

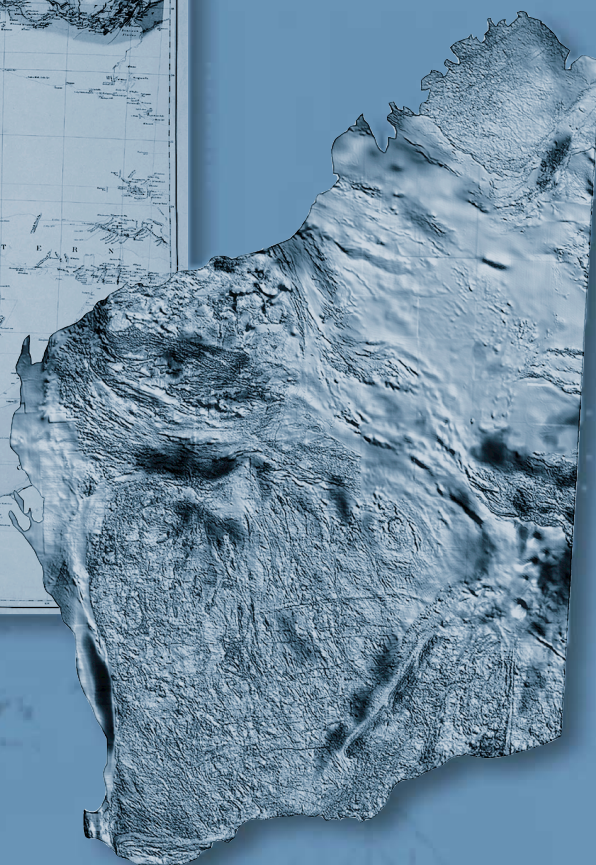
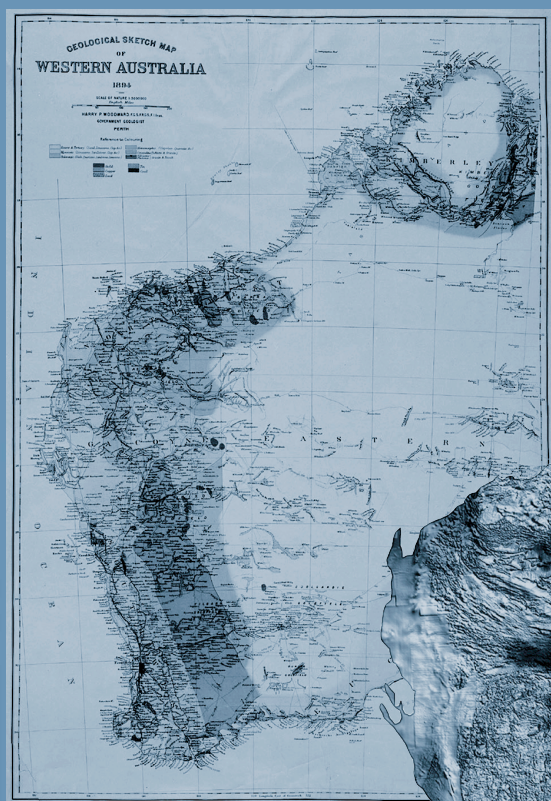


Department of
Mineral and Petroleum Resources

**RECORD
2002/11**

VISITING GEOLOGICAL SITES IN WESTERN AUSTRALIA — A GUIDE TO PLANNING, COLLECTING, AND PROCEDURES

compiled by K. Grey



Geological Survey of Western Australia



GEOLOGICAL SURVEY OF WESTERN AUSTRALIA

Record 2002/11

VISITING GEOLOGICAL SITES IN WESTERN AUSTRALIA — A GUIDE TO PLANNING, COLLECTING, AND PROCEDURES

compiled by

K. Grey

Perth 2002

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Visiting geological sites in Western Australia — a guide to planning, collecting, and procedures

compiled by

K. Grey

Abstract

Many geoscientific visitors to Western Australia are oblivious of the State and Federal legislation that now governs issues such as land access, and the collecting and exporting of materials. The planning of fieldwork in remote outback regions cannot be left to the last minute, and visitors are responsible for obtaining the necessary clearances for their activities, preferably before they arrive in the State. This Record provides guidelines and contact addresses to aid visitors in setting up a successful project, whether visits are planned as part of a cooperative research project with the Geological Survey of Western Australia, or independently.

KEYWORDS: Western Australia, geological sites, collecting, legislation, export.

Introduction

Western Australia (Fig. 1) is now a popular destination for geoscience research and ecotourism, which is hardly surprising considering the range of interesting geological features that have been discovered.

If you are planning to visit geological sites in Western Australia, there are some important things to consider before you arrive:

- the purpose of your visit;
- site access;
- site protection;
- collecting and exporting of geological material;
- outback travel and safety.

This Record provides guidelines for visiting Western Australian sites and collecting geological material. It provides information on restrictions relating to access, site protection, and the collection and exportation of some minerals, fossils, meteorites, and other protected objects. Contact details of all relevant organizations are listed in Appendix 1.

The Geological Survey of Western Australia (GSWA), a division of the Department of Mineral and Petroleum Resources (MPR), is the State government department responsible for geological assets in Western Australia, including the protection of geological sites.

Advanced planning

Many visitors underestimate the distances and travel time involved in reaching remote areas. Nearly all trips need to originate in Perth, and there are few flights between regional centres. For example, if you want to fly from Carnarvon to Port Hedland you will probably have to travel via Perth. Most geological sites are in remote areas, only accessible using a 4WD vehicle, and involve camping out.

Plan your trip well in advance and allow adequate time to buy maps and supplies before leaving Perth, and to pack your vehicle. Towns are few and far between in the north of the State and you will need to plan resupplying and fuel stops. Most shops close at 5.30 p.m., and are closed on Sundays; Government departments are closed at weekends and on Public Holidays. You also need to be aware of the risks when working in remote areas (see **Outback safety**).

Make yourself aware of the many restrictions relating to geological sites and the collection and exportation of geoscientific material (see **Scientific collecting**).

