulla Creek would be of little value in providing any worthwhile storage because of the steel grade of the stream beds. The construction of weirs would be costly and, apart from being unable to provide any surety of supply during extended dry periods, they would increase flood levels along the particular stream.

16. ACKNOWLEDGEMENTS

The Water Conservation and Irrigation Commission gratefully acknowledges the assistance provided by the Director, Commonwealth Bureau of Meteorology, in supplying the section on Climatic Features, the Rainfall Statistical Data and the Median Rainfall Maps for inclusion in this report and by the New South Wales Public Works Department in providing details of the various town water supply schemes.

Appendix 1
Sheet 1

BECTIVE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1882	0	425	0	292	116	174	180	124	27	360	293	408	2399
1883	144	402	98	279	255	18	16	183	207	197	221	198	2218
1884	6	103	0	201	122	182	186	43	325	85	275	41	1569
1885	226	352	156	34	105	286	11	59	151	82	203	323	1988
1886	170	19	202	280	260	190	160	341	55	297	339	170	2483
1887	648	308	801	96	19	227	249	335	20	242	118	790	3853
1888	66	538	31	17	100	0	25	12	140	211	88	70	1298
1889	256	249	213	367	555	262	248	159	182	370	441	268	3570
1890	263	477	565	82	338	464	146	174	339	285	337	289	3759
1891	490	100	230	130	90	357	178	178	289	116	348	128	2634
1892	260	62	278	284	221	156	131	132	448	424	328	360	3124
1893	156	602	396	279	87	316	224	337	51	458	268	69	3243
1894	273	166	1139	234	119	110	105	111	134	324	98	240	3053
1895	456	140	0	37	114	85	41	62	241	154	356	469	2155
1896	137	527	176	139	196	115	0	197	111	109	160	213	2080
1897	558	28	77	0	126	337	302	128	166	233	5	362	2322
1898	407	359	70	15	200	248	67	151	118	72	143	173	2023
1899	275	10	0	477	32	244	95	326	211	78	64	88	1900
1900	104	218	218	271	322	387	277	0	120	0	42	288	2247

Appendix 1
Sheet 2

BECTIVE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1901	163	0	314	141	235	96	133	359	95	276	57	0	1869
1902	66	0	121	21	0	35	24	163	71	334	267	220	1322
1903	60	40	209	227	413	12	183	223	482	428	113	431	2821
1904	55	250	541	40	160	105	437	167	87	210	118	137	2307
1905	246	201	178	689	231	87	119	129	8	137	120	369	2514
1906	85	199	98	200	86	109	69	386	342	139	493	18	2224
1907	245	64	425	42	54	197	72	173	22	108	463	747	2612
1908	83	531	591	155	58	121	103	101	344	71	273	315	2746
1909	52	554	0	172	97	380	102	394	139	161	330	147	2528
1910	1185	67	230	27	55	385	196	166	19	137	183	361	3011
1911	506	307	71	26	98	43	175	75	156	115	499	256	2327
1912	168	139	160	0	59	337	217	248	47	351	82	92	1900
1913	135	354	399	197	369	283	35	40	145	227	55	290	2529
1914	174	249	324	84	154	101	96	0	24	159	474	546	2385
1915	157	253	60	108	98	276	226	147	214	191	12	447	2189
1916	345	225	125	291	17	312	233	244	232	331	319	508	3182
1917	678	163	33	13	13	230	88	174	406	191	643	209	2841
1918	817	32	65	63	35	37	138	430	70	25	190	35	1937

Appendix 1
Sheet 3

BECTIVE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1919	302	58	110	49	243	69	45	61	23	254	32	214	1460
1920	371	126	8	96	116	639	391	281	288	128	134	331	2909
1921	163	123	435	338	345	286	231	77	144	273	174	599	3188
1922	148	259	4	118	10	99	357	74	119	292	43	430	1953
1923	260	14	12	8	19	337	163	66	154	144	223	464	1864
1924	214	401	60	218	63	137	285	167	376	187	705	160	2973
1925	372	228	171	0	253	68	113	149	23	45	299	180	1901
1926	199	105	369	239	270	113	125	73	199	14	40	352	2098
1927	261	27	253	346	35	97	86	50	37	145	506	480	2243
1928	76	1268	452	190	40	334	198	21	21	91	128	52	2871
1929	93	501	98	173	23	95	85	266	140	82	134	52	1742
1930	176	57	320	101	76	478	153	53	98	347	128	139	2126
1931	190	44	261	187	414	418	156	110	109	36	353	442	2720
1932	11	38	261	171	61	88	106	85	432	256	241	312	2062
1933	577	63	72	53	88	260	380	84	298	571	458	347	3251
1934	350	507	0	126	0	89	288	251	201	425	152	251	2640
1935	604	81	18	112	50	65	175	120	209	202	49	325	2010
1936	234	278	239	191	165	61	261	136	156	12	2	522	2257

Appendix 1
Sheet 4

BECTIVE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1937	457	115	335	42	84	139	203	180	85	142	271	125	2178
1938	128	130	49	81	239	139	161	315	68	179	221	20	1730
1939	274	4	340	226	3	144	63	168	31	161	175	67	1656
1940	10	225	198	205	11	92	4	39	170	83	234	254	1525
1941	711	198	525	10	164	253	62	81	48	322	30	29	2433
1942	34	338	314	0	169	180	584	14	94	329	296	222	2574
1943	467	247	48	179	192	149	106	234	253	255	196	365	2691
1944	300	264	13	69	324	34	218	375	44	57	72	193	1963
1945	400	335	53	162	243	250	123	254	42	73	275	99	2309
1946	371	40	50	109	55	80	20	5	182	35	181	123	1251
1947	206	497	140	53	50	85	120	190	172	274	342	481	2610
1948	372	40	399	139	221	341	126	85	217	20	217	217	2394
1949	324	316	79	235	97	257	100	295	528	505	309	143	3188
1950	317	482	30	286	235	482	437	157	333	609	864	16	4248
1951	197	203	135	109	83	264	99	236	123	41	128	59	1677
1952	131	398	322	141	404	307	106	565	81	342	59	450	3306
1953	116	387	80	75	409	5	145	381	105	246	252	0	2201
1954	192	262	0	149	5	217	82	72	93	664	590	120	2446

Appendix 1
Sheet 5

BECTIVE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1955	454	1381	0	95	186	236	187	264	219	795	322	276	4415
1956	319	1142	209	284	624	306	175	44	155	394	124	383	4159
1957	267	389	98	186	36	176	104	164	43	12	91	559	2125
1958	190	326	125	52	299	118	23	297	304	291	20	561	2606
1959	259	567	326	159	95	39	145	0	184	206	245	363	2588
1960	251	118	40	196	170	77	176	138	132	210	400	285	2193
1961	120	365	293	184	48	10	186	232	34	328	677	278	2755
1962	545	281	119	176	112	28	95	169	207	447	50	356	2585
1963	402	75	219	220	455	175	86	227	125	130	285	205	2604
1964	695	28	229	392	231	78	224	108	219	366	40	84	2694
1965	27	115	3	111	32	40	15	138	148	97	85	306	1117
1966	83	84	109	20	77	217	40	264	182	229	486	407	2198
1967	128	NO RECORDS		0	151	215	55	NO RECORDS				130	
1968	770	63	73	0	479	10	248	339	268	114	103	202	2669

Appendix 2
Sheet 1

BENDEMEER RAINFALL STATISTICS
(Points)

Year	Jan,	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1880	150	100	248	151	165	143	104	30	363	351	173	137	2115
1881							NO RECORDS						
1882	23	470	61	345	184	396	278	179	61	422	596	299	3314
1883	391	565	89	262	418	43	28	244	299	355	494	127	3315
1884	26	182	0	165	141	298	257	37	588	138	503	142	2477
1885	557	379	232	84	104	359	29	46	303	132	193	257	2675
1886	614	58	82	186	373	259	245	803	145	430	346	192	3733
1887	415	344	514	180	66	481	278	334	88	263	207	670	3840
1888	299	489	173	30	97	45	60	23	200	322	252	166	2156
1889	286	261	309	399	479	460	181	176	207	299	595	265	3917
1890	520	621	476	200	389	513	166	142	306	511	353	526	4723
1891	554	102	295	134	109	552	276	285	485	128	539	304	3763
1892	314	74	216	404	280	69	80	132	612	594	361	851	3987
1893	220	500	444	489	97	596	244	296	56	552	410	126	4030
1894	523	17	910	188	177	258	172	144	183	478	32	399	3481
1895	1114	99	9	95	196	160	181	134	432	290	507	631	3848
1896	172	455	257	195	237	224	269	305	44	165	275	236	2834
1897	561	62	93	15	113	303	299	167	301	248	110	361	2633

Appendix 2
Sheet 2

BENDEMEER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1898	765	573	80	1	183	343	163	234	134	99	321	132	3028
1899	371	38	79	421	67	404	56	325	275	190	296	231	2753
1900	119	438	329	391	381	551	514	27	267	61	295	395	3768
1901	134	22	481	317	376	483	250	682	30	530	384	119	3808
1902	100	48	222	17	26	176	71	232	191	546	293	557	2479
1903	165	123	245	607	661	96	355	457	820	585	374	465	4953
1904	52	278	493	230	350	165	686	118	202	393	69	297	3333
1905	435	182	228	407	306	166	247	209	4	205	144	364	2897
1906	259	113	659	84	192	168	265	510	527	295	492	170	3734
1907	310	144	765	171	11	402	136	416	57	178	543	846	3979
1908	233	598	822	142	80	240	60	319	466	115	283	433	3791
1909	175	523	52	268	125	500	97	414	156	192	458	226	3186
1910	1413	61	341	20	72	411	271	205	56	293	348	497	3988
1911	326	433	112	49	118	195	268	29	222	168	362	341	2623
1912	173	297	278	0	55	272	270	261	73	326	151	70	2226
1913	413	313	131	254	471	316	28	97	189	301	29	274	2816
1914	535	136	524	64	141	103	81	2	50	197	197	482	2512
1915	55	107	79	113	149	385	461	105	274	300	115	475	2618

Appendix 2
Sheet 3

BENDEMEER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1916	543	391	101	354	72	375	287	327	177	303	257	421	3608
1917	675	120	18	60	32	228	213	152	639	358	674	574	3743
1918	506	25	19	125	52	0	139	515	27	85	302	39	1834
1919	383	133	166	39	237	62	37	63	47	143	62	315	1687
1920	144	180	20	106	20	599	258	408	327	248	134	357	2801
1921	91	130	319	225	377	417	312	115	209	351	237	934	3717
1922	176	255	16	178	23	123	266	132	149	225	162	525	2230
1923	158	25	93	9	39	468	211	101	365	117	168	298	2052
1924	403	508	96	320	74	158	417	197	321	260	801	277	3832
1925	268	172	152	8	203	47	234	255	22	159	551	386	2457
1926	255	175	495	226	197	255	167	133	235	57	32	396	2623
1927	739	28	247	268	0	123	10	41	45	234	424	119	2278
1928	251	1092	334	250	59	513	310	12	97	133	148	165	3364
1929	389	470	77	292	68	101	100	390	238	148	198	54	2525
1930	97	61	276	121	126	585	231	273	112	437	180	229	2728
1931	184	42	219	379	471	505	223	156	138	148	297	552	3314
1932	228	26	244	214	29	112	207	145	431	410	263	276	2585
1933	722	53	54	26	148	273	416	109	330	537	538	360	3566

Appendix 2
Sheet 4

BENDEMEER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1934	467	592	47	223	0	76	483	249	124	396	249	387	3293
1935	757	146	90	166	56	30	197	130	329	256	53	224	2434
1936	353	449	435	143	160	148	442	224	215	67	70	468	3174
1937	443	145	317	117	98	294	136	322	159	240	296	288	2855
1938	566	277	125	93	224	93	338	387	86	271	302	9	2771
1939	254	214	433	164	35	276	144	288	34	204	300	179	2525
1940	197	561	301	230	40	32	8	48	233	170	200	479	2499
1941	793	311	688	25	139	387	74	104	89	389	194	23	3216
1942	65	315	517	0	230	152	536	62	198	507	460	313	3355
1943	498	135	17	269	201	167	193	263	431	260	409	423	3266
1944	362	223	12	115	438	36	220	444	73	142	123	298	2486
1945	486	537	68	122	211	229	181	337	54	176	269	99	2769
1946	451	80	261	160	156	150	65	17	264	108	262	359	2333
1947	191	552	211	255	48	127	223	284	310	374	454	828	3857
1948	417	219	178	235	208	363	143	254	233	69	268	228	2815
1949	410	724	45	263	172	284	141	403	620	483	517	251	4313
1950	410	451	39	221	197	754	546	232	190	817	794	67	4718
1951	404	248	176	146	203	541	150	408	166	36	104	197	2779

Appendix 2
Sheet 5

BENDEMEER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1952	267	635	414	183	444	535	139	460	228	452	68	284	4109
1953	190	570	102	111	462	32	141	485	139	378	254	23	2887
1954	262	428	11	33	62	297	129	138	127	595	639	339	3060
1955	444	760	54	151	203	348	246	333	293	762	413	419	4426
1956	319	881	336	201	735	407	190	87	122	466	125	293	4162
1957	379	341	172	161	9	161	202	228	41	26	97	418	2235
1958	312	514	141	120	323	184	202	339	331	427	120	612	3625
1959	413	562	545	103	115	57	349	5	218	334	463	383	3547
1960	184	224	132	250	240	81	368	272	205	210	446	391	3003
1961	259	433	258	161	71	40	258	340	84	235	786	227	3152
1962	1086	245	185	208	212	39	114	333	184	588	116	588	3898
1963	372	79	640	277	682	351	202	364	124	220	379	269	3959
1964	868	38	463	360	72	232	433	266	246	439	175	138	3730
1965	90	126	40	99	63	73	85	159	147	269	246	382	1779
1966	93	141	302	42	157	205	101	407	199	392	619	325	2983
1967	367	109	495	18	198	184	52	286	125	593	19	261	2707
1968	692	121	270	54	611	60	291	651	267	153	286	195	3651

Appendix 3
Sheet 1

GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1874	972	190	94	201	64	95	495	262	227	402	32	120	3154
1875	108	246	147	90	397	240	274	75	228	185	117	50	2157
1876-1877							NO RECORDS						
1878	0	521	196	235	76	132	300	96	377	282	338	289	2842
1879	101	538	232	170	485	35	424	394	439	137	279	301	3535
1880	199	0	202	205	72	98	34	59	312	141	83	131	1536
1881	416	503	52	16	39	61	0	227	256	199	256	15	2040
1882	65	112	24	205	192	276	202	165	36	217	476	323	2293
1883	403	376	44	275	341	24	0	203	244	248	243	233	2634
1884	52	48	25	239	105	143	226	33	413	165	225	0	1674
1885	302	307	191	45	166	416	0	60	138	88	190	749	2652
1886	354	15	107	232	365	176	153	591	71	319	320	245	2948
1887	951	310	403	125	115	220	259	434	27	297	250	578	3969
1888	0	551	157	49	145	0	32	56	237	103	124	75	1529
1889	258	279	200	170	640	331	206	143	51	365	502	273	3418
1890	375	480	493	161	327	416	249	45	395	313	262	253	3769
1891	433	111	285	91	116	390	139	320	433	147	427	253	3145
1892	286	223	118	284	330	198	160	203	581	511	357	430	3681

Appendix 3
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GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1893	214	580	252	368	103	263	223	376	72	520	385	197	3553
1894	308	91	909	236	126	175	189	86	115	475	93	237	3040
1895	503	102	8	50	92	91	25	65	227	163	196	632	2154
1896	324	532	355	140	186	188	190	219	84	171	295	74	2758
1897	499	33	42	0	96	392	434	127	163	154	16	192	2148
1898	425	529	97	18	191	280	59	161	173	58	158	121	2270
1899	312	18	63	484	37	234	23	249	211	136	181	140	2088
1900	97	129	294	238	316	450	413	42	105	2	137	639	2862
1901	140	0	223	215	213	227	129	441	54	220	306	67	2235
1902	86	41	126	0	21	46	20	138	196	264	142	493	1573
1903	29	117	200	287	573	23	196	240	461	446	158	481	3211
1904	143	330	336	120	203	92	495	160	79	304	17	127	2406
1905	287	362	262	725	233	117	116	191	0	138	204	146	2781
1906	72	87	228	114	130	93	64	350	568	208	521	74	2509
1907	222	36	388	138	62	287	95	188	69	94	473	662	2714
1908	56	707	650	157	102	200	166	139	302	99	382	395	3355
1909	189	566	13	149	99	364	134	476	132	259	382	296	3059
1910	1078	10	235	15	70	382	212	100	20	246	157	449	2974

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GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1911	359	380	350	43	90	88	295	50	109	151	482	170	2567
1912	114	231	109	0	61	217	316	170	48	170	123	44	1603
1913	288	341	406	181	344	285	43	50	133	323	52	307	2753
1914	291	141	358	60	132	72	120	0	26	110	501	480	2291
1915	84	163	72	65	127	216	358	128	233	181	19	320	1966
1916	205	184	135	249	31	308	280	257	191	274	346	441	2901
1917	543	177	37	36	39	249	170	185	455	253	761	276	3181
1918	771	7	38	101	22	107	113	475	94	39	167	21	1955
1919	389	52	55	80	228	78	52	49	31	198	111	316	1639
1920	241	246	0	48	98	803	335	283	327	79	144	250	2854
1921	17	99	495	345	453	361	306	88	201	397	284	695	3741
1922	203	155	23	93	0	64	330	39	183	239	118	436	1883
1923	150	9	15	0	21	441	180	70	265	89	181	276	1697
1924	276	476	69	251	83	105	211	208	364	301	608	228	3180
1925	208	212	159	0	137	117	123	235	21	81	200	243	1736
1926	118	25	406	181	301	119	130	110	218	45	30	571	2254
1927	253	6	241	242	27	102	15	80	32	126	464	149	1737
1928	224	335	391	92	25	271	343	0	45	221	154	120	2221

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Sheet 4

GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1929	357	483	125	231	49	60	74	291	184	136	226	63	2279
1930	323	66	185	140	95	482	226	69	46	333	168	177	2310
1931	143	245	334	349	358	515	175	175	113	116	209	472	3204
1932	96	83	263	122	95	119	100	129	331	165	279	246	2028
1933	306	107	181	73	104	307	426	70	355	476	585	366	3356
1934	253	546	0	128	0	125	329	475	157	582	127	184	2906
1935	380	105	27	129	13	48	241	164	225	287	45	261	1925
1936	433	234	393	93	95	81	293	165	202	36	26	402	2453
1937	271	310	354	61	102	148	178	224	89	325	203	248	2513
1938	217	169	47	154	176	192	229	396	91	207	168	63	2109
1939	232	0	331	189	39	114	82	232	7	268	335	241	2070
1940	23	110	196	270	15	102	41	79	187	89	238	438	1788
1941	799	122	440	5	194	300	114	96	53	179	129	10	2441
1942	95	517	228	0	124	199	702	82	170	341	328	174	2960
1943	355	310	10	181	225	180	116	150	244	190	243	263	2467
1944	266	267	23	172	299	60	231	383	36	23	198	127	2085
1945	222	425	95	136	233	398	158	394	20	136	270	240	2727
1946	237	89	152	111	50	109	45	3	229	34	105	132	1296

GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1947	128	321	244	89	62	98	175	264	309	400	401	741	3232
1948	372	170	258	146	117	375	113	136	240	67	151	366	2511
1949	400	396	185	245	68	280	118	136	454	459	430	156	3327
1950	282	454	33	699	210	334	398	181	197	633	645	38	4104
1951	220	513	95	141	95	273	172	290	106	46	112	74	2137
1952	133	310	302	289	386	299	159	419	122	298	80	341	3138
1953	114	286	41	120	504	30	126	335	81	204	145	63	2049
1954	386	414	0	38	2	186	53	104	153	621	547	463	2967
1955	364	1164	30	136	199	210	139	281	184	688	348	161	3904
1956	458	904	304	285	691	268	261	228	116	452	59	274	4300
1957	253	235	183	307	36	184	101	169	17	49	135	395	2064
1958	340	516	64	80	337	148	75	210	440	375	107	323	3015
1959	221	512	277	127	142	155	139	10	267	266	360	443	2919
1960	176	122	74	199	215	70	243	176	277	458	387	600	2997

GOONOO GOONOO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1961	137	221	239	121	45	50	201	245	44	198	371	363	2235
1962	618	544	78	157	265	16	161	230	190	485	68	333	3145
1963	643	218	290	154	537	247	100	344	84	177	372	166	3332
1964	493	80	390	486	146	163	244	108	184	316	163	125	2898
1965	75	27	34	160	9	85	40	111	212	136	271	404	1564
1966	33	163	84	22	104	213	54	415	149	383	339	425	2384
1967	350	24	418	2	140	222	47	212	66	401	3	242	2127
1968	858	26	144		504	62	294	472	236	145	150		

Appendix 4
Sheet 1

MANILLA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1884	100	158	13	212	98	151	145	21	372	96	217	99	1682
1885	340	392	94	24	158	321	19	35	202	110	183	315	2193
1886	297	53	51	341	352	190	221	483	87	286	401	171	2933
1887	607	468	295	232	57	204	117	322	41	200	170	411	3124
1888	207	712	55	2	85	3	14	3	159	281	180	84	1785
1889	326	185	183	303	374	210	218	157	85	369	517	183	3110
1890	528	689	788	162	374	383	190	94	281	339	296	322	4446
1891	512	153	222	131	20	309	170	180	245	128	351	160	2581
1892	196	93	290	427	217	139	101	165	448	408	284	477	3245
1893	233	475	393	316	73	277	193	227	72	417	205	115	2996
1894	379	161	1163	228	137	245	88	85	197	388	162	403	3636
1895	766	48	0	77	75	79	78	42	314	157	433	568	2637
1896	334	491	319	87	245	117	162	164	54	284	378	308	2943
1897	486	47	117	11	103	305	282	116	204	117	45	270	2103
1898	403	315	80	5	220	213	55	50	160	40	115	315	1971
1899	272	46	45	542	40	229	162	231	260	181	168	113	2289
1900	131	306	317	208	225	349	306	8	136	7	145	272	2410
1901	97	6	371	128	302	154	147	277	35	201	183	88	1989

Appendix 4
Sheet 2

MANILLA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1902	70	229	103	8	8	70	25	223	58	259	353	293	1699
1903	74	37	184	539	450	15	250	196	358	403	277	572	3355
1904	65	253	523	215	167	85	382	87	170	244	234	250	2675
1905	453	219	258	687	198	63	102	154	25	172	122	182	2635
1906	143	94	399	77	96	52	62	324	359	134	416	34	2190
1907	555	39	641	48	55	271	85	144	32	97	369	637	2973
1908	53	730	594	212	21	94	81	163	246	86	276	230	2786
1909	49	514	9	176	71	462	95	331	101	206	433	158	2605
1910	1165	35	251	35	148	425	189	166	27	213	260	357	3271
1911	595	273	35	29	125	58	153	52	152	71	318	152	2013
1912	77	179	153	0	31	342	239	122	39	307	92	82	1663
1913	200	162	261	218	312	272	18	2	144	178	16	250	2033
1914	263	169	259	151	167	80	74	0	8	322	121	570	2184
1915	42	150	52	158	81	267	303	93	248	209	12	527	2142
1916	375	153	75	392	20	233	184	218	400	228	652	435	3365
1917	499	176	33	18	20	201	88	106	487	201	600	284	2713
1918	548	62	71	76	54	21	173	407	28	55	212	48	1755
1919	388	108	150	61	210	78	40	33	7	152	97	447	1771

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MANILLA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1920	539	247	16	110	121	682	320	251	312	256	308	414	3576
1921	132	38	354	234	353	322	321	92	111	513	210	860	3540
1922	288	195	20	97	13	115	284	85	152	321	113	422	2105
1923	99	14	96	2	41	363	135	55	145	213	105	323	1591
1924	421	360	69	218	66	200	434	209	306	203	539	181	3206
1925	353	182	173	0	235	90	88	151	3	145	351	130	1901
1926	150	144	378	401	247	135	151	75	175	26	46	250	2178
1927	327	22	226	362	0	87	9	56	29	174	547	306	2145
1928	146	717	803	206	50	536	290	3	21	76	265	157	3270
1929	95	416	79	229	21	90	64	278	112	170	180	69	1803
1930	150	50	183	97	39	487	275	112	103	301	190	242	2229
1931	103	56	422	262	437	386	197	119	99	28	233	452	2794
1932	224	18	263	191	63	117	154	65	416	244	289	295	2339
1933	726	64	23	51	142	254	444	171	242	578	343	330	3368
1934	375	458	0	161	5	96	318	241	218	388	156	388	2804
1935	632	117	32	123	79	29	216	104	227	205	68	252	2084
1936	355	485	292	48	120	54	299	122	185	28	51	405	2444
1937	293	174	416	41	52	166	107	203	106	192	401	165	2316

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Sheet 4

MANILLA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1938	258	84	65	144	287	108	135	221	52	283	343	15	1995
1939	331	17	611	209	8	165	107	170	21	102	214	317	2272
1940	26	182	226	170	12	58	3	78	178	132	202	431	1698
1941	660	372	454	3	142	336	73	32	54	238	227	54	2645
1942	70	490	329	0	207	144	523	52	144	460	328	646	3393
1943	518	157	22	166	161	141	158	217	274	127	322	222	2485
1944	298	166	15	88	367	36	226	415	39	40	77	103	1870
1945	274	348	61	169	143	289	160	250	77	82	236	66	2155
1946	292	48	96	119	60	81	31	0	160	42	242	94	1265
1947	260	681	224	54	66	110	158	160	113	307	338	571	3042
1948	296	185	188	183	192	340	112	62	220	31	149	225	2183
1949	341	345	142	220	85	293	114	372	496	391	414	185	3398
1950	407	455	65	192	201	434	482	112	127	551	783	50	3859
1951	298	251	200	108	124	332	64	251	101	41	72	68	1910
1952	201	470	212	130	344	209	122	587	79	395	53	497	3299
1953	137	792	45	47	443	12	82	276	95	126	172	8	2235
1954	310	350	16	146	28	150	78	101	108	603	548	187	2625
1955	340	1036	0	107	208	207	126	150	161	894	209	309	3747

Appendix 4
Sheet 5

MANILLA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1956	310	865	249	424	562	233	84	27	75	338	85	261	3513
1957	246	316	132	118	20	129	140	136	30	32	29	397	1725
1958	202	276	157	29	258	94	55	258	187	324	51	324	2215
1959	381	430	163	147	85	37	154	2	87	227	200	358	2271
1960	168	98	56	180	94	79	220	174	93	175	366	93	1796
1961	147	337	274	132	92	12	153	199	21	216	891	226	2700
1962	706	181	187	91	76	12	50	188	135	415	114	528	2683
1963	538	94	543	115	635	112	92	277	105	167	331	341	3350
1964	917	238	565	325	126	94	275	114	248	289	40	178	3409
1965	51	46	40	86	70	144	38	127	185	197	103	481	1568
1966	65	99	133	8	78	214	51	341	142	249	415	342	2137
1967	227	51	221	21	132	253	26	181	72	412	9	182	1787
1968	848	79	403	41	335	10	235	328	328	113	122	242	3084

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Sheet 1

NUNDLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1891	352	135	305	122	122	898	370	359	585	195	460	185	4088
1892	215	408	416	215	363	140	430	365	598	260	297	453	4160
1893	285	465	345	408	110	620	350	605	67	652	190	310	4407
1894-1902							NO RECORDS						
1903	102	166	194	282	596	196	221	279	651	686	273	477	4123
1904	148	550	298	133	230	105	571	140	144	242	166	203	2930
1905	215	146	453	754	377	226	236	212	23	167	199	169	3177
1906	29	104	309	100	94	147	151	346	380	289	634	103	2686
1907	271	38	351	96	94	376	134	266	90	107	410	807	3040
1908	150	675	627	184	187	266	167	333	418	151	255	299	3712
1909	132	402	30	188	111	474	174	588	219	261	430	250	3259
1910	959	52	275	220	126	376	260	155	44	236	210	533	3246
1911	489	438	350	445	158	161	327	89	255	183	653	249	3397
1912	188	298	89	20	99	317	375	217	40	217	130	77	2067
1913	293	205	441	240	591	307	153	90	164	280	136	356	3256
1914	426	167	449	110	178	118	162	0	55	137	523	293	2618
1915	36	85	70	205	309	389	456	157	351	176	18	375	2627
1916	304	192	168	224	20	609	389	452	248	470	424	837	4337

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Sheet 2

NUNDLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1917	617	122	0	26	60	347	191	N.R.	597	376	531	616	
1918	902	0	48	171	93	38	142	632	139	54	264	0	2483
1919	301	150	97	779	246	101	70	85	256	226	136	259	2006
1920	365	258	0	40	143	838	501	472	315	103	86	479	3600
1921	52	110	568	375	475	459	485	181	207	439	443	795	4589
1922	205	153	95	135	11	97	449	240	178	335	51	818	2767
1923	201	20	59	0	25	626	397	101	424	188	319	467	2827
1924	400	605	124	381	160	151	324	246	490	370	781	220	4252
1925	254	266	167	0	239	200	160	216	16	116	560	374	2568
1926	302	133	728	272	378	227	181	154	341	77	47	948	3788
1927	313	0	225	262	50	111	54	113	56	202	448	246	2080
1928	189	563	368	163	83	415	424	2	98	194	240	154	2893
1929	169	393	187	288	32	86	27	276	404	166	201	77	2306
1930	442	88	215	235	53	781	344	206	135	637	221	236	3593
1931	323	125	233	394	467	639	298	120	179	205	226	556	3765
1932	177	155	335	218	88	153	196	180	469	196	378	262	2807
1933	360	105	243	98	194	287	475	113	376	485	712	348	3796
1934	295	457	1	197	2	316	329	443	323	692	273	464	3492

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NUNDLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1935	503	159	95	238	54	77	175	99	387	411	67	155	2420
1936	458	382	529	142	130	255	546	378	221	65	13	606	3725
1937	376	170	250	88	161	282	287	419	157	269	172	339	2970
1938	311	119	52	179	187	237	406	438	98	274	453	29	2783
1939	284	47	561	259	13	257	132	465	59	364	416	252	3109
1940	68	418	235	422	34	31	20	76	361	158	224	534	2581
1941	844	204	635	44	143	429	113	174	149	421	271	95	3522
1942	77	362	292	3	196	234	911	109	202	462	437	212	3497
1943	519	242	31	225	295	235	192	270	415	232	276	511	3443
1944	457	210	61	187	467	49	267	412	67	28	155	186	2546
1945	298	358	52	216	238	615	147	446	9	235	358	257	3329
1946	300	32	263	153	128	235	65	10	192	71	126	282	1857
1947	103	319	170	140	80	187	273	295	383	509	465	931	3855
1948	380	203	348	178	159	489	142	269	306	105	245	556	3380
1949	448	658	162	306	185	440	197	120	665	585	653	240	4659
1950	227	442	58	688	305	729	485	169	209	898	605	0	4815
1951	600	129	122	162	175	708	274	467	176	54	131	115	3113
1952	247	444	323	377	515	595	234	613	149	416	205	254	4372

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NUNDLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1953	277	345	100	140	685	61	246	507	152	275	212	67	3067
1954	544	482	10	63	20	320	67	149	166	707	479	441	3448
1955	320	1387	120	158	218	295	246	453	266	980	450	233	5126
1956	388	1039	346	219	716	458	323	271	177	499	105	516	5057
1957	261	266	438	508	33	174	318	204	64	24	102	345	2737
1958	381	570	150	123	457	261	133	360	579	499	178	638	4329
1959	295	591	491	130	162	186	242	40	335	355	225	390	3442
1960	179	355	54	209	380	85	486	274	331	264	365	557	3539
1961	180	264	297	170	52	75	245	400	69	240	650	390	3032
1962	764	668	102	238	283	22	163	312	240	542	68	397	3799
1963	632	155	338	249	562	341	230	569	138	154	429	239	4036
1964	548	75	370	618	240	242	363	179	257	335	163	225	3615
1965	89	43	13	171	33	166	114	159	155	194	223	482	1842
1966	25	126	136	33	136	296	92	414	148	296	612	538	2852
1967	194	57	383	2	188	NO RECORDS		315	126	418	40	332	
1968	997	49	218	71	698	78	350	474	305	134	206	418	3998

Appendix 6
Sheet 1

PRESTWICH (WEABONGA) RAINFALL STATISTICS.
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1908	405	617	732	184	333	355	254	280	400	120	308	394	4382
1909	83	450	26	240	131	517	239	709	213	313	361	360	3642
1910	1074	35	311	0	113	453	480	0	250	288	244	428	3676
1911	405	282	471	0	145	172	388	147	284	205	666	348	3513
1912	186	119	216	15	86	260	435	317	150	380	142	313	2619
1913	401	409	559	220	730	564	38	162	265	221	59	340	3968
1914	444	195	345	165	190	282	111	0	61	227	428	540	2988
1915	152	258	62	227	349	466	614	144	355	237	45	443	3352
1916	422	351	235	283	79	711	399	596	349	535	611	677	5248
1917	583	376	25	83	90	415	329	246	664	370	913	400	4494
1918	396	0	22	146	40	54	141	754	110	90	317	71	2141
1919	358	110	156	109	362	71	0	209	140	346	317	274	2452
1920	474	208	0	175	149	865	342	573	456	128	219	391	3980
1921	90	176	524	342	478	545	306	206	447	522	590	766	4992
1922	304	390	62	239	30	142	555	193	244	251	119	706	3235
1923	236	75	49	8	46	810	583	77	501	235	280	415	3315
1924	464	639	60	380	120	212	343	175	312	355	637	146	3843
1925	311	207	171	0	208	106	277	279	25	121	496	114	2315
1926	300	55	455	221	397	92	127	262	338	57	41	576	2921

Appendix 6
Sheet 2

PRESTWICH (WEABONGA) RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1927	433	20	330	210	120	130	120	60	30	102	580	297	2432
1928	455	990	588	168	96	528	495	43	98	186	276	70	3993
1929	220	688	126	312	60	95	65	366	392	112	361	38	2836
1930	183	75	269	80	117	531	306	160	93	573	176	277	2840
1931	161	172	306	423	586	727	380	162	193	193	128	553	3984
1932	169	192	208	195	60	142	220	285	487	256	320	280	2814
1933	430	112	90	140	130	265	606	133	517	330	568	334	3655
1934	377	660	0	241	0	187	525	639	178	753	142	375	4077
1935	809	110	70	165	130	46	331	216	396	325	315	54	2967
1936	291	447	291	110	97	217	501	350	313	58	35	522	3232
1937	492	205	402	109	182	241	147	530	220	223	308	520	3579
1938	437	220	36	284	210	124	380	517	91	347	231	71	2948
1939	218	16	276	175	61	274	201	388	42	366	460	280	2757
1940	27	195	230	362	22	35	50	33	352	137	135	341	1919
1941	742	179	628	20	196	271	105	161	107	365	282	103	3159
1942	105	620	486	0	4	216	858	98	202	472	417	215	3693
1943	652	86	44	147	210	164	212	221	277	300	312	586	3211
1944	430	225	30	188	430	52	144	100	69	94	160	162	2084

