WORKSHOP SERIES No. 12

WORKSHOP ON THE ROLE OF SCIENTIFIC SUPPORT CO-ORDINATOR (SSC) IN OIL SPILL RESPONSE

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FOREWORD

In 1973 the Australian National Plan'to Combat Pollution of the Sea by Oil came into effect, This Plan was established to draw together the resources held by states and the oil industry to respond to ship sourced oil spills. In setting up the national organisation, oil pollution committees were established in each state and the Northern Territory to provide planning and support to operations.

Membership of these committees consisted of a senior member of the state marine authority who carried the position of chairman and core membership from those organisations who were best placed to provide the expertise to support state plans. The one exception to this arrangement is in the case of Tasmania, where the state responsible authority is the Department of Environment

It was only after a number of years of the Plan's operation that representatives of state environmental authorities took up core membership of all state committees.

As development of State plans took place, so did the need become apparent for 'greater involvement of scientific support within the on scene co-ordinator's (OSC) organisation. Of necessity, the principal decisions to be made in respect of the response to an incident are made by the OSC. Clearly, the greater the awareness by the scientific support co-ordinator (SSC), of the needs of the OSC, the more effective will be the response and the impact of the damage on the environment will be kept to the minimum.

To achieve an optimum level of cohesion and greater understanding of the SSC role, it was decided to convene a workshop specifically to bring together people having these scientific support responsibilities.

This report is a summary and proceedings of the first of these workshops to be conducted in Australia. It is hoped that it will be the forerunner of a continuing program of the National Plan to Combat Pollution of the Sea by Oil.

Principal organisers of the workshop were Donald Brodie of the Department of Transport and Communications and Wendy Craik of the Great Barrier Reef Marine Park Authority.

Department of Transport and Communications
Canberra
May 1989

EXECUTIVE SUMMARY

Under the Australian National Plan to Combat Pollution of the Sea by Oil and various State and regional supplements, an extensive framework for oil spill response has been established. The National plan has been in effect since 1973. During that period there have been no major (on a world scale) oil spills in Australian waters. There have. however, been a number of minor spill incidents in ports and harbours and in coastal (territorial) waters. There have been very few incidents on the high seas.

Despite the low incidence of spills and the estimated low probability of major incidents, there is a strong case for preparedness. The Australian coastal zone and offshore waters are the focus of a wide range of uses, including fishing, recreation, tourism, urban and industrial development, agriculture, aquaculture/mariculture and conservation. Depending upon factors such as location, time, type and amount of oil spill, an incident could have significant economic and environmental consequences.

With this background, the Commonwealth Department of Transport and Communications, which is the co-ordinating agency for the National Plan, and the Great Barrier Reef Marine Park Authority, which has a special interest in environmental protection, arranged for a national workshop on the role of scientific advice in oil spill response. The workshop marked an important extension to previous training efforts under the National Plan, as it was the first time that the needs and implementation of scientific response had been addressed specifically. Under the National Plan framework and the various State and regional contingency plans for oil spill response, the role of Scientific Support Co-ordinator (SSC) is identified as a major element of the overall response organisation.

The workshop sought to provide for the exchange of information, both between SSC's and with others involved in a response team, notably the leader of the combat team, the On Scene Co-ordinator (OSC). The workshop also reviewed the current status of scientific preparedness in the context of contingency plans and provided for specialised training of SSC's in fields such as media relations and environmental monitoring.

Participants agreed that the workshop fulfilled an important training role, and should serve as a valuable reference point for further development of the role of SSC. Because of the limited resources available to State agencies responsible for implementation of the role of SSC, the sporadic nature of the oil spill threat and the low historical priority of scientific advice in spill reponse, the workshop highlighted the need for more "proactive" development of effective scientific response by State and regional SSCagencies. Major recommendations of the workshop directed

towards this need included:

* Information should be prepared on oil and dispersant toxicity and guidelines developed for their use under a range of conditions.
* There is a need to clarify and carefully evaluate the role of monitoring in spill response.
* Coastal resources atlases are an important tool and could be improved by the transfer of information to field usable micro-computer based systems.
* SSC's should articulate their abilities and concerns within a response organisation, particularly through improved communications with OSCs.
* There should be a follow-up workshop planned in which progress towards implementation of the recommendations of this workshop could be assessed and more selective training could be undertaken.

ACKNOWLEDGEMENTS

The Department of Transport and Communications and the Great Barrier Reef Marine Park Authority as co-sponsors of the workshop would like to acknowledge the assistance of all workshop participants in making the workshop a successful meeting. In particular the organisers would like to thank the guest speakers, Captain David Oliver, Ross Worrall, Ian Dutton, John Durham, Russell Colman and Captain Ken Ross. Special mention should also be made of the efforts of Ray Lipscombe from the Department of Transport and Communications who undertook much of the logistical organisation for the workshop.

The organisers would like to express their appreciation of the advice and support of the State oil pollution committees and Chairpersons and the Departments which employ designated SSCs in each state for their assistance in making staff available and providing support for their attendance.

Further information on any aspect of this report, or the workshop generally may be obtained from:

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1.1 Origins

The need for a workshop, or similar forum for discussion of the role of Scientific Support Co-ordinator (SSC), was identified initially during the preparation of REEFPLAN, the oil spill contingency plan for the Great Barrier Reef (a supplement to both the National Plan and the Queensland Supplement). During preparation of REEFPLAN, it became apparent that although the National Plan and State Supplements provided for the incorporation of scientific advice in oil spill response, the specific requirements of designated SSCs were unclear. In addition, it was evident that many agencies which may fulfil the role of SSC were not experienced in, nor sufficiently familiar with, the requirements for scientific advice, particularly during an actual response.

These problems were also identified and discussed informally during the two national conferences on oil 'spills in Australia (SPILLCON '85 and '87) and during the workshop on hazardous chemical spills in the Great Barrier Reef Region (Craik, 1985). As a result of these meetings, the Great Barrier Reef Marine Park Authority approached the Department of Transport and Communications to seek support for the organisation of a workshop specifically on the role of SSC. The Department then approached interested organisations, particularly State Committees to seek endorsement of the workshop proposal and input to the workshop programme.

The workshop was designed to complement and extend the other initiatives of the Department in training and response. The Department recognised the value of such a meeting in the context of overall training priorities, as scientific input to other training activities had been limited, partly because of inadequate understanding of how scientific advice could be effectively incorporated in the overall response framework. It was recognised at the outset that most value would be achieved therefore if the workshop was oriented specifically towards the support needs of the central figure in the response framework - the On Scene Coordinator (OSC).

1.2 Scope

Because of the precedent setting nature of the workshop and considerable investment of resources by all involved it was considered necessary to provide the opportunity for participants and support agencies to have'input into the workshop programme. This led to an expansion of the initial workshop program to include provision for consideration of specific issues of importance at the State and regional levels of

SSC role implementation (e.g. mapping).

The final workshop program (Paper 19, Section D) thus included both formal lecture and discussion sessions and informal sessions for information exchange and discussion. An important central theme of the workshop, also evident in the workshop objectives, was the need to direct all such discussion towards the information needs of the On Scene Co-ordinator. Participation in the workshop was restricted to those with direct operational responsibility for SSC implementation (all State SSCs) and those with particular experience in aspects of spill response of relevance to the role of SSC.

1.3 Workshop Objectives

The overall aim of the workshop was to define and evaluate the role of the Scientific Support Co-ordinator (SSC), with particular reference to the scientific support needs of the On Scene Co-ordinator (OSC). Specific objectives directed towards this aim included:

a. To provide a forum for the exchange of information between SSCs regarding scientific support in all phases of response organisation.

b. To explore lines of communication, organisation and information transfer within the context of the needs of the OSC and consistent with the provisions of the National Plan model.

c. To assist participants in becoming familiar with the nature and range of demands on an SSC and techniques for meeting those demands effectively.

d. To develop familiarity with prediction and monitoring techniques and an awareness of the strengths and limitations of existing approaches.

e. To undertake training exercises which improve participant understanding of the range and nature of environments at risk from oil spills.

f. To define further training and information needs and priorities for implementation of SSC responsibilities relevant to each State or Territory.

While these objectives are broad in scope, they reflect the perceived need for the role of SSC to be more fully defined if the National Plan model is to continue to be efficiently implemented. In particular they stress the nexus between the roles of SSC and OSC.

Throughout all workshop sessions, participants were therefore requested to be mindful of the requirements for fulfilment of these objectives.

Paper 2: Workshop Overview and Recommendations

1. Introduction

The incidence of oil spill events in Australian waters has historically been low. According to Kay (1987) the then Federal Department of Transport in 1986 received 142 reports of marine oil spills. Almost 90% of these occurred within ports and in 71 cases some type of clean up reponse was undertaken. The largest spill was 55 tons and the smallest estimated to cover an area of three by one metres. Kay reports that 1986 was not an atypical year and points to both the low historical incidence of major spills (greater than 100 tons) and the seemingly, disproportionate effort involved in response - less than 10% of spills are responsible for more than 80% of the total quantity spilled. According to a, risk analysis study undertaken in 198 1 by the Bureau of Transport Economics (BTE), Australia has a 40% chance of at least one spill per year which is greater than 20 tons and a 5% chance of one greater than 120 tons. The study noted, however, that over a ten year period there is a 40% chance of a spill greater than 120 tons.

Hawes (1987) noted that since the adoption of the National Plan to Combat Pollution of the Sea by Oil in 1973, the combined efforts of Federal and State governments and the oil industry have achieved a high level of national preparedness for dealing with both minor and major oil spills. As Hawes noted, there is, however, a strong case for both vigilance and for upgrading and improving the response capacity established under the National Plan.. He observed that the nature of the threat from oil, and other types of hazardous materials transported by sea, was constantly changing. For example, with the decline in production from Australian wells and increased reliance on imported oil products, the quantity of oil carried in Australian waters will increase and the nature of the potential impact will change (with different types of oils being introduced). Hawes also intimated that as with any contingency planning exercise there, is a constant need for "fine tuning"; the National Plan establishes a broad reponse capability which needs to be continually expanded and refined if an "optimum condition of preparedness" is to be achieved.

This workshop marked an important phase in the development of the framework for response to oil spills in Australian waters. For the first time since the inception of National Plan arrangements, the role and requirements of the scientific advice in the overall response effort were separately and specifically examined. While the National Plan and various supplements provide for the use of scientific advice in spill response, and a number of State and Commonwealth agencies have been involved in implementation of scientific aspects of contingency plans, there appeared to be a pressing need for these activities to be evaluated and co-ordinated if optimum future response efficiency is to be achieved. There was also a strong level of support amongst those involved at operational levels of plan implementation for the specific requirements of the role of SSC to be more fully defined and for important questions on information use and procedural requirements to be addressed.

The workshop was therefore intended to fulfil an important step in the ongoing evolution of National plan arrangements, particularly as there has historically (with a few exceptions) been little attention given to the role of scientific advice in the broader context of the National Plan.

This report summarises the principal areas of discussion during the workshop on aspects of the role of SSC. The discussion also includes the various recommendations made in relation to specific issues of concern. For certain specific items, more detailed background information presented during the workshop is included in later sections of these Proceedings. For convenience of reference, later sections are divided into:

* State Position papers - Section B, which outlines the experience of each agency currently designated as provider of an SSC, the framework for implementation of that role in the State or regional context, the costs and resources involved in that role and some further needs and directions identified to date;
* Information and discussion papers - Section C, which includes papers presented during the workshop by invited speakers. These papers were intended both to update participants' knowledge and to provide a basis for discussion; and
* Background and Reference Material - Section D, which includes some of the resource material used in, or derived during the workshop as well as reference material provided by participants which is considered to have a broad potential application.

The following discussion is divided according to the agreed main phases of scientific input to spill response of preplanning, response (operations) and follow-up. As may be expected, given the cyclical nature of these phases and the interwoven nature of activities in each phase (e.g. monitoring), there is some overlap between topics. This was considered unavoidable by participants and is partly overcome by the presentation of recommendations in a way which emphasizes the need for a holistic (c.f. reductionist) approach to the provision of scientific input.

2. SSC Role in Preplanning

Response Organisation

Participants noted that there has been wide variation in the way in which each State has implemented National Plan arrangements. There are, however, some common elements of each State approach which can be of assistance in the application of scientific input. For example, the response organisation framework (outlined 'in Paper 12) outlines,, an acceptable chain of command and indicative communications system for response organisation which should enable an SSC to become an effective element of the overall response team. In this respect, the workshop recommended 'that each SSC seek to develop a rapport with other individuals and agencies identified in the response organisation and from that to evolve a clear understanding of the likely requirement for scientific input in all phases of response (R.1) To supplement this initiative, it was agreed that each SSC should endeavour to provide scientific input to all training activities in each State (or region, such as in the case of REEFPLAN).

Mapping

From the State position papers (section B) it is evident that each State has, to various degrees,, commenced a program of coastal and offshore resources, mapping which seeks to enable the nature of threat from an oil spill in various areas to be more quickly and accurately assessed. Participants were in full agreement that such mapping systems were an essential form of scientific input which greatly enhance the accuracy of scientific advice and enable the appropriate decisions regarding possible response options to be made. Concern was expressed that the wide variation in approaches to mapping may cause difficulties of interpretation, however, it was felt that because of the variable ecological and legislative conditions in each State, a uniform approach to mapping was not essential. Participants did, however, endorse the suggestion by Hawes (1987) that a national program of coastal resources mapping would generate information of particular value to oil spill response and may lead to 'economies of scale' in map production. The workshop therefore recommended that the Department of Transport and Communications approach the Australian Environment Council (and other relevant funding agencies) to seek support for an expanded program of coastal and offshore resources mapping preferably.using a uniform approach to Geographic Information System (G.I.S.) development (R.2). Until the outcome of that approach is known, participants agreed to continue to submit proposals to the Department for mapping support via State Committees and that the Department should continue to fund map preparation as funds permit.

Participants viewed examples of overseas mapping projects undertaken by the National Oceanographic and Atmospheric Administration (NOAA) and James Dobbin and Associates and agreed that such atlases are an effective method of information collation and presentation. Examples of Australian studies were also assessed. Those which emphasize the relationship between the characteristics of the resources at risk and the type of response possible, such as the Botany Bay Atlas by the NSW State Pollution Control Commission were regarded as of higher practical value than plain resource maps. It was agreed that because of the need for quick response in most spills, such atlases provide a means for rapid information transfer to the OSC.

There was considerable discussion about the most suitable type of mapping system, with common agreement that the electronic strategic atlas under development by the Great Barrier Reef Marine park Authority appears an effective way to overcome the updating limitations of present hard copy atlas systems. An indicative output set from the GBRMPA system is included in Paper 24. The workshop therefore recommended that the Department of Transport and Communications circulate information on the GBRMPA system and identify sources of support for the future upgrading of present mapping output to field usable electronic geographic information systems (G.I.S.) (R.3). It was noted during discussion of this issue that the user-friendliness of Apple Macintosh systems, coupled with potential linkage with OSSM output (as noted in paper 17. OSSM 11 is being upgraded as a Macintosh software package) and other databases (e.g. the Macintosh based National Estuarine Inventory recently completed by the Centre for Coastal Management) make the Macintosh a potentially suitable system. The final specification of the most suitable system for each State will require careful evaluation of both hardware and software options.

Use of Dispersants

As outlined in Paper 13, under the National plan three principal options for marine oil spill clean up have been identified:

* leave alone, but monitor;
* control and recovery using booms, skimmers and sorbents; or
* disperse using acceptable oil spill dispersants.

The last option is also discussed in more detail in Paper 14.

Participants noted that there are a wide range of uncertainties in the use of dispersants. There appears to be insufficient understanding of the effects of dispersant toxicity, particularly when combined with oil, and other factors affecting potential impact. It was also apparent that the longer term environmental consequences of dispersant use arc not well understood by environmental agencies in each State as there is a lack of Australian research into these effects. During the simulation exercise (No.2 - Paper 21) it was noted that in Queensland there is also a specific constraint on the use of dispersants - a Cabinet directive imposes strict limits on their use.

Participants agreed that the use of dispersants is an important option, particularly where commercially or ecologically important resources downstream of the spill are at risk. Participants therefore recommended that information on dispersant toxicity bc compiled and that guidelines for the use of dispersants be prepared (R.4). This information may, in part, be obtained from studies undertaken by the Marine Science Laboratories in Victoria, based on earlier tests undertaken for the then Department of Transport, James Cook University, Townsville and from work in progress at the Centre for Environmental Toxicology (a joint venture between the University of NSW and the NSW State

Pollution Control Commission) and work undertaken recently by Australian Groundwater Consultants in South Australia. However, participants felt that a specific report 'which draws, together Australian research and results 'and relevant overseas literature (see for example, Papers 25 and 26) would be of widespread practical value and should therefore be commissioned by the Department of Transport and Communications as a special research project.