Geological maps and other publications by GSWA can be purchased from the MPR office in Perth or through the online bookshop at www.mpr.wa.gov.au.

Topographical maps and aerial photographs are available from the Western Australian Department

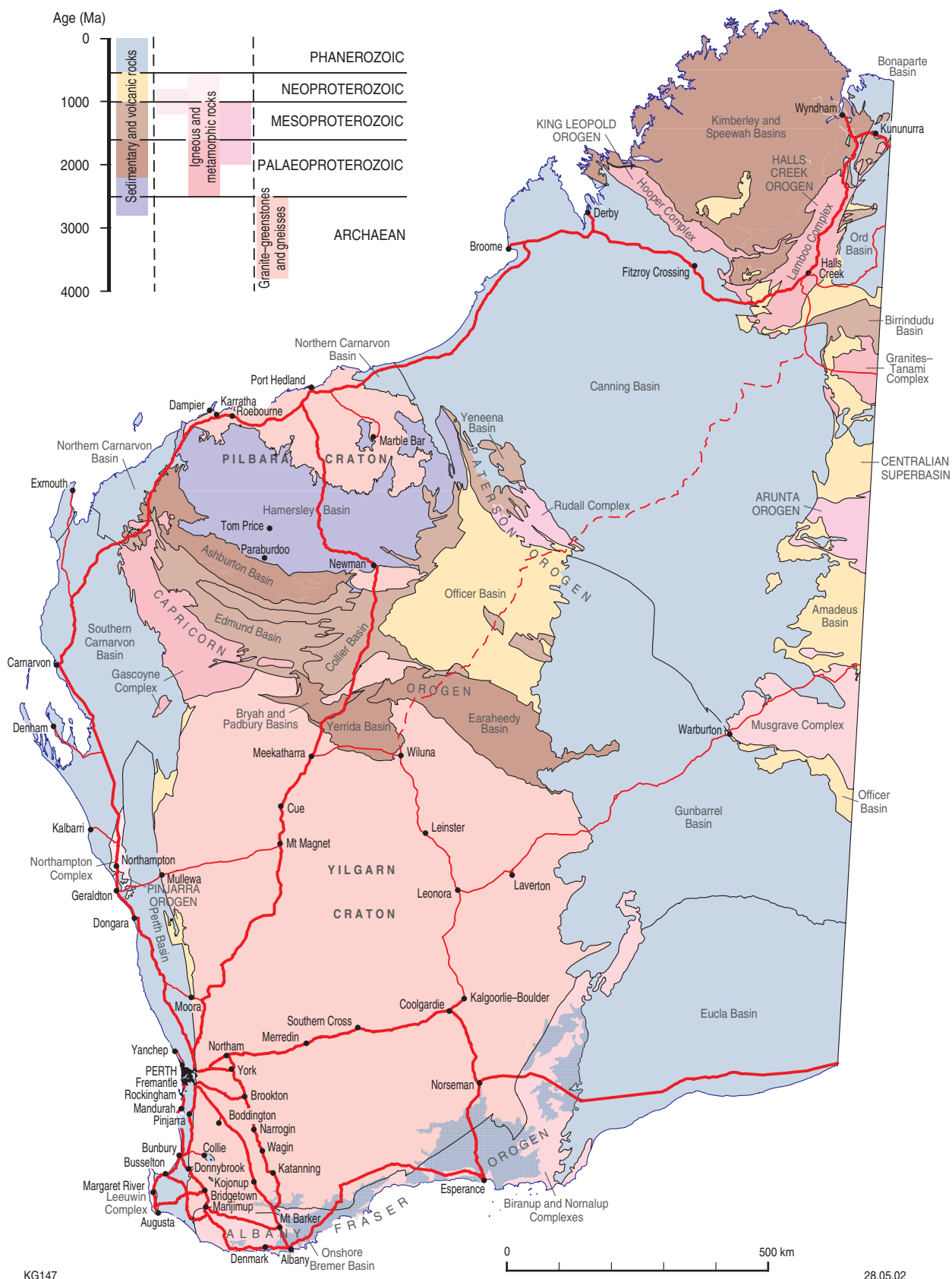


Figure 1. Major roads, towns, and tectonic units of Western Australia

of Land Administration (DOLA; see Appendix 1) and online at www.dola.wa.gov.au.

'Skyview' (for aerial photos and satellite images) is available at Land Online, DOLA's online shopfront, at www.landonline.com.au or email: sales@dola.wa.gov.au.

Purpose of visit

Define what it is that you want to do. Different approaches are needed depending on the nature of your visit:

- scientific research or collecting;
- commercial collecting;
- filming a documentary;
- media interview or research for a book;
- ecotourism or holiday.

Scientific research

If you plan to carry out a geoscience project in Western Australia, you could:

- set up a joint project with GSWA;
- set up a joint project with another Western Australian institution, or an Australian institution familiar with the Australian environment;
- organize your own project.

Scientific research as a joint project with GSWA

Budget and time constraints mean that GSWA has strict guidelines regarding collaborative work. These are summarized below. For more details you should write to the Director of GSWA outlining your interests and proposals.

Information on imminent GSWA projects are provided in the annual work program (GSWA Record 2002/1) and the Annual Review, both of which are available on the MPR website.

Guidelines for cooperative geoscience activities with GSWA

GSWA receives many approaches for support for geoscientific projects. The types of assistance requested include project generation, basic training, logistics (a vehicle with or without a field assistant), and active involvement of a GSWA staff member.

Successful cooperation requires a degree of agreement between the external researcher and GSWA. Whether or not cooperative work is entered into depends on a number of factors, such as the quality of previous work, the ability to meet deadlines, access for GSWA to particular techniques and expertise, and current GSWA program and funding commitments. Cooperative work may be undertaken at a number of levels:

- GSWA support towards academic research;
- self-supported academic research;
- GSWA support towards a PhD project;
- GSWA support towards Honours or Masters research.