Appendix 6
Sheet 3

PRESTWICH (WEABONGA) RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1945	353	546	126	131	292	576	308	525	43	253	651	238	4042
1946	230	47	337	174	169	216	106	7	323	70	166	259	2104
1947	191	350	203	251	85	150	351	370	455	455	441	1024	4326
1948	532	126	332	227	274	498	152	443	317	63	240	386	3590
1949	551	490	76	238	109	574	312	176	643	546	916	321	4952
1950	361	248	23	550	260	862	659	278	234	900	556	224	5155
1951	198	486	147	250	196	647	303	491	226	53	207	100	3304
1952	235	447	402	202	615	674	280	666	257	452	114	244	4588
1953	140	444	152	67	667	85	252	500	178	276	349	69	3179
1954	178	596	12	116	16	335	112	145	178	676	434	276	3074
1955	379	1137	63	176	268	504	325	415	263	705	325	131	4691
1956	397	917	144	209	746	588	597	305	205	522	169	537	5336
1957	284	283	409	255	10	317	260	194	27	100	205	455	2799
1958	341	522	151	0	332	279	201	385	531	534	199	690	4165
1959	325	328	259	62	194	104	421	53	270	377	342	667	3402
1960	277	221	90	538	343	110	624	367	431	255	418	719	4393
1961	222	331	244	109	78	151		NO RECORDS			858	419	
1962	601	658	124	139	421	60	186	382	N.R.	581	50	461	

Appendix 6
Sheet 4

PRESTWICH (WEABONGA) RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1963	337	131	362	238	683	495	332	318	156	223	306	279	3860
1964	575	48	385	487	227	225	482	260	271	495	352	230	4037
1965	77	57	37	151	92	274	106	155	200	276	169	518	2112
1966	69	63	225	46	164	316	126	405	139	285	831	380	3049
1967	322	60	375	9	152	232	63	300	163	N.R.	35	314	
1968	674	64	273	57	715	N.R.	347	734	356	184	306	369	

Appendix 7
Sheet 1

TAMWORTH AERO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1878	0	624	175	353	78	161	287	122	384	368	411	233	3196
1879	99	587	157	200	441	20	410	641	380	140	174	336	3585
1880	280	386	159	155	115	120	0	29	301	194	274	103	2116
1881	228	540	94	0	84	89	63	193	220	205	169	45	1930
1882	50	191	61	303	143	234	209	167	60	330	429	458	2635
1883	223	343	61	246	302	69	30	204	226	350	321	150	2525
1884	131	97	0	158	117	175	281	63	487	85	316	57	1967
1885	338	272	196	112	132	405	3	40	212	104	131	229	2174
1886–1888							NO RECORDS						
1889	249	201	171	396	599	251	208	192	145	346	663	295	3716
1890	355	592	637	151	403	492	178	167	307	393	358	318	4351
1891	490	102	239	130	77	528	174	208	345	135	434	235	3097
1892	256	184	146	394	278	298	171	185	554	422	459	452	3799
1893	185	752	310	454	137	340	292	352	89	422	216	103	3652
1894	277	172	915	233	115	228	151	142	171	352	118	273	3147
1895	445	86	0	26	132	105	68	93	274	178	380	553	2340
1896	238	508	191	174	245	188	190	215	118	223	288	382	2960
1897	442	62	68	8	138	356	390	135	205	227	12	384	2427

Appendix 7
Sheet 2

TAMWORTH AERO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1898	744	493	98	11	298	303	94	114	235	149	164	182	2885
1899	247	9	29	535	55	283	57	294	218	158	183	186	2254
1900	202	252	275	404	290	439	412	15	160	21	125	347	2942
1901	163	0	314	204	283	173	148	360	57	259	376	131	2468
1902	108	32	140	1	15	49	29	213	154	334	191	220	1486
1903	47	38	202	251	432	17	208	229	464	353	318	551	3110
1904	148	285	348	194	179	126	431	137	104	214	43	257	2466
1905	145	165	222	645	260	105	167	148	12	154	110	174	2307
1906	98	35	358	108	108	109	70	383	345	197	562	53	2426
1907	309	77	382	52	80	255	67	213	37	103	393	742	2710
1908	95	569	601	179	90	167	122	118	362	87	226	338	2954
1909	258	482	20	175	91	446	127	515	159	204	388	202	3067
1910	1149	33	292	7	51	292	210	235	21	214	207	380	3091
1911	426	423	168	26	120	66	206	82	262	194	365	363	2701
1912	140	183	312	0	66	373	270	241	86	390	26	4	2091
1913	112	268	512	237	408	298	30	25	167	226	43	331	2657
1914	414	249	337	121	125	120	86	0	11	142	391	479	2475
1915	105	68	88	88	98	259	296	169	213	200	12	551	2147

Appendix 7
Sheet 3

TAMWORTH AERO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1916	339	230	149	310	10	401	319	240	351	262	365	613	3589
1917	504	229	32	10	14	269	126	189	520	263	781	239	3176
1918	789	36	53	114	39	5	129	470	68	20	229	3	1955
1919	406	109	81	39	201	90	47	55	25	267	80	289	1689
1920	293	151	18	63	129	656	332	273	288	134	113	297	2747
1921	207	82	385	266	369	380	239	99	132	360	229	550	3298
1922	124	349	11	113	10	87	269	69	128	224	61	349	1794
1923	132	38	12	4	20	370	160	56	205	82	192	268	1539
1924	342	445	133	336	55	129	318	150	296	223	742	116	3285
1925	547	252	201	0	148	61	114	291	13	89	479	282	2477
1926	298	303	344	288	248	126	141	106	218	21	44	565	2702
1927	273	7	341	234	35	128	4	57	22	106	427	251	1885
1928	154	771	450	239	16	315	395	16	30	111	155	124	2776
1929	189	360	60	170	36	108	98	269	175	51	240	52	1808
1930	251	71	220	76	70	557	200	94	93	389	106	260	2387
1931	231	134	284	297	379	526	191	118	116	41	281	429	3027
1932	82	103	222	146	57	80	126	113	397	224	243	226	2019
1933	577	110	120	19	137	256	394	96	337	444	506	365	3361

Appendix 7
Sheet 4

TAMWORTH AERO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1934	338	533	0	157	0	147	276	257	249	452	153	338	2900
1935	517	96	48	119	48	47	202	110	242	185	72	146	1832
1936	302	257	308	115	131	61	311	174	150	74	6	482	2371
1937	350	197	290	48	72	162	209	185	93	205	305	265	2381
1938	199	165	66	120	201	100	169	393	61	177	155	12	1818
1939	334	1	510	351	31	163	47	130	20	217	314	120	2238
1940	139	198	235	220	12	48	58	23	224	100	277	578	2112
1941	564	227	558					NO	RECORDS				
1942	9	484	295	4	181	186	599	69	96	336	363	196	2818
1943	676	153	19	209	154	176	106	168	205	204	224	424	2718
1944	300	205	36	127	342	48	240	404	40	38	77	208	2065
1945	256	399	61	148	197	249	101	346	36	116	388	233	2530
1946	359	312	180	114	56	86	39	4	176	45	132	110	1613
1947	157	500	148	74	69	152	123	195	220	314	472	886	3310
1948	397	96	478	177	159	316	153	94	226	52	182	423	2753
1949	467	376	91	282	63	314	107	197	633	421	425	215	3591
1950	251	385	19	352	168	441	469	182	162	660	689	14	3792
1951	413	228	130	114	89	263	105	234	122	42	108	58	1906

Appendix 7
Sheet 5

TAMWORTH AERO RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1952	217	249	360	164	400	245	135	512	113	298	63	277	3033
1953	108	335	90	33	412	18	122	350	110	125	176	18	1897
1954	147	346	4	125	23	187	60	60	82	475	405	324	2238
1955	326	1368	99	132	175	265	162	250	142	698	267	424	4308
1956	333	932	123	218	575	304	188	68	129	404	102	287	3663
1957	320	319	125	272	43	184	100	145	14	28	48	456	2054
1958	243	245	54	84	289	124	68	315	332	368	83	486	2691
1959	185	624	277	130	114	98	148	4	242	231	291	411	2755
1960	230	74	71	306	187	88	236	185	188	325	433	322	2645
1961	115	281	384	142	57	54	178	206	39	302	445	145	2348
1962	801	333	90	92	175	11	95	180	214	463	52	309	2815
1963	516	89	352	208	590	213	93	314	133	277	287	191	3263
1964	711	50	261	447	171	146	243	128	180	377	150	185	3049
1965	51	82	25	86	21	85	28	128	215	234	95	360	1410
1966	54	95	178	24	88	190	41	317	160	264	524	246	2181
1967	186	97	442	2	151	176	32	197	42	381	19	193	1918
1968	1089	36	82	17	483	21	249	394	320	116	111	229	3147

STATISTICAL RAINFALL DATA
(Points)
Computed to 1966.

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Bective (Period 85 Years)	Minimum	0	0	0	0	0	0	0	0	8	0	2	0	1117
	10%	62	28	2	16	18	36	24	39	25	38	41	45	1698
	30%	158	103	70	81	61	95	99	85	88	128	121	144	2125
	50%	246	225	156	141	114	156	138	159	140	202	217	254	2394
	70%	341	337	259	199	221	259	186	226	207	292	298	359	2681
	90%	569	529	431	289	359	371	287	339	341	427	485	497	3248
	Maximum	1185	1381	1139	689	624	639	584	565	528	795	864	790	4415
Bendemeer (Period 86 Years)	Minimum	23	17	0	0	0	0	8	2	4	26	29	9	1687
	10%	108	40	19	22	30	44	60	39	46	103	81	107	2300
	30%	237	131	93	115	72	150	143	133	124	180	193	228	2733
	50%	362	248	211	171	149	255	211	232	198	263	293	299	3186
	70%	444	447	315	234	212	373	268	321	273	387	404	398	3732
	90%	732	584	521	371	442	526	427	433	452	542	548	582	4013
	Maximum	1413	1092	910	607	735	754	686	803	820	817	801	934	4953
Goonoo Goonoo (Period 91 Years)	Minimum	0	0	0	0	0	0	0	0	0	2	16	0	1296
	10%	72	18	23	16	25	50	34	49	31	58	59	63	1736
	30%	176	111	74	92	76	105	116	100	89	141	144	156	2157
	50%	253	231	185	140	117	184	170	169	183	207	204	250	2634
	70%	355	362	262	205	210	271	231	235	233	301	335	341	2997
	90%	503	538	393	289	386	392	358	394	413	475	482	571	3535
	Maximum	1078	1164	909	725	691	803	702	591	581	688	761	749	4300

STATISTICAL RAINFALL DATA
(Points)
Computed to 1966.

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Manilla (Period 83 Years)	Minimum	26	6	0	0	0	3	3	0	3	7	12	8	1265
	10%	75	38	17	9	20	36	42	22	27	40	51	68	1758
	30%	198	113	70	83	65	92	88	86	83	133	160	169	2144
	50%	297	182	183	144	120	151	147	150	135	205	217	261	2444
	70%	380	346	267	208	203	259	195	205	199	287	329	347	2955
	90%	605	648	539	358	364	379	316	313	349	414	500	528	3407
	Maximum	1165	1036	1163	687	635	682	523	587	496	894	891	860	4446
Nundle (Period 66 Years)	Minimum	29	0	0	0	2	22	20	0	9	24	13	0	1842
	10%	103	50	50	42	29	76	92	87	56	74	77	86	2452
	30%	215	148	111	134	97	168	171	156	147	186	184	235	2912
	50%	299	226	234	186	162	256	246	256	208	251	260	305	3389
	70%	381	398	342	238	243	383	347	363	333	391	427	459	3777
	90%	574	598	510	401	495	633	485	490	480	645	620	717	4390
	Maximum	959	1387	728	754	716	898	911	632	665	980	781	948	5126

MINIMUM RAINFALL RECORDED IN CONSECUTIVE PERIODS OF UP TO TWELVE MONTHS COMMENCING IN THE MONTH INDICATED
(Points)

Station	Number of Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Bendemeer (Computed to 1963)	1	23	17	0	0	0	0	8	2	4	26	29	9
	2	148	44	44	43	52	40	51	52	67	89	217	88
	3	208	127	106	172	80	88	96	242	164	337	282	212
	4	285	166	196	232	128	209	290	315	453	497	410	335
	5	324	221	335	255	219	352	352	555	711	558	569	493
	6	491	360	428	441	453	414	667	774	796	834	668	532
	7	576	645	628	628	651	729	811	954	911	955	731	629
	8	735	762	794	690	966	873	991	974	1017	990	804	714
	9	882	927	856	1005	1110	1053	1011	1080	1037	1243	889	873
	10	1151	989	1171	1149	1290	1073	1117	1100	1473	1328	1048	1020
	11	1372	1304	1315	1329	1310	1179	1137	1699	1510	1487	1195	1289
	12	1687	1448	1495	1349	1416	1199	1736	1840	1573	1593	1464	1411
Manilla (Computed to 1964)	1	26	6	0	0	0	3	3	0	3	7	12	8
	2	97	48	51	16	70	17	17	8	62	61	140	124
	3	137	112	71	86	73	20	80	100	91	181	269	269
	4	211	153	145	104	105	158	232	227	259	382	315	315
	5	252	279	159	107	181	310	329	522	483	527	355	401
	6	437	357	162	266	355	407	569	617	663	644	441	471
	7	475	399	321	493	516	650	748	671	892	730	511	576
	8	602	595	589	634	710	910	977	1042	917	800	655	601
	9	787	637	766	811	970	1057	1098	1154	925	944	693	780
	10	929	879	866	1089	1184	1311	1307	1185	995	982	820	882
	11	1087	973	1185	1322	1367	1363	1338	1272	1020	1109	1005	995
	12	1265	1233	1377	1505	1464	1396	1419	1297	1188	1266	1202	1237

PEEL RIVER AT BOWLING ALLEY POINT

LOCATION:	Latitude 31°24' Longitude 151°08'
PERIOD OF ESTABLISHMENT:	April 1915 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	53 years.
ZERO OF GAUGE:	R.L. 1721.52 Water Conservation Datum.
CATCHMENT AREA:	120 square miles.
CONTROL:	Gravel.
EQUIPMENT:	Automatic Recorder (Pressure type) installed December 1936. Staff gauge, range 0 to 20 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 411 (b) Maximum observation in cusecs : 4,510 (c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	30,000 cusecs.
MEAN DAILY DISCHARGE FOR 53 YEARS:	71 cusecs.
MEAN ANNUAL DISCHARGE FOR 53 YEARS:	52,000 acre feet.

PEEL RIVER AT BOWLING ALLEY POINT

Year 1915

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	152	1	14	851
June	174	1	47	2,833
July	11600	1	469	29,062
Aug.	152	2	20	1,225
Sept.	1685	0.5	176	10,573
Oct.	50	1.6	8	496
Nov.	1	0	0.3	20
Dec.	50	0	4.2	260
Total	..	..	..	..

Year 1916

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	8	0	0.3	16
Feb.	115	1	4.5	262
Mar.	7	1	0.3	18
Apr.	23	1	2	122
May	1	0	0.6	38
June	3510	1	223	13,398
July	3510	13	227	14,054
Aug.	3510	50	232	14,402
Sept.	455	23	83	4,978
Oct.	9850	50	584	36,196
Nov.	324	50	106	6,388
Dec.	12250	13	698	43,258
Total	..	..	..	133,130

Year 1917

Jan.	455	7	54	3,358
Feb.	198	7	27	1,504
Mar.	5	1	2	145
Apr.	7	1	2	158
May	1	1	1	62
June	318	1	23	1,419
July	224	1	21	1,312
Aug.	81	2	13	795
Sept.	13500	2	754	45,231
Oct.	3510	65	305	18,920
Nov.	13500	65	766	45,974
Dec.	5850	65	340	21,070
Total	..	..	..	139,948

Year 1918

Jan.	12200	50	631	39,108
Feb.	324	50	94	5,298
Mar.	50	23	31	1,962
Apr.	65	7	26	1,748
May	81	13	33	2,044
June	23	7	11	702
July	23	13	17	1,086
Aug.	2240	50	281	17,422
Sept.	97	7	31	1,860
Oct.	36	3	22	1,404
Nov.	224	7	29	1,724
Dec.	7	1	2	111
Total	..	..	..	74,469

PEEL RIVER AT BOWLING ALLEY POINT

Year 1919

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	174	0	32	1,998
Feb.	36	0	2	138
Mar.	13	0	3	201
Apr.	13	1	3	184
May	18	1	7	432
June	6	1	2	152
July	18	1	4	274
Aug.	13	1	3	189
Sept.	18	1	3	192
Oct.	27	0.5	3	176
Nov.	306	0	5	320
Dec.	306	1	10	626
Total	..	..	..	4,882

Year 1920

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	9	0	1	58
Feb.	95	0	30	1,714
Mar.	0	0	0	0
Apr.	0	0	0	0
May	1	0	0	2
June	5100	0	311	18,654
July	8250	6	443	27,494
Aug.	16200	13	410	25,438
Sept.	1150	27	158	9,480
Oct.	63	1	16	994
Nov.	215	9	22	1,380
Dec.	1600	9	120	7,412
Total	..	..	..	92,624

Year 1921

Jan.	18	9	9	584
Feb.	9	0	3	170
Mar.	20500	1	539	33,430
Apr.	890	4	82	4,940
May	890	9	105	6,534
June	700	18	166	9,966
July	4200	38	421	26,090
Aug.	438	27	73	4,528
Sept.	20500	9	415	24,870
Oct.	5100	27	286	17,756
Nov.	700	18	76	4,542
Dec.	1150	18	99	6,140
Total	..	..	..	139,550

Year 1922

Jan.	890	9	69	4,306
Feb.	63	6	11	634
Mar.	50	4	11	664
Apr.	18	3	6	380
May	4	2	3	202
June	9	4	5	274
July	338	6	40	2,508
Aug.	306	9	42	2,624
Sept.	137	6	23	1,360
Oct.	438	13	33	2,082
Nov.	18	4	6	382
Dec.	12050	1	245	15,218
Total	..	..	..	30,634

PEEL RIVER AT BOWLING ALLEY POINT

Year 1923

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	18	0	5	320
Feb.	0	0	0	0
Mar.	0	0	0	0
Apr.	6	0	2	128
May	4	1	1	80
June	700	1	88	5,294
July	1600	18	198	12,282
Aug.	243	18	45	2,764
Sept.	2750	18	195	11,728
Oct.	50	9	14	856
Nov.	162	8	26	1,560
Dec.	338	6	22	1,394
Total	..	..	..	36,406

Year 1924

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1150	5	57	3,510
Feb.	9450	6	415	24,090
Mar.	111	6	13	802
Apr.	258	6	29	1,726
May	44	9	14	854
June	243	9	38	2,292
July	700	13	73	4,526
Aug.	1150	13	68	4,232
Sept.	4200	13	253	15,188
Oct.	370	13	70	4,370
Nov.	23500	63	1123	67,384
Dec.	243	18	58	3,590
Total	..	..	..	132,566

Year 1925

Jan.	44	18	19	1,208
Feb.	50	9	18	996
Mar.	50	9	11	712
Apr.	9	9	9	540
May	95	9	15	906
June	95	13	20	1,188
July	338	13	49	3,018
Aug.	338	13	43	2,674
Sept.	38	13	26	1,530
Oct.	18	9	12	766
Nov.	438	9	45	2,694
Dec.	38	9	13	824
Total	..	..	..	17,056

Year 1926

Jan.	95	13	20	1,220
Feb.	13	0	5	301
Mar.	474	0	41	2,560
Apr.	338	13	32	1,908
May	4200	13	206	12,780
June	700	18	90	5,374
July	274	27	58	3,598
Aug.	63	13	19	1,170
Sept.	566	13	47	2,828
Oct.	50	13	19	1,196
Nov.	13	0.5	7	389
Dec.	700	0	73	4,553
Total	..	..	..	37,877

PEEL RIVER AT BOWLING ALLEY POINT

Year 1927

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	243	13	36	2,260
Feb.	13	3.5	8	465
Mar.	50	2	10	644
Apr.	890	3.5	55	3,309
May	18	9	12	750
June	18	9	12	734
July	13	6	7	462
Aug.	13	3.5	8	470
Sept.	11	2	5	316
Oct.	38	3.5	8	522
Nov.	95	3.5	16	953
Dec.	18	6	12	748
Total	..	..	..	11,633

Year 1928

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	700	2	31	1,941
Feb.	243	6	41	2,374
Mar.	700	3	34	2,107
Apr.	243	6	21	1,266
May	18	6	10	658
June	3800	4.5	426	25,478
July	2150	18	246	15,242
Aug.	70	10	30	1,846
Sept.	20	5	13	792
Oct.	70	5	20	1,230
Nov.	35	2.5	14	867
Dec.	23	2.5	9	536
Total	..	..	..	54,337

Year 1929

Jan.	38	0	6	375
Feb.	243	0	38	2,148
Mar.	38	1	6	362
Apr.	438	1.7	33	1,954
May	20	1.7	9	585
June	26	5	12	716
July	15	3.7	11	668
Aug.	338	2.5	34	2,085
Sept.	4200	2.5	211	12,661
Oct.	70	10	22	1,380
Nov.	700	2.5	49	2,915
Dec.	5	0	0.7	45
Total	..	..	..	25,894

Year 1930

Jan.	1600	0	56	3,452
Feb.	38	1	5	284
Mar.	26	0	6	372
Apr.	20	0	4	250
May	18	5	9	570
June	6100	5	295	17,692
July	1150	32	149	9,232
Aug.	338	29	58	3,586
Sept.	3450	20	149	8,918
Oct.	2150	20	193	11,958
Nov.	173	10	24	1,422
Dec.	10	4	8	482
Total	..	..	..	58,218

PEEL RIVER AT BOWLING ALLEY POINT

Year 1931

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	28	4	9	544
Feb.	4	0	1	66
Mar.	20	0	5	306
Apr.	380	4	44	2,668
May	760	10	86	5,312
June	4200	37	368	22,070
July	5100	59	324	20,068
Aug.	107	37	53	3,304
Sept.	107	28	37	2,218
Oct.	107	20	34	2,096
Nov.	1150	10	67	4,040
Dec.	1150	13	94	5,842
Total	..	..	..	68,534

Year 1932

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	36	5.5	14	895
Feb.	40	5.5	11	649
Mar.	51	4	12	754
Apr.	40	5.5	10	593
May	13	5.5	7	422
June	21	7	10	617
July	359	7	47	2,919
Aug.	51	7	12	784
Sept.	1150	10	104	6,264
Oct.	64	13	28	1,707
Nov.	40	4	13	776
Dec.	40	4	7	458
Total	..	..	..	16,838

Year 1933

Jan.	40	0.3	7	460
Feb.	21	1	3	164
Mar.	4	0	0.6	37
Apr.	3	0.3	1	66
May	13	1	4	267
June	760	2	43	2,567
July	2750	10	177	10,994
Aug.	207	21	39	2,412
Sept.	359	21	75	4,498
Oct.	3100	33	246	15,258
Nov.	13400	33	421	25,270
Dec.	2150	37	125	7,742
Total	..	..	..	69,735

Year 1934

Jan.	635	14	47	2,934
Feb.	890	24	114	6,412
Mar.	37	10	18	1,088
Apr.	59	7	13	782
May	9	4	6	396
June	59	4	12	694
July	2150	10	99	5,964
Aug.	2750	47	212	13,126
Sept.	3450	37	252	15,112
Oct.	5100	20	347	21,516
Nov.	59	20	42	2,504
Dec.	380	17	47	2,928
Total	..	..	..	73,456

PEEL RIVER AT BOWLING ALLEY POINT

Year 1935

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	380	14	53	3,292
Feb.	59	7	17	932
Mar.	28	7	9	546
Apr.	28	7	10	570
May	20	5	10	624
June	12	5	9	560
July	59	7	16	968
Aug.	59	7	17	1,036
Sept.	73	12	24	1,404
Oct.	2150	10	106	6,560
Nov.	14	4	8	484
Dec.	14	1	5	304
Total	..	..	..	17,280

Year 1936

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	112	0.3	11	682
Feb.	13	0.3	4	206
Mar.	359	2	27	1,648
Apr.	51	2	7	436
May	21	2	4	258
June	132	2	17	1,002
July	513	7	103	6,376
Aug.	3550	21	184	11,390
Sept.	407	16	41	2,464
Oct.	17	2	9	546
Nov.	2	0.8	1.5	91
Dec.	1600	0.5	63	3,886
Total	..	..	..	28,985

Year 1937

Jan.	45	2	9	532
Feb.	14	1	4.5	248
Mar.	70	1	8	476
Apr.	7	2	3	169
May	7	2	4	243
June	222	3	35	2,124
July	256	4	22	1,372
Aug.	330	7	50	3,102
Sept.	470	5	31	1,854
Oct.	45	3	15	916
Nov.	28	2	8	501
Dec.	980	2	21	1,307
Total	..	..	..	12,844

Year 1938

Jan.	67	1	7	424
Feb.	51	1	9	479
Mar.	2	0.5	1	51
Apr.	21	0	3	175
May	7	0	3	174
June	430	2.5	18	1,085
July	190	3	29	1,814
Aug.	3040	11	129	7,986
Sept.	51	10	19	1,132
Oct.	51	4	12	762
Nov.	1080	3	29	1,752
Dec.	9	0.2	1.4	86
Total	..	..	..	15,920

PEEL RIVER AT BOWLING ALLEY POINT

Year 1939

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	3	0	0.2	12
Feb.	5	0	0.4	19
Mar.	156	0	9	556
Apr.	21	1.5	6	365
May	4	1.5	3	170
June	250	2	10	610
July	187	6.5	27	1,646
Aug.	480	8	57	3,600
Sept.	16	6	8	508
Oct.	2230	6	49	3,010
Nov.	255	6	14	866
Dec.	73	1.5	9	544
Total	..	..	..	11,906

Year 1940

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	12	0	1.5	95
Feb.	3310	0	28	1,614
Mar.	6	0	0.3	17
Apr.	590	0	13	786
May	3	1	1.5	94
June	2	1	1.6	96
July	2	0.6	1.2	73
Aug.	4	0.2	1.1	71
Sept.	16	0	1.3	82
Oct.	740	0	8	500
Nov.	8	0	0.7	46
Dec.	3220	0	57	3,561
Total	..	..	..	7,035

Year 1941

Jan.	8930	2.5	229	14,171
Feb.	31	2	6.5	364
Mar.	7800	1.5	142	8,798
Apr.	23	14	19	1,155
May	19	10	14	863
June	1520	14	99	5,938
July	106	19	32	1,974
Aug.	45	16	22	1,376
Sept.	30	14	19	1,167
Oct.	3800	12	75	4,676
Nov.	21	2.5	8.1	484
Dec.	2	0	1	62
Total	..	..	..	41,028

Year 1942

Jan.	0.6	0	0.1	4
Feb.	1.8	0	0.5	25
Mar.	130	0	8	502
Apr.	8	0.6	1.5	88
May	16	0.6	2.2	135
June	23	3	5.9	354
July	12000	5.5	379	23,478
Aug.	58	11	19	1,176
Sept.	35	3	17	990
Oct.	2230	3	132	8,200
Nov.	1160	14	113	6,758
Dec.	24	8	15	946
Total	..	..	..	42,656

PEEL RIVER AT BOWLING ALLEY POINT

Year 1943

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	2770	8	96	5,936
Feb.	190	3	16	896
Mar.	11	2	3	180
Apr.	20	2	4	254
May	91	2	13	798
June	580	11	42	2,520
July	58	11	17	1,072
Aug.	580	20	96	5,952
Sept.	1000	20	77	4,650
Oct.	1000	15	78	4,828
Nov.	2410	8	70	4,184
Dec.	3220	8	139	8,632
Total	..	..	..	39,902

Year 1944

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	7260	27	211	13,062
Feb.	1520	15	86	5,002
Mar.	15	9	12	758
Apr.	45	5	10	596
May	420	5	29	1,801
June	17	9	13	756
July	1050	8	97	5,988
Aug.	1340	13	112	6,932
Sept.	34	9	15	944
Oct.	9	4.5	6	372
Nov.	27	2	4	250
Dec.	4.5	1	2.5	154
Total	..	..	..	36,615

Year 1945

Jan.	27	0	2	144
Feb.	27	0	3	174
Mar.	3	0	0.9	56
Apr.	12	1	3	173
May	52	2	9	537
June	5350	3	241	14,447
July	1980	20	78	4,808
Aug.	850	27	119	7,400
Sept.	220	15	41	2,432
Oct.	45	13	20	1,212
Nov.	1000	6	28	1,664
Dec.	1440	3.4	39	2,432
Total	..	..	..	35,479

Year 1946

Jan.	290	1.0	12	772
Feb.	2.7	1.2	1.8	100
Mar.	33	0.7	3.7	231
Apr.	590	1.2	17	1,042
May	58	2.7	5.3	330
June	590	4	33	1,968
July	58	4	10	626
Aug.	5	1.2	2.6	159
Sept.	15	1.2	3.5	209
Oct.	4	0.7	1.6	99
Nov.	1.2	0.4	0.1	6
Dec.	4	0	0.8	50
Total	..	..	..	5,592

PEEL RIVER AT BOWLING ALLEY POINT

Year 1947

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1080	0	6	362
Feb.	590	0	7	418
Mar.	500	0	8	512
Apr.	4	0	0.8	50
May	4	0	1	60
June	220	0.7	8	460
July	634	1.8	27	1,656
Aug.	634	3	73	4,516
Sept.	11400	3	129	7,742
Oct.	1460	7	228	14,136
Nov.	270	7	30	1,794
Dec.	1990	17	438	27,166
Total	..	..	..	58,872

Year 1948

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	634	30	73	4,540
Feb.	2590	7	26	1,492
Mar.	1460	13	31	1,902
Apr.	30	7	14	820
May	197	7	16	1,016
June	900	7	85	5,130
July	840	21	46	2,874
Aug.	1240	3	90	5,556
Sept.	1240	21	64	3,848
Oct.	23	11	16	972
Nov.	16	8	13	790
Dec.	220	4	15	890
Total	..	..	..	29,830

Year 1949

Jan.	565	4	26	1,602
Feb.	1370	4	39	2,170
Mar.	32	8	13	798
Apr.	1290	6	61	3,656
May	176	10	27	1,696
June	565	11	161	9,630
July	3800	23	172	10,678
Aug.	No Records			4,100*
Sept.	8340	23	755	45,328
Oct.	7800	4	543	33,674
Nov.	1080	0.3	87	5,242
Dec.	32	11	19	1,168
Total	..	..	..	119,742*

Year 1950

Jan.	337	8	18	1,132
Feb.	404	6	28	1,546
Mar.	8	4	5	318
Apr.	1520	2	129	7,756
May	246	2	27	1,648
June	2860	6	478	28,694
July	2230	46	283	17,536
Aug.	720	6	73	4,534
Sept.	720	13	54	3,262
Oct.	4900	36	838	51,962
Nov.	1520	171	459	27,532
Dec.	134	36	62	3,862
Total	..	..	..	149,782

* Estimated.

PEEL RIVER AT BOWLING ALLEY POINT

Year 1951

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	173	15	39	2,394
Feb.	84	19	29	1,638
Mar.	19	13	16	1,010
Apr.	19	6	12	726
May	19	6	11	688
June	4150	9	222	13,336
July	14300	46	260	16,146
Aug.	2230	2	82	5,088
Sept.	28	11	15	876
Oct.	28	9	15	942
Nov.	18	9	13	792
Dec.	27	6.7	10	594
Total	..	..	..	44,230

Year 1952

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	56	1.3	8	486
Feb.	27	0	5.8	326
Mar.	150	5	36	2,218
Apr.	150	6.7	37	2,240
May	1890	8.3	77	4,766
June	4200	20	313	18,753
July	3310	46	162	10,020
Aug.	4900	84	660	40,928
Sept.	117	46	74	4,424
Oct.	255	27	75	4,624
Nov.	84	19	30	1,796
Dec.	22	11	14	871
Total	..	..	..	91,452

Year 1953

Jan.	17	5.8	12	725
Feb.	30	5	13	701
Mar.	14	3.5	6.5	400
Apr.	30	2.5	5.2	313
May	1590	5	91	5,622
June	22	14	17	1,020
July	565	14	44	2,712
Aug.	4200	14	175	10,828
Sept.	95	19	35	2,104
Oct.	57	13	20	1,218
Nov.	27	9	15	926
Dec.	27	1	13	818
Total	..	..	..	27,387

Year 1954

Jan.	46	0.5	8	481
Feb.	890	2	85	4,734
Mar.	19	2	8	466
Apr.	4	1	2.5	146
May	5	2	3	198
June	134	2	14	864
July	12	4	7	408
Aug.	152	4	19	1,148
Sept.	171	5	11	682
Oct.	9000	5	196	12,135
Nov.	4900	14	161	9,653
Dec.	220	11	40	2,484
Total	..	..	..	33,399

PEEL RIVER AT BOWLING ALLEY POINT

Year 1955

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	No Records			1,550*
Feb.	30000	No Records		56,100*
Mar.	No Records			10,000*
Apr.	No Records			5,100*
May	No Records			4,550*
June	No Records			8,300*
July	570	17	53	3,283
Aug.	3040	45	159	9,862
Sept.	890	27	71	4,251
Oct.	10200	22	363	22,531
Nov.	404	37	90	5,376
Dec.	242	24	41	2,518
Total	..	..	..	133,421*

Year 1956

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	404	1	38	2,338
Feb.	10900	52	479	27,796
Mar.	3040	35	189	11,748
Apr.	596	11	57	3,432
May	11000	25	537	33,266
June	5500	108	339	20,338
July	6750	127	495	30,702
Aug.	1170	74	190	11,784
Sept.	74	32	45	2,684
Oct.	2160	32	127	7,890
Nov.	167	23	43	2,588
Dec.	1610	14	57	3,524
Total	..	..	..	158,090

Year 1957

Jan.	90	6	21	1,272
Feb.	950	4	22	1,222
Mar.	1760	11	28	1,708
Apr.	3600	8	52	3,092
May	14	6	10	592
June	44	6	12	734
July	108	11	31	1,938
Aug.	1290	11	44	2,750
Sept.	44	10	15	882
Oct.	10	4.5	8.3	516
Nov.	10	2	4.2	255
Dec.	32	2	5.4	333
Total	..	..	..	15,294

Year 1958

Jan.	108	0.8	13	813
Feb.	345	3.0	17	962
Mar.	18	0.6	3.6	225
Apr.	9	0.2	1.7	103
May	640	0.2	17	1,052
June	640	1.2	22	1,331
July	485	6	41	2,534
Aug.	1290	6	55	3,397
Sept.	4200	18	195	11,692
Oct.	10600	42	232	14,370
Nov.	42	19	25	1,512
Dec.	2330	8.5	43	2,696
Total	..	..	..	40,687

* Estimated.