Rogue Ships

In his discussion of marine salvage operations, Captain Ken Ross from AUSTPAC outlined the special problems posed by inadequately insured vessels. He further observed that these problems may be compounded by the increasing prevalence of inadequately trained crews and poorly maintained foreign registered vessels. He noted that the first question asked by salvors was - is it (the disabled vessel) worth saving in a fiscal sense? Salvors play an important role in the spill response and if there are impediments to their involvement, then both the costs (assuming that they have the specialised equipment and expertise necessary) and the logistical feasibility of mounting a control/containment response may devolve to the response agencies. There was general agreement amongst participants that this uncertainty is undesirable and that all steps should be to ensure that a salvage response capacity should be operable as and when required.

Participants therefore recommended that the Department of Transport and Communications continue their discussions with salvage operators and marine insurance underwriters to clarify procedures for involvement of salvors in oil spill response (R.5). Participants recognised that under present insurance arrangements, this may require response agencies to develop contingency procedures where costs are recovered from National Plan funds initially and later by direct claim against ship owners and insurers.

Shin Design

Captain Ross noted that current classification rules make no provision for bunker pump out. Most modem tankers carry between 1200 and 1800 tonnes of bunker oil. An essential element of any response to oil leaking from such vessels is thus to prevent further oil escaping to the marine environment (as per Paper 12). Because of current design of bunker facilities, the maximum pump out rate is approximately 6 t./hr. The desirable rate is to remove between 40 - 50 t./hr. from a damaged vessel. To achieve this would require a modification to bunker fuel storage access.

Participants agreed that such a modification would be both desirable in a response context and cost-effective, given the potential for the prevention of damage arising from this source.

Chemical Spills

During the workshop, reference was frequently made to the need for oil spill contingency plans to be extended to provide a response framework in the event of a hazardous chemical spill, Although such events are rare and not covered by National Plan arrangements, it was agreed that oil spill response procedures are logistically suitable for application.

Captain Ross noted that the amount of hazardous cargo carried in Australia waters was increasing, and that the nature of the hazard was rapidly changing. For example some twelve new chemicals are added to world sea cargo each year. Many of these such as tetra-ethyl lead (a petrol additive) are extremely toxic.

Dr Craik mentioned that the Great Barrier Reef Marine Park Authority had begun to address his problem some years previously, as part of a workshop on response to hazardous chemical spills in the Reef Region (Craik, 1984). However, she observed that it poses particular difficulties for agencies working in isolation and therefore urged a cooperative approach between State and Commonwealth environmental agencies to assessment of the nature of the threat, collation of information on transport routes and amounts and identification of response methods.

Participants considered that the issue of chemical spills is of major concern in implementing the role of SSC. It was agreed that a suitable response to the issue was beyond the scope of this meeting. However, as an initial response, partcipants recommended that each State/regional SSC compile information on the nature of the threat in each State/region and that this information become the basis for assessment of possible response methods based on National Plan arrangements (R.6). An effective operational response will require a long term commitment by involved State and Commonwealth agencies to the establishment of an expanded contingency plan for chemical spills in the marine environment.

Resources

Participants noted that one of the major constraints to implementation of the role of SSC at the State and regional levels was the limited resources available. All designated SSCs are part time, with the majority of their work involving other activities. In addition, there has been an historical problem of continuity - few SSCs have been involved in that rolc for more than five years, thus limiting their exposure to spill expcrience and their awareness of response procedures.

Given the current restrictions on government funding and the sporadic nature of the oil spill threat there appears little potential for this situation to be improved. This workshop was seen as a verypositive step towards improving the capacity of SSCs to understand and implement the requirements for scientific advice in oil spill response. It was recommended that participants continue to exchange information informally within the SSC 'network' now established (R.7). This recommendation may considerably enhance the collective expertise of all SSCs, especially where operational information (e.g. feedback on the success of a particular response strategy) is obtained by one SSC and passed on to others within the 'network'. It should also enable newly appointed SSCs to quickly obtain information on what is required from them. A suggestion was made that it would be desirable to produce an SSC handbook (R.8). Such a handbook would outline specifically the requirements for implementation of the role of SSC and contain readily accessible operations information. The contents of such a handbook could be based on the "SSC Operations Plan" outlined in Paper 15. Until the handbook is available however, it was noted that there is now a wide range of literature available (see e.g. Paper 26) and training activities undertaken which should enable new SSCs to become familiar with role needs.

Land Disposal

During discussion of specific issues which have been of concern in the development of State supplements and during operations involving spill clean up it was noted that one of the major problems facing SSCs was the requirement to minimise the environmental impact of clean up activities. Most States now have comprehensive environmental legislation which *inter alia* requires due consideration of the potential impact of waste disposal. The removal of reclaimed oil to waste dump sites is often a contentious issue and one which should not be left to be resolved during a spill response. Participants therefore recognised a need for adequate preplanning in this respect and recommended that SSCs prepare guidelines for land disposal as part of operations plans. (R.9). Such guidelines should identify suitable locations and requirements for approval, conditions for site preparation and rehabilitation and monitoring needs.

3. SSC Role in Response

While the operational experience of SSCs has been limited to date, participants identified a number of areas in which future response could be facilitated and improved. These include:

Co-ordination

The guest OSCs for the workshop, David Oliver and Ross Worrall noted that in most incidents the OSC has a need for clear and unambiguous scientific advice. Such advice plays an important role in determining the nature of the response undertaken and may cause the type of response adopted to be changed in response to changing circumstances during clean up (e.g. a change in wind direction which places different resources at risk).

For such advice to be effectively assimilated and used by the OSC requires clear lines of communication. The establishment of these can be facilitated by good personal rapport between the SSC and OSC and a mutual appreciation of the requirements and capabilities of personnel in each role. Participants agreed that this can be achieved by the development of an effective working relationship between key response personnel during response (as per Recommendation 1). It can be further augmented during training activities and assessed by auditing the effectiveness of each role after an incident. Participants therefore recommended that each SSC promote the importance of co-ordinated approaches to response and more fully define how the role of SSC can contribute to the co-ordination process (R.lO). To fully meet this requirement may also require a more "proactive" approach to involvement by designated SSCs, such as in the case of the 'Al Qurain" incident at Portland in 1988, where the Victorian SSC sought involvement in the response to a minor spill.

OSSM

During the simulation exercises and in general discussion about the role of SSC in providing advice to the OSC, it was agreed that a priority information need in any response will continue to be information on the spill trajectory, such as is provided by OSSM. With the current upgrading of the OSSM package (Paper 17), and the development of new protocols for its access and use (via Federal Sea Safety Surveillance Centre) an OSC will have improved access to OSSM output. Nevertheless, it was felt by participants that an SSC could, and should, provide a screening service on this output to facilitate comprehension and evaluation by the OSC.

It was therefore recommended that SSCs develop familiarity with the use and application of the OSSM package (R.11). This could involve a number of activities, including:

* training in the use of OSSM, preferably during field-based and simulation exercises such as those conducted during OSC training courses;
* preparation of OSSM base maps (possibly linked with other coastal resources map files);
* development of competence in running OSSM-based simulations and interpreting output;
* verifying output and assessing model limitations based on the results of more detailed or better developed oceanographic models;
* "real time" assessment of the implications of changing meteorological and oceanographic conditions.

Monitoring

As is evident from Papers 16, 20 and 22; monitoring was an important item of discussion at the workshop. The current constraints on the availability of funds for monitoring during response has historically limited the use and application of monitoring in response. Participants agreed, however, that monitoring is an important element of any response. Monitoring provides for assessment of the impact of a spill, the efficacy of a clean up and the long term management needs of impacted areas. As noted in Paper 16, however, monitoring can only be effective (i.e. in meeting agreed objectives) if the monitoring strategy is prepared in advance of a spill and linked with other response activities.

It was therefore recommended that the SSCs clarify their potential use of monitoring in all phases of response and identify situations under which funds may be sought from the National Plan to support, or recover the costs of, monitoring activities (R.12). Once this is undertaken, State agencies will need to approach the Department of Transport and Communications with proposals for any recommended changes to National Plan arrangements to support agreed monitoring activities.

Media Relations

Oil spills are highly visible events. They may cause widespread alarm amongst the general public and are thus of considerable interest to the media. As noted in Paper 18, an SSC may play an important role in the way in which a spill is reported and hence perceived by the public at large. An SSC may also play an important part in the provision of information to the media on the environmental impact of a spill because of their expert knowledge in that field and the importance of environmental aspects to media interest. That role may impose requirements on the SSC additional to those envisaged in other areas of the response organisation.

During the workshop, emphasis was given to understanding the operation of the media and in training SSCs to be effective in media liaison. The output from both simulation exercises (Paper 21) was used to assess the media liaison skills of participants and was found to be a very useful exercise. It was therefore recommended that media relations be incorporated in any future SSC training, and that SSCs make provision for engagement in that role by identification with the OSC and Media Liaison Officer of appropriate preconditions for media liaison (R.13).

4. SSC Role in Follow-up

SSC Activities

During the workshop, it was suggested that to date most emphasis has been placed on the role of SSC in the previous two phases (Preplanning and Response). It was recommended that SSCs now pay greater attention to the link between follow-up and preplanning by making provision for review activities which will enhance the overall response effort and ensure that the operational experience derived during an incident is integrated with planning for future response effort (R. 14).

As suggested in Paper 15, the follow-up phase of an oil spill is one in which the SSC may play an important role in a number of areas, including:

* monitoring (as discussed above);
* review of adequacy/efficacy of response (audit of effectiveness of scientific advice, and assessment of possible improvements in future incidents);
* identification of necessary revisions to contingency plan or procedural arrangements; and
* identification of further research and training needs in relation to issues or problems which arose during a response.

In each of these areas, the SSC is well placed to contribute as other members of the response team may not have the resources, time or expertise necessary to adequately undertake this review. Where possible, however, the SSC should involve other members of the response team in this process (additional to the usual debriefing) as it will play an important part in improving co-ordination and understanding of the needs of each team member.

Future training

Participants agreed that co-ordination and co-operation between designated SSCs will lead to a more effective response capability and therefore recommended that the Department of Transport and Communications make provision in future training activities for greater involvement of SSCs and for a further workshop specifically on the use of scientific advice in spill response in 1989/90 (R.15). The next SSC workshop should, if possible:

* involve the same SSCs who attended this workshop (for continuity and development of expertise);
* involve guest OSCs and provide for participation by guest speakers with expertise in the social and economic sciences (including fisheries personnel);
* provide for realistic, field-based training exercises - two suitable venues were suggested which provide suitable case study material and logistical support - Trial Bay (NSW) and Jervis Bay (NSW) - the latter is especially appropriate in view of the current proposals for naval base relocation and work in progress on environmental studies in that area;
* review progress towards implementation of the recommendations of this workshop and identify further research and training needs; and
* provide increased scope for small group discussions - this could be achieved by shorter lecture sessions (e.g. 40 min. max.) followed by discussion of lecture material.

5. Summary of Recommendations

No.	Details	Responsibility
1.	Develop rapport between key individuals involved in response and clear understanding of scientific input requirements.	all SSCs
2.	Seek support for an expanded program of coastal and offshore resources mapping and a uniform approach to G.I.S. preparation.	DoTC/GBRMPA/SSCs/ external funding agencies
3.	Circulate information on GBRMPA Macintosh-based mapping system and identify sources of support for upgrading of present systems.	DoTC/GBRMPA/SSCs
4.	Compile information on dispersant toxicity and prepare guidelines for dispersant use.	DoTC/GBRMPA
5.	Continue discussions with salvage operators and marine insurance underwriters to ensure mutual understanding of government/industry requirements.	DoTC
6.	Compile information on nature of threat from chemical spills.	all SSCs/DoTC
7.	Initiate the exchange of information within a 'network' of SSCs.	all SSCs/DoTC
8.	Prepare an SSC handbook (Operations Plan)	all SSCs/DoTC
9.	Prepare guidelines for land disposal of recovered oil as part of operations plans.	all SSCs
10.	Promote the importance of a co-ordinated approach to response and assess how an SSC can contribute to co-ordination process.	all SSCs
11.	Develop familiarity with the use and application of the OSSM package.	all SSCs

12.	Clarify potential use of monitoring in all phases of response and identify situations in which funds may be sought from National Plan to support, or recover costs of, monitoring activities.	all SSCs
13.	Incorporate media training in future SSC training, and identify appropriate preconditions for SSC media liaison.	all SSCs/DoTC
14.	Pay greater attention to link between follow-up and preplanning.	all SSCs/DoTC
15.	Make provision for SSC involvement in future training and for a further workshop on the use of scientific advice in spill response in 1989/90.	DoTC and others

Paper 3: Participant Contact List

The following is a list of workshop attendees. In view of the agreed desirability **of maintaining contact** between SSCs and others involved in scientific advice spill response, the list will be maintained and updated by the Department of Transport and Communications. **Any changes to this list should** therefore be referred to the Department,

Name	Affiliation	Day 1 Grp	Grp
Dr David Gordon	Environment Protection Authority 1 Mount Street PERTH. WA. 6000 ph: (09) 222 7000	**A**	**2**
Capt David Oliver	Department of Marine and Harbours PO Box 42 FREMANTLE WA. 6160. ph: (09) 335 0888 fax: (09) 335 0850	**B**	**2 (OSC)**
Mr Brian Wagstaff	Environment Management Division Department of Environment GPO Box 667 ADELAIDE. SA. 5001 ph: (08) 216 7376	C	1
Mr. Paul Manning	Australian Groundwater Consultants **6** The Parade. NORWOOD. SA 5001 ph: (08) 362 0001 fax: (08) 362 0020	**A**	**2**
Mr Phillip Cosser	Division of Environment Department of Environment, Conservation and Tourism PO Box 155 NORTH QUAY. QLD. 4002 ph: (07) 224 6442 fax: (07) 229 1535	**A**	1
Dr Wendy Craik	Research and Monitoring Section Great Barrier Reef Marine Park Authority PO Box 1379 TOWNSVILLE. QLD. 4810 ph: (077) 818 811 fax: (077) 726 093	C	**1***

Mr Steve Hillman	Research and Monitoring Section Great Barrier Reef Marine Park Authority PO Box 1379 TOWNSVILLE. QLD. 4810 ph: (077) 818 811 fax: (077) 726 093	A	2
Mr Rick Perron	Queensland National Parks and Wildlife Service 194 Quay Street PO Box 1395 ROCKHAMPTON. Q. 4700 ph: (079) 276 5 11	B	1
Mr Ross Won-all	Port of Brisbane Authority BRISBANE QLD. 4001. ph: (07) 895 1107 fax: (07) 895 1007	A	1 (OSC)
Mr Russell Cowell	State Pollution Control Commission 157 Liverpool Street SYDNEY. NSW. 2001 ph: (02) 265 8059 fax: (02) 643 2466 alternate (02) 261 2310	B*	1
Dr Geoff Thompson	State Pollution Control Commission 157 Liverpool Street SYDNEY. NSW. 2001 ph: (02) 265 8862 fax: (02) 2612310	C	2
Mr Ian Dutton	Centre for Coastal Management Northern Rivers CAE P.O. Box 157 LISMORE. NSW. 2480 ph: (066) 230 638 fax: (066) 221 300	B	2
Capt Ken Ross	AUSTPAC Salvage Howard Smith Industries Ltd P.O. Box N 364 Grosvcnor Place SYDNEY. NSW. 2000. ph: (02) 230 1777 fax: (02) 251 3862		•
Mr Don Palmer	Marine Science Laboratories PO Box 114 QUEENSCLIFF, VIC. 3225 ph: (052) 520 111	A	2

Dr Colin Gibbs	Environment Protection Authority 477 Collins Street MELBOURNE. VIC. 3600 ph: (03) 651 1916 fax: (03) 614 3575	A	1
Mr. Russell Colman	Victorian Institute of Marine Sciences 14 Parliament Place MELBOURNE. V. 3000 ph: (03) 651 1998 fax: (03) 651 1702	-	
Mr. Peter Wright	Conservation Commission of the Northern Territory GPO Box 2520 DARWIN. NT. 5794 ph: (089) 894 557 fax: (089) 323 849	B	1
Mr John Issac	Department of Environment GPO Box 1396P HOBART. TAS. 7001 ph: (002) 306 5764 alternate (002) 302 770 fax: (002) 233 494	C*	1*
Mr Martin Hawes	Department of Transport and Communications (DoTC) GPO Box 594 CANBERRA. ACT. 2601 ph: (062) 687 111 fax: (062) 572 505		
Mr Ray Lipscombe	DoTC ph: (062) 687 052	C	Leader
Mr Don Brodie	DoTC ph: (062) 687 050	A	Leader
Mr John Durham	DoTC ph: (062) 687 111		Media

<u>Notes:</u>

* Denotes group chairperson.