GSWA support towards academic research

This involves detailed field or laboratory work (or both) on a particular problem by an acknowledged expert. The work may not necessarily contribute directly to a map product, but could be published as a GSWA publication, such as a Record or Report, or as research papers co-authored by GSWA staff in international journals, and with GSWA cooperation prominently acknowledged. Cooperative work should lead to a greater understanding of the geology of Western Australia in its global context. It may be initiated by GSWA or by the individual researcher.

The level of support will vary and could include the provision of some field support. The maximum amount of support would be a field vehicle for a limited time (about four weeks), and might require most costs to be met by the external researcher. There could possibly be some office support. Access to GSWA data would be available before publication. Support levels would be directly related to the level of contribution likely to be made to GSWA's current programs.

Self-supported academic research

GSWA encourages the exchange of information and is willing to cooperate with external researchers at various levels, particularly where work is relevant to GSWA objectives. Help may range from providing pertinent information through to projects in which GSWA staff are active members of a research group. Projects must be individually planned, and issues of funding, time commitments for GSWA staff, level of logistical support, expected products and outcomes, deadlines, and repository of data and materials (e.g. fossils) need to be agreed in advance. Progress reports are required regularly from anyone receiving substantial support from GSWA.

The level of support will vary depending on the proposed project. External researchers will need to meet most costs. Time commitments and funding levels for GSWA staff will need to be carefully considered in relation to GSWA's ongoing programs. Groups seeking substantial cooperation from GSWA should submit a research proposal outlining their objectives and the possible benefits to GSWA.

GSWA support towards a PhD project

This might involve laboratory-based PhD projects that contribute to the overall geological understanding of an area, or projects with a mapping component that can be incorporated directly into GSWA map products. GSWA would set clear goals and strict deadlines for each year of the project, probably requiring the production of compilation sheets or a written report (or both) suitable for inclusion into Explanatory Notes. Failure to meet deadlines is likely to lead to cancellation of the arrangement. This type of work should fit within the framework of a GSWA project plan. A GSWA staff member may act as a formal supervisor.

The level of support would be agreed between GSWA and the student's institution. There could be provision of field support, in which the maximum would be a field

vehicle for two field seasons totalling no more than 26 weeks. Other options include sharing a vehicle with a GSWA geologist on a day-to-day basis, with exclusive use during the geologist's field breaks.

GSWA support towards an Honours or Masters project

This involves work providing a direct contribution to GSWA's mapping or other programs. The student would have a clearly defined product and a completion deadline that fits normal GSWA deadlines for map products and Explanatory Notes. Arrangements would be agreed between GSWA and the student's institution. GSWA may define problems and project areas that are suitable for writing up as an Honours thesis. GSWA recognizes that this type of work involves a considerable training and quality-control requirement, and closer supervision than for a PhD student. Students would be restricted to eight weeks fieldwork and would not be expected to cover the sort of area an experienced GSWA mapping geologist would in the same time. A GSWA staff member may act as a formal supervisor.

The level of support may extend to a maximum of the provision of a field vehicle for eight weeks. Other options include limited availability of a field vehicle when a GSWA geologist is on a field break, or sharing a vehicle with a fellow student working in an adjacent area.

Reporting back

If you are part of a GSWA cooperative project, we expect progress reports on your studies, and may want to include some results in our in-house publications (usually as reviews of progress). This should not preclude independent external publication (GSWA geologists are usually happy to be co-authors where appropriate). Discuss probable outcomes, possible publications, and authorship when setting up the project.

In publications, please mention in the acknowledgements that material was collected with the assistance of GSWA. If there is a GSWA co-author, include the words 'Dr X publishes with the permission of the Director of the Geological Survey of Western Australia'. You should mention the repository of any fossil material described.

GSWA would like to comment on manuscripts before publication to make sure that geological data are current. Even if you work independently of GSWA, we would appreciate hearing about your progress and publications so we can keep our knowledge current and indicate potential duplications of effort.

Scientific research as a joint project with another institution

Joint projects with GSWA can only be undertaken if they fit the current GSWA program and budget. In some cases it may be more appropriate to approach another Australian institution.

Details of some relevant institutions are provided below. Their contact details are listed in Appendix 1.

Curtin University of Technology

Researchers at the Department of Applied Geology at the Curtin University of Technology in Western Australia are involved in diverse Western Australian projects that span all geological disciplines.

More information on specific projects is available on their website at www.curtin.edu.au/curtin/dept/geology.

University of Western Australia

Earth science research at the Department of Geology and Geophysics at the University of Western Australia (UWA) is broad ranging with strengths in mineral and petroleum resources, tectonics, biostratigraphy, and basin studies. Research activity is focused on the resources of Western Australia, but also extends to investigating the geological evolution of parts of Asia, Africa, and the American continents.

More information on specific projects is available on their website at www.geol.uwa.edu.au, with direct links to their research centres at www.cgm.uwa.edu.au (Centre for Global Metallogeny) and www.tsrc.uwa.edu.au (Tectonics Special Research Centre).

Western Australian Museum

The Western Australian Museum houses extensive collections of geological material from around the State. Many significant geological specimens (including some of the best preserved of the 3.5 billion-year-old stromatolites from the Pilbara region) are on display in the Diamonds to Dinosaurs gallery. Museum staff can be consulted about examining museum material, and the collection and export of fossils, minerals, and other geological material from Western Australia.

More details are available on their website at www.museum.wa.gov.au.

Geoscience Australia

Geoscience Australia is the (Australian) national agency for geoscience research and information, and is part of the federal Department of Industry, Tourism and Resources, based in Canberra.

More details are available on their website at www.ga.gov.au.

Australian National University

The Research School of Earth Sciences (RSES) at the Australian National University (ANU) in Canberra conducts research addressing fundamental processes or global phenomena with emphasis on Earth materials and processes and on the evolution of the Earth through time. There are research groups working on Earth physics (geodynamics, seismology, geomagnetism, and geophysical fluid dynamics), Earth chemistry (geochronology and isotope geochemistry, ore genesis, and thermochronology), Earth environment (environmental processes, environmental geochemistry and geochro-

nology), and Earth materials (petrophysics, petrochemistry, and experimental petrology).

