Water Resources Monitoring and Assessment Information Systems

Information requirements, inadequacies, planned developments, issues, and recommendations

For improved monitoring and assessment information systems for water resources management

Revised with input from 24 Feb 2000 workshop

Distributed at second workshop - 17 March 2000

MAIS project – phase 2

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1 Resource Status Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
1.1 Hydrology				
HIS WR90 Stored outputs from systems and operations models Weather Bureau METSIS (Rainfall) IFRs Telemetry system for flood control WHYCOS Dam Monitor –(not well known) HYDAC DAM DTM – (not well known) DAM WATCH CCWR Catchment studies Data bases maintained by other organisations (see list at end of tables)	Data on low flow hydrology is inadequate Data, including abstractions, not measured at all required sites Measurements not accurate through entire range of flows, particularly higher Wide area rain measurements (storms) often unreliable No info on relationship between snow, ground water and surface runoff (Western Cape); No direct access to Weather Bureau data Info for future projections not electronic & on databases Meta data of hydrology data not available Outputs from systems and operations models not generally / easily accessible Rainfall data not always accurate in mountainous areas	D: Hydrology is investigating the adequacy of hydrological monitoring D: Hydro will investigate use of River Forecast system in 2000 Water Management System (WMS) is being expanded to also provide relevant hydrology information Web based flood/incident reporting developed by Emergency Disaster Management Committee Water Balance Model	High cost of hydrological monitoring Regions do not have hydrological assessment tools required for water resource management Regions do not have tools required for managing the operation of hydrological monitoring programmes Regions do not have access to skilled staff to perform hydrological assessments Locations of hydrological monitoring sites are not appropriate for all required assessments Data recorders subject to loss from vandalism and natural events – chart recorders can be lost for most of the recording period without being known Patched and naturalised flow not readily available Development of database structures for water related information	Provide highly skilled water resource expertise to improve turnover time on requests for information Incorporate flow data into WMS and thereby facilitate the use of flow and quality data Use flood telemetry systems for routine data collection so that it is maintained on an ongoing basis and therefore operational when floods occur Develop systems to project water availability in the long term and provide early warning of threats of droughts Decide what types of tools are used for what type of assessment. Examine international standards, relate them to the South African context, and develop SA standards for all aspects of hydrological assessment – especially monitoring sites (density/location) and frequency

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Studies at other orgs, eg WRC Disaster Management Centre WS-NIS	Regions need simple tools to evaluate water processes		The length of time between data capture and information access can be very long. Assessment tools must either be written in-house, which will require resources not currently available, or purchased from international sources, which has consequences in terms of costs (currency exchange), technical support, and integration with DWAF systems Unclear who is responsible for managing droughts and for determining information needs There is a need for inter-institutional co-operation by the organisations that collect and use hydrological information. Results of some hydrological assessments reside with consultants and are not easily accessible.	Continue evaluation and implementation of hydrological monitoring programmes Investigate the availability of technology to integrate information developed by separate organisations. Develop a training and capacity building programme to provide adequate hydrological capacity throughout all the water management areas Develop assessment tools and capacity for their use in Regions Push towards object oriented technology
1.2 Geohydrology				
National Ground water Data Base (NGDB); REGIS; RDP data from WS;	No links between surface and groundwater monitoring; Gathering data from consultants is difficult	Expanding Regis system country-wide in a phased approach NGDB migrating to a server	Aligning Regis system with SA eco-regions a major challenge Poor knowledge of ground water resources	Investigate the use of Regis as a general water resources management system (rather than only for ground water)

