



 Newsletter of the Science & Information Division, Department of Conservation and Land Management

Volume 1, Issue 4

Jul/Aug

Edition date 4 Jul 95

 Edited by Ray Wills & Patrick Pigott
 WA Herbarium, PO Box 104, Como WA 6152
 ph (09) 334 0500, fx (09) 334 0515
 email rayw/patrickp@herb.sid@calm

Next deadline

Wed, 30 Aug 95

EDITORS' NOTES

Along with the financial year, *SID NEWS* farewells a number of SID staff who have had a long involvement with the Division and the Department. Short toasts to Stan Bellgard, Brett Glossop, Rob Buerhig, Felicity Bunny, Wayne Hanks and Michelle Lathwell are included below. Good luck to all. And we welcome Jane McRae joining the Woodvalians.

Contributions for each issue should be submitted by the last Wednesday of the 2 month period of the issue. Next Deadline: Wed, 30 Aug 95. Any suggestions to improve content or style are welcome.

rayw & patrickp@herb.sid

DIVISIONAL NOTES***Management team meeting (7 June)***

SID News is still not being supported adequately, yet many complain about a lack of communication. If you do not think this is the best medium to improve communication, or the wrong type of things are being communicated, then make some suggestions!

- (*Inputs have not really improved - we still needed to do a lot of goading [def. goad, n. & v. t. Spiked stick used for urging cattle; thing that torments, incites or stimulates] - please help on this. Thanks - eds*)

SIMC carried out a spot of omphilopsycation (*we think that means something about navel gazing, but meant very respectfully - eds*) at their recent special meeting with an analysis of the achievements (and non-achievements) of the past year. Section Managers have been asked to think about this and add any more to the list. Ian Abbott has put together a list of potential high priority projects, and has asked SMs to augment this and to prioritise projects in their Sections. Please let SMs know if there are any (new) projects which you feel should be a high priority

Jim and Ian expressed some concern at the verbose nature of some SPPs in the WASPP data base, especially in relation to the aims and outcomes sections. These need to be succinct to allow direct transfer to biennial reports. Many rather waffly SPPs were not streamlined in the initial rush to get them approved after the change in SID structure, but in future SPPs will need to be brief and to the point.

The Integrating Themes which were put together late last year were also discussed, and SIMC has decided to support three of these at present: viz. Landscape

Management in the Wheatbelt (Grant Wardell-Johnson); Fire Web (Neil Burrows); and Sustainable Utilization - Jarrah Forest (Gordon Friend). These three co-ordinators have been asked to provide reasonably detailed costings for the various projects within these themes, before the package is presented to the Corporate Executive.

The idea of having regionalised meetings which address a particular theme of interest to the Region and which involve relevant SID staff and Regional and District staff was supported in principle, though the problems of logistics and expenses inherent in formalising the scheme were significant. As a compromise, Jim suggested having such meetings as part of the initialization of each of the three integrating themes, once they are approved by the Corporate Executive (see above).

The 1995/6 CRF budget is a 2% cut over last year's budget. The Divisional operating budget for 95/96 will be communicated to Divisional staff by the end of July.

The next meeting will be held in late August.

Plagiarised from notes by gordonf@wood.sid

Group notes***BIORESOURCES GROUP******Survey On, Dudes***

Members of Community Resources have been roving far and wide lately. The zoological component has just returned from the Carnarvon Basin, preceded by the "wets" in a rather dry phase and to be followed by the plant people when spring blossoms. Next the write up!

ANCA is funding surveys of the Little Sandy Desert and the Pilbara uplands, fortunately in a bonzer year for Steve van Leeuwen.

The Swan Coastal Plain survey roles along. EPA has given interim protection to communities identified as extremely threatened, and most of the remaining areas on the east of the plain (98% cleared). The data is being used as an integral part of DEP's (Dept. Environmental Protection) update of System 6. DEP are also helping fund the next phase of the volunteer survey program (which was a finalist in the Banksia Awards this year). ANCA funding has been obtained to complete the species reservation status, in 1995-96. The AHC (Australian Heritage Commission) is funding preparation of another 9 area reports, and the Museum in fauna studies. When all these data are combined in cyberspace, the answer to flora conservation will undoubtedly be 42!