- Denotes no group affiliation.

SECTION B: POSITION PAPERS

Paper 4(a): THE ROLE OF THE SCIENTIFIC SUPPORT COORDINATOR TO THE VICTORIAN STATE PLAN TO COMBAT POLLUTION OF SEA BY OIL: Don Palmer,

Marine Science Laboratories

1. The Role of the S.S.C.

The Scientific Support Co-ordinator to the Victorian State Co-ordinating Committee is appointed by the committee and serves as a one-member subcommittee responsible for scientific support co-ordination in the case of an oil spill event, and at other times to provide advice on a demand basis and upon request of the chairman of the State Co-ordinating Committee on scientific and environmental matters relating to oil pollution.

2. Response Planning Responsibilities (pre-incident)

a. Scientific assessment and advice on matters concerning oil pollution control.

b. Be available to address any scientific question raised by the State Co-ordinating Committee.

c. To keep the State Co-ordinating Committee aware of new scientific developments in the control of oil pollution.

d. To provide scientific talks and papers as required by the State Co-ordinating Committee.

e. Updating of relevant publications.

f. Assist in the development of those parts of the contingency plans requiring specialised scientific understanding, including the constant reappraisal of the list of nominated disposal sites for contaminated oils and oiled debris.

3. Incident Response

a. To be available to advise the State Co-ordinating Committee and through it the On Scene Operations Co-ordinator in the event of a significant oil spill on scientific and environmental concerns relating to that spill and its cleanup.

4. Post Incident Responsibilities

a. Evaluate the need for post-spill research and *or* monitoring of the spill site and surrounding area.

b. Advise and assist local authorities in the planning of appropriate monitoring strategies.

5. Costing and Resources Invblved in Meeting Identified Responsibilities

a. Invocation of National Plan
   1. Fund release from state treasury

b. Departmental contingency fund

c. Percentage of time committed to role

d The main components of the costing are:
   a. Salary
   b. Travel expenses (air travel/vehicle hire)
   c. Incidental expenses (goods/material/service)
   d Personal Expenses (meals/lodging)

6. Implementation of the Role to Date

a. Response Planning

During the course of 'evolution' of the Scientific Support Co-ordinator, it has metamorphosed from the original single individual member requested from the Victorian EPA through several multi-member groups and committees back to being an individual member. The successes achieved during this process were considerable, and were only accomplished through the efforts of a large number of highly qualified people from a wide variety of disciplines.

Some of the large projects have produced:

1. The Atlas of Biological and Recreational Resources of the Victorian Coast.
2. Guidelines for the Control of Oil Spills.
3. Oil Spills on the Victorian Coast: Advice on the use or non-use of Oil Dispersants.

b. The Response

The Portland Oil Spill Incident of 29 July 1988.

1. The main events
2. The response
3. The cleanup

4. Communication
5. Discussion of problem areas, difficulties encountered

c. Post-Incident

1. Monitoring Programmes
2. Communication, debriefings

7. **Future Directions and Priority Needs**

a. Communication
b. The role of science

Paper 4(b): VICTORIAN REPORT - POSITION PAPER,

Dr. C. Gibbs,
Environment Protection Authority

1) I am not currently the SSC for the Victorian State Plan, but was until moving from the Dept. of Conservation Forests and Lands to the Environment Protection Authority (EPA).

2) I am currently Deputy Delegate for the EPA on the State Plan Co-ordinating Committee. The primary delegate is Mr. Dennis Monahan. My attendance at this Workshop is due to the combination of this deputy role on the main committee and some years of previous activity as SSC or member of the Technical Advisory Committee.

3) The Co-ordinating Committee for the State Plan (sometimes called the 'main committee') is responsible for (a) developing appropriate response procedures for the event of oil pollution incidents. That is, advance 'contingency planning', bearing in mind the probabilities of accidents in various locations; and (b) providing an advisory role during actual incidents.

4) The Scientific Support Co-ordinator is a person nominated by the Co-ordinating Committee. The brief for this role was to ascertain responsible views on wildlife, fisheries and environmental implications of oil spills and potential cleanup activities. This included both contingency planning and advice during any real incident. It is emphasised that the SSC is not expected to know everything, but should be able to contact the full range of responsible advice.

5) In my original role of member of a Technical Advisory Committee the role was more multi-disciplinary and interactive. I provided a chemical understanding of both oil and dispersants and shared input concerning environmental and ecological matters. Other members contributed on meteorology, movement of slicks under influence of wind and tide (before the development of OSSM), and the technology of pumping out tankers etc. This Committee thus provided much more comprehensive advice than a single SSC. The Technical Advisory Committee is now very much scaled down.

6) Given that the responsibilities for wildlife and environmental matters are split between the Dept. of Conservation, Forests & Lands and the EPA, my present role includes providing EPA liaison with the SSC (who is currently a DCFL nominee).

7) I can comment on response planning (pre-incident phase), while Don Palmer can provide comments on actual response ('real time' activities) in Victoria. The major input to response planning by, the 'SSC type' role in early days was a series of desk studies and reports produced

within the Ministry for Conservation in 1979. (These were co-ordinated by myself and Dr. D. Kay who subsequently moved to the Dept. of Transport). These reports surveyed many aspects including:

Available technology for oil spill clean-up,

Vulnerability of various forms of wildlife and fisheries,

Distribution of various vulnerable resources,

Tourism, etc.

One innovative aspect was the production of a 'decision tree' aimed at guiding the decision making process according to circumstances, when dealing with either offshore or beached oil. A second significant result was the production of an 'Atlas of Coastal Resources' for use in oil spill situations and to assist in more detailed contingency planning. This was produced by overprinting an existing 'Physiographic Atlas' of the Victorian Coast.

8) This contingency planning was taken one stage further in my time as SSC proper. The Co-ordinating Committee requested advice on where to use dispersants in the event of oil pollution, preferably in the form of a map. This involved (a) reference to previous reports emphasising that use of dispersants (or other response) depends on many circumstances of which geographical location is one; (b) consultation with the EPA, all Regions of the Dept. Conservation Forests and Lands, Scientists of the Marine Science Laboratories Queenscliff concerning shellfish farming and ecological issues, ornithologists and other interest groups; and (c) production of the map including drafts for comment.

In producing the map the approach was to build upon the existing Atlas of Coastal Resources, but to produce a two-colour A4 version, cheap enough to be treated as disposable. The whole of the Victorian coast was covered.

9) The costs and resources devoted to this map production were approximately as follows:

Printing and binding 200 copies of 32 pages:	approx.$ 600
Salary of SSC in producing Atlas	approx.$5000

This of course does not include costs of producing the base map already in existence or any contribution to equipment (computer, laser printer) used. The costs of producing the original large format, multi-coloured Atlas and the other components of the 1979 reports are unknown but would be many tens of thousands of dollars. The costs above ($5600) must be a bare minimum, given a very good starting point, and a very modest commitment of effort. It could be argued that the subject deserves a much greater. effort than could be provided. Unfortunately the extreme cut-backs in scientific staffing in the public service make it very difficult to devote time to 'extra-departmental activities such as this, however important.

10) Future directions. There should be concern at the erosion of environmental science within Government. Scientists in this field not only do research but provide vital expertise across a wide range of specialties relevant to emergencies such as oil spills.

In more specific terms in Victoria, the 1979 'guidelines' reports deserve re-printing, ideally with updating. The 1988 'advice' concerning dispcrsant usage might form the basis of a more intensive use of local knowledge.

I suspect that contact between SSCs and on-scene controllers is non-existent except in an actual incident and that a 'communication gap' is almost inevitable in these circumstances. This needs to be solved within each State or the people responsible for clean up operations are likely to turn to inappropriate sources for advice.

INTRODUCTION

This document has been prepared by the Scientific support Coordinator for the State Plan. It is produced as a low-cost document that can be used *in the* field. The base maps are monochrome photo-reductions of the "Atlas of Biological and Recreational Resources of the Victorian Coast" which was compiled to accompany the "Guidelines for the Control of Oil Spills", by the Ministry for Conservation. This form of base map was chosen so that the document is immediately compatible with the original Atlas.

In compiling this document, many people were consulted and their advice and contributions are gratefully acknowledged. They include all Regional Managers of the Dept. of Conservation Forests and Lands, the Planning and Research Officers involved in aquaculture within the Marine Resources Management Branch of that Dept., The Arthur Rylah Institute for Environmental Research, the Marine Research Group of Victoria, and the Victorian Wader Study Group.

NOTES ON THE USE OF THESE MAPS

It is impossible to recommend use or non-use of dispersants on a geographical basis independant of variours other factors, for example, size of spill, direction of drift (wind), direction of tidal flow, presence or absence of seasonal bird life, etc. Nothing in the following notes or maps can substitute for good decision making in the light of all available information. In particular, the guidelines given in the following Ministry for Conservation reports are re-emphasised.

"Guidelines for the Control of Oil Spills" (Project Report, Project TO4), Publication No. 211 in the Ministry for Conservation Victoria, Environmental Studies Series.

"Guidelines for the Control of Oil Spills: Oil Spill Control and Clean-up Technology"; Publication No. 202 in the Ministry for Conservation Victoria, Environmental Studies Series.

However, some further advice is provided on a regional basis on the attached maps. These are photo-reduced from the "Atlas of Biological and Recreational Resources of the Victorian Coast", which was produced as part of the above-mentioned project. The inset notes on each map refer to the whole map-sheet. Discrimination between areas on a map is by description plus symbols on the map.

Note particularly that the areas circled as significant for bii, particularly penguins, do not represent the limit of the setisitive area, as the penguins (for example) forage over a considerable distance. Thus use of dispersants is justified to protect larger areas than those marked, where diving birds are significant and other factors allow.

As a general rule, we do not recommend use of dispersants in the small inlets and estuaries. We also re-emphasise that on rocky shores carrying significant shellfish, the biota is likely to suffer worse damage if dispersants are used to try to remove oil which has reached the shore. Obviously, wherever there is a risk of oil reaching a sensitive area, the further out' to sea it is dispersed the better.

NOTES ON "WADERS"

The maps indicate a number of areas where wading birds are to be found. However by far the most important areas of Victoria for wading birds are the following bays and inlets:

Corner Inlet and Nooramunga Marine and Coastal Park: The whole area from the end of 90 Mile Beach (McLoughlins Beach) to Foster and Millers Landing (Up to 50,000 waders including many important species).

Port Phillip Bay: Mud Island, Swan Bay, Werribee Sewage Farm foreshore, Altona and Pt. Cook (30 to 40,000 waders).

Western Port: Mainly the eastern side and perimeters of French Island (10,000 waders)

Andersons Inlet: (5000 waders).

Shallow Inlet: (2000 waders)

In contrast to diving birds, waders are not particularly sensitive to oil pollution. This is because they do not swim and tend to avoid feeding on polluted beaches, (unlike diving birds which may sometimes be attracted to oil slicks). In general therefore the best treatment for oil in a wader habitat is to treat it very carefully on the beach under supervision by ornithologists. Cleanup (if any) would be either by careful hand cleaning or possibly by "cloaking" the oil with a powder.

SEASONAL PATTERNS FOR THE PRESENCE-OF SEA-BIRDS

The following table summarises the information the author. has obtained- on the seasonal presence of the sea-birds mentioned in the maps. It is not definitive information and local and expert knowledge should be sought.

Species	Dates Present
Fairy penguin (Little penguin)	All year
Mutton birds (Short-tailed shearwater)	Sept 22nd to endbf April
Little terns	Summer
Crested terns	Spring and **summer**
Fairy terns	All year
Waders (in general)	August to **May** (i.e. most of the year except winter)

LEGEND

ZONE I: ROCKY SHORES

Cliffs of variable height, granitic, minimal development of rock platforms or beaches, sometimes with boulder accumulations at base (Wilson's Promontory type)

Low cliff or rock shore in tidal inlet, infrequent small beaches or reefs (Mallacoota type)

Low cliff or rock platform sometimes with sand dune capping

Cliffs less than fifty feet high with rock platform

Cliffs higher than or equal to fifty feet with rock platform

ZONE II: SANDY BEACHES

Permanent sand beaches, occasional admixtures of shingle or mud

Sand beaches with varying seasonal bedrock exposure

Cliffs less than fifty feet high with beach

Cliffs higher than or equal to fifty feet with beach

ZONE III: SHINGLE BEACHES

Cobble or shingle beaches with varying sand content

ZONE IV: TIDAL FLATS

Intertidal sand and mud (undifferentiated)

Low bluffs to four feet high, of eroding salt-marsh deposits, frequent vestigial saltmarsh and/or mangrove patches, often with small sand/mud beaches. Probably more extensive than shown on maps. (Western Port Bay type)

ZONE V: MANGROVESAND SALTMARSHES

Mangroves

Saltmarsh

AREAS OF SPECIAL SCIENTIFIC INTEREST

Botanical .... B

Zoological .... Z

Denotes site highly susceptible to oil .... •

NATIONAL PARKS AND RESERVES

National Parks and Other Parks managed by the National Parks Service

Areas managed by the Fisheries and Wildlife Division

Foreshore Reserve

FISHERIES

Reef – Abalone habitat

Lobster, Scallop, Mussels; showing approximate boundaries

1972-73 fishing catch greater than 1,000,000 lbs live weight

Fishing

RECREATION

Swimming

Surfing

Wreck

Underwater Sports

Sailing

Boat Club or Mooring .... BC

DUNES

Usually backing sand or sand/bedrock beaches, but sometimes 'perched' on cliffs. Strictly not foreshore features, but have been classified as their degree of stability and vegetation cover may influence access and movement of equipment.

Stable, well vegetated dunes, often with Leptospermum scrub

Partly unstable, irregular semi-vegetated dunes, intermittent grass or low shrub cover

Unstable, mobile or potentially mobile dunes, with large unvegetated areas

Sharply cliffed foredunes up to forty feet high backing sand beach. Mobile unvegetated face, varying degree of vegetation on crest. Intensity of cliffing is seasonal, and may not be mapped

MISCELLANEOUS

Cliff line not on shore

Levee Bank or Sea Wall

Brackish or fresh water swamp

ACCESS

All weather sealed or dirt road

Access tracks.

Two wheel drive (car)

Two wheel drive (heavy truck)

Four wheel drive/wheeled tractor

Crawler tractor

Position Doubtful .... P.D.

ADDITIONAL INFORMATION AND ADVICE (1988) RELATING TO THE USE OF OIL DISPERSANTS.

Area sensitiw **to** *oil:*
Use dispersant to prevent oil reaching these areas

Area sensitiw to ***dispersant:***
Avoid *dispersant use in these areas*

G

Mussel farm M

Oyster *farm*

E l

*Mussel and oyster **farm*** M.O

Boundary of bay or **inlet**
in ***which*** *dispersant*
should not be *used*

*Area of zoological interest (as **specified)***

a Z

Significant bird feeding area

Paper 5: NEW SOUTH WALES ARRANGEMENTS AND APPROACHES

Russel Cowell,
State Pollution Control Commission

Role of SSC in State Plan Context

* SSC in NSW is the State Pollution Control Commission (SPCC)

* SPCC represents all other scientific and environmental input to the Plan

* SPCC retains close links with these 'others' so that their concerns are carried forward when planning or when responding to a spill.

* 'Others' represented include:-
  National Parks and Wildlife Service
  Division of Fisheries
  Dept Tourism
  Academic interests
  Conservation groups

SSC Responsibilities in Response Planning

* Preparation of Coastal Resources Atlases

  These atlases are divided into three parts as follows:-

  (i) Analysis of Resources at Risk

  (ii) Assessment of the Threat

  (iii) Review of Resources in Relation to Oil-Spill Countermeasures

It is the third part, which draws together all the other information and makes recommendations in respect of the countermeasures to be adopted in each circumstance, which represents the real strength of these atlases.

* Provision of a Response Team

The SPCC maintains a capability to get a group of scientists and technical support staff (including boats) into the field at short notice in the event of a spill. The funtion of this group is to:-

(i) advise on the progress of the spill, especially in respect of any sensitive resources which may be under threat and for which countermeasures don't seem to be in place, in train or functioning adequately

(ii) monitor the progress of the spill and to collect any data which may be admissible in Court should legal proceedings take place

(iii) carry out any post-spill studies to assess the extent of any damage and to assess any recovery

During the course of a spill response, all advice is funnelled to the OSC via the SSC.

