WATER RESOURCES

OF THE

CASTLEREAGH VALLEY

SURVEY OF THIRTY N.S.W. RIVER VALLEYS

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WATER RESOURCES OF THE CASTLEREAGH RIVER VALLEY

PREFACE

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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 comprehensive survey of the water resources of thirty major river valleys in the State.

The aim of this survey is to provide information which will enable a well balanced and soundly based programme of water conservation to be formulated.

In the survey, which will be the largest and most comprehensive study of its type ever undertaken in Australia, studies will be made of the physiography, climate, groundwater potential and surface water resources of each valley. In addition to reviewing current water requirements, assessments will be made of possible future water requirements.

As the overall survey will not be completed for some time it has been decided to prepare and issue separate reports for individual valleys. This report on the water resources of the Castlereagh Valley is the seventh report to be completed.

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WATER RESOURCES OF THE CASTLEREAGH RIVER VALLEY

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WATER RESOURCES OF THE CASTLEREAGH RIVER VALLEY.

1. INTRODUCTION.

The most essential resource available to mankind, with the exception of air, is water. That there is a preponderance of this resource on the surface of the earth is illustrated by the fact that about 74 percent of the earth's surface is covered by oceans and polar icecaps whilst the remaining 26 percent, comprising the land masses, is frequently covered by surface water in lakes or rivers or by water vapour in clouds.

The total amount of water on earth in the forms of the oceans, polar icecaps, lakes, streams and underground water has been estimated to be about 320 million cubic miles. It is difficult to visualise the magnitude of this resource particularly when it is realised that one cubic mile is equivalent to about a million million gallons.

Despite the magnitude of this resource its suitability for consumptive use is limited, as about 97.2 percent is in the oceans and a further 2 percent is stored in the polar icecaps. Furthermore the availability of suitable water is restricted as over 99.5 percent of the remaining 0.8 percent is in the form of underground water and is therefore not readily usable.

The gross water resources of any country are usually considered to be the amount of precipitation, in the form of either rainfall or snow which falls on the land, whilst the surface water resources are regarded as the amount of water in streams and lakes.

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

However when losses due to evaporation, transpiration and seepage are deducted from the gross water resources of the continents the comparison between the residuals, or surface water resources, is even more unfavourable. The average annual surface water resources of the Australian mainland have been assessed at about 240 million acre feet which is equivalent to a depth of less than two inches over the area of the continent. In comparison, 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 surface of the Australian continent is the most level of all the world's continents, only 7 percent of its area being above 2,000 feet elevation. Unlike all the other continents there are no areas permanently covered by snow.

The persistence of streamflows in Australia is therefore primarily dependent upon the occurrence of runoff producing storms with the result that Australian streams tend to exhibit greater variability than those of other continents.

Flow records obtained for streams in New South Wales indicate that there are few, if any, perennial streams in the State; most streams have either ceased to flow or have been reduced to an insignificant discharge during the period of records.

Furthermore available historical information indicates that more severe droughts occurred prior to the implementation of the present extensive system of measurement of the flows of New South Wales' streams.

Similar considerations apply to the occurrence of extreme floods. At many locations in the State the maximum experienced floods occurred in the nineteenth century, flood levels being determined from flood marks made by local inhabitants after each major flood.

The extreme variability of Australian streamflows and the prolonged duration of severe droughts necessitates the construction of relatively large storages to provide assured water supplies over the full length of each drought period.

The surface water resources of the Castlereagh River Valley have been assessed as averaging about 200,000 acre feet per annum. These water resources do not represent the total valley outflow into the Macquarie River but indicate the magnitude of the overall amount of water available in the valley. As the average annual rainfall of the valley is about 21 inches, the average surface water resources are equivalent to a runoff of about 2½ percent.

On a square mile of catchment area basis, the surface water resources of the Castlereagh River Valley are slightly below the average value for inland New South Wales and are equivalent to about one third of the average value for the State.

2. PHYSIOGRAPHIC FEATURES.

In this report the external boundary of the Castlereagh River Valley has been adopted as the catchment area of the Castlereagh River upstream of the junction of the Macquarie and Castlereagh Rivers.

The extent of the Castlereagh River Valley, in relation to the principal streams and towns is indicated at Figure 1, the total catchment area of the valley being about 6,840 square miles.

The outstanding topographic feature of the Castlereagh River Valley is the Warrumbungle Range which extends along parts of the south eastern and southern borders of the valley over a total distance of about one hundred and forty miles. The major peak of this range is Caraghnan Mountain of elevation 4,500 feet which is located about 30 miles east of Gulargambone. Many of the runoff producing streams in the valley radiate from this mountain. Other peaks in the range are Siding Spring Mountain (elevation 2,820 feet) and Junction Mountain (elevation 2,060 feet) which are located to the west of Coonabarabran. In the extreme south eastern section of the valley the notable peaks are Round Mountain and Dean's Mountain which are situated on the upper watershed of Weetaliba Creek.

The average elevation of the Warrumbungle Range along the border of the valley is about 2,000 feet above sea level. The range therefore tends to result in uplift of air masses, particularly during the winter months, with a consequent production of orographic rainfall. As a result the streams draining the Warrumbungle Range provide the major percentage of the runoff in the valley even though the elevated areas comprise only about 5 percent of the total area of the valley.

The Castlereagh River rises in rugged broken country in the Warrumbungle Range at elevations of about 2,800 feet and flows easterly to the town of Coonabarabran where relatively flat land slopes prevail along the valley floor. The river then enters hilly country and flows in a southerly direction to the town of Binnaway being joined by Belar and Greenbah Creeks on the right bank and Ulimambra Creek on the left bank. The headwaters of Belar and Greenbah Creeks rise in elevated country to

the east of Caraghnan Mountain and as a result these creeks exhibit comparatively high runoff characteristics.

About three miles downstream of Binnaway the Castlereagh River is joined by Weetaliba Creek which although rising in steep country traverses an extensive flat valley of about 25 miles in length upstream of the Castlereagh River junction. Below Weetaliba Creek the Castlereagh begins a sweeping change in direction to the north west over a distance of about sixty miles to Gilgandra. In this section the river is initially joined by Butheroo and Merrygoen Creeks on the left bank, the former rising in hilly country to the west of Coolah. Merrygoen Creek, which joins the Castlereagh River near Mendooran traverses a wide flat valley upstream of the Castlereagh junction. Between Mendooran and Gilgandra the Castlereagh is joined on the right bank by Piangula and Wallumburrawang Creeks which drain hilly to steep country to the south of Caraghnan Mountain. In the lower sections of Wallumburrawang Creek the catchment broadens to a flat plain.

Near Gilgandra the south western border of the valley is only about two miles to the west of the Castlereagh River and between Gilgandra and Gulargambone the catchment boundary is no further than four miles from the Castlereagh River at any point. The entire western boundary of the valley is ill defined there being few hills of any extent along this section of the catchment boundary.

About twelve miles downstream of Gilgandra the Castlereagh is joined on the right bank by Terrabile Creek which rises in the vicinity of Mount Terrabile, an isolated outcrop to the south of Caraghnan Mountain. Whilst the headwaters of Terrabile Creek commence at elevations of over 1,500 feet the creek quickly falls to the general level of the northern plain of the Castlereagh Valley.

Gulargambone Creek, which enters the Castlereagh River at Gulargambone, rises in the vicinity of Tooraweenah to the south of Caraghnan Mountain and traverses a relatively flat catchment for a distance of about 30 miles before joining the Castlereagh River.

The Baronne and Coonamble Creeks systems commence in the north western section of the Warrumbungle Ranges and traverse extensive plain areas before joining the Castlereagh River. At Coonamble, the Coonamble Creek system joins

Warrena Creek which, in addition to receiving runoff from its own catchment, also carries overbank flows from the Castlereagh River during major flood periods.

Downstream of Coonamble the major tributaries are Merrimbah, Mowlma and Nedgera Creeks. These tributaries, which are characterised by sections of flat swampy areas, contribute little or no runoff to the Castlereagh River except during flood periods.

In the extreme northern section of the valley the flood plain between the Darling River and the Castlereagh River is intersected by Womat and Wanourie Creeks which carry flows from the Darling to the Castlereagh River during major floods.

As indicated at Figure 2 landslopes in the Castlereagh River Valley are predominantly flat, about 78 percent of the total area of the valley having slopes of less than 3 degrees. Undulating to hilly areas of the valley comprise 17 percent of the total area whilst hilly and mountainous areas comprise 3 percent and 2 percent respectively.

The two main agricultural industries of the Castlereagh River Valley are sheep grazing for wool and mutton production and cultivation of wheat. The main areas suitable for wheat growing occur in the south eastern section of the valley upstream of Gilgandra whereas, in the northern section below Gilgandra, sheep grazing is the predominant industry.

The north eastern section of the valley includes part of the Pilliga Forest which is perhaps the most extensive Cypress Pine and Ironbark forested area in the State. The most valuable forest type is the White Cypress Pine which covers much of the area from Coonabarabran to the western border of the valley; in addition fairly extensive stands of commercial quality Ironbark occur throughout the central and southern sections of the valley.

3. CLIMATIC FEATURES.

Rainfall.

Highest annual rainfalls in the Castlereagh River Basin are recorded over the high ground above the 1,500 feet contour along the eastern and north eastern boundaries of the catchment. In this area annual median rainfalls are in excess of 24 inches. A marked rain shadow exists to the south west of this high ground, along the main river valley where annual median rainfalls are less than 20 inches. (The median rainfall is that

rainfall experienced or exceeded on 50 percent of occasions).

For the remainder of the catchment, rainfall shows a fairly uniform decrease from the middle reaches where median values are about 18 to 20 inches to the northwest extremity of the catchment where the annual medians are less than 16 inches.

The wettest area of the catchment is in the vicinity of Coonabarabran where the annual median exceeds 27 inches. The distribution of annual median rainfalls over the catchment is shown at Figure 3 whilst the distribution of monthly median rainfalls are shown at Figures 4 to 15 inclusive.

About 50 percent of the annual rainfall is recorded in the five months November to March. A secondary maximum occurs in the months June to July when a further 20 percent of the annual rainfall is recorded. The periods April to May and August to September are relatively dry, each period recording about 11 percent of the annual rainfall.

In the months December, January and February median values are about 2 to 2½ inches over the headwaters and about 1 inch over the northwest corner of the catchment. The driest months have median values of about 1 to 1½ and ½ to ¾ inches over the abovementioned areas respectively.

Monthly and annual rainfalls recorded at Gilgandra, Gulargambone, Pier Pier, Baradine, Coonabarabran, Combogolong, Coonamble, Mt. Tenandra, Urawilkie, Wingadee, Hawthorne, Mendooran, Wallumburawang and Coolah are given in Appendices 1 to 14 inclusive.

Very high monthly totals as recorded over the river basins to the east of the Divide are not recorded in the Castlereagh Valley. The highest monthly totals on record for stations in the catchment are between 6½ and 15 inches, the lower values being recorded in the western parts of the catchment. High monthly totals are generally associated with one of the following meteorological conditions:-

(1) In the warmer months of the year heavy falls occur when a depression forms to the north of the catchment. These depressions, which cause a warm moist northerly air stream to occur west of the Divide, usually form in a trough extending from south eastern Australia to the north of the continent. Intense short-period falls may be experienced under these conditions.

(2) In the cooler months of the year, high monthly totals may result when a series of well developed troughs associated with southern depressions cause several substantial falls in a month. Intense short-period falls are not common under these conditions.

All stations in the catchment have recorded falls of .3 inches in 24 hours. The highest total on record for a station in the catchment for a 24 hour period ending 9 a.m. is 9.29 inches which occurred at Mendooran on 24th February 1955.

The tables at Appendix 15 show on a monthly and annual basis for Combogolong, Coonamble, Gilgandra, Gulargambone, Mt. Tenandra, Pier Pier, Urawilkie, Wingadee, Baradine, Coonabarabran, Hawthorne, Mendooran, Wallumburawang and Coolah the following data:

(1) The maximum and minimum rainfalls.

(2) The 10th, 30th, 50th, 70th and 90th percentiles. (A rainfall observation less than the 10th percentile can be expected once in ten years on the average. Similarly, a rainfall observation less than the 70th percentile can be expected on 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).

Dry spells occur frequently over the catchment. Minimum recorded rainfalls at Gilgandra, Gulargambone, Pier Pier, Baradine and Coonabarabran are shown in the tables at Appendix 16. These tables indicate the minimum cumulative rainfalls, commencing in any month of the year, and continuing for up to 12 months, which have occurred at selected stations.

Even in the wettest months of the year less than 45 points are received on ten percent of occasions. Prolonged dry spells extending over 12 months or more are common, particularly in the north-west corner where, on an average of one year in ten, annual totals of less than 11 inches can be expected.

Totals of less than 4 inches in 12 months have been recorded for the western parts of the catchment.

Temperature.

The temperature regime of the catchment is well recorded. The average monthly and yearly temperatures for selected stations are listed in Tables 1 to 3 as follows:-

(1) Coonabarabran, Table 1, which is representative of the headwaters of the region above 1,500 ft.

(2) Gilgandra, Table 2, which is representative of the middle reaches of the catchment between 600 and 1,000 ft.

(3) Coonamble, Table 3, which is representative of the western part of the catchment.

TABLE 1

COONABARABRAN (Elevation 1,673 feet)

Average Temperature (^{o}F) based on 30 years of record.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average Maximum	88.3	87.3	82.6	73.8	65.9	59.2	57.7	61.3	68.0	75.4	81.7	85.5	73.9
Average Minimum	58.9	58.3	53.4	45.1	38.0	34.3	33.3	34.2	38.5	45.1	51.7	56.7	45.6
Average Daily	73.7	72.8	68.0	59.5	51.9	46.8	45.5	47.8	53.2	60.3	66.7	71.1	59.8
Highest on record 111.9^{o}F							Lowest on record 17.0^{o}F						

TABLE 2

GILGANDRA (Elevation 942 feet)

Average temperature (^{o}F) based on 22 years of record.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average Maximum	92.5	90.8	86.0	75.3	67.9	60.6	59.3	62.9	70.4	77.8	84.4	88.7	76.4
Average Minimum	64.4	64.0	59.6	51.2	43.9	38.6	35.9	37.9	42.5	49.1	55.7	60.8	50.3
Average Daily	78.5	77.4	72.8	63.2	55.9	49.6	47.6	50.4	56.5	63.5	70.1	74.7	63.3
Highest on record 114.5^{o}F							Lowest on record 18^{o}F						

TABLE 3

COONAMBLE (Elevation 589 feet)

Average temperature (^{o}F) based on 30 years of record.

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Average Maximum	96.6	95.2	90.2	80.8	72.1	65.0	63.3	67.9	75.8	83.9	90.5	94.2	81.3
Average Minimum	65.0	65.2	61.1	52.7	45.6	40.6	38.1	39.6	44.2	52.3	59.4	63.1	52.2
Average Daily	80.8	80.2	75.7	66.8	58.9	52.8	50.7	53.7	60.0	68.1	74.9	78.6	66.8
Highest on record 118.0^{o}F							Lowest on record 20.0^{o}F						

Hot to very hot days are experienced over the entire catchment during summer. Prolonged hot spells with temperatures exceeding 100 degrees on seven or more consecutive days occur in most years. Temperatures exceeding 110 degrees are not uncommon and temperatures exceeding 120 degrees can be expected on rare occasions in the northwest corner of the catchment. In general the temperatures experienced over the headwaters are about 6 degrees cooler than those experienced over the western parts of the catchment on the average.

In winter, average minima are quite low particularly over the headwaters of the catchment. Values in the low thirties are common and all stations have experienced a minimum temperature of 23 degrees or lower. In general average winter temperatures are from 25 to 35 degrees cooler than the corresponding summer values.

Frosts.

Frosts occur over the entire catchment in the cooler months of the year. Over the headwaters above the 1,500 ft. contour, the frost season commences about the middle of April and finishes early in October on the average. Frosts have been experienced as early as the middle of March and as late as the end of November. Severe frosts, however, are generally confined to the months May to September. On the average more than 60 frosts per year are experienced over this part of the catchment.

Over the lower parts of the catchment, the season commences on the average about the middle of May and finishes about the end of September. Severe frosts generally occur in the months June to August. Frosts have been experienced from early in April until the middle of October. About 35 frosts per year are recorded over this part of the catchment on the average.

Sunshine.

Estimates of the average duration of bright sunshine in hours per day, for the eastern and western halves of the catchment are shown in Table 4. These estimates are based on cloud observations. In general there is a slight increase in average bright sunshine hours from the eastern to the western boundary of the catchment.

TABLE 4.

Average Duration of Bright Sunshine in Hours Per Day.

Area	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Eastern half	10.5	9.6	8.9	8.3	7.1	6.3	7.1	7.7	8.5	9.0	10.2	10.5	8.8
Western half	10.7	10.0	9.0	8.7	7.6	6.7	7.4	8.2	8.8	9.5	10.5	10.8	9.0

Evaporation.

Estimates of the average monthly and annual evaporation (from a sunken pan) together with an estimate of the standard deviation for the eastern and western halves of the catchment are shown in Table 5.

TABLE 5.

Estimated Average Monthly and Annual Evaporation in Inches for the Castlereagh Valley.

Area		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Eastern Half	Evaporation	8.0	6.0	6.0	4.0	2.7	1.8	1.7	2.5	3.7	5.0	6.9	8.1	56.4
	Standard Deviation	1.3	1.3	1.1	0.7	0.4	0.3	0.3	0.4	0.8	1.1	1.3	1.5	7.1
Western Half	Evaporation	11.1	7.3	6.9	4.9	3.1	2.6	2.0	3.1	4.3	6.1	8.0	9.6	69.0
	Standard Deviation	1.4	1.3	1.2	0.8	0.6	0.4	0.4	0.6	0.9	1.2	1.4	1.6	8.0

Wind.

Wind speeds in the Castlereagh Valley would rarely exceed 45 miles per hour. However, violent squalls may be experienced over limited areas on rare occasions in association with severe local storms such as thunderstorms or frontal squalls. Gusts under these conditions could reach 90 miles per hour. Table 6 shows the extreme wind gust likely to be experienced in the catchment for various return periods.

TABLE 6.

Estimated Extreme Wind Gust to be Expected with Given Return Periods.

Return Period (years)	10	20	50	100
Wind Gust Equalled or Exceeded (miles per hour)	70	75	85	90

4. GROUNDWATER POTENTIAL.

An examination of the map at Figure 16 will show that the surface geology of the catchment of the Castlereagh River is relatively simple. In terms of geological time almost all of the outcropping strata are quite young.

There are only a few small outcrops of ancient Palaeozoic slates and lavas in the area to the east of Mendooran, where they form a core about which outcrop a sequence of sedimentary rocks of Mesozoic age. The Mesozoic strata, which consist mainly of slates and sandstones occur over virtually the entire catchment, being capped by extensive basalt flows in the high country west of Coonabarabran, and masked by alluvium from Gilgandra to the junction of the Castlereagh and the Macquarie Rivers.

Intrusions of plugs of alkaline lavas have given rise to the impressive spires and peaks in the Warrumbungle National Park. The plugs caused a doming up of the Mesozoic sediments and it is of interest that fragments of Permian strata which underlie the outcropping Mesozoic shales and sandstones, and do not come to the surface elsewhere in the area, have been broken off and brought to the surface by these plugs. This activity is believed to have preceded, by only a short time, the uplift of the highlands. The resulting elevation of the strata on the eastern side of the Great Artesian Basin is directly responsible for the water in the aquifers being under enough pressure to cause it to flow out at the surface, and in its true sense the Great Artesian Basin dates from this activity some 15 million years ago.

Groundwater occurs in three main groupings of rocks, viz. the porous rocks such as sandstones, unconsolidated sediments such as the sands and gravels of the alluvial deposits, and jointed rocks, which though impervious in themselves, contain cracks and fissures in which the water is held.

The groundwater potential of the Castlereagh Valley is largely confined to the porous sandstones which form the aquifers of the Great Artesian Basin. There is some rather limited potential in the unconsolidated alluvial deposits and the Tertiary Volcanics are the only representatives of the jointed rocks.

It is convenient to use these three modes of occurrence as a basis for the more detailed discussion which follows.

Porous Rocks.

The Merrygoen-Napperby beds, which are the oldest of the Mesozoic strata, consist essentially of sandy grey shales and thin sandstones with a maximum thickness of about 700 feet. They outcrop in the central parts of the valley between Mendooran and Coonabarabran, where the processes of erosion have removed the newer strata.

These beds contain some discontinuous aquifers, but in general the sandstones are fine grained and virtually impervious. Bores in these rocks frequently penetrate 400 feet or so of sandy shales without encountering water in sufficient quantities even for stock supplies. Where sufficient water is obtained it is normally only of stock quality, being usually described as hard or brackish. Total salinity usually exceeds 150 parts per hundred thousand and may be considerably higher.

The overlying Purlawaugh Beds are also essentially a shaly sequence and are characterised by undulating country with red soils, the latter resulting from the feruginous (iron rich) nature of the shales, sandstones and conglomerates which make up the sequence. Boring in these beds has met with similar results to boring in the Merrygoen-Napperby strata, and of several hundred bores recorded in these two groups of rocks, more than 50 percent have been failures.

The Pilliga Beds are the most widespread of the Jurassic formations. They form prominent cliffs, alternating with large gently sloping expanses of sandy soil. The strata are mainly sandstones which are often coarse grained and sometimes porous, but there are occasional lenses of shale. Bores sunk in these sandstones are almost invariably successful within a depth of 200 feet, the few failures being attributable to insufficient thickness of sandstones overlying the less porous older strata. Yields are often quite high, and the water quality is usually good. The average yield is of the order of 500 gallons per hour with supplies in excess of 1,000 gallons per hour being quite common. Some bores yield sufficient water for irrigation, although few have been adequately tested for yield.

All of these Mesozoic strata dip to the west and north-west beneath the alluvial plain. Where the porous sandstones outcrop, (in particular the Pilliga Group) they form intake beds which feed the pressure aquifers of the

Great Artesian Basin. Both the hydraulic gradient and variations in water quality show that there is a general movement of groundwater from the sandstone outcrops west of Coonabarabran north-westwards towards Coonamble, until beneath the junction of the Castlereagh and the Macquarie Rivers these north-westerly moving waters meet those moving south-west from intake beds in Queensland.

The rate of movement of these waters is extremely slow, except locally where velocities are increased due to pressure reduction at flowing or pumped bores. Permeabilities ranging up to 120 gallons per square foot per day per unit gradient have been calculated using data obtained from bores in the Coonamble lobe of the Great Artesian Basin. Allowing for a porosity of 20 percent and a gradient of 1 in 1,000, the speed of water movement varies from 1 mile in 150 years to 1 mile in over 1,000 years.

The Pilliga sandstone is covered by the Transition Stage, a sequence of sandstones and shales which are believed to mark a change from sediments deposited in fresh water to those deposited in brackish or salty water. Thick, virtually impermeable shaly strata cover the Transition Stage and trap the water in the underlying sandstones so that it cannot escape, thus confining the groundwater under pressure. When bores penetrate through the shales into the porous sandstones the water rises and if the land surface is low enough the water will flow out at the surface.

Some 2,600 feet of shales and sandstones belonging to the Artesian sequence occur beneath the north-western extremity of the Castlereagh River Valley, whilst in the vicinity of Coonamble there are about 2,000 feet of sediments.

North and west of the limit of flowing bores (see Figure 16), most bores reaching the main aquifer group in the Pilliga sandstones yield appreciable flows, ranging up to about half a million gallons per day. Outside the flow line the land surface rises fairly rapidly to more than 2,000 feet in the Warrumbungles and flowing supplies are not now obtained, although some quite large pumping supplies have recently been proved and are used for irrigation.

The salinity of the waters encountered in this part of the Great Artesian Basin decreases from highly saline in the upper shaly strata, through brackish (80 to 200 parts per hundred thousand) in the Transition Stage to less than 50 parts per hundred thousand in the Pilliga Sandstone. As would be expected the salinity in all aquifers decreases towards the intake areas to the south-east. The high residual alkalinity so typical of the waters from the main aquifers in the Pilliga beds, also decreases towards the intakes from 34 parts per hundred thousand in a sample from a bore near Coonamble to 20 parts per hundred thousand near the "limit of flowing bores" and 10 parts per hundred thousand near Gilgandra. With decreasing alkalinity there is a corresponding increase in hardness. This softening of the water as it moves underground is a natural base exchange process similar to that used in water softening equipment.

Water from the Great Artesian Basin provides Coonamble with a town supply, and is expected to play an increasing part in providing reliable "drought proof" supplies for Gilgandra and other smaller towns.

Waters from the deeper artesian aquifers in the vicinity of Coonamble are particularly corrosive because of the presence of free carbon dioxide. Bore casings are rapidly corroded and serious problems have been encountered with pumping equipment. The area where the waters are particularly aggressive is shown on Figure 16.

Unconsolidated Deposits.

The alluvial flats associated with the Castlereagh River have relatively poor groundwater potential. Its catchment upstream of the flood plains, which commence near Gilgandra, is much smaller than those of most inland rivers and suffers from the disadvantage, as far as the deposition of coarse sands and gravels is concerned, of not rising in the highlands further to the east. The rocks in the catchment are predominantly shales, sandstones and basalts and the combination of these source rocks and a fairly low rainfall has resulted in poor hydrogeological conditions in the alluvial flats.

There are numerous bores and wells in the flats in the Coonabarabran-Binnaway-Mendooran section of the valley, most of which are less than 50 feet deep. Yields rarely exceed 5,000 gallons per hour and the water is commonly

recorded as "hard" or "brackish". The potential for any irrigation development is very limited, and almost all supplies from bores or wells in the alluvium are used only for watering stock. So poor are the supplies available from the alluvium that most of the towns located on or near the section of the Castlereagh upstream from Gilgandra obtain water for town use from the very sandy bed of the river. Gilgandra, Mendooran, Binnaway, Merrygoen and, until recently, Coonabarabran which now utilizes a dam, obtain water from sumps or spear points in the sandy bed load of the river.

Some landholders obtain sufficient water for limited irrigation from batteries of spear points in the river bed, one such installation near Mendooran being reported as yielding 20,000 gallons per hour.

At Gilgandra the sands beneath the river bed are 20 feet thick but during the recent drought the water level has fallen and the yield is no longer adequate. Investigation is now being directed towards the porous Pilliga sandstones which outcrop near the township.

From Mendooran to Curban, a township some 15 miles downstream of Gilgandra, there is a noticeable improvement in the quality of the groundwater in the alluvium but yields are still quite small. The salinity of waters from wells or bores in this section of the valley is usually less than 100 parts per hundred thousand. Downstream of Curban the salinity gradually increases until in the vicinity of Coonamble the groundwater in the alluvial flood plain becomes quite saline and is rarely suitable even for sheep. Below Coonamble almost all the water in the alluvium is highly saline, and of no use for agricultural or pastoral pursuits.

Jointed Rocks.

The only jointed rocks with widespread occurrence in the Castlereagh Valley are basalts of Tertiary age. They occur as a capping on the Mesozoic strata in the elevated country to the west and south-west of Coonabarabran.

Another series of jointed rocks, called the Garrawilla basalts, are interbedded between the Mesozoic shales and sandstones belonging to the Merrygoen-Napperby and Purlawaugh beds, but in this valley they outcrop over quite small areas to the south-south east of Coonabarabran, and in the catchment of Weetaliba Creek, just above its junction with the main stream.

Occasional aquifers occur in the Garrawilla Beds, especially in the zones of weathered basalt between successive flows. However the outcrops are small and only occasional stock supplies have been obtained.

The Tertiary Basalts are much more widespread and give rise to some notable springs which maintain a number of permanent streams in the Warrumbungles. Some of these streams have been observed to disappear into the porous Pilliga sandstones where their courses cross these strata. Bores in the basalts yield useful supplies of the order of 500-1000 gallons per hour, from depths ranging to 300 feet. The water is usually hard, but is suitable for garden and stock use.

Use of Underground Water for Stock or Irrigat Purposes.

Although variable in quantity and quality, underground water is generally available for stock purposes throughout the valley.

In the more elevated areas hard rocks prevail making drilling difficult, whilst in some parts quite deep drilling is necessary. Alluvia associated with the main tributary streams towards Gilgandra are quite shallow and limited, and are generally confined to small areas flanking the present stream courses. Stock supplies are generally available from the alluvia and some useful irrigation supplies are also available but the potential is not high.

Good stock water is generally available ranging in depths from about 80 feet to over 2,000 feet from upstream of Gilgandra to the confluence of the Castlereagh with the Macquarie.

The areas extending south east from Coonamble are underlain by the Coonamble lobe of the Great Artesian Basin and recent work has indicated the presence of previously unsuspected deeper alluvium in the vicinity of Gilgandra.

This alluvium may possess potential for irrigation development from groundwater, but considerable further investigational work, including seismic refraction surveys and test drilling will be necessary before an assessment of the true potential and extent of the area can be made.

5. STREAM GAUGING STATIONS.

The measurement of streamflow usually involves two steps, the first being the measurement of river stage or gauge height in relation to a fixed datum and the second being the correlation of the measured height with discharge.

River heights are normally measured by visual observation of the water surface on 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 given in terms of cusecs, one cusec flowing for one day being approximately equal to two acre feet or the volume of water which would cover an area of one acre to a depth of two feet. In catchment yield studies the total volume of runoff, usually during one year, is frequently expressed in inches depth over the total area of the catchment.

Reliable records of streamflows are the most important factors in water resources investigations as they govern the economic and engineering aspects of schemes for irrigation development, town and country water supply and hydro-electric generation.

Stream height gauges were first installed in the Castlereagh Valley in 1909 at Coonabarabran, Mendooran, Gilgandra and Coonamble. Although regular streamflow measurements did not commence until 1951 the earlier gauge height records have been utilised to indicate the general pattern of streamflow variation during earlier years.

At the present time the Water Conservation and Irrigation Commission is operating eleven gauging stations so located as to measure the runoff from about 60 percent of the Castlereagh Valley and to provide adequate basic data for use in water resources investigations.

The current density of gauging stations in the Castlereagh Valley of about 1.6 stations per thousand square miles is about 15 percent greater than the average density for inland New South Wales (1.4 stations per thousand square miles) and about four times greater than the average density for the Australian mainland.

The locations of all gauging stations in the Castlereagh River Valley are shown at Figure 17 and relevant details concerning each station are given in Table 10.

TABLE 7.

Stream	Station	Catchment Area (Square Miles)	Type of Gauge	Period of Operation
Castlereagh River	Coonabarabran	53	Staff Gauge	1951 to date
Castlereagh River	Mendooran	1,340	Staff Gauge	1953 to date
Castlereagh River	Gilgandra	2,340	Staff Gauge	1952 to date
Castlereagh River	Coonamble	3,430	Staff Gauge	1962 to date
Castlereagh River	Binnaway	610	Pressure Recorder	1965 to date
Belar Creek	Warkton	50	Staff Gauge	1951 to date
Baronne Creek	Gulargambone	170	Staff Gauge	1965 to date
Merrygoen Creek	Mendooran	128	Staff Gauge	1965 to date
Wallumburrawang Creek	Bearbung	157	Staff Gauge	1965 to date
Weetaliba Creek	Ulinda	267	Staff Gauge	1965 to date
Warrena Creek	Coonamble	530*	Staff Gauge	1960 to date

* Refers to catchment area upstream of station. Effluent flood flows from the Castlereagh River are also measured at this station.

6. CATCHMENT YIELDS.

The systematic recording of streamflow within the Castlereagh Valley has provided a substantial volume of data for determination of water yield from various sections of the valley. The yield of a catchment is related to many factors, the main ones being precipitation, topography, geology, vegetation and area.

Over the fourteen year period commencing in 1952 the average flow of the Castlereagh River at Coonabarabran has been 12,000 acre feet per annum which is equivalent to an average rate of flow of 16 cusecs (6,000 gallons per minute).

At the gauging station located on Belar Creek at Warkton the average flow over a fourteen year period has been 13,000 acre feet per annum or 18 cusecs (6,800 gallons per minute).

Records of streamflow for the Castlereagh River at Mendooran and Gilgandra indicate that the average annual runoffs have been at the rates of 215 cusecs (80,600 gallons per minute) and 202 cusecs (75,800 gallons per minute) respectively, during the periods shown in Table 7.

For comparative purposes the yields at selected gauging stations in the Castlereagh Valley, based on available computed records, are given in Table 3. Details of monthly maximum, minimum and mean flows for the gauging stations located on Belar Creek at Warkton and on the Castlereagh River at Coonabarabran, Mendooran, Gilgandra and Coonamble are tabulated in Appendices 17 to 21 inclusive.

TABLE 3

Stream	Station	Years of Computed Records	Yield		
			Ac. Ft./ Annum	Cusecs	Gallons/ Minute
Castlereagh River	Coonabarabran	14	12,000	16	6,000
Castlereagh River	Mendooran	12	153,000	215	80,600
Castlereagh River	Gilgandra	13	147,000	202	75,800
Castlereagh River	Coonamble	3	60,000	82	30,800
Belar Creek	Warkton	14	13,000	18	6,800

7. AVERAGE ANNUAL RUNOFF.

As continuous streamflow records in the Castlereagh River Valley are of relatively short durations, the current estimate of the long term average annual surface water resources of the valley is based on approximate streamflow correlations with the adjoining Macquarie River Valley for which streamflow records are available from 1885.

The results of these correlations indicate that the average annual surface water resources of the Castlereagh Valley are of the order of 200,000 acre feet (540,000 million gallons) equivalent to a continuous rate of 103,000 gallons per minute. On a square mile of catchment area basis these resources are slightly less than the average for Inland New South Wales and are equivalent to about one third of the average for the Australian mainland.

The average annual runoff represents about 2½ percent of the average annual rainfall over the valley and may be compared with estimated runoff statistics for the adjoining basins of the Talbragar and Macquarie Rivers.

TABLE 9.

Basin	Catchment Area in Square Miles	Estimated Long Term Average Annual Runoff		
		Acre Feet per Annum	Acre Feet per Annum per Square Mile	Percentage Runoff
Castlereagh Valley	6,840	200,000	29	2.5
Talbragar River Valley	1,800	79,000	44	3.3
Macquarie River at Dubbo	7,700	890,000	116	8.5
Macquarie Valley (including Bogan Valley)	28,290	1,190,000	42	4.0

As indicated in Table 9 the percentage runoff from the Castlereagh Valley is about three quarters of the estimated percentage runoff from the adjoining Talbragar River Valley and only about three tenths of the estimated percentage runoff of the Macquarie River at Dubbo.

As percentage runoffs normally decrease with increases in catchment area it could be expected that the percentage runoff of the Castlereagh Valley would be greater than that of the combined Macquarie-Bogan Valleys. However the percentage runoff of the Castlereagh Valley is only about two thirds of the runoff from the combined catchments of the Macquarie and Bogan Rivers which drain an area over four times greater than the Castlereagh River. These percentage runoffs therefore indicate the relatively poor surface water yield of the Castlereagh Valley in comparison with the adjoining Macquarie Catchment.

8. VARIABILITY OF STREAMFLOWS.

Whilst average annual flows are suitable for comparison of long term yields from catchments they do not indicate the surface water resources which could be available in a particular year or the probable extent to which the valley's surface water resources could be utilised without the construction of conservation works.

An indication of the variability of streamflows at selected stations in the Castlereagh Valley is given at Table 10. This Table shows the maximum, minimum and mean discharges recorded at the selected stations over the periods of available records.

TABLE 1.

Stream	Station	Period of Computed Records	Recorded Discharges		
			Maximum	Minimum	Mean
Belar Creek	Warkton	December 1951 to May 1966	8,000 cusecs (3,000,000 g.p.m.)	0.1 cusecs (40 g.p.m.)	18 cusecs (6,800 g.p.m.)
Castlereagh River	Coonabarabran	October 1951 to May 1966	10,800 cusecs (4,000,000 g.p.m.)	0	16 cusecs (6,000 g.p.m.)
Castlereagh River	Mendooran	January 1953 to May 1966	91,300 cusecs (34,000,000 g.p.m.)	0	215 cusecs (80,600 g.p.m.)
Castlereagh River	Gilgandra	May 1952 to May 1966	100,000 cusecs (38,000,000 g.p.m.)	0	202 cusecs (75,800 g.p.m.)
Castlereagh River	Coonamble	March 1962 to June 1966	11,200 cusecs (4,200,000 g.p.m.)	0	82 cusecs (30,800 g.p.m.)

Streamflow records for gauging stations in the Castlereagh Valley show that there is an extremely high degree of variability in the annual water resources in the valley. In particular, streamflows during the high runoff years of 1955 and 1956 were many times greater than the drought years of 1960 and 1965.

During the flood month of February 1955 the total monthly flows of the Castlereagh River at Mendooran and Gilgandra were about 473,000 acre feet and 290,000 acre feet respectively which are equivalent to about three times and twice the recorded average annual flows at these stations. The peak discharges at these stations during the same month were about 91,000 cusecs (34 million gallons per minute) and 100,000 cusecs (38 million gallons per minute) respectively which are equivalent to over 400 times the average daily flows at both stations.

Monthly discharge hydrographs of streamflows of Belar Creek at Warkton and the Castlereagh River at Coonabarabran and Mendooran are shown at Figure 18 and similar graphs for the Castlereagh River at Gilgandra and Coonamble are appended at Figure 19. These graphs illustrate the extreme degree of variability of streamflows in the Castlereagh Valley.

Whilst the period of reliable records at Coonamble is limited to only three years a comparison of the hydrographs shown at Figure 19 indicates the magnitude of transmission losses which have occurred between Gilgandra and Coonamble.

