CONSULTATIVE SERVICES

Planned Outcome: Enhanced community safety and well-being through the effective use of meteorological consultative services by the general public and other major social and economic sectors.

Consultative Services include the provision of advice and the conduct of investigations involving the application of meteorology and related disciplines to such fields as agriculture, engineering, architecture, health, tourism, transport, urban planning and design. Services are provided to Government and private users on a public interest, cost recovery or commercial basis, as appropriate.

The Bureau’s Consultative Services are coordinated in the Bureau’s Head Office in Melbourne with expertise drawn from throughout the Bureau. They comprise two separate outputs:

- meteorological advice; and
- special investigations.

Meteorological advice includes professional advice on meteorological and related oceanographic issues and applications, particularly where there is a national need. Where there is a clear national interest, advice is provided on a cost recovery basis. Education on, and promotion of, the use of weather and climate information, as well as contributions to Australian Standards are provided free of charge. Special investigations include theoretical, experimental or field studies undertaken to meet consultancy requests. These are delivered in the main by the Bureau’s Special Services Unit (SSU) which operates on a commercial basis and is essentially financially decoupled from the public interest operations of the Bureau.

Resource Use

The resources committed to Consultative Services in 1999-2000 are summarised in Table 3 and are given in more detail in Table 19.

Performance

Performance during 1999-2000 was assessed at two levels in terms of the:

- contribution to the achievement of the planned outcome; and
- quality, quantity and price of the outputs directed to the achievement of the planned outcome relative to agreed target levels.

The measures used are as published in the Portfolio Budget Statements 1999-2000 for the Environment and Heritage Portfolio (Budget Related Paper No 1.7).

Performance indicators relating to the achievement of the planned outcome for 1999-2000 are given in Table 20.

The major strategies used to enhance the Bureau’s consultative services and contribute to the achievement of the planned outcome during 1999-2000 were:

- to maintain a core of expertise in areas of meteorological applications in addition to those for which routine services are provided, in order to respond to community need, for example in support of urban and building design and health; and
- to respond to demands for important tailored services and special studies on a public interest or commercial basis.

A summary of the 1999-2000 performance targets and results for Consultative Services in terms of output quality, quantity and price is given in Table 21. Detailed discussion of these results follows under the component output headings.
Table 19. Consultative Services expenses and revenue ($'000) and staff level for 1999-2000 compared with reconstructed estimates for 1998-99 and the 1999-2000 Budget and Budget plus Additional Estimates appropriations.

<table>
<thead>
<tr>
<th></th>
<th>ESTIMATED ACTUAL 1998-99 ($'000)</th>
<th>BUDGET 1 1999-2000 ($'000)</th>
<th>BUDGET &amp; ADD. EST. 1999-2000 ($'000)</th>
<th>ACTUAL 1999-2000 ($'000)</th>
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<tbody>
<tr>
<td><strong>FINANCIAL</strong></td>
<td></td>
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<tr>
<td><strong>EXPENSES</strong></td>
<td></td>
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<tr>
<td>Employee Expenses (Appropriation)</td>
<td>1,616</td>
<td>1,666</td>
<td>1,465</td>
<td>1,484</td>
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<tr>
<td>Employee Expenses (Section 31)</td>
<td>1,115</td>
<td>1,244</td>
<td>1,739</td>
<td>1,738</td>
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<tr>
<td>Supply of Goods and Services (Appropriation)</td>
<td>276</td>
<td>339</td>
<td>474</td>
<td>483</td>
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<tr>
<td>Supply of Goods and Services (Section 31)</td>
<td>3,946</td>
<td>4,014</td>
<td>6,424</td>
<td>6,402</td>
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<tr>
<td>Operating Lease Rentals</td>
<td>327</td>
<td>310</td>
<td>347</td>
<td>317</td>
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<tr>
<td>Depreciation</td>
<td>352</td>
<td>279</td>
<td>330</td>
<td>354</td>
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<tr>
<td>Other Goods and Services Expenses</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(WMO Contribution)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Use Charge</td>
<td>62</td>
<td>93</td>
<td>132</td>
<td>50</td>
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<tr>
<td><strong>TOTAL PRICE OF OUTPUT</strong></td>
<td>7,693</td>
<td>7,945</td>
<td>10,910</td>
<td>10,827</td>
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<tr>
<td><strong>REVENUE</strong></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Appropriations</td>
<td>2,632</td>
<td>2,687</td>
<td>2,743</td>
<td>2,743</td>
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<tr>
<td>Sale of Goods and Services</td>
<td>5,061</td>
<td>5,258</td>
<td>8,163</td>
<td>8,163</td>
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<tr>
<td>Miscellaneous - other</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>TOTAL REVENUE</strong></td>
<td>7,693</td>
<td>7,945</td>
<td>10,910</td>
<td>10,910</td>
</tr>
<tr>
<td><strong>STAFFING</strong></td>
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<tr>
<td>Staff Years (actual)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Funded from Employee Expenses (Appropriation)</td>
<td>14.7</td>
<td>15.0</td>
<td>15.0</td>
<td>19.8</td>
</tr>
<tr>
<td>- Funded from Supplier Expenses (Appropriation)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>- Funded from Section 31 Receipts</td>
<td>18.6</td>
<td>20.0</td>
<td>23.5</td>
<td>23.5</td>
</tr>
<tr>
<td>- Funded from Capitalised Salaries (Asset Replacement)</td>
<td>0.0</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>33.3</td>
<td>35.2</td>
<td>39.0</td>
<td>43.8</td>
</tr>
</tbody>
</table>