PEEL RIVER AT BOWLING ALLEY POINT

Year 1959

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	66	4	16	964
Feb.	476	4	40	2,260
Mar.	1320	20	117	7,236
Apr.	118	11	32	1,948
May	42	8	13	836
June	476	6	38	2,268
July	684	11	71	4,394
Aug.	730	15	58	3,576
Sept.	2950	28	76	4,564
Oct.	900	14	64	3,952
Nov.	116	14	39	2,312
Dec.	1115	14	35	2,166
Total	..	..	..	36,476

Year 1960

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	14	3	6	398
Feb.	14	3	5	318
Mar.	14	3	5	296
Apr.	20	3	5	284
May	68	4	17	1,064
June	46	9	17	1,048
July	1540	14	149	9,208
Aug.	116	28	62	3,820
Sept.	3220	28	78	4,692
Oct.	350	15	36	2,254
Nov.	1470	10	49	2,918
Dec.	16200	15	193	11,938
Total	..	..	..	38,238

Year 1961

Jan.	720	11	45	2,804
Feb.	32	7	13	702
Mar.	116	7	14	868
Apr.	116	4	12	734
May	32	7	14	876
June	58	7	11	650
July	305	4	15	936
Aug.	2160	7	74	4,608
Sept.	36	9	17	1,048
Oct.	117	6	11	680
Nov.	1920	4.5	39	2,350
Dec.	485	9	31	1,902
Total	..	..	..	18,158

Year 1962

Jan.	9830	22	243	15,064
Feb.	6420	28	127	7,118
Mar.	28	20	23	1,448
Apr.	170	9	26	1,548
May	720	9	66	4,094
June	290	14	40	2,370
July	1410	14	45	2,808
Aug.	1470	14	116	7,212
Sept.	320	20	40	2,372
Oct.	3600	14	153	9,486
Nov.	57	15	27	1,616
Dec.	57	9	20	1,250
Total	..	..	..	56,386

PEEL RIVER AT BOWLING ALLEY POINT

Year 1963

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	560	15	50	3,112
Feb.	80	7	18	1,008
Mar.	410	4	29	1,816
Apr.	230	15	23	1,364
May	No Records			9,000*
June	2250	46	179	10,740
July	760	36	141	8,772
Aug.	1800	36	202	12,530
Sept.	380	36	74	4,430
Oct.	46	20	34	2,080
Nov.	230	7	29	1,718
Dec.	520	11	30	1,844
Total	..	..	..	58,414*

Year 1964

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	467	1.5	23	1,420
Feb.	4	2	2.7	154
Mar.	68	3	9.1	566
Apr.	1540	2	90	5,420
May	380	15	38	2,360
June	1840	15	108	6,480
July	3220	39	219	13,500
Aug.	2160	15	71	4,420
Sept.	2160	22	82	4,910
Oct.	1760	39	103	6,380
Nov.	58	15	29	1,718
Dec.	30	4	11	678
Total	..	..	..	48,006

Year 1965

Jan.	10	1.7	3.5	216
Feb.	12	0.4	2.7	150
Mar.	1	0.2	0.4	25
Apr.	1.7	0	0.8	49
May	1.7	1.0	1.4	89
June	12	1.7	4.3	257
July	19	3.2	9.2	569
Aug.	10	3.2	5.3	326
Sept.	48	3.2	13.4	806
Oct.	6	0.8	1.9	119
Nov.	3.2	0.01	8.1	48
Dec.	290	0.01	28	1,731
Total	..	..	..	4,385

Year 1966

Jan.	0.8	0	0.05	3
Feb.	0	0	0	0
Mar.	6	0	0.6	36
Apr.	0	0	0	0
May	0.2	0	0.02	1
June	38	0.01	8.3	497
July	1.6	0.8	1.1	66
Aug.	175	1.6	17	1,084
Sept.	113	8	20	1,230
Oct.	225	9.5	28	1,766
Nov.	1920	2.3	73	4,400
Dec.	350	1.7	20	1,280
Total	..	..	..	10,363

* Estimated.

PEEL RIVER AT BOWLING ALLEY POINT

Year 1967					Year 1968				
Month	Discharge in Cusecs			Discharge for Month Acre Feet	Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean			Max.	Min.	Mean	
Jan.	11	0.2	3.6	224	Jan.	7890	0.6	262	16226
Feb.	0.6	0.2	0.2	14	Feb.	12	2	6	336
Mar.	600	0.2	12	750	Mar.	130	1	7	444
Apr.	2.6	0.6	1.8	112	Apr.	1.7	1.7	1.7	102
May	22	0.6	3.0	188	May	6260	1.7	198	12292
June	67	2.6	20	1210	June	75	16	24	1464
July	22	5	11	678	July	9930	16	209	12966
Aug.	550	1	29	1820	Aug.	8530	45	294	18230
Sept.	275	5	19	1150	Sept.	3130	21	87	5226
Oct.	1470	3	44	2720	Oct.	1470	12	58	3614
Nov.	19	1	5	298	Nov.	175	5	16	986
Dec.	14	0.2	0.9	58	Dec.	200	5	24	1472
Total				9222	Total				73358

PEEL RIVER AT PIALLAMORE

LOCATION:	Latitude 31°11' Longitude 151°04'
PERIOD OF ESTABLISHMENT:	July 1936 to date
COMPLETE YEARS OF COMPUTED RECORDS:	32 years
ZERO OF GAUGE:	Approximately 1,650 feet above mean sea level. R.L. 85.25 Assumed Datum.
CATCHMENT AREA:	440 square miles
CONTROL:	Gravel
EQUIPMENT:	Automatic recorder (Pressure type) installed December 1936. Staff gauge, range 0 to 20 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained 210
	(b) Maximum observation in cusecs 9,720
	(c) Minimum observation in cusecs 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	32,000 cusecs
MEAN DAILY DISCHARGE FOR 32 YEARS:	141 cusecs
MEAN ANNUAL DISCHARGE FOR 32 YEARS:	103,000 acre feet.
REMARKS:	Records from July to December 1936 are considered to be unreliable.

PEEL RIVER AT PIALLAMORE

Year 1937

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	52	7	20	1,230
Feb.	52	10	22	1,230
Mar.	190	7	31	1,948
Apr.	20	7	11	648
May	27	10	15	920
June	95	14	36	2,140
July	795	20	73	4,556
Aug.	4330	27	242	14,988
Sept.	2450	52	194	11,656
Oct.	83	34	44	2,756
Nov.	230	10	44	2,644
Dec.	171	3	23	1,430
Total	..	..	..	46,146

Year 1938

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	34	0	2	150
Feb.	52	1.5	7	419
Mar.	1.5	0	0.1	7
Apr.	0	0	0	0
May	20	0	3	164
June	230	3	16	968
July	230	7	376	2,308
Aug.	3940	62	266	16,498
Sept.	230	34	74	4,428
Oct.	83	14	31	1,908
Nov.	935	10	52	3,168
Dec.	34	0	4	258
Total	..	..	..	30,276

Year 1939

Jan.	0	0	0	0
Feb.	0	0	0	0
Mar.	153	0	15	486
Apr.	83	0	4	230
May	2	0	0.1	9
June	108	0	5	246
July	153	14	46	2,844
Aug.	490	14	117	7,254
Sept.	83	14	36	2,148
Oct.	375	27	56	3,450
Nov.	73	10	33	1,976
Dec.	73	1.5	18	1,130
Total	..	..	..	19,773

Year 1940

Jan.	5	0	0.5	32
Feb.	730	0	18	1,072
Mar.	0	0	0	0
Apr.	275	0	13	816
May	1.5	0	1	58
June	1	0	0.2	10
July	0	0	0	0
Aug.	2	0	0.5	24
Sept.	0	0	0	0
Oct.	20	0	0.6	40
Nov.	0	0	0	0
Dec.	935	0	19	1,180
Total	..	..	..	3,232

PEEL RIVER AT PIALLAMORE

Year 1941

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	7370	4	308	19,122
Feb.	22	2	13	752
Mar.	3880	1.5	218	13,506
Apr.	66	9	31	1,848
May	28	8	12	756
June	880	16	160	9,906
July	88	28	56	3,490
Aug.	88	22	36	2,232
Sept.	31	11	19	1,118
Oct.	730	11	52	3,238
Nov.	35	2	16	934
Dec.	16	0	1.6	99
Total	..	..	..	57,001

Year 1942

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	49	0	0.4	26
Mar.	25	0	1.7	105
Apr.	11	0	1	58
May	0	0	0	0
June	22	0	3	192
July	13900	16	928	57,538
Aug.	73	23	47	2,936
Sept.	68	20	26	1,590
Oct.	5960	26	305	18,928
Nov.	1365	45	146	8,778
Dec.	45	13	27	1,660
Total	..	..	..	91,811

Year 1943

Jan.	No Records			17,000*
Feb.	171	2	21	1,170
Mar.	3	2	2.5	152
Apr.	11	2	4	246
May	133	2	25	1,522
June	267	15	44	2,644
July	49	20	32	1,960
Aug.	188	41	98	6,054
Sept.	188	53	92	5,524
Oct.	140	33	69	4,296
Nov.	730	20	66	3,954
Dec.	4070	15	102	6,354
Total	..	..	..	50,876*

Year 1944

Jan.	4670	29	144	8,956
Feb.	1565	11	61	3,516
Mar.	58	5	10	649
Apr.	8	5	6	381
May	554	7	53	3,287
June	33	15	18	1,082
July	1610	15	101	6,236
Aug.	2140	15	179	11,102
Sept.	126	33	64	3,836
Oct.	136	9	20	1,264
Nov.	9	1.5	4	256
Dec.	2	0	0.5	30
Total	..	..	..	40,595

* Estimated

PEEL RIVER AT PIALLAMORE

Year 1945

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	35	0	1	43
Feb.	35	0	3	178
Mar.	5	0	0.5	34
Apr.	1.5	0	0.4	23
May	26	0	6	352
June	9530	5	549	32,946
July	1860	68	195	12,112
Aug.	1610	108	243	15,078
Sept.	815	42	152	9,140
Oct.	185	22	47	2,914
Nov.	136	13	37	2,198
Dec.	121	11	32	2,000
Total	..	..	..	77,018

Year 1946

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	61	3	9	569
Feb.	16	0	2	90
Mar.	16	0	2	124
Apr.	230	0	11	672
May	No Records			200*
June	No Records			1,800*
July	34	7	14	880
Aug.	7	1	2.9	174
Sept.	14	0	3	152
Oct.	2	0	0.5	38
Nov.	0	0	0	0
Dec.	0	0	0	0
Total	..	..	..	4,699*

Year 1947

Jan.	373	0	4	274
Feb.	84	0	16	872
Mar.	84	0	12	758
Apr.	0	0	0	0
May	0	0	0	0
June	10	0	0.7	43
July	121	0	11	710
Aug.	251	1	60	3,726
Sept.	17600	45	324	19,436
Oct.	9530	63	257	15,950
Nov.	792	73	143	8,602
Dec.	11480	73	858	53,194
Total	..	..	..	103,565

Year 1948

Jan.	8150	73	449	27,864
Feb.	760	33	133	7,694
Mar.	30	18	24	1,508
Apr.	30	18	24	1,462
May	54	24	38	2,280
June	226	30	110	6,588*
July	160	73	112	6,928
Aug.	247	54	104	6,424
Sept.	1144	96	221	13,270
Oct.	296	37	99	6,110
Nov.	54	9	30	1,792*
Dec.	153	6	30	1,872
Total	...	..	..	83,792

* Estimated

PEEL RIVER AT PIALLAMORE

Year 1949

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	522	13	61	3,658
Feb.	No Records			6,000*
Mar.	122	24	43	2,692
Apr.	952	9	42	2,530
May	170	18	45	2,774
June	984	24	293	17,590
July	3750	73	303	18,784
Aug.	440	84	200	12,416
Sept.	No Records			66,000*
Oct.	No Records			48,000*
Nov.	13870	121	442	26,522*
Dec.	314	66	130	8,036*
Total	..	..	..	215,002*

Year 1950

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	107	28	55	3,380
Feb.	No Records			3,000*
Mar.	39	16	24	1,476
Apr.	No Records			23,000*
May	204	52	88	5,484*
June	6650	61	1609	96,524
July	19700	472	1360	81,600
Aug.	No Records			47,000*
Sept.	No Records			20,000*
Oct.	No Records			145,000*
Nov.	1080	83	330	19,808*
Dec.	363	144	234	14,506*
Total	..	..	..	460,778*

Year 1951

Jan.	318	60	143	8,856
Feb.	200	44	99	5,542
Mar.	48	19	33	2,034
Apr.	30	11	25	1,472
May	30	15	24	1,468
June	3460	19	317	19,014
July	9800	30	425	26,344
Aug.	2210	83	444	27,532*
Sept.	348	144	202	12,104*
Oct.	181	70	108	6,688
Nov.	110	24	38	2,304
Dec.	60	15	20	1,264*
Total	..	..	..	114,622*

Year 1952

Jan.	200	3	19	1,174
Feb.	44	0	6.7	388
Mar.	363	15	70	4,366
Apr.	No Records			3,000*
May	1480	37	223	13,826
June	13000	200	882	52,894
July	3300	221	391	24,250
Aug.	1580	344	596	36,984
Sept.	451	170	287	17,244
Oct.	562	204	300	18,616
Nov.	204	82	118	7,100
Dec.	82	20.5	40	2,502
Total	..	..	..	182,308*

* Estimated.

PEEL RIVER AT PIALLAMORE

Year 1953					Year 1954				
Month	Discharge in Cusecs			Discharge for Month Acre Feet	Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean			Max.	Min.	Mean	
Jan.	43	20	25	1,561	Jan.	34	2	11	668
Feb.	137	15	45	2,533	Feb.	1360	2	105	5,880
Mar.	30	17	23	1,416	Mar.	63	4	17	1,066
Apr.	51	6	10	632	Apr.	9	5	7	410
May	1480	43	203	12,616	May	9	6	8	482
June	82	39	54	3,238	June	139	0.6	27	1,640
July	680	30	100	6,580	July	38	20	23	1,436
Aug.	4400	51	388	24,058	Aug.	63	16	24	1,472
Sept.	562	74	180	10,780	Sept.	47	12	22	1,302
Oct.	65	50	61	3,802	Oct.	5160	14	255	15,820
Nov.	84	25	49	2,910	Nov.	4800	63	303	18,176
Dec.	43	3	12	756	Dec.	244	24	53	3,306
Total	..	..	..	70,882	Total	..	..	..	51,658

Year 1955					Year 1956				
Jan.	76	4	34	2,090	Jan.	110	36	57	3,516
Feb.	32000	7	1939	108,598	Feb.	19300	32	1138	65,994
Mar.	2240	128	343	21,278	Mar.	1120	220	368	22,790
Apr.	141	95	108	6,478	Apr.	396	118	173	10,362
May	141	79	93	5,782	May	4600	118	1021	63,304
June	1850	95	190	11,424	June	4340	286	794	47,644
July	556	106	204	12,652	July	4120	441	1251	77,572
Aug.	3220	189	410	25,404	Aug.	4120	263	730	45,272
Sept.	380	95	197	11,834	Sept.	263	148	193	11,560
Oct.	5800	43	676	41,906	Oct.	2540	148	301	18,674
Nov.	479	58	202	12,120	Nov.	468	96	172	10,308
Dec.	174	32	92	5,696	Dec.	1020	25	155	9,632
Total	..	..	..	265,262	Total	..	..	..	286,628

PEEL RIVER AT PIALLAMORE

Year 1957					Year 1958				
Month	Discharge in Cusecs			Discharge for Month Acre Feet	Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean			Max.	Min.	Mean	
Jan.	70	1	22	1,346	Jan.	32	0	1.5	94
Feb.	692	0	51	2,866	Feb.	101	0	9	509
Mar.	421	32	84	5,226	Mar.	13	0	1.6	102
Apr.	1730	32	111	6,646	Apr.	0	0	0	0
May	66	32	38	2,368	May	294	0	20	1,268
June	66	28	37	2,192	June	664	6	28	1,664
July	178	52	97	6,006	July	650	32	109	6,784
Aug.	1150	48	106	6,556	Aug.	990	25	136	8,490
Sept.	128	34	56	3,388	Sept.	4170	114	390	23,408
Oct.	32	6	17	1,012	Oct.	4900	175	539	33,444
Nov.	9	0	2.9	172	Nov.	157	48	91	5,484
Dec.	1	0	0.1	5	Dec.	1120	32	87	5,410
Total	..	..	..	37,783	Total	..	..	..	86,657

Year 1959					Year 1960				
Jan.	405	36	78	4,812	Jan.	80	12	24	1,488
Feb.	532	19	92	5,166	Feb.	32	12	16	928
Mar.	3880	64	194	12,000	Mar.	14	0.5	7.2	430
Apr.	182	35	69	4,114	Apr.	23	0.2	10	586
May	148	26	39	2,394	May	106	16	48	2,990
June	310	30	49	2,946	June	56	23	36	2,142
July	1150	31	150	9,840	July	1240	51	344	21,312
Aug.	400	65	109	6,782	Aug.	2130	97	327	20,252
Sept.	1900	51	128	7,676	Sept.	2470	77	232	13,914
Oct.	445	56	124	7,678	Oct.	253	68	123	7,640
Nov.	445	56	143	8,550	Nov.	2100	37	192	11,534
Dec.	635	30	66	4,064	Dec.	9130	87	586	36,348
Total	..	..	..	76,022	Total	..	..	..	119,564

PEEL RIVER AT PIALLAMORE

Year 1961					Year 1962				
Month	Discharge in Cusecs			Discharge for Month Acre Feet	Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean.			Max.	Min.	Mean	
Jan.	665	45	127	7,844	Jan.	11900	55	480	29,808
Feb.	108	37	51	2,844	Feb.	3520	132	357	20,002
Mar.	37	18	25	1,568	Mar.	160	56	90	5,590
Apr.	56	14	20	1,220	Apr.	361	33	86	5,154
May	29	18	24	1,466	May	930	26	126	7,830
June	64	16	21	1,286	June	288	56	108	6,500
July	152	18	31	1,896	July	1150	37	102	6,340
Aug.	1430	18	130	8,062	Aug.	1630	46	257	15,900
Sept.	108	24	60	3,600	Sept.	270	80	122	7,330
Oct.	119	18	26	1,590	Oct.	3920	56	329	20,400
Nov.	1360	13	122	7,300	Nov.	380	54	126	7,590
Dec.	324	37	85	5,274	Dec.	138	23	69	4,290
Total	..	..	..	43,950	Total	..	..	..	136,734

Year 1963					Year 1964				
Jan.	1180	65	155	9,600	Jan.	1560	4	83	5,136
Feb.	180	20	57	3,200	Feb.	31	8	17	1,000
Mar.	255	10	50	3,100	Mar.	400	15	47	2,910
Apr.	150	27	53	3,200	Apr.	2400	15	168	10,100
May	3030	65	408	25,300	May	380	46	115	7,130
June	3100	165	498	29,900	June	1270	55	185	11,100
July	845	165	340	21,000	July	3560	108	475	29,500
Aug.	4400	165	477	29,500	Aug.	2720	75	225	13,900
Sept.	930	150	310	18,600	Sept.	800	114	202	12,140
Oct.	248	92	145	8,970	Oct.	2060	114	270	16,800
Nov.	264	45	73	4,358	Nov.	127	50	75	4,490
Dec.	240	20	54	3,330	Dec.	50	17	31	1,930
Total	..	..	..	160,058	Total	..	..	..	116,136

PEEL RIVER AT PIALLAMORE

Year 1965

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	22	2.5	10	628
Feb.	2.5	0	0.5	33
Mar.	0	0	0	0
Apr.	0	0	0	0
May	0	0	0	0
June	5	0	1	38
July	34	5	9.6	596
Aug.	8	5	7.7	478
Sept.	17	0	7.4	442
Oct.	0	0	0	0
Nov.	0	0	0	0
Dec.	91	0	9.2	573
Total	..	..	..	2,788

Year 1966

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	0	0	0	0
Mar.	0	0	0	0
Apr.	0	0	0	0
May	0	0	0	0
June	0	0	0	0
July	0	0	0	0
Aug.	139	0	31	1,930
Sept.	127	8	29	1,740
Oct.	114	5	31	1,950
Nov.	931	17	131	7,890
Dec.	260	14	39	2,420
Total	..	..	..	15,930

Year 1967

Jan.	23	2	14	844
Feb.	2	0	0.2	9
Mar.	276	0	18	1,100
Apr.	0.5	0	0.1	3
May	0	0	0	0
June	139	0	37	2,250
July	91	18	41	2,530
Aug.	510	6	57	3,560
Sept.	198	2.5	39	2,320
Oct.	960	0.5	84	5,180
Nov.	46	0	8	464
Dec.	31	0	0.7	42
Total	..	..	..	18,302

Year 1968

Jan.	15100	0	461	28,600
Feb.	44	6.5	22	1,250
Mar.	53	0.5	12.5	775
Apr.	2	0	0.17	10
May	4400	0	143	8,890
June	108	38	59	3,540
July	6600	46	268	17,600
Aug.	8460	113	705	43,700
Sept.	2960	88	307	18,400
Oct.	2160	53	195	12,100
Nov.	400	18	65	3,870
Dec.	167	14	32	1,970
Total	..	..	..	140,705

COCKBURN RIVER AT MULLA CROSSING

LOCATION:	Latitude 31°06' Longitude 151°08'
PERIOD OF ESTABLISHMENT:	July 1936 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	32 years.
ZERO OF GAUGE:	Approximately R.L. 1480 Standard Datum. R.L. 77.67 Assumed Datum.
CATCHMENT AREA:	350 square miles.
CONTROL:	Gravel.
EQUIPMENT:	Automatic Recorder (Float type) installed August 1937. Staff gauge, range 0 to 30 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 266 (b) Maximum observation in cusecs : 3,210 (c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	42,500 cusecs.
MEAN DAILY DISCHARGE FOR 32 YEARS:	112 cusecs.
MEAN ANNUAL DISCHARGE FOR 32 YEARS:	82,000 acre feet.
REMARKS:	Records from July to December 1936 are considered to be unreliable.

COCKBURN RIVER AT MULLA CROSSING

Year 1937

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	575	1.2	35	2,186
Feb.	30	1.2	7	398
Mar.	119	0.6	13	801
Apr.	10	1.5	2.4	141
May	10	3	6	402
June	90	7	24	1,448
July	337	7	32	2,004
Aug.	4530	12	172	10,648
Sept.	1140	10	101	6,042
Oct.	54	6	22	1,372
Nov.	114	3	23	1,374
Dec.	1540	0.5	46	2,854
Total	..	..	..	29,670

Year 1938

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1120	0	32	2,002
Feb.	285	2	42	2,340
Mar.	2	0	0.3	20
Apr.	6	0	1	70
May	30	1	4.5	266
June	15	3	6	340
July	251	4	41	2,564
Aug.	3035	30	328	20,336
Sept.	81	15	30	1,810
Oct.	310	8	32	1,990
Nov.	145	5	33	1,962
Dec.	8	0.2	1.6	96
Total	..	..	..	33,796

Year 1939

Jan.	605	0	28	1,728
Feb.	215	0.1	5	294
Mar.	123	0.2	12	748
Apr.	63	0.5	10	572
May	6	1	2	140
June	18	1	4	275
July	420	14	45	2,820
Aug.	1120	19	117	7,240
Sept.	54	6	12	718
Oct.	209	6	32	1,954
Nov.	360	5	69	4,122
Dec.	75	1	9	551
Total	..	..	..	21,162

Year 1940

Jan.	64	0	3.4	209
Feb.	2060	0	32	1,859
Mar.	36	0	3	192
Apr.	139	0.2	15	887
May	7	1.5	3	194
June	2.5	1	1.6	97
July	2	0.4	0.8	51
Aug.	2	0.2	0.7	45
Sept.	23	0.2	2	142
Oct.	3.5	0	1	54
Nov.	320	0	6	369
Dec.	3970	0	87	5,394
Total	..	..	..	9,493

COCKBURN RIVER AT MULLA CROSSING

Year 1941

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	4060	2.5	370	22,926
Feb.	397	4	35	1,954
Mar.	2680	3	270	16,746
Apr.	49	9	21	1,280
May	30	4	9	552
June	1240	11	218	13,090
July	49	19	34	2,092
Aug.	162	11	28	1,750
Sept.	19	5	10	606
Oct.	790	8	63	3,888
Nov.	240	0.5	20	1,222
Dec.	17	0	1	76
Total	..	..	..	66,182

Year 1942

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	390	0.5	44	2,462
Mar,	950	0	75	4,650
Apr.	30	2	6	384
May	21	2	6	374
June	13	7	8	510
July	No Records			35,000*
Aug.	69	13	30	1,884
Sept.	75	8	20	1,194
Oct.	1180	11	145	8,962
Nov.	1670	13	123	7,360
Dec.	81	5	14	850
Total	..	..	..	63,630*

Year 1943

Jan.	3080	11	177	10,994
Feb.	120	1.5	14	780
Mar.	18	0.2	1	82
Apr.	34	0.2	6	354
May	28	1.5	9	521
June	77	10	20	1,216
July	No Records			750*
Aug.	196	26	58	3,594
Sept.	755	19	69	4,156
Oct.	730	17	88	5,472
Nov.	443	8.5	44	2,644
Dec.	1920	1.5	78	4,832
Total	..	..	..	35,395*

Year 1944

Jan.	630	10	72	4,472
Feb.	855	6	48	2,772
Mar.	12	4	8	466
Apr.	10	0.2	3	158
May	335	0.5	32	2,004
June	16	7	10	606
July	274	7	52	3,238
Aug.	4060	5	218	13,490
Sept.	100	21	42	2,530
Oct.	21	3	11	700
Nov.	3	0.5	1	61
Dec.	0.5	0.2	0.4	22
Total	..	..	..	30,519

* Estimated.

COCKBURN RIVER AT MULLA CROSSING

Year 1945

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1600	0	35	2,179
Feb.	3495	0.3	150	8,375
Mar.	215	1.5	17	1,078
Apr.	1.5	0.5	1	61
May	18	0.5	2.9	181
June	4790	5	186	11,154
July	650	14	88	5,426
Aug.	No Records			18,000*
Sept.	No Records			14,000*
Oct.	79	3	14	880
Nov.	322	1	23	1,382
Dec.	23	0.5	4.8	296
Total	..	..	..	63,012*

Year 1946

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	58	0	1	60
Feb.	1.5	0	0.4	18
Mar.	4	0	0.5	28
Apr.	7.2	0.2	1.9	116
May	13	1.5	4.3	268
June	8	1.5	2.7	163
July	18	1.5	8	476
Aug.	1.5	0.5	0.9	56
Sept.	156	0.2	11	632
Oct.	44	0	2	140
Nov.	116	0	4.6	278
Dec.	156	0	4.6	284
Total	..	..	..	2,519

Year 1947

Jan.	1860	0	25	1,546
Feb.	830	0.2	48	2,714
Mar.	425	0	37	2,308
Apr.	11	0	0.8	46
May	33	0.5	7	432
June	38	0.5	5	306
July	94	3	28	1,736
Aug.	365	9	67	4,130
Sept.	605	26	122	7,332
Oct.	1530	12	215	13,312
Nov.	286	15	102	6,134
Dec.	3260	106	543	33,698
Total	..	..	..	73,694

Year 1948

Jan.	9300	26	382	23,666
Feb.	295	10	18	1,034
Mar.	890	7	40	2,488
Apr.	16	4	10	622
May	202	7	25	1,578
June	1180	7	119	7,154
July	1330	16	91	5,672
Aug.	3495	40	289	17,926
Sept.	1360	35	144	8,956
Oct.	86	8	26	1,638
Nov.	214	7	24	1,416
Dec.	No Records			1,000*
Total	..	..	..	73,150*

* Estimated.

COCKBURN RIVER AT MULLA CROSSING

Year 1949

Month	Discharge in Cusecs Max.	Min.	Mean	Discharge for Month Acre Feet
Jan.	No Records			11,000*
Feb.	No Records			6,000*
Mar.	31	2.5	8	518
Apr.	No Records			700*
May	No Records			1,300*
June	No Records			14,000*
July	3545	24	178	11,048
Aug.	1800	31	166	10,282
Sept.	10500	121	817	49,036
Oct.	4280	117	479	29,672
Nov.	5050	45	377	22,632
Dec.	252	19	109	6,774
Total	..	..	..	162,962*

Year 1950

Month	Discharge in Cusecs Max.	Min.	Mean	Discharge for Month Acre Feet
Jan.	183	7	37	2,266
Feb.	214	10	40	2,222
Mar.	56	4	9	542
Apr.	840	4	73	4,396
May	130	14	39	2,436
June	6585	40	749	44,928
July	10400	198	1013	62,814
Aug.	1090	183	357	22,124
Sept.	340	123	156	9,382
Oct.	10900	123	1058	65,626
Nov.	No Records			124,000*
Dec.	No Records			17,000*
Total	..	..	..	357,736*

Year 1951

Jan.	1240	42	97	6,046
Feb.	183	33	51	2,880
Mar.	262	19	39	2,416
Apr.	No Records			1,200*
May	No Records			1,000*
June	No Records			22,000*
July	No Records			22,000*
Aug.	No Records			60,000*
Sept.	214	65	116	6,954
Oct.	No Records			1,800*
Nov.	No Records			400*
Dec.	No Records			90*
Total	..	..	..	126,786*

Year 1952

Jan.	No Records			200*
Feb.	No Records			200*
Mar.	55	35	41	2,558
Apr.	No Records			1,200*
May	3350	11	202	13,736
June	5780	50	703	42,156
July	1150	67	170	10,538
Aug.	5990	105	760	47,136
Sept.	630	78	144	8,616
Oct.	No Records			14,000*
Nov.	No Records			4,500*
Dec.	83	8.2	16.5	1,024
Total	..	..	..	145,864*

* Estimated.

COCKBURN RIVER AT MULLA CROSSING

Year 1953

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	No Records			2,000*
Feb.	440	2.1	40	2,224
Mar.	23	5	10	624
Apr.	38	6	10	616
May	538	25	117	7,232
June	28	18	22	1,322
July	No Records			6,000*
Aug.	No Records			20,000*
Sept.	83	20	47	2,816
Oct.	88	13	31	1,941
Nov.	200	6.0	30	1,775
Dec.	13	0.3	2.2	140
Total	..	..	..	46,690*

Year 1954

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	4.2	0.3	1.7	108
Feb.	97	0.3	16	925
Mar.	10	0.1	1.9	120
Apr.	0	0	0	0
May	0.5	0.1	0.3	19
June	50	0.3	9	539
July	13	3.4	5.8	362
Aug.	19	3.4	6.0	374
Sept.	23	3.1	6.8	407
Oct.	5050	1.6	276	17,118
Nov.	4060	30	261	15,676
Dec.	945	4.2	45	2,776
Total	..	..	..	38,424

Year 1955

Jan.	342	2.8	28	1,708
Feb.	23500	3.4	2177	121,911
Mar.	1470	49	194	12,026
Apr.	84	33	42	2,508
May	55	21	33	2,028
June	2240	25	154	9,254
July	899	49	171	10,614
Aug.	1250	112	296	18,328
Sept.	633	49	151	9,056
Oct.	14800	44	903	55,990
Nov.	1090	51	170	10,180
Dec.	158	29	64	3,998
Total	..	..	..	257,601

Year 1956

Jan.	304	10	41	2,559
Feb.	22100	29	1159	67,204
Mar.	727	46	124	7,658
Apr.	75	33	50	3,000
May	11200	46	851	52,750
June	6060	158	565	33,874
July	2560	166	562	34,874
Aug.	1470	91	212	13,156
Sept.	230	63	90	5,370
Oct.	3640	59	275	17,044
Nov.	293	27	94	5,652
Dec.	1090	16	61	3,796
Total	..	..	..	246,937

* Estimated.