RSES analytical facilities can be accessed by outside researchers on a 'commercial-in-confidence' or 'collaborative' basis through Precise Radiogenic Isotope Services (PRISE).

More information is available on ANU's website at www.rses.anu.edu.au. Details about PRISE are at www.rses.anu.edu.au/prise/.

Scientific research as a self-organized project

If you are organising your own project, please consider the advice given here about land access, collecting, exporting, and safety issues.

Ignoring export requirements could mean that your collection is delayed or confiscated and that future shipments will be subject to closer scrutiny. There are several cases where this has happened. Failure to follow these guidelines will also create problems for other scientists wishing to work in the areas you have visited.

Scientific collecting

You should be aware of issues such as sampling protocols, land access, protected sites, export requirements, and bush safety. Some of these issues are discussed in more detail below, but requirements change from time to time, and you are urged to obtain the latest information and contact the relevant organizations when planning your trip to ensure currency.

You are responsible for ensuring that you comply with the Australian legislation dealing with these matters.

You should read the MPR booklet 'Prospecting in Western Australia' which can be downloaded from www.mpr.wa.gov.au or obtained in hardcopy from MPR's Perth office. You will also find information on 'fossicking' under the Mining Act Information Series on the website.

If you plan to collect only a few kilograms of rock for scientific study, you should obtain a Miner's Right, which allows access to pastoral leases and unallocated Crown land. If you plan to remove more than 20 kg of rock from a single site, or use machinery to remove material (perhaps for commercial collecting), you may need to apply for a mining title.

Sampling constraints have increased considerably in recent years. Some restrictions result from legal obligations; others stem from issues of conservation, culture, and politics. GSWA has certain rights under various mining regulations with respect to the removal of materials, but we aim to perform our studies in a sensitive and cooperative manner. Please assist us in maintaining GSWA's reputation for carrying out its projects conscientiously by observing sampling and export protocols.

Department of Conservation and Land Management

The Western Australian Department of Conservation and Land Management (CALM) has responsibility for conserving the State's native plants, animals, natural ecosystems, and unique landscapes. It manages more than 23 million hectares of national parks, marine parks, conservation parks, regional parks, State forests, timber reserves, nature reserves, and marine conservation reserves. It protects Western Australia's wildlife by preventing the illegal removal of native plants, animals, and other materials.

You should contact CALM if you wish to sample in any of their managed areas (e.g. if you wish to collect samples of bacterial mat from Hamelin Pool, Shark Bay). CALM is responsible for issuing collecting permits in these areas.

More information is available on their websites at www.calm.wa.gov.au or www.naturebase.net.

Sampling protocols

- Do not collect everything in sight at any one locality.
- Be familiar with the existing geological literature and discuss your plans with geologists familiar with the area. The chances are that you will not be the first person to visit a locality. If there are good examples left at a site, this has probably been done deliberately, perhaps because the rock face is illustrated in the literature or it is one that demonstrates field relationships clearly. Do not vandalize such sites.
- One of the best means of protecting important sites is non-disclosure of the precise locations. Some reserves have been deliberately made larger than needed to make it more difficult for key outcrops to be pinpointed. If GSWA provides you with location details of such sites, we ask you not to publicize precise locations. We also try to protect vulnerable sites by not making wheel tracks too obvious. For this reason we discourage large numbers of vehicles because this would leave well-worn tracks. Try to walk to localities so that their position is not immediately obvious.

Export requirements

In recent years, key Australian geological sites have been plundered and significant specimens have been illegally exported. Some sites were vandalized in the process. Australian Customs Officers are now very vigilant. They monitor sites and collecting activities on a regular basis, and will confiscate samples not accompanied by an export permit or appropriate clearance.

The Australian Customs Service has Customs Information Centres that can be contacted from anywhere within or outside Australia (see Appendix 1). More information is available on their website at www.customs.gov.au.

The export of minerals, fossils, and potentially fossiliferous material is controlled by the Australian Protection of Moveable Cultural Heritage Act 1986 (APMCHA). You must ensure that everything is in order and accompanied by the correct paperwork if you wish to avoid problems.

There are two ways to arrange export under the current legislation:

1. Borrow or permanently export samples yourself.
2. If you are part of a GSWA cooperative research project, register specimens in the GSWA collection and borrow them for the duration of the study. GSWA loans are subject to certain conditions (Appendices 2–4), and any material borrowed remains part of the GSWA collections.

Making your own arrangements for export

If you plan to export samples, contact Environment Australia (the federal Department of the Environment and Heritage; www.ea.gov.au) well in advance of your visit, outline your plans, and check if you need a permit, or if there is anything else you need to do before you export material. Allow time; getting required clearances can take up to three months. You may be required to take specimens to be exported to the Western Australian Museum for assessment before a permit can be signed. Post Office staff are unlikely to accept parcels of rock for posting, and will probably refer you to the nearest Australian Customs office (see Appendix 1).

You are not allowed to permanently export rare or significant items. You might be able to temporarily remove such material overseas for scientific study (usually for one year), but it must be returned to Australia. All type and illustrated fossils must be returned.

You can find relevant information and download forms at www.ea.gov.au/heritage/awh/movable/export.html or write to Environment Australia's Canberra office for copies of the Act, control lists, application forms, and further information (see Appendix 1).

Exporting as part of a GSWA cooperative project

An associate researcher who is part of a GSWA cooperative research project should register specimens in the GSWA collection and borrow them for the duration of the study, subject to certain conditions.

Such specimens are 'part of the GSWA collection temporarily removed overseas for scientific study'. All specimens are given GSWA sample numbers and are borrowed through one of the GSWA loans systems (Appendices 2–4). GSWA temporarily exports certain specimens, such as fossils, under a special licence using a form signed by the Director. Samples do not require inspection by the Western Australian Museum, and formalities do not take long if forms are in order. Some loans may be extended by agreement (see Appendix 2 for GSWA palaeontological loan conditions).