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Agriwater; Muniwater (GW module, Rainfall & Geochemistry) WISH (operational tool for geo-hydrology) Corporate GIS Maps: Aquifer Classification Hydrogeological Vulnerability Harvest Potential	Ground water data collected outside D:Geo-hyd does not reach NGDB	Using Regis to model flow and chemical quality in aquifers to establish reference conditions in each ecotype WRC project to define parameters needed for RDM to be included in ground water monitoring & assessment A strategy has been developed for a National Ground Water Quantity Monitoring System Certification of drillers is being investigated as a method to encourage better data exchange NGArchive being developed NGIS being developed for use in Regions SABS compiling national standards in co-operation with ground water community WISH being expanded to include assessment	Integration of Regis system used for groundwater monitoring & assessment with other DWAF systems perceived to be a major challenge Population of NGWIS begun relatively recently, so the historical data record is short Perception that geo-hydrological data is unreliable/inaccurate Negative perception of general public on reliability of ground water as a resource Models to link surface water and flow are not generally used	Include (and document) groundwater reference conditions in the classification of Ecotypes Ensure RDP data is channelled to NGDB Establish three levels of monitoring networks, National, Regional, Local Report current ground water resources status
1.3 Water Quality				
Water Management System (WMS)	Information on toxic substances is inadequate	A National Microbiological Monitoring Programme is being implemented	Unclear responsibility for initiation of new data collection efforts	Provide and widely disseminate reports of current water quality status

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Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
Reports on water resources investigations WaterMarque – assessment tool Generic 1st order reference system – Water Services LIMS (Laboratory Information Management System); PC-Polmon; Other organisationss, eg universities, Water Boards, ARC, DoH, DEAT	Radioactivity not generally measured Very little information on microbiological water quality; Poor info on nutrients; Degree to which current monitoring programmes address monitoring requirements of National Water Act have not been assessed Data on organic substances not readily available Appropriate links to borehole database Lack of info on estuaries	Catchment based radioactivity monitoring programme ongoing PC Muniwater – (POLMON and Waste Manager being incorporated into modules)	WMS not available to all yet All laboratories supplying DWAF information systems with data need to be accredited Design and implementation of monitoring programmes has not been systematically applied during the development of procedures to support the NWA Cost of monitoring, especially for toxicity and microbiology Existing national networks need to be rationalised and focused towards supporting resource status reporting requirements Limited capacity in specialists fields Incorporation of data recorders at flow gauging sites is resulting in a decrease in frequency with which water quality samples are collected	Expand the national water quality monitoring programmes to include monitoring of additional constituents required for implementation of NWA (e.g. toxic substances, nutrients and system variables) Develop assessment strategy
1.4 Aquatic Ecosystem Health				
River Health Database (UCT); Reports on special studies;	No national program and infrastructure for monitoring status of aquatic ecosystem health	The National River Health Programme is currently being expanded to all provinces	Present state of the river needs to be described at a consistent level for the entire country	Capture IFR data on WMS Incorporate River Health database in WMS

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Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
Corporate GIS IFR studies Other organisations, eg Universities, Water Boards, ARC, DEAT Eco-region maps – RDM office	Eco-region information not yet detailed enough for comprehensive RDM River health monitoring not yet done country-wide	Development and implementation of the River health database	Additional data are needed to describe river characteristics adequately	Make additional data gathered on catchment characteristics accessible
1.5 Class / Reserve / Resource Quality Objectives				
RDM studies through RDM office Catchment studies	Information required to determine comprehensive RDM is not readily available; RDM information not accessible through an information system; RDM information available for only a few sites; No formal programme to monitor / audit compliance to RQO's currently exists RQO's are not set	RDM office plans to develop a system to capture RDM information; RDM office plans to develop spatial presentation of ecotype descriptions backed by intelligence to describe expected occurrences for that ecotype; There is a process on the go to develop capacity in SA for performing RDM determinations	Cost of full reserve determination is very high in terms of financial input and skilled understanding Experience in determining the Reserve limited to a small number of individuals Potential legal challenges to classification decisions require access to all data used in decision-making Format of output from RDM process not widely known Unclear responsibility for initiation of new data collection efforts Volume and varied locations of data used in RDM determination increases the importance of the rapid development of an information system for information retrieval	Develop system for storage of "grey literature" as a matter of priority Design and implement a RDM module into WMS Design and implementation of RDM related monitoring programmes must be integrated with national monitoring programmes There is a need to publish a "State of South African Water Resources" report at regular intervals Develop criteria to audit compliance with reserve