The variations in average monthly rainfalls at Coonamble and Coonabarabran are shown at Figure 20. These locations can be considered to be representative of the lower and upper sections respectively, of the valley. Reference to Figure 20 shows that, for both locations, the highest average rainfall occurs in February and the lowest in September. It is of interest to note that a definite increase in monthly rainfall occurs in June.

Average monthly streamflows in the valley exhibit distributions similar to the average monthly rainfalls. The average monthly streamflows of Belar Creek at Warkton, and the Castlereagh River at Coonabarabran and Gilgandra are shown at Figure 21. The highest average monthly flows at each of these stations occur in February, the next highest flows being in the month of July. Generally the period of lowest flow occurs in the months of November and December.

9. PERSISTENCE OF STREAMFLOWS.

In view of the relatively low runoff which occurs in the valley in normal years and the comparatively long pervious channels of the main streams of the valley, stream discharges are relatively low and do not exhibit good flow persistence. A feature of the general characteristics of the majority of the streams in the valley is the substantial periods of time during which no flow occurs.

As previously indicated the major yield area of the valley is the Warrumbungle Range particularly in the vicinity of Caraghnan Mountain. Streams radiating from this area exhibit flow persistences greater than other sections of the valley.

However once the streams enter the general plain of the Castlereagh Valley substantial transmission losses occur. As a result all streams in the valley, with the exception of those in elevated catchments, show poor persistence of flows.

To indicate the distribution of flows at a particular location and to enable comparisons to be made with other stations, flow duration curves are constructed. These curves show the percentages of time that discharges varied from the minimum flow (in many cases this is zero) up to the maximum flow or any other desired discharge. Normally a flow duration curve indicates the percentages of time that discharges were equal to or greater than (or alternatively equal to or less than) any specific flow.

The duration curve of discharge of Belar Creek at Warkton is shown at Figure 22. The frequencies of flow during the period of records at this station are given in Table 11.

TABLE 11.

% of Time Flow Equalled or Exceeded	Corresponding Flow	
	Cusecs	Gals./Min.
10	25	9,400
30	6.5	2,440
50	2.0	750
70	1.5	560
90	0.9	340
95	0.6	220
100	0.1	38

The flow duration curve for the Castlereagh River at Coonabarabran is appended at Figure 23 and flow frequency statistics for this station are indicated in Table 12.

TABLE 12.

% of Time Flow Equalled or Exceeded	Corresponding Flow	
	Cusecs	Gals./Min.
10	22	8,250
30	3.2	1,200
50	1.0	380
70	0.5	190
90	0.1	38
95	0	0
100	0	0

The duration curve of recorded flow at the gauging station located on the Castlereagh River at Mendooran is shown at Figure 24. Flow frequency statistics for this station are given in Table 13.

TABLE 13.

% of Time Flow Equalled or Exceeded	Corresponding Flow	
	Cusecs	Gals./Min.
10	300	112,500
30	38	14,250
50	13	4,880
70	4	1,500
90	0	0
100	0	0

The flow duration curve for the Castlereagh River at Gilgandra is shown at Figure 25 and flow frequency statistics for this station are given in Table 14.

TABLE 14.

% of Time Flow Equalled or Exceeded	Corresponding Flow	
	Cusecs	Gals./Min.
10	270	101,300
30	57	21,400
50	18	6,750
70	5	1,880
90	0	0
100	0	0

To enable a direct comparison to be made of the flow statistics of the gauging stations on the Castlereagh River at Coonabarabran, Mendooran and Gilgandra and on Belar Creek at Warkton, composite flow duration curves have been derived and are shown at Figure 26. These curves are based on the discharge per square mile of catchment area for each location and indicate that, of the four stations considered, Belar Creek at Warkton shows the best flow persistence. However this station has the smallest catchment area of the four stations and as yields per square mile normally decrease with increases in catchment area this result is to be expected.

Although the catchment area of the Castlereagh River at Coonabarabran is only 6 percent greater than that above the gauging station on Belar Creek

at Warkton the flow persistence at Coonabarabran is substantially less than at Warkton, particularly in the low flow range. This difference is due to the differing topographic, rainfall and geologic features of the two catchments.

10. OCCURRENCE OF FLOODING.

Major floods in the Castlereagh Valley are of infrequent occurrence. However considerable property and stock losses have been experienced during past floods particularly during the extreme flood which occurred in February 1955.

At the Gilgandra gauging station the February 1955 flood reached a peak level of 33 feet equivalent to a flow of about 100,000 cusecs. The next highest flood at this station occurred in 1950 when a maximum height of 24 feet 9 inches equivalent to a discharge of about 54,000 cusecs was recorded.

During the February 1955 flood an estimated maximum discharge of 91,000 cusecs occurred at Mendooran, whilst at the upper stations at Coonabarabran and Warkton estimated peak flows were 10,800 cusecs and 8,000 cusecs respectively. In Coonamble a large section of the residential area was inundated due to breakaway flows from the Castlereagh River and backwater in Warrena Creek.

A comparison of the February 1955 flood characteristics at Warkton, Coonabarabran, Mendooran and Gilgandra is given in Table 15.

TABLE 15.

Stream	Station	Catchment Area (Square Miles)	February 1955 Flood		
			Peak Discharge		Approximate Flood Volume (Acre Feet)
			Cusecs	Cusecs/Sq. Mile	
Belar Creek	Warkton	50	8,000	160	20,000
Castlereagh River	Coonabarabran	53	10,800	204	29,000
Castlereagh River	Mendooran	1,340	91,000	68	500,000
Castlereagh River	Gilgandra	2,340	100,000	43	330,000

As indicated in Table 15 a considerable volume of flood water was apparently lost in transit between Mendooran and Gilgandra. Reports indicate that during this flood overbank flows from the Castlereagh River entered the upper catchment of Marthaguy Creek between Mendooran and Gilgandra, thereby diverting a considerable volume of flood water into the Macquarie River Valley.

11. DROUGHT PERIODS.

There does not appear to be any universally accepted definition of the term "drought". In general it is accepted as a period of rainfall deficiency at any location but such a criterion is inapplicable to locations where water supplies are drawn from streams which may originate in distant catchments.

Drought is considered to occur when the soil moisture is insufficient for the requirements of most crops during the growing season or when water shortages for domestic, industrial or municipal purposes are experienced. Normally a prime indicator of drought conditions is a diminished or exhausted rate of streamflow.

A graph depicting annual rainfalls recorded at Coonabarabran and Coonamble is appended at Figure 27. This graph indicates that the lowest calendar year rainfalls at Coonabarabran and Coonamble were 12.64 inches and 6.95 inches in 1940 and 1902 respectively. The most prolonged sequence of below average falls occurred over the period from 1897 to 1903 inclusive and this period appears to have been the most critical period since 1880 for the Castlereagh Valley. As indicated at Figure 27 other shorter sequences of low annual rainfalls have occurred but these periods have been relieved to some extent by the occurrence of reasonable rainfalls in preceding or following years.

Since the commencement of regular recording of streamflows of the Castlereagh River at Coonabarabran in October, 1951 the lowest flow over any twelve month period occurred from December, 1964 to November, 1965 inclusive. During this twelve month period the total runoff was 450 acre feet which is equivalent to about four percent of the average annual flow.

The lowest twelve monthly flow recorded on the Belar Creek at Warkton since December, 1951 occurred over the period from December, 1964 to November, 1965 inclusive when only 730 acre feet was recorded. This discharge is equivalent to about six percent of the average annual flow or one cusec (375 gallons per minute).

At the gauging station on the Castlereagh River at Mendooran several periods of zero flow have been experienced since January, 1953, the most prolonged being during the first five months of 1965. The lowest twelve monthly flow at this station occurred over the period from December, 1964 to November, 1965 inclusive when only 1,960 acre feet or 2.7 cusecs (1,000 gallons per minute) were recorded. This flow is equivalent to about one percent of the average annual flow at this location.

Since the commencement of regular recording of flows at Gilgandra in May 1952 the lowest twelve monthly flow recorded occurred in the period from December, 1964 to November, 1965 inclusive. The total discharge over this twelve month period was only 480 acre feet which is equivalent to about 0.3 percent or one three hundredth of the average annual flow.

12. THE 1964-1965 DROUGHT.

Since December 1964 the Castlereagh Valley, in common with many other areas of the State, has experienced a period of extremely low rainfall. During the twelve month period from November 1964 to October 1965 a total rainfall of only 807 points was recorded at Gilgandra. This rainfall is the second lowest twelve monthly rainfall which has been recorded at this location since 1884 and exceeds, by only 4 percent, the minimum twelve monthly fall of 779 points, which occurred from February 1946 to January 1947 inclusive. In addition the twelve monthly rainfall of 807 points is equivalent to about one third of the average annual rainfall at Gilgandra of approximately 23 inches.

The recorded monthly rainfalls for the four stations at Coolah, Coonabarabran, Gilgandra and Coonamble over the period from November, 1964 to September 1966 inclusive are shown in Table 16.

TABLE 16.

Period	Coolah	Coonabarabran	Gilgandra	Coonamble
November 1964	136	66	27	10
December 1964	151	86	120	37
January 1965	8	18	0	1
February 1965	35	4	48	12
March 1965	9	1	4	5
April 1965	189	36	0	21
May 1965	48	29	42	15
June 1965	23	82	60	65
July 1965	53	49	60	35
August 1965	129	199	161	88
September 1965	163	194	106	280
October 1965	150	469	179	269
November 1965	123	190	69	29
December 1965	466	901	419	530
January 1966	8	5	19	46
February 1966	52	154	98	13
March 1966	290	209	188	166
April 1966	66	172	82	8
May 1966	61	75	163	139
June 1966	100	239	49	68
July 1966	92	96	63	86
August 1966	204	579	232	305
September 1966	164	222	263	89
October 1966	286	368	332	193
Totals November 1964 to October 1966	3,006	4,443	2,784	2,510
Totals November 1964 to October 1965	1,094	1,233	807	838

As indicated in Table 16 drought conditions in the Castlereagh Valley were somewhat alleviated by the occurrence of above average rainfalls in December 1965 when over nine inches was recorded at Coonabarabran and an

average of over four inches was experienced over the catchment of the Castlereagh River above Coonamble.

As previously indicated, streamflows in the Castlereagh Valley over the twelve month period from December 1964 to November 1965 have been the lowest experienced since records were commenced in 1951. The total flow of the Castlereagh River at Gilgandra over a twelve month period from December 1964 to November 1965 and the minimum twelve monthly flows recorded at Gilgandra during other drought periods are given in Table 17.

TABLE .

	Total Volume in Acre Feet	Average Flow	
		Cusecs	Gallons per Minute
December 1964 to November 1965	480	0.7	250
January 1953 to December 1953	6,690	9.2	3,420
December 1959 to November 1960	7,580	10.4	3,900

Prolonged periods of no flow were experienced in the majority of streams in the Castlereagh Valley during 1965. The Castlereagh River at Gilgandra ceased to flow for a period of 307 consecutive days from January to November 1965. This period is nearly double the next most severe recorded period of 176 days of no flow, which occurred from January to July 1960.

At Mendooran the Castlereagh River ceased to flow for 171 consecutive days from January to June 1965. This period is double the next most severe recorded period which occurred from February to April 1960. Over the period of available records since 1951 the Castlereagh River at Coonabarabran has ceased to flow on several occasions, the most prolonged period being in January and February 1952 when the river was dry for 42 consecutive days. During the 1964/1965 drought, flow ceased at Coonabarabran for five days in October 1965.

Over the period of available records since December 1951 the Belar Creek at Warkton has not ceased to flow, however very low flows were experienced during the 1964/1965 drought, the minimum in these years being 0.4 cusecs (150 gallons per minute) in the first four months of 1965.

At Table 18 the twelve monthly flows of the Castlereagh River at Coonabarabran, Mendooran and Gilgandra and Belar Creek at Warkton are given for the period from December 1964 to November 1965 inclusive.

TABLE 18

Stream	Station	Twelve Month Flow December, 1964 to November, 1965			
		Acre Feet	Average Discharge		Percentage of Average Flow
			Cusecs	Gals./Min.	
Castlereagh River	Coonabarabran	450	0.6	230	4%
Castlereagh River	Mendooran	1,960	2.7	1,000	1%
Castlereagh River	Gilgandra	480	0.7	250	0.3%
Belar Creek	Warkton	730	1.0	380	6%

All streams in the valley experienced extremely low or zero flows over the period from December, 1964 to November, 1965. A comparison of the minimum total three monthly and six monthly flows during this period for the stations at Coonabarabran, Mendooran, Gilgandra and Warkton is given at Table 19.

TABLE 19

Stream	Station	Minimum Total Flow During 1964/1965 (Acre Feet)	
		Three Months	Six Months
Castlereagh River	Coonabarabran	51	168
Castlereagh River	Mendooran	0	35
Castlereagh River	Gilgandra	0	0
Belar Creek	Warkton	76	288

The 1964/1965 drought period ended with the occurrence of minor floods during the first three weeks of December 1965 when maximum flows of 1,300 cusecs and 3,700 cusecs, were recorded at Coonabarabran and Mendooran respectively. However the effects of these flows were not prolonged and by the beginning of 1966 flows in all streams in the valley had fallen to low discharges.

During 1966 the downward trend in streamflows continued and although minor rises occurred in March and April discharges in early August had reached low values. However during the second week in August the Castlereagh Valley experienced falls of about 1½ inches over a period of two days and these were followed a week later by further falls of over two inches over a three day period. Further falls of about one inch were experienced over the

catchment during the final two days of August. In general, rainfall over the valley during August 1966 was about double the average rainfall and, as a result, minor increases in flow occurred. In addition widespread rainfalls, averaging about one inch in 24 hours over the Castlereagh Valley, occurred during the second week in October.

As a result of the August and October rainfalls streams in the Castlereagh Valley have experienced minor increases in flows, details of recent streamflow measurements at Warkton, Coonabarabran, Mendooran, Binnaway, Gilgandra and Coonamble being given in the following Table 20.

TABLE 20

Stream	Station	Date of Measurement	Measured Flow (Cusecs)
Belar Creek	Warkton	7.10.1966	10
Castlereagh River	Coonabarabran	7.10.1966	21
Castlereagh River	Mendooran	6.10.1966	78
Castlereagh River	Binnaway	6.10.1966	59
Castlereagh River	Gilgandra	12.10.1966	52
Castlereagh River	Coonamble	14.10.1966	49

13. WATER REQUIREMENTS FOR CURRENT DEVELOPMENT.

Sheep grazing for wool and mutton and the growing of wheat are the main agricultural activities in the Castlereagh River Valley. A minor secondary industry which is undertaken mainly in the southern section of the valley is the raising of beef cattle.

The area authorised for irrigation by license under the Water Act has increased from 110 acres at June 1945 to 1,912 acres at June 1966, the corresponding number of licenses being only two at June 1945 and seventy-seven at June 1966. The variaton in total area and number of licenses for authorised irrigation purposes over the period from 1945 to 1966 in the Castlereagh River Valley is given at Figure 28.

The variation in the total area authorised for irrigation in the Castlereagh Valley has been somewhat erratic over the past twenty years. Up to 1953 very little licensed irrigation was practised in the Castlereagh Valley, the total licensed area at June 1953 being only 74 acres. However during the years from 1953 to 1960 the authorised area increased rapidly and was 1,953 acres at June 1960. Since 1960 the authorised area has been

subject to minor variations, the minimum value being 1,704 acres at June 1965 and the maximum 1,955 acres at June 1962.

As indicated at Figure 28 variations in the number of licenses for authorised irrigation have followed a similar pattern to the authorised area. However since 1959 the average acreage applicable to each license has remained reasonably constant at about 25 acres.

At the end of June 1966 there was a total of 20 licenses for the diversion of up to 6,075 gallons per minute (16 cusecs) for recreational, town and stock water supply purposes.

To date no major water conservation storages have been constructed in the valley. The only water storage of any significant size in the valley is the Timor Dam which is located about nine miles upstream of Coonabarabran. This storage which has a maximum capacity of about 1,200 acre feet (335 million gallons) is used exclusively to supply water to the town of Coonabarabran. It is estimated that the storage could provide about 800 acre feet per annum for this purpose.

The estimated maximum requirements under present conditions for irrigation under license, water supply and riparian usage (not including transmission losses) are given in Table 21.

TABLE 21.

Requirement	Acre Feet per Annum	Average Cusecs
Irrigation under license (1,912 acres at 2½ feet per season)	4,800	6.6
Town and commercial water supplies	11,900	16.3
Riparian usage	17,800	24.4
Totals	34,500	47.3

There is a limited demand for irrigation on the tributaries of the Castlereagh River. The areas authorised for irrigation on the Castlereagh River and its tributaries at 30th June 1966, and the estimated total demands (including water supply and riparian usage but excluding transmission losses) are given in Table 22.

TABLE 22.

Stream	Area Authorised for Irrigation (Acres)	Total Demand	
		Average Cusecs	Acre Feet per Annum
Castlereagh River above Gilgandra	1,252	20.2	14,700
Castlereagh River below Gilgandra	388	6.0	4,400
Belar Creek and tributaries	155	1.5	1,100
Greenbah Creek and tributaries	20	1.0	700
Weetaliba Creek and tributaries	28	1.6	1,200
Warrena Creek and tributaries	10	3.2	2,300
Mowlma Creek and tributaries	20	2.7	2,000
Nedgera Creek and tributaries	30	2.5	1,800
Miscellaneous tributaries	9	8.6	6,300
Totals	1,912	47.3	34,500

It should be noted that the foregoing requirements given in Tables 21 and 22 do not include any allowance for transmission losses due to evaporation and seepage. As previously indicated seepage losses can be of substantial magnitudes, particularly in the sections of the Castlereagh River below Mendooran. These seepage losses are directly related to groundwater conditions and the magnitude of discharges in the various sections of the Castlereagh River and therefore can be expected to vary widely depending on streamflows and antecedent meteorological conditions.

14. POSSIBLE IRRIGATION DEVELOPMENT.

Due to the increasing elevation of the country back from the river, in the upper reaches, it would be necessary for water to be supplied by pumps and distributed by sprays. Irrigation development, supported by a storage on the main river, will therefore probably be confined largely to river frontage lands along the upper river. Readily irrigable lands fronting the main stream extend downstream almost to Gilgandra, and comprise an area of approximately 50,000 acres of which 10,000 acres and 25,000 acres lie upstream of the Binnaway and Neilrex dam sites respectively, and 25,000 acres is situated between the Neilrex dam site and Gilgandra.

Below Gilgandra, within the riverine plain and along the main tributaries below Coonamble, a far greater potential exists for irrigation development because topographically suitable lands extend for many miles from the river. The extent of development in this region will be governed by the availability of water, as the area of potentially suitable land far exceeds that which could be supplied by economic regulation of the Castlereagh River and its main tributaries.

The area of readily irrigable land along the Castlereagh River below Gilgandra and within two miles from the river is assessed as being of the order of 140,000 acres, but of course, a far greater area would be available at some distance from the river.

Irrigation development of lands remote from the main river or on tributary streams will be largely dependent on the construction of farm dams or small storages on tributary streams.

The potential areas of readily irrigable lands along the Castlereagh River and tributaries which have been assessed from field inspection and examination of aerial photographs are summarised in Table 23 which shows that the potential area of readily irrigable lands within the Castlereagh Valley is approximately 250,000 acres. Existing irrigation development within the Castlereagh Valley therefore represents about 1 percent of those lands which are readily available and suitable. This no doubt results from the absence of a dependable water supply.

TABLE 23.

Stream	Approximate Area of Suitable and Readily Irrigable Land (Acres)
Castlereagh River above Ulamambri Dam Site	3,000 acres
Tributaries above Ulamambri Dam Site	1,000 acres
Castlereagh River between Ulamambri Dam Site and Binnaway Dam Site	7,000 acres
Tributaries between Ulamambri Dam Site and Binnaway Dam Site	4,000 acres
Castlereagh River between Binnaway Dam Site and Neilrex Dam Site	15,000 acres
Tributaries between Binnaway Dam Site and Neilrex Dam Site	5,000 acres
Castlereagh River between Neilrex Dam Site and Gilgandra	25,000 acres
Tributaries between Neilrex Dam Site and Gilgandra	15,000 acres
Castlereagh River between Gilgandra and Coonamble	75,000 acres
Tributaries between Gilgandra and Coonamble	20,000 acres
Castlereagh River between Coonamble and Macquarie River	65,000 acres
Tributaries between Coonamble and Macquarie River	15,000 acres

15. INVESTIGATION OF DAM SITES.

Detailed investigations have not yet been undertaken of sites for storage dams on the Castlereagh River or its tributaries, although preliminary examination of the valley has revealed the existence of three apparently

suitable sites for the construction of a dam on the main stream.

These sites are shown in Figure 29. They are located near Neilrex, about 12 miles upstream from Mendooran; near Binnaway, about 4 miles upstream from the town, and at Ulamambri, downstream of the confluence of Baby Creek. (The lastmentioned is suitable only for the construction of a small dam, for topographic reasons). Catchment areas above the dam sites are as follows:

Ulamambri Dam Site : 300 square miles

Binnaway Dam Site : 625 square miles

Neilrex Dam Site : 1,130 square miles

Because of the relatively low mean annual rainfall over the Castlereagh Valley and the high percentage variation, effective regulation of the Castlereagh River is more difficult than on those streams which rise in the Dividing Range and consequently the relationship between storage capacity and safe draft is less attractive.

In addition, available sites appear less suitable topographically than those on many other rivers. The valley section at all of the sites referred to above is wide and rock occurs only on one abutment.

A dam constructed on the Ulamambri site would submerge the Ulamambri Village and extensive lengths of road and railway works. The Binnaway storage would inundate less highly developed land than either of the other two sites.

Present indications are that the Binnaway site is the most favourable of the three, but confirmation of this will require detailed investigation including surveys, foundation drilling and the location and testing of construction materials.

At present only an approximate assessment can be made of the safe draft-capacity relationships for the two larger storages and these are shown in Table 27.

TABLE 27

Dam Site	Storage Capacity Acre Feet	Regulated Flow Acre Feet/Annum	Percentage Regulation*
Binnaway	250,000	30,000	15%
Binnaway	350,000	40,000	20%
Neilrex	500,000	70,000	35%

* Percentages are based on the estimated yield of the valley.

The benefit-cost relationship attainable from construction of a storage on the Castlereagh River would be low, for whilst expansion of irrigation along the Castlereagh would no doubt bring benefits comparable with those on other western streams, the cost in terms of water supply would be considerably greater because of the poorer safe draft-capacity relationship and the higher cost of dam construction resulting from the less favourable topography and foundation conditions.

The position is further aggravated because of the inevitable loss of a large portion of the available regulated flow by absorption in the extensive sand deposits within the river bed.

There is very limited scope for the construction of weirs on the Castlereagh River and its tributaries. The depth of alluvial material and the deposits of sand which exist over most of the river length render the sites quite unsuitable for weir construction. Although better foundation conditions are available upstream of Neilrex, and particularly above Ulamambri, the bed grade of the river and its tributaries rapidly increases towards its headwaters so that weir capacities would be relatively small.

These factors emphasise the desirability of provision of small private storages, either in the nature of relatively minor structures on tributaries or farm dams to enable better utilization of the valley's limited water resources.

The storage potential by way of farm dams however is not high because of topography and prevailing soil types. Upstream of Mendooran the available soils and characteristic land slopes are generally unsatisfactory for earth dam construction.

To the north east and east of Gilgandra towards Mendooran the potential for surface storage works is poor because of the pervious sandy type soils in this area.

From Gilgandra downstream the terrain is generally flat, and whilst prevailing soil types are suitable for surface storage works these are normally confined to excavations which are suitable as stock water structures but are uneconomic for irrigation purposes.

16. ACKNOWLEDGMENT.

The Water Conservation and Irrigation Commission gratefully acknowledges the assistance provided by the Director, 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.

GILGANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1883		NO RECORDS			145	48	19	154	37	373	159	15	
1884	30	50	65	302	72	266	235	72	91	136	154	99	1572
1885	318	121	100	119	48	274	31	20	95	43	149	368	1686
1886	128	21	5	701	364	176	337	568	64	136	532	826	3858
1887	427	439	435	171	44	148	251	609	53	200	403	747	3927
1888	49	379	40	0	163	74	34	0	168	120	19	125	1171
1889	120	108	307	483	546	361	90	236	110	317	260	344	3282
1890	366	738	516	499	376	459	225	125	373	160	48	174	4059
1891	767	140	355	285	163	364	354	332	321	154	221	219	3675
1892	225	70	55	118	363	148	467	92	347	325	238	233	2681
1893	279	108	384	267	556	284	255	250	121	111	332	44	2991
1894	221	269	840	560	80	265	128	161	170	267	71	394	3426
1895	506	56	11	43	125	123	45	78	178	307	189	293	1954
1896	69	699	123	130	368	173	158	127	42	116	357	228	2590
1897	290	65	91	0	136	273	404	155	303	250	30	88	2085
1898	682	359	0	0	120	317	40	250	75	291	104	210	2448
1899	194	143	86	229	14	216	415	234	294	85	130	8	2048
1900	228	49	493	204	265	238	178	23	126	24	26	184	2038

GILGANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1901	101	0	282	285	279	92	80	316	49	168	102	46	1800
1902	19	44	71	0	9	49	20	171	63	237	119	448	1250
1903	22	45	179	614	353	21	314	129	326	266	226	289	2784
1904	285	166	278	17	94	56	224	142	32	215	23	72	1604
1905	72	291	222	735	222	119	186	135	13	181	60	55	2291
1906	304	91	360	82	151	254	65	393	435	158	360	104	2757
1907	359	31	285	257	13	247	214	275	87	29	390	164	2351
1908	85	657	225	102	103	117	56	195	131	150	192	71	2084
1909	229	547	95	164	100	391	22	507	107	314	97	343	2916
1910	489	0	407	133	117	186	102	68	33	219	70	213	2037
1911	536	326	23	0	148	97	145	197	179	16	385	507	2559
1912	31	167	102	3	4	257	377	119	70	121	21	3	1275
1913	134	271	230	238	307	178	41	43	100	157	55	86	1840
1914	20	454	403	151	141	40	102	1	74	35	331	299	2051
1915	215	7	54	17	318	169	148	101	55	117	9	136	1346
1916	61	114	9	317	111	623	319	175	237	309	286	357	2918
1917	332	78	225	24	22	307	114	231	276	135	369	184	2297
1918	335	43	20	120	90	23	116	260	15	37	40	91	1190

GILGANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1919	53	89	80	47	370	20	65	81	42	12	16	234	1109
1920	178	145	0	100	66	459	614	179	314	127	143	440	2765
1921	213	60	269	577	413	348	207	151	154	113	370	297	3172
1922	235	39	2	66	22	115	229	33	64	84	49	354	1292
1923	0	0	125	0	47	409	152	50	186	121	164	627	1881
1924	48	173	18	122	28	179	212	126	419	228	792	89	2434
1925	98	140	116	13	256	268	152	162	20	41	436	182	1884
1926	118	30	820	384	313	186	62	73	226	71	39	409	2731
1927	133	0	150	141	8	106	5	88	77	136	318	152	1314
1928	449	332	139	51	27	107	218	17	21	104	100	49	1614
1929	88	187	114	185	12	83	54	114	132	96	121	31	1217
1930	268	73	180	82	136	357	335	135	47	359	82	157	2211
1931	169	16	453	406	523	438	113	23	54	25	196	506	2922
1932	19	62	292	147	52	106	149	94	291	117	231	169	1729
1933	133	44	123	156	160	137	234	52	227	189	439	105	1999
1934	76	965	0	71	1	178	286	181	207	464	274	39	2742
1935	288	3	17	154	81	113	54	94	191	237	77	57	1366
1936	234	254	311	44	97	102	345	120	93	56	1	446	2103

Appendix 1
Sheet 4

GILGANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1937	216	285	155	28	62	136	61	126	50	216	246	27	1608
1938	42	108	57	122	161	150	204	181	48	261	186	102	1622
1939	238	28	428	556	108	258	96	447	15	175	193	67	2609
1940	13	0	62	332	32	13	12	121	219	0	27	106	937
1941	689	64	234	50	56	389	61	65	70	135	257	26	2096
1942	219	178	128	0	493	388	281	63	123	84	297	432	2686
1943	199	103	14	239	231	97	75	91	74	65	431	47	1666
1944	240	119	100	64	325	16	176	433	34	32	61	0	1600
1945	279	193	41	209	204	820	151	413	0	134	71	47	2562
1946	140	94	42	98	114	51	49	10	143	26	69	62	898
1947	21	666	122	44	115	109	181	170	444	345	358	398	2973
1948	157	289	360	84	172	481	52	116	285	25	141	34	2196
1949	159	252	310	181	85	253	208	225	369	266	177	22	2507
1950	422	461	470	442	192	459	470	220	169	701	961	42	5009
1951	436	258	197	83	307	258	134	234	114	47	114	115	2297
1952	9	357	236	196	154	268	302	598	84	125	58	272	2659
1953	132	315	84	133	250	23	36	314	81	245	134	160	1907
1954	419	789	0	81	6	128	52	78	110	544	94	147	2448

GILGANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1955	433	1493	50	135	200	135	165	212	186	407	265	61	3742
1956	390	936	497	236	239	356	314	108	132	196	17	138	3559
1957	27	327	140	105	5	108	135	145	0	5	6	300	1303
1958	451	115	83	127	267	144	82	154	321	395	111	173	2424
1959	284	400	288	507	50	153	243	1	23	170	88	176	2383
1960	206	53	56	100	187	10	286	254	225	153	350	118	2008
1961	69	171	321	149	0	68	168	207	16	118	548	406	2241
1962	317	51	120	71	182	40	157	287	59	184	55	553	2076
1963	576	268	464	30	404	277	138	232	130	55	115	250	2939
1964	247	77	213	385	149	82	228	125	272	288	27	120	2213

Appendix 2
Sheet 1

GULARGAMBONE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1886	N.R.	33	0	387	458	314	363	499	35	177	102	531	
1887	356	476	372	72	39	115	280	361	28	155	118	777	3149
1888	103	898	210	40	110	30			NO RECORDS				
1889	151	203	263	548	703	343	193	335	543	455	494	366	4597
1890	483	926	753	339	401	653	175	245	282	115	57	133	4562
1891	679	40	469	212	145	296	197	282	260	137	110	323	3150
1892	180	0	187	169	345	133	218	39	283	267	258	222	2301
1893	322	135	415	90	550	371	217	281	52	30	184	18	2665
1894	441	242	908	385	90	168	24	175	135	155	80	263	3066
1895	802	90	0	0	105	0	0	70	115	332	202	446	2162
1896	45	1053	135	196	507	200	128	111	6	29	272	156	2838
1897	467	45	155	0	105	424	377	100	198	185	30	105	2191
1898	425	475	0	0	119	304	0	95	79	197	207	70	1971
1899	170	125	46	324	0	188	468	174	225	37	87	0	1844
1900	136	13	463	200	290	179	139	0	107	15	22	95	1659
1901	65	13	269	264	215	212	30	394	36	126	91	0	1715
1902	24	13	70	30	0	68	5	168	122	145	84	534	1263
1903	15	0	104	267	274	8	255	147	280	162	201	126	1839

GULARGAMBONE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1904	295	264	187	0	75	65	166	35	14	232	8	110	1451
1905	12	302	195	718	152	150	160	116	33	55	60	81	2034
1906	143	76	148	123	174	215	0	572	414	183	109	107	2264
1907	268	6	100	57	0	169	111	122	0	18	274	46	1171
1908	119	668	125	180	105	95	85	179	102	90	110	141	1999
1909	136	661	134	131	72	341	16	477	104	87	255	442	2856
1910	576	18	194	48	76	294	49	41	102	148	125	358	2029
1911	582	329	26	0	226	63	135	283	142	122	230	434	2572
1912	125	58	171	0	0	323	368	102	66	105	60	14	1392
1913	300	204	298	338	418	280	56	63	131	154	100	183	2525
1914	130	366	481	127	198	34	157	0	42	40	364	328	2267
1915	163	0	17	32	338	115	106	124	74	151	0	202	1322
1916	27	58	23	483	73	402	423	175	200	367	301	335	2867
1917	491	177	106	9	31	380	89	178	419	95	505	110	2590
1918	328	38	19	136	99	21	126	274	29	12	110	45	1237
1919	101	124	113	5	456	53	72	129	21	52	50	333	1509
1920	226	9	0	11	57	1094	494	151	451	180	197	393	3263
1921	147	93	447	468	485	408	289	147	191	156	260	350	3441

GULARGAMBONE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1922	254	40	0	62	0	133	299	68	30	58	48	343	1335
1923	82	1	62	19	28	450	147	50	202	83	85	647	1856
1924	234	321	5	211	6	111	129	52	396	333	885	109	2792
1925	121	190	147	0	245	243	136	212	41	33	389	273	2030
1926	196	48	968	482	304	188	94	46	102	46	17	284	2775
1927	154	3	16	153	35	85	0	91	41	151	346	183	1258
1928	296	622	133	52	32	51	174	22	3	40	98	5	1528
1929	32	82	59	233	58	54	39	127	133	122	118	50	1107
1930	488	70	247	75	100	472	334	161	83	256	155	121	2562
1931	146	57	426	380	467	414	162	10	38	30	337	402	2869
1932	39	116	216	128	40	87	176	85	196	42	147	86	1358
1933	147	19	89	211	123	100	282	16	267	256	332	140	1982
1934	143	590	0	116	2	164	247	137	200	571	147	76	2393
1935	185	3	11	84	32	62	103	82	204	293	45	73	1177
1936	466	191	224	28	91	43	375	130	61	32	0	242	1883
1937	137	235	120	21	105	127	48	73	42	140	275	9	1332
1938	112	39	5	95	390	136	205	158	40	230	107	30	1547
1939	231	32	609	173	76	217	66	286	6	193	75	38	2002

GULARGAMBONE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1940	37	2	100	304	5	6	0	106	200	0	41	93	894
1941	661	36	224	14	61	244	21	41	26	134	136	91	1689
1942	118	124	58	0	503	291	300	45	98	91	217	233	2078
1943	329	86	3	97	196	88	68	55	67	422	394	100	1905
1944	118	189	23	86	288	5	142	288	18	13	42	0	1212
1945	258	355	22	152	242	452	118	223	0	98	57	34	2011
1946	114	47	78	119	63	31	27	18	158	27	48	74	804
1947	9	472	209	2	151	89	136	173	465	352	341	457	2856
1948	283	207	144	109	282	604	49	114	373	11	161	163	2500
1949	67	368	348	137	131	179	102	43	375	227	249	31	2257
1950	591	359	368	672	146	369	356	141	204	697	891	83	4877
1951	549	363	131	71	202	273	98	203	112	23	128	246	2399
1952	14	318	247	316	126	248	230	376	33	99	65	114	2186
1953	143	418	68	110	356	18	46	255	59	187	220	77	1957
1954	387	920	0	52	2	85	75	47	120	483	127	407	2705
1955	527	912	2	249	158	127	150	215	140	438	229	37	3184
1956	482	497	430	276	327	308	383	64	58	246	16	172	3259
1957	11	270	139	88	4	105	103	80	0	0	0	216	1016

GULARGAMBONE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1958	440	210	28	84	253	149	79	116	282	287	37	213	2178
1959	321	430	459	322	49	106	277	0	42	133	36	181	2356
1960	136	64	56	45	159	7	172	199	369	68	250	78	1603
1961	65	263	217	128	35	24	181	136	9	45	446	315	1864
1962	572	171	166	164	110	24	140	225	160	161	33	419	2345
1963	400	181	347	53	300	172	36	186	136	60	50	213	2134
1964	340	91	77	367	153	15	143	78	213	312	27	48	1864

PIER PIER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1884	0	42	33	244	43	237	76	34	141	48	110	28	1036
1885	299	82	224	101	62	179	11	2	79	60	110	117	1326
1886	50	19	0	192	157	178	267	426	15	293	500	313	2410
1887	533	422	437	76	0	64	166	487	7	263	262	243	2960
1888	73	462	0	0	176	0	0	3	72	35	0	102	923
1889	57	145	137	479	361	183	216	286	49	281	103	338	2635
1890	330	858	517	69	252	311	149	41	213	119	32	83	2974
1891	676	80	497	181	23	198	112	147	207	31	28	123	2303
1892	174	23	16	61	180	77	129	27	206	293	94	193	1473
1893	70	37	394	82	194	387	137	153	5	157	155	129	1900
1894	239	177	728	443	25	202	61	75	87	100	38	304	2479
1895	464	91	0	57	103	61	23	9	80	167	436	247	1738
1896	84	426	60	156	221	31	156	30	10	15	296	56	1541
1897	281	32	164	0	0	333	435	95	206	178	6	61	1791
1898	497	515	0	5	127	120	15	66	73	61	36	4	1519
1899	245	81	40	148	0	99	210	330	144	10	78	6	1391
1900	120	14	150	35	281	132	129	0	122	13	7	70	1073
1901	55	58	111	309	100	108	73	285	51	64	36	0	1250

Appendix 3
Sheet 2

PIER PIER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1902	66	29	47	7	0	57	0	81	32	40	127	115	601
1903	175	6	242	88	245	45	256	125	438	164	104	74	1962
1904	316	324	228	101	47	20	109	29	53	250	38	110	1625
1905	5	192	114	525	98	53	101	35	4	37	57	120	1341
1906	90	249	177	111	167	105	9	303	529	98	337	26	2201
1907	407	13	330	0	100	92	31	113	50	26	179	114	1455
1908	185	422	106	116	69	52	34	189	67	120	186	390	1936
1909	116	310	85	110	78	227	53	322	46	88	124	166	1725
1910	327	50	184	25	0	276	74	53	66	113	117	278	1563
1911	425	184	0	0	116	28	56	254	50	18	148	286	1565
1912	155	124	141	0	0	320	202	21	32	103	130	83	1311
1913	120	225	100	176	292	241	30	34	30	50	93	281	1672
1914	61	336	236	44	113	10	72	0	7	100	133	309	1421
1915	22	5	14	154	197	31	121	162	48	212	0	366	1332
1916	39	49	42	475	54	317	349	65	120	260	226	375	2371
1917	72	231	46	6	12	222	86	85	156	83	358	224	1581
1918	310	39	19	47	71	4	114	215	24	18	35	51	947
1919	64	87	13	63	214	7	34	55	32	17	3	163	752