* Maintenance of a Contact Group of Expert Advisors

The SPCC maintains a regularly updated list of contacts who are expert in particular aspects of environmental/scientific concern. Contacts are included for:-

birds

fisheries

mangroves, seagrasses etc

intertidal ecology

marine biology

* Taking Part in Desk-top Exercises

The NSW State Committee of Advice to the National Plan has run several desk-top spill exercises which have included SSC input. These have been most valuable as a test of the capabilities of individual parts of the whole spill response network and have had the added benefit that each part now has a better understanding of the pressures and constraints under which the other parts work.

* Education

The SPCC has provided speakers on several occassions to OSC's training courses/workshops

* Production of Guideline/Assessment Documents

Aerial Application of Dispersants in Botany Bay

Guidelines for Controlling Oil Spills in Maritime Waters of NSW

Costs and Resources

* Response team.

Costs vary with the spill but as an indication:-

Spill October 1984 total cost $800 (including fuel and other consumables) (50 person hours)

Spill February 1985 total cost $1750 (1988 S's) (92 person hours)

* **Atlases** ,

Work involves:-

- collection and collation of information
- production of a draft atlas
- circulation to interested parties for comment
- incorporation of relevant comments into final draft
- production of final draft for review by State Committee
- editing and printing

Each atlas produced under this scheme costs approximately $15500 with some variability depending on the number of atlases to be printed. These costs take no account of any resources expended by third parties in the provision of information or in providing comments on drafts. One person of Senior Technical Officer level working full time can produce three such atlases per year. This requires some professional guidance and quite a deal of drafting assistance for maps etc.

Experience

* **Atlases**
  - Need to consider 'unusual' resources at risk
  - Need to consider the type of oil likely to be handled
  - Need to have a flexible approach
* Response Team
  - Logistical problems
  - Communications
* Exercises
  - Control room layout, facilities and management
  - Communications

Future

* Further atlases
* Further exercises - command room
* Trajectory modelling?

Paper 6: THE SOUTH AUSTRALIAN EXPERIENCE

Brian Wagstaff,
Department of Environment and Planning

Overview and Organisation

In South Australia the SSC for the State is provided by the Department of Environment and Planning.

The role played by the SSC has been that of broad 'environmental' co-ordination. Most time has been taken in dealing with minor or 'nuisance' spills, at terminals or outports, from industrial storage and from poorly maintained or designed drainage systems. These 'nuisance' spills range from a few litres of sump oil to 20 tonnes of bunker oil. They can ruin the aesthetics of a linear park or coastal lakeside sub-division!

The co-ordinator provides a focal point for various disciplines and groups from which information can be obtained and/or to which information can be distributed.

During a spill the SSC has provided a 'filter' to the many different inputs from the scientific and environmental community. This has allowed the OSC to attend to his prime role.

The SSC has the responsibility to know where information and expertise are available and to draw on them. 'Standard answers have been prepared for many media/public enquiries, e.g.

How 'poisonous' is an oil spill?
How will it affect animals?
How should it be removed from - feet, boats, birds etc?

Response Planning

Mapping of sensitive areas/cleanup priorities in consultation with various groups.

Publish records of above in easily understood format.

Educational role for Public Operators' Administrators/Politicians

Maintain lines of communication with particular expert bodies.

- Evaluate industry contingency plans, for terminals, refineries and exploration operators.

Research

Real Time Role

- Be able to appreciate severity of a spill with perhaps no more information than its approximate location and size.

Advise OSC on type and scale of scientific response needed and the practicalities of doing this promptly, e.g. 'finger printing' oil, spill modelling etc.

Take responsibility to initiate required action • e.g. this could range from 'do nothing' other than notify Wildlife and Fisheries authorities to a major response.

Keep written and visual records.

If the response plan and information is adequate, much of the work should be to authorise pre-arranged action via a flow chart.

A trial of 'real time' events was provided in South Australia a year ago. An oil spill was simulated over 2 days; 'Exercise Gulf Spill'. The scenario had the tanker 'Fortune' in collision with HMAS 'Nonsuch 'at Port Stanvac, a terminal in the middle of Adelaide's 60 kilometres of coastline. A spill of 1500 tonnes was reported.

The exercise was a test of communications; Murphy's Law was invoked liberally. The stamina of the response team was well tested and highlighted the need for adequate relief crew in real events.,

Follow up

Assist OSC to decide when is a credible time to cease clean-up.

Check waste disposal arrangements and long term action.

Implement any follow up monitoring. (Photo/video records at least).

Publish and distribute results.

Costs and Resources

The State to date has met costs on an ad hoc basis. Most spills have not involved activating the National Plan.

No S.A. State Authority has made specific allocation of money for contingency planning.

The role of the SSC is a part time one filled from the general marine environment/pollution area. No specific manpower allocation is made for the task.

A major cost in follow up monitoring has been for chemical analysis.

Experience in Implementing the Role of SSC

Training Seminars for clean-up operators.

Sensitive areas. State Map.

Inland spills.

Kangaroo Island spill.

Database compilation.

Port River spill and follow up monitoring.

Mangrove impact experiments.

Offshore drilling and contingency plans.

Environmental Impact Assessment and contingency plans for new oil terminal.

Operation 'Gulf Spill' - training exercise.

Future Directions

- Formalised contingency plans giving clean-up priorities based on sensitivity and/or feasibility of clean-up action need to be prepared.

- Most marine community distribution in S.A. is mapped only at very broad scale, if at all, e.g. seagrass/mangrove distribution.

- Inshore bathymetry is poor.

- Continue and improve education program.

Standardisation of analytical techniques.

- Post- Spills Impact and monitoring need guidelines for extent and areas for priority,

- Put National Plan documents on, say, Macintosh software • much easier to access and update, perhaps 'Hypercard'.

1

Paper 7: State Position Paper: WESTERN AUSTRALIA

Dr. David Gordon,
Environmental Protection Authority

There have been no major oil spills in Wcstcrn Australian waters, therefore our experience in the role of SSC for oil spill clean-up has been quite limited up until now. The potential exists, nevertheless, for large spills to occur, particularly from marine transport activities. The most likely locations for oil spills in WA coastal waters are just south of Perth, in the Kwinana-Fremantle region, and also along the north-west coast at Barrow Island, Dampier, Port Walcott and Port Hedland, these being focusses for transport storage and handling of oils.

The main oil-related activities are:

(1) tanker loading eg. at Barrow Island and Broome;

(2) unloading of refined products eg. at Fremantle, Port Hedland, Port Walcott and Dampier;

(3) bunkering eg. Port of Fremantle

(4) transfer of condensates eg. at Burrup Pcninsula near Dampier, as part of the North-West Shelf Gas Projects of Woodside Offshore Petroleum Pty. Ltd.

(5) oil exploration and production eg. 185 cxploratory wells were drilled offshore up until June 1983, from the start of this activity in WA in 1968. This has increased recently with the importation of several drilling vessels (Joncs et al. 1984).

Oil company figures for 1977 indicatcd about 560 000 tonnes (3.9 million barrels) were carried to and from WA ports per month. About 80% of thc oil was transported from Kwinana. Figures from the Department of Transport (1979) indicatc about 8.4 million tonnes of oil are handled annually in WA ports, 64% of this at Fremantle, including Kwinana. Reccnt statistics on oil spill risks for Australian ports handling at least 1000 tonncs of cargo during at lcast one year between 1982 and 1986 (Cosgrove, 1987) indicate that WA ports contributcd about 16% of oil-handling (loading, discharging) spills, 8% of bunkering spills and about 7% of miscellancous (ballasting, tank cleaning) spills. The equivalent figure for numbers of “at sea” spills was 10%.

A State oil spill combat committee, consisting of State and Commonwealth representatives, is responsible for the administration and operation of National Plan in WA. The State Combat Committee in WA consists of:

Cpt. W. Spencer (Department of Marine and Harbours)
Cpt. L. Atkinson (Fremantle Port Authority)
Cpt. D. Clarke (Department of Transport)

The Technical Advisory Committee to the above is represented by:

Mr. C. Robinson	(BP Refinery; Australian Institute of Petroleum Environmental Conservation Executive (AIPIECE))
Mr. T. Wilson	(Shell; AIPIECE)
Dr. H. Jones	(Fisheries Dcpt)
Dr. D. Gordon	(Environmental Protection Authority)
Mr. D. Atherden	(State Emergency Service)
Mr. D. Schonhut	(Department of Mines)

The following agencies are involved in oil response, and their roles and responsibilities are defined in the State Counter Disaster Plan:

Federal Department of Transport
WA Deptartment of Marine and Harbours (DMH)
WA State Emergency Service (SES)
WA Police
WA Fire Brigade
WA Dept of Mines
WA Environmental Protection Authority (EPA)
WA Department of Conservation and Land Management (CALM)
WA Fisheries Department
Department of Premier & Cabinet
Australian Institute of Petroleum Conservation Executive
Rottnest Island Board
Waterways Commission
Chemistry Centre of WA
Local government authorities

Under existing arrangements, EPA is the first contact to the State Contact Committee on environmental matters and liaises with other environmental agencies eg. CALM, Fisheries Department, -Waterways Commission, to provide the best advice to the Committee; to do this the SSC role is flexible and therefore the EPA representative may or may not be the SSC in the event of a spill.

The EPA representative on the State Combat Committee contributes to training courses through presentation of lectures on environmental aspects of oil pollution at Federal and State-run courses held in WA,

The field organisation for oil spill response in WA is shown in Appendix 1. Under this scheme the SSC liaises directly with other environmental personnel to provide advice to the on-scene co-ordinator (OSC). The SSC also liaises, if necessary, with the deputy OSC's responsible for offshore and onshore clean-up, who are linked directly to the OSC. Advice in an SSC role may come from one of several agencies eg. EPA, CALM, Fisheries Department.

Role of SSC in the State Plan

The perceived role of the SSC in the State Plan is to provide accurate, scientifically sound advice to the OSC on the preferred options for handling spilt oil, to ensure minimal damage to the environment. The SSC is usually an environmental scientist with expertise, or access to expertise, in marine biology and has three preferred options to consider in dealing with environmental implications of oil spills:

(1) containment and collection;

(2) do nothing; and

(3) apply chemical dispersants

SSC Responsibilities

a) Pre-incident Phase

Where the SSC is the EPA representative on State Combat Committee, responsibilities include providing an on-call service statewide to give advice and scientific support during oil pollution incidents and to provide advice to the committee, on environmental issues pertaining to spills.

The SSC also liaises with other relevant agencies to keep up to date on environment information (eg the marine resources inventory) and to be acquainted with updating of emergency procedures, eg. those outlined within the State Counter Disaster Plan (1988).

b) Real-time Phase

Once alerted, the SSC will contact any relevant personnel from other State agencies (eg. CALM, Fisheries and Waterways) who can assist.

The SSC ensures that appropriate environmental information will be available, or forwarded if necessary, to the field operation centre. This may include information on harbours at risk, photographs, climatological and hydrological data, areas with potential conflicts of interest, preferred site for particular options in the clean-up and special restriction areas, if known.

During the spill the SSC instigates discussions with relevant scientific personnel then advises the OSC. The SSC also advises the OSC on when, and under what conditions, it is appropriate to terminate a mode of action in the clean-up.

c) Post-incident Phase

The SSC reports on the spill. This may include advice given and follow-up action taken, and the needs for, and requirements of, any follow-up monitoring.

Costs and Resources Involved in Meeting the Identified Responsibilities

a) Pre-incident

Actual costs are difficult to allocate since this involves several agencies and the effort is not continuous. The main expenditure is in the preparation and publication of reports and marine resources inventories, which can amount to several thousands of dollars per report.

WA presently has three major reports with summary accounts of resources and information pertinent to oil spills:

(i) The Fisheries Department's Report No.74 (Jones, 1986) and accompanying resources atlases of the coast (1:250 000) divided into 16 categories (sectors) between WA/NT border and WA/SA border. These summarize (in maps and accompanying reports) the major significant components of the WA coast;

(ii) an EPA bulletin (Jones *et* al., 1984) outlining 67 environmentally significant locations along the WA coast, from Cambridge Gulf to Esperance. The report describes, generally, the nature of the communities at risk and their locations. It identifies them according to their global and state ecological importance. Nominal boundaries have been placed around these locations, defined as either environmentally-sensitive locations (ESL) or special protection localities (SPL), to delineate those waters where it is recommended as appropriate and safe to use dispersants. As a guideline this zoning recognises an 8km immediate protection zone (IPZ) around all ESLs and SPLs, and two adjacent'special conditions zones (SCZ) immediately outside the IPZ, of 22 and 20km width. The report recommends that no dispersants, should be used, without approval, in all ESL, SPL and IPZ zones. Existing recommended limits for dispersant use are waters less than 10m deep, or less than 8km from shore, whichever is applicable.

(iii) the State Counter Disaster Plan; which includes an annex dividing the coast into 22 sectors, for which there are general comments on chart (map) references of locations, ESL, SPL and IPZ locations, nature of coastline, predominant winds, currents, tides, nearest ports, nearest air access (long-range Hercules), shipping lanes and local government authorities.

Smaller costs (tens of hundreds of dollars) are met for preparation of lectures in training courses.

b) Real-time

In WA, because of large distances between towns or ports on an extensive coastline, the SSC role usually involves air travel. As an example, approximate costs are $500 return from Perth to north-west ports. With two incidents in remote locations within ten months in 1988 future air travel expenses for one SSC may be realistically estimated at $1000-$1500 pa. This cost is recoverable through the National Plan.

Minor costs may be involved during the 'real-time' phase in providing records of incidents (eg. photographs etc.).

c) Post-incident

Post-incident expenses include the costs of preparing incident reports, much of which will be met by the agency involved. Other costs may be incurred through requirements for undertaking post-spill monitoring. This cost will usually be met, however, by the polluter; EPA requires responsible parties to implement post-spill monitoring, and to provide the EPA with detailed reports on the results of these.

Further expenses may be incurred by SSC, or a relevant managing agency for any follow-up action eg. a review of oil damaged coast-line. This may require further air travel or deployment of vessels and manpower (eg. DMH, EPA, CALM etc.); costs are difficult to determine. They depend on location but probably amount to several hundreds of dollars per visit.

Experience in Implementing the SSC Role

a) Pre-incident Phase

'Activities have included:-

(i) commenting and advising on oil spill contingency plans prepared by oil, companies and ports (specifically where the SSC is an EPA officer);

(ii) holding discussions with other personnel (eg. officers in EPA, CALM, Fisheries and Waterways) to maintain or update oil response emergency needs;

(iii) presentation of information on environmental aspects of oil spills at Federal and State-run training courses. Recent examples in WA are:

(a) Equipment Operators' Course, Bunbury, August 1988

(b) Oil Spill Contingency Planning Workshop, Albany, August 1988

(c) Equipment Operators' Course, Mandurah, August 1988

b) Real-time Phase

There have been several potentially-serious spills in WA recently requiring SSC advice:

(i) Fremantle Fishing Boat Harbour; pipe rupture, in July 1986

(ii) Port Walcott, north-west Australia; ruptured fuel tank on ore transport vessel, in February 1988.

(iii) Cape Cuvier, north-west Australia; grounding and break-up of salt transport vessel, in May 1988

The SSC role has varied, depending on the nature of the incident. In the case of the Port Walcott spill, which involved a large amount of oil threatening mangroves, corals and beaches, in a location with a large tidal range and strong water movement, the SSC advice was largely concerned with the appropriate use of chemical dispersants. The SSC was, in this case, advised of the spill through the State Combat Committee and provided the necessary advice from Perth. This was relayed to the OSC, who was the harbour master. Approval was required for dispersant both in inshore waters, where the spill started, and in waters offshore, where the vessel had been ordered to minimise the impact on sensitive nearshore environments. Dispersant was applied to those parts of the slick threatening mangrove communities. Assistance was available to the SSC from regional environmental personnel in EPA and CALM, who participated in the clean-up. Post-spill surveys were undertaken using helicopter and beach inspection. Shires were asked to undertake physical clean-up of beaches. A monitoring programme was subsequently begun voluntarily by the company involved, to assess damage to mangroves and corals by oil and dispersants. Much of the oil dispersed readily in the first day, and the remnants appeared as tar balls on beaches in the vicinity over the next few days. Surveys were subsequently conducted farther afield by the regional Environmental Officer of EPA. Preliminary reports have been submitted to the EPA on the extent of degradation of corals and mangroves.