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1.6 Other data collected by other organisations For example; land cover; geology; topography, etc				
Dept of Agric. Agricultural Research Centre (ARC) Surveys & Mapping DEAT Stats-SA Consultants Council of GeoScience Web based access to other data ReGis (land cover) US Geological Survey (USGS) PLAN database (not user friendly) Others	Shortage of rainfall data Incompatibility between GIS systems of different departments Lack of appropriate liaison and co-ordination with data collection – national, provincial and other organisations	National Spatial Information Framework – Dept of Land Affairs Update of National Land Cover Database being investigated SA-Integrated Spatial Information System (SA-ISIS) system framework for web based access to multiple data is being established	Use of satellite derived land cover/use data Rainfall data not patched and distributed because there has been no broad agreement on the procedures to use for patching Inconsistencies in spatial references used for spatial data	Liase with other organisations to understand their current projects and plans in terms of water development Develop a prototype GIS system to help neighbouring local institutions to exchange information Establish agreements with external organisations to share data Introduce an integrated reference system for referencing spatial data Form syndicates with other government departments to pay for cleaning up data Participate in initiatives of other organisations to facilitate coordination, for example, NSIF, SA-ISIS

2 Water Demand Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
2.1 Demographics				
Water Services –National Information Systems Statistics-SA Corporate GIS Environmental Management Framework from DEAT Universities	Other data collection procedures, for example for census, are not designed for DWAF requirements	Water Services initiatives	Population estimates perceived to be largely inaccurate Water Services Development Plans provide only about 20% of information required by Water Demand Stats SA data has long delays before publishing	Re-organise existing demographic data to fit DWAF needs Liase with other organisations to make water resource management information needs better known and to improve accuracy of data collected
2.2 Socio-economic information				
WSDPlans D:WR Planning Corporate GIS Stats-SA Monitoring &Evaluation System – Water Services Schemes & projects database – Water Services Guideline framework for development of a Catchment Management strategy WRC project output Universities	Reserve Determination produces some info on socio-economic goals, but does not allow for consideration of opportunity costs of interventions No source of generally used data Water Balance Model short of some socio-economic data		Data/information requirements are often project specific and require specialist input to acquire and analyse data Some socio-economic parameters are difficult to incorporate into information systems Catchment-based water resources planning will require more detailed socio-economic information than what is currently available Strategic Environmental Assessment Decision Support System developed for allocation decisions provides for socio-economic data	Develop a water balance model for each catchment where major development and investment decisions have to be taken. Investigate sources of socio-economic data

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2.3 Chemical characteristics for specific water requirements				
Water quality guidelines Resource Quality Objectives (RQO's)	Not electronically accessible	Development underway to establish RQO's		Make water quality guidelines electronically accessible
2.4 Waste standards				
WMS; Published as a regulation Waste Manager	Effluent standards have not been revised to consider currently available technology	Effluent standards currently being revised by D: WQM		Include whole effluent toxicity testing in waste standards
2.5 Management Practices – e.g. Water use efficiency				
Local and inter-national literature	Little systematic implementation of local guidelines Management legality	Benchmarking studies planned in D:WC/DM on water use efficiency and conservation practices Development of sector specific strategies will identify required activities and help structure data collection Water Management Plans will be submitted by sectors and will correspond in format to Water Services Dev. Plans.	Development of Best Management Practices requires understanding of specific technologies Acceptance of BMPs by the user community requires good communication between the developers and the community Lack of baseline information on which to base estimates of water savings implies that the baseline information must be collected while assessing compliance Need to improve the understanding of rainfall/runoff relationships with reference to a variety of crops Waterlit pricing structure is a problem	Resolve the apparent conflict between WS-GIS architecture and Corporate GIS architecture

