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The Committee Secretary
Standing Committee on Science and Innovation
House of Representatives
R1 Suite 116
Parliament House
Canberra ACT 2600

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Honourable Members,

Submission to the Inquiry into the coordination of the science to combat the nation's salinity problem

Thankyou for the invitation to make a submission to this inquiry. Sinclair Knight Merz is an active participant in the salinity industry and we welcome the opportunity to further contribute to this important issue.

Summary of our submission

Sinclair Knight Merz is a professional service firm that provides science and engineering services to the salinity and natural resource sectors. We generate science concepts and knowledge, as well as implement concepts developed elsewhere in the industry working closely with community groups. We believe that this gives us a sound basis to offer the following submission.

The comments in this summary are discussed in full further on in the submission.

Use of the salinity science base

- Access to all relevant information is a key part of ensuring that appropriate technology is used to combat salinity. We suggest that management of knowledge in the grey literature, to make it accessible to researchers and managers alike, is a key task that has not yet been effectively undertaken.
- In the interests of making rapid progress in fighting salinity, catchment groups should be allowed the ability to promote and undertake work on issues in parallel with other catchment groups. Whilst some duplication of effort towards particular problems may arise, this is outweighed by an improvement in the rate of development overall and particularly a much greater likelihood of acceptance of results by the local group.



- Significantly more resources need to be devoted to building networks and structures to preserve data and knowledge through organisational change. Whilst work is currently being done in this area, we believe that more is needed.
- The Commonwealth can play a key role in facilitating collection of and access to data on fundamental catchment parameters. Such a role can also assist the promotion of transparency in the fundamental science used to develop management options.

Linkages between those conducting research and those implementing salinity solutions

- Significantly more allowance needs to be made in research and investigation activities for the researchers to meet and get to know the communities in which their work will be used. This may require a change in the incentive structure for researchers and consultants to favour the adoption of research rather than the generation of knowledge *per se*.
- It is unlikely that there will be a quick fix approach to salinity. It is important that knowledge and science is developed in each priority area to meet the needs of that area. Whilst some techniques may be common across some areas, universal application of individual techniques must be avoided. To do this successfully will require strong links between catchment communities and the researchers who are working on the problems that are particular to that area.

Adequacy of technical and scientific support

- There are insufficient skilled technical and scientific support people to meet the current demands in the salinity field. It will be a number of years before this can be addressed through training and on the job development. In order to attract and retain suitable people in the industry more certainty in ongoing research and support is required. The burden of training and development should not fall on traditional research groups alone, but needs to be taken on by the whole industry. Scientific and technical support can be provided by both the private and public sector.
- Government's role in salinity management is as an investor, on behalf of the people of Australia. With growing pressure on how funds are allocated, demonstrating the return on the investment is paramount. We believe that the way in which natural systems are monitored and evaluated does not reflect this way of thinking, with outmoded approaches that gather data, but do not provide knowledge about how the investment is performing. Monitoring and evaluation needs to be restructured based on outcomes, not just data collection.



About Sinclair Knight Merz

Sinclair Knight Merz is a long established independent professional services firm with a team of 3500 people in offices in major business centres across the globe. We have provided services in salinity and natural resource management for many years. A short summary of our firm is provided in Attachment A.

Detailed Submission

Use of the Salinity Science Base and Research Data

A broad range of groups has undertaken salinity research and investigation over the years. Government departments and private firms have combined with the more traditional research bodies such as universities and CSIRO. As a result, much of the salinity science base and fundamental data is not "published" in the formal sense of the word. Significant bodies of knowledge are located in what is referred to as "grey literature". Such material includes departmental reports, consultant's reports and the like. Being dispersed in a variety of obscure sources provides an enormous barrier to entry for people wishing to become conversant with research and investigation relevant to their particular problem. This leads to considerable inefficiency as valuable information and ideas are often overlooked.

Sinclair Knight Merz believes that access to all relevant information is a key part of ensuring that appropriate technology is used to combat salinity. We suggest that management of knowledge in the grey literature, to make it accessible to researchers and managers alike, is a key task that has not yet been effectively undertaken.

In an attempt to maximise efficiency in science research and investigation, funding bodies have generally discouraged competition in research areas. There is a view that competition equals duplication, and that this is inefficient, so competition is discouraged. Such practices tend to provide a bottleneck to innovation and adoption. It is widely recognised that there is no single solution to salinity problems across Australia. Reviews of the National Dryland Salinity Program phases I and II have identified the difficulties of broad scale application of all but the most general principles. Each catchment group will need to innovate and customise ideas from research as well as undertake their own research. This points to the need for a number of different groups all working in parallel on the issues relevant to each catchment or priority area. Multiple processing is faster than serial processing and will lead to quicker solutions. Whilst such an approach of competing teams and parallel activity has a risk of some



duplication, the benefits of increased rate of development and adoption outweigh these. In addition, ownership of results is much greater if research and investigation has been undertaken within a catchment area. So that even if the wheel is invented twice in two different areas, local ownership of each "wheel" is much greater if it is seen as directly relevant to the local community.