1 Includes adjustments made to the initial output allocations (as published in the 1999-2000 Environment and Heritage Portfolio Budget Statement) in the light of further analysis of the overall resource situation following the Budget.
Meteorological Advice

Meteorological advice provided for external clients during 1999-2000, through consultative projects in the public interest, addressed environmental problems, health and safety issues and issues affecting the efficiency of the agricultural sector or public utilities. Confidentiality provisions preclude a full description of the services provided in some cases, but the diversity of projects undertaken shows the wide range of useful applications of meteorological and related science and information in virtually every sector of the economy.

The total number of consultative services provided during 1999-2000 was over 2000, well in excess of the target value of 450, since the definition of a consultative service was broadened, after the initial target was set, specifically to better capture the work of the Climate and Consultancy sections in Regional Offices. Services provided during the year included cost recovery and commercial consultancies, certified extracts with meteorological opinion, talks to external organisations, media interviews and show displays.

User satisfaction with these services was gauged through direct interaction and through a customer survey implemented for tasks undertaken during March 1999. Overall, 92 per cent of clients surveyed were satisfied or very satisfied with the consultative meteorological services provided. Unsolicited opinion received from clients throughout the year was overwhelmingly positive, with numerous letters of appreciation being received.

Government and community planning and urban design

Improved understanding of climate variability and climate change is of vital importance to a wide range of planning activities. During 1999-2000, meteorological advice was provided to the Indian Ocean Climate Initiative (IOCI), a five-year strategy established by the Western Australian

Table 20. Indicators of achievement of planned outcome: Enhanced community safety and well-being through the effective use of meteorological consultative services by the general public and other major social and economic sectors.
Government to develop more effective interseasonal climate forecasting and improve understanding of climate variability in the Australian south-west. The Bureau was a member of the IOCI directing/advisory Panel and participated in the Initiative’s scientific research work. Assistance was also provided in the planning of events and activities. Bureau staff took an active role in an international conference and workshop of the International Energy Agency (IEA),
‘Renewable Cities: Vision, Targets, Tasks’, held in Sydney in March, through presentations on the influence of climate on people’s life and health and provision of information about climate-responsive urban design. The purposes of the conference/workshop were firstly to set the future of urban development against the diminishing supply of fossil fuel and possible global climate change and secondly to define a new IEA program, ‘Solar City’, which aims to engage a number of cities and towns in active planning and implementation programs aimed at broad, community-wide greenhouse gas reductions to globally sustainable levels by 2050. Bureau staff participated in the preparation of a Memorandum of Understanding between the IEA, participating nations and a selected group of cities for active integration of solar and other renewable forms of energy in cities and urbanised regions. The Director of Meteorology agreed to be one of three international advisers to the ‘Solar City’ program.

Work on the micro-climatic impact of rooftop gardens in an inner suburban area continued this year on behalf of several local Councils in Melbourne, each interested in using such gardens as a means of mitigating the urban heat island effect. During 1999-2000, attention was directed to modelling the cooling and wind-sheltering effect of rooftop greening on a hot, windy day in Melbourne (Figure 45).