In the case of the Cape Cuvier spill, in which a bulk salt carrier ran aground on remote, low sensitivity coastline and leaked several hundred tonnes of bunker oil, the SSC was in attendance and inspected the site directly and by air in conjunction with the WA State Combat Committee personnel. In this case, the advice given, on account of the weather and sea conditions, the physical nature of the coastline and the remote location of the spill, was to leave the oil to weather naturally.

Staff from DMH inspected the site several months after the spill and reported little visible evidence of oil remnants on beaches and foreshore areas.

Future Direction and Priority Needs to Enhance SSC Role

The SSC role in WA could be enhanced through more extensive and detailed information on WA marine resources. This requires further surveys of 'high risk' coastlines where there are gaps in the information available.

At present the marine resources atlases in WA are limited in scope and of large-scale (1:250 000). There are many sensitive localities, such as mangrove and coral-dominated communities, for which we have little detailed information, including sites designated as ESLs or SPZs. Decisions need to be ma& on priority needs for an information base, priority areas requiring attention, the best scale of coverage and the allocation of resources to do this. Discussions are currently being held on this by officers from EPA and CALM, and the Fisheries Department.

More definitive information on the toxic effects of dispersants and dispersant oil mixtures on marine communities in WA would reduce the pressure facing the SSC in providing the correct advice to the OSC on the appropriate use of dispersants.

References

1. Commonwealth Department of Transport (1979). Assessing the risk of oil spills in Australian Waters. <u>In</u>: Joint Meeting of National Plan State Committees, Discussion Papers, Department of Transport, Canberra.

2. Jones, H.E. (1986) Marine Resources Map of Western Australia. Part 1. The Resources. Part 2. The Influence of oil on Marine Resources and Associated Activities with an emphasis on those found in Western Australia. Report No. 74. Fisheries Department, Western Australia.

3. Jones, H.E., Field, R.A. and Hancock, D.A. (1984). Procedures for Protection of the Western Australian 'Marine Environment from Oil Spills. Bulleting 104, Department of Conservation and Environment, Western Australia.

4. WA State Counter Distaster Plan (1988). Pollution of the sea and inland waters (Unpublished)

5. Cosgrove, D. (1987). Marine oil spill risk in Australia. In: 9th Conference of Australian Institute of Transport Research. University of New South Wales, December 1987, Division of Transport and Communications Economics.

Paper 8: ROLE OF THE SCIENTIFIC SCIENTIFIC SUPPORT CO-ORDINATOR IN THE TASMANIAN SUPPLEMENT TO THE NATIONAL PLAN TO COMBAT POLLUTION OF THE SEA BY OIL

J. Isaac,
Department of Environment

The organisation of the Tasmanian response group for a marine sourced oil spill is consistent with that for the National Plan as outlined elsewhere in these proceedings.

The Scientific Support Co-ordinator (SSC) is identified as performing a key role within that organisation as he is required to directly advise the Operations Controller (On Scene Co-ordinator).

The 'real-time' response functions of the SSC, as stated in the Tasmanian Supplement, are as follows:

1. Co-ordinate input from all environment centres
2. Prove balanced assessment of relevant environment priorities and sensitive areas
3. General liaison with all environment sources
4. Advise on the selection, application and use of clean-up equipment and materials
5. Provide assistance and interpretation of computer predictions of the likely track of oil slicks.

All harbour authorities in this State are encouraged to prepare and update as necessary port contingency plans to facilitate an effective response to an oil spill incident. The SSC (who is also the Manager, Scientific Support in the Department of the Environment) is available as required to advise the harbour authorities on such matters.

Tasmania has been fortunate to date in having very few ship sourced oil pollution incidents. At approximately 2000 hours on Saturday 18 December 1976 the 28,000 tonne tanker Bethouia grounded in the Tamar River and 350 tonnes of the cargo of 20,000 tonnes of petrol leaked into the river. The greatest risk in this case was that of explosion and fire and the long term environmental impact was minimal. The ship was eventually refloated and the cargo discharged. On the 3 December 1987 the mv. Nella Dan grounded at Macquarie Island. Initial estimates were that 5 tonnes of lubricating oil and 90 tonnes of diesel oil had been spilled. Although this area is a very important wildlife reserve, the weather conditions fortunately encouraged the off shore dispersal of the oil. The ship was finally scuttled in over 2,000 metres of water far off the west coast of the island.

Key personnel have been identified in the Tasmanian Department of Sea Fisheries, and Lands, Parks and Wildlife, also in the Tasmanian Inland Fisheries commission, to assist with the provision of information relating to the impact of oil on the environment. The Department of Sea Fisheries is also represented on the State Committee and the Dcparunent of Lands, Parks and Wildlife has previously been invited to nominate an observer to attend those meetings.

An important objective from the State Committee point of view is the preparation of an atlas of environmentally sensitive areas for Tasmania. It is recognised that in order to undertake an environmentally effective response to a pollution incident, information must be readily available on sensitive marine organisms and sensitive coastline structures.

Ideally such atlases should include the following information:

Coastal geomorphology
Important estuarine habitat and coastal lagoons
Marine reserves
Areas of high aesthetic value or tourist significance
Seabird rookeries
Marine mammal habitats
Aquaculture farms
Important wild fish habitats
Industrial water intakes
Areas of seagrass and kelp beds
Details of road access and shipping lanes
Areas acceptable for the use of chemical dispersants
Approved land disposal sites for oil spill debris.

Paper 9: ROLE OF THE SCIENTIFIC SUPPORT CO-ORDINATOR NORTHERN TERRITORY SITUATION

Peter Wright,
Conservation Commission of the Northern Territory

1. Organisational Structure

Procedures for the control, co-ordination and support response in the event of an oil spill in the marine environment of the Northern Territory are set out in:

- National Plan : Operations and Procedures Manual, Department of Transport and Communications (DoTC);
- National Plan : Operations and Procedures Manual, NT Supplement, DoTC; and
- Special Counter Disaster Plan : Pollution of the Sea by Oil, Northern Territory Emergency Services.

Implementation of the procedures is the responsibility of the Northern Territory Oil Pollution Prevention Committee, chaired by an officer of the Marine Branch, Department of Transport and Works. The committee operates pursuant to section 15 (e) of the NT Disasters Act, and comprises representatives of:

- Commonwealth Department of Transport and Communications.
- Darwin Port Authority.
- Northern Territory Department of Transport and Works, Marine Branch.
- Australian Institute of Petroleum Conservation Executive (AIPIECE).
- Northern Territory Emergency Service.
- Royal Australian Navy.

Consideration is being given to increasing membership to include representatives from the Work Health Authority and the Conservation Commission (to provide, "scientific" representation).

The NT Supplement to the National Plan lists three scientific support organisations : Work Health Authority (Hazardous Goods), Primary Industry and Fisheries (Fisheries Research), and Conservation Commission (Environment Protection). The SSC for the particular oil spill event would most likely be chosen from one of these organisations, depending on the circumstances of the spill, including location, and degree of oil spill response training of potential SSC's, etc.

Other scientific bodies likely to be called upon to provide advice include:

- Department of Mines and Energy
- Water Directorate, Power and Water Authority
- Museum and Art Galleries
- CSIRO
- Australian National Parks and Wildlife Service

2. SSC- Responsibilities

The role of the Scientific Support Co-ordinator (SSC) is to co-ordinate the provision of all scientific and environmental advice to the On Scene Co-ordinator (OSC) to assist in the development of an appropriate response to the spill.

The SSC will provide the On Scene Co-ordinator and deputies with a balanced assessment of environmental priorities within the area threatened by the spill, and act as a focal point for the provision of scientific and technical advice to the OSC. The SSC will also give environmental advice on site selection for disposal of contaminated debris.

Response planning activities so far undertaken in the NT have included:

- identification (in 1983) of sensitive coastal areas where dispersant should not be used, and regular amendments to reference maps to reflect increased knowledge of the coastal environment (appendix 1).

- Coastal Resources Atlas, prepared by the Conservation Commission (appendix 2) showing detailed resource information critical to decision-making in relation to coastal development and oil spill response.

- on-scene spill model (OSSM), run on CSIRONET and held locally by the Work Health Authority.

The role of the SSC during the response period and post-incident phase has not yet been fully addressed by the NT Committee; however, the nature and size of the administrative structure in the NT, including a relatively small professional/technical staff, has meant that a close working relationship exists between the various people who would be involved in oil spill response.

3. Costs and Resources

Costs associated with response planning, such as development and upgrading of databases are borne by individual authorities and are covered by financial resources obtained through normal budget arrangements.

Costs of the clean-up of an oil spill would normally be recoverable from the polluter with interim funding being made available through the National Plan.

4. NT Experiences

To date the Northern Territory has had no experience in dealing with a major oil spill, although there have been several incidents producing small localised spills around the coast line:

- March 1984 : loss of diesel during fishing trawler refuelling within waters of Cobourg Peninsula Marine Park.
- September 1984 : report of oil slick on beaches of Bathurst Island. Investigation revealed reef spawn.
- May 1985 : trawler fire and beaching led to controlled release of 30,000 litres of diesel, after modelling exercise using OSSM.

(The above events included participation by Scientific Advisors • several other incidents in Darwin Harbour (e.g. bilge pump-outs) have involved only DTW Marine Branch personnel).

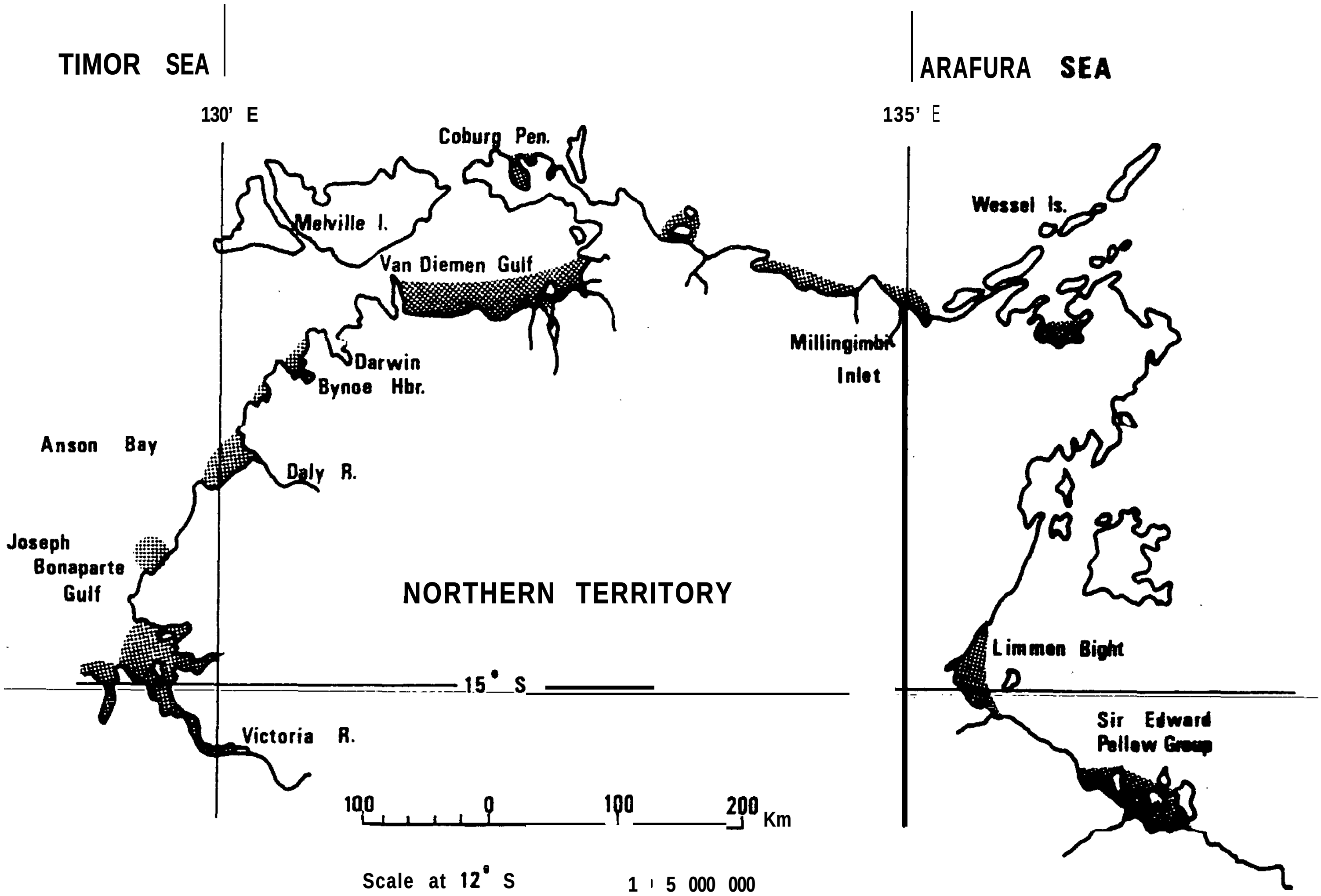
Problems

- no cost reimbursement for false alarms;
- isolated nature of NT coast makes fast response practically impossible and successful contaminant/clean-up improbable.

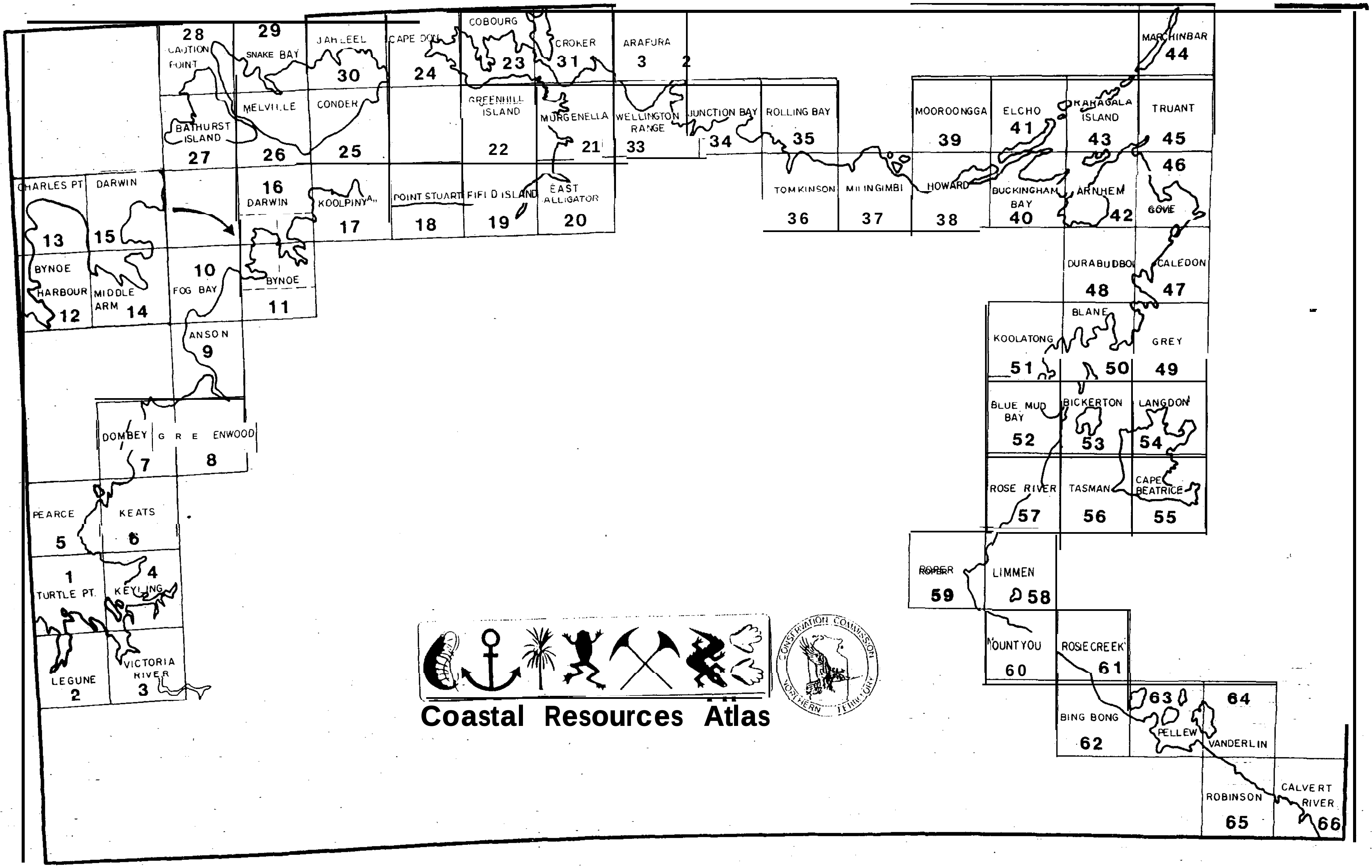
5. Future Directions

Priority actions include:

- expanding membership of Northern Territory Committee to include "scientific" advisors
- developing and refining procedures to cover role of SSC in the planning, response and clean-up phases of a spill
- upgrading of the coastal resources atlas to include a guide to appropriate response measures for each section of the NT Coastline
- improving ability to respond to spills in isolated areas' of coastline (communications, infrastructure, training)
- improving public awareness about all aspects of marine oil pollution (e.g. spill notification procedure, spill avoidance by individuals, awareness of environmental effects).
- establishing an information exchange/liaison network amongst interstate scientific support Co-ordinators.