COCKBURN RIVER AT MULLA CROSSING

Year 1957

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	501	10	41	2,567
Feb.	136	6.9	22	1,214
Mar.	443	8.2	41	2,530
Apr.	129	6.9	20	1,207
May	43	11	14	886
June	109	11	23	1,408
July	143	24	55	3,392
Aug.	899	18	70	4,340
Sept.	71	6.9	24	1,452
Oct.	7	1.0	3.3	207
Nov.	16	0.2	1.2	72
Dec.	91	0.1	4.6	278
Total	..	..	..	19,553

Tear 1958

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	9	0.2	1.2	77
Feb.	201	2	32	1,774
Mar.	14	0.5	4.0	247
Apr.	0.5	0.2	0.3	17
May	109	0.2	7.9	492
June	62	2	4	244
July	183	8	38	2,332
Aug.	2000	9	102	6,308
Sept.	1825	37	203	12,188
Oct.	5580	66	303	18,786
Nov.	29	3.6	14	848
Dec.	6060	3.6	252	15,644
Total	..	..	..	58,957

Year 1959

Jan.	1230	12	103	6,408
Feb.	355	4.4	41	2,311
Mar.	76	8.4	26	1,589
Apr.	48	6	14	838
May	54	5.2	10	632
June	17	5.5	10	568
July	887	6.7	93	5,754
Aug.	54	9.4	20	1,747
Sept.	227	8.0	32	1,916
Oct.	389	15	82	5,088
Nov.	895	29	170	10,192
Dec.	2270	13	149	9,264
Total	..	..	..	46,307

Year 1960

Jan.	170	4	28	1,740
Feb.	161	1	13	776
Mar.	13	0.6	1.5	96
Apr.	399	0.6	22	1,325
May	86	9	27	1,652
June	45	11	19	1,133
July	3260	20	308	19,126
Aug.	3125	37	292	17,544
Sept.	2030	30	131	7,844
Oct.	170	15	54	3,352
Nov.	2400	7.1	106	6,336
Dec.	10100	16	421	26,112
Total	..	..	..	87,036

COCKBURN RIVER AT MULLA CROSSING

Year 1961

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	440	7	40	2,492
Feb.	93	6	16	917
Mar.	13	4.0	8.1	501
Apr.	13	3.4	5.5	328
May	13	5.5	7.0	435
June	15	6.3	10	574
July	125	8.5	22	1,338
Aug.	2290	5.5	135	8,362
Sept.	61	5.0	22	1,344
Oct.	370	4.0	53	3,314
Nov.	5440	5.0	413	24,786
Dec.	225	15	64	3,952
Total	..	..	..	48,343

Year 1962

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	42500	55	948	58,754
Feb.	1000	58	221	12,374
Mar.	58	23	38	2,356
Apr.	147	18	35	2,086
May	230	16	50	3,088
June	164	22	48	2,856
July	173	20	34	2,132
Aug.	860	22	149	9,262
Sept.	220	37	65	3,888
Oct.	5330	32	338	20,932
Nov.	310	14	59	3,516
Dec.	95	11	29	1,790
Total	..	..	..	123,034

Year 1963

Jan.	2640	14	112	6,948
Feb.	30	4	11	620
Mar.	131	1	30	1,278
Apr.	95	12	31	1,858
May	7120	30	594	36,850
June	4560	88	586	35,170
July	930	66	204	12,630
Aug.	2340	56	288	17,884
Sept.	790	46	134	8,046
Oct.	116	27	62	3,872
Nov.	128	17	42	2,524
Dec.	500	9	57	3,542
Total	..	..	..	131,222

Year 1964

Jan.	18800	1.5	494	31,600
Feb.	34	8	19	1,090
Mar.	340	6	36	2,220
Apr.	1590	6	94	5,610
May	135	19	39	2,430
June	275	31	88	5,260
July	4450	30	434	26,900
Aug.	3390	30	133	8,250
Sept.	440	19	54	3,210
Oct.	4560	41	252	15,600
Nov.	395	25	59	3,540
Dec.	61	0.4	18	1,090
Total	..	..	..	106,800

COCKBURN RIVER AT MULLA CROSSING

Year 1965

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	86	0.6	23	1,450
Feb.	15	0.4	2.2	125
Mar.	0.4	0.2	0.2	13
Apr.	4.5	0.2	0.7	43
May	2	2	2	124
June	7	4	5.1	306
July	20	7	8.4	522
Aug.	15	7	8.2	508
Sept.	18	0.3	6.5	392
Oct.	20	0	3.3	206
Nov.	27	0.1	2.0	120
Dec.	2440	1.5	71	4,410
Total	..	..	..	8,219

Year 1966

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	10	0.1	2.1	128
Feb.	0.1	0	0.01	1
Mar.	38	0	0.6	39
Apr.	0.02	0.01	0.02	1
May	0	0	0	0
June	26	0.02	5.2	312
July	7	1.2	4.7	298
Aug.	230	0.2	24	1,490
Sept.	78	6	18	1,070
Oct.	365	6	47	2,920
Nov.	4100	11	306	1,830
Dec.	395	2.1	260	1,610
Total	..	..	..	9,699

Year 1967

Jan.	660	0.2	32	2,000
Feb.	2	0	0.4	24
Mar.	280	0	18	1,100
Apr.	0.7	0	0.2	13
May	2	0	0.6	35
June	23	0.7	9.3	559
July	28	3	7.7	476
Aug.	116	3	29	1,810
Sept.	221	2	37	2,200
Oct.	815	0.5	75	4,680
Nov.	18	0.1	2.9	176
Dec.	7	0	0.9	59
Total				13,132

Year 1968

Jan.	5000	0	212	13,100
Feb.	24	0.3	10.2	590
Mar.	8.5	0.3	2.1	128
Apr.	0.3	0.15	0.19	11.7
May	221	0	53	3,310
June	84	7	22	1,330
July	610	23	105	6,500
Aug.	4480	28	621	38,500
Sept.	1620	26	171	10,300
Oct.	1300	6	65	4,050
Nov.	285	0.7	28	1,710
Dec.	87	0.5	10.2	630
Total				80,160

PEEL RIVER AT PARADISE WEIR

LOCATION:	Latitude 31°06' Longitude 150°56'
PERIOD OF ESTABLISHMENT:	November 1953 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	15 years.
ZERO OF GAUGE:	R.L. 1228.52 Standard Datum.
CATCHMENT AREA:	930 square miles.
CONTROL:	Rock.
EQUIPMENT:	Automatic Recorder (Float type) Staff gauge, range 0 to 20 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained 112
	(b) Maximum observation in cusecs 10,800
	(c) Minimum observation in cusecs 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	47,400 cusecs.
MEAN DAILY DISCHARGE FOR 15 YEARS:	297 cusecs.
MEAN ANNUAL DISCHARGE FOR 15 YEARS:	222,000 acre feet.

PEEL RIVER AT PARADISE WEIR

Year 1953

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	..	..	..	..
June	..	..	..	..
July	..	..	..	..
Aug.	..	..	..	..
Sept.	..	..	..	..
Oct.	..	..	..	..
Nov.	..	..	..	..
Dec.	53	0	10	627
Total	..	..	..	..

Year 1954

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	23	0	2.6	162
Feb.	1750	0.1	133	7,464
Mar.	83	2.6	26	1,626
Apr.	7	1.6	4.2	254
May	4.2	3	3.7	232
June	239	3	43	2,564
July	55	24	34	2,113
Aug.	107	14	32	1,955
Sept.	89	6	27	1,589
Oct.	7480	11	428	26,535
Nov.	7930	114	673	40,402
Dec.	2060	28	140	8,647
Total	..	..	..	93,543

Year 1955

Jan.	187	8	70	4,315
Feb.	47400	11	3754	210,230
Mar.	5780	356	1147	71,142
Apr.	624	153	247	14,840
May	446	83	169	10,502
June	3190	114	379	22,710
July	1880	133	393	24,360
Aug.	2950	298	932	57,818
Sept.	2150	247	591	35,460
Oct.	21500	173	1827	113,304
Nov.	2160	216	509	30,560
Dec.	411	130	223	13,812
Total	..	..	..	609,053

Year 1956

Jan.	950	63	139	8,634
Feb.	29200	95	2617	151,780
Mar.	3350	243	712	44,156
Apr.	650	194	277	16,590
May	11800	206	1866	115,750
June	12600	715	1627	97,600
July	6920	830	2041	132,764
Aug.	7300	940	1913	118,608
Sept.	1295	290	752	45,104
Oct.	7050	252	776	48,100
Nov.	1220	147	297	17,812
Dec.	1820	95	254	15,734
Total	..	..	..	812,632

PEEL RIVER AT PARADISE WEIR

Year 1957

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	418	55	113	6,994
Feb.	962	43	98	5,512
Mar.	810	55	111	6,892
Apr.	1900	43	113	6,772
May	140	64	77	4,804
June	177	51	71	4,290
July	300	95	150	9,316
Aug.	2355	81	179	11,076
Sept.	185	51	90	5,396
Oct.	47	0	22	1,344
Nov.	No Records			100*
Dec.	No Records			70*
Total	..	..	..	62,566*

Year 1958

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	No Records			10*
Feb.	0	0	0	0
Mar.	0	0	0	0
Apr.	0	0	0	0
May	No Records			1,300*
June	No Records			800*
July	No Records			9,400*
Aug.	No Records			11,300*
Sept.	No Records			48,000*
Oct.	No Records			66,900*
Nov.	No Records			5,750*
Dec.	5660	38	334	20,704
Total	..	..	..	164,164*

Year 1959

Jan.	1510	48	174	10,812
Feb.	850	17	128	7,150
Mar.	2100	78	227	14,066
Apr.	220	54	93	5,562
May	210	48	61	3,776
June	405	33	59	3,550
July	1360	43	238	14,784
Aug.	545	72	136	8,434
Sept.	1375	43	143	8,586
Oct.	882	91	211	13,072
Nov.	1450	125	335	20,098
Dec.	2190	66	238	14,764
Total	..	..	..	124,654

Year 1960

Jan.	139	13	50	3,116
Feb.	104	8	27	1,542
Mar.	13	0	3.6	222
Apr.	280	0	21	1,243
May	169	22	68	4,244
June	104	29	56	3,336
July	4180	60	698	43,266
Aug.	3810	176	648	40,178
Sept.	3170	132	384	23,014
Oct.	395	139	216	13,422
Nov.	4000	72	323	19,374
Dec.	28500	132	1100	68,206
Total	..	..	..	221,163

* Estimated.

PEEL RIVER AT PARADISE WEIR

Year 1961

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	900	43	156	9,702
Feb.	132	29	62	3,444
Mar.	98	19	40	2,460
Apr.	54	13	22	1,304
May	43	25	31	1,922
June	60	22	35	2,092
July	184	22	50	3,000
Aug.	2310	38	277	17,154
Sept.	216	40	104	6,218
Oct.	440	14	80	4,964
Nov.	4550	14	473	28,374
Dec.	960	76	170	10,526
Total	..	..	..	91,160

Year 1962

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	44700	92	1669	103,464
Feb.	2320	228	701	39,252
Mar.	290	92	158	9,806
Apr.	510	92	155	9,282
May	1200	76	233	14,442
June	605	101	214	12,862
July	1280	84	176	10,940
Aug.	2135	92	490	30,356
Sept.	492	138	218	13,094
Oct.	5165	84	594	36,818
Nov.	880	62	211	12,670
Dec.	168	45	88	5,468
Total	..	..	..	298,454

Year 1963

Jan.	2480	56	249	15,454
Feb.	253	16	51	2,830
Mar.	440	8	54	3,352
Apr.	277	30	83	4,964
May	7510	92	965	59,852
June	5100	320	1099	65,944
July	1535	285	588	36,484
Aug.	4330	229	656	40,676
Sept.	2170	218	525	31,482
Oct.	420	142	221	13,716
Nov.	275	98	139	8,354
Dec.	490	36	127	7,898
Total	..	..	..	291,006

Year 1964

Jan.	30000	16	647	40,100
Feb.	100	27	52	3,040
Mar.	845	40	115	7,150
Apr.	2680	23	265	15,900
May	740	63	193	12,000
June	1370	83	299	17,900
July	5360	163	1020	63,200
Aug.	4000	124	388	24,100
Sept.	1635	142	269	16,160
Oct.	4715	163	573	35,500
Nov.	350	107	157	9,420
Dec.	148	30	62	3,850
Total	..	..	..	248,320

PEEL RIVER AT PARADISE WEIR

Year 1965

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	62	0	14	873
Feb.	3.5	0	0.2	11
Mar.	0	0	0	0
Apr.	0	0	0	0
May	0	0	0	0
June	9	0	1	63
July	25	7	10	618
Aug.	11	6	8	498
Sept.	20	0	7.4	442
Oct.	2.5	0	0.03	2
Nov.	0	0	0	0
Dec.	1900	0	98	6,070
Total	..	..	..	8,577

Year 1966

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	0	0	0	0
Mar.	107	0	1.2	73
Apr.	0	0	0	0
May	0	0	0	0
June	252	0	2.2	133
July	0	0	0	0
Aug.	287	0	31	1,910
Sept.	152	6.5	39	2,340
Oct.	525	15	81	5,000
Nov.	3780	34	426	25,600
Dec.	1846	15	83	5,100
Total	..	..	..	40,156

Year 1967

Jan.	680	1	58	3,590
Feb.	1	0	0.1	4
Mar.	360	0	22	1,360
Apr.	0	0	0	0
May	0	0	0	0
June	107	0	26	1,580
July	100	18	38	2,370
Aug.	507	18	74	4,580
Sept.	405	5	65	3,910
Oct.	1,140	0	146	9,050
Nov.	50	0	11	634
Dec.	6	0	0.3	20
Total				27,098

Year 1968

Jan.	29200	0	795	49,300
Feb.				1,600*
Mar.	40	0	6.8	422
Apr.	0	0	0	0
May	2640	0	226	14,000
June	277	54	96	5,780
July	2810	69	363	22,500
Aug.				82,000*
Sept.				30,800*
Oct.				16,000*
Nov.	675	18	125	7,540
Dec.	204	14	40	2,460
Total				232,402*

* Estimated

PEEL RIVER AT TAMWORTH

LOCATION:	Latitude 31°07' Longitude 150°55'	
PERIOD OF ESTABLISHMENT:	January 1925 to August 1953	
COMPLETE YEARS OF COMPUTED RECORDS:	27 years.	
ZERO OF GAUGE:	R.L. 1217.52 Standard Datum	
CATCHMENT AREA:	1,190 square miles	
CONTROL:	Gravel	
EQUIPMENT:	Staff gauge, range 0 to 25 feet	
CURRENT METER OBSERVATIONS:	(a) Number obtained:	223
	(b) Maximum observation in cusecs:	19,000
	(c) Minimum observation in cusecs:	0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	26,500 cusecs	
MEAN DAILY DISCHARGE FOR 27 YEARS:	256 cusecs	
MEAN ANNUAL DISCHARGE FOR 27 YEARS:	187,000 acre feet	

PEEL RIVER AT TAMWORTH

Year 1925

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	125	17	42	2,388
Mar.	46	15	26	1,646
Apr.	20	10	14	820
May	69	10	27	1,650
June	108	20	37	2,284
July	227	46	78	4,842
Aug.	333	46	104	6,442
Sept.	108	49	73	4,382
Oct.	53	15	37	2,300
Nov.	1200	20	99	5,942
Dec.	164	20	57	3,524
Total	..	..	..	..

Year 1926

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1260	15	104	6,438
Feb.	61	1	9	508
Mar.	213	2	30	1,864
Apr.	61	20	33	2,010
May	507	25	121	7,480
June	425	88	178	10,656
July	240	88	139	8,592
Aug.	130	88	98	6,044
Sept.	333	78	118	7,080
Oct.	222	57	99	6,164
Nov.	53	20	33	1,976
Dec.	1990	15	155	9,600
Total	..	..	..	68,412

Year 1927

Jan.	1260	32	133	8,252
Feb.	69	0	18	994
Mar.	20	0	5	326
Apr.	98	2	29	1,752
May	15	10	13	810
June	15	10	12	710
July	20	10	12	740
Aug.	20	15	16	1,020
Sept.	15	1	5	278
Oct.	5	1	3.5	216
Nov.	119	0	8	500
Dec.	69	15	31	1,896
Total	..	..	..	17,494

Year 1928

Jan.	88	2	17	1,032
Feb.	4900	15	328	19,000
Mar.	4900	20	304	19,884
Apr.	4900	20	276	16,566
May	25	20	21	1,270
June	5820	5	851	51,036
July	2580	160	650	40,338
Aug.	425	184	245	15,218
Sept.	231	60	103	6,204
Oct.	60	34	40	2,460
Nov.	60	16	30	1,798
Dec.	21	5	11	666
Total	..	..	..	175,472

PEEL RIVER AT TAMWORTH

Year 1929					Year 1930				
Month	Discharge in Cusecs			Discharge for Month Acre Feet	Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean			Max.	Min.	Mean	
Jan.	34	5	10	648	Jan.	514	0	61	3,894
Feb.	710	5	229	12,830	Feb.	27	1	3	176
Mar.	50	8	18	1,106	Mar.	385	0	19	1,175
Apr.	34	21	27	872	Apr.	16	2	2.6	158
May	21	12	18	1,088	May	2	1	2	118
June	42	16	22	1,342	June	11900	2	603	36,180
July	27	16	20	1,214	July	2510	134	501	31,052
Aug.	566	21	125	7,746	Aug.	615	165	279	17,284
Sept.	2490	27	189	11,342	Sept.	233	62	123	7,370
Oct.	80	21	41	2,532	Oct.	773	50	251	15,588
Nov.	195	12	39	2,368	Nov.	421	40	111	6,678
Dec.	27	1	6.2	385	Dec.	65	13	35	2,146
Total	..	..	..	43,473	Total	..	..	..	121,819

Year 1931					Year 1932				
Jan.	330	7	29	1,822	Jan.	164	6	44	2,700
Feb.	134	0	8	468	Feb.	49	6	16	950
Mar.	118	0	7.5	462	Mar.	100	1	21	1,308
Apr.	495	2	87	5,198	Apr.	10	10	10	600
May	8440	40	497	30,812	May	22	10	13	808
June	22100	233	1856	111,344	June	22	15	16	942
July	12800	440	1848	114,556	July	520	15	105	6,524
Aug.	580	258	404	25,044	Aug.	60	22	34	2,094
Sept.	321	131	200	12,024	Sept.	1410	39	377	22,648
Oct.	No Records			6,000*	Oct.	225	46	111	6,902
Nov.	580	39	124	7,712	Nov.	255	31	70	4,208
Dec.	2670	30	417	25,858	Dec.	46	5	24	1,470
Total	..	..	..	341,300*	Total	..	..	..	51,154

* Estimated.

PEEL RIVER AT TAMWORTH

Year 1933

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	4260	0	304	18,820
Feb.	255	0	38	2,120
Mar.	205	0	7	458
Apr.	2	0	0.6	36
May	5	0	2	108
June	9	5	6	348
July	2610	5	444	27,526
Aug.	1220	84	247	15,318
Sept.	2320	95	439	36,362
Oct.	16100	107	1499	92,952
Nov.	3230	225	786	47,168
Dec.	1820	135	337	20,916
Total	..	..	..	262,132

Year 1934

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	332	42	109	6,788
Feb.	2610	95	664	37,170
Mar.	332	63	119	7,408
Apr.	205	54	75	4,506
May	54	25	43	2,638
June	84	25	39	2,358
July	3540	63	349	21,666
Aug.	3310	185	696	43,158
Sept.	22900	205	1640	98,388
Oct.	20000	127	1898	117,648
Nov.	483	138	223	13,388
Dec.	1360	75	283	17,520
Total	..	..	..	372,636

Year 1935

Jan.	13800	75	1136	70,420
Feb.	240	75	139	7,762
Mar.	98	35	59	3,638
Apr.	68	35	48	2,878
May	61	39	48	2,960
June	44	35	38	2,294
July	271	44	77	4,804
Aug.	159	44	66	4,086
Sept.	1560	44	178	10,696
Oct.	2350	31	246	15,260
Nov.	116	14	45	2,690
Dec.	159	5	27	1,684
Total	..	..	..	129,172

Year 1936

Jan.	640	5	55	3,416
Feb.	116	4	24	1,388
Mar.	1770	20	193	11,974
Apr.	138	23	47	2,796
May	44	20	24	1,516
June	240	23	51	3,060
July	2880	68	523	32,412
Aug.	17300	135	995	61,702
Sept.	1410	93	259	15,544
Oct.	93	35	61	3,782
Nov.	35	14	22	1,308
Dec.	1180	14	125	7,740
Total	..	..	..	146,638

PEEL RIVER AT TAMWORTH

Year 1937

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	255	20	65	4,018
Feb.	285	14	50	2,808
Mar.	495	10	65	4,018
Apr.	23	14	18	1,074
May	27	20	23	1,400
June	315	20	76	4,546
July	800	35	111	6,890
Aug.	14900	54	747	46,334
Sept.	2880	55	294	17,750
Oct.	211	35	79	4,896
Nov.	240	27	75	4,508
Dec.	5330	12	234	14,518
Total	..	..	..	112,760

Year 1938

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	225	1.2	32	1,980
Feb.	225	2	62	3,476
Mar.	2	0.2	0.7	39
Apr.	1.2	0.1	0.3	21
May	19	0	1.3	82
June	119	0.5	22	1,301
July	470	9	66	4,118
Aug.	7840	119	856	53,050
Sept.	272	64	119	7,132
Oct.	435	33	83	5,130
Nov.	325	19	75	4,490
Dec.	44	0	7	442
Total	..	..	..	81,261

Year 1939

Jan.	15	0	0.7	45
Feb.	0	0	0	0
Mar.	459	0	44	2,714
Apr.	24	0	3.6	218
May	2	0.7	1.1	68
June	24	0.7	4.3	358
July	560	7	82	5,072
Aug.	1124	19	221	13,730
Sept.	105	14	36	2,158
Oct.	128	14	54	3,348
Nov.	311	14	106	6,360
Dec.	197	0.2	59	3,670
Total	..	..	..	37,741

Year 1940

Jan.	36	0	7	409
Feb.	914	0	65	3,760
Mar.	66	0	2	136
Apr.	382	0	31	1,869
May	7	2	2.3	144
June	7	0.7	4	212
July	7	2	7	414
Aug.	2	2	2	124
Sept.	2	0	0.5	30
Oct.	182	0	10	624
Nov.	382	0	14	837
Dec.	2880	0	183	11,368
Total	..	..	..	19,927

PEEL RIVER AT TAMWORTH

Year 1941

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	11900	19	1080	66,942
Feb.	387	7	53	2,948
Mar.	3690	3	504	31,250
Apr.	108	34	59	3,534
May	83	27	36	2,250
June	2090	95	436	26,138
July	193	83	114	7,074
Aug.	193	42	77	4,638
Sept.	72	34	42	2,530
Oct.	896	34	118	7,346
Nov.	95	11	41	2,458
Dec.	7	0	1.2	74
Total	..	..	..	157,182

Year 1942

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	470	0	52	2,884
Mar.	295	0	47	2,906
Apr.	103	2	14	866
May	4	1	1.8	110
June	21	2	5	280
July	24500	29	1466	90,904
Aug.	220	38	94	5,814
Sept.	120	14	42	2,516
Oct.	3770	14	529	32,776
Nov.	950	79	250	14,994
Dec.	94	24	53	3,276
Total	..	..	..	157,326

Year 1943

Jan.	1220	43	267	16,568
Feb.	540	14	59	3,288
Mar.	11	4	9	580
Apr.	33	7	12	694
May	94	7	18	1,118
June	305	17	62	3,734
July	94	33	44	2,710
Aug.	570	66	184	11,406
Sept.	1030	66	183	10,992
Oct.	630	54	156	9,376
Nov.	1530	33	147	8,810
Dec.	1100	17	145	9,010
Total	..	..	..	78,286

Year 1944

Jan.	1300	54	268	16,598
Feb.	1250	15	101	5,850
Mar.	10	3	6	388
Apr.	15	3	7	412
May	880	6	82	5,050
June	54	24	30	1,826
July	720	24	144	8,916
Aug.	9250	33	662	41,016
Sept.	280	54	116	6,966
Oct.	54	15	30	1,876
Nov.	10	0	4	242
Dec.	6	0	1	52
Total	..	..	..	89,192

PEEL RIVER AT TAMWORTH

Year 1945

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1000	0	43	2,670
Feb.	1330	0	115	6,440
Mar.	260	0	27	1,670
Apr.	88	0	7	448
May	169	0	22	1,374
June	15300	6	706	42,362
July	1050	77	220	13,630
Aug.	3050	101	456	28,262
Sept.	2500	88	331	19,834
Oct.	151	22	62	3,872
Nov.	241	13	58	3,458
Dec.	385	13	41	2,522
Total	..	..	..	126,542

Year 1946

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	260	0	23	1,410
Feb.	320	0	19	1,036
Mar.	1	0	0.2	14
Apr.	13	0	1.7	104
May	13	0	4	252
June	59	6	13	760
July	101	6	24	1,504
Aug.	6	0	1.6	104
Sept.	50	0	5	312
Oct.	3	0	0.2	10
Nov.	0	0	0	0
Dec.	460	0	20	1,250
Total	..	..	..	6,756

Year 1947

Jan.	470	0	20	1,220
Feb.	440	0	59	3,310
Mar.	410	0	46	2,876
Apr.	98	0	4	256
May	0	0	0	0
June	0	0	0	0
July	23	0	4	276
Aug.	410	1	79	4,928
Sept.	6520	38	324	19,438
Oct.	3200	51	427	26,504
Nov.	644	68	206	12,380
Dec.	8900	322	1794	111,248
Total	..	..	..	182,436

Year 1948

Jan.	18500	98	1003	62,160
Feb.	560	27	79	4,560
Mar.	3400	32	220	13,658
Apr.	68	27	35	2,100
May	246	32	64	3,988
June	1500	27	354	21,262
July	560	124	233	14,438
Aug.	2850	68	351	21,762
Sept.	2700	124	391	23,456
Oct.	300	42	120	7,420
Nov.	260	17	61	3,666
Dec.	340	6	46	2,880
Total	..	..	..	181,350

PEEL RIVER AT TAMWORTH

Year 1949

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1670	9	214	13,268
Feb.	1270	9	162	9,096
Mar.	151	17	66	4,122
Apr.	320	9	55	3,274
May	300	28	66	4,114
June	1090	42	528	31,664
July	5660	116	539	33,438
Aug.	945	116	376	23,320
Sept.	8900	320	1927	115,674
Oct.	2950	550	1155	71,610
Nov.	6300	260	902	54,134
Dec.	1090	151	524	32,502
Total	..	..	..	396,216

Year 1950

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	410	42	135	8,380
Feb.	520	22	135	7,576
Mar.	42	0	14	876
Apr.	7000	3	595	35,686
May	520	77	154	9,572
June	15300	133	2289	137,346
July	22200	875	2986	185,142
Aug.	4100	580	1159	71,844
Sept.	1232	340	496	29,774
Oct.	26500	700	3506	217,386
Nov.	19800	830	2331	139,852
Dec.	1420	292	579	35,880
Total	..	..	..	879,314

Year 1951

Jan.	648	240	288	17,842
Feb.	1180	174	285	15,976
Mar.	174	64	122	7,572
Apr.	136	98	105	6,302
May	117	98	99	6,152
June	5200	98	750	44,976
July	7000	349	843	52,286
Aug.	5730	410	1431	88,744
Sept.	636	265	380	22,802
Oct.	335	155	203	12,596
Nov.	155	29	86	5,154
Dec.	94	13	30	1,854
Total	..	..	..	282,256

Year 1952

Jan.	320	0.5	36	2,244
Feb.	190	0	23	1,335
Mar.	2060	4.2	265	16,454
Apr.	168	40	75	4,486
May	4800	49	697	43,238
June	20900	220	2563	153,752
July	3950	310	762	47,272
Aug.	21700	560	2610	161,792
Sept.	1140	250	517	31,016
Oct.	1970	320	596	36,960
Nov.	500	174	278	16,680
Dec.	300	49	112	6,968
Total	..	..	..	522,197

PEEL RIVER AT TAMWORTH

Year 1953

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	174	19	70	4,322
Feb.	650	13	99	5,516
Mar.	92	19	41	2,544
Apr.	38	13	20	1,174
May	1380	62	389	24,148
June	110	92	97	5,808
July	1800	92	236	14,612
Aug.	4400	76	701	43,460
Sept.				
Oct.				
Nov.				
Dec.				
Total	..	..	..	..

PEEL RIVER AT CARROLL GAP

LOCATION:	Latitude 30°57' Longitude 150°32'
PERIOD OF ESTABLISHMENT:	December 1923 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	45 years.
ZERO OF GAUGE:	Approximately 1,000 feet above mean sea level.
CATCHMENT AREA:	1,800 square miles.
CONTROL:	Gravel.
EQUIPMENT:	Manometer-Servo installed May 1966. Automatic Recorder (Float type) installed May 1952. Staff gauge, range 0 to 30 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 399
	(b) Maximum observation in cusecs : 18,100
	(c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	193,000 cusecs.
MEAN DAILY DISCHARGE FOR 45 YEARS:	360 cusecs.
MEAN ANNUAL DISCHARGE FOR 45 YEARS:	262,000 acre feet.

PEEL RIVER AT CARROL GAP

Year 1923

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	..	..	..	..
June	..	..	..	..
July	..	..	..	..
Aug.	..	..	..	..
Sept.	..	..	..	..
Oct.	..	..	..	..
Nov.	..	..	..	..
Dec.	425	1	64	3,602
Total	..	..	..	..

Year 1924

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	755	28	127	7,560
Feb.	7650	19	662	38,390
Mar.	147	48	89	5,494
Apr.	400	58	120	7,716
May	123	60	84	5,208
June	240	58	140	8,428
July	1230	48	348	21,558
Aug.	1080	102	210	13,044
Sept.	503	114	220	13,192
Oct.	1670	154	422	26,190
Nov.	18600	429	2139	129,710
Dec.	840	144	289	17,892
Total	..	..	..	294,382

Year 1925

Jan.	151	59	89	5,512
Feb.	349	40	69	3,884
Mar.	90	44	64	3,962
Apr.	51	20	32	1,896
May	67	20	37	2,314
June	63	20	29	1,722
July	349	26	105	6,494
Aug.	605	59	131	8,116
Sept.	125	40	74	4,450
Oct.	48	14	29	1,802
Nov.	1850	14	273	16,358
Dec.	371	32	98	6,090
Total	..	..	..	62,600

Year 1926

Jan.	1790	9	210	12,992
Feb.	144	0	23	1,262
Mar.	219	0	25	1,538
Apr.	495	20	74	4,466
May	2090	48	228	14,166
June	1080	128	332	19,940
July	1092	116	261	16,166
Aug.	223	116	153	9,514
Sept.	425	73	134	8,024
Oct.	570	48	118	7,306
Nov.	51	9	22	1,330
Dec.	2960	0	169	10,454
Total	..	..	..	107,158

PEEL RIVER AT CARROL GAP

Year 1927

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	3420	24	265	16,450
Feb.	180	4	37	2,086
Mar.	40	0	12	742
Apr.	262	9	48	2,872
May	38	16	24	1,486
June	44	14	23	1,396
July	29	18	23	1,416
Aug.	29	9	18	1,134
Sept.	17	2	7	442
Oct.	23	0	7	442
Nov.	180	0	13	774
Dec.	930	4	110	6,802
Total	..	..	..	36,042

Year 1928

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	138	1	21	1,280
Feb.	24000	11	1274	81,892
Mar.	7420	9	472	29,266
Apr.	1080	84	246	14,762
May	71	26	46	2,836
June	6080	23	721	43,274
July	3420	188	952	59,048
Aug.	930	130	301	18,632
Sept.	162	55	105	6,286
Oct.	115	19	52	3,216
Nov.	130	9	34	2,050
Dec.	30	4	9	534
Total	..	..	..	263,076

Year 1929

Jan.	1450	0	90	5,578
Feb.	2900	0	497	27,844
Mar.	71	8	31	1,906
Apr.	820	18	124	7,456
May	27	13	18	1,096
June	42	13	26	1,580
July	27	18	21	1,320
Aug.	1620	21	155	9,632
Sept.	5530	36	320	19,180
Oct.	162	42	77	4,760
Nov.	71	24	31	1,856
Dec.	24	1	7	420
Total	..	..	..	82,628

Year 1930

Jan.	2150	0	91	5,632
Feb.	66	2	7	408
Mar.	1620	0.5	119	7,388
Apr.	85	1	10	620
May	6	2	3	198
June	9570	6	617	36,986
July	2900	134	598	37,060
Aug.	730	134	342	21,208
Sept.	397	96	166	9,960
Oct.	1450	96	359	22,236
Nov.	510	66	166	9,954
Dec.	66	14	26	1,640
Total	..	..	..	153,290

PEEL RIVER AT CARROL GAP

Year 1931

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	108	10	26	1,648
Feb.	96	0	11	642
Mar.	252	1	37	2,304
Apr.	820	30	210	12,602
May	6980	58	606	37,562
June	20800	322	2278	136,696
July	12500	452	2052	127,234
Aug.	690	186	362	22,474
Sept.	397	108	174	10,440
Oct.	322	85	125	7,770
Nov.	650	54	156	9,352
Dec.	2090	50	290	17,960
Total	..	..	..	386,684

Year 1932

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	108	19	50	3,096
Feb.	50	8	22	1,312
Mar.	28	8	11	688
Apr.	58	18	27	1,628
May	28	11	19	1,186
June	41	23	30	1,810
July	397	25	147	9,126
Aug.	132	28	49	3,016
Sept.	1560	148	453	27,172
Oct.	219	84	149	9,212
Nov.	132	49	91	5,466
Dec.	79	14	34	2,106
Total	..	..	..	65,818

Year 1933

Jan.	6670	3	501	31,060
Feb.	298	14	140	7,842
Mar.	34	3	8	522
Apr.	41	8	13	784
May	11	3	9	542
June	510	11	58	3,460
July	3350	41	501	31,082
Aug.	1450	117	316	19,568
Sept.	1620	117	448	26,876
Oct.	13600	189	1555	96,382
Nov.	2900	371	1013	60,804
Dec.	4550	138	976	60,516
Total	..	..	..	339,438

Year 1934

Jan.	397	63	134	8,330
Feb.	3690	80	709	39,700
Mar.	424	90	159	9,870
Apr.	230	71	93	5,586
May	71	55	66	4,082
June	138	63	78	4,652
July	4110	90	299	18,508
Aug.	1620	189	574	35,564
Sept.	18600	315	1904	114,220
Oct.	15800	235	1520	94,040
Nov.	610	200	362	21,750
Dec.	790	200	295	18,320
Total	..	..	..	374,622

PEEL RIVER AT CARROL GAP

Year 1935

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	13600	200	1145	71,000
Feb.	355	93	156	8,744
Mar.	106	58	82	5,074
Apr.	106	48	68	4,090
May	69	48	59	3,650
June	58	40	51	3,064
July	235	40	84	5,190
Aug.	150	48	68	4,210
Sept.	830	40	104	6,224
Oct.	1790	48	256	15,846
Nov.	150	40	73	4,366
Dec.	215	4	53	3,292
Total	..	..	..	134,750

Year 1936

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	475	26	56	3,464
Feb.	40	20	27	1,594
Mar.	2870	40	301	18,650
Apr.	103	27	58	3,500
May	34	18	24	1,466
June	148	21	41	2,428
July	1560	68	417	25,868
Aug.	12500	117	820	50,838
Sept.	1400	90	358	21,472
Oct.	90	41	61	3,768
Nov.	1400	27	90	5,430
Dec.	132	21	50	3,128
Total	..	..	..	141,606

Year 1937

Jan.	165	11	31	1,912
Feb.	174	21	57	3,212
Mar.	203	11	67	4,162
Apr.	34	11	20	1,188
May	37	16	24	1,486
June	395	11	69	4,128
July	870	35	112	6,914
Aug.	3350	58	319	19,796
Sept.	1090	85	240	14,416
Oct.	255	35	91	5,670
Nov.	395	35	103	6,194
Dec.	5530	19	309	19,144
Total	..	..	..	88,222

Year 1938

Jan.	162	8	21	1,308
Feb.	395	19	102	5,688
Mar.	58	3	12	718
Apr.	35	1	8	458
May	235	3	22	1,368
June	345	13	47	2,934
July	145	19	62	3,822
Aug.	5100	158	993	61,562
Sept.	450	66	159	9,552
Oct.	272	31	81	4,996
Nov.	252	19	87	5,208
Dec.	94	1	12	732
Total	..	..	..	98,346

PEEL RIVER AT CARROL GAP

Year 1939

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	23	1	3	168
Feb.	6	0	1	76
Mar.	2900	0	203	12,562
Apr.	109	6	16	948
May	13	8	10	612
June	23	10	14	840
July	400	23	99	6,134
Aug.	1140	31	209	12,954
Sept.	141	16	50	2,970
Oct.	313	16	60	3,722
Nov.	670	16	85	5,080
Dec.	480	1	75	4,642
Total	..	..	..	50,708

Year 1940

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	2150	0	107	6,634
Feb.	4330	0	155	7,344
Mar.	10	0	1	80
Apr.	2150	0	139	8,338
May	10	3	8	504
June	10	3	7	438
July	10	6	8	516
Aug.	10	1	4	270
Sept.	94	0	3	150
Oct.	195	0	9	548
Nov.	8000	0	571	14,110
Dec.	17300	6	625	38,738
Total	..	..	..	77,670

Year 1941

Jan.	18000	94	2100	127,780
Feb.	570	31	106	5,922
Mar.	19500	53	1393	86,358
Apr.	162	35	81	4,884
May	275	19	63	3,908
June	1910	114	365	21,874
July	216	99	140	8,686
Aug.	235	58	90	5,398
Sept.	99	19	48	2,858
Oct.	910	8	126	7,832
Nov.	114	16	51	3,086
Dec.	13	1	6	358
Total	..	..	..	278,944