3 Water Use Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
3.1 License – administrative who; where; how much, etc				
Water Legal system [Water Reg] MUNIWATER Water Administration System (WAS) WaterRight PERMEX – Register of WQ permits Water Use Registration Mgmt System (WURMS) Deeds Office Survey and Land Information WSDPs	Historical permits/licences information stored on paper copies and filed The electronic files that are in place are in disparate formats and data bases Significant backlog of data to be captured in electronic format; Incomplete records on existing water use (information available only w.r.t. requirements of 1956 Act); Spatial information related to water use coming in from external sources, e.g. Survey and Mapping, are not correct	Water Use Authorisation & Registration Management System (WARMS) WARMS phase 2 includes financial components and links to other data	Capturing of historical permit information into electronic format needs to be planned and implemented. Interfacing with other government departments data bases is necessary (eg Deeds) Information related to licensing needs to be available to all users. There is a backlog of data that may not be captured before the set period.	Implement WARMS in all Regional Offices as soon as possible Design and use interim systems while broader and more complex are being designed and tested Develop systems in small modules that are readily usable, then consider incremental improvements Make WARMS information available through the Internet and in paper format to ensure access to all users Interface WARMS with WMS
3.2 Evaluation of use				
Use status information Municipal Water Database (MEO) Assessment of the impact of use, e.g. EIA, EMPR, EMP, SIA, RAP PC Muniwater (Sup/use) in development	Lack of models and tools to effectively evaluate impacts of use Lack of primary data describing human impact No uniform approach to dealing with water use Cost/benefit analysis	Procedures for impact assessments to support license application Procedures based on Strategic Environmental Assessments Procedures to assess Stream Flow Reduction Activities	No integrated evaluation and assessment of impact process exists Different directorates use different approaches in dealing with water use Supporting information must be well prepared before meeting with public stakeholders	Develop integrated evaluation and assessment processes and procedures Facilitate integration of WARMS with the WMS and other identified evaluation systems Investigate and establish mechanisms for consensus building and data sharing

3 Water Use Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
Provincial Assessment Studies (Planning)	Monitoring and auditing of water use	A mechanism for considering licence application requirements (Section 27) has been developed – J Perkins Water Balance Model	Data and information on which decisions are made have to be accepted and agreed upon No overall strategy exists to deal with use at a fine detail	around data / information and public participation Set up a programme to facilitate info sharing with other institutions in the license approval process
3.3 Waste disposal info (land)				
Waste Manager Local authorities PC Muniwater (waste manager module)	Assessment tools to incorporate land use impacts into status description not generally available Solid waste related information currently not available on WMS	Incorporation of solid waste info on WMS planned	Responsibility for maintaining information on solid waste between DWAF and DEAT not clear. Presumably DEAT is developing a solid waste information system?	
3.4 Compliance				
PC-POLMON Water Care Works PROBOS (Afforestation Permit System) has been placed by SFRA water use licensing system DEAT legislation (NEMA)	Updating of POLMON information is problematic No system to monitor compliance with quantity of water use Compilation of a consolidating EIP/EMP Electronic incorporation of data from regional offices Auditing of compliance to licence requirements is limited	Incorporation of PC Polmon, Water Care Works, Waste Manager into the WMS Monitoring of effluent discharge is taken Information on compliance is already in WMS ?DWAF Western Cape? busy compiling a consolidating EIMP for DEAT as required in NEMA WARMS SEA DSS – Strategic Environmental Assessment : Decision Support System	Confidentiality criteria of data needs to be clearly defined Monitoring programmes to audit compliance with licence conditions are limited only to effluent discharge	Undertake implementation of WMS in all Regional Offices as soon as possible Develop appropriate monitoring programmes to audit compliance with all licence conditions

4 Institutional / Administrative / Legislative Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
4.1 Water and related Legislation / policies **For example:** **· DWAF Directorates Policies standards and procedures** **· Policies on the establishment of Catchment Management Agencies, including, for example, organisational design of CMAs** **· Status of institutional transition and development** **· International protocols and agreements**				
DWAF Internet and Intranet Hard copies distributed through Government Printer PC Docs Paper copies of communications are currently filed in some offices using the Section16 / 1 filling system according to the archives law which controls registry. Reserve determination documentation Hard copy documents within DWAF directorates Joint basin commission meetings DEAT Spreadsheet project tracking system DoH	The web is not accessible to the majority of people Electronic and personal communication, no systematic storage procedures No systematic approach to store information on procedures as they are developed Directorate policies/procedures not easy to trace for those outside specific directorates Process for establishment of a CMA - guidelines Guidelines for pubic participation in CMAs Guidelines for establishing new Water User Associations (WUAs) Guidelines for transformation of irrigation boards to WUAs Overarching policy on CMAs	Communication facility has been approved by IS and Integrator Reg Admin System (RAS) – Western Cape Requirement to have stakeholders participate in decision making	The policy development process was well supported by DWAF, but the implementation process is not well integrated. There is currently a need to audit activities such as EIA, EMPR, SIA, EMP, RAP etc, however there are no electronic records of information submitted by applicants or records of recommendations by other departments who are stake holders in the process Regions do not have procedures for the establishment of local institutions Current database on the mainframe, probably not a desirable platform No systematic tracking of progress on the transformation of irrigation boards. Records of proceedings and decisions in hard copy files	Develop a departmental database which will have policy documents pertaining to various activities, for example, policy on bottled water Integrate policy implementation activities Develop a protocol for the establishment of CMAs that uses IT to facilitate and track Generate reports on the institutional interrelationships as determined by the various Acts and policies Liase with neighbouring countries to encourage exchange of data Make SADC protocols available on the web. Create a Southern African Water Information Network (see GWP)