Appendix 3
Sheet 3

PIER PIER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1920	77	4	25	29	31	607	664	89	359	103	53	380	2421
1921	114	151	477	350	229	415	420	79	44	28	65	283	2655
1922	47	102	0	54	3	152	185	14	46	48	0	377	1028
1923	1	94	87	1	36	290	112	17	138	149	45	512	1482
1924	62	230	0	41	6	73	169	35	360	111	553	99	1739
1925	151	167	145	0	230	420	80	91	31	40	378	265	1998
1926	212	39	763	320	191	100	75	40	246	32	0	191	2209
1927	225	37	71	83	32	62	18	17	38	108	191	323	1205
1928	242	123	128	135	30	36	155	20	0	26	80	18	993
1929	140	88	48	160	0	51	49	85	63	40	147	10	881
1930	387	30	71	41	70	347	207	214	27	141	23	85	1643
1931	86	0	788	218	354	356	116	10	6	17	240	474	2665
1932	75	43	259	117	98	79	277	30	232	24	121	62	1417
1933	100	16	112	112	83	60	269	12	263	447	472	94	2040
1934	156	534	0	2	0	164	238	150	160	683	177	138	2402
1935	230	0	6	24	0	71	69	27	267	146	36	138	1014
1936	395	144	384	20	58	43	264	93	62	0	0	272	1735
1937	54	478	119	6	11	80	53	99	102	47	47	23	1119
1938	156	115	0	41	284	159	120	55	79	205	190	6	1410

PIER PIER RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1939	86	168	482	208	100	206	130	410	0	154	96	40	2080
1940	11	191	60	385	51	3	3	42	134	0	77	286	1243
1941	858	20	128	9	162	235	6	27	33	55	144	147	1824
1942	113	577	129	0	519	136	235	4	88	38	235	316	2390
1943	421	30	0	121	145	61	41	49	90	35	353	36	1382
1944	52	108	50	26	76	11	132	236	14	12	18	0	735
1945	200	210	69	154	159	183	166	132	24	58	35	31	1421
1946	172	119	105	33	56	28	0	0	184	54	37	75	863
1947	42	556	94	31	100	62	109	225	159	273	187	333	2171
1948	178	119	230	74	300	482	34	90	121	5	57	47	1737
1949	48	305	224	160	115	228	77	0	292	157	472	19	2097
1950	344	436	313	545	125	359	368	80	215	449	605	15	3854
1951	113	224	59	42	158	236	31	162	79	9	102	54	1269
1952	36	181	251	73	81	216	117	204	7	74	48	200	1488
1953	112	177	20	141	253	9	5	105	63	107	163	34	1189
1954	194	578	3	9	1	54	82	65	45	371	109	188	1699
1955	501	458	53	67	127	45	104	175	44	363	194	76	2207
1956	447	551	349	355	144	310	304	24	25	334	56	158	3057
1957	10	554	54	38	0	56	68	40	0	105	3	78	1006

Appendix 4
Sheet 1

BARADINE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1882	0	661	20	215	279	316	101	56	20	260	485	243	2656
1883	30	179	30	212	336	65	22	178	83	326	132	13	1606
1884	0	32	42	250	69	257	221	36	342	54	211	126	1640
1885	341	205	250	98	72	394	12	6	49	46	80	110	1663
1886	99	0	0	300	430	257	370	734	35	285	365	513	3388
1887	600	430	222	380	40	180	530	353	31	221	322	413	3722
1888	165	486	30	0	128	5	0	0	91	78	23	147	1153
1889	112	190	388	490	822	234	297	207	38	448	370	342	3938
1890	389	732	407	261	544	432	150	145	263	198	95	210	3826
1891	703	90	522	115	135	289	185	170	140	0	20	50	2419
1892	294	0	152	50	400	272	50	100	300	400	264	283	2565
1893	310	90	50	146	327	266	50	525	16	296	89	84	2249
1894	25	46	1019	496	40	177	76	86	127	148	104	90	2434
1895	515	211	0	63	137	113	0	0	258	0	379	226	1902
1896	0	661	439	177	327	58	226	131	92	116	263	122	2612
1897	405	21	117	0	91	433	629	20	257	125	0	96	2194
1898	289	669	0	0	120	239	11	161	100	265	107	168	2129
1899	444	89	30	260	0	234	628	272	156	158	123	35	2429

Appendix 4
Sheet 2

BARADINE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1900	311	0	476	127	412	432	139	0	101	0	59	333	2390
1901	0	0	0	0	308	45	43	565	88	0	0	72	1121
1902	97	72	48	100	10	75	2	173	72	149	163	229	1190
1903	106	130	197	520	681	25	286	157	480	117	112	220	3031
1904	254	914	234	29	96	92	186	90	43	267	42	185	2432
1905	37	213	225	784	193	170	217	228	19	178	191	78	2533
1906	170	103	236	62	105	275	25	463	459	162	322	32	2414
1907	350	26	201	131	9	247	140	189	52	38	226	293	1902
1908	55	851	222	45	159	119	117	134	119	236	271	298	2626
1909	156	591	99	150	76	274	106	404	157	111	238	339	2701
1910	1070	0	213	35	81	303	125	71	128	237	145	242	2650
1911	471	294	153	0	105	56	269	169	120	136	252	310	2335
1912	55	0	240	0	0	313	377	122	37	315	35	0	1494
1913	220	220	289	265	405	165	60	20	90	85	65	160	2044
1914	186	228	470	65	199	0	100	0	10	60	105	370	1793
1915	100	43	7	122	325	135	235	134	37	169	0	283	1590
1916	135	178	20	307	90	393	475	96	244	232	305	543	3018
1917	693	213	10	0	10	285	93	147	246	181	270	239	2387

Appendix 4
Sheet 3

BARADINE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1918	405	30	33	33	80	42	178	375	26	12	50	0	1264
1919	98	223	91	71	350	22	77	60	0	30	0	398	1420
1920	164	55	16	37	42	791	967	175	235	40	219	418	3159
1921	79	125	133	411	305	460	275	108	72	138	25	362	2493
1922	99	322	0	89	18	147	207	20	12	105	90	267	1376
1923	0	15	65	0	12	434	127	25	155	100	107	466	1506
1924	156	466	0	175	45	125	138	117	453	152	1005	165	2997
1925	177	144	109	0	228	115	140	159	42	35	377	140	1666
1926	105	0	634	215	383	70	78	38	321	28	0	245	2117
1927	224	0	94	155	25	110	0	12	6	271	313	398	1608
1928	270	502	354	57	57	149	205	5	0	72	102	83	1856
1929	97	219	136	291	0	94	87	143	113	118	171	125	1594
1930	322	30	333	56	114	534	251	183	90	434	82	87	2516
1931	127	26	503	293	546	544	59	36	25	14	443	210	2826
1932	148	22	262	184	141	135	181	106	460	180	146	117	2082
1933	206	80	115	106	140	158	343	56	272	384	609	189	2658
1934	191	798	0	44	0	147	329	286	198	625	273	380	3271
1935	208	25	0	113	75	80	143	112	271	184	33	280	1524

BARADINE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1936	282	325	249	15	140	93	354	147	279	21	0	218	2123
1937	242	193	244	20	39	180	129	99	60	123	384	62	1775
1938	357	182	41	170	324	133	232	290	6	151	86	60	2032
1939	274	13	416	300	92	217	37	518	19	138	202	43	2269
1940	53	102	112	557	40	8	5	52	126	55	32	291	1433
1941	844	148	570	0	166	318	27	41	55	151	122	63	2505
1942	101	366	146	0	309	304	414	73	108	114	281	321	2537
1943	691	52	18	209	125	76	69	52	70	118	452	37	1969
1944	31	99	47	25	202	118	138	428	85	36	19	0	1228
1945	310	288	47	325	348	403	116	297	6	103	35	275	2553
1946	516	0	55	26	79	77	10	2	214	41	87	281	1388
1947	22	574	304	47	88	68	182	216	312	427	277	826	3343
1948	299	245	519	74	201	511	45	65	179	43	92	332	2605
1949	79	468	305	138	85	158	81	68	462	368	239	113	2564
1950	321	267	83	676	170	569	327	167	144	739	941	108	4512
1951	158	226	164	57	302	305	133	205	132	12	95	73	1862
1952	39	312	428	160	161	250	214	430	5	144	71	25	2239
1953	92	435	137	62	211	3	41	300	58	309	242	28	1918

BARADINE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1954	712	697	155	56	0	215	43	69	113	784	134	153	3131
1955	516	922	0	146	216	193	208	230	204	682	152	159	3628
1956	655	650	242	332	256	362	254	37	98	241	10	246	3383
1957	40	318	96	131	4	145	70	99	0	14	22	283	1222
1958	451	83	197	43	278	247	65	107	260	431	55	227	2444
1959	291	457	528	363	49	65	171	0	108	97	204	181	2514
1960	253	12	190	38	198	59	231	55	146	170	400	256	2008
1961	192	397	839	122	87	27	155	198	17	31	433	396	2894
1962	421	271	227	182	145	13	152	232	238	326	69	338	2614
1963	645	184	147	118	269	213	51	157	149	106	154	239	2432
1964	273	85	130	431	160	76	115	116	364	379	25	52	2206

Appendix 5
Sheet 1

COONABARABRAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1880	217	237	499	628	103	61	37	26	520	228	94	133	2783
1881	151	446	230	1	185	162	47	275	125	198	283	50	2153
1882	44	404	53	273	356	292	115	141	23	335	438	404	2878
1883	94	443	126	392	357	35	15	238	114	397	112	25	2348
1884	22	20	22	280	78	290	210	55	489	57	262	103	1888
1885	344	187	329	105	132	458	33	6	105	103	156	178	2136
1886	434	21[illegible]	6	432	504	320	352	884	58	427	376	524	4338
1887	477	946	463	271	42	204	487	615	58	297	340	607	4807
1888	83	795	26	52	187	137	31	25	158	161	69	230	1954
1889	197	126	221	848	1298	436	228	277	145	366	322	413	4877
1890	443	931	438	194	596	472	229	247	352	135	98	153	4288
1891	927	150	529	264	291	336	273	375	452	134	211	226	4168
1892	196	28	73	196	523	189	367	93	510	527	389	702	3793
1893	275	171	484	401	290	368	241	386	47	195	158	79	3095
1894	409	134	1140	302	51	201	109	129	212	294	112	109	3202
1895	833	182	12	111	148	121	93	90	267	289	410	338	2894
1896	98	1100	197	235	364	142	215	221	83	116	182	436	3389
1897	718	62	99	0	92	228	550	130	204	187	86	109	2465

COONABARABRAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1898	462	804	4	1	114	395	42	207	168	266	121	110	2694
1899	315	120	14	170	28	231	452	330	102	59	138	12	1971
1900	249	46	230	262	288	315	188	56	132	20	43	233	2062
1901	134	0	164	292	329	187	81	553	119	233	168	20	2280
1902	41	31	60	18	2	73	13	242	55	217	151	635	1538
1903	53	7	176	415	456	20	252	165	600	220	200	240	2804
1904	190	1051	445	43	64	116	264	167	60	365	90	200	3055
1905	2	348	300	840	219	191	174	115	22	93	109	52	2465
1906	264	212	405	335	140	238	69	576	569	204	305	194	3511
1907	356	24	287	162	18	349	227	280	93	50	303	293	2442
1908	99	879	402	272	112	190	112	171	193	224	411	230	3295
1909	99	772	135	223	72	266	143	585	219	104	209	498	3325
1910	817	27	260	64	178	424	111	81	121	247	204	424	2958
1911	807	558	132	59	217	91	294	164	372	58	178	264	3194
1912	162	107	80	3	16	364	294	110	40	173	116	111	1676
1913	117	241	237	454	532	220	90	52	134	136	85	200	2498
1914	228	472	414	59	274	2	132	0	49	135	237	396	2398
1915	88	30	38	79	265	89	273	178	82	212	5	174	1513

Appendix 5
Sheet 3

COONABARABRAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1916	94	142	45	361	95	640	556	232	330	347	255	476	3573
1917	441	222	46	65	14	320	118	189	319	171	487	307	2699
1918	640	20	32	153	116	90	227	524	30	32	83	8	1955
1919	198	162	111	56	319	67	60	120	20	48	42	307	1510
1920	262	154	44	36	76	912	1224	279	360	116	183	455	4101
1921	75	64	510	422	373	595	459	164	141	94	193	275	3365
1922	95	136	22	64	8	146	298	24	100	105	65	442	1505
1923	16	3	127	0	12	488	260	52	235	71	119	581	1964
1924	296	518	15	115	35	151	231	188	327	189	966	42	3073
1925	209	346	149	5	338	196	171	230	56	44	346	220	2310
1926	180	2	965	386	484	93	153	56	397	61	28	681	3486
1927	238	12	65	203	20	164	9	64	32	254	367	439	1867
1928	438	623	273	128	40	170	255	18	12	112	115	65	2249
1929	128	354	90	311	20	126	70	245	97	204	160	110	1915
1930	358	13	434	90	123	632	294	152	122	543	132	215	3108
1931	162	134	681	333	582	573	77	84	62	19	386	250	3343
1932	42	73	610	178	108	127	207	88	333	146	139	149	2200
1933	321	81	187	319	119	192	460	28	322	426	493	310	3258

COONABARABRAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1934	216	1100	1	76	23	157	300	187	269	763	299	83	3474
1935	477	7	13	117	62	86	179	117	283	333	49	121	1844
1936	164	659	276	56	127	85	474	251	167	74	7	381	2721
1937	307	377	310	32	51	214	130	134	79	103	512	179	2428
1938	225	168	25	127	199	141	261	237	30	114	237	75	1839
1939	252	74	706	452	132	200	99	485	24	146	107	87	2764
1940	39	42	123	440	4	43	1	52	177	8	91	244	1264
1941	907	104	601	6	197	356	46	71	115	238	308	65	3014
1942	115	216	174	6	324	348	488	106	150	161	473	185	2746
1943	245	112	32	325	174	91	111	114	111	168	339	212	2034
1944	111	212	78	51	318	98	166	507	119	37	53	0	1750
1945	386	146	114	227	275	517	112	318	5	153	103	124	2480
1946	467	39	104	56	70	105	38	7	201	60	66	167	1380
1947	102	804	315	51	104	93	247	237	304	326	317	921	3821
1948	257	309	499	216	160	528	95	98	169	98	86	228	2743
1949	69	708	248	161	61	152	106	144	390	478	356	145	3018
1950	763	676	271	1348	228	596	396	221	149	596	1032	9	6285
1951	377	199	447	82	167	260	198	287	146	52	120	141	2476

COONABARABRAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1952	55	330	484	298	153	265	321	556	77	234	88	128	2989
1953	141	476	232	125	337	19	59	417	111	191	237	120	2465
1954	460	841	0	97	0	237	54	109	156	722	231	138	3045
1955	844	1167	26	167	262	224	199	281	308	475	278	151	4382
1956	567	676	373	279	388	429	424	85	120	327	59	188	3915
1957	73	343	287	225	7	163	83	177	4	16	21	379	1778
1958	429	406	83	89	264	241	30	194	398	453	78	210	2875
1959	352	1173	540	437	54	144	198	10	114	193	342	327	3884
1960	356	185	167	37	265	58	277	108	299	144	351	317	2564
1961	126	516	785	189	40	28	187	251	14	143	431	298	3008
1962	310	142	199	279	221	57	245	260	177	390	179	252	2711
1963	908	255	341	193	470	249	94	271	284	134	345	242	3786
1964	285	319	230	465	169	152	145	146	531	369	66	86	2963

Appendix 6
Sheet 1

COMBOGOLONG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1896	204	404	54	138	291	49	199	72	12	88	438	129	2078
1897	412	40	187	0	0	355	485	97	214	221	23	87	2121
1898	292	529	11	0	136	131	13	58	55	57	34	22	1338
1899	132	81	29	201	0	128	134	295	151	4	93	0	1248
1900	117	52	144	76	202	201	145	5	32	16	80	129	1199
1901	27	63	256	251	201	149	93	302	44	96	56	20	1558
1902	25	0	17	5	0	70	6	112	28	41	88	116	508
1903	65	0	229	96	267	54	281	78	308	128	111	125	1742
1904	259	527	238	7	84	27	136	35	94	194	45	63	1709
1905	74	343	151	602	102	45	77	79	10	79	79	116	1757
1906	93	210	213	101	220	125	4	215	527	150	241	0	2099
1907	508	42	225	68	4	91	108	116	35	21	93	97	1408
1908	83	374	141	77	76	44	40	199	79	108	308	344	1873
1909	73	301	92	149	50	282	81	292	55	81	162	221	1839
1910	502	65	171	13	63	192	98	103	99	124	122	135	1687
1911	386	521	0	0	152	29	68	254	49	11	220	223	1913
1912	94	37	132	0	0	390	174	41	37	120	0	108	1133
1913	86	104	258	233	393	342	NO	RECORDS		64	39	198	

Appendix 6
Sheet 2

COMBOGOLONG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1914	44	264	236	129	161	26	68	0	8	120	86	481	1623
1915	54	10	20	148	228	55	116	99	33	144	1	200	1108
1916	63	22	33	414	46	225	393	46	90	246	242	360	2180
1917	172	224	0	0	0	256	77	115	152	58	464	397	1915
1918	394	1	27	84	62	10	117	276	27	21	30	42	1091
1919	50	141	32	88	248	0	63	40	41	42	9	155	909
1920	48	14	22	98	28	430	522	117	268	61	140	207	1955
1921	241	46	178	420	290	538	456	78	65	74	115	286	2787
1922	61	144	0	31	5	95	231	33	109	84	40	378	1211
1923	4	33	65	3	27	254	110	15	147	100	43	413	1214
1924	110	339	0	46	22	105	209	32	376	92	541	122	1994
1925	85	218	57	0	126	510	71	119	54	38	421	333	2032
1926	304	27	462	177	273	57	39	38	126	29	30	210	1772
1927	205	20	117	81	11	74	0	0	95	124	212	357	1296
1928	196	395	258	34	26	46	166	0	0	14	67	21	1223
1929	42	116	106	175	0	66	31	87	96	187	142	22	1070
1930	473	27	70	65	71	402	234	182	24	156	62	85	1851
1931	112	32	532	236	517	354	69	0	30	15	159	554	2610

COMBOGOLONG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1932	125	76	231	115	153	95	239	40	217	33	99	34	1457
1933	82	29	95	160	97	57	301	0	288	443	531	90	2173
1934	110	392	0	36	0	114	229	121	150	680	152	55	2039
1935	340	0	0	32	0	65	85	56	242	122	26	92	1060
1936	309	177	578	23	86	25	241	107	57	0	0	155	1758
1937	30	589	97	28	0	114	36	12	15	49	348	27	1345
1938	249	175	12	86	294	108	136	178	40	156	54	17	1505
1939	98	249	660	183	106	129	122	358	5	196	80	45	2231
1940	20	91	47	354	36	2	0	58	135	1	103	265	1112
1941	681	21	245	5	95	268	8	7	28	40	113	58	1569
1942	43	485	211	0	325	119	325	0	72	156	170	282	2188
1943	41	13	0	144	166	88	29	47	62	32	375	30	1027
1944	41	144	13	20	84	20	110	359	17	26	15	0	849
1945	228	151	34	216	181	280	209	121	15	55	0	45	1535
1946	158	42	60	0	70	27	6	0	270	47	61	241	982
1947	14	575	140	65	105	61	77	263	152	261	287	202	2202
1948	180	167	432	42	425	404	30	70	48	24	20	80	1922
1949	150	248	44	182	72	148	63	0	327	337	439	17	2027

COMBOGOLONG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1950	400	416	48	580	179	488	369	73	191	538	425	0	3707
1951	80	59	62	25	92	277	39	92	82	11	104	17	940
1952	0	116	222	74	68	168	58	200	4	79	0	56	1045
1953	97	272	28	195	190	0	0	96	46	138	104	0	1166
1954	99	527	8	12	0	78	84	69	40	439	45	151	1552
1955	572	518	0	233	135	85	107	163	89	641	185	26	2754
1956	307	671	602	259	180	249	243	0	37	356	14	0	2918

Appendix 7
Sheet 1

COONAMBLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1878	0	80	325	73	16	68	130	210	374	198	266	103	1843
1879	42	370	178	146	303	121	312	292	333	181	162	300	2740
1880	170	141	307	640	81	23	13	24	372	227	7	54	2059
1881	158	327	212	0	156	61	71	205	86	154	147	9	1586
1882	0	621	18	229	204	249	65	32	23	264	406	141	2252
1883	35	152	35	155	210	47	0	97	34	297	222	0	1284
1884							NO	RECORDS					
1885							NO	RECORDS					
1886	54	12	0	453	281	169	276	403	33	274	570	441	2966
1887	747	373	404	69	16	94	159	252	125	198	317	544	3298
1888	53	583	1	0	68	4	11	6	86	52	35	37	936
1889	20	149	209	366	504	188	172	225	81	405	116	320	2755
1890	302	779	577	69	321	319	144	70	296	85	104	71	3137
1891	583	161	634	189	95	251	127	241	270	52	108	160	2871
1892	54	0	77	121	89	135	148	40	282	210	171	124	1451
1893	347	155	375	126	529	353	164	169	22	193	106	76	2615
1894	175	131	848	450	87	132	18	124	123	151	78	199	2516
1895	561	181	1	65	132	81	29	54	133	133	334	517	2221

COONAMBLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1896	67	613	69	170	276	60	130	50	32	99	331	54	1951
1897	409	51	143	0	8	412	374	83	165	189	60	45	1939
1898	278	420	6	0	101	152	5	98	53	114	105	58	1390
1899	168	99	12	246	1	171	290	239	157	13	55	1	1452
1900	271	107	331	54	310	141	139	12	61	14	17	126	1583
1901	93	34	188	295	216	179	88	408	93	135	56	14	1799
1902	16	7	116	0	0	48	4	60	68	89	72	215	695
1903	65	0	75	173	322	4	203	87	395	248	90	137	1799
1904	200	287	193	0	28	46	101	30	28	413	12	102	1440
1905	0	389	137	650	199	110	80	29	13	48	51	30	1736
1906	240	151	353	177	127	141	12	397	501	85	59	24	2267
1907	340	6	228	58	0	144	64	19	40	33	41	134	1207
1908	78	238	103	78	72	47	53	192	120	103	265	297	1646
1909	91	446	177	158	73	232	61	330	130	71	200	291	2260
1910	640	6	184	31	40	346	89	54	88	210	176	430	2294
1911	607	296	19	0	142	56	111	281	75	49	218	230	2084
1912	15	5	82	0	0	282	287	98	33	253	87	39	1181
1913	97	328	164	229	329	231	42	50	46	120	90	196	1922

COONAMBLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1914	86	279	371	69	211	18	120	0	31	52	141	347	1725
1915	122	10	18	85	300	111	132	108	55	146	0	160	1247
1916	37	40	36	339	75	345	421	110	127	301	194	335	2360
1917	688	261	11	11	15	205	87	121	314	78	473	211	2475
1918	333	22	20	140	92	10	106	251	37	24	90	28	1153
1919	119	64	138	37	321	0	65	73	33	28	11	271	1160
1920	47	39	47	29	21	655	628	136	267	180	117	249	2415
1921	82	127	455	281	355	366	345	108	124	85	202	278	2808
1922	104	257	0	71	7	156	167	36	32	103	0	504	1437
1923	92	6	30	30	24	318	86	42	150	96	52	430	1356
1924	132	455	26	65	11	52	128	50	413	94	793	74	2293
1925	345	112	138	0	181	223	91	138	44	28	382	218	1900
1926	153	22	828	348	219	84	98	35	87	43	99	306	2322
1927	311	6	22	151	14	82	1	35	40	149	290	343	1444
1928	218	269	304	23	44	53	134	0	3	47	100	50	1245
1929	30	76	82	207	5	63	74	122	75	79	182	13	1008
1930	445	24	301	79	91	382	311	151	46	331	58	87	2306
1931	99	9	545	188	349	350	118	10	34	23	156	302	2183

COONAMBLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1932	118	72	282	117	81	111	277	86	256	40	119	86	1645
1933	114	13	111	150	104	93	269	23	234	255	341	98	1805
1934	183	661	0	32	0	129	271	188	148	524	146	121	2403
1935	112	6	12	52	8	33	153	86	290	213	53	197	1215
1936	302	190	214	10	59	21	260	73	74	25	5	216	1449
1937	95	339	147	26	25	80	47	82	53	77	151	17	1139
1938	131	77	18	67	360	163	148	154	34	250	116	62	1580
1939	314	114	660	256	62	182	165	327	28	231	97	61	2497
1940	0	122	39	376	25	4	15	41	157	9	14	110	912
1941	635	30	398	0	106	292	20	69	42	158	196	112	2058
1942	140	310	116	0	359	240	230	10	63	105	185	86	1844
1943	453	50	0	150	164	96	66	66	103	28	429	116	1721
1944	108	97	12	41	124	32	151	329	17	3	37	0	951
1945	134	334	24	171	201	266	106	192	6	90	46	194	1764
1946	206	37	99	32	43	37	12	2	134	24	58	188	872
1947	30	448	161	12	95	57	141	156	169	367	339	362	2337
1948	224	266	49	110	249	487	31	106	192	28	64	121	1927
1949	197	636	191	126	128	172	94	34	264	266	218	79	2405

COONAMBLE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1950	460	334	228	665	132	412	456	89	131	587	950	0	4444
1951	480	512	256	81	193	272	43	163	119	8	107	72	2306
1952	33	354	315	108	87	200	171	323	17	82	32	78	1800
1953	140	319	62	203	240	20	8	131	49	104	175	82	1533
1954	154	653	0	31	2	74	89	59	68	508	87	243	1968
1955	575	598	0	188	140	96	160	217	129	565	174	89	2931
1956	358	501	368	102	246	290	280	33	45	216	86	245	2770
1957	20	374	16	148	8	133	27	73	0	0	9	187	995
1958	549	403	183	94	287	221	45	95	281	226	30	68	2482
1959	246	558	620	373	87	68	347	2	68	141	63	124	2697
1960	202	71	262	23	177	15	159	115	124	85	287	51	1571
1961	131	144	432	208	66	28	119	114	13	46	327	129	1757
1962	458	164	254	158	135	9	197	295	205	238	67	395	2575
1963	551	224	126	77	249	186	60	189	186	70	82	131	2131
1964	273	148	184	304	151	28	69	93	146	323	10	37	1766

Appendix 8
Sheet 1

MOUNT TENANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1886	68	22	0	426	491	207	265	633	55	271	331	486	3255
1887	399	706	494	186	39	192	327	357	23	183	475	340	3721
1888	107	360	5	0	143	43	11	0	116	92	30	172	1079
1889	117	44	361	445	587	290	277	254	100	451	377	1182	4485
1890	314	623	657	331	505	384	254	101	222	110	45	142	3688
1891	525	160	451	287	190	365	217	300	208	198	196	126	3223
1892	134	29	46	63	482	162	419	76	511	406	159	321	2808
1893	253	138	453	142	414	223	208	224	41	234	173	50	2553
1894	215	131	966	318	101	245	83	127	146	181	122	298	2933
1895	586	133	0	64	119	77	48	80	178	185	155	520	2145
1896	75	624	226	158	330	113	185	47	59	25	212	164	2218
1897	447	58	150	2	42	409	410	113	253	231	28	55	2198
1898	313	475	5	0	147	232	20	161	58	278	209	123	2021
1899	365	259	15	309	22	220	372	202	157	39	52	17	2029
1900	115	15	383	82	318	246	130	5	107	0	25	127	1553
1901	155	0	185	357	241	152	39	359	72	52	151	0	1763
1902	0	45	50	0	26	110	0	193	30	182	84	284	1004
1903	23	4	123	383	254	6	179	132	490	253	116	240	2203

Appendix 8
Sheet 2

MOUNT TENANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1904	321	554	251	0	52	68	137	52	34	196	8	83	1756
1905	37	376	187	691	190	135	196	81	9	160	150	54	2266
1906	166	197	334	125	111	212	43	349	545	168	222	103	2575
1907	366	15	366	204	33	226	153	174	63	51	289	141	2081
1908	118	515	263	104	106	102	53	138	125	232	264	239	2259
1909	164	930	351	190	105	417	37	530	146	173	300	457	3800
1910	552	0	211	107	56	430	109	71	143	167	133	283	2262
1911	655	313	126	6	109	75	172	126	273	124	213	326	2518
1912	34	96	101	0	0	241	382	104	41	160	114	48	1321
1913	116	116	442	277	404	317	45	74	91	183	102	144	2311
1914	132	338	364	173	236	10	126	0	28	20	99	491	2017
1915	120	37	45	79	320	151	222	31	81	228	0	116	1430
1916	48	76	0	348	112	497	408	152	357	349	216	273	2936
1917	274	150	10	0	28	295	82	160	354	98	443	171	2065
1918	180	0	0	90	83	0	149	353	59	8	31	48	1001
1919	140	119	181	51	472	55	50	128	25	19	13	289	1542
1920	274	258	30	14	36	751	845	166	319	150	123	506	3472
1921	227	50	389	494	332	413	176	144	62	50	22	552	2911

MOUNT TENANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1922	139	222	0	93	12	141	142	28	352	82	27	428	1349
1923	49	0	78	43	18	453	205	70	202	96	109	480	1803
1924	151	206	27	129	0	93	165	94	499	104	1098	65	2631
1925	181	189	87	0	233	179	152	172	95	23	241	197	1749
1926	212	0	959	517	295	172	74	42	270	26	117	356	3040
1927	325	62	45	106	13	114	0	60	42	175	332	301	1575
1928	426	334	243	39	47	110	134	0	7	55	157	68	1620
1929	39	123	88	236	5	66	59	204	88	119	100	61	1188
1930	317	132	219	147	137	500	416	159	69	383	102	192	2773
1931	108	34	929	339	406	480	116	19	34	36	327	300	3128
1932	54	44	531	170	54	143	340	124	272	31	297	100	2160
1933	175	44	92	231	144	201	357	80	275	278	461	157	2495
1934	285	810	0	107	7	138	285	259	182	746	172	89	3080
1935	199	4	15	83	51	53	156	155	238	291	66	160	1471
1936	303	359	192	20	72	81	497	108	86	21	5	184	1928
1937	189	305	302	37	48	272	75	83	50	101	379	18	1859
1938	245	87	79	108	317	122	238	243	30	231	206	35	1941
1939	161	108	666	447	62	112	1122	408	33	262	234	78	2835

MOUNT TENANDRA RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1940	0	2	35	469	40	6	3	64	268	54	23	157	1121
1941	856	87	272	0	225	323	27	112	78	198	109	131	2418
1942	75	347	127	35	502	331	360	46	88	76	354	199	2540
1943	472	178	0	193	180	100	65	62	93	109	474	60	1986
1944	122	145	23	67	192	34	160	385	90	30	14	4	1266
1945	253	239	39	172	267	400	131	353	28	164	105	140	2291
1946	244	24	62	104	93	59	63	10	180	28	72	202	1141
1947	67	399	130	22	118	69	147	200	281	355	274	480	2542
1948	288	236	317	138	249	459	41	136	221	30	119	42	2276
1949	90	540	169	144	131	156	120	93	374	386	303	52	2558
1950	448	411	53	809	203	391	311	198	161	772	956	91	4804
1951	335	316	245	61	233	300	89	242	173	19	124	144	2281
1952	36	428	292	298	114	165	254	346	35	136	64	38	2206
1953	149	352	49	137	155	31	29	226	88	254	239	232	1941
1954	134	766	0	44	12	231	36	46		NO RECORDS			

URAWILKIE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1881	170	200	245	0	211	71	60	265	56	161	169	0	1608
1882	0	848	0	193	35	560	0	90	0	168	276	30	2199
1883	0	218	172	15	175	0	0	78	25	173	0	0	856
1884	0	5	0	224	78	247	287	30	240	40	90	84	1325
1885	198	92	216	146	82	209	20	0	52	23	86	84	1208
1886	243	0	3	327	445	235	306	498	27	275	334	412	3105
1887	425	358	318	50	0	139	394	452	10	292	255	252	2945
1888	25	414	31	0	168	30	10	0	80	53	67	104	982
1889	73	146	339	408	562	277	306	253	57	330	213	465	3429
1890	347	763	675	187	342	424	129	92	295	136	95	82	3567
1891	685	66	406	79	173	246	98	204	325	56	25	167	2530
1892	162	16	105	76	393	94	90	99	295	353	78	206	1967
1893	0	115	465	25	198	308	127	327	6	197	100	75	1943
1894	135	220	759	425	103	97	65	113	101	124	58	200	2400
1895	987	412	20	0	113	87	18	73	197	198	326	280	2711
1896	13	581	228	200	310	54	153	86	22	55	106	0	1808
1897	229	10	111	0	2	381	443	83	163	157	70	117	1766
1898	301	495	45	0	109	124	30	67	67	154	46	22	1460

Appendix 9
Sheet 2

URAWILKIE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1899	175	89	22	360	0	129	265	182	124	28	87	0	1461
1900	151	0	152	93	331	196	104	17	88	13	22	145	1312
1901	91	0	211	246	260	184	107	385	84	168	55	48	1839
1902	43	0	51	0	0	70	0	84	67	104	62	246	727
1903	106	0	123	138	355	0	194	162	350	30	213	396	2067
1904	231	602	250	0	95	70	103	69	44	230	33	56	1783
1905	30	260	89	575	155	104	60	84	0	114	114	25	1610
1906	155	189	340	137	103				NO RECORDS				
1907	280		NO RECORDS			175			NO RECORDS				
1908	207	612	185	48	112	69	73	157	69	207	290	375	2404
1909	232	426	89	119	72	257	111	353	93	94	169	271	2286
1910	647	0	185	126	92	328	130	77	92	154	85	238	2154
1911	633	262	11	0	114	48	125	228	187	34	297	242	2181
1912	25	101	57	0	0	245	260	118	0	249	94	49	1198
1913	179	87	194	203	360	249	52	27	109	106	25	157	1748
1914	45	335	523	85	218	0	157	0	9	95	115	328	1910
1915	22	46	4	155	318	90	157	108	26	136	0	218	1280
1916	30	42	31	248	104	321	418	102	189	239	248	453	2425

URAWILKIE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1917	500	214	0	5	8	239	62	149	174	69	225	262	1907
1918	310	53	39	63	68	20	153	299	23	33	55	20	1136
1919	99	120	39	27	327	0	60	93	34	29	7	178	1013
1920	106	21	29	67	0	1018	581	148	175	107	200	368	2820
1921						NO	RECORDS						
1922						NO	RECORDS						
1923						NO	RECORDS						
1924	89	332	0	138	9	128	107	81	407	89	919	123	2422
1925	215	128	62	0	182	150	165	130	50	31	415	186	1714
1926	175	9	509	206	273	137	87	46	137	27	4	360	1970
1927	243	90	58	198	21	90	0	0	66	154	174	453	1547
1928	156	479	317	61	21	89	178	0	0	42	95	20	1458
1929	82	103	71	268	6	90	74	102	124	130	300	59	1409
1930	304	6	244	25	85	414	269	147	42	340	12	102	1990
1931	80	22	716	530	553	466	143	21	20	19	149	399	3118
1932	45	151	214	176	140	95	236	86	175	74	219	128	1739
1933	73	26	72	135	112	135	68	34	257	332	329	103	1676
1934	161	613	0	217	0	102	248	189	197	683	181	134	2725

URAWILKIE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1935	267	0	5	70	22	82	136	93	279	126	63	131	1264
1936	240	194	227	0	92	45	248	131	151	29	0	117	1474
1937	64	261	155	22	24	114	73	60	47	104	308	16	1248
1938	331	100	15	128	233	143	171	143	13	225	176	46	1724
1939	224	0	473	321	69	176	55	451	37	150	125	50	2131
1940	115	0	88	371	42	0	6	55	109	0	17	221	1024
1941	660	184	527	8	80	256	13	28	51	110	129	10	2056
1942	60	289	192	0	326	234	414	22	94	73	190	195	2089
1943	454	0	0	293	122	89	50	78	86	41	392	16	1621
1944	0	232	40	19	111	129	125	333	27	16	0	0	1032
1945	159	370	25	270	317	347	100	189	15	88	29	104	2013
1946	491	14	40	28	71	20	12	0	190	70	86	201	1223
1947	170	708	105	42	95	73	145	198	229	405	374	388	2932
1948	220	123	353	91	100	446	40	77	132	42	84	65	1773
1949	156	215	66	145	116	60	82	0	331	159	72	5	1407
1950	402	481	5	619	330	479	354	78	164	645	NO	RECORDS	
1951	226	214	96	68	284	301	82	196	167	0	110	63	1807
1952	34	277	366	213	81	148	210	279	0	84	20	57	1769