Year 1942

Jan.	1	0	0.5	31
Feb.	300	0	48	2,706
Mar.	377	1	54	3,364
Apr.	125	3	22	1,308
May	53	3	9	545
June	16	10	11	660
July	24700	10	1730	107,278
Aug.	252	73	140	8,426
Sept.	141	53	84	5,052
Oct.	1790	53	358	22,186
Nov.	2830	150	414	24,824
Dec.	141	41	96	5,928
Total	..	..	..	182,308

PEEL RIVER AT CARROL GAP

Year 1943

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	2770	80	706	43,746
Feb.	425	13	99	5,564
Mar.	13	2	6	364
Apr.	53	1	14	828
May	252	6	59	3,664
June	313	31	84	5,066
July	101	31	57	3,556
Aug.	750	87	223	13,824
Sept.	870	109	191	11,456
Oct.	445	87	175	10,824
Nov.	1450	36	144	8,634
Dec.	1140	15	188	11,650
Total	..	..	..	119,176

Year 1944

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1670	75	411	25,490
Feb.	1500	15	153	8,850
Mar.	18	4	11	656
Apr.	21	3	8	502
May	750	3	56	3,452
June	75	12	32	1,900
July	1290	15	168	10,436
Aug.	12500	36	747	46,284
Sept.	280	75	137	8,186
Oct.	75	24	40	2,500
Nov.	21	6	12	720
Dec.	161	3	8	502
Total	..	..	..	109,478

Year 1945

Jan.	710	3	46	2,870
Feb.	3830	6	284	15,934
Mar.	280	4	51	3,172
Apr.	36	4	10	618
May	114	3	20	1,230
June	11400	10	621	37,284
July	1290	87	266	16,468
Aug.	2150	161	497	30,820
Sept.	3620	81	373	22,368
Oct.	216	35	72	4,472
Nov.	216	10	65	3,886
Dec.	420	19	69	4,282
Total	..	..	..	143,404

Year 1946

Jan.	255	6	21	1,330
Feb.	450	2	32	1,812
Mar.	19	1	4	220
Apr.	23	1.5	8	465
May	23	4	11	674
June	145	13	25	1,528
July	85	13	29	1,782
Aug.	13	4	9	556
Sept.	85	8	13	786
Oct.	11	2	6	369
Nov.	640	1	19	1,156
Dec.	570	2	32	1,992
Total	..	..	..	12,670

PEEL RIVER AT CARROL GAP

Year 1947

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	12500	0	398	24,686
Feb.	11400	13	807	45,122
Mar.	4550	46	259	16,046
Apr.	85	6	22	1,324
May	8	4	6	368
June	8	4	6	376
July	26	4	9	572
Aug.	540	6	107	6,658
Sept.	8000	85	540	32,374
Oct.	4400	97	626	38,836
Nov.	750	85	260	15,592
Dec.	13000	145	2310	143,230
Total	..	..	..	325,184

Year 1948

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	15000	139	1095	67,906
Feb.	770	61	129	7,464
Mar.	4960	47	321	19,954
Apr.	320	36	87	5,196
May	203	54	100	6,204
June	2950	48	410	24,614
July	1790	87	462	28,656
Aug.	4300	42	334	20,688
Sept.	2430	132	360	21,580
Oct.	270	65	131	8,108
Nov.	65	28	48	2,850
Dec.	345	23	48	2,998
Total	..	..	..	216,218

Year 1949

Jan.	1550	36	190	11,758
Feb.	1900	69	305	17,084
Mar.	132	42	72	4,484
Apr.	1430	26	122	7,328
May	185	36	65	4,050
June	2950	61	474	28,450
July	3300	78	418	25,926
Aug.	3010	168	502	31,112
Sept.	18800	345	2965	177,924
Oct.	7200	430	1401	86,860
Nov.	12100	295	992	59,504
Dec.	870	320	458	28,412
Total	..	..	..	482,892

Year 1950

Jan.	320	107	169	10,462
Feb.	1550	82	291	16,316
Mar.	97	51	67	4,178
Apr.	9100	51	945	56,672
May	540	125	239	14,826
June	14300	176	1970	118,196
July	26800	1030	3301	204,670
Aug.	3250	540	1269	78,660
Sept.	1250	358	586	35,142
Oct.	24300	357	3924	243,310
Nov.	26800	1030	5167	310,000
Dec.	3130	750	1280	79,290
Total	..	..	..	1,171,722

PEEL RIVER AT CARROL GAP

Year 1951

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1430	320	642	39,820
Feb.	870	221	402	22,492
Mar.	221	132	169	10,494
Apr.	160	119	132	7,906
May	132	113	124	7,698
June	1490	126	654	39,226
July	10000	370	1115	69,136
Aug.	6920	410	1458	90,364
Sept.	691	295	412	24,732
Oct.	284	156	215	13,310
Nov.	156	52	100	5,982
Dec.	95	36	52	3,230
Total	..	..	..	334,390

Year 1952

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	102	24	35	2,180
Feb.	202	12	31	1,804
Mar.	2160	33	232	14,364
Apr.	240	85	130	7,772
May	4410	61	542	33,612
June	No Records			157,000*
July	No Records			68,000*
Aug.	26900	500	3369	208,870
Sept.	1200	313	543	32,562
Oct.	3570	366	695	43,088
Nov.	424	154	249	14,942
Dec.	646	83	135	8,380
Total	..	..	..	592,574*

Year 1953

Jan.	275	76	108	6,680
Feb.	No Records			6,950*
Mar.	No Records			3,200*
Apr.	No Records			1,300*
May	No Records			28,000*
June	No Records			7,350*
July	No Records			17,000*
Aug.	No Records			60,000*
Sept.	810	120	302	18,134
Oct.	136	88	118	7,288
Nov.	161	46	84	5,038
Dec.	54	9	28	1,740
Total	..	..	..	162,680*

Year 1954

Jan.	104	26	42	2,632
Feb.	932	29	104	5,830
Mar.	97	9	42	2,584
Apr.	8	4	5	296
May	16	4	6	382
June	127	15	41	2,458
July	87	24	51	3,178
Aug.	92	42	62	3,816
Sept.	80	15	37	2,242
Oct.	9000	22	774	48,000
Nov.	8710	181	1232	73,926
Dec.	2500	92	174	10,786
Total	..	..	..	156,130

* Estimated.

PEEL RIVER AT CARROL GAP

Year 1955

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	575	12	88	5,464
Feb.	193000	57	11520	645,120
Mar.	16500	239	1071	66,400
Apr.	239	95	164	9,834
May	291	136	176	10,934
June	3600	151	421	25,252
July	1705	200	488	30,280
Aug.	5330	369	1074	64,978
Sept.	2860	291	628	37,707
Oct.	51000	252	3707	229,816
Nov.	1960	402	792	47,510
Dec.	587	226	358	22,174
Total	..	..	..	1,195,469

Year 1956

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1060	115	210	13,048
Feb.	82000	151	4443	257,686
Mar.	4750	421	983	60,958
Apr.	925	265	395	23,708
May	22000	300	6330	196,234
June	23100	850	2433	145,988
July	12400	1060	3040	188,600
Aug.	7790	619	1480	91,850
Sept.	671	424	522	31,332
Oct.	6500	388	815	50,518
Nov.	1325	215	429	25,766
Dec.	1350	159	334	20,678
Total	..	..	..	1,106,366

Year 1957

Jan.	540	106	188	11,664
Feb.	804	84	130	7,258
Mar.	765	91	163	10,094
Apr.	1480	77	159	9,552
May	137	84	98	6,086
June	192	77	100	5,992
July	353	106	180	11,176
Aug.	1670	91	203	12,608
Sept.	284	77	128	7,668
Oct.	77	23	43	2,658
Nov.	26	17	20	1,208
Dec.	284	17	24	1,504
Total	..	..	..	87,468

Year 1958

Jan.	50	20	24	1,474
Feb.	653	20	76	4,266
Mar.	31	15	19	1,180
Apr.	15	12	14	810
May	263	13	37	2,272
June	46	29	34	2,032
July	910	59	144	8,906
Aug.	2440	51	247	15,296
Sept.	6310	191	797	47,846
Oct.	15300	292	1231	76,334
Nov.	269	82	142	8,510
Dec.	6570	69	473	29,302
Total	..	..	..	198,228

PEEL RIVER AT CARROL GAP

Year 1959

Month	Discharge in Cusecs			Discharge For Month Acre Feet
	Max.	Min.	Mean	
Jan.	1550	90	239	14,790
Feb.	7140	56	407	22,816
Mar.	3860	126	371	23,016
Apr.	340	82	144	8,634
May	202	62	90	5,568
June	340	75	95	5,676
July	1425	75	260	16,114
Aug.	390	90	160	9,940
Sept.	1700	82	177	10,608
Oct.	640	107	232	14,378
Nov.	1350	137	356	21,344
Dec.	1990	77	265	16,442
Total	..	..	..	169,326

Year 1960

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	137	32	68	4,238
Feb.	74	21	35	2,006
Mar.	21	10	14	846
Apr.	203	7	25	1,518
May	139	32	72	4,486
June	85	46	60	3,604
July	4980	78	680	42,156
Aug.	5430	191	748	46,400
Sept.	4950	139	436	26,188
Oct.	545	129	252	15,626
Nov.	6410	71	496	29,736
Dec.	19500	181	1299	80,518
Total	..	..	..	257,322

Year 1961

Jan.	926	85	222	13,744
Feb.	181	58	86	4,844
Mar.	303	46	85	5,300
Apr.	71	37	52	3,124
May	71	39	50	3,116
June	71	39	52	3,094
July	245	41	73	4,522
Aug.	2410	71	299	18,518
Sept.	257	52	125	7,476
Oct.	396	25	97	5,986
Nov.	5330	37	592	35,528
Dec.	7210	111	364	22,542
Total	..	..	..	127,794

Year 1962

Jan.	60000	158	2591	160,638
Feb.	3480	280	757	42,400
Mar.	352	111	203	12,586
Apr.	472	102	172	10,336
May	1035	78	212	13,130
June	526	130	239	14,344
July	1100	102	192	11,934
Aug.	2110	120	484	29,984
Sept.	485	186	245	14,678
Oct.	8400	86	804	49,874
Nov.	1060	102	280	16,774
Dec.	636	78	126	7,792
Total	..	..	..	384,470

PEEL RIVER AT CARROL GAP

Year 1963

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	5430	120	503	31,180
Feb.	295	38	97	5,438
Mar.	380	17	67	4,140
Apr.	425	68	128	7,668
May	12600	130	1615	100,104
June	8850	470	1590	95,404
July	1780	440	714	44,292
Aug.	7010	320	1064	65,954
Sept.	4420	335	714	42,850
Oct.	788	197	323	20,024
Nov.	365	141	197	11,834
Dec.	518	78	189	11,728
Total	..	..	..	440,616

Year 1964

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	48300	34	1720	106,600
Feb.	180	53	98	5,686
Mar.	1510	53	189	11,702
Apr.	6980	44	487	29,260
May	910	138	281	17,422
June	1350	153	400	23,980
July	8055	220	1285	79,678
Aug.	4600	195	463	28,692
Sept.	1580	200	309	18,544
Oct.	6420	235	701	43,446
Nov.	400	130	200	12,020
Dec.	272	34	76	4,724
Total	..	..	..	381,754

Year 1965

Jan.	60	11	28	1,750
Feb.	14	8	11	598
Mar.	12	8	9.3	580
Apr.	12	4	8.5	510
May	11	8.5	10	612
June	16	7	12	712
July	42	14	17	1,080
Aug.	23	10	15	950
Sept.	50	7.5	21	1,240
Oct.	6	2	4	246
Nov.	23	0.2	1.5	89
Dec.	1580	3	127	7,860
Total	..	..	..	16,227

Year 1966

Jan.	9	0	1.6	99
Feb.	0.2	0	0.1	5
Mar.	0	0	0	0
Apr.	0	0	0	0
May	85	0	0.2	13
June	63	0.8	6.7	401
July	4.9	2.2	3.4	208
Aug.	219	1	29	1,770
Sept.	142	14	46	2,770
Oct.	465	17	84	5,180
Nov.	5620	46	498	29,900
Dec.	2125	23	110	6,840
Total	..	..	..	47,186

Appendix 15
Sheet 13

PEEL RIVER AT CARROL GAP

Year 1967

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1510	4	117	7,260
Feb.	4	0.5	1.3	74
Mar.	620	1.1	38	2,380
Apr.	3.5	0.7	1.9	117
May	3.5	0.4	2.1	127
June	120	4.5	26	1,580
July	120	13	49	3,050
Aug.	360	11	69	4,280
Sept.	345	10	64	3,830
Oct.	895	1.7	123	7,600
Nov.	56	0.1	13	778
Dec.	1.7	0	0.5	28
Total				31,104

Year 1968

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	31800	0	1612	99,900
Feb.	127	9	42	2,430
Mar.	112	3	16.9	1,050
Apr.	7	1.7	4.2	250
May	3205	1.7	218	13,500
June	285	60	99	5,960
July	6260	78	473	29,300
Aug.	13560	142	1814	112,000
Sept.	3700	255	756	45,300
Oct.	3700	127	415	25,800
Nov.	570	48	134	8,050
Dec.	195	32	60	3,730
Total				347,270

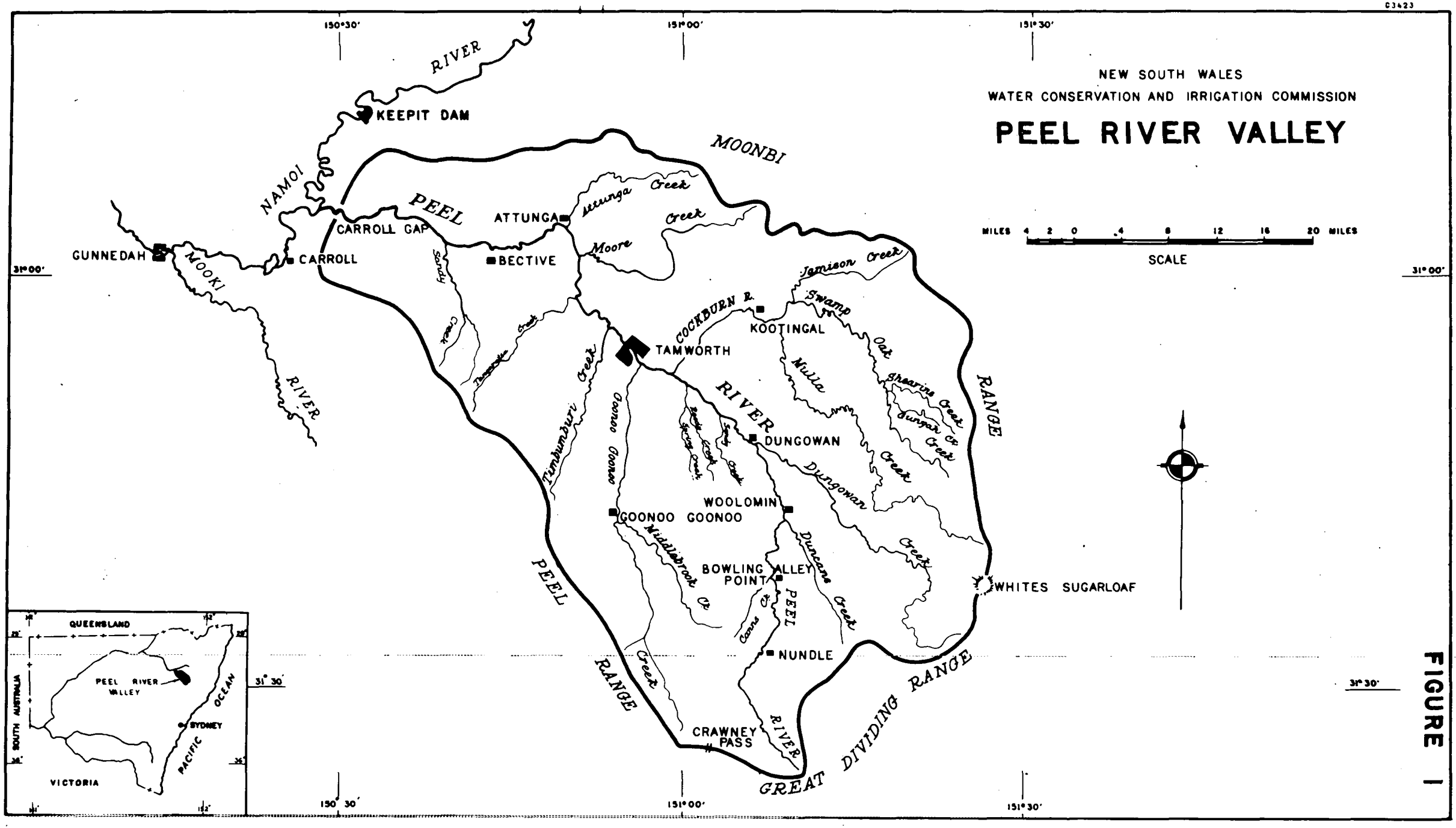
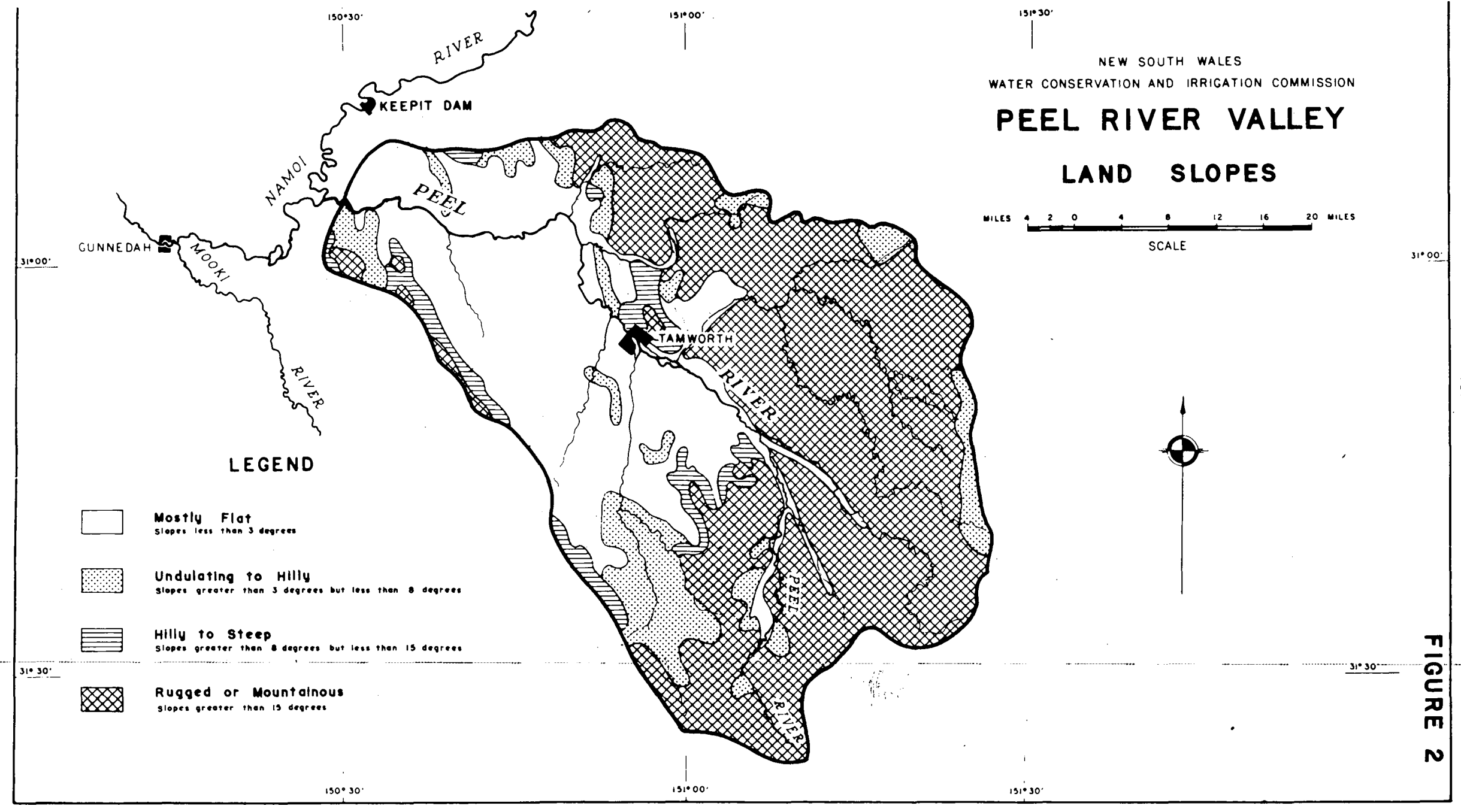

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
KEEPIT DAM
NAMOI RIVER
MOONBI
PEEL
ATTUNGA
Attunga Creek
Moore Creek
CARROLL GAP
GUNNEDAH
NOOKI RIVER
CARROLL
BECTIVE
Sandy Creek
Tangarooke Creek
Timbumburi Creek
Goonoo Goonoo Creek
COCKBURN R.
KOOTINGAL
Jamison Creek
Swamp Oak Creek
Nulla Nulla Creek
Spearins Creek
Dungar Creek
TAMWORTH
RIVER
DUNGOWAN
Dungowan Creek
WOOLOMIN
GOONOO GOONOO
Middlebrook Cr
Duncans Creek
BOWLING ALLEY POINT
Cains Cr
PEEL RIVER
NUNDLE
PEEL RANGE
Creek
CRAWNEY PASS
GREAT DIVIDING RANGE
RANGE
WHITES SUGARLOAF
QUEENSLAND
PEEL RIVER VALLEY
SOUTH AUSTRALIA
VICTORIA
SYDNEY
PACIFIC OCEAN

FIGURE 1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PEEL RIVER VALLEY
LAND SLOPES
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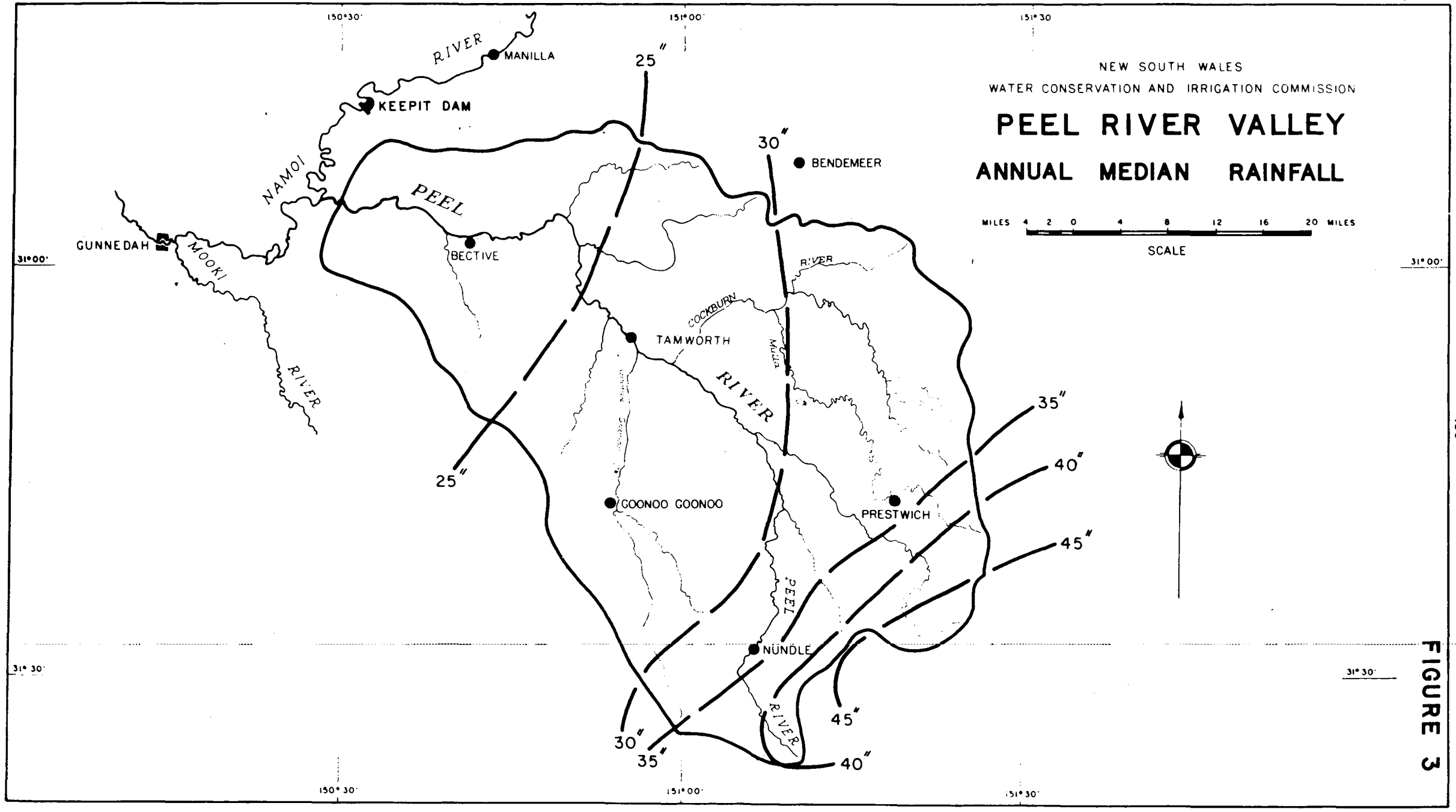
151°00'
151°30'
31°00'
31°30'
RIVER
KEEPIT DAM
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
TAMWORTH
RIVER
PEEL
RIVER
LEGEND
Mostly Flat
Slopes less than 3 degrees
Undulating to Hilly
Slopes greater than 3 degrees but less than 8 degrees
Hilly to Steep
Slopes greater than 8 degrees but less than 15 degrees
Rugged or Mountainous
Slopes greater than 15 degrees

FIGURE 2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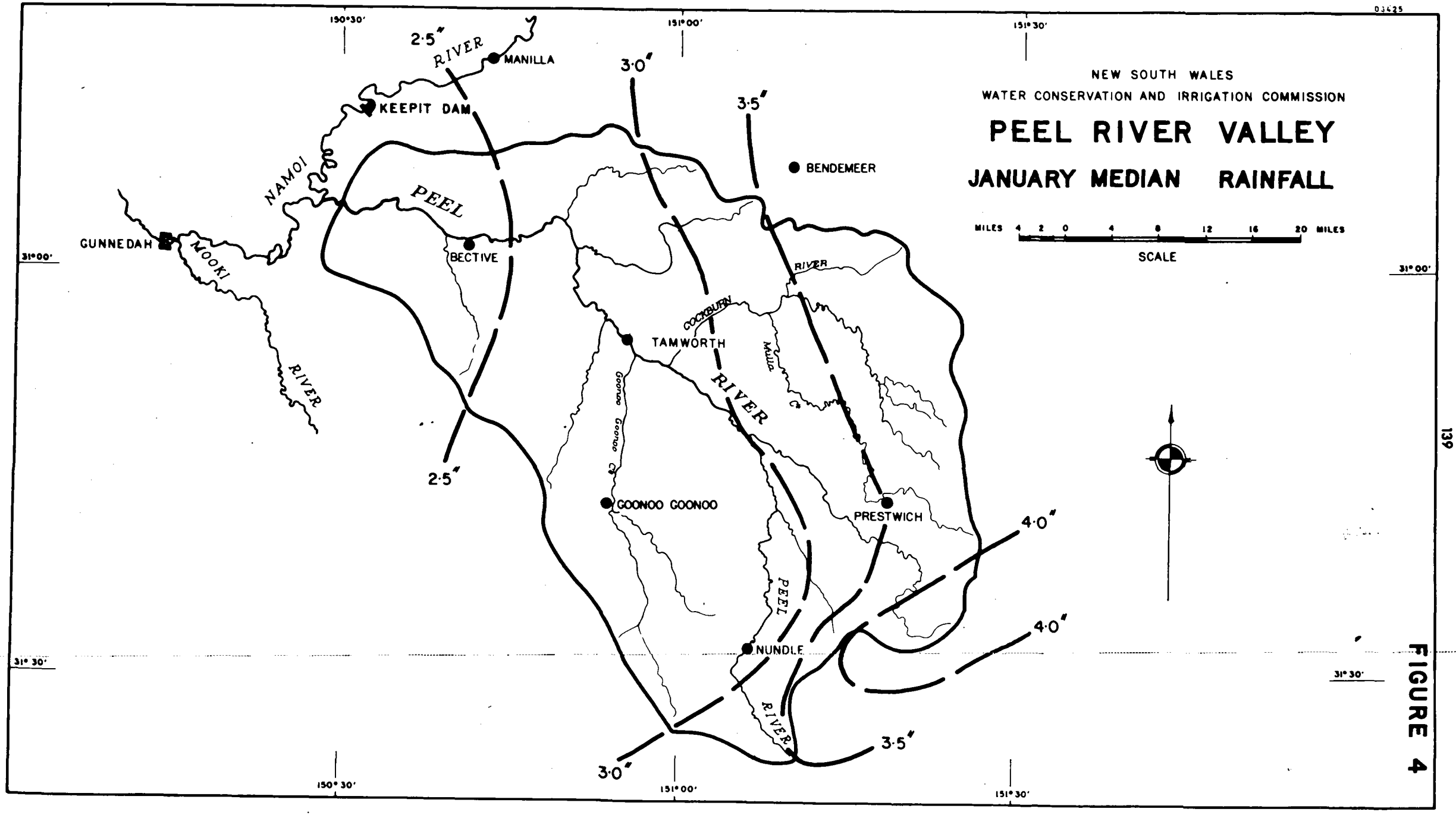
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
ANNUAL MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30
31°00'
31°30'
MANILLA
KEEPIT DAM
RIVER
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
RIVER
MUSWELLBROOK
RIVER
GOONOO GOONOO
PRESTWICH
NUNDLE
PEEL
RIVER
25"
30"
35"
40"
45"

FIGURE 3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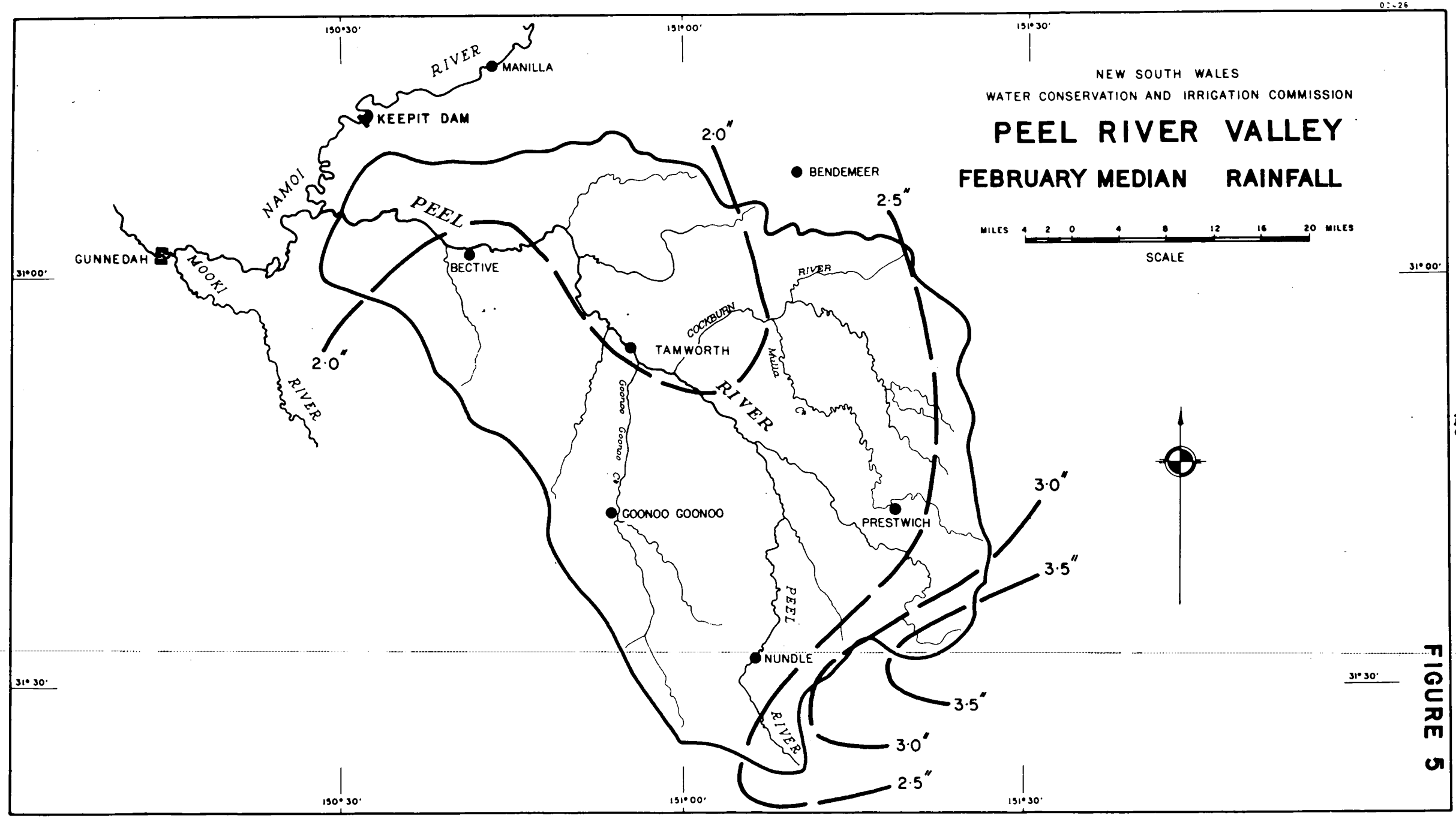
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
JANUARY MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
2·5"
3·0"
3·5"
4·0"
MANILLA
KEEPIT DAM
NAMOI
PEEL
RIVER
GUNNEDAH
MOOKI
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
Mulla C
Goonoo Goonoo C
GOONOO GOONOO
PRESTWICH
NUNDLE