Sinclair Knight Merz believes that in the interests of making rapid progress in fighting salinity catchment groups should be allowed the ability to promote and undertake work on issues in parallel with other catchment groups. Whilst some duplication of effort towards particular problems may arise, this is outweighed by an improvement in the rate of development overall and particularly a much greater likelihood of acceptance of results by the local group.

Institutional change is inevitable. Organisations, both public and private, change. Maintaining access to salinity knowledge in the face of rapidly changing organisations and personnel is a real challenge. But it is one that must be met head on. Salinity is a spatially diverse phenomenon. Data and knowledge of salinity must retain the context of the location from which it was derived. Management of the knowledge base to retain the data and knowledge and the context in which it was generated is a major challenge. Knowledge management structures are needed that can outlive organisations and individuals. This is not a new concept, but the challenge of managing the diverse sources of input and delivery is a challenge that may be greatest in the fight against salinity. Salinity management is an evolving science and art. The current management structures are most likely to change over time as lessons are learnt and priorities change. Making sure that the fundamental data and knowledge of how and where salinity occurs survives these changes needs more effort. Some efforts are being made to tackle this problem, but the scale of the issue dwarfs these efforts.

Sinclair Knight Merz believes that significantly more resources need to be devoted to building networks and structures to preserve data and knowledge through organisational change. Whilst work is currently being done in this area, we believe that more is needed.

The Commonwealth has an opportunity to provide resources to ensure that basic data and knowledge in catchments is readily available to those working in an area. A number of attempts have been made to provide a clearing house, or one stop shop for data or information (e.g. National Land and Water Resources Audit). To date these have not generally been aimed at researchers and they are usually limited in scope to a particular manifestation of salinity (dryland or irrigation). The Commonwealth can provide a leadership role in establishing and maintaining data and knowledge repositories that are freely accessible to all.



It would be highly desirable for certain core data sets to be made available for all regions. Such data sets might include information on various assets (e.g. biodiversity, water resources, land use), process understanding (e.g. Groundwater Flow Systems) and salinity hazard projections. Given variation in the sophistication of response to salinity across the country, these data sets may need to be prepared at different scales.

Data exchange protocols exist, but data can be difficult to access.

Sinclair Knight Merz believes that the Commonwealth can play a key role in facilitating collection of and access to data on fundamental catchment parameters. Such a role can also assist the promotion of transparency in the fundamental science used to develop management options.

Linkages between those conducting research and those implementing salinity solutions

Effective links between researchers and the community have been an issue for many years. Much good work on this issue has been done but there is still a lot to achieve. All groups that sponsor research and investigation have grappled with the obvious gap between the results of research and investigation and how this is applied in regions and by communities. We believe that it is all about people. By their different natures, research and land management attract two very different types of people. It takes time and effort to establish rapport and trust between two groups, especially when they have very different life views.

It is our observation that communication is most effective when knowledge generation is based on "grass roots" regional needs and when sufficient time is given for those generating knowledge to work with those who will use it. Almost by definition this is time intensive and seemingly inefficient. It requires commitment from researchers and research funders to ensure that regionally based research projects build capacity in regional stakeholders to understand, manage and report on regional issues.

We have observed that research projects usually allow insufficient time for both the engagement of end users, the communication of results and for ensuring that end users have the capacity to make use of the resultant information or technologies. This is due in part to financial pressures on researchers and their need to move on to the next field of research. Knowledge brokers are usually not effective in this role either, as they have to build and maintain trust two ways and do not necessarily have the skills themselves to interpret or help apply the information.

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Sinclair Knight Merz believes that significantly more allowance needs to be made in research and investigation activities for the researchers to meet and get to know the communities in which their work will be used. This may require a change in the incentive structure for researchers and consultants to favour the application of research rather than the generation of knowledge per se.

Salinity problems occur in ways that are as diverse as the landscape. There is not, nor is there likely to be, a single "quick fix" that will solve the majority of our salinity issues. Research and investigation are needed on a number of different fronts, each of which is attuned to the particular conditions of each catchment. Our view is that some recent approaches to understanding salinity issues have been oversold, in that they are marketed as providing "the answers" to salinity. Examples include airborne geophysical surveys (the "ultrasound of the earth") and the Groundwater Flow Systems (GFS) approach. Whilst these techniques are valid and can offer valuable knowledge in areas, they are either not universally applicable or only relevant to a certain scale. Effort needs to be made to ensure that appropriate science for each area is used. It is not the case that one form of "best" science can be used everywhere.