In general, all material should be returned to Australia, but this is not always practicable (e.g. there seems to be

little point in returning nonproductive material, such as rock matrix). However, you must return all type and illustrated fossil specimens, and any other significant material to GSWA. GSWA may agree to the retention of some representative specimens or bulk material by your institution, provided this is approved for permanent export under the Australian Protection of Moveable Cultural Heritage Act 1986. If bulk material later yields type or illustrated specimens, then these too should be returned to GSWA, but nonproductive bulk material need not be returned. Transportation costs must be borne by the researcher or their institution.

Before publication, type and illustrated fossil specimens must be allocated GSWA Fossil Catalogue numbers (available on request) and the repository cited as the GSWA Fossil Collection.

Commercial collecting

Most of the information in this document relates to small-scale scientific collecting. Commercial collectors are also interested in geological sites, and such activities are governed primarily by the Western Australian Mining Act 1978. Some important geological sites are protected by various pieces of legislation; others are regarded as geological monuments, and should be conserved as part of the State's heritage. Certain sites may be suitable for commercial collecting purposes, but you will have to check carefully whether there are constraints on commercial exploitation.

In Western Australia, private landowners have a veto over mining and access cannot be made without the consent of the owner and occupier of that land. You must also check whether there is an existing mining title over the area. Table 1 contains land access information and contact details of relevant authorities.

Most commercial operations will fall within the provisions of the Mining Act 1978. Before you begin any operation of a commercial nature, you should obtain advice from MPR (www.mpr.wa.gov.au). If you are only going to collect a few kilograms of rock you will require a Miner's Right for access over pastoral leases and unallocated Crown land. However, if you plan to remove more than 20 kg of rock from a single site, or use machinery to extract material, you will probably need to apply for a mining title. For more information, read the MPR booklet 'Prospecting in Western Australia' (download from the website or obtain as hardcopy from the Perth office), and see the Mining Act Information Series on the MPR website.

If the site falls within the boundaries of a national park or other reserve, you must contact CALM or the appropriate authority for advice and permits (Table 1, Appendix 1). You must check whether there are any Aboriginal sites and ensure compliance with the Aboriginal Heritage Act 1972. You must also obtain the necessary permits to export material under the Australian Protection of Moveable Cultural Heritage Act 1986 (see **Export requirements**).

Table 1. Land access contacts in Western Australia

	<i>Issue</i>	<i>Contacts and information</i>	<i>Website</i>
Land tenure			
Private land	Approval required by owner	Look at the Department of Mineral and Petroleum Resources' (MPR's) TENGGRAPH for details on location and Shire then contact relevant Shire through the Western Australian Local Government Association	www.mpr.wa.gov.au www.wama.wa.gov.au
Pastoral or other lease	Approval of lease holder	Look at MPR's TENGGRAPH then search White Pages or visit the Department of Land Administration (DOLA) website or contact the Pastoralists and Graziers Association of Western Australia (PGA)	www.mpr.wa.gov.au www.dola.wa.gov.au/home.nsf/(FrameNames)/Crown+land (click on Land Administration Services Branch) www.pgaofwa.org.au (click on Contact us)
Reserve	Approval of land manager who may include the following: Department of Conservation and Land Management (CALM) Aboriginal Lands Trust, Department of Indigenous Affairs Relevant Shire and/or WA Local Government Association For unvested reserves where there is no on-ground management	Look at MPR's TENGGRAPH first, search in White Pages or link to individual land manager website Department of Land Administration	www.mpr.wa.gov.au www.whitepages.com.au www.calm.wa.gov.au www.aad.wa.gov.au or www.dia.wa.gov.au www.wama.wa.gov.au/locGovInfo/localGovInfo_index.htm www.dola.wa.gov.au/home.nsf/(FrameNames)/Crown+land (click on Land Administration Branch)
Vacant Crown land	No approval required	Look at MPR's TENGGRAPH for locations of vacant Crown land	www.mpr.wa.gov.au
Indigenous interests			
Heritage	Seek information on known heritage sites from Department of Indigenous Affairs	Department of Indigenous Affairs	www.dia.wa.gov.au/Contacts
Native Title	Advice from relevant Native Title Representative Body	National Native Title Tribunal Aboriginal and Torres Strait Islander Commission (ATSIC) Will provide information on representative bodies and how they can be contacted	www.nntt.gov.au/nntt/contacts.nsf/area/homepage (click on Types of Organisations, Indigenous then Native Title Representative Bodies) www.atsic.gov.au
Mineral and Petroleum tenure	Advice from relevant tenement holder	Look at MPR's TENGGRAPH for details on tenement holders and locations of individual sites. Then search White Pages for contact details	www.mpr.wa.gov.au www.whitepages.com.au

Media visits (making a film, interviews, publications)

Many sites that film crews or other members of the media wish to visit are extremely remote. They can only be reached by 4WD vehicle or helicopter and involve camping out. Transport costs are high. Many sites are extremely small in area and can only be located with the aid of a guide. GSWA has only limited resources and a heavy work program, so staff cannot be made available at short notice. In some areas you may need to be accompanied by a traditional owner, who will indicate where there are taboos about access or photography. In some cases the best material has been placed in museums to protect it, and little is left at the location.

GSWA holds a collection of published and unpublished photographs and diagrams created by staff members during project activities. Members of the public are welcome to request permission to use these in publications and for other purposes such as on the web or in textbooks, and permission, if granted, will generally be on the condition that appropriate acknowledgement is made to the source of the material. A written request should be forwarded to the Manager, Geoscience Information Products, GSWA, or emailed to publications@mpr.wa.gov.au.

Requests for interviews or assistance from GSWA or other divisions of MPR in relation to making a film, publishing a book, or other forms of science journalism should be directed to Corporate Communications and Marketing at MPR's Perth office or website.

Some filming and photography in national parks (for example Shark Bay) requires permission from CALM and may require the presence of a CALM officer. Information on terms and conditions and online forms are available at CALM's website at www.naturebase.net.

Ecotourism or family holiday

Many visitors to Western Australia are keen to see some of the significant geological sites. Information on some of the more popular sites has been published by GSWA, providing details on accessibility and the main features.