WINGADEE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1884	0	40	5	223	99	227	162	29	191	58	128	68	1230
1885	164	76	307	83	59	195	12	0	61	114	109	79	1259
1886	76	4	0	255	367	231	260	509	27	226	233	421	2609
1887	556	426	282	89	0	121	281	488	5	385	248	475	3356
1888	85	348	130	0	171	13	0	0	48	24	0	25	844
1889	73	220	244	290	439	249	269	199	0	299	132	419	2833
1890	272	671	417	51	392	414	132	68	358	178	84	71	3108
1891	808	156	462	95	82	280	81	291	250	174	56	196	2931
1892	115	0	71	84	293	50	45	33	250	415	199	122	1677
1893	298	126	410	120	266	436	109	218	25	186	111	81	2386
1894	224	217	856	357	121	119	78	80	97	82	108	106	2445
1895	457	47	0	18	100	79	13	48	151	102	406	297	1718
1896	87	404	69	167	327	36	149	50	10	22	300	347	1968
1897	302	70	63	0	0	398	507	55	171	154	21	83	1824
1898	152	504	10	0	157	109	15	75	48	76	34	35	1215
1899	89	93	81	204	0	128	224	236	163	0	90	30	1338
1900	138	11	165	117	287	167	139	0	41	0	49	63	1177
1901	50	0	309	349	225	154	85	407	69	105	45	0	1798

WINGADEE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1902	46	80	32	0	1	62	18	98	48	66	119	249	819
1903	253	0	249	149	265	0	292	111	356	134	100	199	2108
1904	267	607	184	25	83	32	118	47	60	370	16	119	1928
1905	77	166	106	654	82	37	98	63	0	62	73	112	1530
1906	39	180	299	51	145	65	20	260	500	141	156	61	1917
1907	305	133	103	38	8	125	97	81	39	15	131	196	1271
1908	187	429	165	66	84	47	46	215	99	134	253	353	2078
1909	75	461	26	150	60	231	86	311	59	82	114	244	1899
1910	673	9	178	3	71	201	102	92	80	142	162	260	1973
1911	530	349	6	0	118	29	103	357	52	88	109	175	1916
1912	110	40	126	0	0	372	178	24	33	201	94	56	1234
1913	120	108	172	197	341	338	39	15	34	80	89	280	1813
1914	30	279	237	90	248	14	79	0	7	217	130	297	1628
1915	130	66	45	191	220	54	93	76	56	139	0	300	1370
1916	21	40	53	491	62	258	396	87	91	259	205	442	2405
1917	384	251	10	0	18	241	48	112	182	52	375	349	2022
1918	341	7	27	65	74	6	102	242	26	12	41	52	995
1919	47	123	12	50	269	26	59	54	26	31	9	358	1064

Appendix 10
Sheet 3

WINGADEE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1920	62	28	26	19	77	505	730	81	209	76	85	208	2106
1921	219	73	85	406	306	550	410	72	59	53	57	241	2531
1922	152	101	0	48	0	74	182	12	55	75	27	322	1048
1923	6	52	19	10	27	279	99	23	181	70	43	588	1397
1924	106	295	2	92	6	103	138	29	369	79	889	108	2216
1925	143	186	80	0	92	306	79	117	56	36	295	258	1648
1926	189	21	551	182	236	103	45	48	76	63	5	226	1745
1927	314	5	185	55	18	70	0	6	42	132	255	528	1610
1928	177	445	277	51	38	31	209	26	7	28	53	56	1398
1929	87	21	57	179	0	56	51	84	86	125	203	47	996
1930	543	20	144	14	94	342	239	168	38	265	56	111	2034
1931	100	33	528	232	408	377	106	1	15	14	136	521	2471
1932	69	74	250	122	128	55	311	61	154	9	88	50	1371
1933	145	25	112	233	100	61	312	14	310	286	437	71	2106
1934	102	566	0	19	4	113	200	137	141	536	149	101	2068
1935	176	12	3	18	58	64	85	54	447	121	12	63	1113
1936	207	226	292	1	116	21	243	88	83	0	0	105	1382
1937	39	416	111	24	9	178	25	56	21	60	202	0	1141

WINGADEE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1938	236	125	19	90	342	151	85	127	16	131	71	0	1393
1939	83	83	469	142	62	129	64	409	10	131	87	59	1728
1940	0	59	37	342	32	0	0	60	113	0	98	124	865
1941	598	22	113	0	149	271	8	14	20	127	90	103	1515
1942	84	587	225	0	289	69	283	20	57	72	294	332	2312
1943	611	23	0	117	145	79	36	74	61	78	605	205	2034
1944	49	165	44	16	77	20	115	260	16	20	25	0	807
1945	111	287	56	161	212	238	116	127	40	55	25	95	1523
1946	177	472	59	11	95	42	0	0	137	29	65	40	1127
1947	21	438	110	51	110	56	110	214	151	313	129	257	1960
1948	155	185	350	77	324	401	42	94	134	32	71	56	1921
1949	184	214	188	151	146	190	45	8	303	195	277	26	1927
1950	425	497	106	732	92	360	473	82	256	651	506	38	4218
1951	72	174	104	42	173	232	35	198	96	17	99	37	1279
1952	25	143	402	152	99	193	163	309	0	161	11	161	1819
1953	132	360	78	223	213	4	9	104	71	40	74	101	1409
1954	181	711	0	25	0	111	99	74	139	480	100	197	2117
1955	701	520	110	220	151	115	112	201	95	685	242	108	3260

WINGADEE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1956	448	689	631	124	221	266	228	35	38	303	62	145	3190
1957	0	492	58	81	3	148	12	45	0	2	0	103	944
1958	517	173	108	43	253	168	46	74	225	216	0	98	1921
1959	297	554	310	492	65	62	272	0	35	162	20	76	2345
1960	127	20	228	6	166	50	134	73	95	120	214	198	1431
1961	213	392	91	243	85	34	154	76	0	33	221	286	1828
1962	191	252	358	195	110	15	113	181	218	251	40	442	2366
1963	394	145	166	7	155	173	10	140	150	96	245	95	1776
1964	329	0	191	219	128	87	53	55	186	305	102	92	1747

Appendix 11
Sheet 1

HAWTHORNE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Years
1886	NO RECORDS			140	340	200	303	493	20	363	596	430	
1887	649	511	480	171	137	157	278	476	34	201	267	661	4022
1888	14	437	31	0	169	36	69	4	175	83	241	161	1420
1889	149	57	204	431	522	289	100	157	205	385	435	294	3228
1890	377	747	359	211	354	253	284	81	271	135	69	256	3397
1891	682	112	375	73	226	304	201	194	332	127	153	120	2899
1892	165	113	58	159	347	105	234	50	557	390	352	511	3041
1893	334	111	525	225	239	219	351	227	55	176	408	47	2917
1894	214	146	911	184	37	134	69	102	79	277	61	166	2380
1895	801	71	0	12	94	95	62	60	231	227	276	232	2161
1896	113	648	188	154	305	184	115	211	32	92	116	473	2631
1897	396	28	82	0	45	346	326	86	170	189	82	201	1951
1898	635	483	0	2	148	438	50	209	88	252	122	228	2655
1899	221	112	48	289	10	145	306	341	71	99	210	30	1882
1900	156	16	341	73	243	209	152	39	113	32	121	296	1791
1901	158	25	283	235	232	124	76	318	41	151	191	26	1860
1902	24	48	66	7	22	66	23	240	90	205	159	488	1438
1903	29	26	137	262	244	5	173	248	615	138	90	231	2198

HAWTHORNE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1904	45	539	311	75	71	0	346	192	34	220	67	146	2046
1905	36	333	268	483	263	82	96	133	26	147	80	91	2038
1906	197	181	207	76	126	162	71	544	300	184	266	288	2602
1907	311	50	379	94	19	195	148	138	73	21	514	355	2297
1908	100	624	277	90	81	111	79	85	173	93	415	87	2215
1909	89	554	87	134	73	294	61	452	171	163	201	455	2734
1910	613	15	268	76	59	257	100	60	111	161	136	282	2138
1911	545	364	73	53	118	82	204	164	202	82	465	389	2741
1912	75	190	40	19	0	264	367	193	33	234	10	18	1443
1913	235	247	231	299	455	122	80	72	175	179	70	85	2250
1914	73	305	328	159	163	35	115	0	139	30	402	393	2142
1915	73	27	90	63	99	223	127	117	53	159	47	211	1289
1916	145	86	21	260	90	472	368	116	173	195	252	398	2576
1917	309	108	48	19	18	237	60	151	443	214	369	442	2418
1918	298	41	129	72	48	58	154	280	26	95	128	43	1372
1919	112	267	25	41	223	16	74	87	41	14	7	368	1275
1920	354	166	9	52	79	641	908	156	186	23	255	396	3225
1921	171	308	492	563	263	347	225	113	96	136	262	81	3057

HAWTHORNE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1922	160	76	0	31	9	150	203	38	85	75	202	493	1522
1923	47	11	117	0	15	363	150	31	177	155	84	399	1549
1924	154	377	38	184	43	107	124	76	267	163	471	0	2004
1925	127	183	106	0	337	115	92	103	30	38	259	95	1485
1926	267	89	841	353	294	64	164	35	253	26	0	909	3295
1927	222	0	180	267	0	42	0	86	28	224	415	149	1613
1928	271	482	263	0	0	168	188	0	0	72	153	7	1604
1929	105	431	103	185	0	21	49	187	54	148	79	147	1509
1930	293	29	143	55	141	460	303	90	100	344	48	88	2094
1931	153	63	558	340	492	316	78	63	50	0	100	151	2364
1932	42	0	378	144	35	59	136	60	278	69	246	111	1558
1933	158	43	60	319	93	95	277	42	267	252	431	126	2163
1934	221	862	0	113	0	80	118	175	140	385	163	171	2428
1935	247	83	24	101	61	21	185	90	268	227	22	148	1477
1936	392	386	269	45	102	18	396	88	134	46	0	416	2292
1937	272	311	191	40	60	242	102	126	47	144	266	132	1933
1938	286	185	0	122	151	44	174	222	21	57	84	52	1398
1939	135	0	285	371	61	133	90	179	14	175	74	23	1540

Appendix 11
Sheet 4

HAWTHORNE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1940	150	0	40	215	0	34	23	134	210	66	101	319	1292
1941	1230	80	371	24	95	245	52	87	55	206	94	25	2564
1942	159	317	281	11	258	311	352	122	48	112	335	317	2623
1943	242	217	12	0	248	95	74	29	101	152	262	119	1551
1944	200	85	38	42	267	53	153	432	44	15	25	0	1354
1945	325	166	152	154	242	448	110	266	0	140	61	106	2170
1946	603	176	68	56	56	55	20	0	141	2	96	108	1381
1947	40	673	248	139	124	40	145	144	258	385	275	553	3024
1948	247	191	322	117	123	321	13	85	159	40	126	155	1899
1949	193	481	225	216	75	177	103	287	298	342	140	108	2645
1950	476	479	593	799	189	386	321	194	113	619	693	0	4862
1951	213	216	231	66	90	198	112	251	38	27	98	192	1732
1952	59	243	288	74	74	176	229	636	10	60	55	278	2182
1953	110	445	65	368	263	14	36	256	135	129	268	14	2103
1954	610	690	0	24	11	148	8	113	117	436	68	112	2337
1955	720	1224	0	95	193	153	122	241	157	479	350	178	3812
1956	449	638	554	209	313	367	231	129	47	315	16	231	3499
1957	26	219	207	85	2	58	128	85	0	9	17	345	1172

Appendix 11
Sheet 5

HAWTHORNE RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1958	647	496	57	89	371	157	5	117	496	263	74	233	3004
1959	234	393	309	209	67	176	158	0	44	243	175	119	2127
1960	187	70	83	67	134	5	270	94	148	176	200	163	1597
1961	90	351	561	183	0	61	104	285	1	194	345	708	2883
1962	300	125	158	230	181	15	176	201	124	308	40	186	2044
1963	632	216	138	187	432	264	134	167	173	193	238	383	3157
1964	336	103	367	461	71	149	142	96	238	319	113	146	2541

Appendix 12
Sheet 1

MENDOORAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1886		NO RECORDS			442	330	275	556	0	118	601	377	
1887	730	249	391	158	132	154	265	742	54	213	450	895	4433
1888	0	255	65	0	170	48	63	4	147	140	100	24	1017
1889	90	115	133	370	323	316	70	200	127	333	286	347	2710
1890	268	703	307	239	343	298	465	186	333	197	105	343	3787
1891	561	147	238	307	216	382	327	249	585	121	271	197	3601
1892	243	30	168	301	318	104	328	70	635	362	212	420	3191
1893	217	90	668	162	322	256	252	228	110	124	270	30	2729
1894	193	68	1094	333	115	150	102	87	89	279	71	138	2719
1895	571	17	0	32	68	103	66	129	199	109	203	400	1897
1896	38	814	139	125	172	126	104	202	28	156	173	414	2491
1897	365	0	109	0	120	332	559	66	147	203	10	84	1995
1898	680	519	29	0	129	496	0	343	0	370	75	127	2768
1899	315	75	23	220	32	198	314	257	56	116	200	0	1806
1900	405	0	296	29	238	203	254	0	154	0	15	162	1756
1901	70	0	313	239	195	100	33	247	20	156	185	30	1588
1902	5	14	75	43	10	100	52	225	55	128	273	326	1306
1903	55	0	144	384	146	27	163	137	524	150	200	253	2183

Appendix 12
Sheet 2

MENDOORAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1904	202	395	279	63	110	80	387	136	56	164	78	134	2084
1905	18	601	212	555	262	193	131	155	0	187	55	92	2461
1906	110	47	327	73	95	160	61	443	253	203	295	140	2207
1907	234	51	170	118	29	92	153	106	190	28	60	71	1302
1908		NO RECORDS		53					NO RECORDS				
1909	36	706	83	127	36	418	37	410	152	137	216	399	2757
1910	573	0	225	98	90	162	180	38	46	238	56	266	1972
1911	476	340	45	0	134	93	138	145	184	34	341	357	2287
1912	80	59	65	10	0	288	454	186	52	107	21	24	1346
1913	167	174	288	265	369	183	84	102	114	209	61	170	2186
1914	95	361	318	258	124	51		NO RECORDS			439	289	
1915	63	174	279	12	290	193	162	94	130	120	31	121	1669
1916						NO RECORDS							
1917						NO RECORDS							
1918						NO RECORDS							
1919	138	75	21	60	453	17	58	86	42	27	27	362	1366
1920	251	117	5	12	113	559	706	182	218	114	211	501	2989
1921	163	191	264	542	341	264	185	133	212	105	158	221	2779

Appendix 12
Sheet 3

MENDOORAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1922	211	60	135	47	2	122	284	73	102	97	38	260	1431
1923	53	0	65	0	44	369	169	55	225	132	132	274	1518
1924	222	169	40	213	30	110	75	177	335	212	648	24	2255
1925	248	285	177	13	244	153	98	83	19	48	294	101	1703
1926	147	41	974	375	306	85	95	73	225	110	0	849	3280
1927	246	0	205	312	0	63	44	102	62	122	471	171	1798
1928	316	387	224	97	33	91	169	6	15	74	65	7	1484
1929	91	378	124	210	53	47	50	141	96	261	107	48	1606
1930	246	55	72	73	124	476	365	161	54	438	57	161	2282
1931	149	78	646	427	425	313	109	16	78	30	188	283	2742
1932	22	37	287	156	46	77	174	106	339	82	236	89	1651
1933	143	120	127	190	96	136	219	38	242	237	400	82	2030
1934	64	699	0	64	0	108	310	219	205	319	212	135	2335
1935	217	60	21	116	66	71	115	106	255	210	70	121	1428
1936	284	461	288	49	108	62	360	105	108	61	0	372	2258
1937	216	213	189	52	59	229	48	135	64	61	371	58	1695
1938	242	68	0	84	161	91	246	152	36	125	181	40	1426
1939	159	45	406	573	149	232	105	280	32	196	244	43	2464

MENDOORAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1940	31	0	35	300	32	53	22	102	255	2	169	409	1410
1941	671	90	267	34	76	274	85	97	129	118	233	53	2127
1942	198	352	244	0	379	186	393	81	131	72	199	336	2571
1943	396	138	19	302	331	90	62	78	90	67	256	98	1927
1944	105	132	114	46	174	8	140	373	57	19	103	0	1271
1945	408	326	102	176	185	0	118	431	0	126	124	278	2274
1946	145	82	44	69	81	65	45	4	148	60	116	163	1022
1947	126	620	96	143	121	87	179	133	327	358	343	389	2922
1948	207	279	253	88	135	357	23	119	271	29	128	38	1927
1949	420	336	515	210	79	178	201	271	338	384	217	79	3228
1950	452	443	207	514	253	401	348	258	164	580	899	33	4552
1951	250	238	125	73	104	230	145	230	88	38	128	144	1793
1952	14	150	248	185	135	298	206	460	79	172	63	330	2340
1953	183	247	42	153	155	33	38	329	95	150	267	122	1814
1954	376	844	0	72	4	139	39	69	163	392	133	209	2440
1955	663	1499	0	93	206	221	146	224	244	488	294	116	4194
1956	496	1195	529	229	354	322	354	115	64	245	36	119	4058
1957	54	108	156	114	11	88	122	98	0	22	5	193	972

MENDOORAN RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1958	409	176	90	161	322	216	100	88	353	318	29	381	2643
1959	289	342	600	260	56	160	253	6	41	230	258	219	2714
1960	182	115	97	46	160	12	225	287	383	130	255	180	2072
1961	101	205	491	147	46	85	152	290	16	101	608	247	2489
1962	471	89	111	105	255	12	163	223	88	241	46	362	2166
1963	600	208	247	43	362	273	150	248	126	107	103	292	2759
1964	223	27	413	297	115	156	189	112	247	254	92	113	2238

Appendix 13
Sheet 1

WALLUMBURAWANG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1901					NO RECORDS					187	146	25	
1902	0	79	15	0	36	77	33	300	138	221	176	130	1205
1903	40	25	225	235	240	75	124	115	479	190	155	170	2073
1904	125	566	135	30	100	95	55	50	41	320	0	88	1605
1905	0	327	165	315	281	234	120	90	0	101	58	70	1761
1906	160	60	248	83	74	170	70	350	276	100	242	213	2046
1907	270	0	356	18	20	87	16	90	80	10	381	160	1488
1908	300	210	72	100	42	138	130	70	83	105	360	6	1616
1909	40	580	70	127	104	220	50	290	86	162	305	330	2364
1910	420	0	58	0	70	105	75	105	82	140	153	122	1330
1911	573	300	20	0	155	35	168	155	185	40	411	278	2320
1912	65	358	15	0	0	246	523	178	17	110	166	30	1708
1913	155	292	300	228	365	172	60	110	120	110	84	116	2112
1914	120	344	493	147	238	43	158	0	142	184	497	620	2986
1915	143	49	58	31	294	245	162	108	110	142	0	176	1518
1916	47	148	0	262	82	517	412	184	229	235	223	630	2969
1917	395	172	50	0	61	356	150	179	344	193	375	222	2497
1918	215	23	0	121	57	44	149	339	62	88	98	30	1226

WALLUMBURAWANG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1919	161	129	91	42	467	74	75	109	22	40	28	322	1560
1920	193	86	0	21	155	779	1081	267	324	135	270	456	3767
1921	283	18	448	623	372	198	52	166	136	77	163	394	2930
1922	141	5	0	101	29	173	167	26	81	66	82	301	1172
1923	49	0	60	0	20	488	253	111	311	78	129	524	2023
1924	123	104	21	234	21	167	107	134	381	223	459	35	2009
1925	135	80	120	0	247	164	204	120	13	46	357	92	1578
1926	160	78	1018	447	389	139	93	91	220	45	0	471	3151
1927	197	0	35	209	29	120	0	118	48	190	306	237	1489
1928	449	294	234	60	41	81	147	24	13	61	122	36	1562
1929	169	212	96	268	23	52	69	171	104	148	115	42	1469
1930	292	73	178	95	140	451	455	193	58	438	44	156	2573
1931	137	36	599	500	375	364	118	40	72	37	228	286	2792
1932	5	74	401	177	43	127	233	157	358	124	356	166	2221
1933	239	97	89	150	126	161	277	24	260	255	395	218	2291
1934	419	705	1	48	4	104	303	247	218	397	162	108	2716
1935	336	12	16	123	50	75	128	83	240	236	37	125	1461
1936	201	238	207	103	105	84	397	112	153	80	3	367	2050

Appendix 13
Sheet 3

WALLUMBURAWANG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1937	305	260	139	38	82	183	27	97	76	98	357	48	1710
1938	266	39	64	128	188	73	250	160	42	171	156	76	1613
1939	180	13	296	334	96	252	141	255	11	170	231	83	2062
1940	18	5	35	215	28	28	19	83	230	0	84	326	1071
1941	631	64	257	20	86	334	70	88	107	155	344	90	2246
1942	164	228	147	4	342	306	314	72	144	129	307	250	2407
1943	226	135	10	197	214	110	68	66	104	134	201	103	1568
1944	86	81	53	63	286	14	173	402	53	38	24	7	1280
1945	326	277	142	188	299	628	108	368	0	240	101	162	2839
1946	232	116	114	34	133	74	50	9	147	35	70	76	1090
1947	17	430	290	75	128	156	168	158	427	390	405	663	3307
1948	214	258	188	138	181	326	52	157	252	34	165	68	2033
1949	228	522	349	217	125	221	175	233	325	440	159	63	3057
1950	328	438	222	504	315	482	351	292	259	781	901	69	4942
1951	208	285	217	67	195	260	192	261	162	48	164	213	2272
1952	40	189	301	238	135	335	247	593	56	199	66	143	2542
1953	98	267	14	159	234	48	32	410	86	145	332	139	1964
1954	267	876	0	71	15	183	27	67	88	566	69	178	2407

WALLUMBURAWANG RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1955	467	1054	140	138	289	159	127	269	283	484	276	106	3792
1956	415	554	590	277	339	319	318	148	96	278	70	105	3509
1957	35	333	287	144	10	158	112	63	0	3	0	198	1343
1958	335	241	276	128	353	222	129	167	469	291	80	165	2856
1959	405	352	372	333	50	188	306	0	42	154	173	307	2682
1960	194	17	79	89	196	8	259	250	252	83	258	131	1816
1961	98	190	468	209	8	79	112	316	3	67	434	227	2211
1962	472	73	136	182	233	43	167	295	151	344	79	522	2697
1963	654	113	476	95	356	294	163	194	112	117	195	185	2954
1964	345	14	178	301	89	62	167	112	228	272	77	90	1935

Appendix 14
Sheet 1

COOLAH RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1885	296	437	170	150	96	508	30	25	74	63	148	204	2201
1886	188	61	91	389	331	139	343	618	91	325	744	448	3768
1887	880	748	311	192	30	343	319	559	72	287	291	567	4599
1888	69	255	57	7	160	48	96	32	212	64	259	91	1350
1889	124	301	286	491	819	286	152	140	155	406	325	328	3813
1890	266	740	422	149	338	355	333	116	378	142	132	415	3786
1891	550	165	357	74	227	451	202	213	401	110	210	197	3157
1892	118	126	87	219	406	118	284	96	705	507	203	492	3361
1893	365	112	788	310	253	316	316	281	105	269	265	163	3543
1894	93	132	840	152	39	266	207	115	150	321	111	305	2731
1795	674	138	0	18	82	118	81	96	303	237	358	363	2468
1896	194	607	288	105	298	265	120	224	33	138	116	347	2735
1897	395	48	104	12	143	310	364	112	164	255	41	213	2161
1898	693	564	0	4	239	499	86	332	279	272	66	125	3159
1899	258	20	78	222	35	182	256	486	81	117	260	15	2010
1900	420	104	382	135	197	251	222	104	188	41	107	335	2486
1901	142	21	262	271	228	181	76	431	72	150	189	66	2089
1902	24	55	97	28	6	110	53	369	141	254	166	566	1869

COOLAH RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1903	40	26	208	319	219	43	160	243	562	395	266	357	2838
1904	144	753	456	368	86	104	407	216	50	230	79	236	3129
1905	49	250	245	325	321	105	176	185	12	96	80	88	1932
1906	91	103	206	75	88	190	74	370	390	262	363	212	2424
1907	132	72	231	125	34	186	164	174	94	51	438	262	1963
1908	294	549	332	136	116	147	105	86	192	74	244	157	2432
1909	393	390	99	170	80	374	59	398	135	234	170	601	3103
1910	919	0	239	91	88	323	158	59	130	226	93	315	2641
1911	641	515	509	68	120	125	385	139	235	69	475	372	3653
1912	91	151	14	39	3	271	692	182	37	242	31	15	1768
1913	91	268	421	301	569	175	68	100	174	298	63	98	2626
1914	182	353	408	169	145	41	138	0	117	58	219	395	2225
1915	54	32	130	85	110	177	180	118	115	193	30	180	1404
1916	63	121	51	356	68	570	391	241	191	265	286	547	3150
1917	316	137	22	6	34	280	155	201	597	281	428	268	2725
1918	419	66	74	133	68	24	149	335	35	30	36	23	1392
1919	230	221	44	62	222	19	70	93	53	40	12	325	1391
1920	182	166	20	32	110	752	913	223	232	38	237	433	3338

COOLAH RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1921	350	160	420	446	366	352	388	128	164	165	302	286	3527
1922	177	97	0	43	26	76	173	48	74	124	24	300	1162
1923	163	0	77	0	34	420	164	72	221	173	148	227	1699
1924	196	386	56	163	27	167	142	170	341	185	506	389	2728
1925	92	100	131	5	119	144	148	84	64	66	263	119	1335
1926	271	57	872	416	303	111	109	120	252	39	83	1080	3713
1927	179	0	86	210	17	97	7	97	62	210	489	172	1626
1928	239	725	456	92	51	147	195	21	30	144	151	105	2356
1929	112	275	80	242	40	33	46	218	87	191	218	155	1697
1930	220	95	154	140	120	487	328	132	108	438	110	140	2472
1931	151	81	447	446	447	422	183	72	55	52	306	270	2932
1932	51	114	474	156	37	126	157	138	413	73	262	145	2146
1933	427	14	90	305	92	143	353	41	277	328	438	141	2649
1934	179	575	0	169	0	104	332	189	201	365	122	380	2616
1935	343	225	30	143	89	128	82	93	209	254	42	154	1792
1936	322	445	434	68	76	63	396	157	160	46	13	309	2489
1937	269	596	147	59	68	156	83	217	97	144	264	71	2171
1938	243	92	0	138	189	49	213	351	23	155	191	63	1707

COOLAH RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1939	151	52	414	683	127	196	87	211	23	225	211	113	2493
1940	0	0	51	319	76	58	6	90	281	35	105	564	1585
1941	1043	120	235	30	103	217	75	88	146	224	139	28	2448
1942	268	223	156	11	254	389	334	134	174	73	342	385	2743
1943	136	67	12	298	303	198	101	206	206	60	375	321	2283
1944	172	154	81	60	181	106	233	461	63	54	82	11	1658
1945	307	347	228	217	273	621	108	315	1	176	94	200	2887
1946	477	90	33	164	77	116	58	3	163	38	123	251	1593
1947	109	588	144	102	130	63	213	165	300	387	262	877	3340
1948	205	556	141	145	172	288	32	195	170	72	146	250	2372
1949	182	452	187	182	148	164	103	303	276	247	205	161	2610
1950	435	551	146	710	195	422	364	231	200	539	877	1	4671
1951	165	136	220	64	144	284	231	283	167	63	133	163	2053
1952	142	155	301	246	212	360	264	417	96	196	108	315	2812
1953	164	317	12	112	328	28	60	343	113	143	285	122	2027
1954	468	692	0	39	31	229	21	74	119	427	250	130	2480
1955	662	1493	5	160	225	209	155	374	222	513	337	153	4508
1956	244	858	403	363	342	392	313	211	98	334	71	89	3718

COOLAH RAINFALL STATISTICS
(Points)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
1957	105	280	139	116	9	79	162	184	14	17	18	376	1499
1958	343	213	92	114	352	210	100	216	557	297	104	272	2870
1959	432	344	446	119	66	176	190	2	72	333	312	153	2645
1960	258	265	96	53	176	11	318	189	263	306	304	281	2511
1961	171	237	356	232	10	85	144	334	11	128	565	505	2778
1962	437	110	94	136	251	18	245	242	163	319	99	257	2371
1963	786	230	221	345	466	329	185	277	155	108	212	391	3705
1964	327	106	198	338	137	125	233	163	301	334	136	151	2549

STATISTICAL RAINFALL DATA
(Points)

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Combogolong (Period 60 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	508
	10%	27	13	0	0	0	25	6	0	12	14	9	2	1029
	30%	67	42	30	29	39	58	64	40	37	41	48	43	1230
	50%	110	142	81	79	89	106	102	78	59	86	96	102	1655
	70%	221	270	184	149	164	198	172	117	121	142	161	201	1945
	90%	411	526	415	258	288	401	323	275	270	354	425	360	2228
	Maximum	681	671	660	602	517	538	522	359	527	680	541	554	3707
Coonamble (Period 60 years)	Minimum	0	0	0	0	0	4	0	2	0	0	0	0	695
	10%	21	12	1	0	8	21	12	23	22	23	16	14	1009
	30%	98	98	42	68	81	63	55	67	50	85	63	71	1604
	50%	156	172	154	113	126	125	128	97	98	143	106	111	1924
	70%	295	349	255	183	208	187	163	182	154	223	175	188	2328
	90%	551	611	534	372	328	347	289	295	282	363	338	318	2861
	Maximum	747	779	848	665	529	487	456	408	374	587	950	544	4444
Gilgandra (Period 81 years)	Minimum	0	0	0	0	0	10	5	0	0	0	1	0	898
	10%	23	17	12	5	12	40	40	25	21	27	24	35	1278
	30%	111	63	76	77	77	109	87	94	64	108	71	89	1865
	50%	215	121	128	130	136	173	152	142	110	136	141	160	2211
	70%	286	270	280	217	226	267	226	215	186	217	258	279	2629
	90%	451	635	449	496	370	405	343	381	321	323	400	445	3397
	Maximum	767	1493	840	735	556	820	614	609	444	701	961	826	5009

STATISTICAL RAINFALL DATA
(Points)

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Gulargambone (Period 76 years)	Minimum	9	0	0	0	0	0	0	0	0	0	0	0	804
	10%	30	5	3	0	3	20	19	31	12	21	25	26	1229
	30%	125	49	59	53	72	87	80	73	43	58	60	81	1727
	50%	175	130	133	121	124	157	136	125	109	133	121	136	2032
	70%	327	269	217	210	240	270	180	175	200	187	228	246	2490
	90%	556	600	460	381	429	417	360	284	374	356	371	411	3160
	Maximum	802	1053	968	718	703	1094	494	572	543	697	891	647	4877
Mt. Tenandra (Period 68 years)	Minimum	0	0	0	0	0	0	0	0	7	0	0	0	1001
	10%	39	4	0	0	17	42	29	27	30	23	23	42	1258
	30%	118	56	48	64	55	110	80	80	59	70	101	90	1907
	50%	177	141	140	127	125	175	148	130	94	160	150	157	2212
	70%	286	314	278	212	234	277	218	199	188	207	235	276	2554
	90%	450	541	498	445	420	432	385	353	354	358	385	481	3277
	Maximum	856	930	966	809	587	751	845	633	545	772	1098	1182	4804
Pier Pier (Period 70 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	601
	10%	39	14	0	0	0	12	9	4	7	13	6	15	952
	30%	72	45	46	34	48	61	54	31	40	37	46	61	1335
	50%	120	119	105	75	99	114	110	77	69	69	103	118	1564
	70%	228	205	182	146	161	220	156	130	137	135	173	260	1954
	90%	420	459	473	347	278	355	269	286	261	272	376	363	2473
	Maximum	858	858	788	545	519	607	664	487	529	683	605	512	3854

STATISTICAL RAINFALL DATA
(Points)

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Urawilkie (Period 66 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	727
	10%	19	0	2	0	1	20	11	0	8	26	10	8	1105
	30%	80	42	40	27	73	89	65	73	42	55	63	57	1462
	50%	161	125	100	92	110	129	107	93	85	106	97	120	1778
	70%	231	261	216	197	196	239	157	156	162	159	189	217	2087
	90%	494	587	484	337	346	391	306	329	284	303	327	390	2854
	Maximum	987	848	759	575	562	1018	581	498	407	683	919	465	3567
Wingadee (Period 81 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	807
	10%	32	9	3	0	1	20	12	6	8	14	11	35	1051
	30%	86	56	57	25	69	59	50	48	39	59	57	74	1395
	50%	152	145	110	84	100	115	99	75	61	102	99	111	1798
	70%	243	290	205	163	172	211	151	121	140	161	152	242	2034
	90%	527	517	408	332	320	370	290	285	255	311	295	407	2593
	Maximum	808	711	856	732	439	550	730	509	500	685	889	588	4218
Baradine (Period 70 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	1121
	10%	39	1	0	0	9	28	25	13	6	15	11	35	1391
	30%	105	74	70	44	79	92	79	66	59	89	70	114	1702
	50%	207	188	146	103	131	148	138	119	110	137	128	219	2302
	70%	311	307	239	173	202	249	212	174	192	183	241	282	2548
	90%	632	660	475	360	346	434	353	367	320	423	398	394	3121
	Maximum	1070	922	839	784	681	791	967	565	480	784	1005	826	4512

STATISTICAL RAINFALL DATA
(Points)

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Coonabarabran (Period 59 years)	Minimum	16	2	0	0	0	2	1	0	4	8	5	0	1264
	10%	73	20	25	32	14	58	54	28	24	44	49	65	1676
	30%	128	112	90	65	62	126	111	106	97	104	103	141	2310
	50%	245	212	199	153	132	190	179	164	146	153	193	212	2743
	70%	356	406	315	272	228	265	260	237	269	234	308	298	3108
	90%	763	804	601	437	373	573	459	485	372	475	473	455	3821
	Maximum	908	1173	965	1348	582	912	1224	585	569	763	1032	921	6285
Hawthorne (Period 78 years)	Minimum	14	0	0	0	0	0	0	0	0	0	0	0	1172
	10%	45	24	8	6	2	21	35	35	25	26	25	25	1396
	30%	148	84	66	61	61	76	87	86	49	93	83	112	1773
	50%	213	184	169	107	100	148	127	124	113	157	146	168	2162
	70%	303	355	282	194	224	227	186	193	174	208	260	295	2584
	90%	632	625	495	354	338	363	328	290	280	348	415	474	3225
	Maximum	1230	1124	911	799	522	641	908	636	615	619	693	909	4862
Mendooran (Period 73 years)	Minimum	0	0	0	0	0	0	0	0	0	0	0	0	972
	10%	37	0	20	11	18	39	41	38	23	29	28	30	1354
	30%	139	68	84	65	77	91	96	99	64	107	76	93	1800
	50%	216	138	156	125	129	154	152	136	127	137	169	162	2207
	70%	310	274	262	219	204	230	224	224	204	212	235	277	2629
	90%	567	667	505	380	342	377	363	337	337	367	388	400	3473
	Maximum	730	1499	1094	573	453	559	706	742	635	580	899	895	4552

STATISTICAL RAINFALL DATA
(Points)

Station	Rainfall Statistic	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Wallumburawang (Period 63 years)	Minimum	0	0	0	0	0	8	0	0	0	0	0	6	1071
	10%	37	8	5	0	20	43	32	32	13	37	26	38	1300
	30%	135	73	58	64	58	85	79	92	77	84	84	94	1614
	50%	197	135	139	127	126	161	141	148	112	140	164	160	2062
	70%	290	275	245	207	234	232	175	194	226	198	275	226	2533
	90%	437	541	460	326	355	416	338	330	336	394	401	465	3113
	Maximum	654	1054	1018	623	467	779	1081	593	479	781	901	663	4942
Coolah (Period 80 years)	Minimum	0	0	0	0	0	11	6	0	1	17	12	1	1162
	10%	71	27	12	19	27	43	58	49	33	41	41	66	1586
	30%	151	103	82	87	76	117	104	113	92	100	110	153	2150
	50%	212	162	146	144	123	176	163	183	155	188	197	243	2491
	70%	325	336	279	221	221	283	233	229	208	264	265	327	2830
	90%	632	606	447	367	342	422	364	374	374	385	437	504	3712
	Maximum	1043	1493	872	710	819	752	913	618	705	539	877	1080	4671

MINIMUM RAINFALL RECORDED IN CONSECUTIVE MONTHS
(Points)

Station	Number of Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Gilgandra	1	0	0	0	0	0	10	5	0	0	0	1	0
	2	0	20	0	7	45	25	34	24	5	11	24	65
	3	75	78	72	58	57	108	146	102	11	93	152	80
	4	125	124	129	78	178	208	189	151	127	178	211	142
	5	143	173	149	249	284	220	216	291	236	310	282	180
	6	192	193	311	312	393	236	359	331	325	390	282	189
	7	212	364	383	491	404	410	380	484	405	437	291	238
	8	383	427	533	509	524	431	662	602	452	459	340	258
	9	446	627	602	622	545	724	750	709	508	508	360	429
	10	683	696	664	643	814	793	828	756	557	528	531	492
	11	802	758	685	931	894	851	904	873	577	699	594	729
	12	898	779	954	1014	941	959	953	893	748	762	831	848
Gulargambone	1	9	0	0	0	0	0	0	0	0	0	0	0
	2	15	9	0	0	11	0	45	25	0	0	42	24
	3	107	20	54	98	11	70	88	65	0	55	115	37
	4	137	77	105	103	117	185	183	80	73	158	128	107
	5	137	181	105	175	252	261	183	168	178	210	198	137
	6	205	186	175	290	292	288	342	200	260	316	228	137
	7	210	265	290	374	292	383	361	282	319	354	228	205
	8	378	380	507	380	425	392	456	341	390	354	296	210
	9	500	568	519	477	455	507	515	574	390	422	301	378
	10	645	616	610	509	539	566	748	632	458	427	469	500
	11	729	690	642	591	598	799	806	686	463	595	591	645
	12	804	699	724	650	831	857	860	725	631	717	736	729

MINIMUM RAINFALL RECORDED IN CONSECUTIVE MONTHS
(Points)

Station	Number of Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Pier Pier	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	27	6	0	0	51	0	0	7	23	0	18	51
	3	41	30	2	64	57	3	66	33	44	30	102	95
	4	135	30	101	64	84	75	110	107	44	145	131	142
	5	149	101	111	117	167	110	110	144	192	195	178	149
	6	206	140	179	177	210	110	212	267	246	242	185	149
	7	206	197	224	217	286	212	269	325	292	249	185	206
	8	287	253	264	286	365	269	385	376	300	249	242	206
	9	319	293	286	388	445	392	410	405	300	306	242	287
	10	359	420	388	445	590	417	439	436	357	306	323	319
	11	486	535	445	590	631	446	470	631	357	387	355	359
	12	601	701	590	694	660	477	715	642	438	419	395	486
Baradine	1	0	0	0	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	48	13	0	5	14	0	19	68
	3	0	0	20	155	53	65	18	70	30	55	148	167
	4	0	92	188	187	105	110	134	90	88	160	241	214
	5	92	218	235	194	153	170	167	262	186	241	289	239
	6	353	247	249	308	286	189	459	359	329	289	389	359
	7	396	249	402	434	318	569	560	493	377	389	399	474
	8	577	402	504	485	609	713	632	493	477	399	474	476
	9	626	504	581	730	770	788	632	493	487	474	476	649
	10	798	591	829	827	881	795	632	586	562	476	649	721
	11	939	859	894	970	946	859	793	846	564	649	721	870
	12	1121	894	970	1035	946	901	985	889	737	721	870	1022

MINIMUM RAINFALL RECORDED
IN CONSECUTIVE MONTHS
(Points)

Station	Number of Months	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Coonabarabran	1	16	2	0	0	0	2	1	0	4	8	5	0
	2	19	20	77	12	47	44	45	30	20	37	53	126
	3	146	130	94	218	48	96	105	142	41	90	233	168
	4	146	142	240	269	100	183	238	218	153	321	275	291
	5	158	285	373	276	277	281	290	322	351	421	398	535
	6	471	412	380	477	285	357	539	450	445	544	618	600
	7	692	419	557	537	376	616	641	755	568	650	665	746
	8	744	569	641	603	620	746	993	882	680	770	885	779
	9	807	680	707	770	816	1069	1057	882	870	1031	886	831
	10	929	746	874	872	1207	1107	1093	894	1055	1032	938	1008
	11	1020	913	976	1271	1334	1160	1169	1338	1056	1084	1115	1016
	12	1264	1015	1293	1398	1334	1236	1538	1421	1108	1236	1123	1107

BELAR CREEK AT WARKTON

LOCATION:	Latitude 31°23' Longitude 149°12'
PERIOD OF ESTABLISHMENT:	26th November, 1951 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	14 years
ZERO OF GAUGE:	R.L. 37.52 Assumed Datum.
CATCHMENT AREA:	50 square miles.
CONTROL:	Natural rock causeway.
EQUIPMENT:	Staff gauge, range 0 to 15 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 66
	(b) Maximum observation in cusecs : 205
	(c) Minimum observation in cusecs : 0.33
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	8,000 cusecs.
MEAN DAILY DISCHARGE FOR 14 YEARS:	18 cusecs.
MEAN ANNUAL DISCHARGE FOR 14 YEARS:	13,000 acre feet.