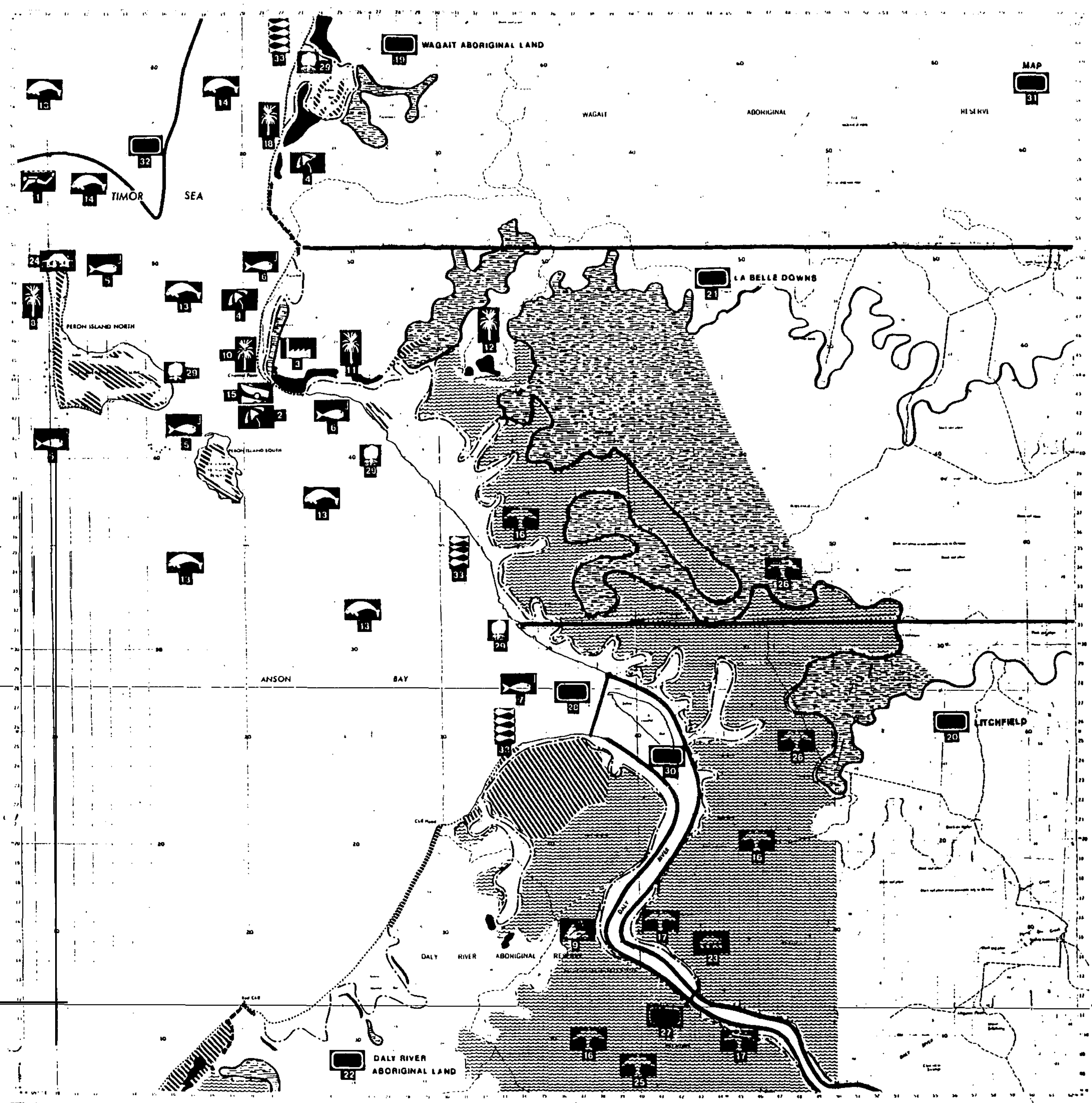


(a) ENVIRONMENTALLY SENSITIVE AREAS DISPERSANT RESTRICTED


Coastal Resources Atlas
28 CAUTION POINT
29 SNAKE BAY
JAH LEEL 30
CAPE DON 24
COBOURG 23
CROKER 31
ARAFURA 32
MARCHINBAR 44
BATHURST ISLAND 27
MELVILLE 26
CONDER 25
GREENHILL ISLAND 22
MURGENELLA 21
WELLINGTON RANGE 33
JUNCTION BAY 34
ROLLING BAY 35
MOOROONGGA 39
ELCHO 41
RARAGALA ISLAND 43
TRUANT 45
46
CHARLES PT 13
DARWIN 15
16 DARWIN
KOOLPINYAH 17
POINT STUART 18
FIELD ISLAND 19
EAST ALLIGATOR 20
TOMKINSON 36
MILINGIMBI 37
HOWARD 38
BUCKINGHAM BAY 40
ARNHEM 42
GOVE
BYNOE HARBOUR 12
MIDDLE ARM 14
FOG BAY 10
BYNOE 11
DURABUDBOI 48
CALEDON 47
ANSON 9
KOOLATONG 51
BLANE 50
GREY 49
DOMBEY 7
GREENWOOD 8
BLUE MUD BAY 52
BICKERTON 53
LANGDON 54
PEARCE 5
KEATS 6
ROSE RIVER 57
TASMAN 56
CAPE BEATRICE 55
1 TURTLE PT.
KEYLING 4
ROPER 59
LIMMEN 58
LEGUNE 2
VICTORIA RIVER 3
MOUNT YOU 60
ROSE CREEK 61
BING BONG 62
PELLEW 63
64 VANDERLIN
ROBINSON 65
CALVERT RIVER 66
CONSERVATION COMMISSION NORTHERN TERRITORY

AUSTRALIA 1:100 000 TOPOGRAPHIC SURVEY

ANSON



This map last UPDATED: Aug 1987

Suggested amendments for next UPDATE:

Name: Telephone: Date:

To retrieve Atlas information for a specific area

1. Note all the site location symbols in the area of interest, and for a radius of approximately 15 km surrounding. Note also the MAP boundary site for that map in the top right hand corner.
2. To relate these symbols to the Atlas Site Records, determine an 8 character SITE NUMBER for each site. The SITE NUMBER comprises a 2 digit map code, a 2 letter category code and a 4 digit site code.
   For example: [symbol] 4 on Map No. 9 ---------> SITE NUMBER: 09DU0004
3. Find the Atlas Site Record for each SITE NUMBER. N.B. Each Site Record contains specific site location details in the SITE DESCRIPTION and an Australian Map Grid designation for the site location symbol in AMG.

0 2 4 6 8 10

Kilometres

N

Map No. 9

Coastal Resources Atlas

Atlas produced by Tim Wood and Bridget Bottom

Site Categories

BY Boundary

RECREATIONAL

AN Anchorage

BR Boat Ramps

DV Diving

RE Recreation

RF Rec Fishing

COMMERCIAL

AQ Aquaculture

DE Development

FS Fishery

MG Mining

PR Prawn6

NATURAL ENVIRONMENT

BD Birds

CR Crocodiles

DU Dugong

FA Fauna

GE Geomorphic

MN Mangroves

SE Saagrass

TU Turtles

VE Vegetation

CULTURAL

H S Historic

MA Macassan

SS Sacred Site

SW Shipwrecks

Landform Categories

ROCKYFORESHORES

High Cliffs (>20m)

Low Cliffs (< 20m)

Degraded Cliffs

Rock platforms

COASTAL FLATS

Littoral Areas

Wetland6

Seasonally flooded plains

SANDY FORESHORES

Sandy beech

Beech ridges and low parallel dunes

Transgressive dunes and sand sheets

Sand or mud flats

VEGETATION COMMUNITIES

Rainforest

Mangrove6

COASTAL RESOURCES ATLAS OF THE NORTHERN TERRITORY

AMG: 526410008516000 CATEGORY: BIRDS SITE NUMBER: 09BD0017

SITE DESCRIPTION:

Magpie geese (Anseranas semipalmata) - strip 2 km wide along the Daly River from approx 10 km from the mouth upstream to the extent of the map

STATEMENT OF SIGNIFICANCE:

(1) The range of magpie geese has been drastically reduced since the settlement of Australia. They. are locally abundant in their present range. (2) Significant concentrations of geese are found here during the Dry season.

SOURCE:

P Bayliss, Qld. NPWS

REFERENCES :

CRVR SITE F08001, 00038, 00039, 00040, 00031, 00024

OTHER COMMENTS:

Refer P Whitehead, CCNT. Magpie geese breeding requirements are specific and nesting is in concentrations. This exposes entire breeding populations to the risk of cyclones, abrupt habitat decline, human disturbance etc.. A present threat is habitat destruction, caused the spread of Mimosa pigra.

This record last UPDATED: Aug 1987

Suggested amendments for next UPDATE:

Name: Telephone: Date:

Paper 10: QUEENSLAND REPORT - SCIENTIFIC SUPPORT CO-ORDINATORS ROLE

Phillip R. Cosser,
Local Government Department

The appointment of a SSC to the Queensland State Committee was made in October, 1987. However, the Committee was fortunate in that scientific representation was high, with professional staff from the Department of Fisheries, QNPWS, and GBRMPA, all providing input. Consequently, scientific advice was available prior to the appointment of a SSC. The nominated SSC for the Queensland State Committee is the Division of Environment.

One of the major objectives of the National Plan is to minimise the environmental impact associated with an oil spill. In order to achieve this objective methods for the containment, control, dispersion and clean-up of oil need to be applied which are appropriate to the circumstances of the spill. Where control and clean-up action is required, the decisions relating to the selection of methods and strategies to be used must be made with knowledge as to the social, economic and environmental consequences of the action. The role of the SSC is to provide informed advice to the OSC relating to environmental aspects of oil spill management. The SSC is responsible for co-ordinating scientific resources for emergency response to oil spills.

1. Response Planning

An effective and rapid response to a spill requires the immediate availability of information relevant to the decision-making process. A major responsibility of the SSC is to collate biological resource information and ensure that it is in a usable, interpretable and accessible form.

Specifically, responsibilities of the SSC in response planning include:

1.1 Pre-incident

- Assist in the production of documents and guidelines relating to environmental aspects of oil spills and oil spill control and clean-up.

- Provide advice to the State Committee on matters of a scientific nature.

- Assist in the development of those parts of **contingency plans** requiring **specialised** scientific **knowledge.**

- Acquire familiarity with the materials and methods used **in** oil spill clean-up and control, and the potential of respective methods **to adversely affect biological resources.**

- Acquire a knowledge and understanding of:

  - the physical and chemical properties of dispersants,
  - the fate of dispersants in the environment,
  - the toxicity of dispersants to marine organisms,
  - the role of dispersants in the degradation of oil.

  The SSC should be sufficiently briefed to the extent that he has a balanced and objective view as to the value of using dispersants in different oil spill situations.

- Assist in the collation of coastal biological resource information. Such information may take the form of a resource atlas in which habitat types and biological resources are identified, and for each, the location, extent, depth, seasonal occurrence (breeding areas), and significance are detailed.

- Collate information relating to the sensitivity of different **habitat types to** contamination by oil, and their sensitivity to different **methods of** clean-up (dispersant toxicity, etc.). Preferred methods of clean-up should be identified for **each** habitat type.

- Establish links with expert bodies and personnel who **may be called upon during an oil** spill.

- Identify research needs and establish research priorities

1.2 On-Scene Role

In the event of an oil spill:

Advise relevant personnel from other interested agencies (Queensland National Parks and Wildlife Service, Fisheries, Great Barrier Reef Marine Park Authority).

- Provide rapid assessment of, and advice on, the nature, behaviour and fate of the oil, e.g. toxic properties, alteration in physical and chemical characteristics which can be expected, and the prospects of water column mixing, sinking; etc.

- Co-ordinate, collate and evaluate all available information relating to biological resources within the region of potential impact.

- Identify 'sensitive' habitats and those of special significance.

- Determine environmental priorities based on the significance, sensitivity and recovery potential of identified biological resources.

- Provide balanced, sensible and realistic advice to the OSC relating to environmental priorities.

- Nominate preferred control/cl&-up methods.

- Pacify and control single interest groups.

1.3 Post-Incident

Following an oil spill:

- Provide advice to the OSC on when it is appropriate to terminate a mode of action in the clean-up operation.

- Identify priority research projects that may take advantage of a spill incident.

- Provide advice as to the need for, and the requirements of, any follow-up monitoring.

- Participate in post-spill monitoring studies for purposes of assessing the magnitude of alteration or destruction of naturally occurring populations, communities or habitats in both the short term and long term.

- Participate in debriefing session.

- Publish and distribute post-spill monitoring results.

2. Costs and Resources

Initial planning for a resource inventory is underway. The compilation of such an inventory will require considerable resource allocation in the near future. It is envisaged that the collation of data and the design of the presentation format will be done by the SSC and other members of the State Committee, but that the development of the resource inventory will be contracted to a computer consultancy firm. A computer stored resources atlas is currently under consideration by the Great Barrier Reef Marine Park Authority for resources within the Marine Park. It is probable' that the same format and company will be used for the development of a similar atlas for the remainder of the Queensland Coast. An approximate cost estimate is within the region of $20 - $30,000.

More time will also be allocated by the SSC in the near future for the compilation of a regional personnel directory. Liaison with regional support personnel and the compilation of material relevant to the region has a high priority.

In both 1987 and 1988 the SSC was requested to provide input into regional training exercises which involved expenditure by the Division of Environment, for airfares and accommodation.

3. Experiences in Implementing Defined Roles

- Experience on-scene is nil.
- Involvement in all aspects of pre-incident response planning. Specifically:
  - resources inventories have been reviewed and a format proposal prepared for a Queensland inventory;
  - an extensive library of research papers relating to oil pollution and its effects on marine coastal habitats - seagrass, mangroves, coral reefs - has been compiled,
  - talks have been given at two operators workshops relating to environmental considerations of oil spills.
- A simulated oil spill is planned for January 1989, in which the SSC will participate.

Paper 11: GBRMPA'S RESPONSIBILITIES AS SCIENTIFIC SUPPORT CO-ORDINATOR IN THE GREAT BARRIER REEF REGION.

Wendy Craik,
Great Barrier Reef Marine Park Authority

The Great Barrier Reef Marine Park Authority (GBRMPA) established under the Federal Great Barrier Reef Marine Park Act in 1975, has the responsibility for care and development of a Marine Park in the Great Barrier Reef Region with the objective of conservation of the Great Barrier Reef and reasonable use.

The Great Barrier Reef Region covers some 350,000 km^2, stretches over 2000km and contains 2900 reefs.

As part of its responsibilities, GBRMPA requested the Department of Transport and Communications to develop an oil spill contingency plan for the Great Barrier Reef Marine Park. The resulting plan REEFPLAN (DoT, GBRMPA, 1987), provides such a contingency plan for the Great Barrier Reef Region and Adjacent area.

Under REEFPLAN, GBRMPA has to provide the Scientific Support Co-ordinator (SSC), Administrative Support Co-ordinator (ASC), and is partially responsible for the Media Liaison Officer (MLO).

REEFPLAN ocganisation

The organisation of REEFPLAN is as attachment 1.

REEFPLAN is to be integrated with the Queensland State plan: in the event of a spill the Queensland State Committee (of which GBRMPA is a member) and the Great Barrier Reef Marine Park Authority provide advice to the On Scene Co-ordinator.

GBRMPA as SSC

GBRMPA's Scientific Support Co-ordinator has the following responsibilities:

i. development of a database of relevant scientific information
ii. advice to the On Scene Co-ordinator

iii. development and implementation of a monitoring strategy and response in the event of an oil spill

i. Development of a database of relevant scientific information

In developing a database of relevant scientific information, GBRMPA has taken the following initiatives:

- conducted a workshop on response to hazardous chemical spills in the Great Barrier Reef Region (Craik, 1985)

- developed a list of scientific contacts in different subject areas with office and after hours contacts

- produced a brochure to assist the public to distinguish between oil, *Trichodesmium* blooms and coral spawn slicks to help in reporting pollution incidents

- produced a user-friendly pilot computerised strategic atlas for an oil spill management program for use by SSCs and OSCs. It is envisaged that this will be expanded to a full atlas shortly. A description is included as Paper 24 in this proceedings.