Biogeographical Regionalisation

ANCA published the IBRA (Interim Biogeographical Regionalisation for Australia) in May. This now provides an agreed format across Australia for Bio-regional zones. WA is based largely on John Beard's work, but with three added areas (Ord-Victoria-NE Kimberley, and two other interzones in the South-Yalgoo and Hampton) and a simpler nomenclature (ie: North Kimberley vs Gardener). Members of the program especially Norm McKenzie were heavily involved in the process and a poster is in preparation by Norm and Grant Revell.

gregk@wood.sid

BIOCONSERVATION GROUP

Natasha Baczocha is working on an ANCA funded project on dibblers with Gordon Friend. Trapping has been carried out on the south coast at Cheyne beach, Two Peoples Bay and in the Fitzgerald River National Park with no dibblers found so far. The drought last summer may partly explain the lack of captures. Trapping on Boullanger and Whitlock Islands has revealed that animal numbers are still OK although there is some concern over the high numbers of house mice discovered. There are plans to establish a captive colony at Woodvale in the near future with animals coming from the islands.

gordonf@wood.sid

Centre notes

COMO

Disease workers expire

Felicity Bunny and Stan Bellgard have finished their contracts with SID.

Felicity joined CALM in 1986 as a Technical Officer working with Joanna Tippet on a range of pathogens. With the completion of her MSc in 1990, Felicity won a position as Research Scientist on an ALCOA-funded project examining the interactions of forest management with *Phytophthora* invasion of jarrah tissues. The project finished in June 1992, and she went on to investigate the biology of *Phytophthora citricola* on funded by MERIWA. With the finish of that contract, Felicity will complete her PhD in plant pathology at the School of Biological Sciences at Murdoch University.

Stan Bellgard had two stints with CALM - he joined briefly as Technical Officer in 1988 working with Geoff Stoneman. He went on to do his PhD at the University of Wollongong from 1989 to 1992 on mycorrhizae and came back to CALM in 1992 after he'd finished. He took up a contract as a Research Scientist to work on an ANCA-funded position studying *Phytophthora megasperma*. Stan has a part time lectureship with University of Notre Dame Australia.

We wish Felicity and Stan all the best in their endeavours.

rayw@herb.sid

DWELLINGUP

Rob Buerhig has gone

Rob Buerhig has retired from CALM after nearly twenty years of service. We wish him well as he manages his rural retreat in the North Dandalupian Highlands.



Rob is well known to many for his enthusiastic sponsorship of the thesis that everything that happens is determined by geology.

He was also one of the "A Team" based at Dwellingup. This tightly knit group of field officers roamed the area between Collie and Mundaring carrying out Dieback Hazard surveys in the early 1980's. Stories told at his farewell BBQ on 16 June suggested that surveying data wasn't the only material collected in those years!

Syd Visits SID Dwellingup

Executive Director Syd Shea came to town on Monday 19 June to welcome the recent intake of new Forest Officers. The officers have begun the new Skills-Based Training Program based in the old Cadet School at Dwellingup.

In the afternoon Syd addressed CALM's Dwellingup employees in the new gymnasium. Syd's "State of the Conservation Nation" presentation included comments on the benefits of the past two years of reorganisations and present constraints on CALM operations.

Between speeches Syd had time to visit some old research sites near Dwellingup. Two of these sites may be included in an educational Forest Walk being developed in conjunction with the soon to be opened Forest Heritage Centre.

The "sand pit" is an excavation undertaken in the 1970's to examine the effect of *Phytophthora cinnamomi*-caused root death on tree health. The pit, the tree and the roots cut to simulate *P. cinnamomi* damage are still there and illustrate how well adapted jarrah's root system is to the nutrient and (periodically) water deficient WA environment.

The "Helms Lines" are part of the many kilometres of forest transect surveyed during Depression Era. Along the lines can be found the stumps of trees removed in the first cut (1915), culled as waste (1930s, 1995), severely damaged or killed in the Dwellingup Fire (1961), drowned under the South Dandalup Dam (1965) and harvested for power poles (1981) or mill timber (1994/5).

After all this a 2.1 km section of 10 m wide transect contained 806 trees in 1993 (up from 162 in the virgin forest) with virtually the same cross-sectional area of stems as in the virgin forest (30.2 and 31.9 m² ha¹ respectively).

Compare this with the changes which have occurred to the woodlands of the wheatbelt over the same period.

Stuart Crombie

HARVEY

Resignation of Research Scientist Brett Glossop

After four years with the Forests Department and nine years with CALM, Brett Glossop has decided to move into the private sector. Brett has spent five years as a technical officer at the Dwellingup Research Station working in forest hydrology, jarrah silviculture and computing. In 1987 he transferred to the Wood Utilisation Research Centre (WURC) where he worked as a technical officer in timber seasoning and developing process control systems for the WURC's research kilns. In 1989 Brett was appointed as a research scientist and continued working in timber seasoning, developing drying schedules for regrowth jarrah, karri, marri and WA. grown Tasmanian blue gum. With the need for hardwood sawmillers to value-add timber products, CAIM encouraged the use of solar-assisted kilns to dry timber.