BELAR RIVER AT WARKTON

Year 1951

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	..	..	..	..
June	..	..	..	..
July	..	..	..	..
Aug.	..	..	..	..
Sept.	..	..	..	..
Oct.	..	..	..	..
Nov.	..	..	..	..
Dec.	21	1.1	2.0	123
Total	..	..	..	..

Year 1952

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1.2	1.1	1.1	71
Feb.	1.8	1.2	1.3	77
Mar.	1.8	1.2	1.3	79
Apr.	20	1.2	4.5	270
May	5	1.2	3.1	190
June	960	5	70	4,206
July	720	6.2	73	5,542
Aug.	1220	13	109	6,754
Sept.	15	3.5	.2	552
Oct.	6	3.5	4.1	257
Nov.	3.5	1.1	1.4	84
Dec.	1.1	1.1	1.1	68
Total	..	..	..	18,150

Year 1953

Jan.	3.5	1.1	1.4	84
Feb.	1.8	1.2	1.4	76
Mar.	1.8	0.9	1.3	82
Apr.	75	1.2	6.2	372
May	1.8	1.8	1.8	112
June	1.1	1.1	1.1	66
July	0.9	0.9	0.9	56
Aug.	340	0.9	20	1,248
Sept.	3.5	1.8	2	122
Oct.	3.5	1.8	2.5	152
Nov.	3.5	0.5	1.5	92
Dec.	29	0.5	2.4	148
Total	..	..	..	2,610

Year 1954

Jan.	1.8	0.5	0.6	36
Feb.	1850	0.5	135	7,586
Mar.	13	2.5	5	318
Apr.	1.6	1.6	1.6	96
May	1.4	1.4	1.4	86
June	5	1.6	1.8	110
July	1.6	1.6	1.6	99
Aug.	1.6	0.8	1.1	68
Sept.	2.5	1.6	1.7	100
Oct.	1080	1.6	62	3,860
Nov.	128	2.5	12	705
Dec.	2.5	0.8	1.6	98
Total	..	..	..	13,162

BELAR CREEK AT WARKTON

Year 1955

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1380	0.8	58	3,590
Feb.	8000	5	343	19,226
Mar.	230	6	42	2,612
Apr.	15.5	3.5	4.3	259
May	670	4.7	38	2,350
June	23	8.5	12	735
July	230	8.5	26	1,622
Aug.	645	19	55	3,420
Sept.	155	12	27	1,632
Oct.	460	12	40	2,492
Nov.	23	6	12	732
Dec.	12	3.5	5	324
Total	..	..	..	38,994

Year 1956

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1400	3.5	32	1,994
Feb.	600	6	96	5,588
Mar.	1170	12	68	4,226
Apr.	70	11	24	1,414
May	785	16	95	5,874
June	1100	22	88	5,278
July	1300	43	149	9,218
Aug.	137	22	40	2,484
Sept.	29	11	16	959
Oct.	268	7	31	1,891
Nov.	11	5	7	431
Dec.	16	1.5	4.3	269
Total	..	..	..	39,626

Year 1957

Jan.	1.5	1.5	1.5	93
Feb.	1.5	1.5	1.5	84
Mar.	16	1.5	2.2	137
Apr.	10.5	1.5	2.0	112
May	1.5	1.5	1.5	93
June	1.5	1.5	1.5	90
July	1.5	1.5	1.5	93
Aug.	1.5	1.5	1.5	93
Sept.	1.5	1.1	1.2	75
Oct.	1.1	1.1	1.1	68
Nov.	1.1	0.8	1.0	58
Dec.	7	0.8	1.1	66
Total	..	..	..	1,062

Year 1958

Jan.	840	0.8	18	1,138
Feb.	1170	2	39	2,184
Mar.	7.5	2	3	184
Apr.	7.5	2	2.3	142
May	11	2	2.6	163
June	90	2	7.5	452
July	192	4.5	22	1,384
Aug.	36	4.5	7	461
Sept.	320	7.5	37	2,226
Oct.	2310	7.5	77	4,772
Nov.	7.5	1.7	4	246
Dec.	3.5	1.7	1.8	112
Total	..	..	..	13,464

BELAR CREEK AT WARKTON

Year 1959

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	136	1.7	9	538
Feb.	420	1.7	45	2,536
Mar.	236	3.5	45	2,810
Apr.	1040	7.5	75	4,520
May	7.5	6.2	6.3	394
June	6.2	3.5	6	344
July	192	6.2	30	1,862
Aug.	19	3.5	9	562
Sept.	6.2	3.5	3.7	220
Oct.	3.5	1.7	2.6	160
Nov.	32	1.7	3.6	214
Dec.	19	1.7	3	186
Total	..	..	..	14,346

Year 1960

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	6.2	1.7	2.3	144
Feb.	1.7	0.9	1.4	82
Mar.	0.9	0.9	0.9	56
Apr.	0.9	0.9	0.9	54
May	6.2	0.9	1.7	105
June	1.3	1.3	1.3	78
July	9.6	1.3	3.6	222
Aug.	40	1.7	6.4	394
Sept.	40	1.7	5	288
Oct.	6.2	1.7	3	192
Nov.	3.5	1.3	2	120
Dec.	3.5	1.3	1.6	100
Total	..	..	..	1,835

Year 1961

Jan.	1.3	0.9	1	64
Feb.	19	0.9	1.7	95
Mar.	150	0.9	9	546
Apr.	3.5	1.7	2.3	138
May	1.7	1.7	1.7	106
June	1.7	1.7	1.7	102
July	19	1.7	2.5	156
Aug.	300	1.7	36	2,226
Sept.	14	1.7	5.4	322
Oct.	236	1.7	10.5	652
Nov.	56	0.9	7.3	438
Dec.	6.2	1.7	3.2	200
Total	..	..	..	5,045

Year 1962

Jan.	6.2	1.7	2.1	132
Feb.	6.2	1.3	1.8	102
Mar.	1.7	0.9	1.0	65
Apr.	19	1.7	3.4	202
May	1.7	1.7	1.7	105
June	3.5	1.7	2.0	120
July	460	1.7	11.3	697
Aug.	264	5.0	32	1,982
Sept.	7.8	2.8	4.4	263
Oct.	88	1.4	7.5	464
Nov.	2.8	0.7	1.5	89
Dec.	1.4	0.7	0.8	52
Total	..	..	..	4,273

BELAR CREEK AT WARKTON

Year 1963

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1140	0.7	32	1,988
Feb.	170	1.4	18.3	1,028
Mar.	100	1.1	10.6	659
Apr.	7.8	1.4	3.1	184
May	770	5	72	4,470
June	420	11	52	3,130
July	31	7.8	11.7	727
Aug.	25	5	9	556
Sept.	15	1.4	5.7	343
Oct.	25	1.4	3.5	215
Nov.	100	1.4	9.4	565
Dec.	66	1.2	14.6	906
Total	..	..	..	14,771

Year 1964

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	14	1.7	2.3	143
Feb.	755	0.9	16	935
Mar.	9.6	1.3	2.5	157
Apr.	420	1.3	28.2	1,693
May	8.4	1.5	3.2	196
June	133	5.5	14.7	846
July	66	3.2	13.2	821
Aug.	120	3.2	13	805
Sept.	133	5.5	20.4	1,225
Oct.	97	12	27	1,652
Nov.	18	1.5	6	359
Dec.	1.5	0.9	1.1	70
Total	..	..	..	8,902

Year 1965

Jan.	3.2	0.4	0.6	37
Feb.	0.4	0.4	0.4	22
Mar.	0.4	0.4	0.4	25
Apr.	1.2	0.4	0.8	46
May	1.5	1.2	1.4	88
June	1.5	1.5	1.5	90
July	1	1	1	62
Aug.	1	1	1	62
Sept.	1	1	1	60
Oct.	12	1	1.6	101
Nov.	5.5	0.9	1.1	67
Dec.	175	1.5	19	1,192
Total	..	..	..	1,852

Year 1966

Jan.	0.9	0.4	0.8	49
Feb.	0.4	0.4	0.4	22
Mar.	3.2	0.1	0.6	38
Apr.	5.5	0.9	1.6	97
May	1.5	1.5	1.5	93
Total	..	..	...	..

CASTLEREAGH RIVER AT COONABARABRAN

LOCATION:	Latitude 29°16' Longitude 149°17'
PERIOD OF ESTABLISHMENT:	19th September, 1951 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	14 years
ZERO OF GAUGE:	R.L. 1628.27 Standard Datum.
CATCHMENT AREA:	53 Square Miles.
CONTROL:	Rock bar.
EQUIPMENT:	Staff gauge. Range 0 to 25 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 66
	(b) Maximum observation in cusecs : 954
	(c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	10,800 cusecs.
MEAN DAILY DISCHARGE FOR 14 YEARS:	16 cusecs.
MEAN ANNUAL DISCHARGE FOR 14 YEARS:	12,000 acre feet.

CASTLEREAGH RIVER AT COONABARABRAN

Year 1951

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	..	..	..	..
June	..	..	..	..
July	..	..	..	..
Aug.	..	..	..	..
Sept.	..	..	..	..
Oct.	3.8	0.5	2.7	168
Nov.	0.5	0.5	0.5	30
Dec.	0.5	0	0.3	21
Total	..	..	..	..

Year 1952

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0.5	0	0.03	2
Feb.	1.7	0	0.15	9
Mar.	1.7	0	0.5	32
Apr.	11	0	0.8	50
May	0.5	0.5	0.5	31
June	478	0.5	45	2,715
July	1600	1.7	91	5,634
Aug.	755	11	116	7,220
Sept.	34	1.7	11	648
Oct.	1.7	0.5	1.2	77
Nov.	0.5	0.5	0.5	30
Dec.	0.5	0	0.4	22
Total	..	..	..	16,470

Year 1953

Jan.	1.7	0	0.4	23
Feb.	3.8	0	0.5	28
Mar.	0.5	0.5	0.5	31
Apr.	1.7	0.5	0.5	32
May	11	0.5	1.1	68
June	1.7	0.5	0.7	42
July	0.5	0.5	0.5	31
Aug.	142	0.5	16	996
Sept.	3.8	0.5	2	120
Oct.	1.7	0.5	0.8	48
Nov.	1.7	0	0.5	30
Dec.	1.7	0	0.2	11
Total	..	..	..	1,460

Year 1954

Jan.	3.8	0	0.9	54
Feb.	2310	0	129	7,276
Mar.	21	0.4	5	314
Apr.	0.4	0.4	0.4	24
May	0.4	0.4	0.4	25
June	2.1	0.4	0.6	34
July	0.4	0.4	0.4	25
Aug.	0.4	0.4	0.4	25
Sept.	6.6	0.2	0.6	36
Oct.	190	0.4	18	1,133
Nov.	49	0.4	10.4	624
Dec.	0.4	0.1	0.3	17
Total	..	..	..	9,587

CASTLEREAGH RIVER AT COONABARABRAN

Year 1955

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1920	0.1	66	4,110
Feb.	10800	2.1	514	28,786
Mar.	755	5	36	2,248
Apr.	11	1	5	296
May	33	1	7	454
June	33	5	16	968
July	142	11	23	1,448
Aug.	355	11	41	2,568
Sept.	49	13	27	1,606
Oct.	165	13	35	2,184
Nov.	26	13	18	1,068
Dec.	13	1.7	4	227
Total	..	..	..	45,963

Year 1956

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	2310	0.7	52	3,218
Feb.	1600	20	111	6,436
Mar.	190	20	35	2,156
Apr.	33	7	19	1,156
May	610	33	70	4,330
June	1220	20	91	5,452
July	1050	33	149	9,232
Aug.	49	13	25	1,574
Sept.	20	13	13	808
Oct.	73	7	18	1,138
Nov.	26	1.7	8	472
Dec.	1.7	1.7	1.7	105
Total	..	..	..	36,077

Year 1957

Jan.	1.7	0.7	1.5	91
Feb.	7	0.5	1	59
Mar.	33	0.5	3	188
Apr.	13	0.7	1.4	87
May	0.7	0.7	0.7	43
June	1.7	0.7	0.7	44
July	1.7	0.7	1.5	95
Aug.	1.7	0.7	0.8	51
Sept.	0.7	0.7	0.7	42
Oct.	0.7	0.3	0.4	27
Nov.	0.3	0	0.1	6
Dec.	7	0	0.3	17
Total	..	..	..	750

Year 1958

Jan.	33	0.3	2.4	146
Feb.	231	0.3	47	2,608
Mar.	1.4	1	1.4	86
Apr.	1	0.6	0.8	48
May	7	0.6	1.7	103
June	45	2	5	298
July	5.3	1.4	4	243
Aug.	11	1.4	3.2	199
Sept.	190	2.6	22	1,302
Oct.	2310	5.3	65	4,042
Nov.	5.3	1.4	3.5	208
Dec.	1	0.2	0.5	30
Total	..	..	..	9,313

CASTLEREAGH RIVER AT COONABARABRAN

Year 1959

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	46	0	4.8	300
Feb.	900	0	53	2,994
Mar.	290	4	42	2,600
Apr.	3520	9	187	11,216
May	9	4.2	7.5	462
June	9	4.2	4.5	272
July	71	1.8	15	930
Aug.	16	4.2	6.5	400
Sept.	4.2	1.3	2.7	160
Oct.	9	1.3	2	126
Nov.	16	0.8	2.8	166
Dec.	9	0.8	1.2	74
Total	..	..	..	19,700

Year 1960

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	1.8	0.8	1	62
Feb.	0.8	0.8	0.8	46
Mar.	1.8	0.8	0.8	52
Apr.	0.8	0.8	0.8	48
May	0.8	0.8	0.8	50
June	0.8	0.8	0.8	48
July	9	0.8	1.5	96
Aug.	46	0.8	4.4	272
Sept	290	0.8	15.5	934
Oct.	9	0.8	3.1	190
Nov.	9	0.8	1.8	106
Dec.	4.2	0.1	1.1	70
Total	..	..	..	1,974

Year 1961

Jan.	1.8	0	0.8	52
Feb.	119	1	13	728
Mar.	290	1.1	12	736
Apr.	18	1.1	2.6	161
May	2	1.1	1.4	90
June	3	1.1	1.5	88
July	6.2	1.1	1.8	110
Aug.	60	2	12.5	772
Sept.	6.2	1.1	4.0	240
Oct.	1.1	0.3	0.4	24
Nov.	74	0.3	3.5	212
Dec.	126	0.2	6.3	388
Total	..	..	..	3,601

Year 1962

Jan.	3	0.3	0.6	39
Feb.	1.1	0	0.3	17
Mar.	1.1	0.2	0.3	15
Apr.	15	0.3	1.1	68
May	18	0.3	1.2	74
June	0.7	0.3	0.3	21
July	225	0.3	5.7	352
Aug.	126	3	15	958
Sept.	11	1.1	4.5	228
Oct.	315	0.3	16	986
Nov.	60	0.3	3.3	200
Dec.	11	0.3	1.4	88
Total	..	..	..	3,046

CASTLEREAGH RIVER AT COONABARABRAN

Year 1963

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	755	0.3	38	2,326
Feb.	148	0.3	10	556
Mar.	6.2	0.3	0.9	56
Apr.	1.1	0.3	0.3	20
May	126	0.3	20	1,256
June	255	6.2	35	2,128
July	6.2	3	5	324
Aug.	60	3	9	548
Sept.	26	3	5.4	324
Oct.	6.2	1.2	2.6	163
Nov.	6.2	0.3	1.1	69
Dec.	16	0.3	2.3	146
Total	..	..	..	7,916

Year 1964

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	9	0.2	0.7	45
Feb.	755	0.4	13.5	786
Mar.	0.6	0.4	0.4	28
Apr.	47	0.6	2.5	148
May	1.4	0.6	0.6	39
June	4	0.6	2.2	132
July	231	0.6	17.4	1,082
Aug.	9	2.8	4.3	268
Sept.	665	4	41	2,442
Oct.	292	6	32	1,998
Nov.	11	0.6	4	242
Dec.	0.6	0.6	0.6	37
Total	..	..	..	7,247

Year 1965

Jan.	0.4	0.1	0.3	17
Feb.	0.4	0.1	0.2	12
Mar.	0.4	0.3	0.4	22
Apr.	0.9	0.3	0.5	30
May	0.9	0.8	0.9	53
June	0.9	0.8	0.9	51
July	0.9	0.8	0.9	53
Aug.	0.9	0.8	0.9	53
Sept.	1.5	0.1	0.5	30
Oct.	4	0	0.7	46
Nov.	3.6	0.6	0.8	47
Dec.	1300	0.6	43	2,674
Total	..	..	..	3,088

Year 1966

Jan.	0.6	0.1	0.3	17
Feb.	0.6	0.2	0.3	18
Mar.	1.7	0.2	0.3	21
Apr.	1.7	0.2	0.3	17
May	0.6	0.2	0.5	32
Total	..	..	..	..

CASTLEREAGH RIVER AT MENDOORAN

LOCATION:	Latitude 31°49' Longitude 149°07'
PERIOD OF ESTABLISHMENT:	1st January, 1953 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	12 years.
ZERO OF GAUGE:	30.82 Assumed Datum.
CATCHMENT AREA:	1,340 Square Miles.
CONTROL:	Sand.
EQUIPMENT:	Staff gauge, range 0 to 30 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 55
	(b) Maximum observation in cusecs : 6,144
	(c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	91,300 cusecs.
MEAN DAILY DISCHARGE FOR 12 YEARS:	215 cusecs.
MEAN ANNUAL DISCHARGE FOR 12 YEARS:	153,000 acre feet.

CASTLEREAGH RIVER AT MENDOORAN

Year 1953

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	535	1	69	4,254
Feb.	335	1	91	5,068
Mar.	135	1	17	1,034
Apr.	24	1	8	472
May	306	3	57	3,562
June	13	1	4	252
July	5	1	2	108
Aug.	250	1	67	4,124
Sept.	18	3	7	426
Oct.	32	1	7	460
Nov.	18	1	9	510
Dec.	5	0	1	84
Total	..	..	..	20,354

Year 1954

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	397	1	76	4,742
Feb.	13480	40	1747	97,816
Mar.	157	0	53	3,298
Apr.	26	0	10	628
May	12	8	10	640
June	300	12	66	3,956
July	15	10	13	790
Aug.	10	6	9	556
Sept.	22	6	12	716
Oct.	2250	15	216	13,416
Nov.	3420	18	396	23,734
Dec.	18	4	8	466
Total	..	..	..	150,758

Year 1955

Jan.	11320	0	716	44,358
Feb.	91300	24	8449	473,118
Mar.	5900	68	1562	96,860
Apr.	141	45	57	3,428
May	660	28	122	7,568
June	1320	101	283	16,986
July	950	68	357	22,132
Aug.	1520	141	543	33,682
Sept.	580	141	255	15,310
Oct.	3410	101	491	30,424
Nov.	620	56	168	10,072
Dec.	81	30	48	2,950
Total	..	..	..	756,888

Year 1956

Jan.	4700	12	308	19,066
Feb.	8900	72	1594	92,434
Mar.	6240	260	1019	63,200
Apr.	1370	155	504	30,220
May	6940	205	1188	73,654
June	25250	356	1622	97,350
July	16240	364	2082	129,082
Aug.	5960	166	634	39,302
Sept.	274	80	163	9,760
Oct.	980	50	162	10,148
Nov.	50	22	33	1,954
Dec.	770	10	55	3,380
Total	..	..	..	569,550

CASTLEREAGH RIVER AT MENDOORAN

Year 1957

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	30	6	15	920
Feb.	22	6	11	622
Mar.	30	10	16	962
Apr.	30	10	14	840
May	15	13	14	898
June	39	15	19	1,168
July	22	15	20	1,270
Aug.	22	15	18	1,118
Sept.	15	3	7	450
Oct.	6	3	4	276
Nov.	2	2	2	120
Dec.	10	0	0.3	20
Total	..	..	..	8,664

Year 1958

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	8890	0	424	26,276
Feb.	5840	18	530	29,688
Mar.	130	8	29	1,774
Apr.	96	9	19	1,140
May	605	11	73	4,516
June	64	1	7	390
July	1170	3	81	4,998
Aug.	79	3	28	1,708
Sept.	6310	24	377	22,648
Oct.	7560	35	374	23,202
Nov.	39	10	21	1,236
Dec.	166	1	11	664
Total	..	..	..	118,240

Year 1959

Jan.	304	1	19	1,160
Feb.	2530	1	194	10,868
Mar.	2600	22	341	21,134
Apr.	9720	60	703	42,172
May	No Records			
June	No Records			
July	No Records			
Aug.	No Records			
Sept.	No Records			
Oct.	No Records			
Nov.	No Records			
Dec.	No Records			
Total	..	..	..	..

Year 1960

Jan.	1	1	1	30
Feb.	0	0	0	0
Mar.	0	0	0	0
Apr.	2	0	0.1	8
May	12	2	7	460
June	12	6	8	508
July	26	6	18	1,136
Aug.	48	8	21	1,330
Sept.	26	6	9	572
Oct.	6	0	2	102
Nov.	12	0	1.5	96
Dec.	64	0	3	192
Total	..	..	..	4,434

CASTLEREAGH RIVER AT MENDOORAN

Year 1961

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	2	0	0.1	4
Feb.	36	0	1	72
Mar.	1860	13	224	13,880
Apr.	180	13	39	2,374
May	18	5	9	568
June	9	5	8	480
July	40	5	11	712
Aug.	156	9	41	2,576
Sept.	36	5	13	784
Oct.	32	0	4	260
Nov.	397	0	76	4,556
Dec.	3260	3	259	16,082
Total	..	..	..	42,348

Year 1962

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	156	1	20	1,254
Feb.	13	0.1	4	222
Mar.	0.2	0	0.1	4
Apr.	51	0.1	11	642
May	40	0.3	4.4	276
June	13	3	5.6	338
July	335	3	41	2,570
Aug.	815	13	167	10,330
Sept.	48	1.5	13	774
Oct.	1320	0.2	98	6,088
Nov.	28	0.3	5	306
Dec.	28	0.3	4.7	294
Total	..	..	..	23,098

Year 1963

Jan.	7700	2	556	34,474
Feb.	2920	12	239	13,406
Mar.	100	1	20	1,226
Apr.	36	1	9	546
May	4500	36	277	17,200
June	3900	36	304	18,226
July	125	28	42	2,606
Aug.	225	22	50	3,124
Sept.	140	16	43	2,572
Oct.	65	13	23	1,396
Nov.	160	8	32	1,924
Dec.	200	6	50	3,116
Total	..	..	..	99,816

Year 1964

Jan.	36	3.5	9.4	580
Feb.	9	3.5	5	298
Mar.	36	6	11	674
Apr.	1920	5	85	5,086
May	27	8	12	746
June	65	17	33	1,970
July	81	16	32	1,996
Aug.	69	10	21	1,312
Sept.	970	16	71	4,246
Oct.	105	28	58	3,584
Nov.	57	8	22	1,294
Dec.	13	0	6	354
Total	..	..	..	22,140

CASTLEREAGH RIVER AT MENDOORAN

Year 1965					Year 1966				
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.	0	0	0	0	Jan.	13	0	4.2	262
Feb.	0	0	0	0	Feb.	0	0	0	0
Mar.	0	0	0	0	Mar.	125	0	7.5	468
Apr.	0	0	0	0	Apr.	63	0	0.5	278
May	0	0	0	0	May	42	2	9	558
June	1.7	0	0.6	35					
July	3.2	1.7	2.5	153					
Aug.	3.8	3.2	3.6	225					
Sept.	6.5	1.7	3.9	233					
Oct.	105	0	10	620					
Nov.	44	0	5.7	340					
Dec.	3700	0	289	17,888					
Total	..	..	..	19,494	Total	..	..	..	..

CASTLEREAGH RIVER AT GILGANDRA

LOCATION:	Latitude 31°43' Longitude 148°40'
PERIOD OF ESTABLISHMENT:	8th May, 1952 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	13 years.
ZERO OF GAUGE:	R.L. 901.40 Railway Datum.
CATCHMENT AREA:	2,340 square miles.
CONTROL:	Sandy bed.
EQUIPMENT:	Staff gauge, range 0 to 30 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 53
	(b) Maximum observation in cusecs : 9,656
	(c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	100,000 cusecs.
MEAN DAILY DISCHARGE FOR 13 YEARS:	202 cusecs.
MEAN ANNUAL DISCHARGE FOR 13 YEARS:	147,000 acre feet.

CASTLEREAGH RIVER AT GILGANDRA

Year 1952

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
Mar.	..	..	..	..
Apr.	..	..	..	..
May	31	8	22	1,388
June	2850	25	263	15,766
July	4450	31	449	27,872
Aug.	17870	86	1693	104,938
Sept.	166	44	82	4,938
Oct.	44	25	34	2,128
Nov.	37	4	18	1,086
Dec.	8	2	3	204
Total	..	..	..	..

Year 1953

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	59	1	10	628
Feb.	20	1	4	248
Mar.	11	1	3	194
Apr.	4	1	2	138
May	67	4	18	1,104
June	4	3	3.5	210
July	3	3	3	186
Aug.	135	4	41	2,540
Sept.	31	6	12	706
Oct.	37	3	7	414
Nov.	8	2	5	270
Dec.	3	0	1	48
Total	..	..	..	6,686

Year 1954

Jan.	1015	0	64	3,946
Feb.	18290	4	1707	95,614
Mar.	135	8	37	2,312
Apr.	8	4	5	304
May	6	4	6	356
June	37	6	16	980
July	11	8	9	574
Aug.	11	6	9	568
Sept.	11	6	8	452
Oct.	1910	6	145	8,984
Nov.	1072	20	126	7,588
Dec.	20	3	11	684
Total	..	..	..	122,362

Year 1955

Jan.	8860	2	415	25,710
Feb.	100000	37	5200	291,188
Mar.	5520	126	1004	62,260
Apr.	114	80	98	5,872
May	243	80	115	7,160
June	226	90	122	7,296
July	243	80	121	7,502
Aug.	2370	90	285	17,694
Sept.	410	102	154	9,212
Oct.	4050	80	428	26,536
Nov.	226	43	103	6,198
Dec.	102	30	59	3,638
Total	..	..	..	470,266

CASTLEREAGH RIVER AT GILGANDRA

Year 1956

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	4550	12	270	16,726
Feb.	14160	72	3586	208,016
Mar.	7210	243	1182	73,276
Apr.	1616	243	557	33,436
May	6480	300	1424	88,284
June	26250	447	2102	126,148
July	20000	636	2513	155,822
Aug.	9790	420	1160	71,910
Sept.	500	192	325	19,486
Oct.	1150	100	251	15,552
Nov.	171	61	95	5,678
Dec.	151	50	69	4,250
Total	..	..	..	818,584

Year 1957

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	50	40	49	3,060
Feb.	40	31	33	1,826
Mar.	115	31	52	3,224
Apr.	61	31	43	2,558
May	50	31	40	2,468
June	61	31	50	2,980
July	61	61	61	3,782
Aug.	61	31	54	3,360
Sept.	22	15	18	1,082
Oct.	13	4	9	548
Nov.	4	4	4	240
Dec.	6	0	2	102
Total	..	..	..	25,230

Year 1958

Jan.	7846	0	157	9,746
Feb.	8100	42	546	30,580
Mar.	42	9	29	1,828
Apr.	32	7	12	704
May	323	9	45	2,788
June	24	9	11	646
July	1000	14	112	6,974
Aug.	14	9	11	672
Sept.	4830	11	338	20,296
Oct.	5550	82	512	31,766
Nov.	67	24	36	2,142
Dec.	24	11	17	1,044
Total	..	..	..	109,186

Year 1959

Jan.	136	0	23	1,424
Feb.	1890	0	201	11,268
Mar.	1130	42	302	18,734
Apr.	9620	117	852	51,148
May	136	67	96	5,964
June	67	67	67	4,020
July	1086	42	193	11,994
Aug.	136	24	65	4,038
Sept.	18	6	8	478
Oct.	67	6	22	1,340
Nov.	293	9	85	5,078
Dec.	54	0	5	306
Total	..	..	..	115,792

CASTLEREAGH RIVER AT GILGANDRA

Year 1960

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	7	0	2	130
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	32	0	15	952
Aug.	136	0	30	1,834
Sept.	117	9	25	1,514
Oct.	182	9	37	2,322
Nov.	42	5	9	526
Dec.	136	0	10	640
Total	..	..	..	7,918

Year 1961

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	0	0	0	0
Feb.	0	0	0	0
Mar.	1430	0	151	9,342
Apr.	168	0	20	1,180
May	8	5	6	346
June	22	5	7	430
July	22	5	7	428
Aug.	500	8	109	6,736
Sept.	61	3	13	754
Oct.	1	0	0.3	16
Nov.	1215	0	153	9,196
Dec.	1476	3	252	15,636
Total	..	..	..	44,064

Year 1962

Jan.	71	9.5	23	1,430
Feb.	96	0	20	1,114
Mar.	0	0	0	0
Apr.	35	0	3	192
May	28	0	7	434
June	21	3.5	8	498
July	114	3.5	18	1,108
Aug.	474	10	97	6,000
Sept.	71	10	29	1,726
Oct.	570	0.2	57	3,526
Nov.	35	0	6	354
Dec.	144	0	23	1,398
Total	..	..	..	17,780

Year 1963

Jan.	4450	0.2	337	20,920
Feb.	1890	14	252	14,120
Mar.	170	4	26	1,584
Apr.	46	0.3	10	578
May	1486	0.3	324	20,118
June	3990	84	511	30,660
July	293	39	100	6,172
Aug.	570	39	104	6,432
Sept.	474	4	85	5,110
Oct.	209	4	40	2,494
Nov.	170	4	33	1,976
Dec.	669	2	97	5,992
Total	..	..	..	116,156

CASTLEREAGH RIVER AT GILGANDRA

Year 1964

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	23	2	5.3	330
Feb.	3.2	0	0.6	34
Mar.	42	0	9	554
Apr.	806	0	79	4,756
May	49	5.2	13	814
June	84	8	42	2,494
July	170	17	59	3,652
Aug.	42	3.2	11	674
Sept.	137	17	56	3,372
Oct.	669	23	142	8,808
Nov.	109	2	27	1,592
Dec.	7.8	0	3.4	212
Total	..	..	..	27,292

Year 1965

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.	0	0	0	0
Sept.	0	0	0	0
Oct.	0	0	0	0
Nov.	42	0	4.4	266
Dec.	3250	0	363	22,484
Total	..	..	..	22,750

Year 1966

Jan.	42	0	3.4	212
Feb.	0	0	0	0
Mar.	12	0	1.8	112
Apr.	0	0	0	0
May	0	0	0	0
Total	..	..	..	..

CASTLEREAGH RIVER AT COONAMBLE

LOCATION:	Latitude 30°57' Longitude 148°23'
PERIOD OF ESTABLISHMENT:	1st March, 1962 to date.
COMPLETE YEARS OF COMPUTED RECORDS:	3 years.
ZERO OF GAUGE:	R.L. 578.64 Standard Datum.
CATCHMENT AREA:	3,430 square miles.
CONTROL:	Sandy bed.
EQUIPMENT:	Staff Gauge, range 0 to 30 feet.
CURRENT METER OBSERVATIONS:	(a) Number obtained : 22
	(b) Maximum observation in cusecs : 211
	(c) Minimum observation in cusecs : 0
MAXIMUM ESTIMATED DISCHARGE DURING PERIOD OF RECORDS:	11,200 cusecs.
MEAN DAILY DISCHARGE FOR 3 YEARS:	82 cusecs.
MEAN ANNUAL DISCHARGE FOR 3 YEARS:	60,000 acre feet.

CASTLEREAGH RIVER AT COONAMBLE

Year 1962

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	..	..	..	..
Feb.	..	..	..	..
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.	320	3	91	5,624
Sept.	118	6	59	3,516
Oct.	220	4	38	2,358
Nov.	71	0	12	740
Dec.	118	0	25	1,520
Total	..	..	..	..

Year 1963

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	3550	10	487	30,206
Feb.	2300	15	416	23,314
Mar.	45	1	11	704
Apr.	40	2	10	614
May	1390	2	266	16,494
June	4300	97	540	32,402
July	155	40	78	4,850
Aug.	155	35	59	3,686
Sept.	380	35	111	6,664
Oct.	130	6	33	2,076
Nov.	45	6	16	974
Dec.	202	4	53	3,260
Total	..	..	..	125,244

Year 1964

Jan.	13	0	2	132
Feb.	1	0	0	2
Mar.	4	0	0.6	38
Apr.	380	0	40	2,372
May	155	0	29	1,794
June	57	16	32	1,940
July	107	16	44	2,746
Aug.	45	8	20	1,260
Sept.	64	10	23	1,368
Oct.	400	45	133	8,270
Nov.	45	4	22	1,342
Dec.	4	0	0.3	20
Total	..	..	..	21,284

Year 1965

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.	0	0	0	0
Sept.	0	0	0	0
Oct.	0	0	0	0
Nov.	0	0	0	0
Dec.	11200	0	510	31,608
Total	..	..	..	31,608

CASTLEREAGH RIVER AT COONAMBLE

Year 1966

Month	Discharge in Cusecs			Discharge for Month Acre Feet
	Max.	Min.	Mean	
Jan.	33	0	6	392
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
Total	..	..	..	..