4 Institutional / Administrative / Legislative Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
Dept of Agriculture	No database on international agreements		CMAs will need access to international agreements and DWAF policy Government database is not easily accessible to public because of security reasons	Encourage data swaps with other departments Save the record of decision as described in Section 27 of the NWA electronically and integrate with WMS
4.2 Stakeholders / participation / organisational design of CMAs				
Water Services NIS WMS CSS Minutes of interdepartmental (Nat & Prov) and public participation meetings SEA DSS supports a stakeholder database	WS databases concerned with information relevant to WS stakeholders only There is no provision, at this time, to incorporate certain data in WMS Roles & relationships among institutions in water mgmt areas Numerous disparate stakeholder data bases throughout DWAF and consultants	The SEA process provides Advisory Committees with info for decisions on licensing allocations SEA procedures include an Advisory Committee that is a mix of government and private initiatives (free market principles) Policy guidance is being developed in the SEA process to establish criteria for determining stakeholders	There is a great need for integration of disperse information especially in areas of public participation CSS data needs a lot of cleaning up and upgrading Advisory committees are intensive on capacity, costs, admin, and organisation, but achieve phenomenal integration on decisions for licences due to co-operative governance. Records of minutes, participation, and actions must be accessible	Develop a uniform public participation process and capture related documentation on who is involved in forums Develop a financial system to track financial management in CMAs Develop an easily accessible (Web-based) data/document retrieval system for capturing and disseminating information pertaining to stakeholder interaction. Ensure involvement of stakeholder. Need to take ownership of aspects of monitoring
4.3 Boundaries				
Surveyor General DWAF Corporate GIS Cadastral maps WMS	Some data still in hard copy, Some info. Not spatial Current GPS system not widely used	Initiatives have been taken to develop standards – eg Dept of Land Affairs National Spatial Information Framework SA Converting to new co-ordinate system (WGS 84)	Surveyor General data is patchy and difficult to use Surveyor General data is costly Lack of standards is delaying development	Link WARMs licensing system to the land parcel and deeds information Encourage the conversion from a Cape datum to a WGS84 system

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			Integrator has not had any impact on the process of standardisation	Use property as the basis for information capture
4.4 Land ownership				
Title deeds from Registrar of Deeds An appreciable amount of information resides in indi-viduals and is not recorded or systematically managed	Data has to be corroborated with cadastral maps Sometimes GIS co-ordinates (longitude and latitude) do not match	Land Affairs is beginning to develop standards	Some data still in hard copy Government owned land not registered Servitudes information not always updated on time	Link land parcel (property code) to servitudes register and water use register

5 Infrastructure Information				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
5.1 Water Infrastructure **For example - location of dams, pumps, canals, gate,; valves, water pipelines, etc**				
Corporate GIS PLAN DB Water Services - National IS Water Services Development Plans (WSDP) Civil design information Survey Register System (SRS) – indirect source Reservoir Capacities and Silt Surveys (SlikDB) Dam Safety Permits Flood Control System Written reports – indirect source Geographical infrastructure Network – WS Vodacom	"As-built" not always surveyed All water infrastructure not captured Local authority distribution systems not known Lack of required info on water infrastructure for disaster management purposes Inadequacy of PLAN DB	Ongoing accumulation of data from other sources in Corporate GIS	Accurate information on existing construction not always available; Co-ordinate system for locating, eg, pumps, may not be consistent with other spatial co-ordinates Responsibilities and jurisdiction may not be clear in all cases – eg; does DWAF need or want to know about the local authorities water distribution system?	
5.2 Other Infrastructure **For example – roads, bridges, railways, towns & cities, power lines, telephone lines, servitudes**				
Corporate GIS; Written reports; WS NIS LIS (Geomatics) ESKOM	Lack of knowledge of data capture activities nationally/ provincial/ local levels	GIS developments in provinces Common GIS standards Preliminary metadata standards in place via NUS	Some data are used only during specific incidents, such as floods or chemical spills. Should that data be stored at DWAF? Reference co-ordinate systems are not all compatible	Establish agreements with organisations responsible for strategic infrastructure information (eg ESKOM and local authorities) to ensure mutual access to the latest information when necessary. Establish agreements with Departments responsible for