The Bureau contributed to the organisation of the world’s largest scientific fora on biometeorology and urban climatology, the International Congress of Biometeorology and the International Conference on Urban Climatology, held jointly for the first time, in Sydney in November. The Conferences examined the impacts of urban climates on human health, ecosystems, energy utilisation in buildings, energy resource efficiency and urban design. Strategies and programs for human adaptation to significant changes in climate over the next 100 years and the development of appropriate responses to worsening natural disasters were also explored.

Over the next few years the Townsville City Council will be addressing the urban renewal of the central business district (CBD) and, as part of a public information and consultation process, the Council has established a CBD urban planning shopfront/display area in the city to which the Bureau has contributed brochures and display material, covering the benefits (social, economic and environmental) of climate-responsive urban design.

Displays on climate-responsive urban design were also mounted at the Royal Australian Planning Institute’s international conference, ‘Planning in the Hothouse’, in Darwin this year, which attracted a strong contingent of urban planners from South-East Asia.

Advice was provided by the Queensland Regional Office to the State Office of Sustainable Energy and the
Department of Natural Resources on locations of significant mean wind speeds in that State, for use in assessments of the feasibility of generating useful quantities of power from wind turbines.

**Building design and safety**

Detailed information on the design of climate-responsive residential buildings was added to the Bureau’s Web site during 1999-2000, providing design tips for reducing energy consumption and increasing health and comfort levels, through consideration of aspects of the local climate.

Maps of climate zones relevant to building design were produced by the Bureau for inclusion in a CSIRO feasibility study, ‘A National Approach to Energy Efficiency Provisions in Houses’, which is being undertaken for the Australian Building Codes Board. The study will determine what type of energy efficiency provisions would be suitable for inclusion in the Building Code of Australia.

Reference material on the effects of heat on health and on climate-responsive building design was provided to the New South Wales Department of Health, which was investigating the benefits of insulation and air-conditioning in Aboriginal housing for the far western region of New South Wales.

The Bureau continued its contribution to the Australian Standard for wind loading on buildings this year, through provision of climate information for cyclone ratings on parts of the Queensland coast.

**Health and safety issues**

During 1999-2000, the Bureau received many requests for information and meteorological advice in relation to issues of health and safety. Requests ranged from information to assist with the investigation into a fatal workplace accident, to meteorological advice to assist in the comparison of several potential sites for the sinking of a vessel for use as a dive wreck.

Meteorological advice in relation to the rate of dispersion of pollutants was provided to authorities considering the adverse impacts on health of polluted air. Pre-processed climate data were provided to several clients engaged in air pollution studies using the Environment Protection Authority’s AUSPLUME air dispersion model.

The Bureau played a key role this year in the revision of the Australia-New Zealand standard for lightning protection. Data on lightning incidence and severity were provided to the joint Committee on Protection Against Lightning and a draft map of annual average thunder days was prepared.

A tropical cyclone study was undertaken as a part of a larger WMO study of the "Climate of the 20th Century". Tropical cyclone occurrences in the southern hemisphere in general and in the Australian region were analysed using records assembled through collaboration between the Meteorological Services of Australia, New Zealand and Reunion (France). A cyclone climatology and maps showing the incidence of tropical cyclones across the southern hemisphere were constructed. An

Figure 46. Annual occurrence of tropical cyclones in the Australian region (105°E - 165°E) from 1970 to 1997, showing a slight downward trend.
analysis of time series of occurrences of tropical cyclones in the Australian region revealed a slight downward trend over the past few decades (Figure 46).

During the past year, the South Australian Regional Office continued work on a coastal wind climatology, using wind observations from shore-based and moored-buoy anemometers. The results of these investigations should benefit the Australian public through more accurate forecasts and warnings as well as more accurate design data for coastal engineering.

Advice on the return periods of extreme winds was provided by the Queensland Regional Office to the Department of Natural Resources for use in their review of the safety of Queensland dams.

The Tasmanian Regional Office provided a detailed assessment of the expected frequency of storms that could affect holiday homes in a low-lying coastal area. The assessment included consideration of swell height, wind speed and atmospheric pressure.

A study of the climatology and forecasting of low cloud at Melbourne Airport was undertaken by the Victorian Regional Office to assist with the understanding of what could be defined as a significant safety issue for airport operations.

Special Investigations

Special Services Unit

The Special Services Unit (SSU) has operated since 1990 providing specialised meteorological and related services on a commercial basis. The SSU has offices in Melbourne, Perth, Sydney and Brisbane and a staff of 32. A full-time Finance Manager was appointed in June 2000 to cope with the increasing financial load associated with the expanding range of activities. An important task of that position is to deal with the financial reporting and the transition to a post Goods and Services Tax environment in the new financial year.