Information on specific sites can be obtained by contacting the Manager, Geoscience Information Products, GSWA, or email publications@mpr.wa.gov.au.

Information on commercial ecotours, vehicle hire, and accommodation are available through the Western Australian Tourism Commission on their website at www.tourism.wa.gov.au.

CALM's website at www.naturebase.net provides a wealth of information on areas to visit, particularly for national parks such as Shark Bay or the Yalgorup Lakes, both of which are popular destinations for geoscientists.

Outback safety

Anyone planning a trip away from main settlements needs to be very aware of safety issues. Working in remote areas can be extremely hazardous, even for those with plenty of experience. The outback often looks benign, but even a slight mishap can trigger a chain of events that can put your party, and sometimes members of rescue parties, at serious risk. If you have a breakdown or get lost, you should stay with your vehicle. A search party is more likely to spot a vehicle than a body.

Always carry adequate water, food, fuel, spare parts, a global positioning system (GPS) navigator, and emergency position indicating radio beacon (EPIRB). For extended trips in remote areas a satellite phone and/or high frequency (HF) radio is recommended for position reporting and emergencies (see VKS-737 Radio Network below). You should know basic first aid and vehicle maintenance. Fieldwork in the north of Western Australia is best carried out in the cooler winter months from June to September. Daytime summer temperatures are often higher than 38°C (100°F). Monsoon rains and cyclones can cause flash flooding and you can be stranded for days if the rivers rise. Bushfires are another major hazard. Many bush tracks may not conform to the position shown on maps because they vary as a result of local conditions.

The Western Australian Police Department issues a booklet called 'Aids to Survival', which is available free of charge at police stations or through the Command and Land Operations Unit, Police Academy, Perth (Appendix 1).

If you are travelling away from main roads, notify someone of your travel plans. Preferably, you should lodge a trip plan with the nearest police station, giving an indication of your route and intentions, and a deadline by which you will notify someone of your safe return. Make sure you have any necessary permits for entering reserves, such as Aboriginal or conservation reserves, and that the roads are open to the public. Driving on a road that has been closed can carry substantial fines.

CALM's website (www.naturebase.net) provides information on local weather and road conditions, and access information to national parks. CALM also conduct outback safety and survival courses for those wishing to brush up on 4WD and bushcraft skills.

Up-to-date information on road conditions for the State is provided at the Main Roads Western Australia website (www.mainroads.wa.gov.au). Outback roads may be closed because of flash flooding.

The VKS-737 Radio Network (a division of the Australian National 4WD Radio Network Inc.) provides safety services to outback travellers through its extensive Australia-wide network of 10 HF radio base stations. Safety services include weather reports, road condition reports, position reporting, safety logging, message handling, breakdown assistance, access to medical advice, and emergency communications. The network also provides extensive road condition reports and outback safety information via its website at www.vks737.on.net. The site also features many links to outback-related websites.

Land access consultation procedures for research purposes

It is important to conduct research activities in a way that:

- ensures that the appropriate land users, owners, lessees, and government authorities are consulted so that statutory and other requirements are known;
- respects the rights, cultural beliefs, and relevant concerns of all parties having a particular interest in the area;
- complies with all legal requirements;
- protects the natural and social environments affected;
- minimizes environmental impacts;
- ensures land affected by research activities is rehabilitated appropriately.

Therefore, it is very important to contact the land holder or land manager before accessing land in Western Australia for research purposes.

Sources for approval or advice and relevant contact information are provided in Table 1 and Appendix 1. For a particular area, accessing an area for research may require approval from a land manager along with advice from indigenous interests and tenement holders. Those who may need to be consulted include:

- land owners or land managers;
- native title representative bodies;
- mineral or petroleum tenement holders.

Land, mineral, and petroleum tenure, and native title claims are clearly shown on MPR's TENGGRAPH digital mapping system, which can be accessed online at www.mpr.wa.gov.au. To access the system you will need to register with MPR at the above web location. This is a free service and you will be provided with a userid and password, which will allow you to access the TENGGRAPH system and download reports.

Land interests

The need to contact relevant land users or managers extends across a range of interest groups including those who:

- own or are given management responsibility for the land (land tenure);
- hold mineral or petroleum tenements (mineral or petroleum tenure);
- represent native title interests or are responsible for Aboriginal heritage sites (indigenous interests).

These interests are shown on MPR's TENGGRAPH digital mapping system at www.mpr.wa.gov.au.

Land tenure

Of all land in Western Australia:

- 7% is private land;
- more than one-third is held under pastoral lease;

- one-third is vacant Crown land;
- 16% comprises reserves (including those for the benefit of Aboriginal people, conservation reserves, and national parks).

Of all reserved land in Western Australia:

- 40% is controlled by CALM;
- 51% is set aside for the benefit of Aboriginal people and vested in the Aboriginal Lands Trust (there is ongoing transfer to the local Aboriginal communities);
- the remainder is controlled by local governments, State government authorities, and private organizations (e.g. church and community groups), or is 'unmanaged' (under Department of Land Administration control).

Leasehold land

There is a range of leases over crown land, with the most common being pastoral leases, for the grazing of sheep and cattle. In addition there are leases for use by Aboriginal people, and leases for tourism, industry, residential, commerce, and farming.

Indigenous interests

Native Title is recognized in Australia as a form of indigenous land title that can exist across a range of other land and resource tenures. It exists in accordance with the laws and customs of indigenous people where:

- those people have maintained their traditional connection with the land;
- their title has not been removed by a law or other action of government (such as a grant of freehold title).

The State is working with Aboriginal representative bodies (namely the South West, Goldfields, and Yamatji Land and Sea Councils, and the Kimberley, Pilbara, and Nganyatjarra Land Councils), the claimants, the Native Title Tribunal, and the Federal Court to finalize claims as quickly as possible.