FIGURE 4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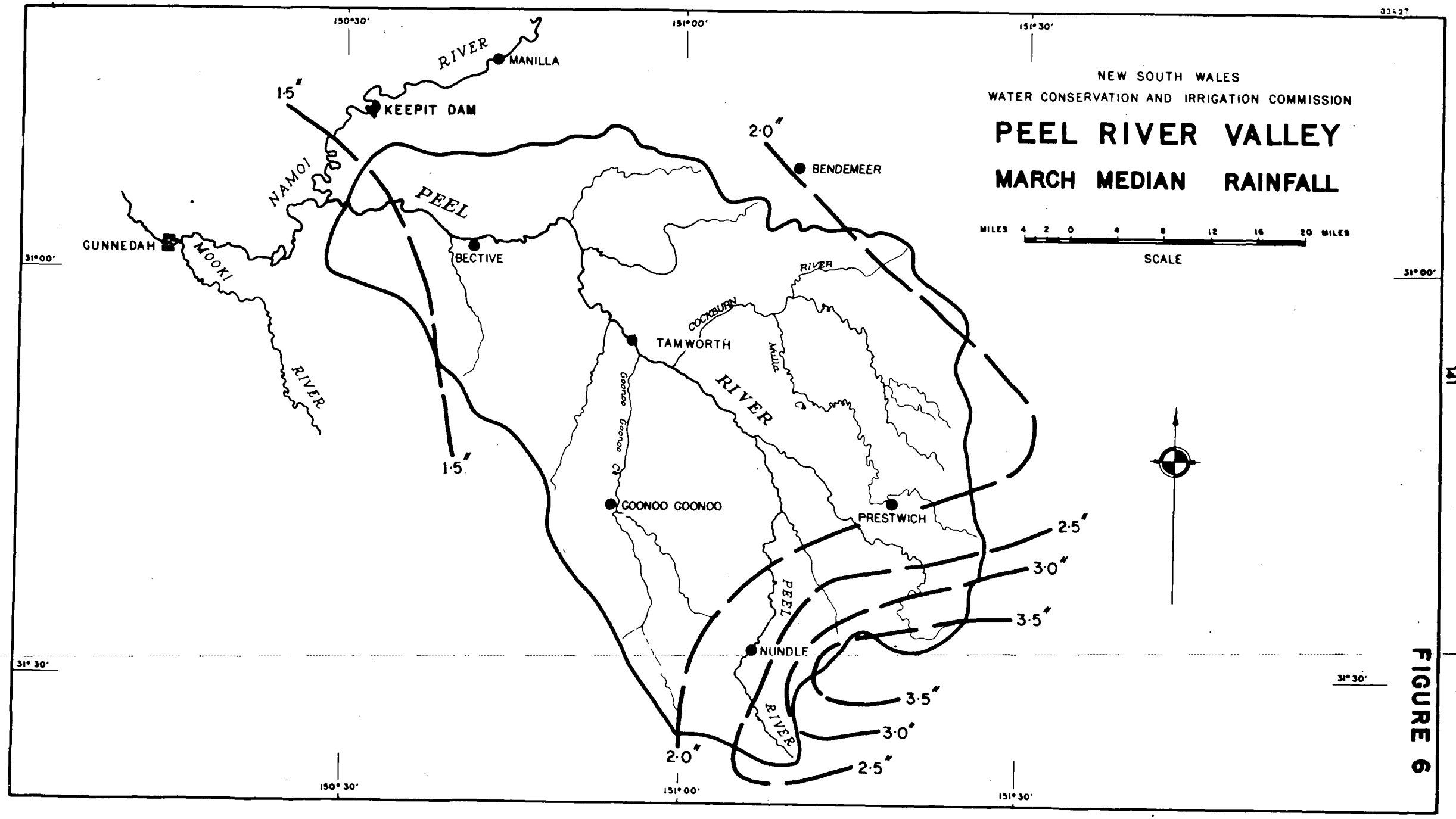
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
FEBRUARY MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
BENDEMEER
GUNNEDAH
MOOKI
BECTIVE
RIVER
COCKBURN
TAMWORTH
Mulla Cr
RIVER
Goonoo Goonoo Cr
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
2·0"
2·5"
3·0"
3·5"

FIGURE 5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WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
MARCH MEDIAN RAINFALL
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SCALE
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151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
RIVER
Mulla C
Goonoo Goonoo Cr
GOONOO GOONOO
PRESTWICH
NUNDLE
PEEL
RIVER
1·5″
1·5″
2·0″
2·0″
2·5″
3·0″
3·5″
3·5″
3·0″
2·5″

FIGURE 6

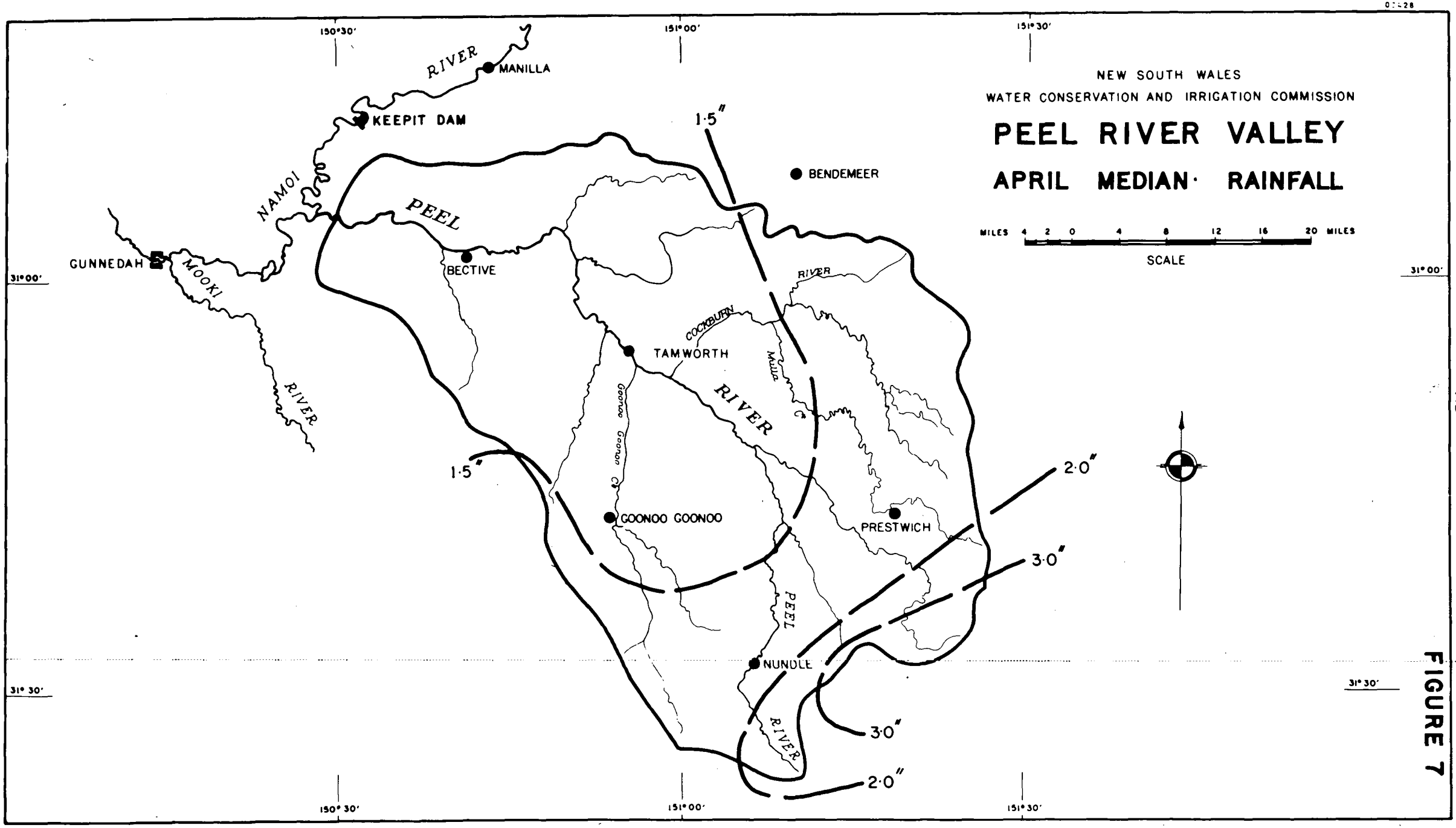

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
APRIL MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
BENDEMEER
GUNNEDAH
MOOKI
RIVER
BECTIVE
COCKBURN
TAMWORTH
RIVER
Mulla Cr
Goonoo Goonoo Cr
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
1·5"
2·0"
3·0"

FIGURE 7

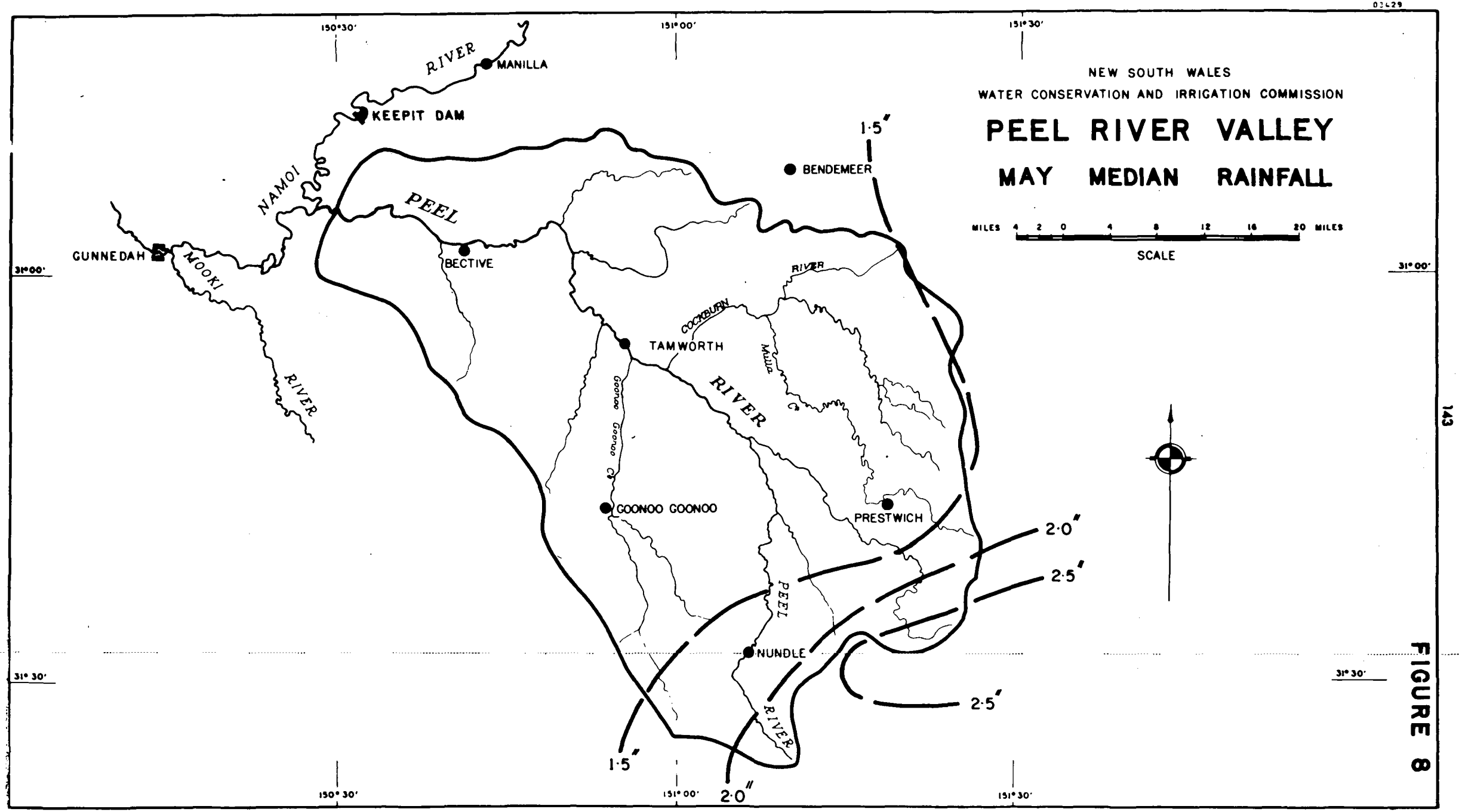
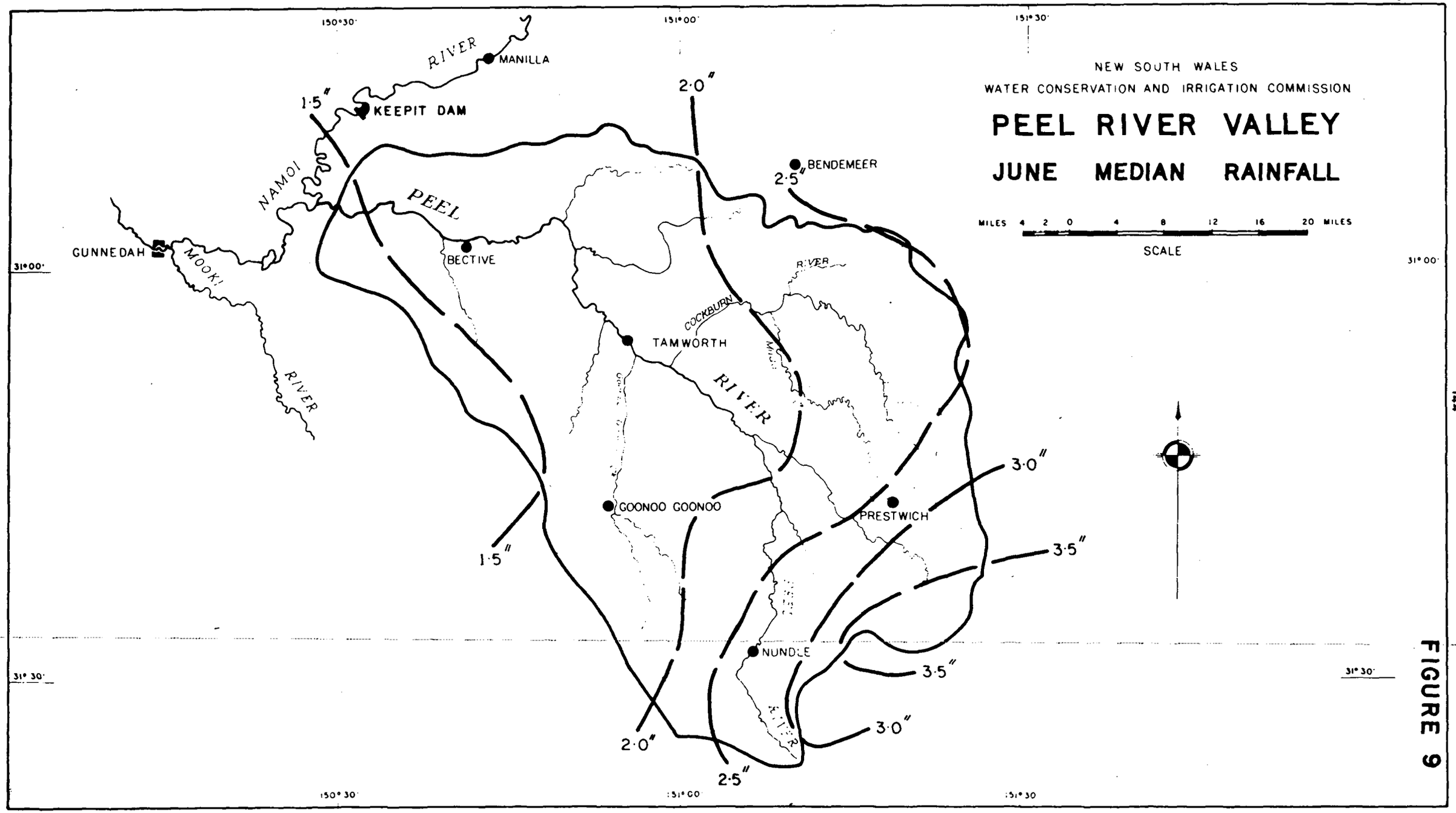

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
MAY MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
BENDEMEER
GUNNEDAH
MOOKI
RIVER
BECTIVE
COCKBURN
RIVER
TAMWORTH
Mulla Cr
Goonoo Goonoo Cr
RIVER
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
1·5"
2·0"
2·5"
2·5"
2·0"
1·5"

FIGURE 8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WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
JUNE MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
COCKBURN
RIVER
TAMWORTH
RIVER
GOONOO GOONOO
PRESTWICH
NUNDLE
1·5″
2·0″
2·5″
3·0″
3·5″

FIGURE 9

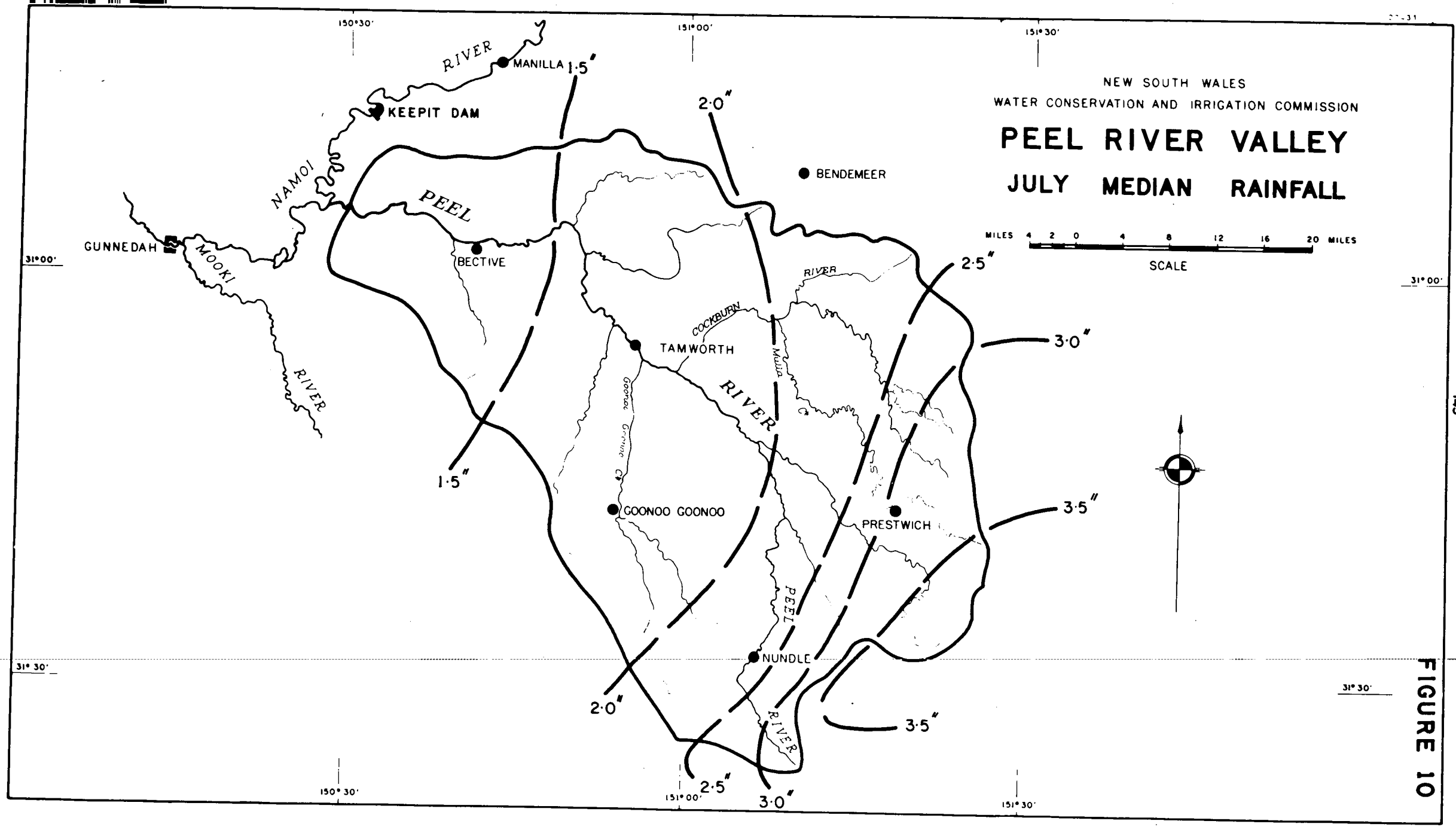

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
JULY MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
KEEPIT DAM
NAMOI
RIVER
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
COCKBURN
RIVER
TAMWORTH
Mulla Cr
Goonoo Goonoo Cr
RIVER
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
1·5"
2·0"
2·5"
3·0"
3·5"

FIGURE 10

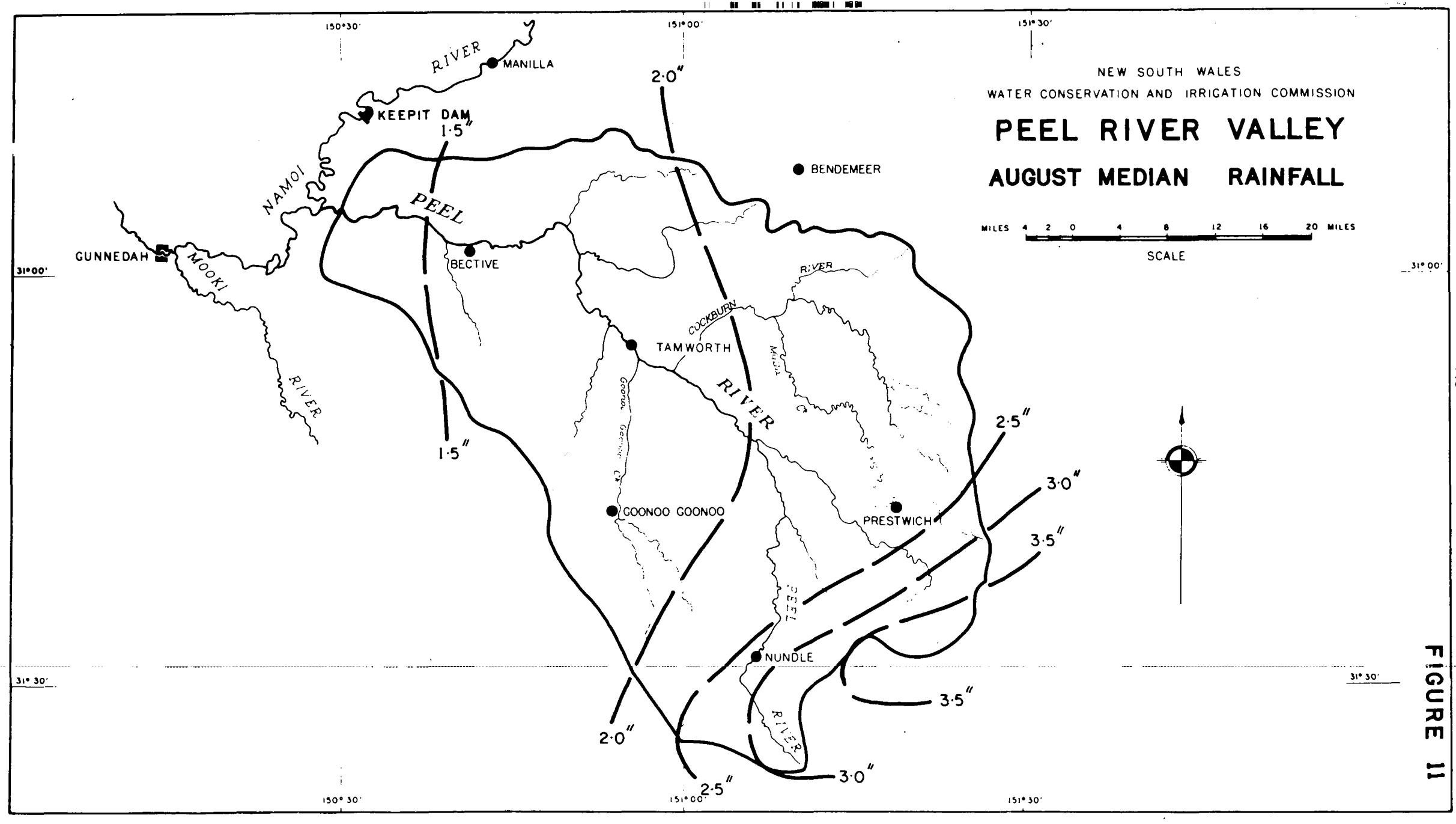
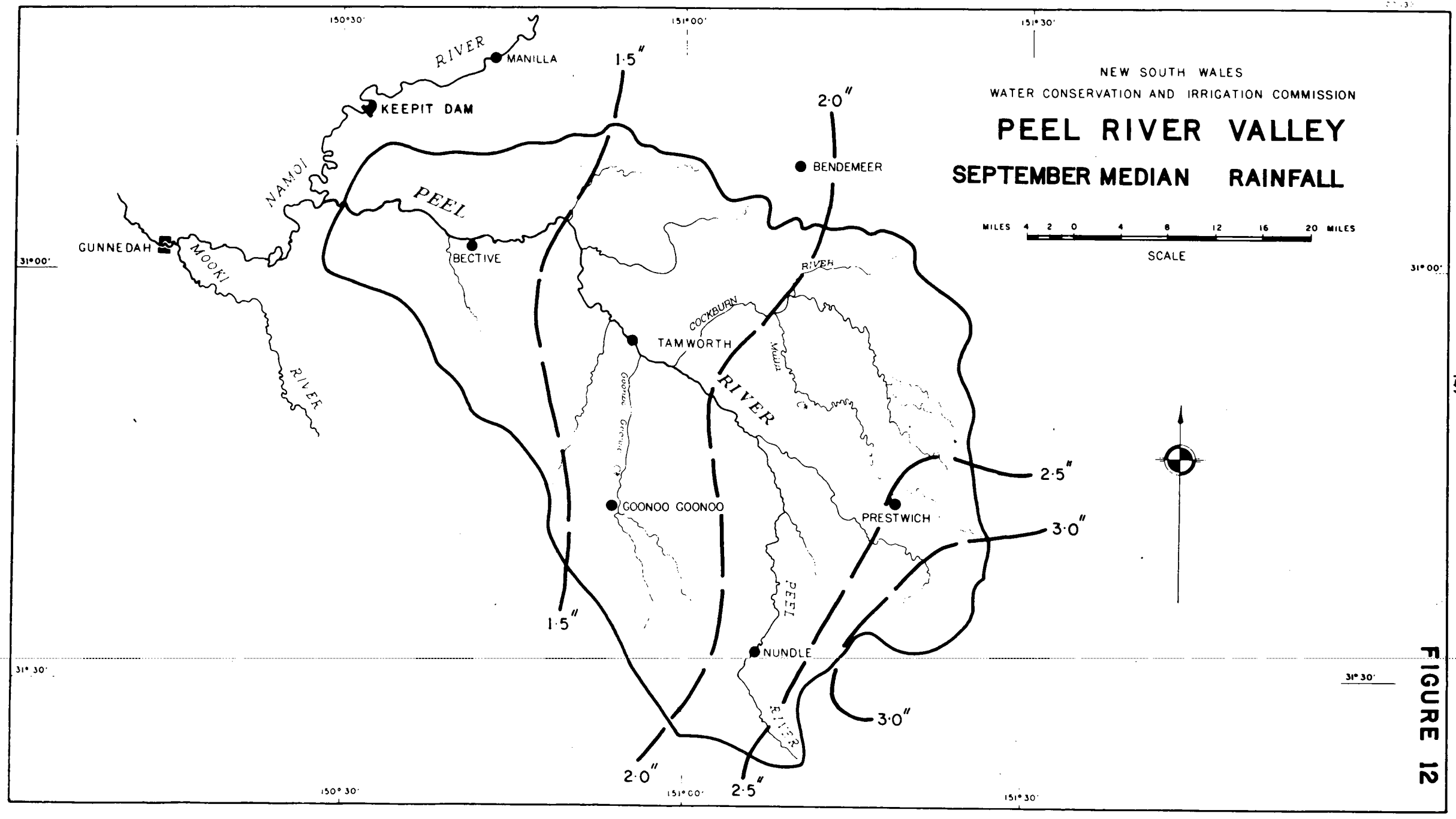

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
AUGUST MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
KEEPIT DAM
NAMOI
RIVER
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
RIVER
GOONOO GOONOO
PRESTWICH
NUNDLE
PEEL
RIVER
1·5″
1·5″
2·0″
2·0″
2·5″
2·5″
3·0″
3·0″
3·5″
3·5″

FIGURE 11


NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
SEPTEMBER MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
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151°00'
151°30'
31°00'
31°30'
MANILLA
KEEPIT DAM
NAMOI
RIVER
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
RIVER
COCKBURN
TAMWORTH
RIVER
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
1·5"
2·0"
2·5"
3·0"

FIGURE 12

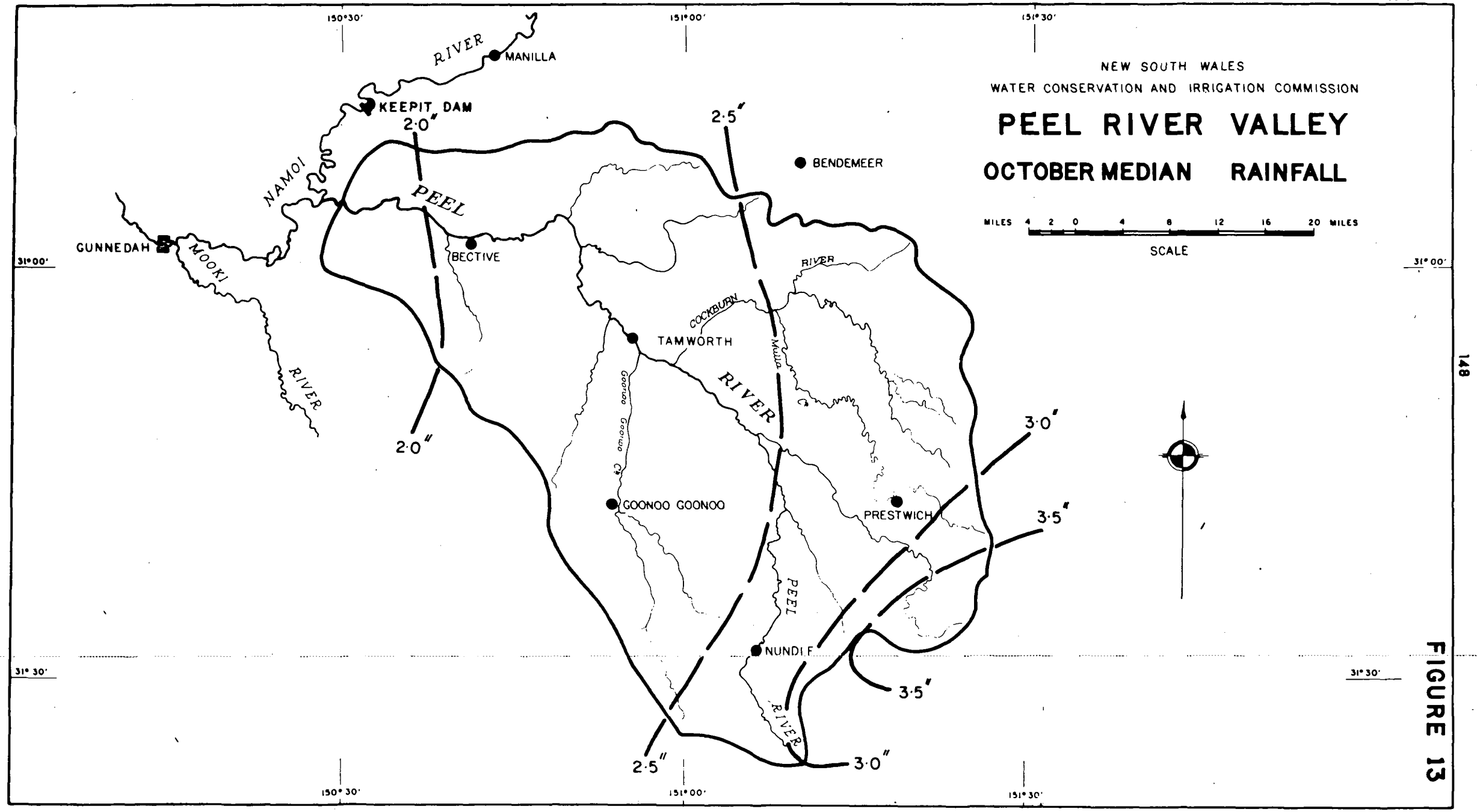

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
OCTOBER MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
RIVER
Mulla Cr
Goonoo Goonoo Cr
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
2·0"
2·0"
2·5"
2·5"
3·0"
3·0"
3·5"
3·5"

FIGURE 13

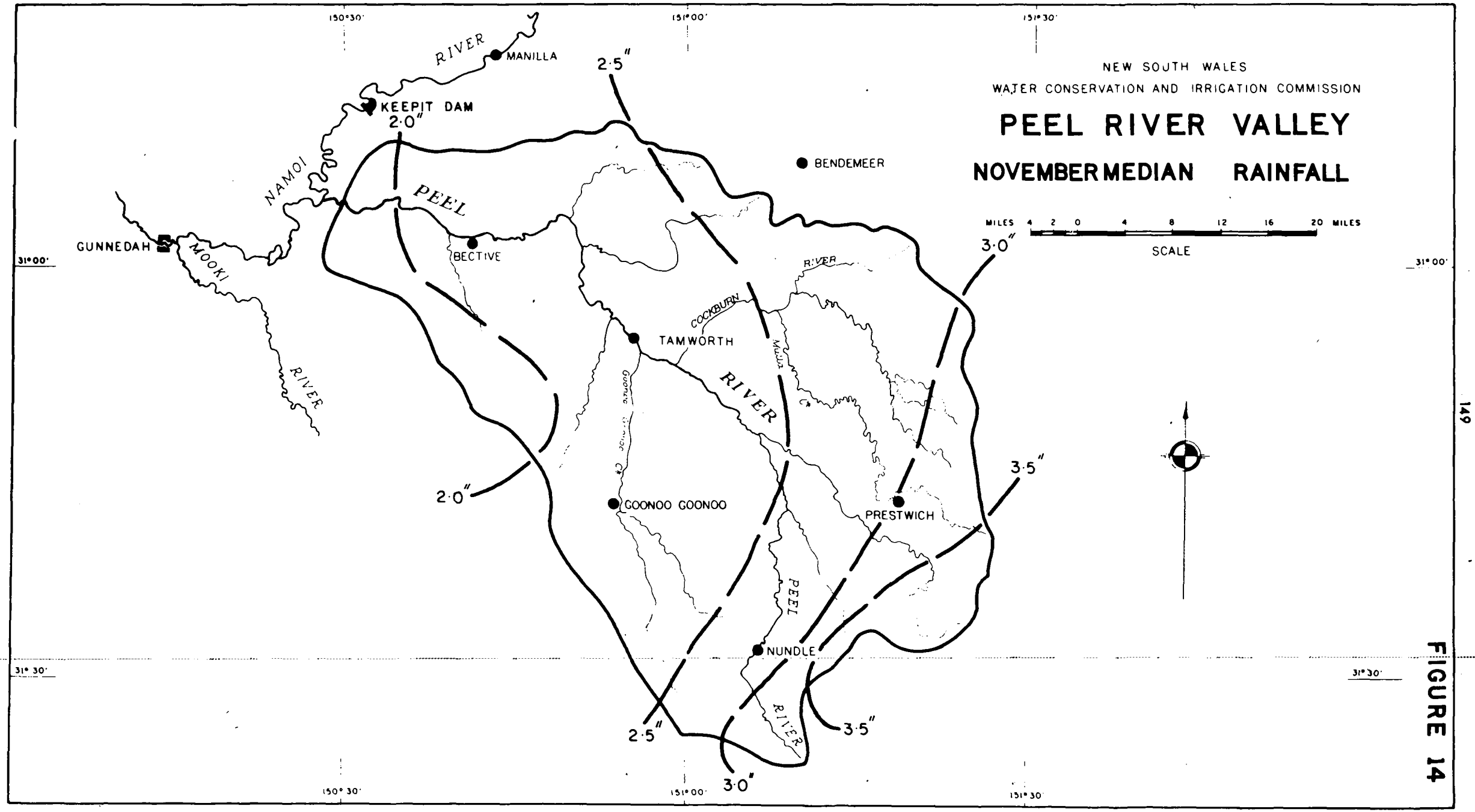

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
NOVEMBER MEDIAN RAINFALL
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
MANILLA
RIVER
KEEPIT DAM
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
BECTIVE
BENDEMEER
TAMWORTH
COCKBURN
RIVER
GOONOO GOONOO
PRESTWICH
PEEL
NUNDLE
RIVER
2·5"
2·0"
3·0"
3·5"
2·0"
2·5"
3·0"
3·5"

