



Activities of the Regional Geological Survey Branch

by E. Williams

SUMMARY

The importance of systematic, multipurpose geological maps in nearly every earth-science problem of concern to the State, local governments and the private sector has been recognised universally.

At present, the Branch, which consists of 10 professional officers, produces per year two systematic, general or multipurpose 1:50 000 maps of the Geological Atlas Series, and 57% of the sheets covering the State have been completed. Each map is compiled from a long-term program of field and laboratory work, with current investigations requiring each officer to have job goals determined over a period of approximately five years.

With the present level of staffing the 1:50 000 Geological Atlas Series maps can be completed for the State in about 16 years. However, the advances in geological knowledge is such that published map sheets require revision, and, due to client needs, an earlier published sheet is being revised. As requests for revision will undoubtedly increase the number of years before a satisfactory geological coverage of the State is achieved will be considerably extended.

INTRODUCTION

The Branch produces systematic, multipurpose 1:50 000 geological maps with corresponding explanatory notes.

Geological maps are the primary data source for the solution of nearly every earth-science problem of concern to the State, local governments and the private sector. The uses to which geological maps are put include mineral resource and energy assessments, and land use issues (fig. 1 – p. 2). Further-more, general or multipurpose geological maps can provide the earth-science data base needed in any rapid response to changes in the needs of society.

The significance of geological maps has been universally recognised, as, for example, in a publication of the U.S. Department of the Interior (1987, U.S.G.S. Circular 1020), which was in response to a nationwide survey of geoscience information users conducted by the National Research Council. The conclusions of the NRC survey are that 'geologic maps are the starting point and data source for most earth-science projects' and that 'almost every user group responding to the survey emphasised the need for general or multipurpose geologic maps'.

Recently, the importance of geological mapping was highlighted in the consideration by the Federal Government of a major review of the Federal Bureau of Mineral Resources, Geology and Geophysics. In the response Senator Peter Cook (Media Release, June 1989) announced plans 'to meet the pressing need for new generation geoscience maps and databases required as a foundation for successful mineral and petroleum exploration' and for such maps to 'lead to much-needed improved information being available to

governments for integrating development and conservation interests'.

PRESENT BRANCH STRENGTH AND OUTPUT

The number of professional officers of the Branch over the past ten years has varied from eleven in 1984 to nine in 1987 and to ten in 1989. The staff consists of a Deputy Chief Geologist, three Senior Geologists and six geologists, two of whom are Project Leaders.

At present, the Branch produces per year two systematic, general or multipurpose 1:50 000 maps of the Geological Atlas Series. The State is covered by 79 map sheets 57% of which have been published or are being prepared for printing. Field work is proceeding in areas covered by 11% of the map sheets, and one map sheet is being revised (fig. 2 – p. 3).

Explanatory Notes detailing field observations and subsequent laboratory investigations of the material collected during mapping are published for each map sheet within some two to three years of map publication, which compares more than favourably with other States producing systematic 1:50 000 map sheets (fig. 3 – p. 4).

Each map sheet is compiled from a long term work program, and current investigations require each officer to have job goals determined over a period of approximately five years (Appendix 1).

The budget for the Branch for 1988–1989 was about \$580 000 and estimates for 1989–1990 amount to some \$610 000. Costs of rock thin-sections, chemical analyses, cartography, publications etc. are included in separate budgets of the Department.

METHOD OF WORK

Field data are recorded on 1:10 000 to 1:25 000 contoured maps, aerial photos, and in note books. Usually mapping in western and southwestern Tasmania is carried out by geologists accompanied by field assistants, based in camps during the summer months of December to March inclusive. In the remainder of the State geologists, occasionally accompanied by field assistants, can work from hotels throughout the year. Tasmanian experience over the past fifteen years indicates that, in general, rates of mapping are about 0.75 field-days/km² for western and south-western Tasmania and approximately 0.94 field-days/km² for the rest of the State.

Laboratory investigations of material collected in the field, library researches and the preparation of maps and explanatory notes for publication are performed between field trips throughout the year at the Hobart-based office.