FIGURE 1

WATER CONSERVATION & IRRIGATION COMMISSION

CASTLEREAGH RIVER BASIN

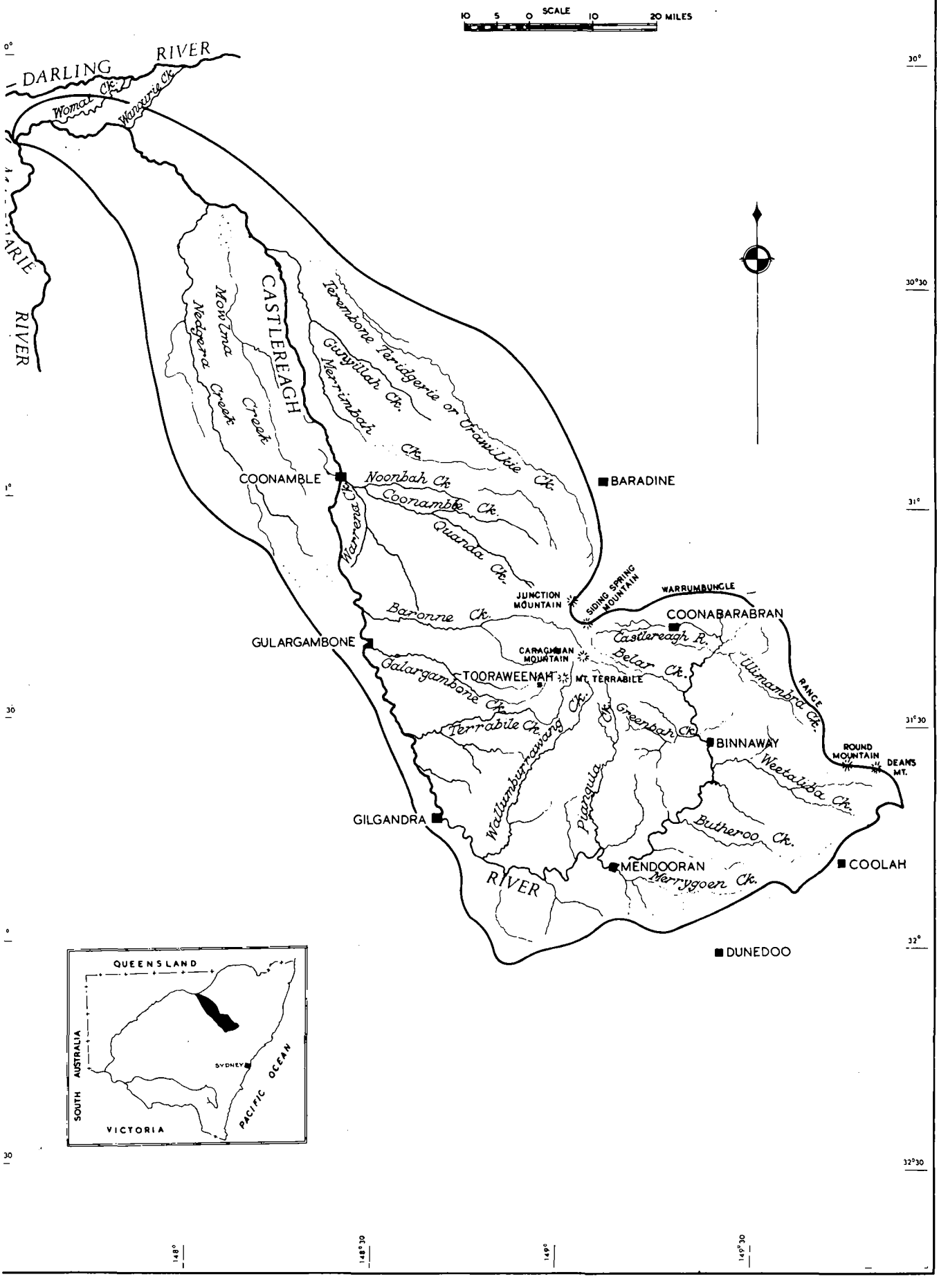


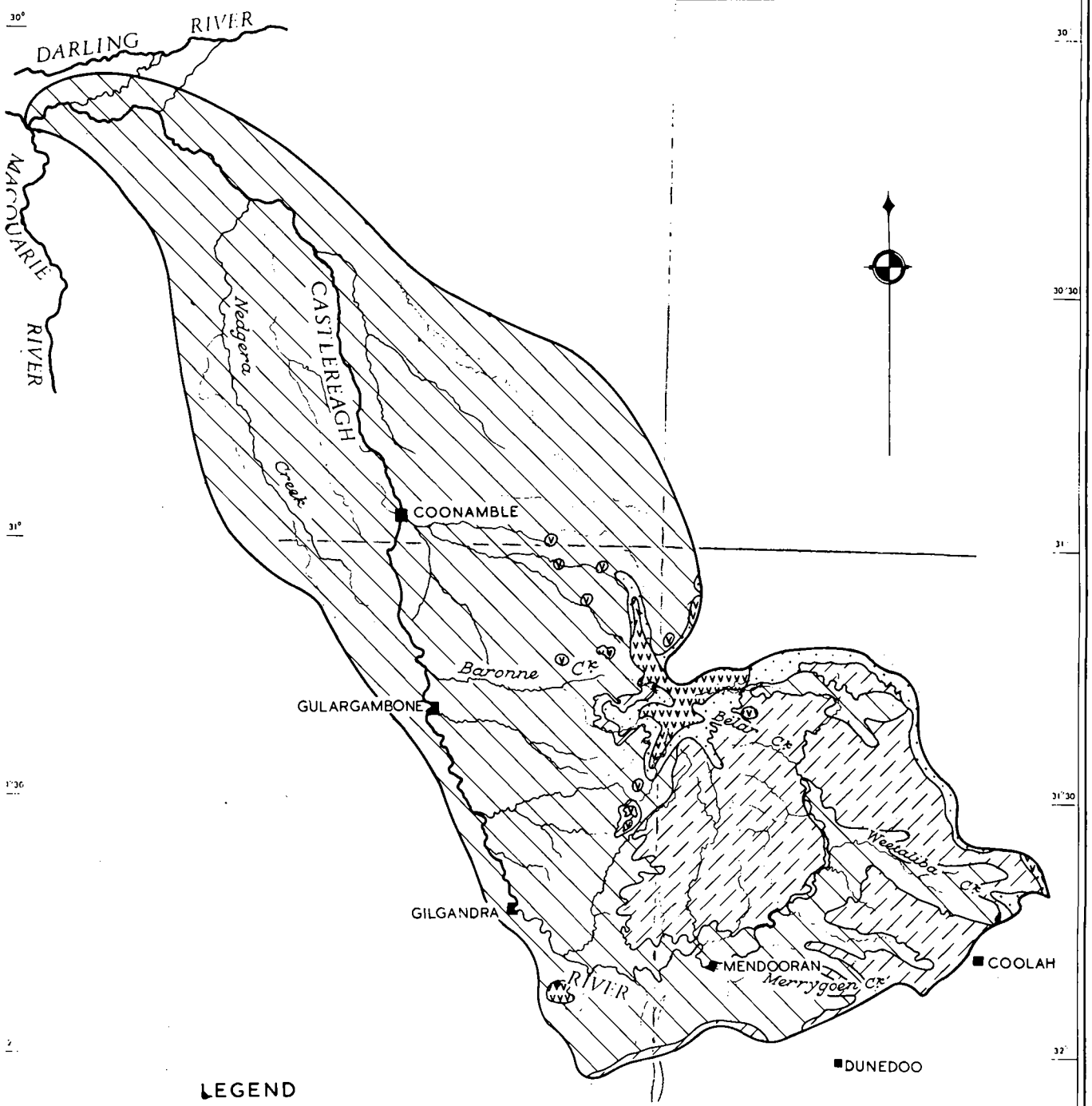
FIGURE 2

WATER CONSERVATION & IRRIGATION COMMISSION

CASTLEREAGH RIVER BASIN

LAND SLOPES

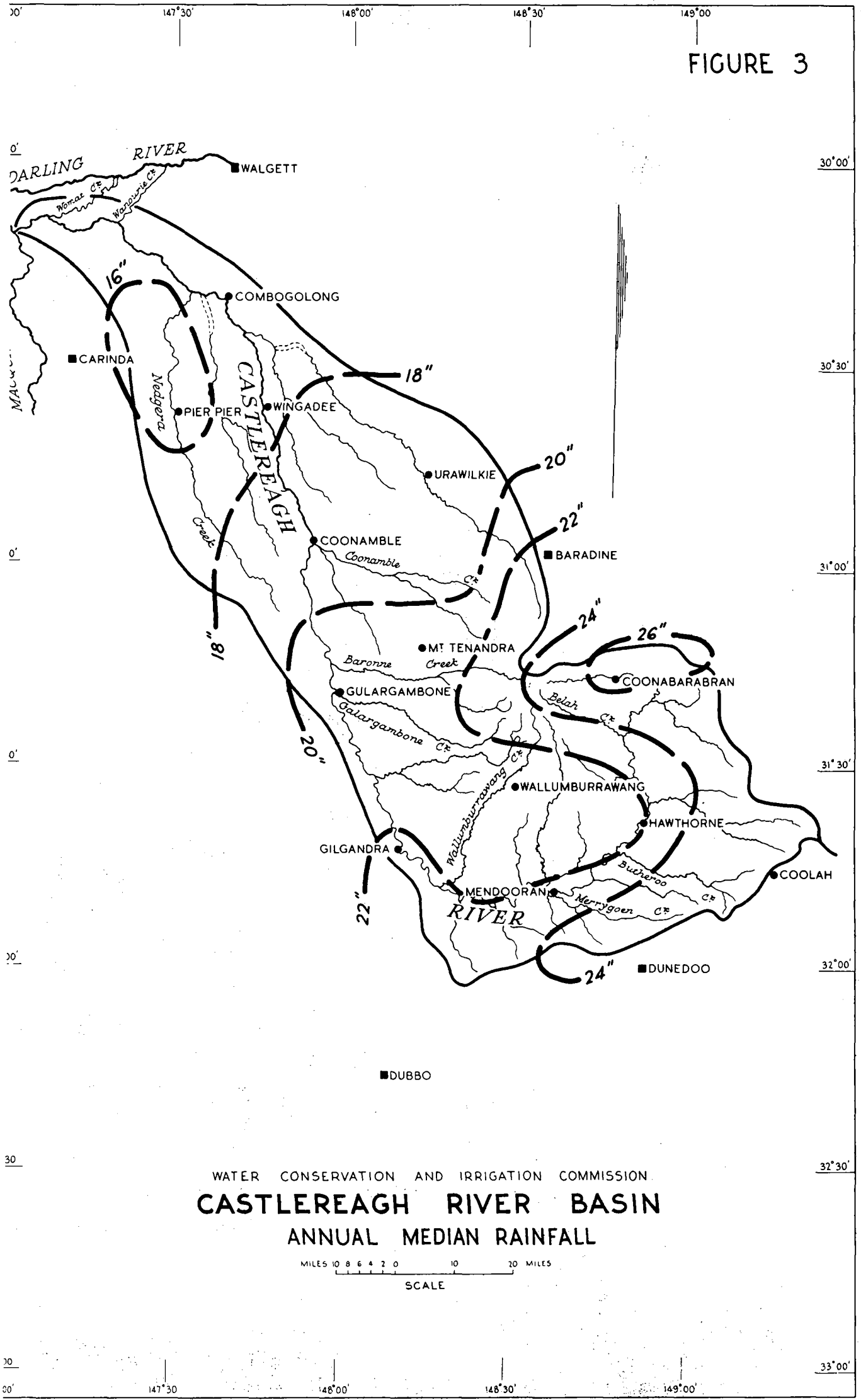
SCALE
10 5 0 10 20 MILES



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 3



WATER CONSERVATION AND IRRIGATION COMMISSION

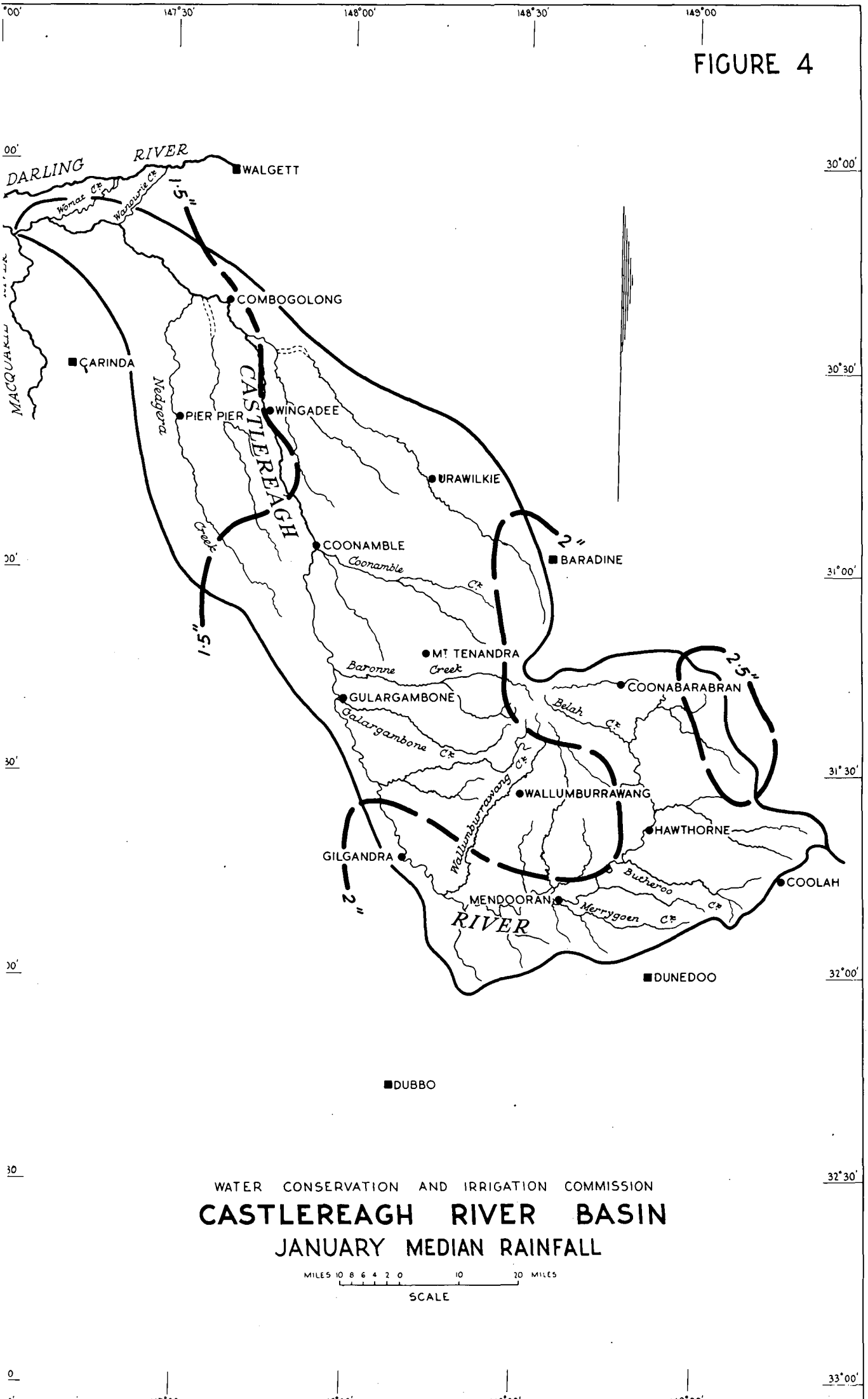
CASTLEREAGH RIVER BASIN

ANNUAL MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 4



WATER CONSERVATION AND IRRIGATION COMMISSION

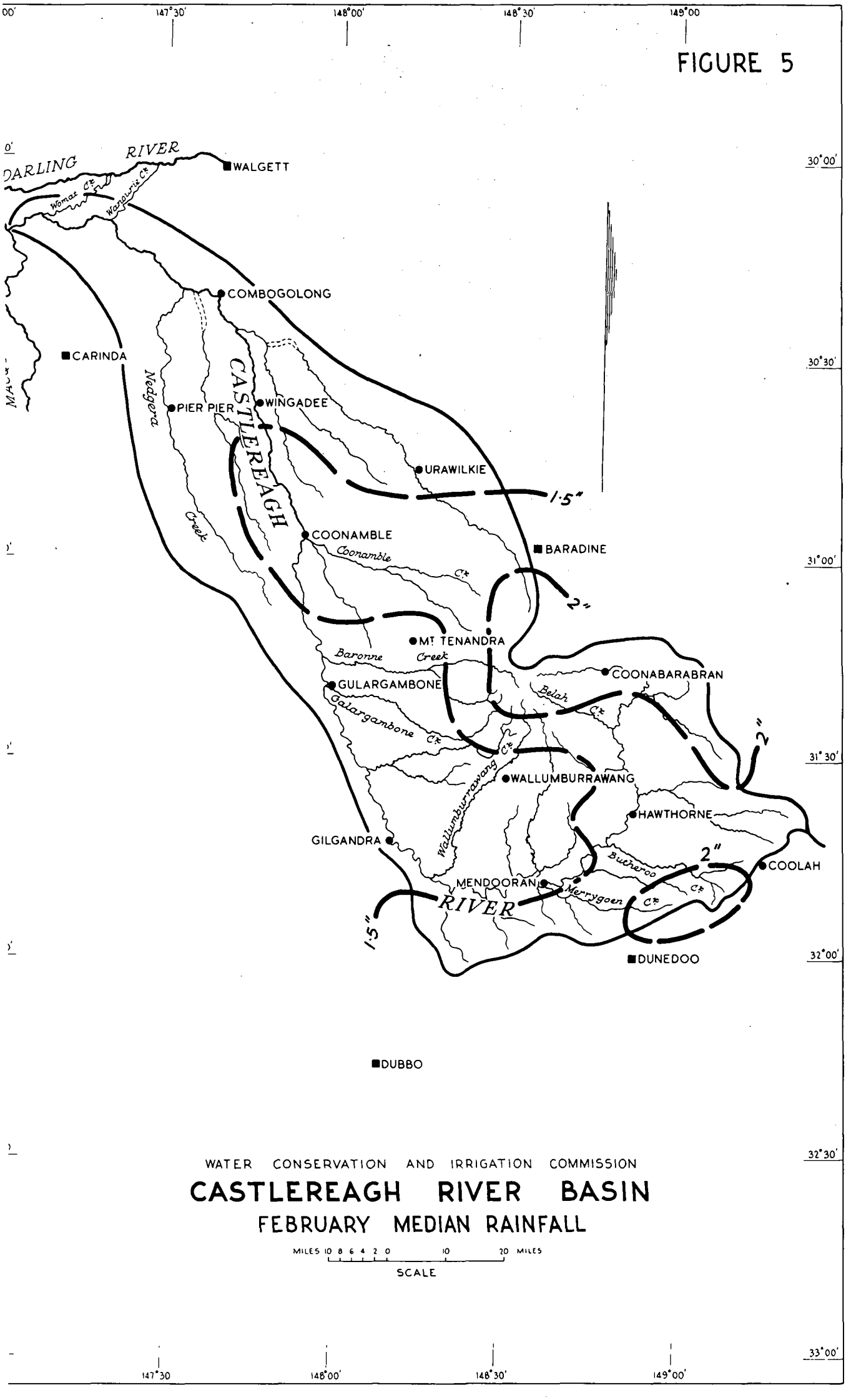
CASTLEREAGH RIVER BASIN

JANUARY MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 5



WATER CONSERVATION AND IRRIGATION COMMISSION

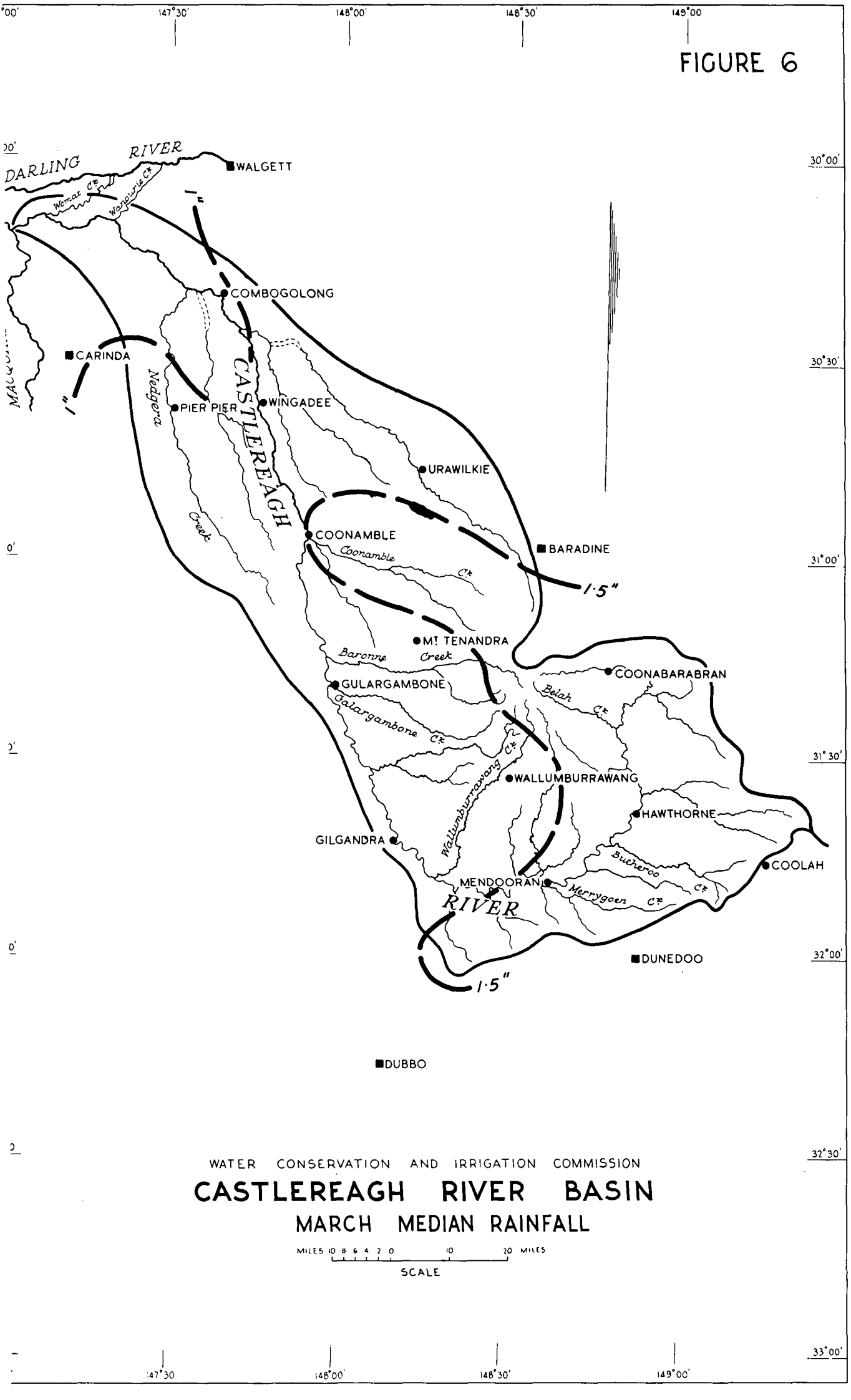
CASTLEREAGH RIVER BASIN

FEBRUARY MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 6



WATER CONSERVATION AND IRRIGATION COMMISSION

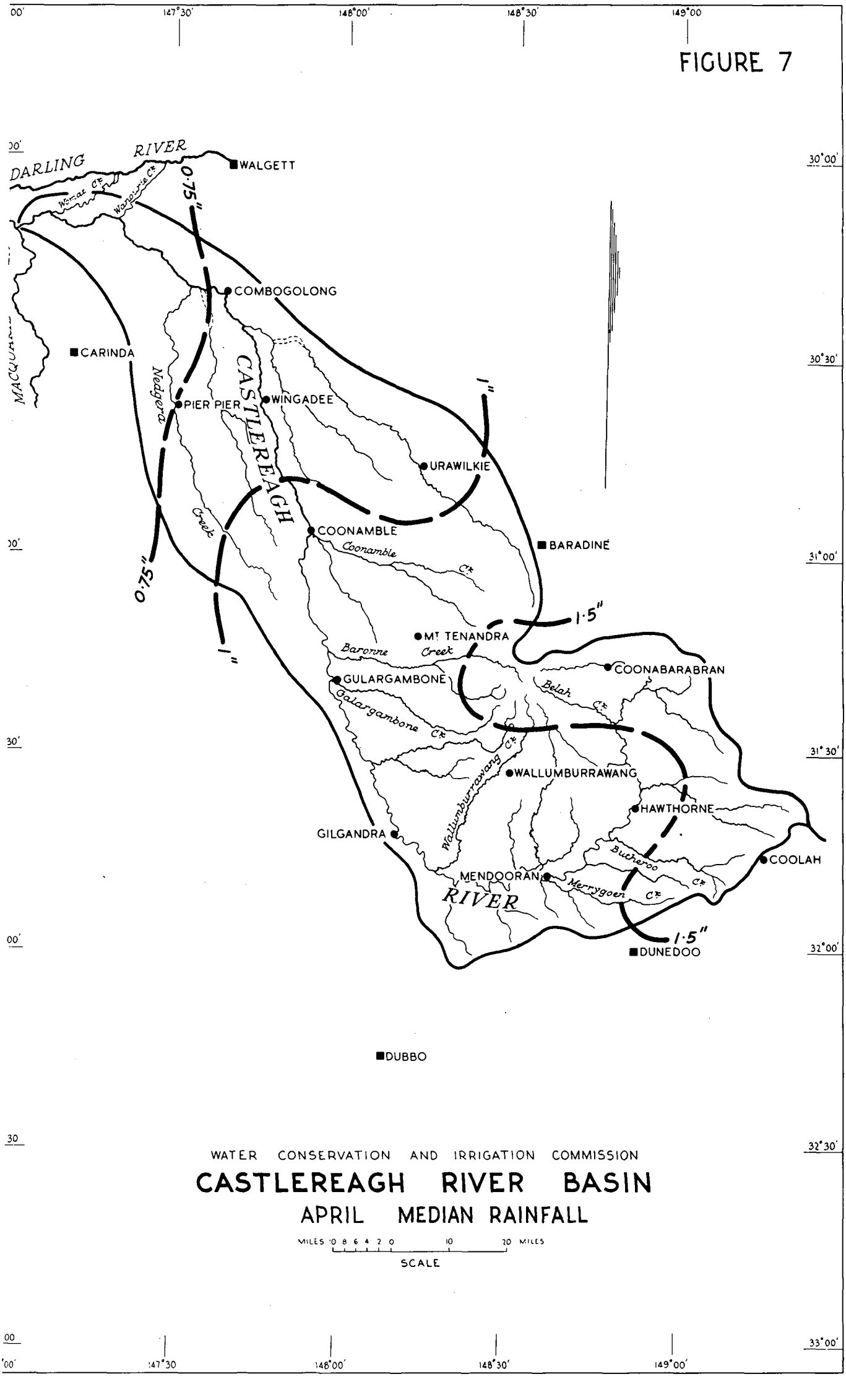
CASTLEREAGH RIVER BASIN

MARCH MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 7



WATER CONSERVATION AND IRRIGATION COMMISSION

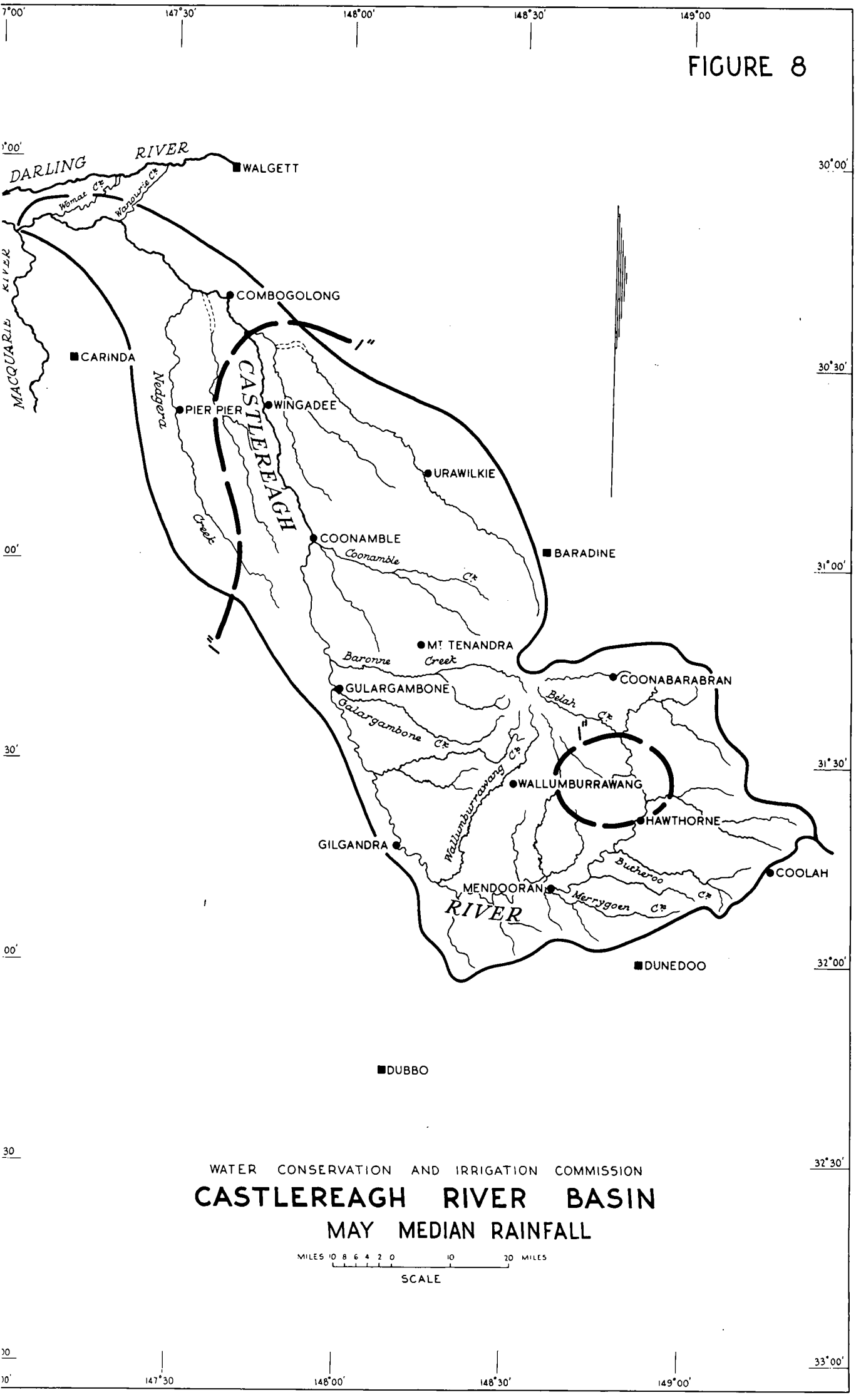
CASTLEREAGH RIVER BASIN

APRIL MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 8



WATER CONSERVATION AND IRRIGATION COMMISSION

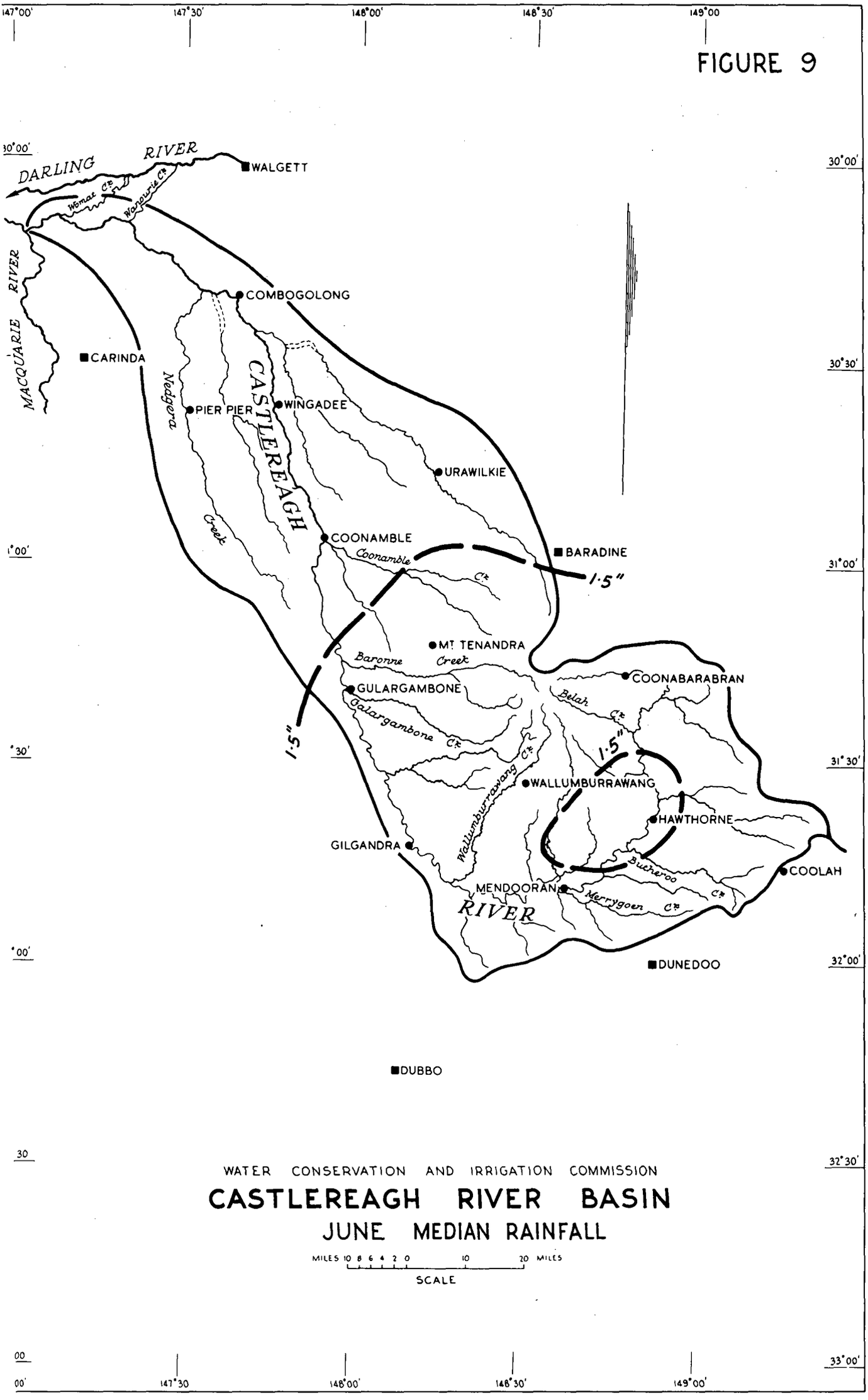
CASTLEREAGH RIVER BASIN

MAY MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 9



WATER CONSERVATION AND IRRIGATION COMMISSION

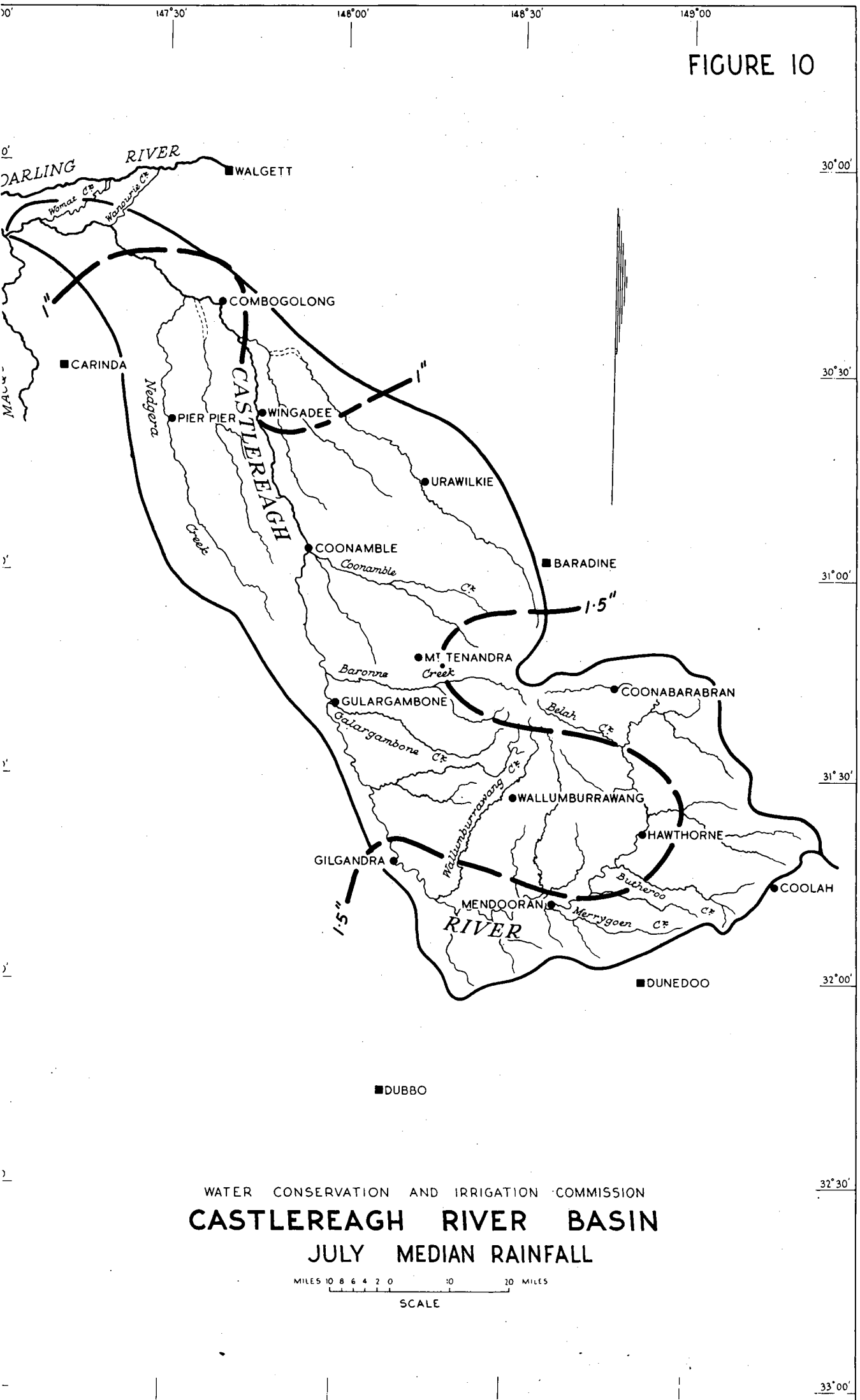
CASTLEREAGH RIVER BASIN

JUNE MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 10



WATER CONSERVATION AND IRRIGATION COMMISSION

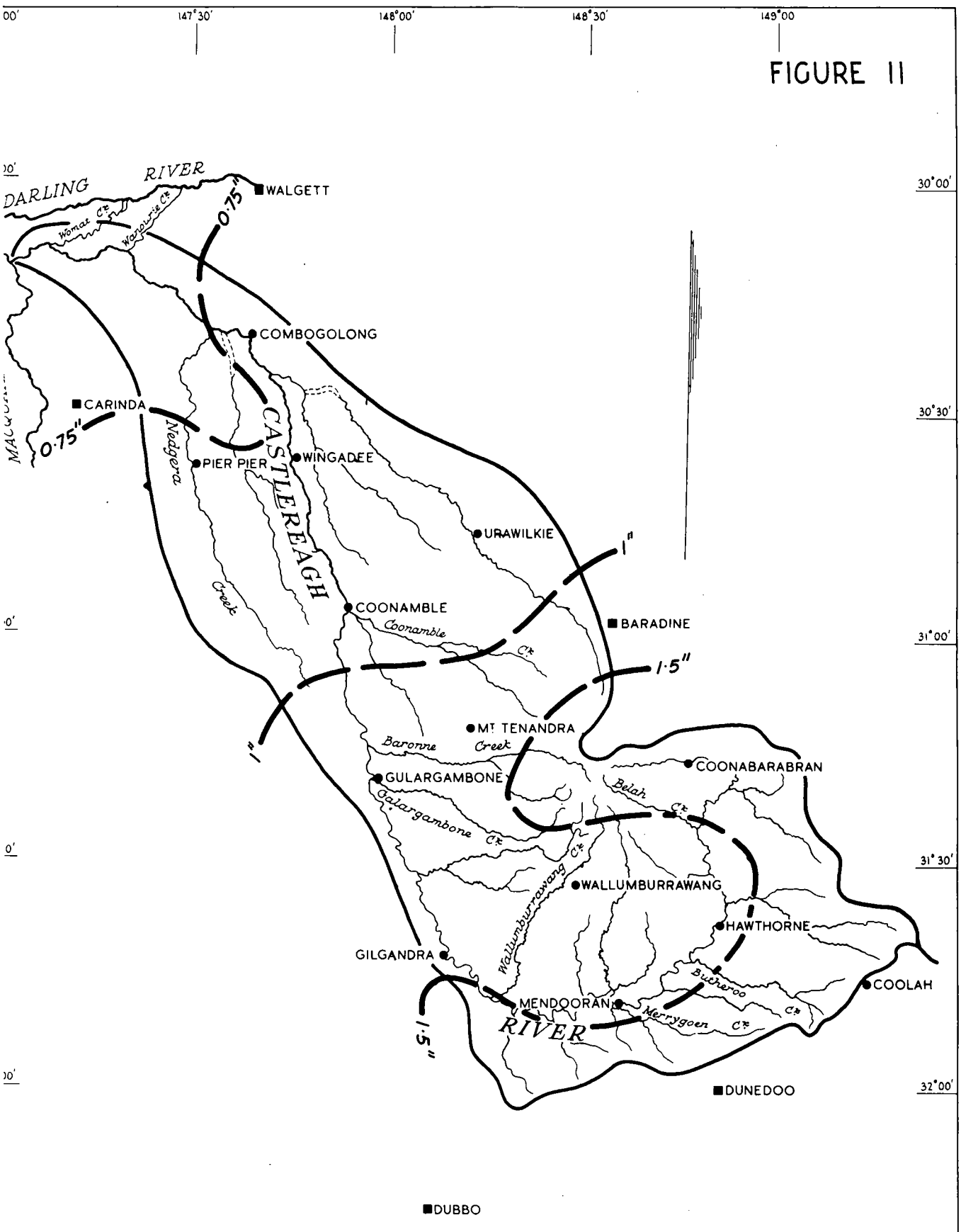
CASTLEREAGH RIVER BASIN