- supported a number of research projects relevant to oil spills, in particular, projects providing information on water movements in the GBRR

- is compiling dedicated SSC kits for use in oil spills including:

  - video camera
  - still camera
  - oil sampling instructions
  - clean-up information
  - local area resource information
  - GBRMPA Zoning Plans
  - list of scientific experts.

- provided input to permit conditions relating to possible spills eg. for fuel barges and on-reef developments

- established an after hours response facility for GBRMPA's nominated SSCs.

ii. Advice to the On-Scene Co-ordinator

To date, this has not been required as there have been no spills of the magnitude etc. requiring development of a combat response. The management strategy contained in the computerised resource atlas should be valuable in this respect, in conjunction with relevant local advice.

iii. Develonment and implementation of a monitoring strategy and response in the event of an oil spill

A monitoring program to be implemented in the event of an oil spill has yet to be developed. It is envisaged that tenders will be called to develop such a program including:

- specification of protocols and equipment necessary
- biological and socioeconomic assessments required
- follow-up and longer term monitoring
- possible experimental actions to be tested for management purposes eg. experimental use of dispersants

The recent development of monitoring programs for GBR tourism developments and. specific environmental issues provides a good basis for development of such a program.

A monitoring program should focus on quick and useful monitoring measures eg. numbers of coral lesions rather than growth rates of corals, as outlined by Jackson *et* al. (1988).

In the event of a spill a debriefing session on the monitoring program will be essential to modify the program for future oil spills.

Costs and Resources (estimate)

Personnel:	approx. 0.5 persons p.a.
Research	approx. $10,000 - $20,000 p.a.
Equipment:	approx. $ 2,000 (1988)
Maintenance:	nil.

Experience to date

GBRMPA experience in oil spills has been confined to small spills only, in which no combat response has been required with the exception of a Taiwanese clam boat, the Hui Ju Hup. However, two small spills (approx. 30 litres) have had high media profile because they occurred at the Four Seasons Floating Hotel at John Brewer Reef. The biological effect was believed negligible, but a follow-up visit recommended changed procedures for fuel transfer operations.

Future Directions

- develop computerised resources atlas
- print and distribute pamphlet

SECTION C: INFORMATION AND DISCUSSION PAPERS

- establish oil spill trajectory model for the reef
- develop monitoring program
- participate in an oil spill exercise
- develop directions/operating plan for SSCs

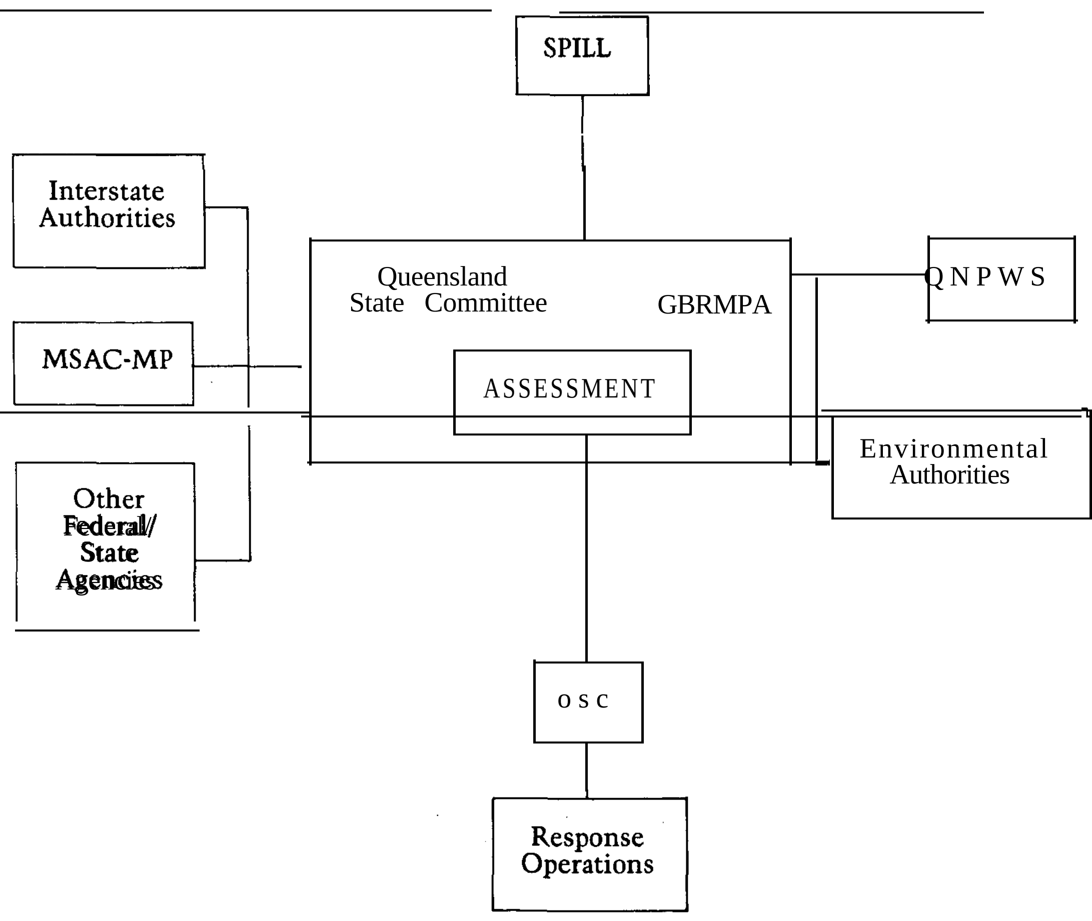
References

DoT, GBRMPA. 1987. REEFPLAN Oil Spill contingency plan for the Great Barrier Reef. DoT Canberra 1987. 75pp

Craik, G.J.S. 1985 (Ed) Workshop on response to hazardous chemical spills in the Great Barrier Reef. GBRMPA Workshop Series No. 6. 107 pp

Jackson J.B.C., H.M. Guzman and E. Weil 1988. Effects of a major oil spill on subtidal reef corals along the Caribbean coast of Panama. Abstracts 6th. Int. Coral Reef Symposium, Townsville 1988 p.51

Attachment 1: REEFPLAN Liaison and Responses



Paper 12: OSC FIELD ORGANISATION

R. Lipscombe,
Department of Transport and Communications

Introduction

The response to an oil spill is an exercise in team work and co-ordination with the size and complexity of the spill dictating the scale of the team required. If the spill is extensive, virtually all resources available within the region where the spill occurs may need to be mobilised.

This paper outlines the field organisation and support staff required to assist the On Scene Co-ordinator and discusses his role and responsibilities.

Scope

The scale of the organisation employed in an oil spill response will be determined by the size and nature of the threat and potential impact of the spill. The organisation available to the OSC should be structured so that it can cater to the scope and complexity of a particular operation. It should therefore be flexible enough to deal with small incidents as well as being capable of handling major incidents requiring co-ordination between various response organisations and the control of substantial resources of men and equipment.

In order to minimise delays in the initial hours of a major spill it is essential that the organisation is in place before a spill occurs.

An integral part of this organisation is a formal reporting mechanism which allows all interested people and authorities to be contacted and kept informed.

Field Organisation

An advance operations centre should be established close to the scene of an incident staffed with Federal, State and other personnel, including representatives from the oil industry as required. From this centre the OSC will direct overall response operations and co-ordinate activities of the various bodies involved in a clean-up operation. In co-ordinating an effective response, the OSC will be assisted by key personnel (figure 1). Depending on the severity of an incident these personnel will include the following:

- Deputy OSC (foreshore).
- Deputy OSC (offshore).
- Scientific Support Co-ordinator (SSC)
- Administrative Support Co-ordinator (ASC)
- Media Liaison Officer

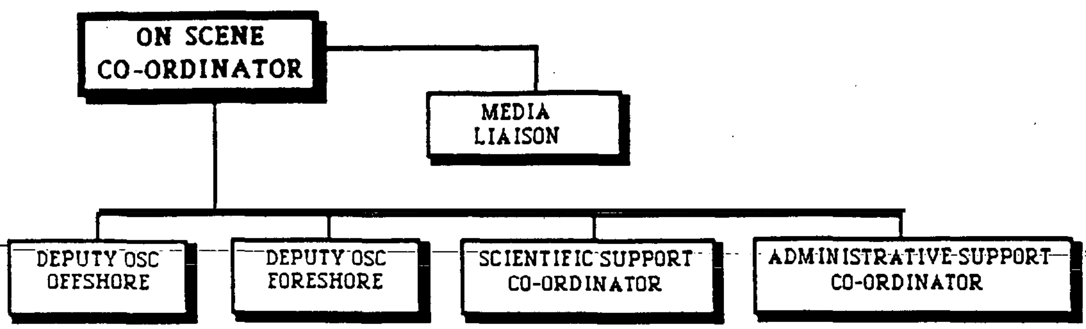


Figure 1

It is generally envisaged that, as the OSC is the person appointed by an authority to take direct charge of clean-up operations, he will have close support provided by the State Oil Pollution Committee. An efficient communications link using telephone, facsimile, telex, and, if necessary, a radio network, is therefore seen as one of the first facilities established between the OSC's advance operations centre and the support centre accommodating members of the State Committee.

In addition to members of the State Committee, the support centre will be manned with as many staff as is required to provide full back-up support to personnel manning the advance operations centre.

Experience, both nationally and internationally, has highlighted the need for well defined media relations procedures following a major oil spill. A lack of adequate procedures may result in what is an otherwise well conducted oil spill response operation receiving bad publicity.

To prevent this occurring it is important that there is adequate media support. This can be achieved by the provision of a Media Liaison Officer (MLO). The MLO will operate from the advance operations centre and be responsible for liaising with representatives of the media. His role would, be to provide sufficient information and facilities to satisfy press, parliamentary and public inquiries. All information provided to the media must originate either from the OSC or MLO.

Activation of Response

Response action following an oil spill can be separated into four relatively distinct phases:

reporting and alerting
evaluation and mobilisation
containment and recovery
clean-up and disposal.

In actual practice these four phases may follow consecutively but more often overlap.

A first priority in activation is the reporting of the spill to the authority having responsibility for combating the spill. The potential seriousness of the spill is evaluated and further action is determined.

Actions to combat, contain and clean up the spill should be initiated as soon as possible following receipt of the spill report and assessment of the situation. The decision to commence these actions should be based on the best possible information about the spill. To obtain this information it may, in some cases, be necessary to send an observer to the spill site to overfly the scene before the final size and composition of the response organisation can be determined. Once commenced, response operations will be conducted under a unified command controlled by the On Scene Co-ordinator.

On Scene Co-ordinator (OSC)

National and international experience in dealing with marine oil spills clearly indicates that a single authority, or On Scene Co-ordinator, must be appointed to take overall responsibility for co-ordination of activities if a response is to be successfully accomplished. Recognising this, the National Plan to Combat Pollution of the Sea by Oil, Glossary of Terms, defines the On Scene Co-ordinator (OSC) as "the person appointed by an authority to take direct charge of operations to combat a pollution incident".

The On Scene Co-ordinator is responsible for the co-ordination and direction of pollution control efforts at the scene of an existing or potential oil spill. The OSC will be charged with the responsibility for the direction and deployment of available resources to initiate and continue oil spill countermeasures, including containment, recovery and/or dispersal, foreshore clean-up and disposal functions. First and foremost a decision maker, he must be flexible and capable of selecting the most appropriate course of action from a number of available alternatives. He must be familiar with a variety of oil spill combat response options in order to carry out effective combat witliin the limitations of reasonable expenditure. Additionally, he must be capable of maintaining close co-operation between authorities to allow rapid deployment of response equipment and resources (figure 2).

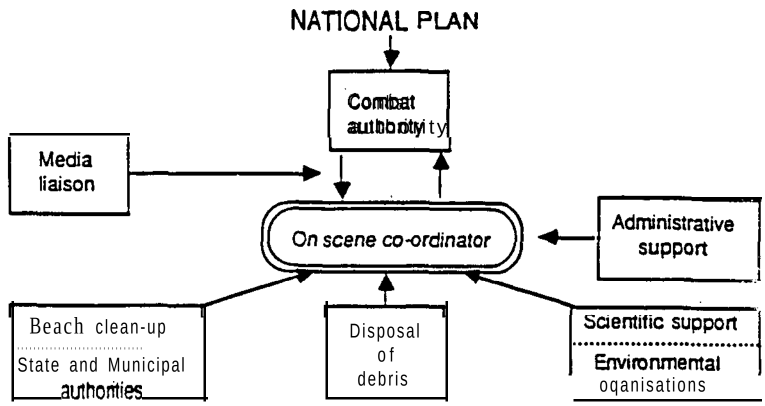


Figure 2. **Example of cooperation between OSC and dean-up authorities.**

Responsibilities of the On Scene Co-ordinator

In responding to an oil spill, the OSC **must** be capable of selecting the most appropriate method of response. His responsibilities are:

- determine pertinent facts about a particular spill, the nature, amount and location of the discharged oil; the probable movement and rate of travel of the oil; its impact on human activities and the environment; the resources and installations which may be affected and the priorities for their protection.

- determine the extent of the response necessary.

- determine the location of the advance operations centre and the scale of support staff required.

- determine the extent to which the assistance of associated authorities and resources are required.

- initiate and direct combat measures, clean-up and disposal operations.

- initiate appropriate level of documentation and supporting data needed for effective cost recovery action.

- determine the degree of hazard existing and if necessary arrange for crowd control procedures to be implemented.

- ensure timely release of information through the media liaison officer.

- arrange collection of oil samples for analysis.

I'

- preparation of a report covering all aspects of the spill and response operation.

To assist him in meeting his responsibilities, the OSC will be assisted as required by key personnel assigned to specific areas and tasks.

Deputy On Scene Co-ordinators

The deputy on scene co-ordinators will be responsible for tasks in clearly specified areas (figure 3) and will provide advice and recommendations to the OSC to assist him in achieving the most effective and economic response. In the absence of the OSC a deputy will act in that capacity.

Other responsibilities of the deputies will include:

- translation of the policy and direction of the OSC into an effective clean-up and disposal program.
- ensure a flow of information from the clean-up area to the OSC and attend regular planning meetings to discuss progress and strategy of clean-up operations.
- make recommendations to the OSC based on developments as they occur within their area of operation.
- maintain effective use of clean-up personnel and equipment
- ensure that safety of personnel is paramount at all times and that personnel and equipment are not being used beyond their limitations.
- receive weather forecasts and cnsurerclevant personnel are informed.
- in the absence of a dedicated communications officer, set up a working communications system.
- ensure that adequate recording data is being supplied to the Administrative Support Co-ordinator's staff.