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				infrastructural development to address the following two main issues: (a) Impact of the infrastructural development on the water resource (b) Potential for mutually beneficial monitoring mechanisms to be established

6 Information on status of DWAF projects and initiatives				
Info systems / Sources	**Adequacy / gaps**	**Current / planned developments**	**Issues**	**Recommendations**
6.1 What data are available?				
Directorate business plans – available from D: Strategic Planning Access to non-codified knowledge through personal networks and existing library systems; Catchment Study reports SEA Methodology and Logical Framework analysis from Water Utilisation Monitoring & Evaluation – Water Services Geomatics Intranet home page for spatial data inventory	No comprehensive data library – no meta data of attribute data held by DWAF Multiple formats and sources of data requiring specialist knowledge to access Lack of co-ordination of data acquired and/or purchased Lack of a central data base to track ongoing projects and their products Catchment studies do not all conform with data acquisition & dissemination standards No national data exchange standard	Establishment of a centre for disseminating spatial information. WMS is establishing a tool box of assessment techniques Scientific Services investigating mechanisms to interface data with modelling functionality Water Services propose to establish Regional Information Centres which will catalogue and disseminate available information Water Conservation Information Centres proposed (industry, mining, power generation strategy)	Need communication within DWAF and relevant stakeholders on what projects and initiatives are ongoing or being planned and where; No single entity responsible for co-ordination and collaboration between related projects and initiatives; No common interface to access data on projects and initiatives; Problems with data acquisition related to confidentiality Cost of some spatial data sets, like land use, aerial photography, etc	Establish an information co-ordination centre for water resource information Develop a common interface that will allow access to data bases and evaluation tools WEB access and reporting of data and information should become established practise Clarify legal requirements re: data & info and initiate a process of establishing contracts with data providers
6.2 What projects are ongoing				
Project Administration System (IS Project Office) Directorates business plans International Liaison's Projects Tracking System	No centralised system tracks projects	Establishment of an IS Service Project Office to support planning and control of projects. Establishment of a Customer Service Centre to deal with problems, faults and service requests Establishment of an IS Operations and Maintenance Service	No central, comprehensive, management software accessible to all resource managers.	Establish a water resource information projects office and ensure accessibility to information Establish a corporate projects database Link registration of projects with financial management Encourage Web reporting

6 Information on status of DWAF projects and initiatives				
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		Water Resources Planning making studies available in electronic format SEA (Water Utilisation) will provide strategic info to assist CMAs in establishing CM Strategies and Plans		Ensure compliance of all catchment studies with data acquisition standards and make results available in standard electronic format. Data acquisition standards and reporting formats must be incorporated into DWAF tenders and contracts
6.3 Funding Sources/ Financial Models				
Access to non-codified knowledge through personal networks and existing international initiatives DANCED, EU, USAID, DFID, SIDA, NORAD, IUCN, WWF, OTHER CD: International Projects is responsible for donor liaison and programme identification	Lack of knowledge of funding opportunities	A number of internationally funded projects are underway	More effective communication on funding opportunities is required Significant delays are incurred before funding becomes available No comprehensive system for tracking financial management Commercial framework for access to data/info	Identify and fund priority monitoring and information related projects. Identify international funds targeted for monitoring and information related projects
6.4 Liaison with monitoring and information organisations, internationally and nationally				
SADC, WMO, SA-ISIS USGS, GEMS NASA State of the Environment Reports OTHER	Significant lack of liaison and co-ordination with organisations that collect data including local government	International protocols to be addressed, for example Agenda 21 RAMSAR SADC	Numerous data collection and dissemination activities are ongoing which could provide a significant amount of information. Lack of participation and communication in these processes excludes the Department from benefiting.	Increase participation in national and international organisations, e.g. through joint projects