JULY MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 11



WATER CONSERVATION AND IRRIGATION COMMISSION

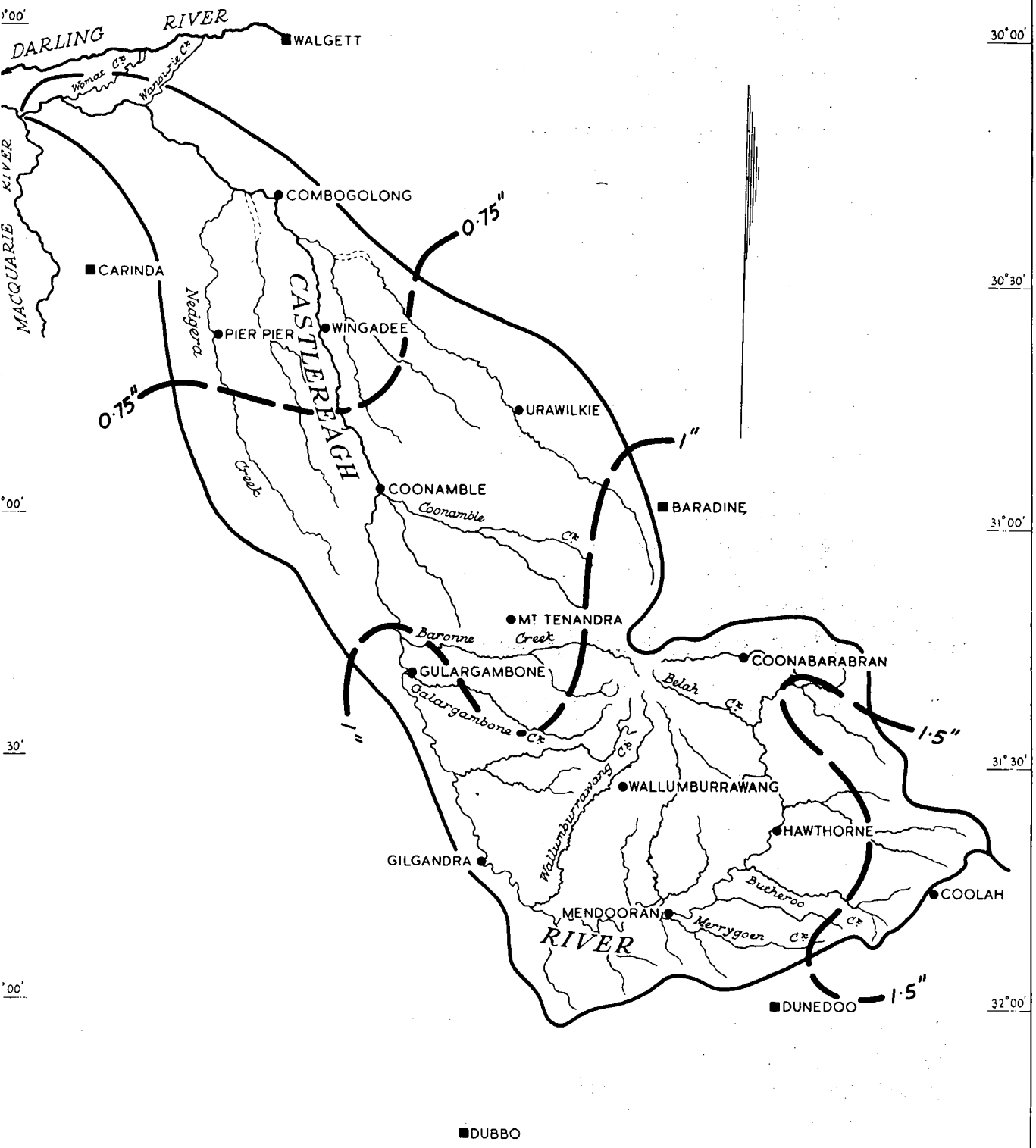
CASTLEREAGH RIVER BASIN

AUGUST MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 12



WATER CONSERVATION AND IRRIGATION COMMISSION

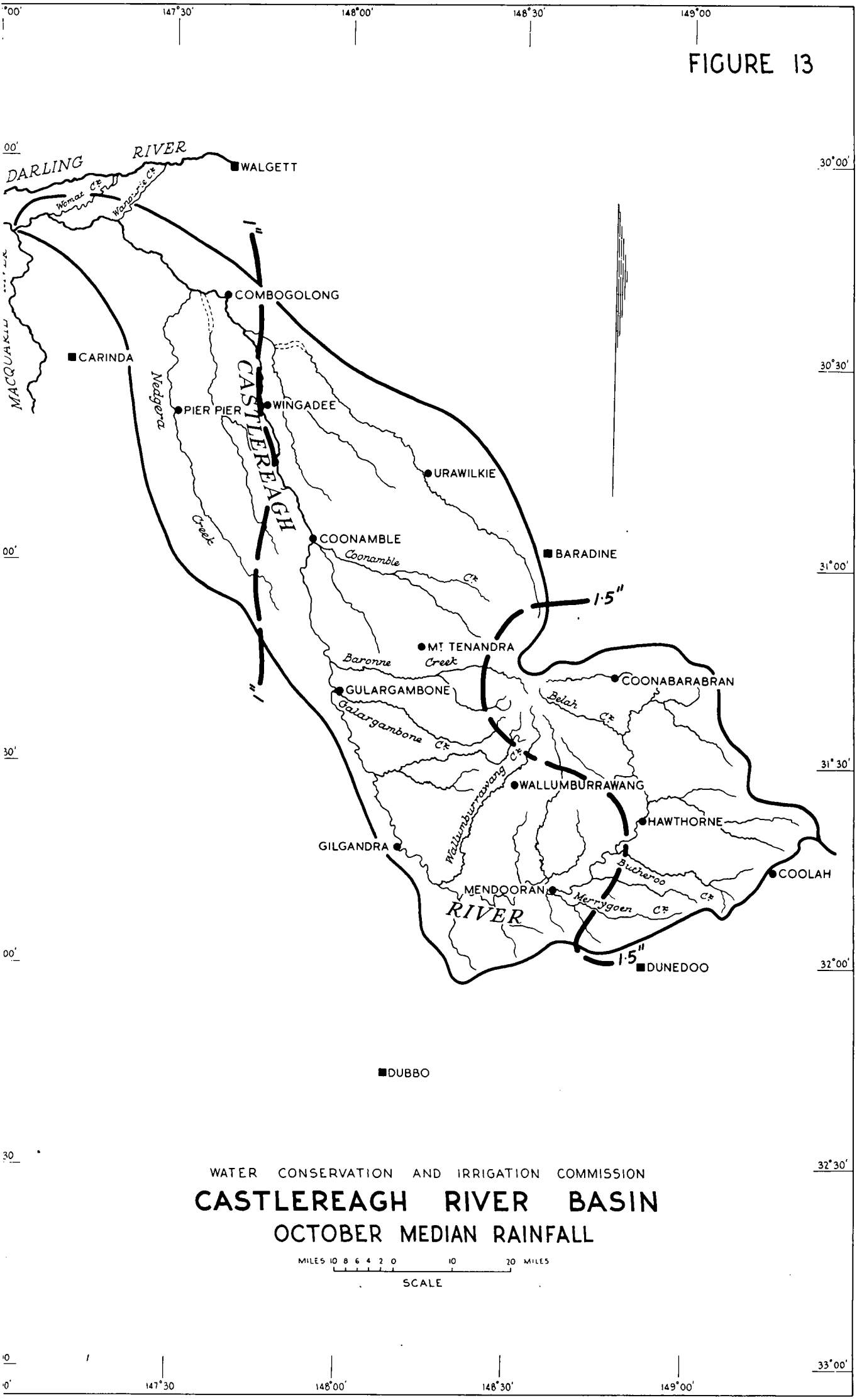
CASTLEREAGH RIVER BASIN

SEPTEMBER MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 13



WATER CONSERVATION AND IRRIGATION COMMISSION

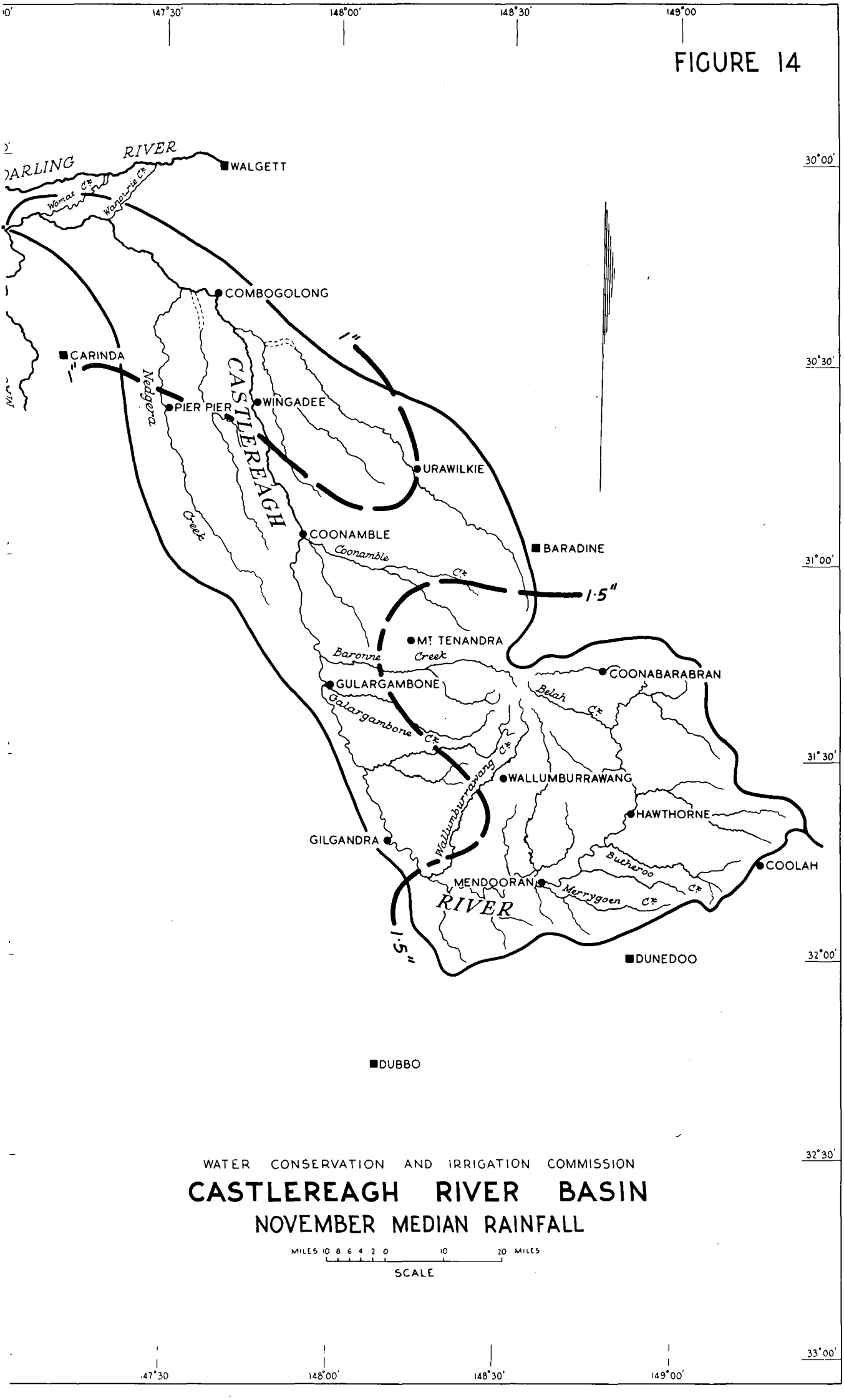
CASTLEREAGH RIVER BASIN

OCTOBER MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 14



WATER CONSERVATION AND IRRIGATION COMMISSION

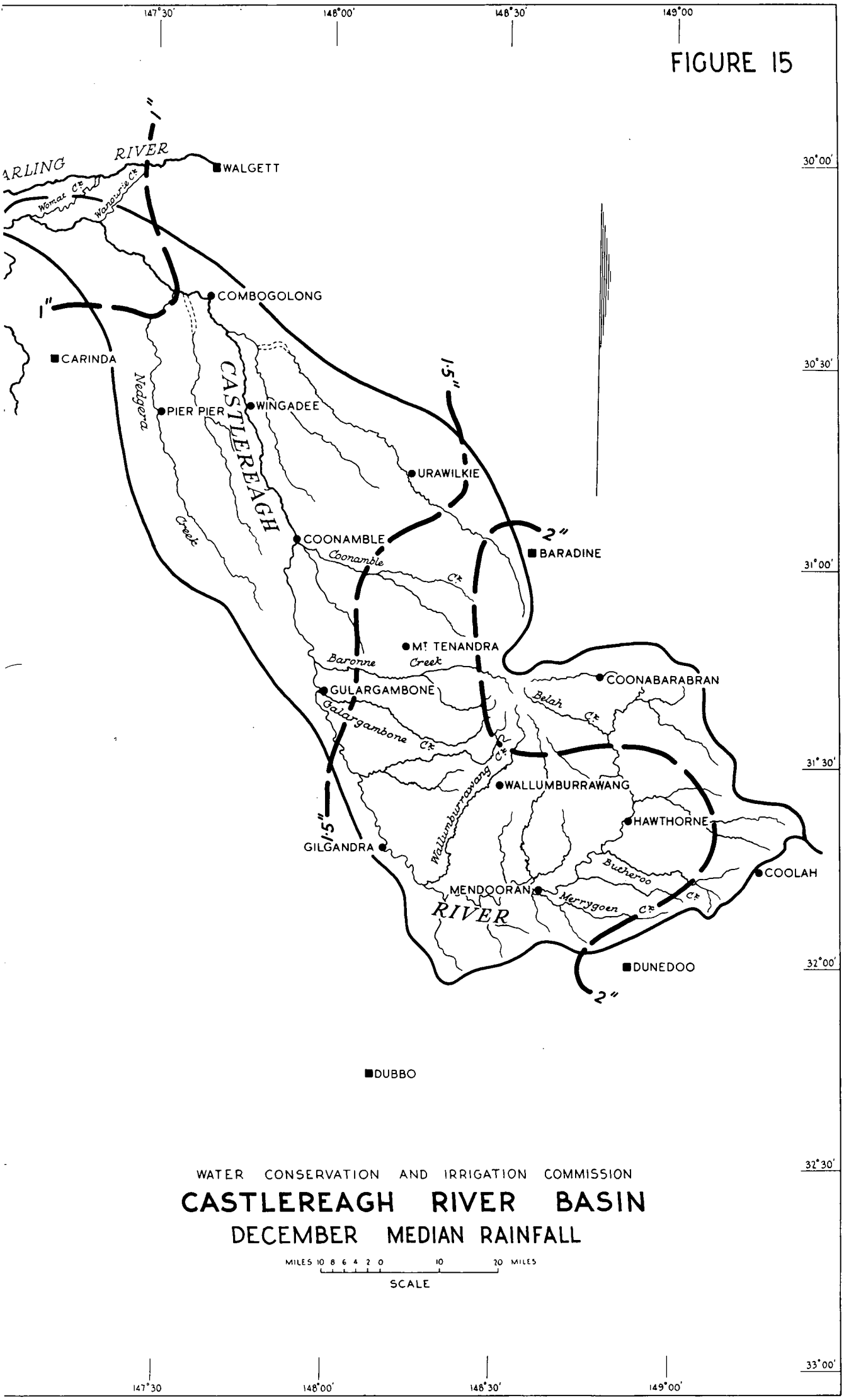
CASTLEREAGH RIVER BASIN

NOVEMBER MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 15



WATER CONSERVATION AND IRRIGATION COMMISSION

CASTLEREAGH RIVER BASIN

DECEMBER MEDIAN RAINFALL

MILES 10 8 6 4 2 0 10 20 MILES

SCALE

FIGURE 16

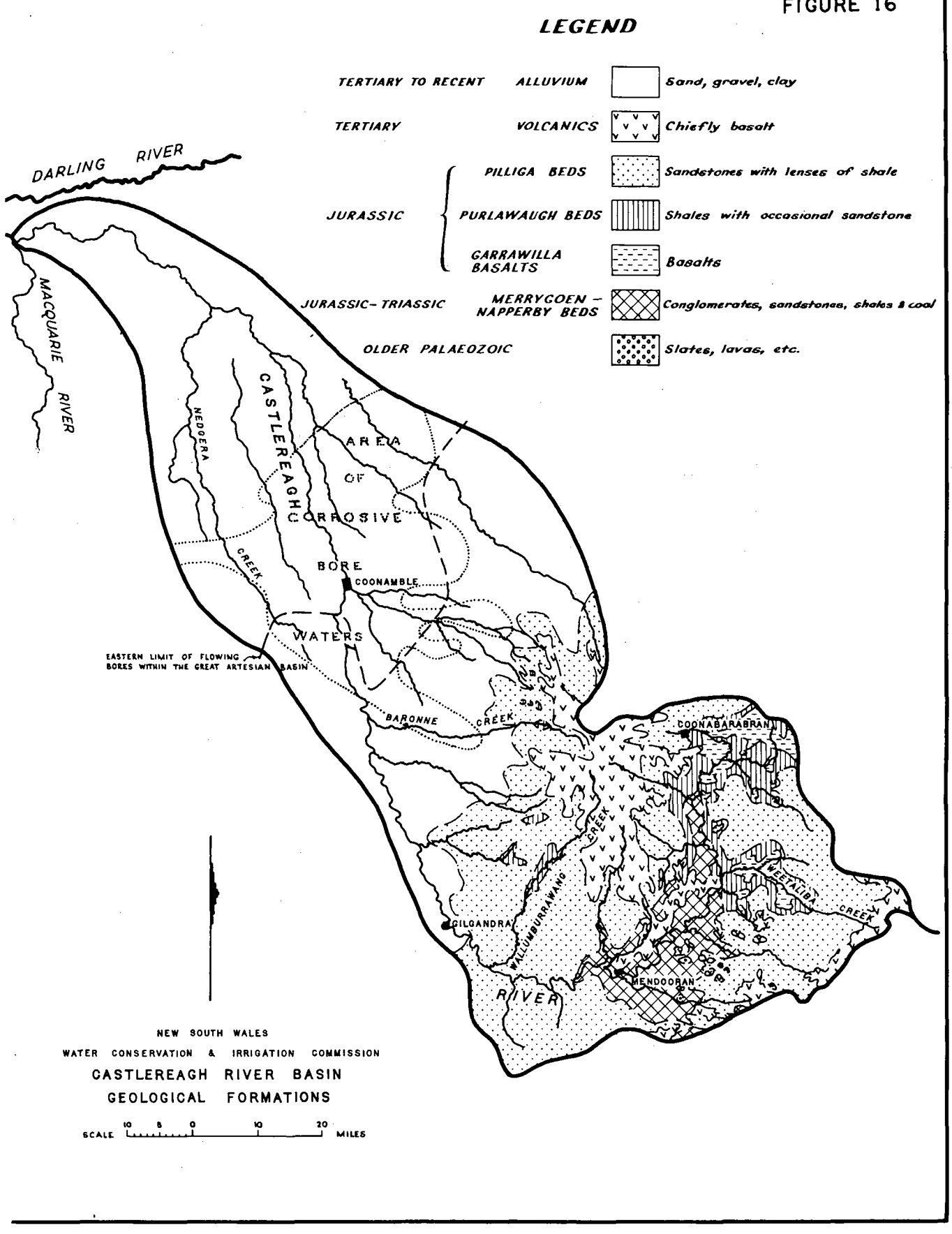
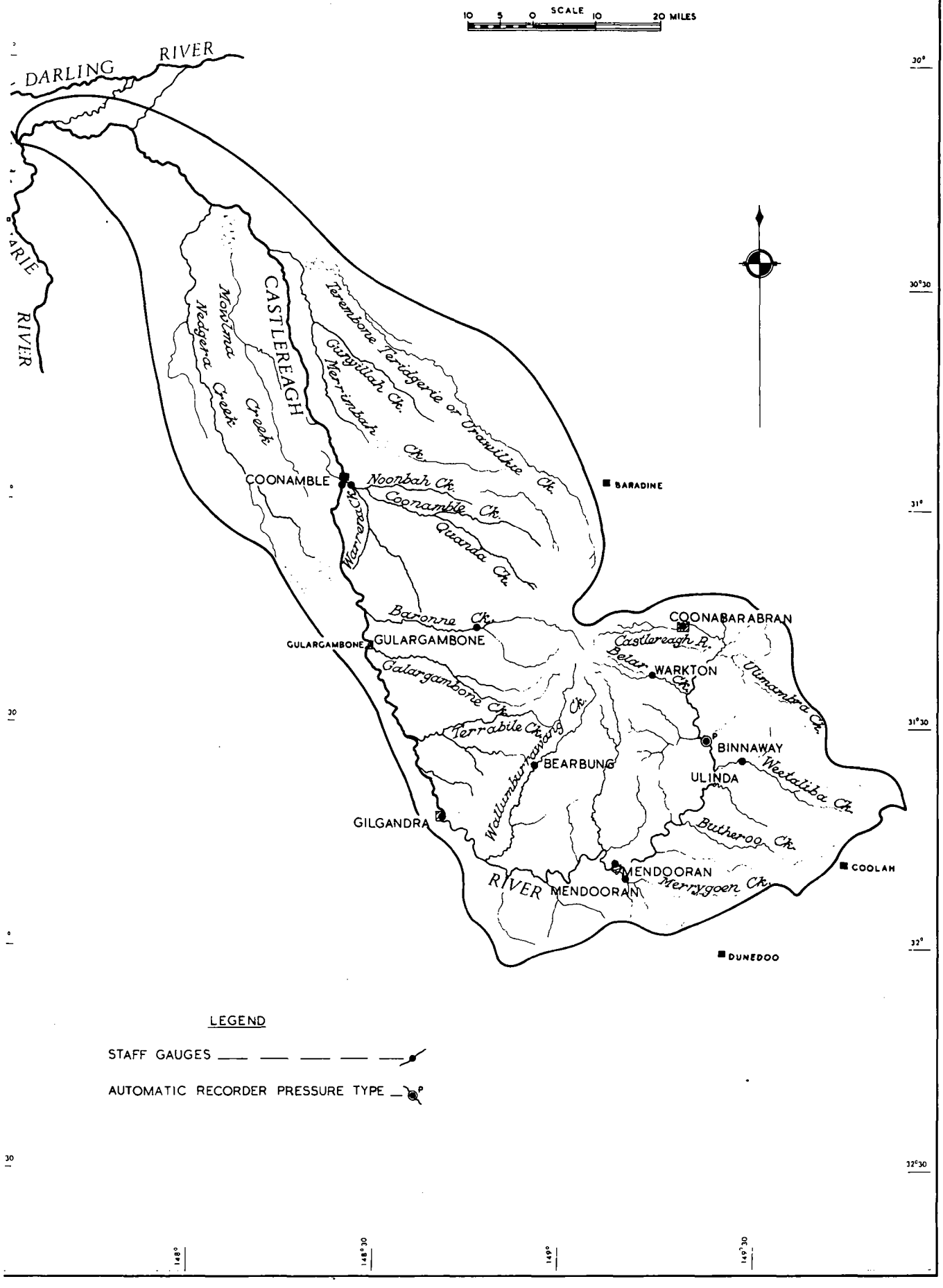

LEGEND
TERTIARY TO RECENT
ALLUVIUM
Sand, gravel, clay
TERTIARY
VOLCANICS
Chiefly basalt
JURASSIC
PILLIGA BEDS
Sandstones with lenses of shale
PURLAWAUGH BEDS
Shales with occasional sandstone
GARRAWILLA BASALTS
Basalts
JURASSIC-TRIASSIC
MERRYGOEN - NAPPERBY BEDS
Conglomerates, sandstones, shales & coal
OLDER PALAEOZOIC
Slates, lavas, etc.
DARLING RIVER
MACQUARIE RIVER
NEDGERA
CASTLEREAGH
AREA OF CORROSIVE WATERS
BORE
COONAMBLE
CREEK
EASTERN LIMIT OF FLOWING BORES WITHIN THE GREAT ARTESIAN BASIN
BARONNE
CREEK
COONABARABRAN
WEETALIBA
CREEK
GILGANDRA
WALLUMBURRAWANG
CREEK
MENDOORAN
RIVER
NEW SOUTH WALES
WATER CONSERVATION & IRRIGATION COMMISSION
CASTLEREAGH RIVER BASIN
GEOLOGICAL FORMATIONS
SCALE
10 5 0 10 20
MILES