Sinclair Knight Merz believes that it is unlikely that there will be a quick fix approach to salinity. It is important that knowledge and science is developed in each priority area to meet the needs of that area. Whilst some techniques may be common across some areas, unthinking application of individual techniques must be avoided. To do this successfully will require strong links between catchment communities and the researchers who are working on the problems that are particular to that area.

Adequacy of technical and scientific support in applying salinity management options

Given the scale of the salinity problem in Australia and the rate of increase, it is not surprising that we observe a significant gap between the demand for experienced and trained support and the available resources. This can be corrected over time as long as career structures exist and salinity is seen as an area where people can work for the long term. We have observed too many cases where a promising person starts to develop skills in salinity, to find that the project that employs them is truncated or not renewed. These people do not always find a new position in the salinity industry, so skills are lost. We believe that a commitment to supporting long term research and investigation in salinity is essential. Salinity needs to be faced as a challenge in the same way that other major national resource needs have been faced. Training and development programs are required. To assist the purchasers of support services, some form of accreditation of support may be needed. We have often seen new graduates handed

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important research projects where they have little background and supervision is distant, perhaps in another State. When the long term sustainability of communities may hinge on the results of research we are selling the country short by such behaviour.

There has traditionally been a perception that catchment groups and state agencies had to have all the knowledge and expertise "in house". We need to move beyond this narrow view and recognise that both public and private sectors have much to offer salinity stakeholders.

Sinclair Knight Merz believes that there is insufficient skilled technical and scientific support to meet the current demands in the salinity field. It will be a number of years before this can be addressed through training and on the job development. In order to attract and retain suitable people in the industry more certainty in ongoing research and support is required. The burden of training and development should not fall on traditional research groups alone, but needs to be taken on by the whole industry. Scientific and technical support can be provided by both the private and public sector.

We are currently in an era of natural resource management that salinity has a prominent profile. Expectations of natural resource managers and the outcomes they will deliver are greater than ever before. These expectations have emerged over the past 5 years with the review of major funding programs and initiatives like the Natural Heritage Trust (NHT) and Landcare. Investment through these initiatives was made in a large number of relatively small projects, and it successfully triggered additional investment by landholders, community groups, regional organisations and State Governments. However, these projects often lacked agreed targets and monitoring programs, making it difficult to verify the extent of implementation and the associated outcomes.

Commonwealth and State Governments are now assuming the role of an 'investor' in activities to deliver environmental outcomes, where the activities are founded on good science and economics. This requires more rigorous planning, analysis of costs and benefits, and improved monitoring and reporting against agreed targets.

Within the new paradigm of NRM there is also a strong emphasis on adaptive management and integration – integration in the form of coordination and cooperation amongst stakeholders in planning and implementing NRM activities, and in the form responses to NRM issues.

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Sinclair Knight Merz believes that the Government's role in salinity management is as an investor, on behalf of the people of Australia. With growing pressure on how funds are allocated, demonstrating the return on the investment is paramount. We believe that the way in which natural systems are monitored and evaluated does not reflect this way of thinking, with outmoded approaches that gather data, but do not provide knowledge about how the investment is performing. Monitoring and evaluation needs to be restructured based on outcomes, not just data collection.

Thankyou for the opportunity to make this submission. We would be please to provide further information or detail on any of the points above.

Yours sincerely


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Not
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ATTACHMENT A - About Sinclair Knight Merz

Sinclair Knight Merz is a long established independent professional services firm with a team of 3500 people in offices in major business centres across the globe. We have provided services in salinity and natural resource management for many years.

We have significant resources, financial standing and technical capability, designed to provide clients with superior service.

From our offices we provide an extensive range of consulting services to national, provincial and local government departments and agencies, and to the broad spectrum of industry and commerce.

The firm employs professional engineers, planners, architects, economists, scientists, and project managers, along with technical and administrative staff.

Sinclair Knight Merz is a leading environmental consultancy, with a growing global environmental practice. We have qualified environmental scientists, engineers, planners, economists, hydrogeologists and social scientists with specialised skills in all facets of environmental management. Environmental management is the key to success in developing ecologically, socially and environmentally sustainable projects.

Our team provides services across a broad range of industry sectors:

- Environmental Science
- Environmental Planning
- Environmental Engineering
- Natural Resource Management
- Spatial.

Sinclair Knight Merz places an emphasis on ensuring that our environmental management team maintains up-to-date knowledge about environmental laws and regulations, current and emerging issues and environmental best practice. The quality of our environmental management team and our technologies place Sinclair Knight Merz at the forefront of our industry.

Sinclair Knight Merz has established itself as a reliable and reputable provider of independent scientific advice and is able to design and manage large multi-disciplinary scientific projects



with mostly in-house staff. Strong links with other scientific organisations (such as CRCs) enable the latest scientific methods and research to be incorporated into projects.

The Environmental Science Group at Sinclair Knight Merz works closely with other professionals such as Engineers, GIS Specialists and Economists to provide a full range of services to clients, including all levels of government and private industry.