Work continued during 1999-2000, in collaboration with CSIRO, the National Tidal Facility, GEMS Pty Ltd and Weather Solutions Pty Ltd on a new sea surface trajectory system for the Australian Maritime Safety Authority to support its search and rescue and oil spill responsibilities. The oil spill prediction software component was...
also completed this year.

Several projects were undertaken by the SSU during the year with the involvement of a number of other Bureau branches and regions in line with appropriate costing and resource backfilling arrangements. These included:

- the installation of the Mount Hotham Airport automatic weather station and weather and terminal information reciter (WATIR) unit;
- the installation of an automatic weather station on Thevenard Island (Western Australia);
- the development of a Linux version of the Bureau’s message switching software by the Communications Software Section of the Bureau. This software was installed subsequently at the Indonesian Meteorological and Geophysical Administration in Jakarta and at three Indonesian regional offices;
- the completion of three Probable Maximum Precipitation studies for engineering companies in eastern Australia through the Bureau’s Hydrometeorological Advisory Service;
- the continuation of project management support for the development of a UHF boundary layer profiler in collaboration with the Bureau of Meteorology Research Centre and Observations and Engineering Branch. Installation of a profiler and associated radio acoustic sounding system (RASS) at Shanes Park, New South Wales, for the New South Wales Environment Protection Agency was progressed, with commissioning in August 2000; and
- the installation of a waverider buoy on Thevenard Island (Western Australia) in association with Lawson & Treloar Pty Ltd for WAPET (now Chevron).

The international activities of the SSU during 1999-2000 provided the most significant contribution to its revenue. Three of these projects were carried out under contract to Mitsubishi Corporation, under the auspices of the Japan Weather Association, and were funded by Japanese government Grant-in-Aid. In the Philippines, the SSU continued to lead an Australian consortium comprising the Australian Geological Survey Organisation and Mindata Pty Ltd to undertake a seismic network upgrade for the Philippines Institute of Volcanology and Seismology. This project resulted in significant export of Australian equipment and systems provided by Mindata through its Seismic Research Centre. In Bangladesh, work was completed on a project involving the upgrade of data processing systems for the Bangladesh Meteorological Department. In Fiji, the support program continued for the meteorological systems upgrade installed in 1998 for the Fiji Meteorological Service (FMS) primarily through the work of a Bureau computing adviser located in Nadi.

In addition to these projects, other collaborative activities with the private sector expanded significantly during the year. These included:

- two projects completed in Turkey in
conjunction with the Australian company Ecowise Pty Ltd. Both projects were World Bank funded and the clients included the Turkish National Meteorological and Hydrological Services. The first project was a site survey for five proposed Doppler radar sites. The second and more substantial project consisted of a detailed design study for new hydrological and meteorological networks;

- a major project commenced late in the year with ES&S Pty Ltd to supply the Malaysian Meteorological Service (MMS) with an upgraded data processing system consisting of an integrated message switching and forecaster workstation. This project will run throughout the next two years. Other activities with ES&S included the supply of the Bureau’s 3D-RAPIC system for four MMS radars;

- ongoing support to Vaisala Australia Pty Ltd in a major monitoring program in the Pacific undertaken by the US Department of Energy. This involved the supply and maintenance of Remote Balloon Launchers and assistance to Vaisala in installing or refurbishing a number of hydrogen electrolyser. Further assistance in training local staff and ongoing maintenance will be provided in later years;

- participation with a number of Australian and overseas companies in the development of tenders or proposals for major system projects in Hong Kong, the Philippines and Venezuela;

- support provided to Almos Systems Pty Ltd for their Taiwan Low Level Windshear Alerting System (LLWAS) project;

- the installation of the Phu Quy automatic weather station off the southern coast of Vietnam. Observations are being transmitted to the Hydrometeorological Service of Vietnam (HMS) via the Japanese GMS5 satellite and via the Public Switched Telephone Network. Technical training in its use and maintenance was provided to HMS staff in Phu Quy and Hanoi; and

- the recommissioning of the Ujung Pandang weather radar in Indonesia, with the support of the Observations and Engineering Branch and ES&S Pty Ltd.

The SSU operates on the basis of competitive neutrality with the private sector and non-interference in the public good functions of overseas National Meteorological Services. The continued growth in the SSU’s revenue has exceeded projections and reinforces its role as a quality provider of specialised meteorological and related services on both the national and international scene.