In addition to the often-extensive Native Title claims there are sites of particular significance either to current Aboriginal people or archaeological sites that record evidence of past occupation and endeavour. These are usually very localized. It is an offence to knowingly disturb sites without approval. The management of reserves and special purpose leases for the use and benefit of Aboriginal people is being progressively transferred from the Aboriginal Lands Trust to the relevant Aboriginal community.

Mineral and petroleum tenure

Western Australian laws provide that under certain circumstances, mineral or petroleum titles can be granted over all land tenures and areas of native title. Because of the potential for research activities to coincide with exploration and development activities, it is desirable to consult with tenement holders regarding proposed research activities that may involve the area of a tenement.

Consultation

Private land

For accessing private land, the permission of the landowner is required (even though tracks may be shown on maps of the area, you should not use them without permission).

Pastoral leases

The permission of the pastoralist is required to access pastoral lease land. Refer to the White Pages website www.whitepages.com.au and check for the pastoral lease (listed as a business) or refer to the Pastoralists and Graziers website at www.pgaofwa.org.au for details on how to contact the pastoral lessee.

Any person entering a pastoral lease for research needs to give the pastoralist prior notification in order to ascertain whether that person's presence will interfere with the pastoralist's activities (e.g. mustering operations). Any access without approval of the pastoralist is illegal (even though tracks may be shown on maps of the area, you should not use them without permission).

It is important that a mutual understanding or 'good neighbour policy' be adopted. This is necessary to satisfy concerns arising from the location and type of the proposed activity that may affect any pastoral improvements or disturb pastoral programs with respect to rangeland regeneration or livestock, and so on. Do not camp near livestock watering points, and leave all gates as you find them.

Reserves

To access reserved land, the permission of the land manager is required. Details are normally available through relevant websites (Table 1). The land manager of a reserve (e.g. CALM) has to be satisfied that proposed research activities in sensitive environments are in accordance with the management objectives and protection of these areas.

Indigenous issues

The majority of Western Australia is under Native Title claim or determined Native Title. In addition there are heritage sites that should be respected. To ensure that Aboriginal people are aware of your activities, it is best to contact the Native Title representative body for the area.

Sensitive issues

Do not assume that you can work wherever you choose. Access to some field areas is highly sensitive, and may involve political issues at State or Federal level. Identify potential access issues well in advance, and be aware of any particular management issues or locations you cannot enter.

Please respect local concerns about possible disturbance. Both pastoralists and Aboriginal communities express dismay at the mess made by some geologists through indiscriminate hammering. Try to cause as little damage as possible when collecting and leave sites tidy. Do not hammer faces that will carry scars for many years. In particular, remember that many prominent outcrops are part of local indigenous mythologies. Major watercourses may be viewed as pathways followed by Dreamtime ancestors, so outcrops marginal to rivers may be particularly significant.

Concern is often expressed by indigenous people about bits of the land being taken overseas, so minimize collecting. Photography can also be an issue; many Aboriginal people do not like to be photographed, or there may be constraints on photographing certain rock faces. Taboos can be broken if photos are published and become available to those with no right to see them.

The GSWA liaises with local Aboriginal communities before beginning field projects, and discussions in this context follow a series of guidelines. We are anxious to maintain the goodwill that has been built up through discussion and personal contact. Please do not create problems for other scientists by insensitive attitudes.

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Appendix 1

Contact details of relevant organizations

State organizations

Department of Mineral and Petroleum Resources (MPR)

Mineral House
100 Plain Street
East Perth, WA 6004
Australia
Telephone: +61 8 9222 3333;
Information Centre: +61 8 9222 3459
Fax: +61 8 9222 3444
Website: www.mpr.wa.gov.au
Email: webmaster@mpr.wa.gov.au

Geological Survey of Western Australia (GSWA)

Department of Mineral and Petroleum Resources
Mineral House
100 Plain Street,
East Perth, WA 6004
Australia
Telephone: +61 8 9222 3222
Fax: +61 8 9222 3633
Website: www.mpr.wa.gov.au/geology
Email: publications@mpr.wa.gov.au

Department of Conservation and Land Management (CALM)

Western Precinct Technology Park
17 Dick Perry Avenue
Kensington, WA 6151
Australia
Telephone: +61 8 9334 0333
Fax: +61 8 9334 0466
Website: www.calm.wa.gov.au
Email: info@calm.wa.gov.au

Department of Land Administration (DOLA)

1 Midland Square
Midland, WA 6056
Australia
Telephone: +61 8 9273 7373
Fax: +61 8 9273 7666
Website: www.dola.wa.gov.au
Email: mailroom@dola.wa.gov.au

Curtin University of Technology (CUT)

Department of Applied Geology
Hayman Road
Bentley, WA 6102
Australia
Telephone: +61 8 9266 7968
Fax: +61 8 9266 3153
Website: www.curtin.edu.au/curtin/dept/geology
Email: ilabrooy@info.curtin.edu.au

Main Roads Western Australia

PO Box 6202
East Perth, WA 6892
Australia
Telephone: +61 8 9323 4111
Fax: +61 8 9323 4430
Website: www.mainroads.wa.gov.au
Email: dac@mainroads.wa.gov.au

The University of Western Australia (UWA)

Department of Geology and Geophysics
35 Stirling Highway
Crawley, WA 6009
Australia
Telephone: +61 8 9380 3838
Fax: +61 8 9380 1380
Website: www.geol.uwa.edu.au
Centre for Global Metallogeny: www.cgm.uwa.edu.au
Tectonics Special Research Centre: www.tsrc.uwa.edu.au
Email: general.enquiries@uwa.edu.au

Pastoralists and Graziers Association of Western Australia

1st Floor, Pastoral House
277 Great Eastern Highway
Belmont, WA 6104
Australia
Telephone: +61 8 9479 4599
Fax: +61 8 9277 7311
Website: www.pgaofwa.org.au
Email: pga@pgaofwa.org.au

Western Australian Museum

Francis Street
Perth, WA 6000
Australia
Telephone: +61 8 9427 2700
Fax: +61 8 9427 2882
Website: www.museum.wa.gov.au
Email: roz.brown@museum.wa.gov.au (Collections Management)

Western Australian Police Department

Command and Land Operations Unit,
Police Academy
Joondalup, WA 6027
Australia
Telephone: +61 8 9301 9776
Website: www.police.wa.gov.au
Email: webmaster@police.wa.gov.au

Western Australian Tourism Commission

GPO Box X2261

Perth, WA 6841

Australia

Telephone: +61 8 9220 1700

Fax: +61 8 9220 1702

Website: www.tourism.wa.gov.au

Email: welcome@tourism.wa.gov.au

National organizations

Australian Customs Service

Customs Information Centres

Telephone: 1300 363 263

from anywhere within Australia for the cost of a local call, apart from mobile phones.