7 General

Information sources - additional sources added at the workshop on 24 Feb – they would apply in many information categories

Data bases maintained by other organisations include

- Provincial departments of Agriculture
- Local government
- Deciduous Fruit Board, KWV, (quantity of water)
- Water Boards
- Metropolitan Councils
- Municipal records (databases?)
- Regional and town planning departments
- Tertiary Education Institutions
- ARC (Institute for Soil, Climate & Water)
- DoH - Department of Health
- DEAT – Department of Environmental Affairs and Tourism
- CCWR – Computing Centre for Water Research
- ESKOM
- Telkom
- Spoornet
- USNOAA – United States National Oceanic and Atmospheric Agency
- WRC project results
- Council for Geoscience
- Water Care Programme conducted by CSIR
- Deeds Office
- HSRC – Human Sciences Research Council
- Waterlit

Other databases maintained by DWAF include

- Corporate GIS
- Dam Safety Office
- Locality System

Recommendations

1 Establish an independent water information standards authority

2 Establish a web-based yearly planner of projects : who, what, when and where – this allows linkages and coordination within and beyond DWAF – can help prevent stakeholder burnout

Add to “Preliminary list of detailed data and information” Under

3. Demography
   - Levels of water and sanitation services

4. Ecological
   - Aquatic weeds
   - Species diversity

8 Acronyms in the table

ARC – Agricultural Research Council
BMP – Best Management Practice
CCWR – Computing Centre for Water Research
CM – Catchment Management
CMA – Catchment Management Agency
CSS – Central Statistical Services
DAM DTM – Dam Digital Terrain Mapping
DAM WATCH –
DANCED – Danish Co-operation for Environment and Development
DEAT – Department of Environmental Affairs and Tourism
DFID – Department for International Development (UK government)
DM&EA – Department of Mineral and Energy Affairs
DoH – Department of Health
EIA – Environmental Impact Assessment
EIMP -
EIP –
EMP – Environmental Management Plan
EMPR – Environmental Management Programme Report, required by DM&EA
GEMS – Global Environmental Monitoring System
GIS – Geographical Information System
GPS – Global Positioning System
GWP – Global Water Partnership
HIS – Hydrological Information System
HYDAC – Hydrological Data Capture System; hydrological digitising
IFR – Instream Flow Requirements – estimate of water needed to maintain aquatic biota
IGS – Institute for Groundwater Studies, Univ of Orange Free State
IS – Information System
IUCN – World Conservation Union
LIMS – Laboratory Information Management System
MEO - …? Municipal Water Database
METSIS -
NASA – National Agency for Space Administration
NEMA – National Environmental Management Act
NGDB – National Ground Water Data Base
NGIS – National Ground Water Information System
NORAD – Norwegian Agency for Development
NSIF – National Spatial Information Framework
NWA – National Water Act
POLMON – Pollution Monitoring System – software system for storage of effluent quality data
RAS – Reg Administrative System
RDM – Resource Directed Measures
RDP – Reconstruction and Development Programme
REGIS – software system developed in the Netherlands, currently under investigation for its application in South Africa
RQO's – Resource Quality Objectives
SA-ISIS – South African Integrated Spatial Information System
SABS – South African Bureau of Standards
SADC – Southern Africa Development Community
SEA – Strategic Environmental Assessment
SEA DSS – Strategic Environmental Assessment: Decision Support System
SIA – Social Impact Assessment
SIDA – Swedish International Development Agency
SRS – Survey Register System
UCT – University of Cape Town
USAID – United States Agency for International Development
USGS – United States Geological Survey
WARMS - Water Use Authorisation & Registration Management System
WC/DM – Water Conservation/ Demand Management
WHYCOS – World Hydrological and Climate Observation System; WMO, UN, EU, SADC,
WISH – Water Information System for Hydrologists; developed at IGS, UOVS
WMO – World Meteorological Organisation
WMS – Water Management System – software tool for water management
WQM – Water Quality Management
WR – Water Resources
WR90 – Water Resources 90 – set of naturalised flow estimates
WRC – Water Research Commission
WS – Water Services
WS NIS – Water Services – National Information System
WSDP – Water Services Development Plan
WUA – Water User Association
WURMS – Water Use Registration Management System
WWF – World Wildlife Fund