Each 1:50 000 map is compiled from a long term program (greater than 3 years) of field mapping supplemented by an

approximately equal time spent on appropriate laboratory investigations and office-based research. The geology of Tasmania varies so considerably over short distances that most map sheets require a number of geologists working as a team to cover all the specialities (stratigraphy, structure, petrology etc.) needed to adequately investigate the geology (see fig. 4 – p. 4). However, the geology of some map sheets is of a more uniform nature and it can be mapped by one geologist with certain selected specialities.

On completion of a map sheet the data are compiled for publication of a 1:50 000 geological map, explanatory notes of the map and scientific papers for national and international journals. Although completion of a 1:50 000 map sheet involves more than three years of work, results of component investigations are made available as they come to hand to other government departments, industry and members of the public. The component investigations of the incomplete regional geological surveys of 1:50 000 map sheets can be grouped according to any particular interest of society. In terms of mineral resources the grouping of present component investigations is given in Figure 5 (p. 4), and any component can be rapidly expanded in response to the demands of society.

PERFORMANCE CRITERIA

All the work done by the Regional Geological Survey Branch is presented in 1:50 000 map sheets and Explanatory Notes published by the Department and circulated widely. Geologists are encouraged to prepare scientific communications based on their work for specialised journals of national and international circulation. Some 50% of the total publications of the past 15 years were published by outside journals. The quality of work done is gauged by the general reception received from other professional geologists both in Australia and abroad.

The basic general level of the work is of University Ph.D. standard, which has been indicated by the acceptance of the Branch as a research group by the University of Tasmania and as a member of a research organisation by the Commonwealth Department of Industry Research and Development Board.

EMERGING ISSUES / FUTURE PLANNING

On average a 1:50 000 geological map sheet of western / south-western Tasmania together with a 1:50 000 sheet from elsewhere in the State can be compiled for publication by four geologists and a senior geologist in two years. Thus, with the present staff of ten professional officers the 1:50 000 Geological Atlas Series maps can be completed for the whole of the State in about sixteen years, providing that revision of 1:50 000 sheets published many years ago is not required.

In Tasmania the advance of geoscience is such that, in general, about 20% of the geology of a 1:50 000 map sheet would be expected to need revision after five years. This is in agreement with the findings of the geological surveys in U.S.A. where they have expressed revision in terms of a half-life of ten years for each map sheet of similar scale.

Already twenty-five of Tasmania's 1:50 000 geological map sheets are older than 10 years with fifteen of them older than 20 years. Recently, due to client needs, the Branch embarked upon revision of the Zeehan Sheet published 26 years ago. The revision will probably require 75% of the field work time needed to survey a previously unmapped sheet. Doubtless the need for revision of early published map sheets will increase in the years to come, which may considerably extend the number of years before a satisfactory geological coverage of the State on a scale of 1:50 000 is achieved given the staff levels currently available for this task.