Telephone: +61 2 6275 6666 from outside Australia

Website: www.customs.gov.au

Email: information@customs.gov.au

Environment Australia

Movable Cultural Heritage Unit

Identification and Conservation Branch

Environment Australia

GPO Box 787

Canberra, ACT 2601

Australia

Telephone: +61 2 6274 1810

Fax: +61 2 6274 2731

Website: www.ea.gov.au/heritage/awh/movable/index.html

Email: movable.heritage@ea.gov.au

Geoscience Australia

GPO Box 378

Canberra, ACT 2601

Australia

Physical location:

Cnr Jerrabomberra Avenue and Hindmarsh Drive

Symonston, ACT 2609

Australia

Telephone: +61 2 6249 9111

Fax: +61 2 6249 9999

Website: www.ga.gov.au

Email: ref.library@ga.gov.au

The Australian National University (ANU)

Research School of Earth Sciences

Institute of Advanced Studies

The Australian National University

Mills Road

Canberra, ACT 0200

Australia

Telephone: +61 2 6125 3406

Fax: +61 2 6125 0738

Website: www.rses.anu.edu.au

Email: Administration.RSES@anu.edu.au

Geology Department

The Australian National University

Mills Road

Canberra, ACT 0200

Australia

Telephone: +61 2 6125 2056

Fax: +61 2 6125 5544

Website: geology.anu.edu.au

Email: geology@anu.edu.au

The VKS-737 Radio Network

Telephone: +61 8 8287 6222

Fax: +61 8 8287 1255

Website: www.vks737.on.net

Email: info@vks737.on.net

Appendix 2

Conditions for the loan of palaeontological material, including type specimens

Palaeontological material, including type specimens may be borrowed from the Geological Survey of Western Australia (GSWA) under the following conditions:

1. All loans are at the discretion of the Director. Loan conditions may be varied to suit individual loans provided the variations are documented on the accompanying forms.
2. Material is loaned to institutions and not to individuals.
3. Material must be sent either by courier or registered post.
4. Primary type specimens, that is holotypes, paratypes, syntypes, lectotypes, and other illustrated specimens, may be loaned only to institutions in Australia. Period of loan is initially for one month. The loan can be extended for a longer period on request, but the length of the extended loan should be agreed and a loan modification issued. The borrower must provide adequate, preferably fireproof, storage for the specimens.
5. Other material (non-type or illustrated registered material) and bulk macrofossil material is loaned to institutions anywhere in the world for a period of six months in the first instance.
6. Bulk microfossil or palynomorph-bearing samples (including cuttings and conventional cores, but excluding all material held in the GSWA Petroleum Relinquishment Collection) that will be destructively treated, are loaned on condition that duplicate samples of any preparations are given to GSWA. Material is loaned to institutions anywhere in the world for a period of six months in the first instance.
7. No material may be transferred to other borrowers without the consent of the GSWA, and the issuing of a modified loan form.
8. All subsequently designated type specimens or illustrated specimens must be repositied in the GSWA Fossil Collection. An assigned registered number should be obtained from the GSWA Fossil Catalogue. Details of the repository must be cited in relevant publications.
9. Copies of any publications and reports (including confidential reports) arising from the study of material on loan should be sent to the GSWA.
10. The borrower should sign the transmittal form that accompanies the loan and return it to GSWA; signing of this form will be deemed an acceptance of all conditions outlined above.

Appendix 3

Conditions attached to the sampling of cores and cuttings from drillholes in State acreage

Samples of cores and cuttings may be borrowed from the Geological Survey of Western Australia (GSWA) under the following conditions:

1. All sampling is to be supervised by a GSWA Officer and is subject to the availability of material.
2. Samples from any one core are not to exceed 150 g and cuttings samples are not to exceed 10 g.
3. Samples from cuttings must be representative of the total sample (i.e. selective sampling of particular lithologies is not permitted).
4. All remaining core material not destroyed or used in analysis must be returned to the GSWA Core Library within 12 months of the date of sampling.
5. All data (including any slides prepared) and a copy of the final report are to be forwarded to GSWA within six months of the date of sampling. This report should contain both basic data and a discussion of the results. In addition it shall be bound, properly titled, and shall state the approval number.
6. Results from the study will, unless otherwise approved by the Department, be made public six months from the date of sampling.
7. Before leaving the GSWA Core Library, you shall give the Curator a detailed list of the samples taken from each well and the purposes for which they were taken (e.g. geochemistry, palynology, petrophysics, etc).

In addition, where approval has been granted to sample a well, but sampling has not taken place, please indicate this on the sample summary sheet.

Appendix 4**Conditions attached to the loan of palaeontological material
from petroleum exploration wells located in acreage
subject to Western Australian State petroleum laws**

Samples of palaeontological material may be borrowed from the Western Australian Department of Mineral and Petroleum Resources (MPR) under the following conditions:

1. Loans are initially for a period of two months unless other terms are agreed to. This loan period may be extended upon application.
2. The Department reserves the right to recall any material at short notice.
3. A report containing both basic and interpretative results of any examination of palaeontological material should be submitted to the Department as soon as possible. The report should be bound, properly titled, and should state the Approval number. It will be placed on open-file two years after the material is made available.
4. Holotypes and paratypes of any new species described from the material are to be repositied with the Department.
5. In the case of residues and undigested sidewall cores, any slides or other preparations made from this material, as well as unused residue and sidewall core, are to be returned to the Department.