FIGURE 14

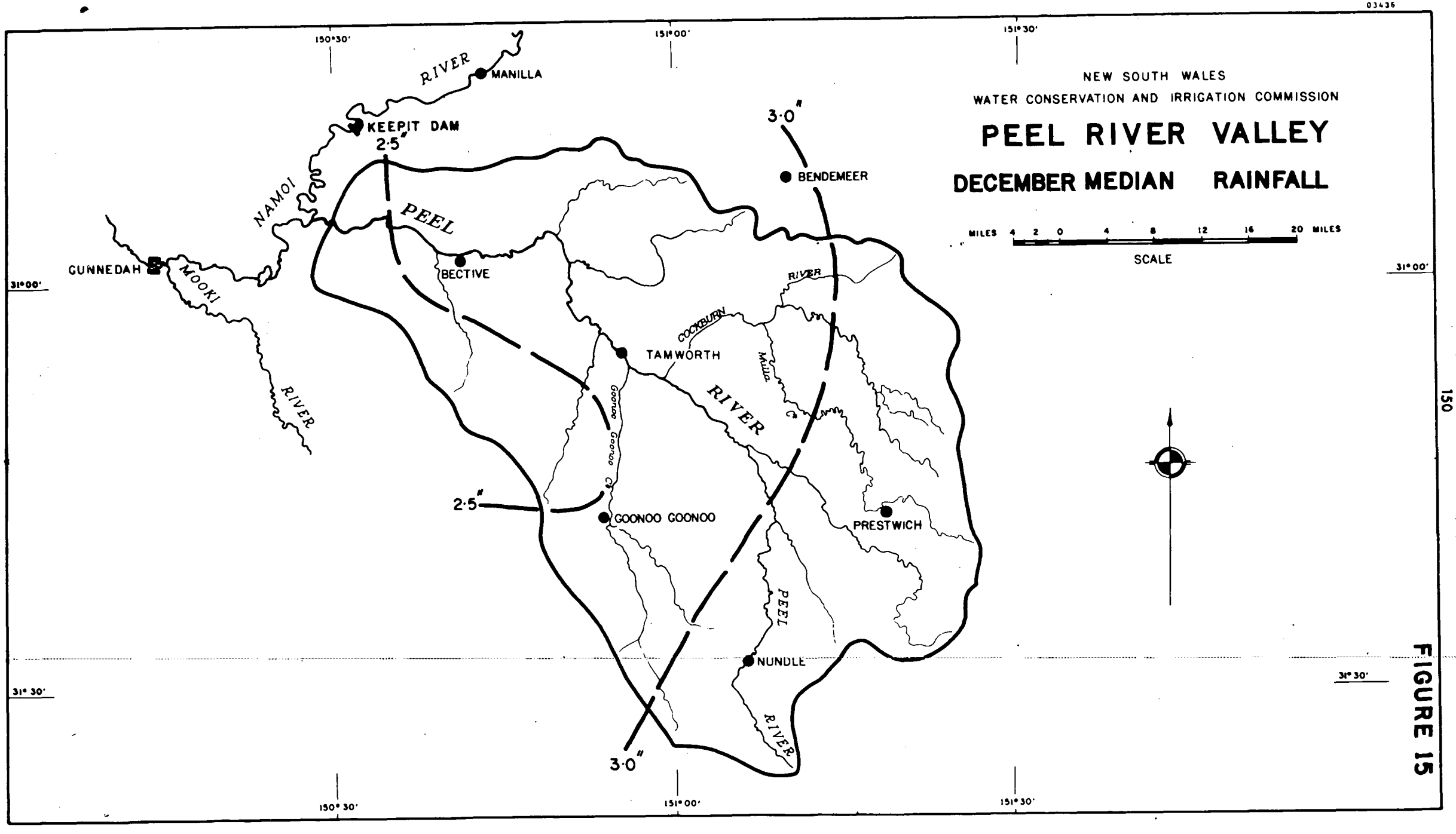


FIGURE 15

150

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION

PEEL RIVER VALLEY GEOLOGICAL FORMATIONS

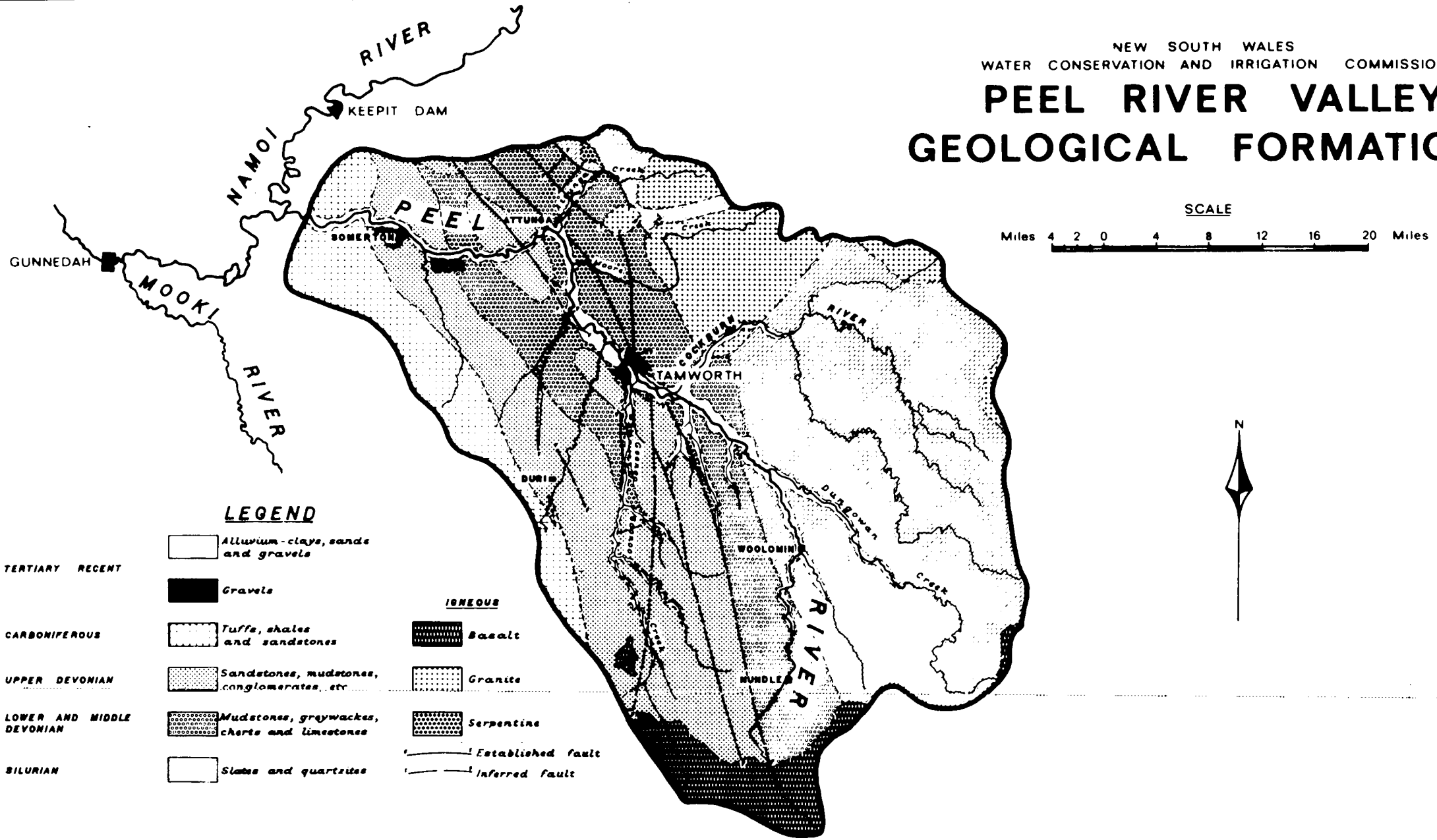


FIGURE 16

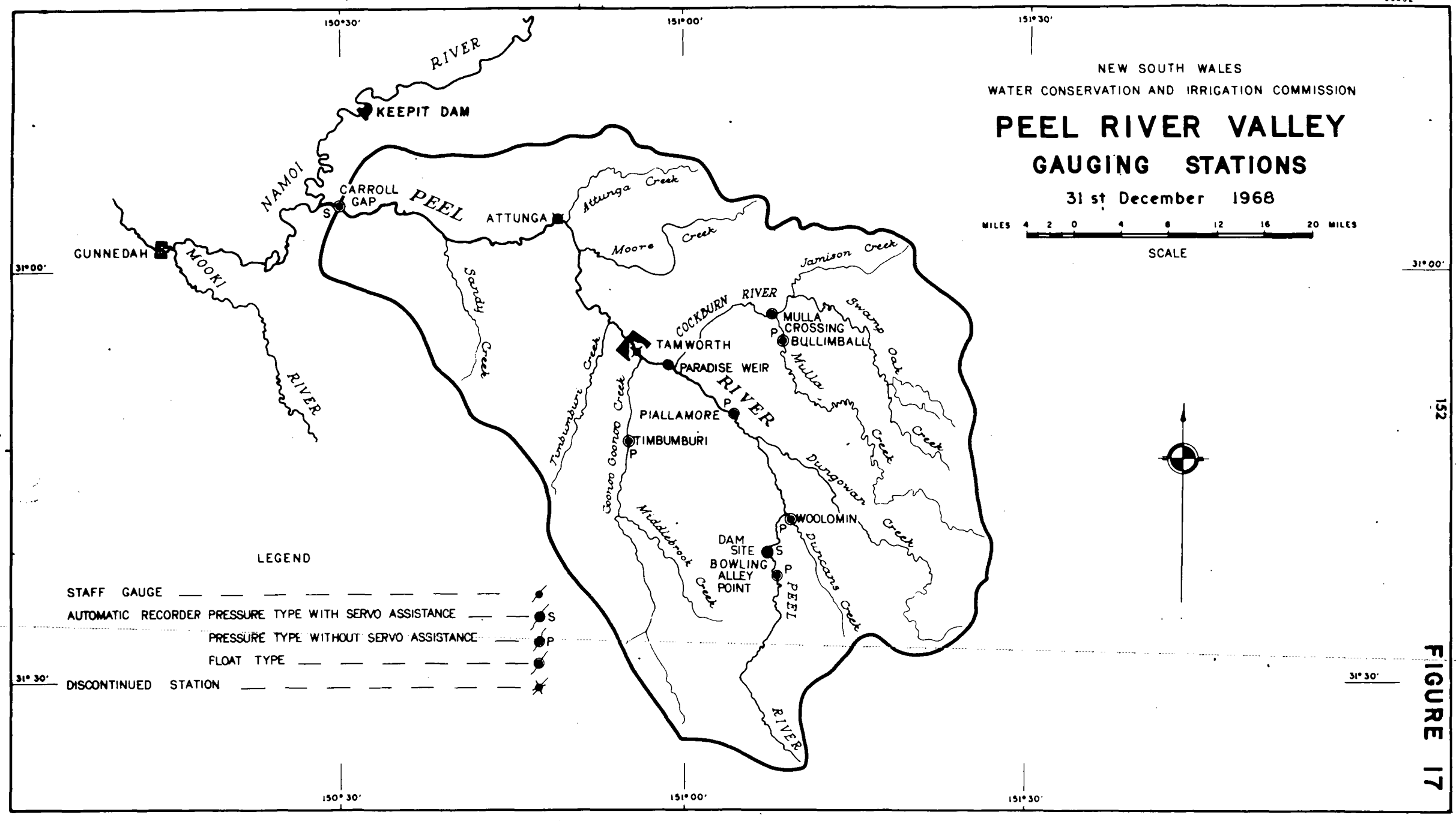
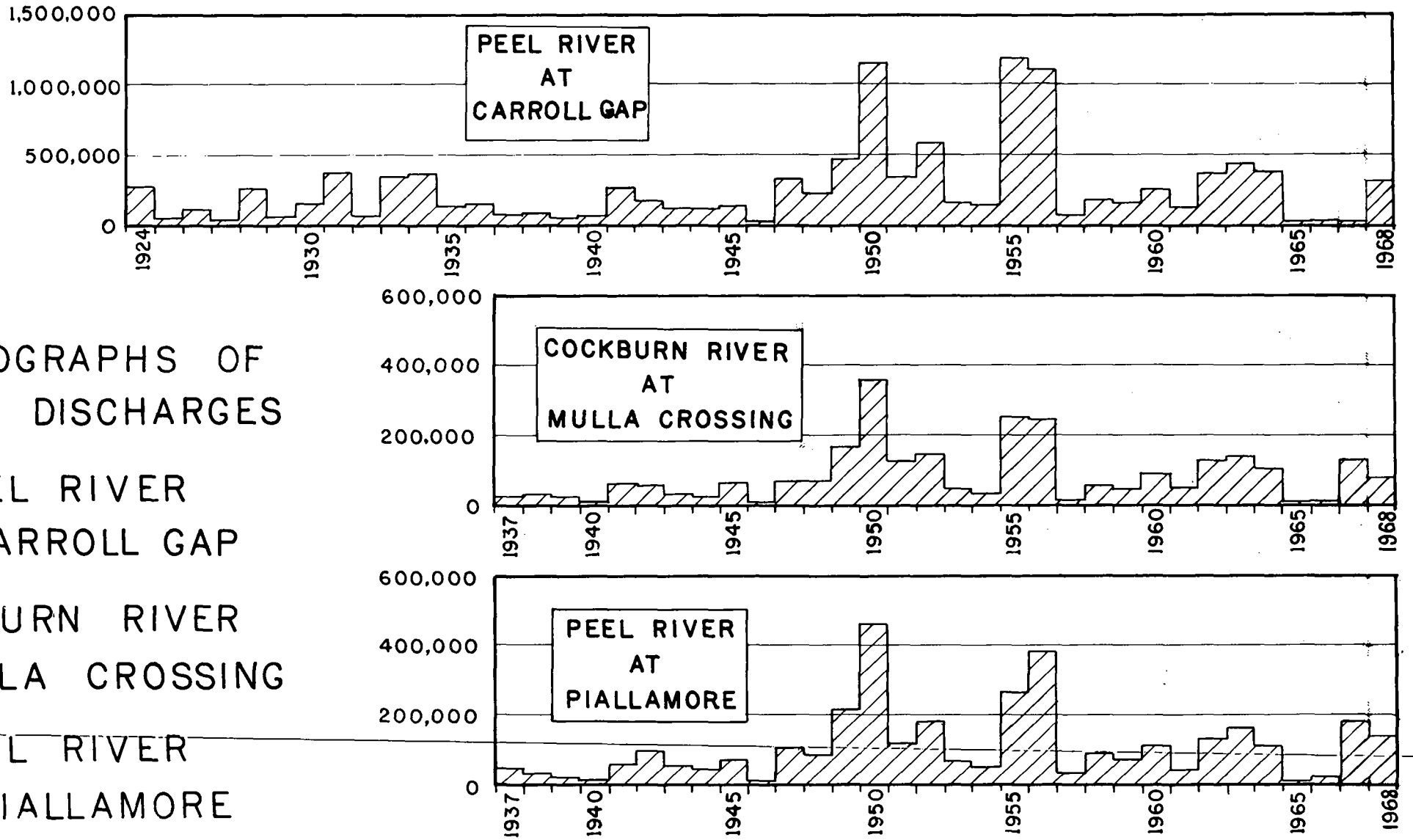

NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
GAUGING STATIONS
31 st December 1968
MILES 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
KEEPIT DAM
NAMOI RIVER
CARROLL GAP
PEEL
ATTUNGA
GUNNEDAH
MOOKI RIVER
Attunga Creek
Moore Creek
Sandy Creek
Jamison Creek
COCKBURN RIVER
MULLA CROSSING
BULLIMBALL
Swamp Oak Creek
TAMWORTH
PARADISE WEIR
RIVER
Mulla Creek
Tumbumburi Creek
Goonoo Goonoo Creek
PIALLAMORE
TIMBUMBURI
Dungowan Creek
Middlebrook Creek
WOOLOMIN
DAM SITE
BOWLING ALLEY POINT
Duncans Creek
PEEL
RIVER
LEGEND
STAFF GAUGE
AUTOMATIC RECORDER PRESSURE TYPE WITH SERVO ASSISTANCE
PRESSURE TYPE WITHOUT SERVO ASSISTANCE
FLOAT TYPE
DISCONTINUED STATION