Over the last four years Brett has liaised with sawmillers and other customers on design, controls, data logging equipment, drying schedules for solar assisted kilns and he did the hands-on commissioning of approximately 20 solar assisted kilns built around Australia.

Brett has made many friends and colleagues while working at WURC. The staff and employees at the WURC wish him well in his new career, where he will be managing the Ringfab Dryers Division for the Ringfab Group.

Kristy Brittain's at International Dragon Boat Regatta

Kristy Brittain is member of the WURC team involved with VALWOOD ® production. When she is not gluing boards or dressing timber she is out on the Leschenault Inlet paddling for the Worsley Aluminators Dragon Boat Club. Recently Kristy competed in an international regatta in Penang where her team the Worsley Aluminators won the mixed open and mixed corporate divisions, which is a great achievement(s) as they were competing against teams from Hong Kong, China, Singapore, Malaysia, and other Australian teams. Kristy plans to continue paddling for the Worsley team this summer and next year hopes to return to Penang and retain both titles. Well done Kristy

Gary Brennan

HERBARIUM

Resignation of Wayne Hanks

Wayne Hanks joins private enterprise in July. He leaves after 11 years with CALM. Wayne started as a forest worker and moved to WURC as a Technical Officer a couple of years later. In Jan 93, he transferred to work at the Herbarium with RT/ISS. Wayne is off to work for The Net Effect, a computer networking company that specialises in Banyan Vines. The Herbarium had a "Tie Day" to farewell Wayne - everyone came suitably 'a-tie-red' to give Wayne a fore-taste of the likely dress requirements in the new job! Good luck Wayne.

rayw@herb.sid

WAHERB

The WAHERB database and related Texpress databases on the Herbarium's SUN are once again operational after a very successful visit by the Knowledge Engineering consultant. Some of the benefits of the work done during this period will be immediately apparent as faster query response times and more reliable queries. Others will become apparent over the next few weeks as we refine the new interfaces to Texpress datasets via the CALM Web, ARCView2 GIS software, and other applications such as Access.

alex@herb.sid

New consultant position at the Herbarium

Diana Papenfus has been appointed on a 12 month contract (beginning July 1995) to survey, determine the conservation status and provide management recommendations for priority (poorly known) conservation flora primarily in the Moora District, Swan Region, Central Forest Region and South Coast Region.

Diana will be based at the WA Herbarium, but spend a great deal of time out in the field. Please make her welcome.

vickih@herb.sid

Workplace Agreements

The Herbarium JCC has been in recess awaiting the outcome of CALM's Enterprise Bargaining process, which looks now to be settled union by union. Recently after informal discussions on workplace agreements, Peter Heslewood from HRB was asked to talk to interested staff. Many questions were raised and as a result of this meeting a number of Herbarium staff have signed a six month workplace agreement.

patrickp@herb.sid

MANJIMUP

Michelle Lathwell resigns

Michelle Lathwell has resigned from CALM having been on 12 months maternity leave since July 1994. A long-standing identity at Manjimup since 1985, Michelle was responsible for administration functions at the Centre and more recently for administration of the Sustainable Resources Group.

She also shared in the work of organising the 1987 National Fire Workshop in Busselton and the 1993 Landscape Fires Conference. On behalf of all SID staff, we thank Michelle for her substantial contribution over the years and wish her well for the future.

Safety

After more than five years as safety co-ordinator for SID Manjimup, John Rooney has relinquished this task. John's ability and interest in occupational health and safety are widely acknowledged in CALM. SID Manjimup thank John for his efforts to provide a safer working environment over the years. A new safety co-ordinator is now being sort.

Workplace Agreements

After a long delay awaiting the outcome of CALM's Enterprise Bargaining process, the Manjimup JCC is to meet again on 3 July. Despite the disappointing outcome so far, most JCC members consider that the committee

can continue to play a constructive role in the the management of the Centre.