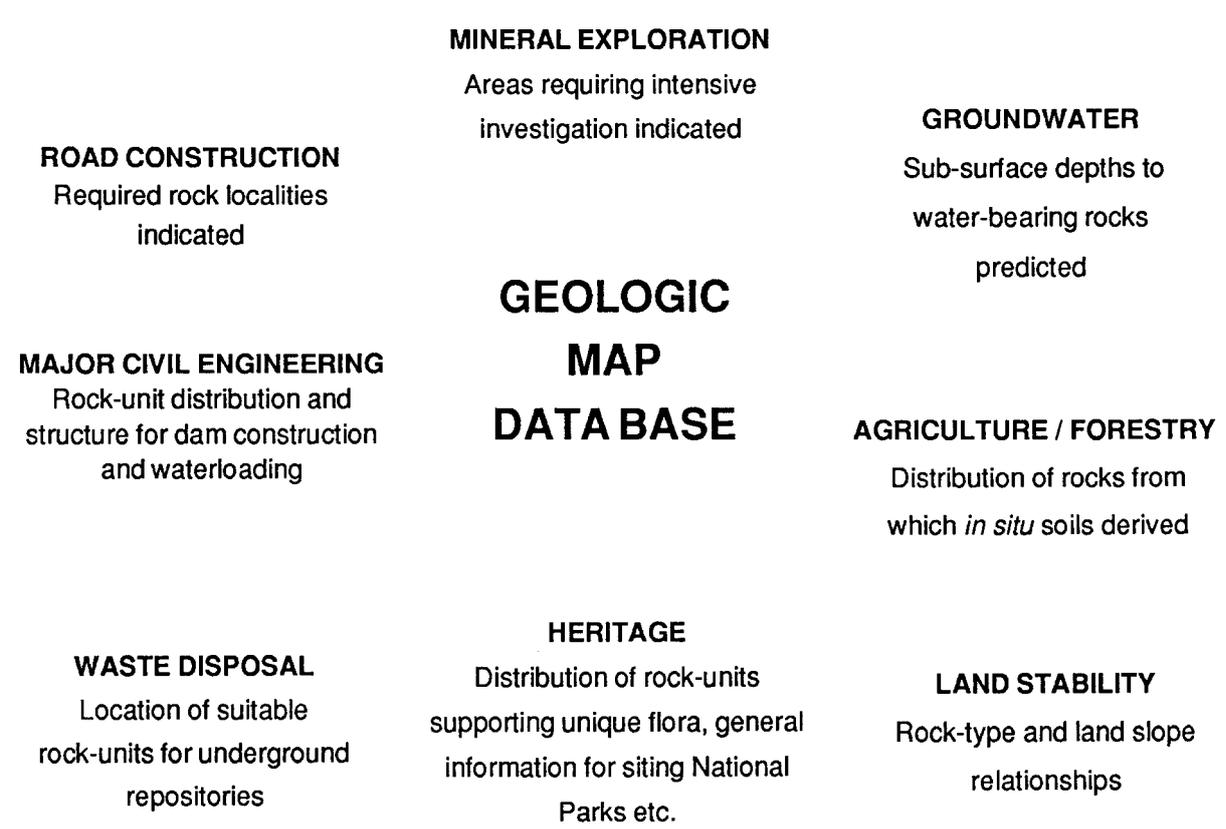


Figure 1. Some Uses of 1:50 000 Geological Atlas Map Sheets

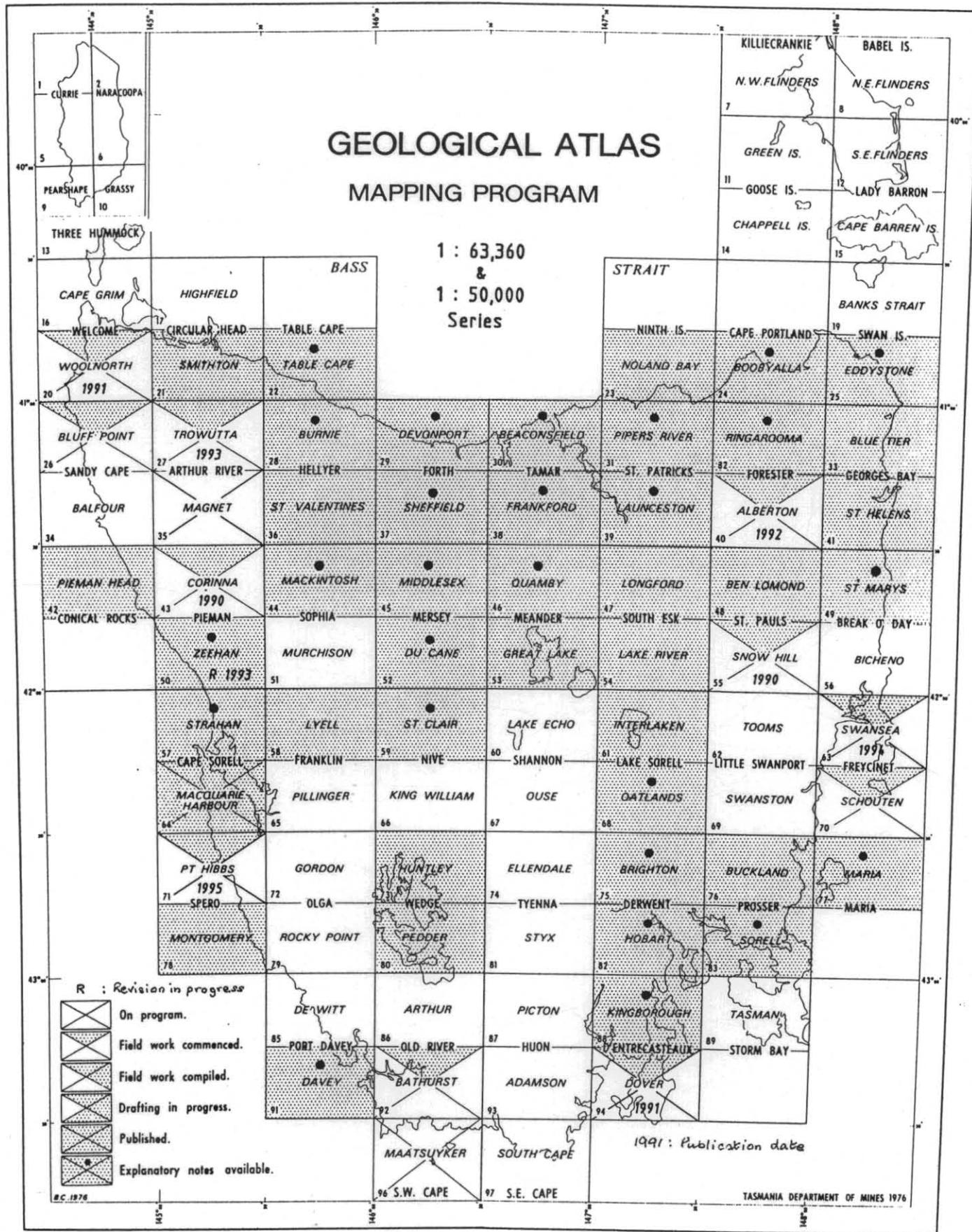
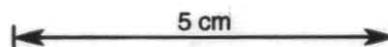


Figure 2. 1:50 000 Geological Atlas Series program



| State Survey | Record Known / No. of Maps | Map Publication to Explanatory Notes Publication : Average in Years |
|-----------------|----------------------------|---|
| Victoria | 1975-1985 / 17 maps | >2.8 9 published to Aug. 1985 |
| South Australia | 1975-1985 / 10 maps | >4 None published to Aug. 1985 |
| TASMANIA | 1978-1988 / 17 maps | Approximately 3 |

Figure 3. Publication data of Australian State Surveys engaged in systematic 1:50 000 map series

| Name | Position | Specialisation |
|---------------------------------------|------------------------------------|--|
| E.Williams B.Sc. (Hons), Ph.D., F.G.S | Deputy Chief Geologist | Structure / sedimentology / tectonics |
| A.V.Brown B.Sc. (Hons), Ph.D. | Senior Geologist | Petrology - ultramafic / mafic |
| M.J.Clarke B.Sc. (Hons), M.A., M.Sc. | Senior Geologist / Palaeontologist | Upper Palaeozoic and later stratigraphy / Upper Palaeozoic brachiopods |
| M.P.McClenaghan B.Sc. (Hons), Ph.D. | Senior Geologist | Petrology - acid igneous / granitic |
| S.M.Forsyth B.Sc. | Project Leader | Upper Palaeozoic and later stratigraphy / Palynology |
| R.H.Findlay B.A. (Hons), Ph.D. | Project Leader | Sedimentology / structure |
| C.R.Calver B.Sc. (Hons) | Geologist | Sedimentology / stratigraphy |
| J.L.Everard B.Sc. (Hons) | Geologist | Petrology - acid / basic igneous |
| D.B.Seymour B.Sc. (Hons), Ph.D. | Geologist | Meso / macro structure |
| B.Goscombe B.Sc. (Hons), Ph.D. | Geologist | Metamorphism / structure |