FIGURE 17



HYDROGRAPHS OF ANNUAL DISCHARGES

PEEL RIVER AT CARROLL GAP

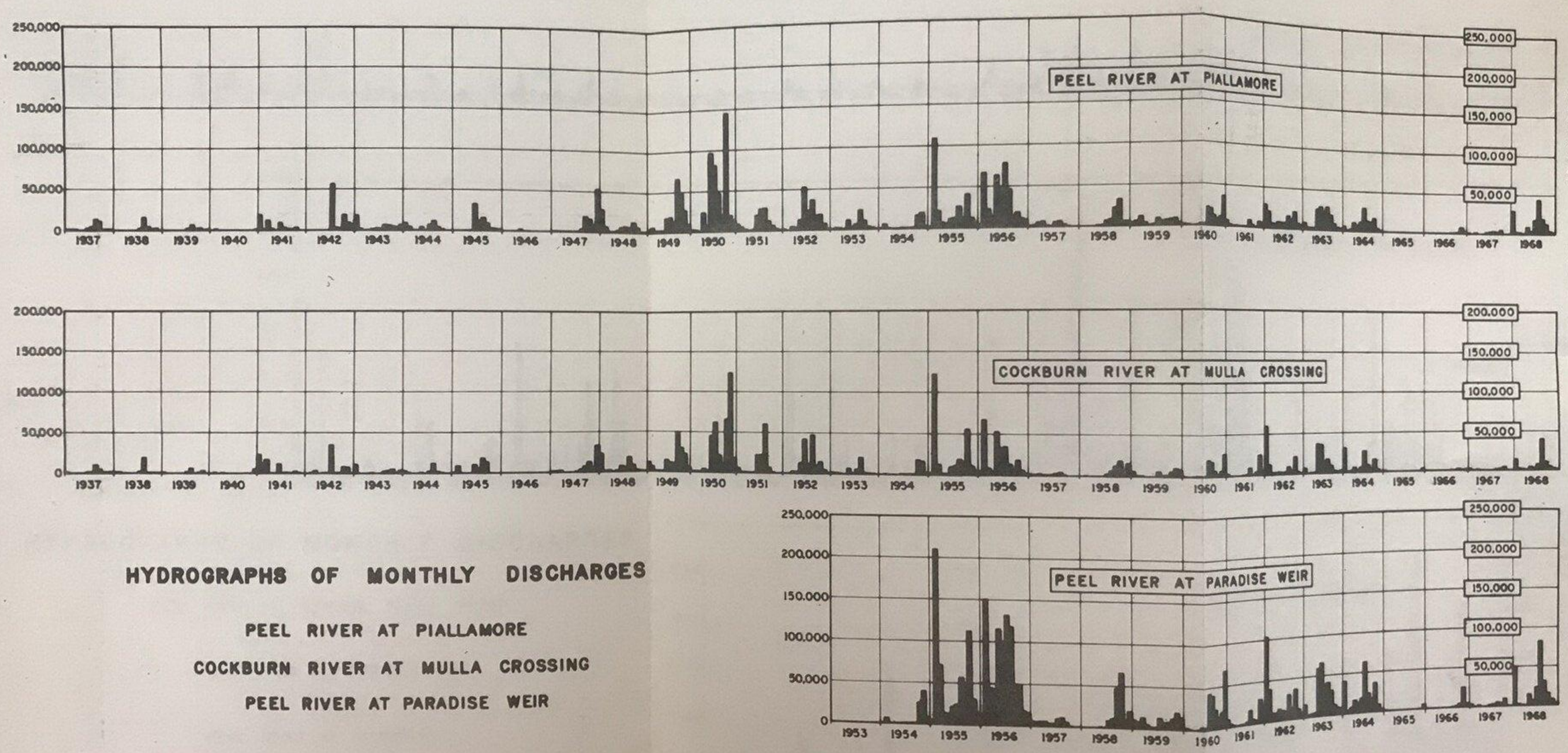
COCKBURN RIVER AT MULLA CROSSING

PEEL RIVER AT PIALLAMORE

ANNUAL DISCHARGE IN ACRE FEET

FIGURE 18

FIGURE 20



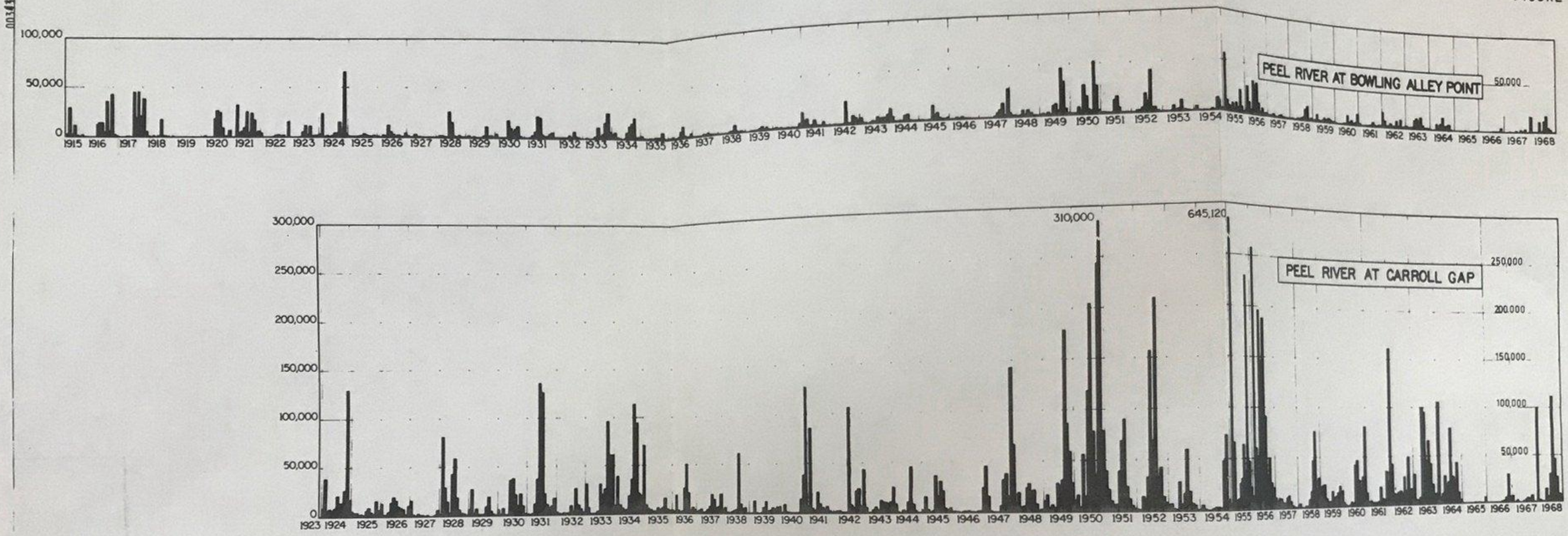
HYDROGRAPHS OF MONTHLY DISCHARGES

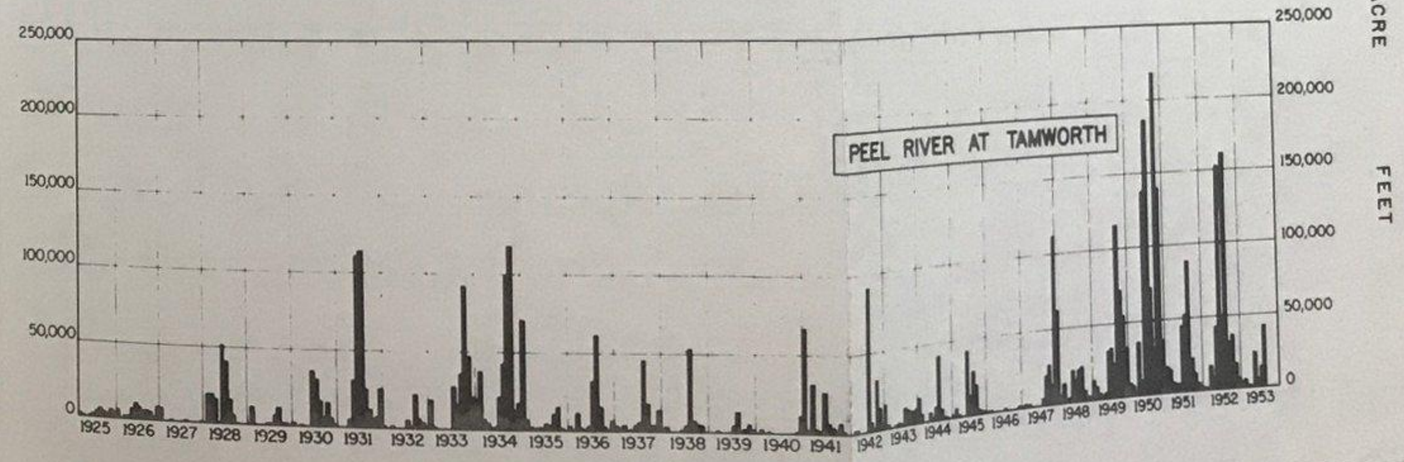
PEEL RIVER AT PIALLAMORE

COCKBURN RIVER AT MULLA CROSSING

PEEL RIVER AT PARADISE WEIR

FIGURE 19





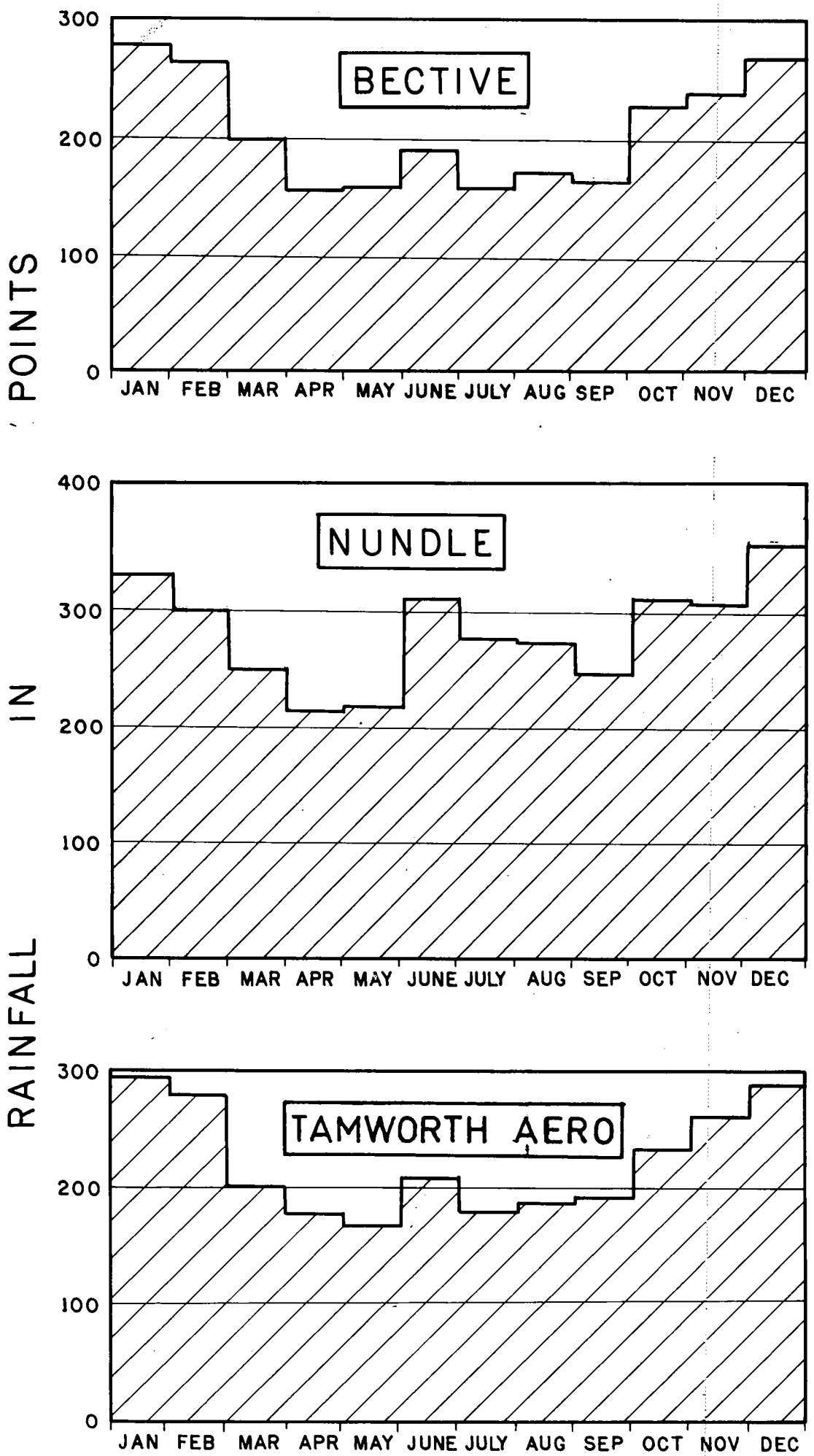
HYDROGRAPHS OF MONTHLY DISCHARGES

PEEL RIVER AT BOWLING ALLEY POINT

PEEL RIVER AT CARROLL GAP

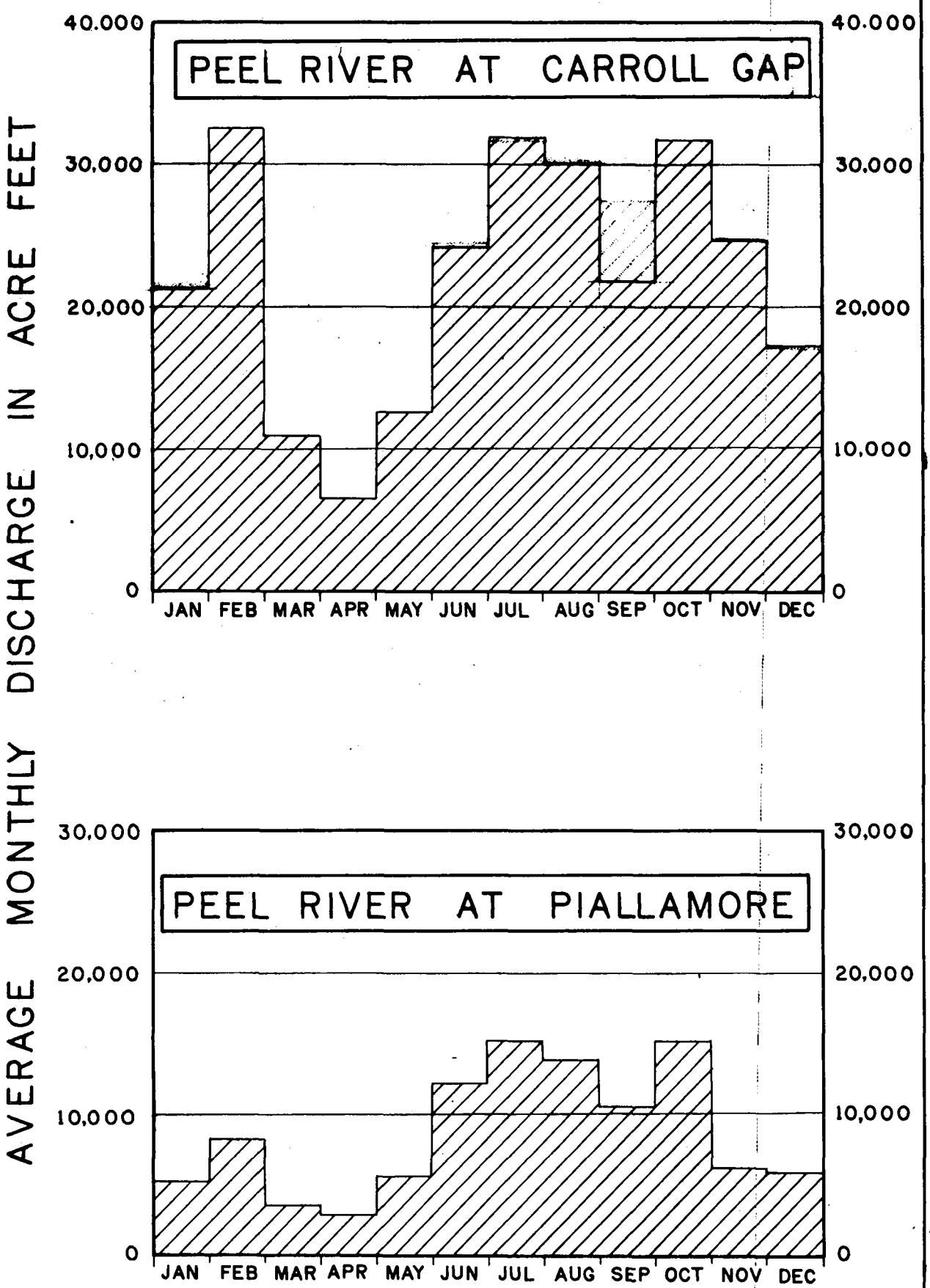
PEEL RIVER AT TAMWORTH

FIGURE 21



AVERAGE MONTHLY RAINFALLS
BECTIVE, NUNDLE AND TAMWORTH AERO

FIGURE 22

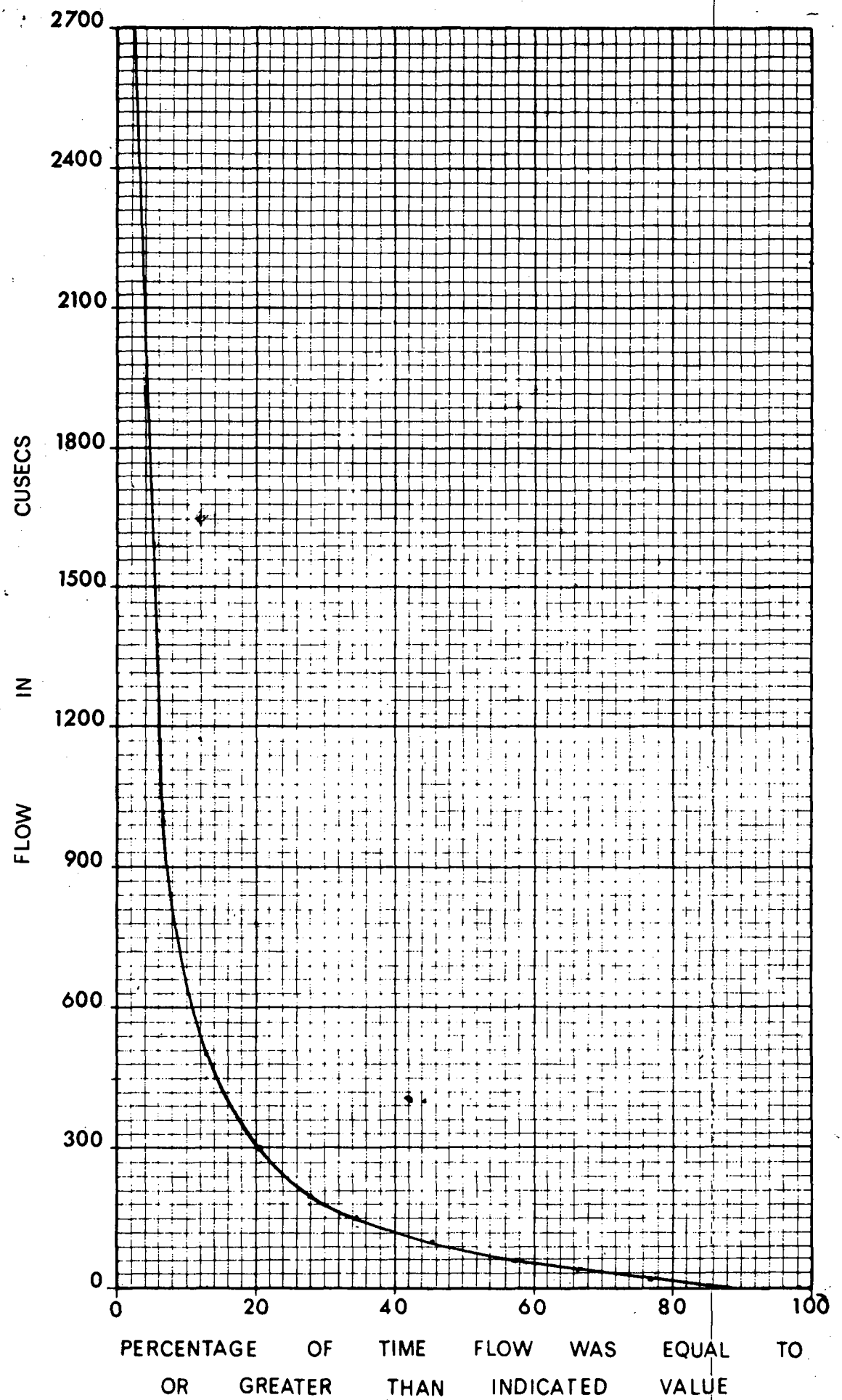


AVERAGE MONTHLY STREAM FLOWS

PEEL RIVER AT CARROLL GAP

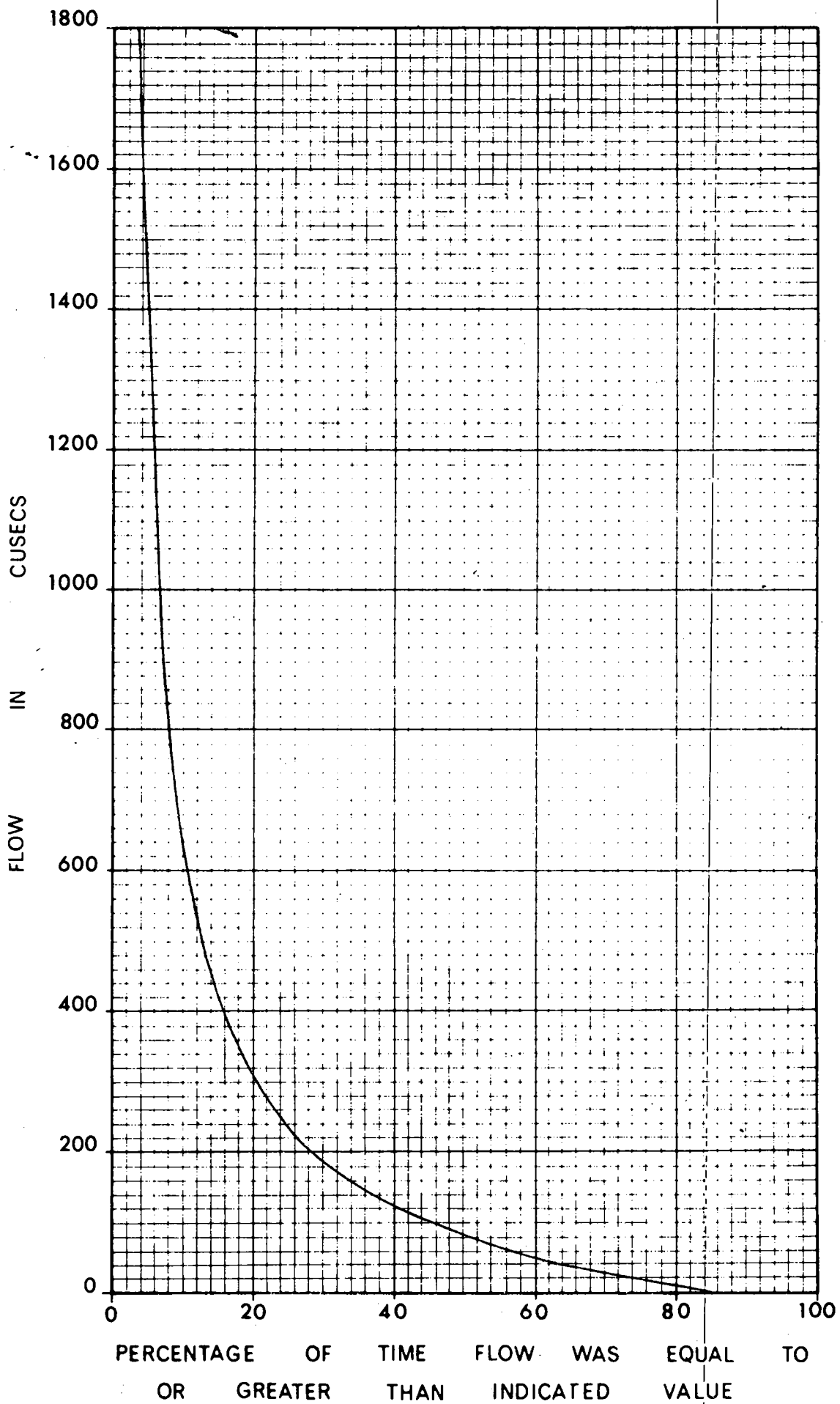
PEEL RIVER AT PIALLAMORE

FIGURE 23



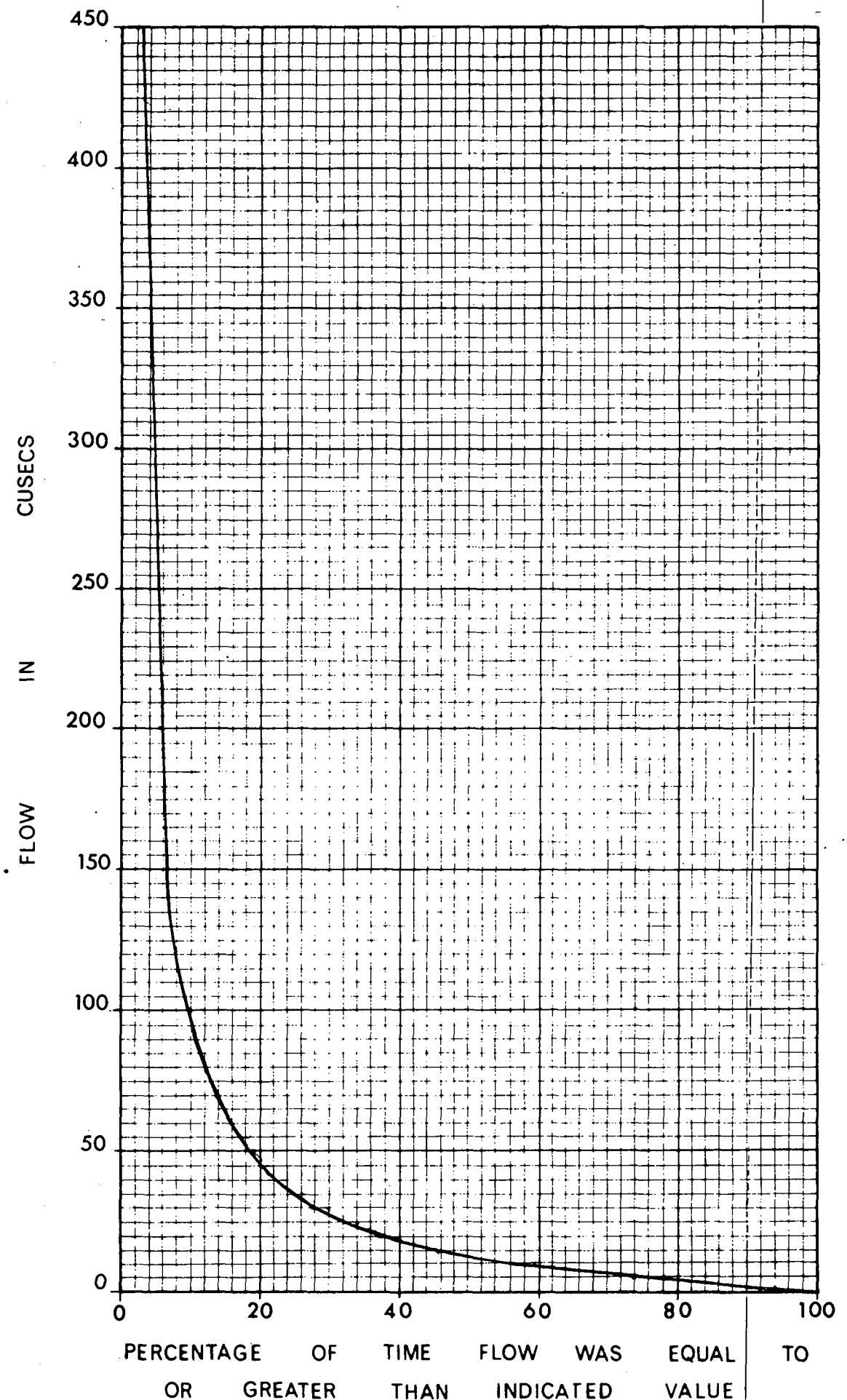
FLOW DURATION CURVE FOR PEEL RIVER AT CARROLL GAP

FIGURE 24



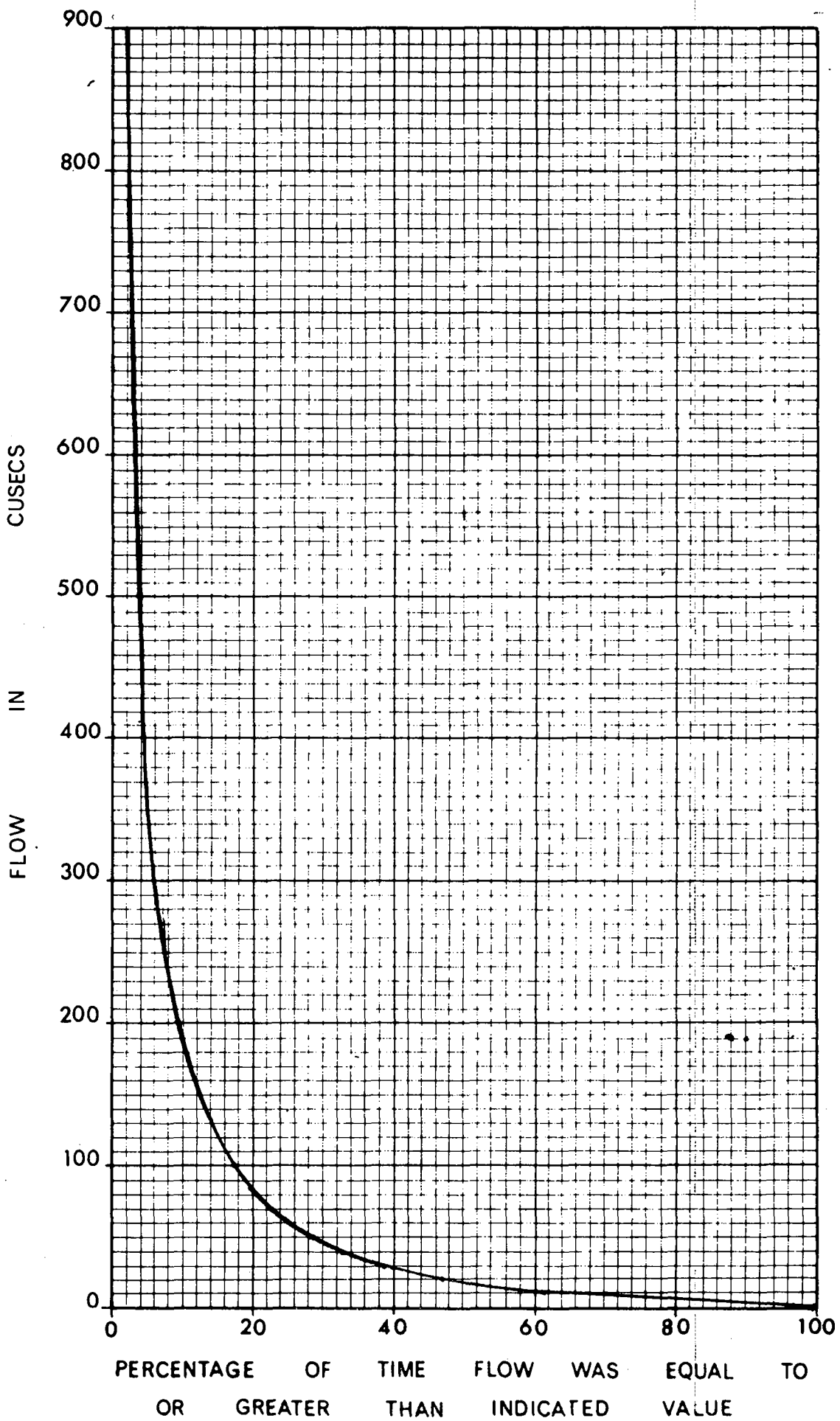
FLOW DURATION CURVE FOR PEEL RIVER AT PARADISE WEIR

FIGURE 25



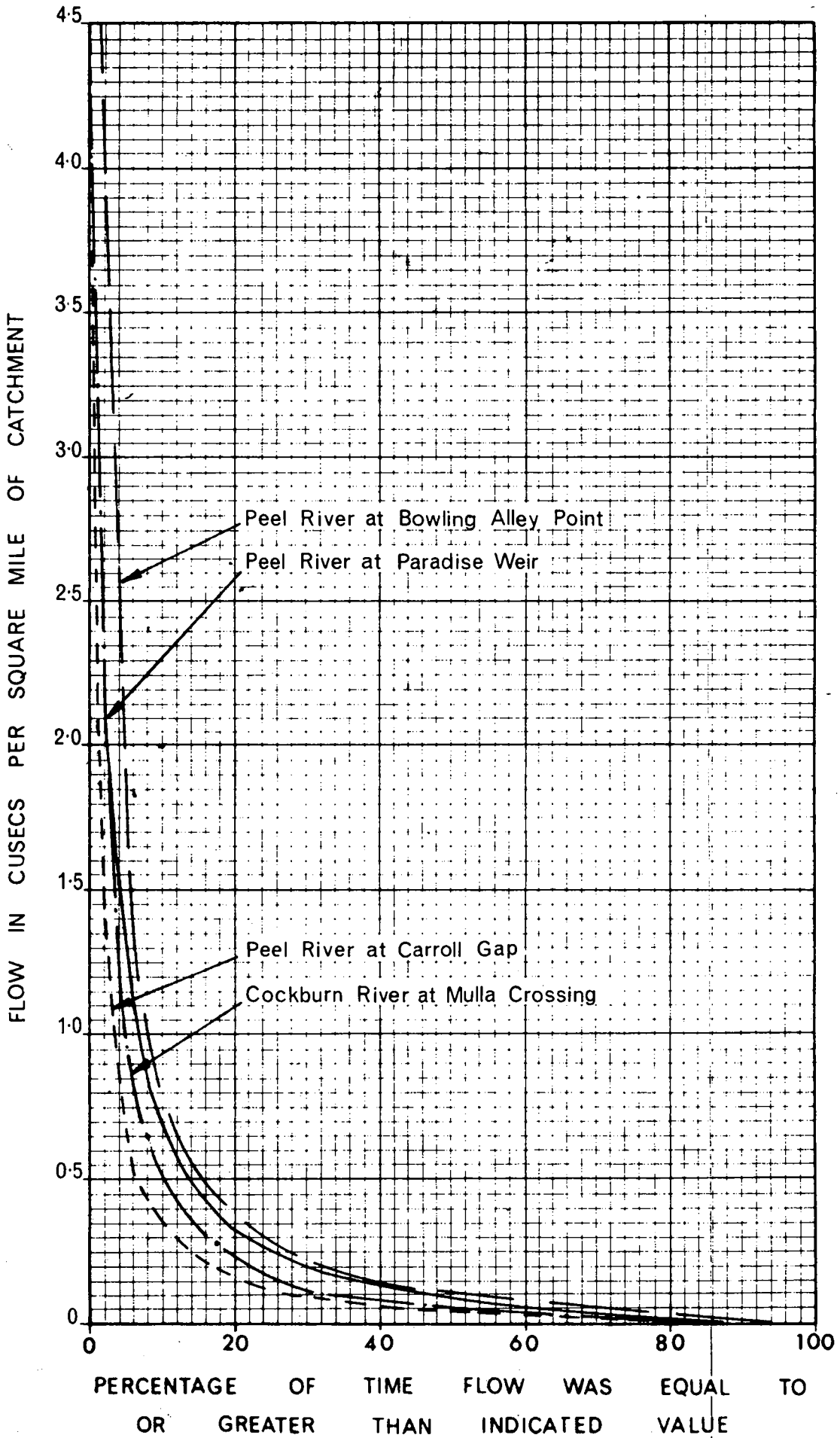
FLOW DURATION CURVE FOR PEEL RIVER AT BOWLING ALLEY POINT

FIGURE 26



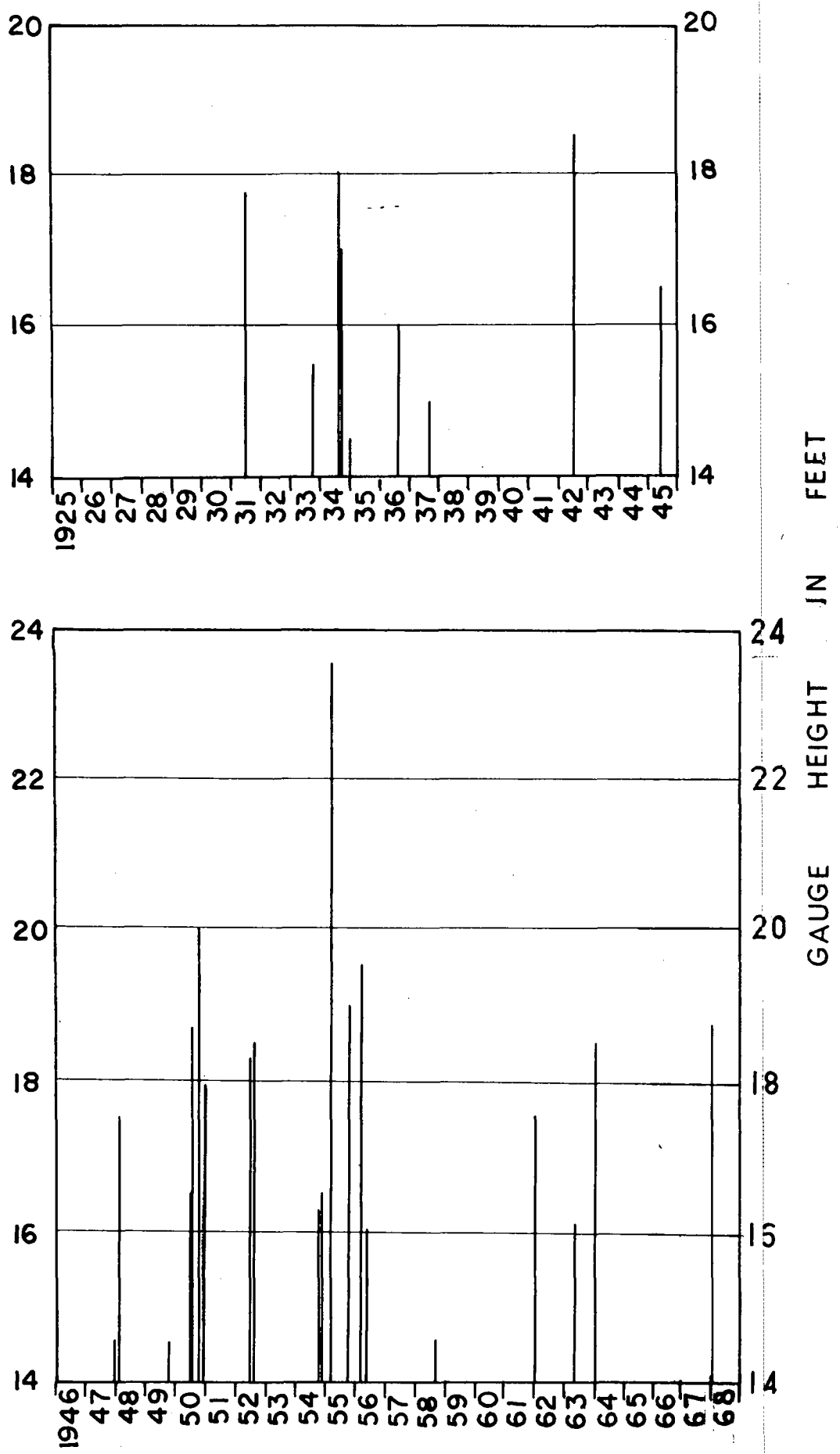
FLOW DURATION CURVE FOR COCKBURN RIVER AT MULLA CROSSING

FIGURE 27

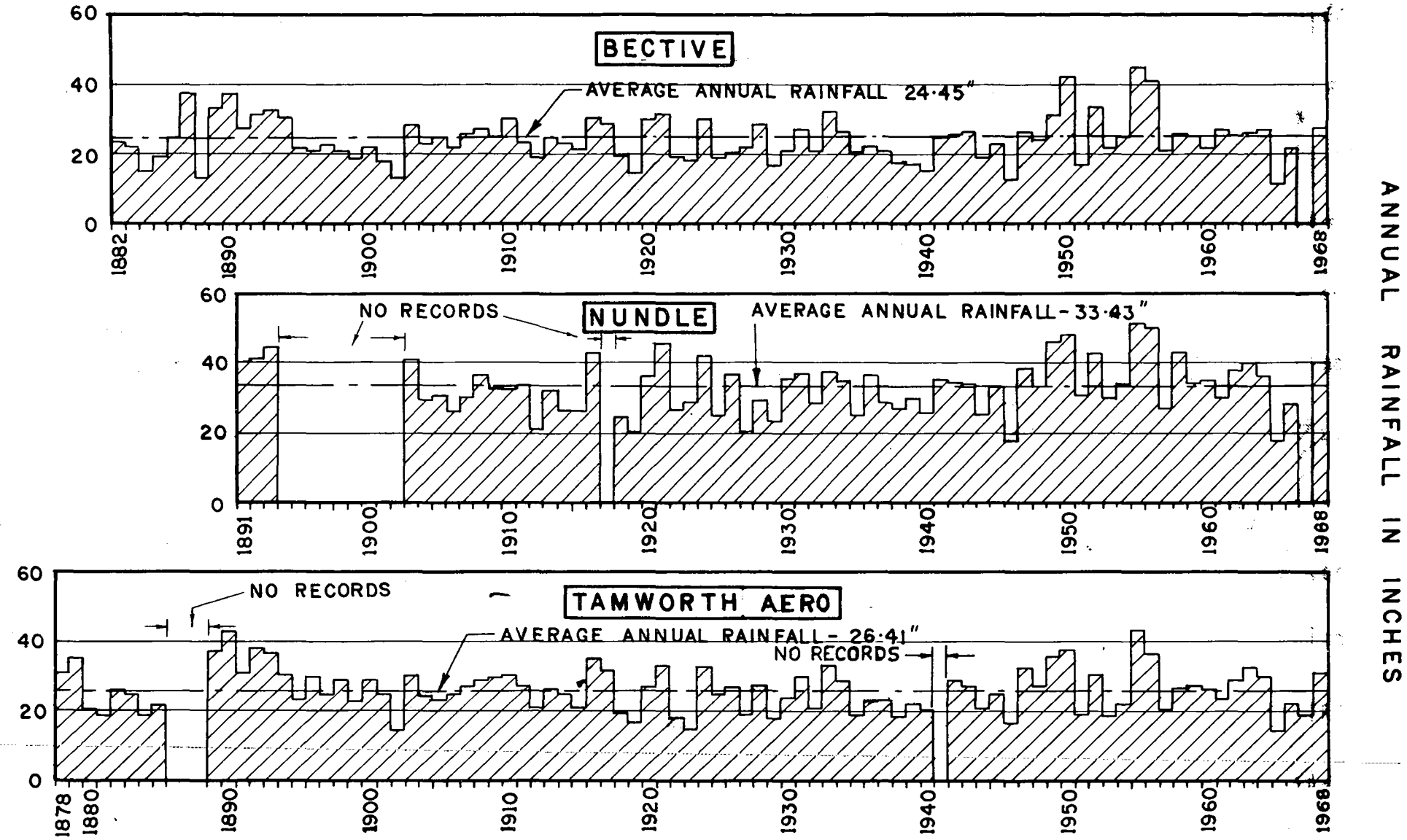


FLOW DURATION CURVES FOR THE PEEL VALLEY

FIGURE 28



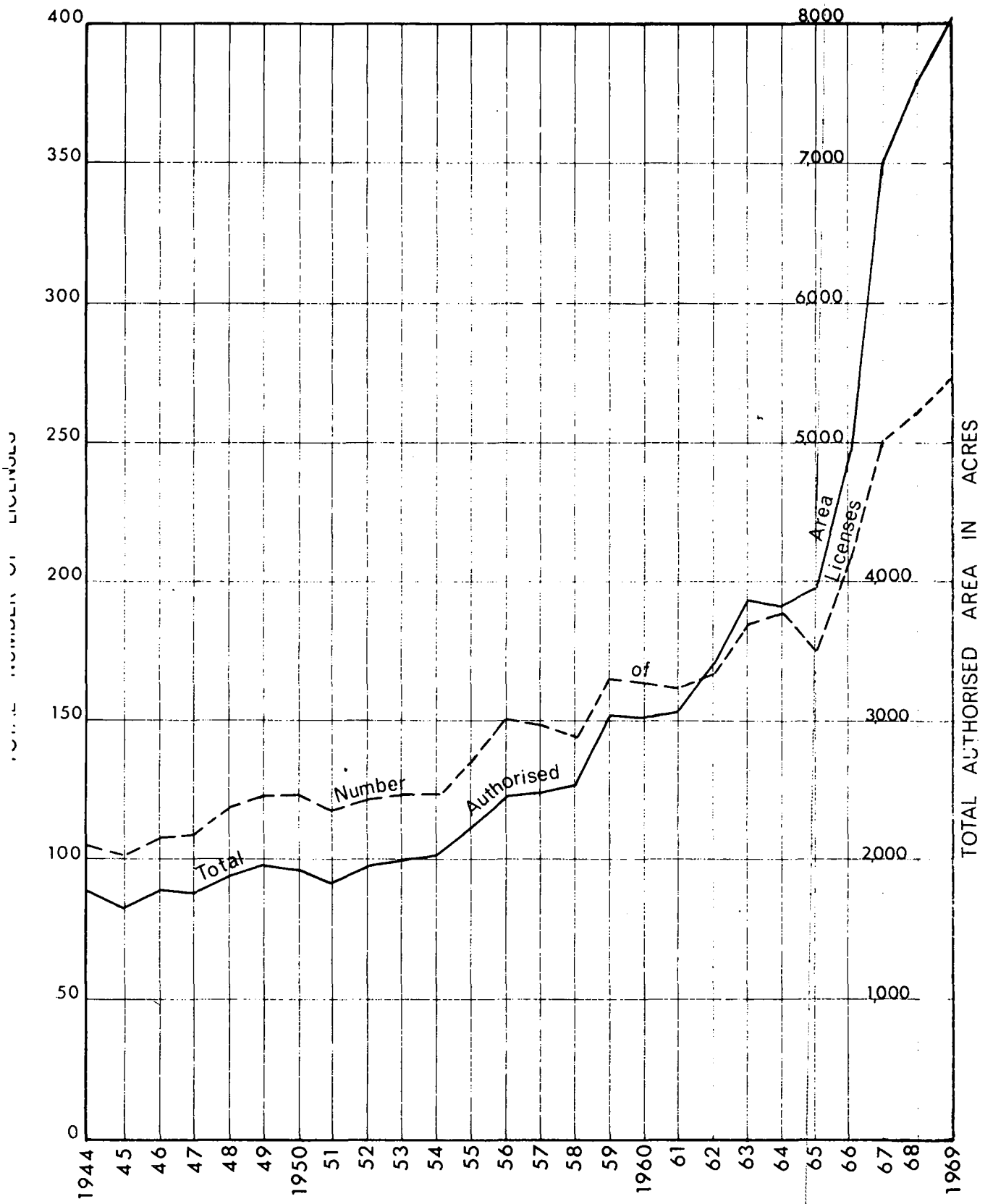
FLOOD PEAKS EXCEEDING 14FT. AT TAMWORTH



ANNUAL RAINFALLS AT BECTIVE, NUNDLE AND TAMWORTH AERO

FIGURE 29

FIGURE 30



PEEL RIVER BASIN

AREA AUTHORISED FOR IRRIGATION AND

TOTAL NUMBER OF LICENSES AT 30th.

JUNE FOR EACH YEAR INDICATED

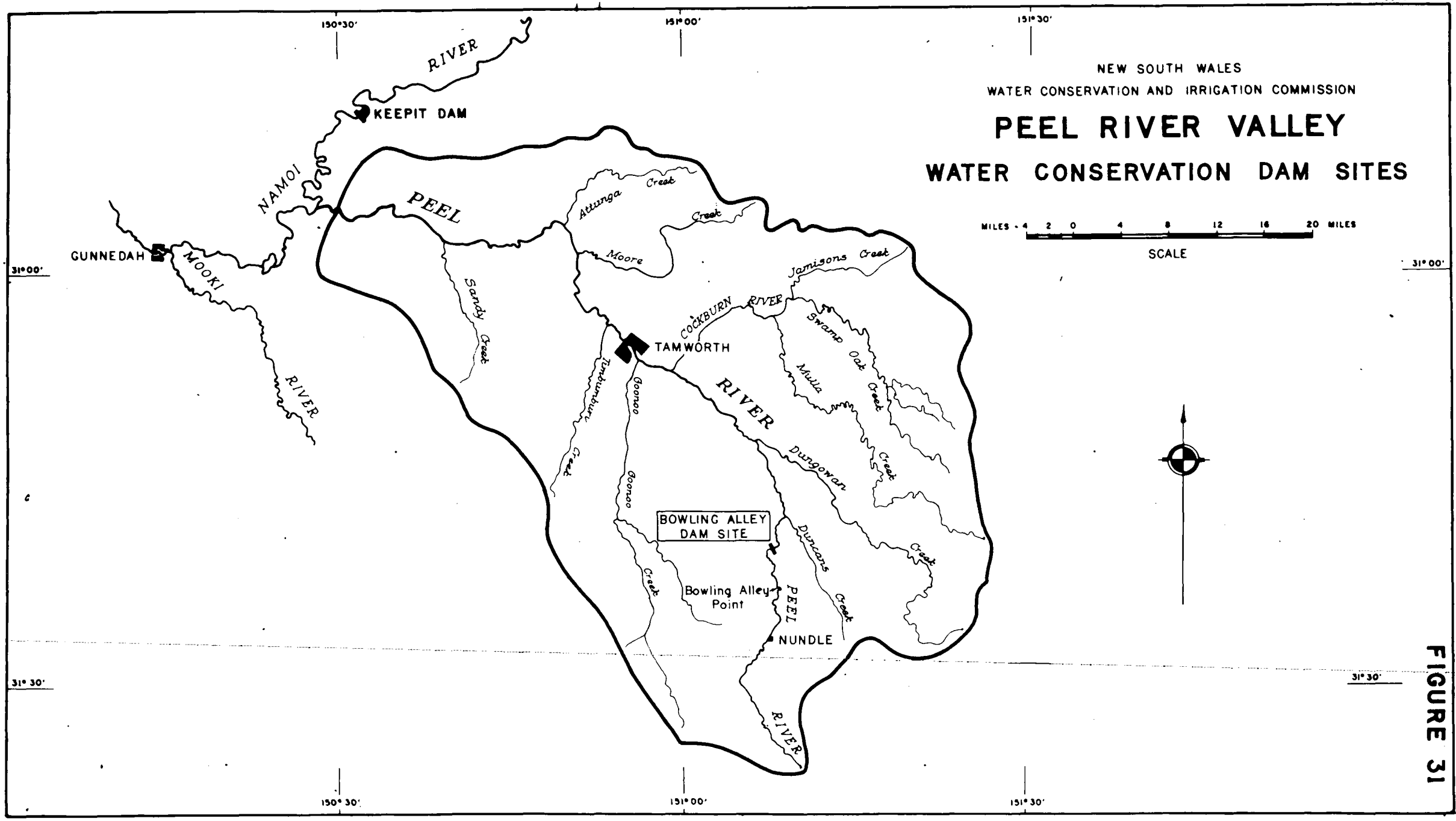

03450
NEW SOUTH WALES
WATER CONSERVATION AND IRRIGATION COMMISSION
PEEL RIVER VALLEY
WATER CONSERVATION DAM SITES
MILES - 4 2 0 4 8 12 16 20 MILES
SCALE
150°30'
151°00'
151°30'
31°00'
31°30'
KEEPIT DAM
RIVER
NAMOI
PEEL
GUNNEDAH
MOOKI
RIVER
Attunga Creek
Creek
Moore
Sandy Creek
Jamisons Creek
COCKBURN RIVER
TAMWORTH
Swamp Oak Creek
Mulla
Tinbinbilly Creek
Goonoo
Goonoo
RIVER
Dungowan
Creek
BOWLING ALLEY DAM SITE
Duncans Creek
Creek
Bowling Alley Point
PEEL
NUNDLE
RIVER

FIGURE 31