For Sale

A number of items considered surplus to requirements at Manjimup have been identified. Most of it is junk, but some of it may be just what you are looking for. Watch the email over the next couple of weeks for details.

lachie@manj.sid

WOODVALE

New Appointment

Jane McRae has started with Tony Friend as a Technical Officer. Jane will be preparing illustrations for an ABRF-funded project on the taxonomy and phylogeny of the terrestrial amphipods of Australia. Jane is on a 12 month contract. Her most recent employment before joining CALM was on a study of polychaete worm taxonomy at the Australian Museum.

kylied/tonyf@wood.sid

SPECIAL ANNOUNCEMENTS

Kingston Block Research

Logging is now completed on all of the Kingston block experimental sites. The post-logging trapping has started. A number of the marked animals are still present, and appear to be feeding in the logging coops but living in adjacent buffers. A number of deaths have occurred post-logging - these appear to be mainly a result of predation by foxes and cats.

A workshop will be held later this year with the Districts and other operations groups to inform them of the results of the study.

gordonf@wood.sid

PUBLICATIONS

Albany DRF

Wildlife Management Plan No. 20 (Robinson & Coates, "Declared Rare and Poorly Known Flora in the Albany District) has recently been published.

The Plan states overall priorities for management and research of Declared Rare Flora, targets certain Priority taxa for urgent survey and highlights threatening processes such as *Phytophthora* dieback, invasive weeds, etc.

Breaking with tradition and to accommodate its large size, this 615 page Plan was published in a ring folder format using thick paper for strength. This format should make the Plan quite a versatile document; users being easily able to add their own notes, photographs, etc. or even remove those parts of the Plan of interest to them.

vickih@herb.sid

Landscape Fires '93

The proceedings of the Landscape Fires '93 conference held in Perth in September, 1993, was recently published as Supplement 4 to CALMScience. Copies will be mailed to all conference delegates. The proceedings is

being widely publicised nationally and internationally; enquiries about the publication should be directed to Lachie McCaw or Joanne Elliot at Manjimup, or Marianne Lewis at Como.

lachie@manj.sid

THOUGHT FOR THE DAY...

If you're not as confused as I am, then you obviously don't have a good grasp of the complexity of the problem at hand.

FORTHCOMING SEMINARS

Botany Dept., UWA Seminars

10 Jul 95 (Mon) 4 pm in Top Floor Seminar Room

- Prof Margaret Cully Biology, Carleton Uni, Canada. *How do real roots work.*

17 July 95 (Mon) 4pm

- Assoc Prof Sid James, Botany, UWA. *Paradigms and othe misapprehensions in plant evolution.*

24 July 95 (Mon) 4pm

- Dr Neil Emery, Botany, UWA. *Phenotypic plasticity in alpine and prairie ecotypes of *Stellaria longipes*.*

Conservation Biology Discussion Group

2nd Tuesday of the month, 5.30 pm at University House, UWA.

11 Jul 95 Greg Keighery and Neil Gibson *Species and Community Conservation on the Swan Coastal Plain*

8 Aug 95 Grant Wardell-Johnson (to be confirmed)

Contact: Kristina Lemson, Botany, UWA

Kings Park Research Seminars

13 Jul 95 (Thu) 12.10 pm, Kings Park Lecture Theatre

- Bob Dixon. *Weed control in Kings Park Bushland.*

27 Jul 95 (Thu) 12.10 pm

- Dr Kathy Meney. *Seed bank dynamics ... in population fluctuations.*

Royal Society of WA

17 Jul 95 (Mon) 8pm at Kings Park Lecture Theatre.

- Annual General Meeting

Presidential Address by Dr D. I. Walker.

21 Aug 95 (Mon) 8pm.

- Dr John Scott, CSIRO Entomology. *Biological control of weeds.*

SOCIAL

Wine Club

SID Wine Club is held on the last Friday of each month. Non-members welcome (\$5 per head); please notify me no later than the Thursday before Wine Club. Hosts, dates and venues for the next two Wine Clubs are:

- Dave Coates, Andrew Brown, Anne Kelly on 27 Jul at the Herbarium

- Neil Thomas, Paul De Tores, Greg Keighery on 25 Aug at Woodvale

davec@herb.sid

USE OF HYPOTHESES IN THE SCIENCE AND INFORMATION DIVISION

Ian Abbott

"The hypothesis is the principal intellectual instrument in research" - WIB Beveridge

The following comments are presented to stimulate discussion amongst science staff in SID on the important topics of clear formulation of hypotheses, the rationale behind the null hypothesis, and the significance of testability, objectivity and rigour.

Hypothesis literally means 'lesser proposition', embodying the ideas of tentativeness and uncertainty. Hypotheses represent mental maps of how we think aspects of nature work. They can vary in quality from the pedestrian to the completely novel, a new way of looking at some aspect of the world. Hypotheses are important because if they are testable they guide our collection of data. This serves to minimize expensive and time-consuming gathering of inconclusive or irrelevant data.