FIGURE 17

WATER CONSERVATION & IRRIGATION COMMISSION

CASTLEREAGH RIVER BASIN

GAUGING STATIONS

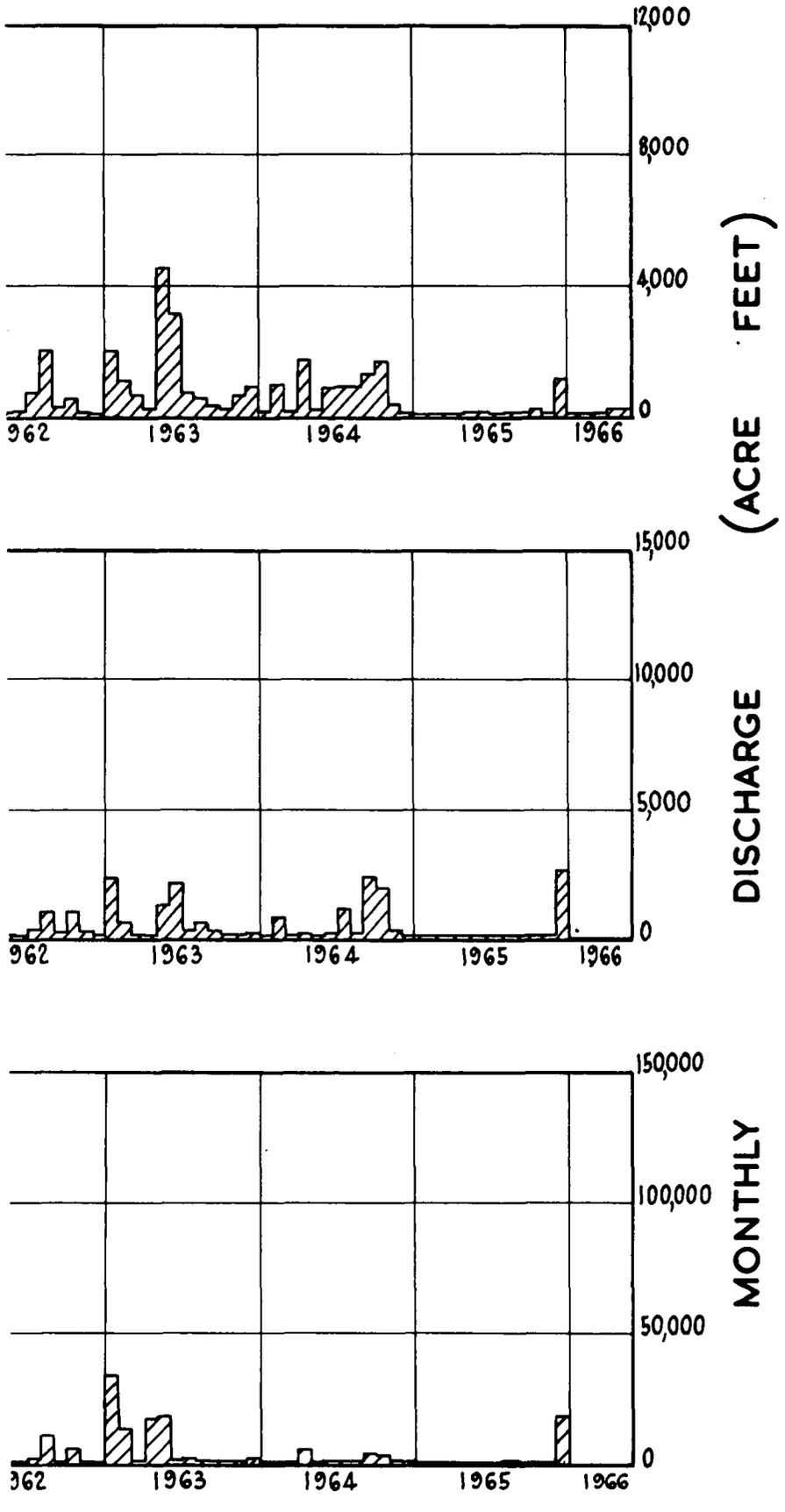


LEGEND

STAFF GAUGES

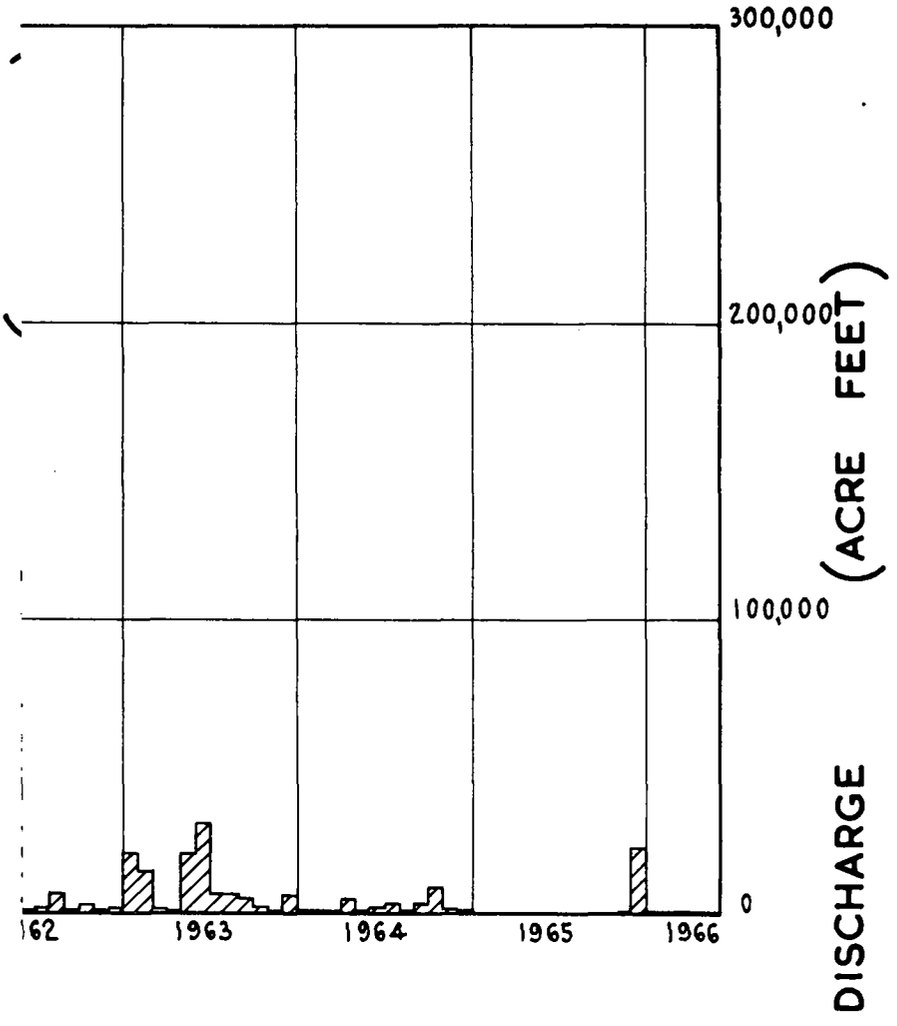
AUTOMATIC RECORDER PRESSURE TYPE

FIGURE 18



HARGE

FIGURE 19


300,000
200,000
100,000
0
DISCHARGE (ACRE FEET)
62
1963
1964
1965
1966

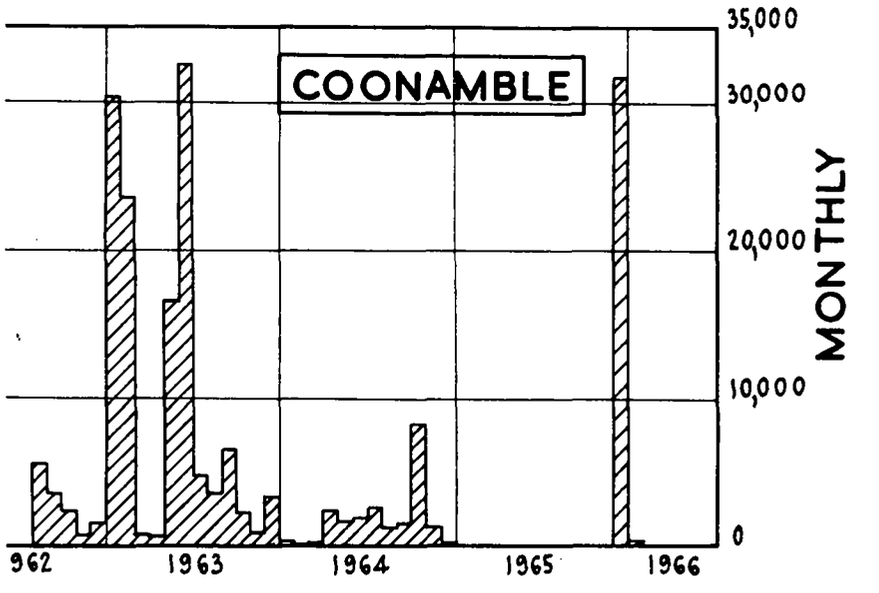
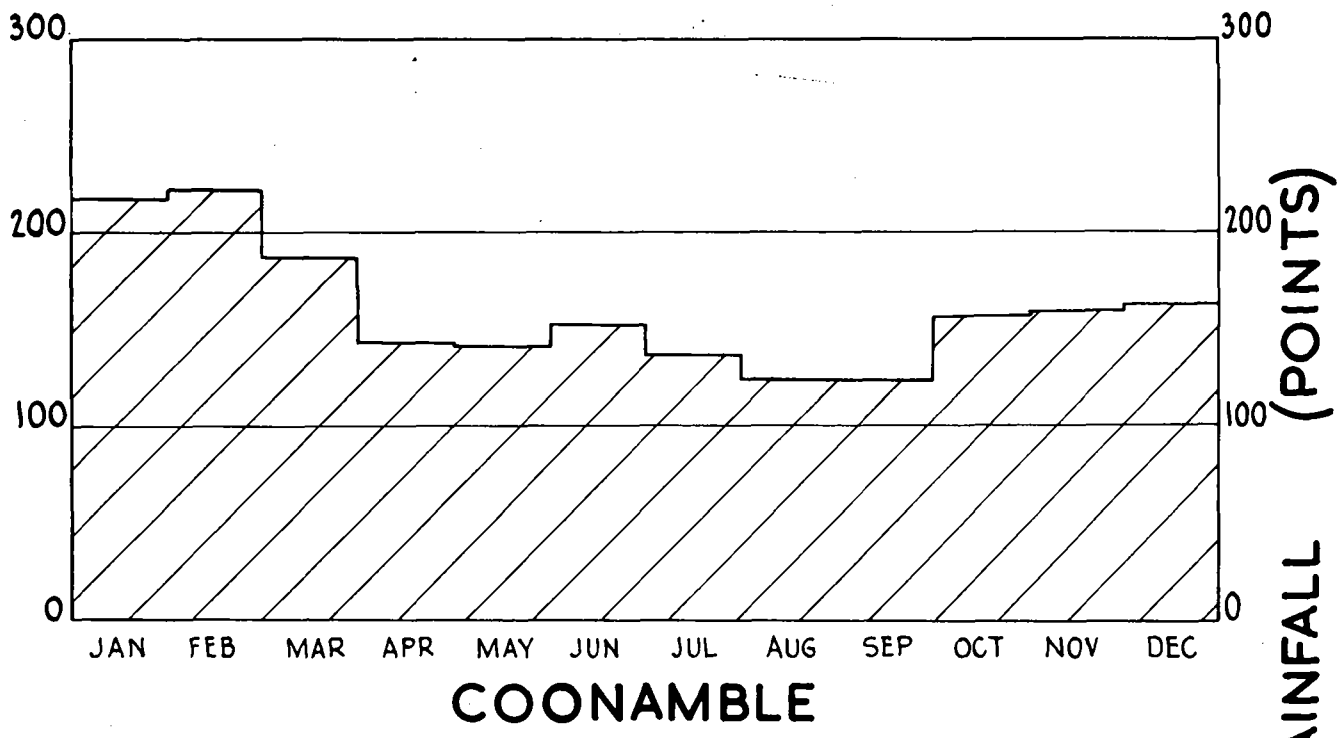
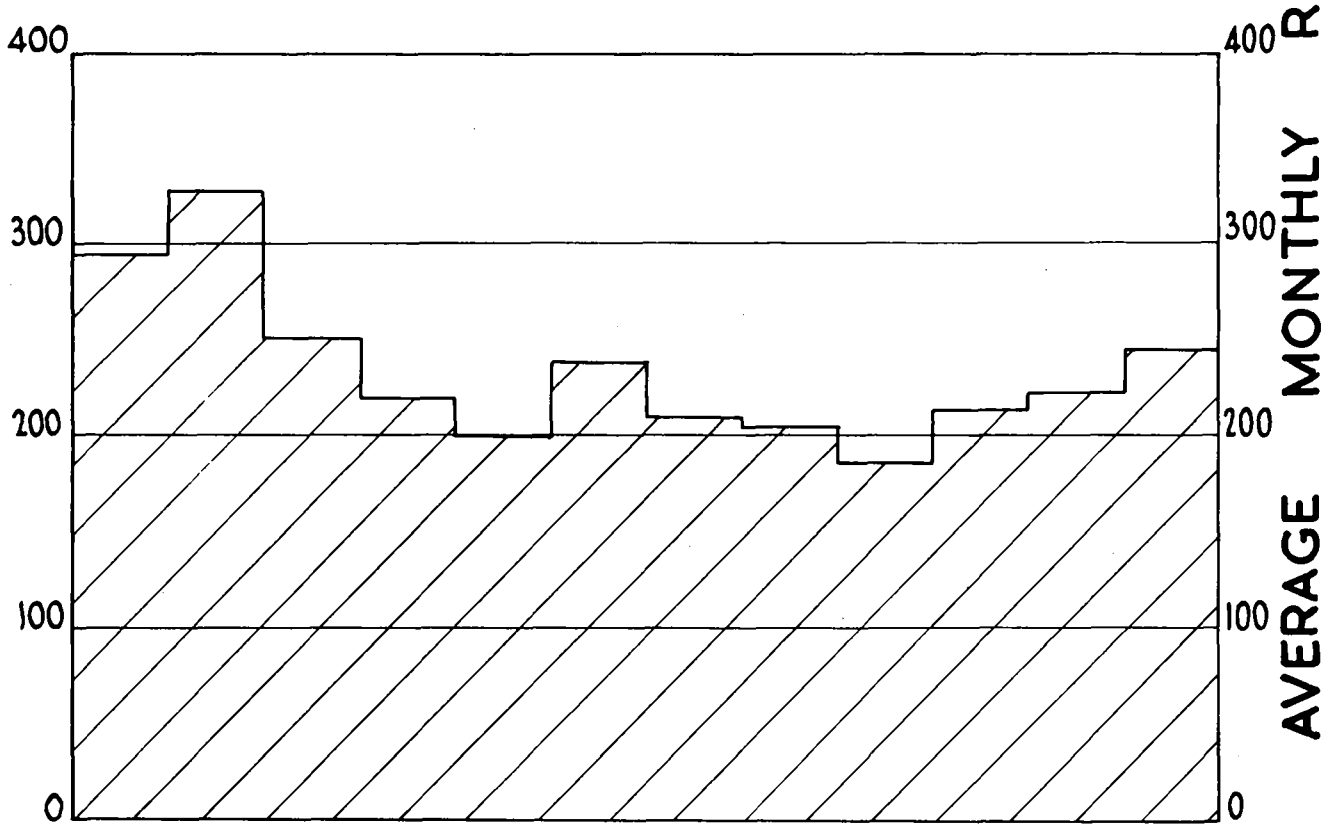

COONAMBLE
35,000
30,000
20,000
10,000
0
MONTHLY
962
1963
1964
1965
1966

FIGURE 20



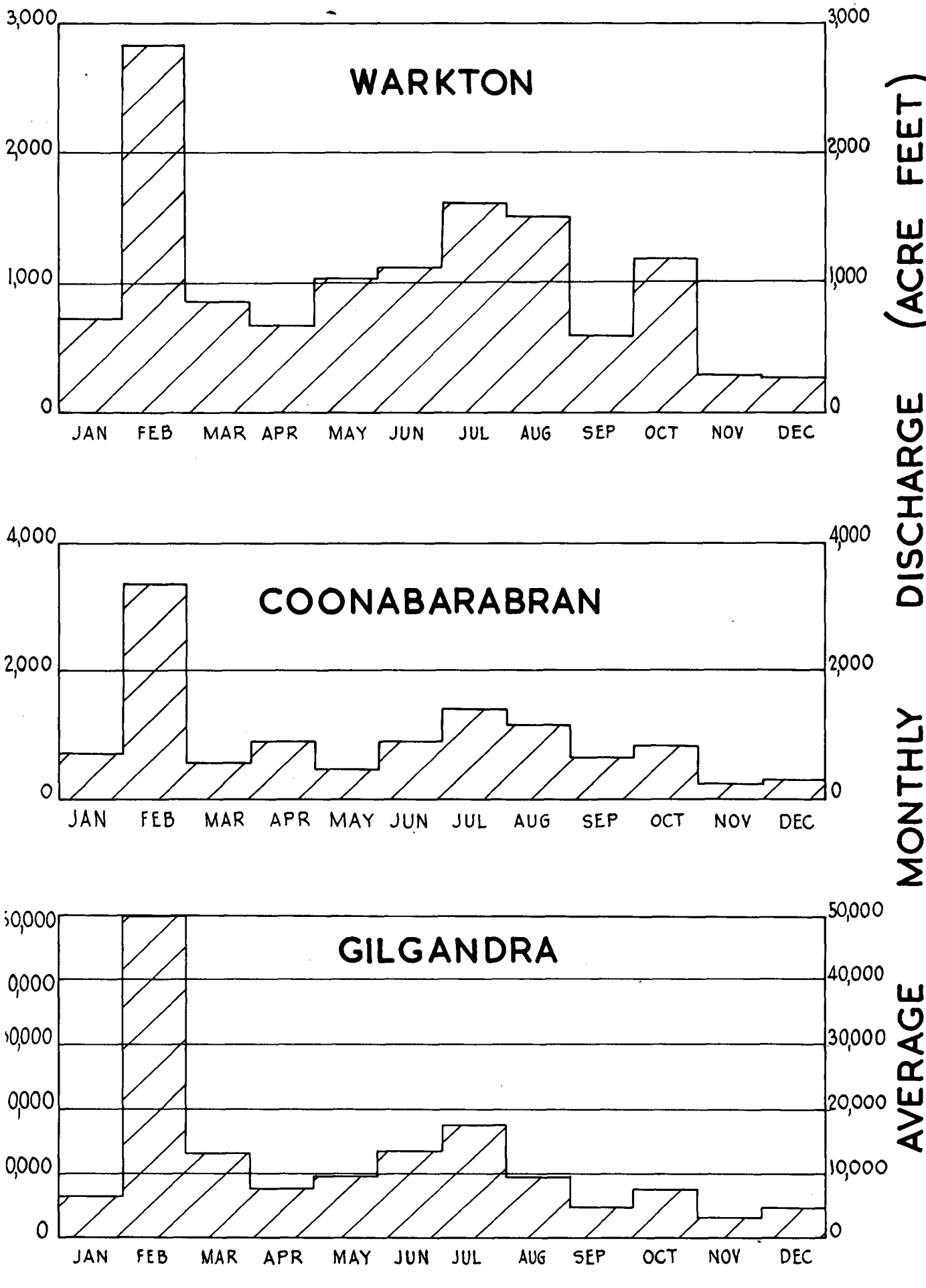
COONAMBLE



COONABARABRAN

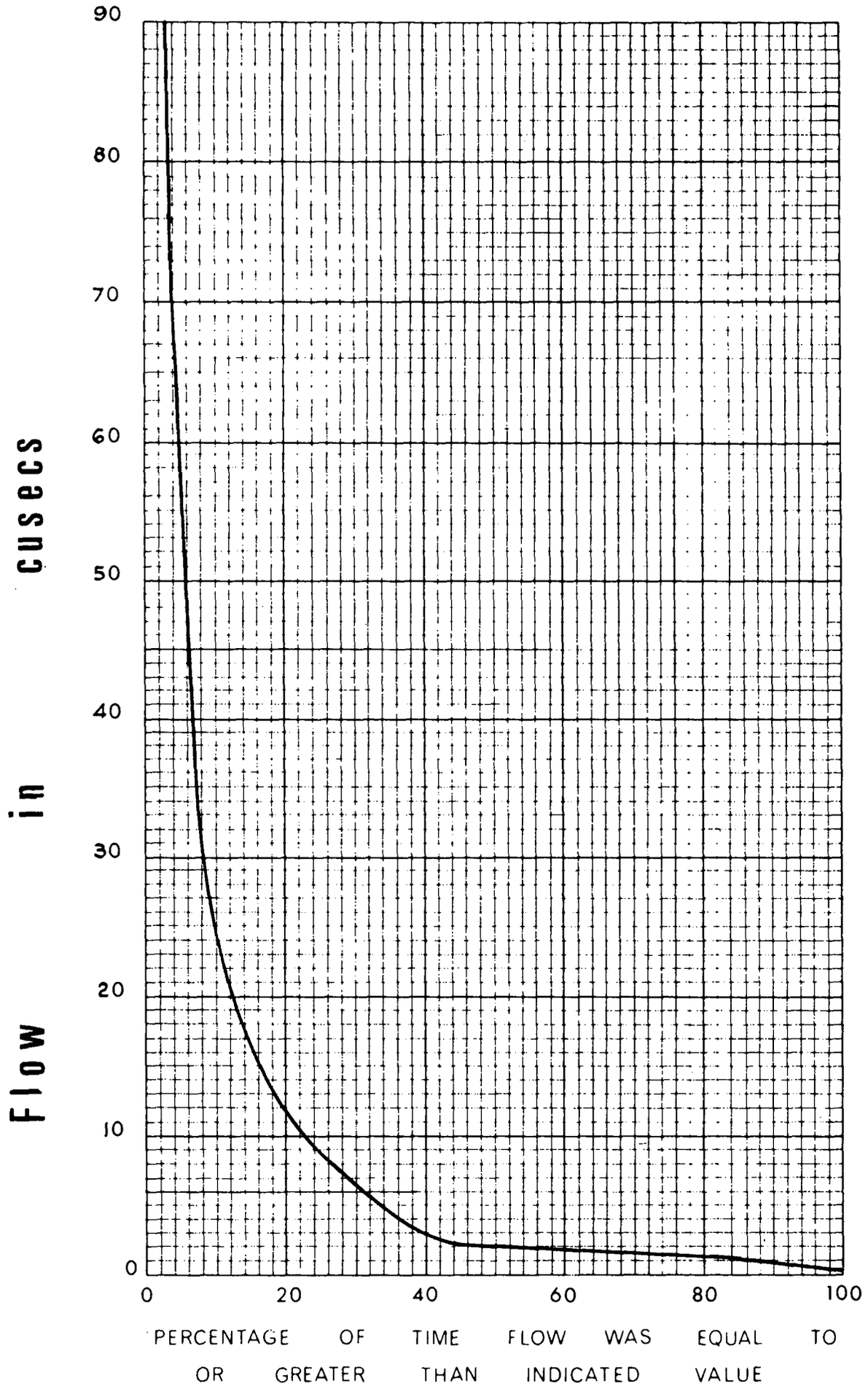
DISTRIBUTION OF AVERAGE MONTHLY RAINFALLS AT COONAMBLE AND COONABARABRAN

FIGURE 21



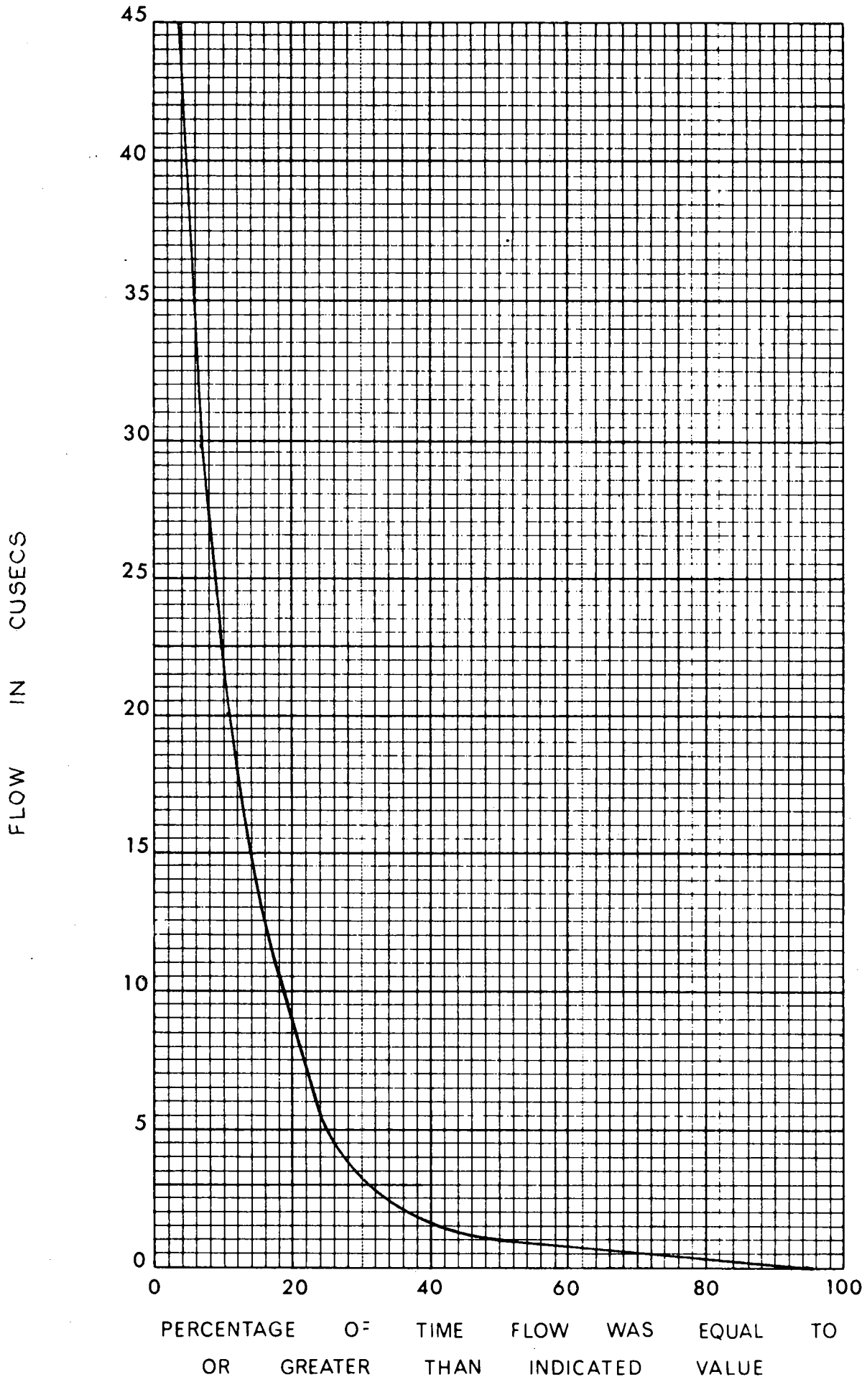
AVERAGE MONTHLY DISCHARGES FOR WARKTON, COONABARABRAN AND GILGANDRA

FIGURE 22



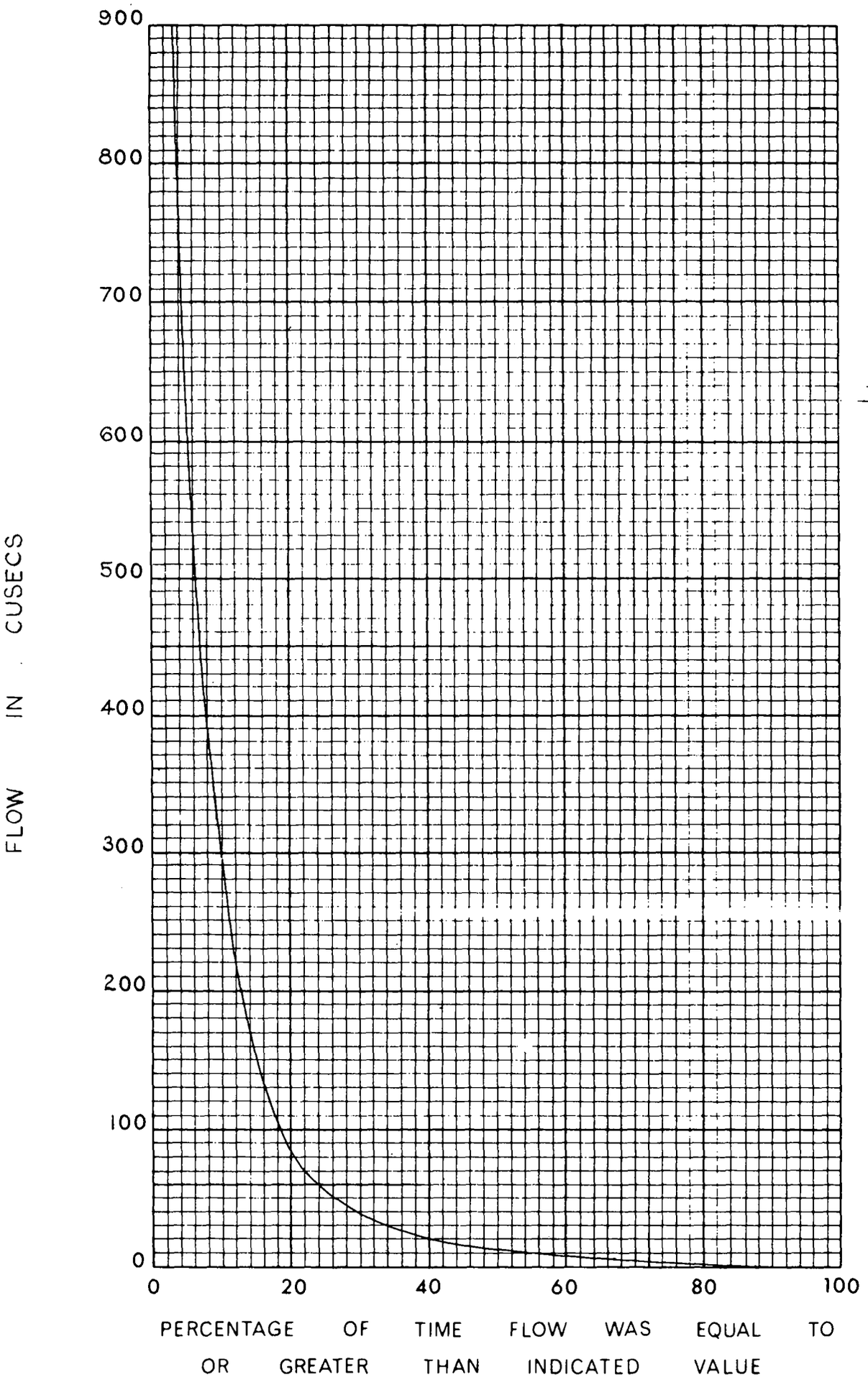
FLOW DURATION CURVE FOR BELAR CREEK AT WARKTON

FIGURE 23



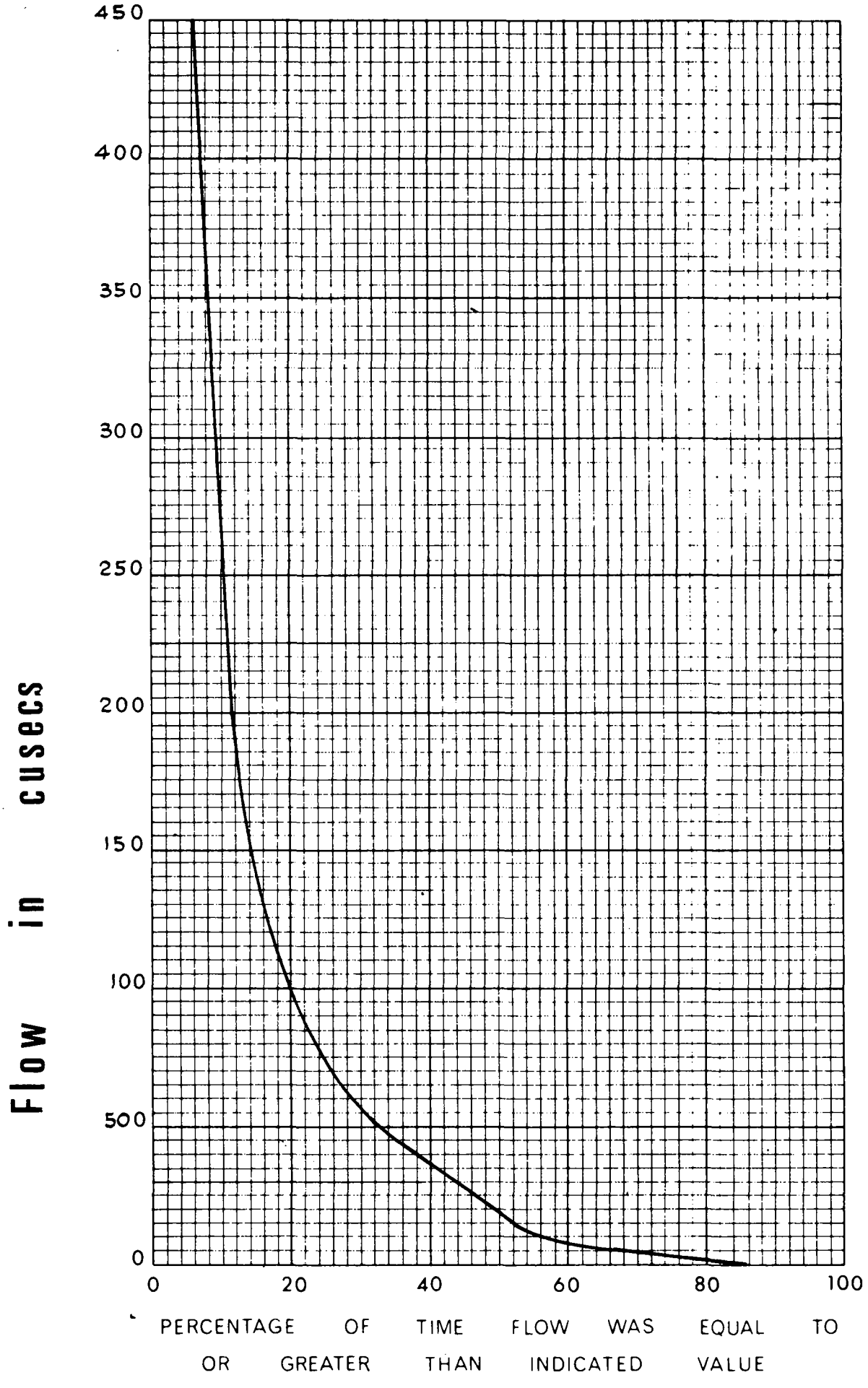
FLOW DURATION CURVE FOR CASTLEREAGH RIVER AT COONABARABRAN

FIGURE 24



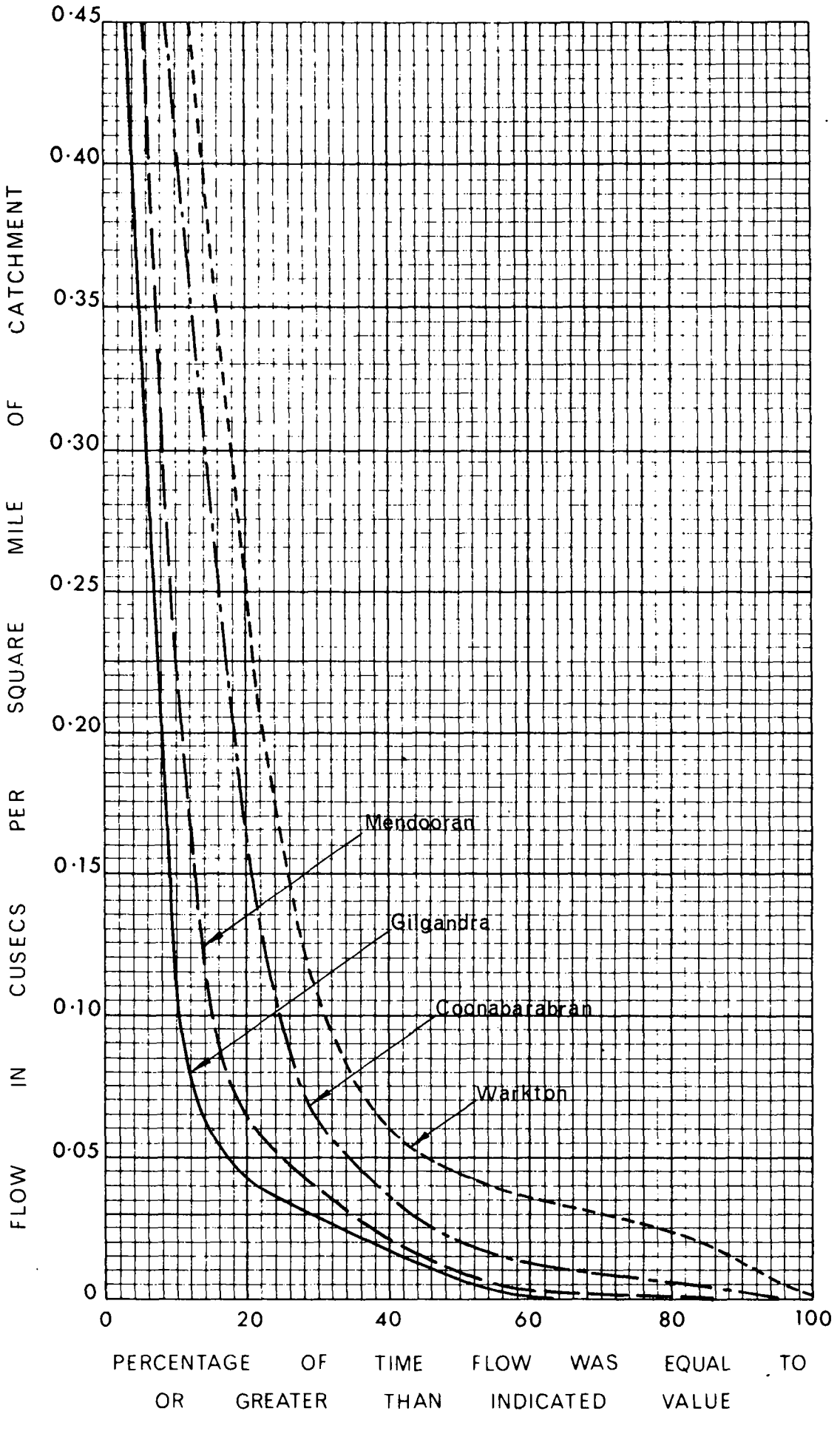
FLOW DURATION CURVE FOR CASTLEREAGH RIVER AT MENDOORAN

FIGURE 25



FLOW DURATION CURVE FOR CASTLEREAGH RIVER AT GILGANDRA

FIGURE 26



FLOW DURATION CURVES FOR CASTLEREAGH VALLEY STREAMS

FIGURE 27

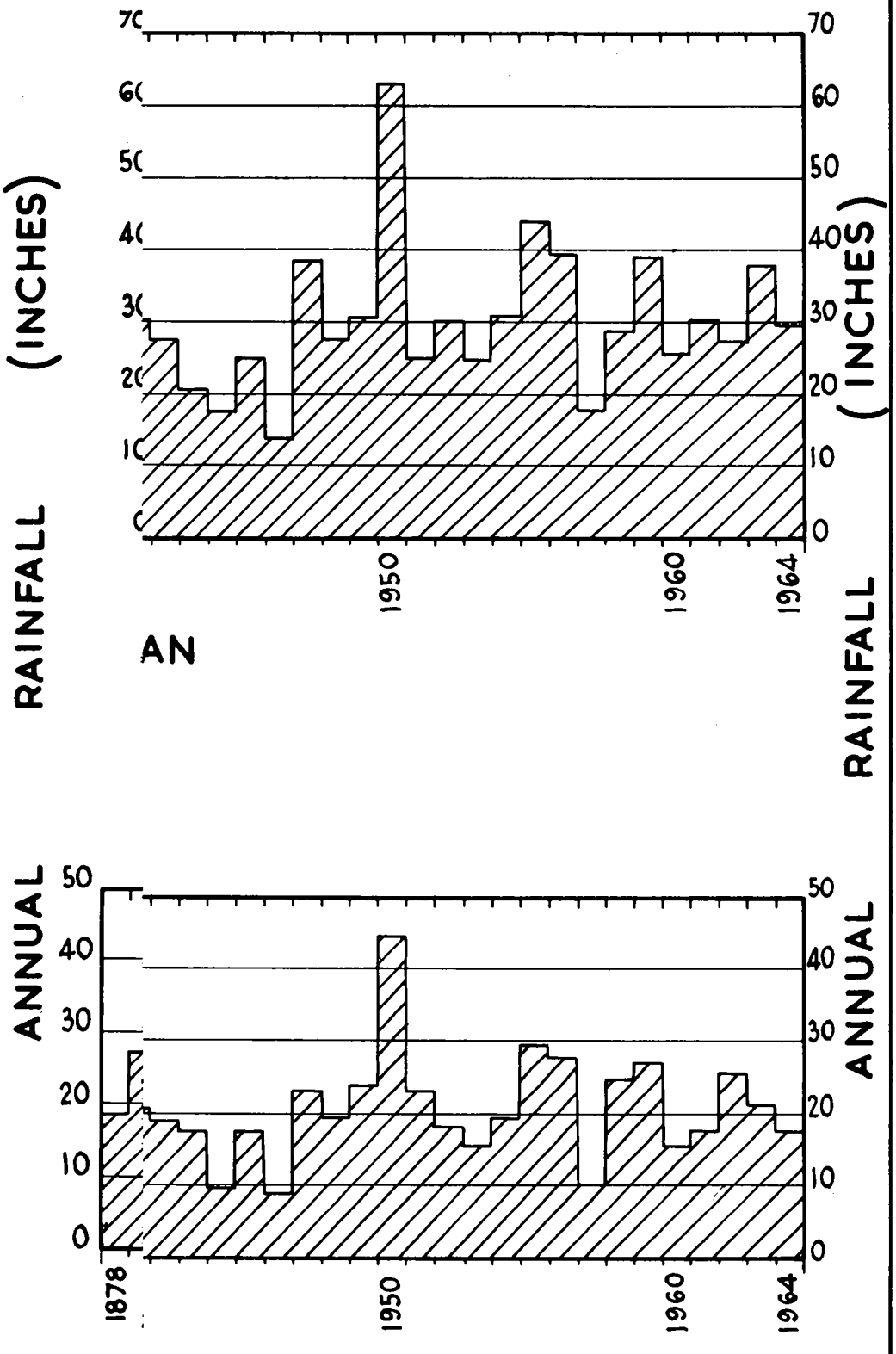
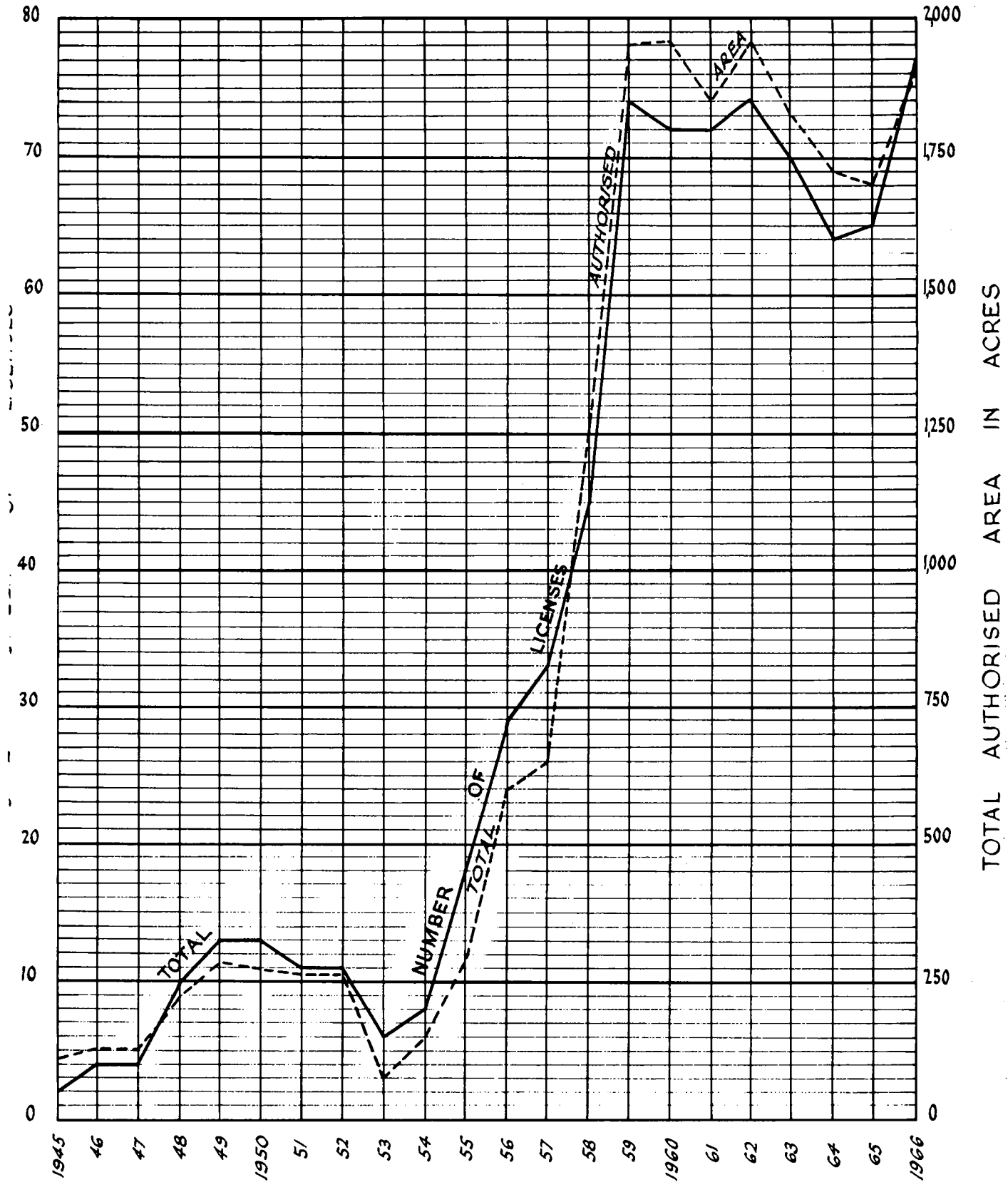

ANNUAL RAINFALL (INCHES)
70
60
50
40
30
20
10
0
1950
1960
1964
AN
ANNUAL RAINFALL (INCHES)
50
40
30
20
10
0
1878
1950
1960
1964

FIGURE 28



CASTLEREAGH RIVER BASIN

AREA AUTHORISED FOR IRRIGATION AND TOTAL NUMBER OF LICENSES AT 30th. JUNE FOR EACH YEAR INDICATED

FIGURE 29

WATER CONSERVATION & IRRIGATION COMMISSION

CASTLEREAGH RIVER BASIN

WATER CONSERVATION DAM SITES

SCALE

10 5 0 10 20 MILES