Figure 4. Regional Geological Survey Branch geologists

PARMEENER SUPERGROUP AND YOUNGER DEPOSITS

ECONOMIC EXPLORATION TITLES

- (a) Determination of suitable localities for alluvial heavy mineral prospecting e.g. Sn, Au, Os, Ir etc.
- (b) Distribution of gravel, roadstone etc.
- (c) Coal Measure stratigraphic constraints.

ULTRAMAFIC AND MAFIC IGNEOUS ROCKS IN FOLDED TERRAINS

ECONOMIC EXPLORATION TITLES

- (a) Location of associated Platinum Group minerals for prospecting.
- (b) Possible mineralised locality determinations by structural analysis.

GRANITOIDS AND FELSIC IGNEOUS ROCKS IN FOLDED TERRAINS

ECONOMIC EXPLORATION TITLES

- (a) Location of tin-granite for prospecting.
- (b) Location of Pb-Zn and Cu mineralised felsic igneous rocks.
- (c) Possible mineralised locality determination by structural analysis.

Figure 5. Grouping of current component investigations of systematic 1:50 000 mapping in terms of mineral resources.

Appendix A

REGIONAL GEOLOGICAL SURVEY 1:50 000 MAP SHEETS
AND EXPLANATORY NOTES – PROGRAM 1989–1994

| Completion Date | Maps | Notes | Participants | Project Leader |
|-----------------|------|-----------------------------|---|------------------|
| 1989 | | Smithton | A.V. Brown K.D. Corbett P.W. Baillie | A.V.B. |
| | | Pedder | M.P. McClenaghan N.J. Turner C.R. Calver | M.P.M. |
| | | St Helens | M.P.M. N.J.T. | M.P.M. |
| | | Snow Hill | S.M. Forsyth J.L. Everard | M.J. Clarke |
| | | Corinna | A.V.B. M.P.M. N.J.T. | A.V.B. |
| June 1990 | | Montgomery | A.V.B. | A.V.B. |
| | | Lyell | E. Williams C.R.C. P.W.B. D.B. Seymour J.L.E. N.J.T. S.M.F. | E.W. |
| | | Macquarie | M.P.M. R.H. Findlay | M.P.M. |
| | | Dover | S.M.F. | M.J.C. |
| | | Woolnorth | D.B.S. | A.V.B. |
| June 1991 | | Corinna | A.V.B. M.P.M. N.J.T. | A.V.B. |
| | | Ben Lomond and Snow Hill | S.M.F. J.L.E. C.R.C. R.H.F. | M.J.C. M.P.M. |
| | | Alberton | M.P.M. R.H.F. C.R.C. J.L.E. | M.P.M. R.H.F. |

| Completion Date | Maps | Notes | Participants | Project Leader |
|--------------------------------|----------------|-----------|--|------------------|
| June 1992 | | Woolnorth | D.B.S. | A.V.B. |
| | | Dover | S.M.F. | M.J.C. |
| | Trowutta | | A.V.B. D.B.S. J.L.E. | A.V.B. |
| | Zeehan revised | | A.V.B. M.P.M. R.H.F. C.R.C. | A.V.B. |
| June 1993 | | Alberton | M.P.M. R.H.F. C.R.C. J.L.E. B.Goscombe | M.P.M. R.H.F. |
| | Lake Echo | | S.M.F. | M.J.C. |
| | Swansea | | M.J.C. M.P.M. J.L.E. | M.J.C. M.P.M. |
| June 1994 | Pt Hibbs | | M.P.M. R.H.F. D.B.S. J.L.E. A.V.B. B.G. | M.P.M. |
| | Styx | | C.R.C. | M.J.C. |
| 1993 -1994 incomplete programs | | | | |

[31 July 1989]