Generation of hypotheses is subjective; where highly so it may represent a profoundly imaginative and truly creative act. This is the bold conjecture that tends to elate (the "Eureka" phenomenon). The testing of hypotheses, on the other hand, has to be truly objective. Who would wish to waste their time continuing to embrace an hypothesis without trying to find out whether its basis is true? Moreover, if we don't attempt to find out its scope and weaknesses, our professional competitors will!

Over the last decade or so it has become fashionable for scientists and philosophers of science to claim that there is no single method of science. I agree with this in the sense that doing science is not like following a recipe to bake a cake, but in a more profound sense the claim seems wrong. Several centuries of scientific endeavour have shown that the so-called hypothetico-deductive method of discovery is highly effective - it works; it exposes error; it saves time and money; and it minimizes dogmatism. Moreover, it is widely recognized to have a logically impeccable foundation thanks to the attention given to it by illustrious philosophers such as Whewell (last century) and Popper (this century).

The essence of Popper's viewpoint (as given in, for example, his book *Conjectures and Refutations*) is:

- Take note that truth is not manifest and is not easy to come by. Imagination, trial and error, the gradual discovery of our prejudices, and critical discussion are essential ingredients in the search for truth.
- Distinguish science from other intellectual endeavours by the criterion of empirical disproof - a scientific hypothesis must be able (at least in principle) to be found wrong by experiment or observation.
- Comprehend the essential idea or concept - arguments about words and their meanings become insignificant and distracting.
- Do not evade criticism or look for verifications or confirmations but instead seek crucial tests or refutations, ie tests which could refute the hypothesis under test.
- Accept that an hypothesis can never be established. No test is final or conclusive.
- Realize that the more an hypothesis forbids, the more it tells us. Thus the hypothesis All swan species are white would if true convey more than the hypothesis Some (or most) swan species are white.
- Be self-critical. Ask 'under what conditions would I admit that my hypothesis is untenable?' ie what conceivable facts would I accept as refuting or falsifying my hypothesis?
- Recognize that progress in science consists of moving towards hypotheses and theories which explain more and

more. Scientific progress is not the accumulation of observations but the overthrow of less adequate hypotheses by better ones (ie hypotheses of greater content).

- Realize that there is no induction, because universal theories are not deducible from singular statements. But they may be refuted by singular statements, since they may clash with descriptions of observable facts.
- Accept that our knowledge grows through trial and error. Therefore, consciously search for our errors and eliminate them.
- Realize from the history of science that there have been many more incorrect hypotheses than correct ones.
- Be objective - ie justify your preference for a hypothesis on the basis that it has stood up to refutation and criticism better than its competitors, and certainly not on the basis that it is your hypothesis or that you would like it to be true or that you think it will be good for society!

The null hypothesis (ie that X and Y are not different or that A does not cause B) is of great importance. In statistical analysis, one computes a statistic and the corresponding probability of a more extreme value (as in a t-test, for example). One tries to strike a balance between committing so-called type I and type II errors (ie falsely rejecting a true null hypothesis vs failing to reject a false null hypothesis). A type II error perpetuates ignorance whereas a type I error results in a false positive; this probably accounts for the attention given by scientists to levels of significance (usually $\alpha = 0.05$) rather than statistical power (β).

In logic, only one counter example suffices to disprove a null hypothesis, whereas thousands of confirmatory examples can never prove an hypothesis, eg contrast 'The swans of Europe and Australia do not differ in colour' with 'All swans are white'. Moreover, the second hypothesis is confirmed by seeing a white swan and logically is equivalent to "All entities which are not white are not swans". Seeing a sparrow therefore, paradoxically, confirms that all swans are white!, as made by someone living in Europe. Likewise, it is logically more defensible to propose and test "Prescribed burning of jarrah forest in spring does not spread *Phytophthora* fungus"(A) rather than "Prescribed burning of jarrah forest in spring causes the spread of *Phytophthora* fungus"(B). If the evidence collected does not refute (A), then we do not need to consider (B). It does not make logical sense to not formulate (A) and instead to proceed directly to attempting to test (B).

This initial formulation and testing of the null hypothesis as a foundation of scientific inquiry seems to be analogous to the presumption in criminal law of innocence until guilt is proven. In our preparation of Science Project Plans, should we state explicitly the null hypothesis as part of the Aim of the project?

I would be most interested to hear other's views on the above and on any related issues, including:

- How are hypotheses used in taxonomic studies?
- What hypothesis is being tested in monitoring?
- Is there a more intellectually superior instrument than the hypothesis in research?