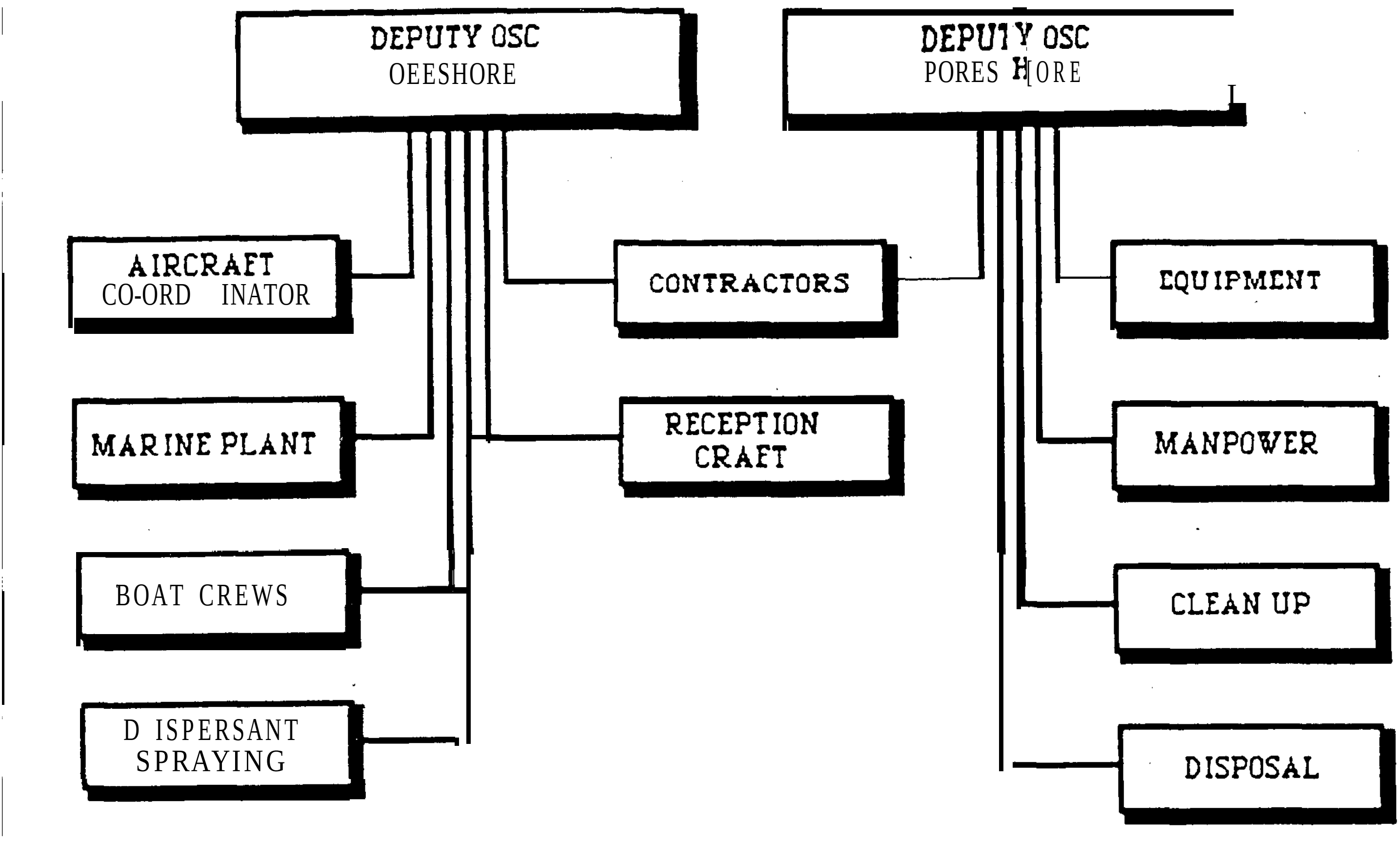


Figure 3

Scientific Support

One of the reasons for taking action following an oil spill is to minimise environmental damage. To enable the OSC to take the most effective course of action it is important that he be provided with accurate environmental information and advice. Scientific support provides this information and advice which requires co-ordination and access through one individual, the Scientific Support Co-ordinator (SSC) (figure 4).

The Scientific Support Co-ordinator will co-ordinate the input from all environmental interests and provide the OSC and his deputies with a balanced assessment of environmental priorities within the area threatened by the spill.

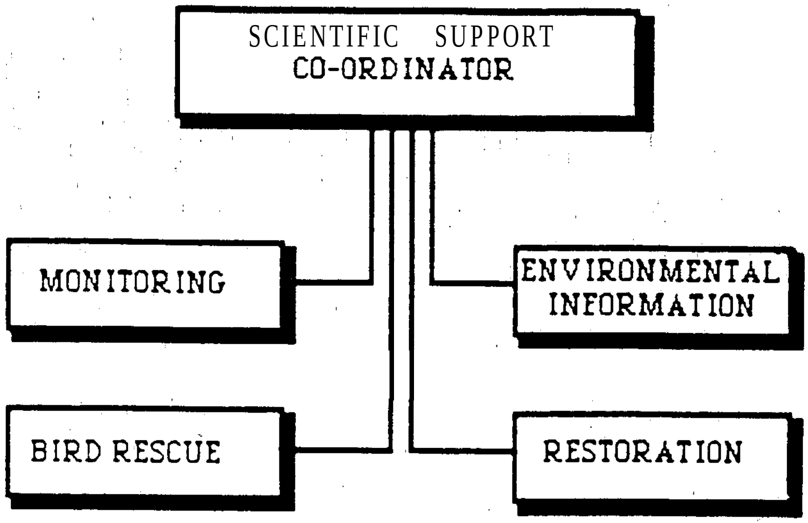


Figure 4

Administrative Support

One of the most important tasks in an oil spill response is to accurately document the history of the, incident. It is therefore essential that the OSC has an Administrative Support Co-ordinator (ASC) on the team to ensure that this task is carried out. Dependent upon the size and complexity of a particular operation, the ASC will make certain that sufficient support staff are available to oversight the planning and monitoring of all administrative activities (figure 5).

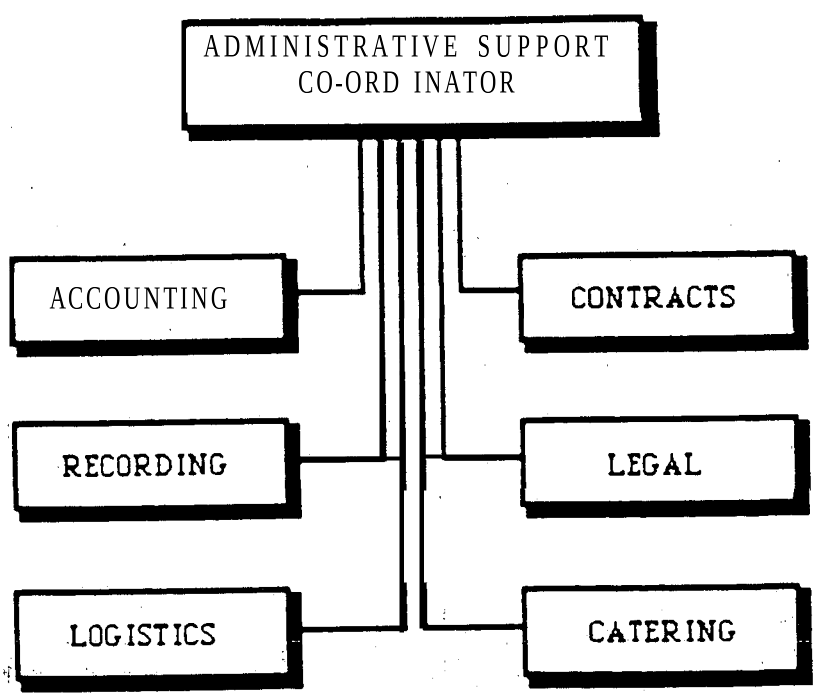


Figure 5

Summary

The type of field organisation employed in an oil spill response should be structured so that it can cater to the scope and complexity of a particular operation. It is not necessary to plan in detail for the maximum credible incident but the arrangements should be sufficiently flexible to be easily adopted or enlarged to deal with a major spill or a particularly complex and time consuming operation. An example of an OSC field organisation designed to cater for a major spill is shown at figure 6.

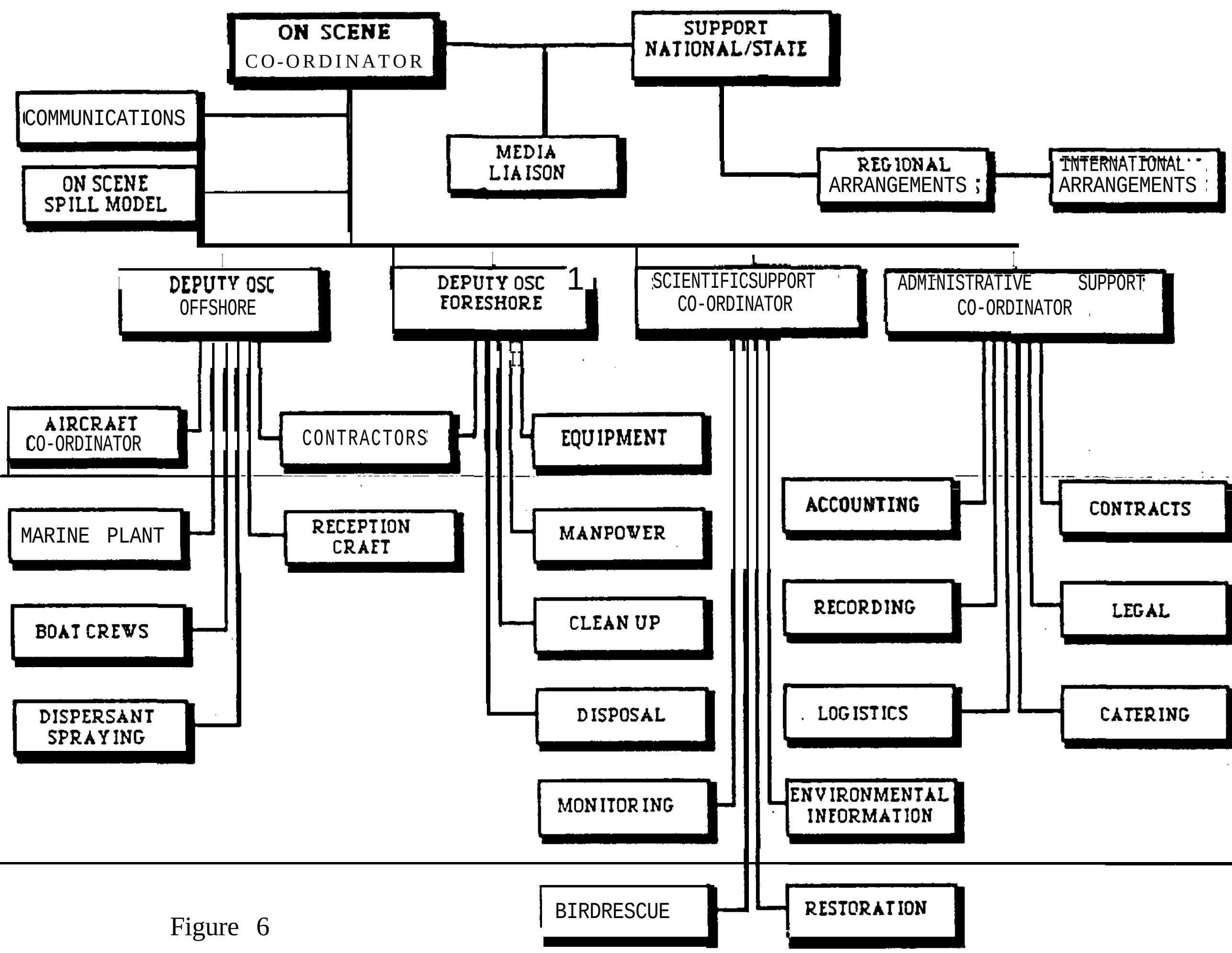


Figure 6

Paper 13: SPILL MITIGATION

R. Lipscombe,
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Introduction

For centuries crude oil has seeped from subterranean reservoirs into our oceans and seas without creating major physical problems to the marine environment. The problem of pollution can arise however, when man taps these sources, transports the oil and in so doing may allow large quantities to escape accidentally. If left alone this oil will, in time, degrade naturally but in the process may harm the environment either by damaging amenities or by killing or injuring marine life and birds. As a result of media coverage of such events most people are now aware of the immediate and dramatic effects of marine oil spills - oil soaked birds and fouled beaches are the visible effects. Less visible, but equally alarming, are the long term effects on marine life, fishing and related industries. Tourism also suffers as a result of major oil pollution incidents.

Marine oil pollution can therefore adversely affect a range of coastal resources. These can be conveniently classified into:

* recreational and amenity areas
* industrial installations
* marine fauna and flora
* sea birds
* commercial fisheries

In an attempt to mitigate the harmful effects of a marine oil spill it is therefore necessary to take steps to remove oil from the sea or to accelerate the process of bio-degradation.

Spill Response

Marine oil spills are a problem, and, invariably, a spill will create damage, the magnitude and extent varying according to a number of factors, including, volume spilled, location, and conditions prevailing at the time.

In Australia, the National Plan to Combat Pollution of the Sea by Oil (National Plan) has been in operation since October 1973. The Plan represents a combined effort by Commonwealth and State governments, with the assistance of the oil industry, to help provide a solution to the threat posed to the coastal environment by oil spills from ships.

An initial requirement for the successful handling of oil pollution incidents in Australia was a clear definition of responsibilities of the two major participants, the Commonwealth and the States. This was provided following discussions between these participants in a set of Commonwealth/State administrative arrangements. Based on the capacity to take action to prevent or clean up pollution by oil from ships, the arrangements provide that prime responsibility for action lies with various bodies, depending on the location of the spill:

1. within a port or harbour:
   the administrative authority of that port or harbour

2. on beaches and foreshores:
   the relevant State government or Territorial authority

3. in territorial seas:
   a. in Western Australia, Victoria and Tasmania, the relevant State governmental authority, and
   b. in all other States and the Northern Territory, the Commonwealth Government authority (represented by Commonwealth regional authorities), at the request of the relevant State government or Territorial authority

4. on the high seas:
   the Commonwealth Government authority, represented by Commonwealth regional authorities.

No matter which authority has initial responsibility for responding to an oil spill, the administrative arrangements provide that other authorities shall assist, so far as practicable, the authority having prime responsibility for action. The arrangements also provide for an authority to request another to accept responsibility when the magnitude of response required exceeds its capability,

Each State and the Northcm Territory has a co-ordinating committee responsible for the administration and operation of the National Plan within its area. This commiuee, which includes representatives from Commonwealth and State marine authorities, port and harbour authorities, the oil industry, and other departments, is also responsible for the provision of advice to the authority combating a marine pollution incident.

Having evaluated the threat posed by an oil spill the most appropriate response can be identified. The National Plan considers three options for clean-up of oil spills in the marine environment:

leave alone, but monitor;

control and recover, using booms, skimmers and sorbcnts; or

- disperse using oil spill dispersants.

Depending on the location of the spill the best course of action may be simply to 'monitor the movement of the oil as a combination of natural dissipation and distance from valuable resources requiring protection precludes any other response. In such situations it is recommended that no action be taken apart from reporting the incident and then monitoring the movement of the oil by aerial overflights.

If the indications are that the oil spill is going to impact sensitive resources then every effort should be made to physically deal with it at sea using control and recovery techniques. If successful, such techniques will prevent damage, high clean-up costs and the inevitable public uproar which follow widespread pollution of recreational waters and amenity beaches and foreshores.

It is generally accepted that the removal of oil from the sea by mechanical means is the preferred response technique for a number of reasons:

(i) recovery of the oil removes the threat of environmental damage

(ii) mechanical control and recovery devices such as booms and skimmers in themselves do not cause significant environmental damage (though their deployment may cause problems if correct judgement is not exercised)

(iii) recovered oil may, in certain circumstances, have a commercial value while dispersed oil is lost

Mechanical control and recovery techniques have many features of the ideal response system, removal of pollution potential and insignificant environmental consequences. In practice, however, mechanical devices can suffer a number of disadvantages, including:

(i) weather and tidal influences reducing the efficiency of booms and skimmers or preventing their use

(ii) floating debris damaging or inhibiting efficient operation of equipment

(iii) limitations of certain types of skimmers and pumps in handling viscous oils and water-in-oil emulsions

(iv) need for trained operators and support equipment

(v) high capital cost.

In situations where the range of circumstances are such that it is not possible to deploy control and recovery equipment, consideration may need to be given to the use of dispersants to enhance the natural dispersal process. The dispersant option is adopted in those situations where the possible short term risk to marine life resulting from its use is balanced against damage that will be caused to sea birds and mammals, coastal amenities and intertidal marine life by untreated oil or by the foreshore clean-up response that may subsequently have to be carried out.

It is unlikely that a response team will bc in a position to protect the whole length of a threatened coastline to an equal extent during a major oil pollution incident. It is more realistic to attempt to reduce the impact at those locations that are considered to have the highest priorities for protection.

As it is likely that only part of a large spill will be recovered or dispersed at or near the source, secondary measures to clean up ashore will be required. Once oil is ashore the most appropriate response will depend on the physical features of the affected area. There may be occasions when the best course of action will be to do nothing; oiled cliffs, rocky shores and remote beaches not used by the public and subject to wavc action should be lcft alone as they will eventually be cleaned by natural processes. Salt marshes, mud flats and muddy estuaries should, in most cases, be left alone as attempts to treat or recover the oil may be far more damaging than the effect of oil left untouched to clear by flushing and natural dispersion. If removal of oil is necessary, such as from popular amenity beaches, the methods employed arc likely to bc reasonably straightforward and not require the use of sophisticated clean-up equipment.

Equipment Availability

Under National Plan arrangements, specialist rcsponsc equipment is made available on a long term loan basis to State marine and port authoritics (details of equipmcnt held by the National Plan and provided to the States under these arrangements is containcd in Anncx 1).

This equipment, comprising booms, skimmcrs, surfacc and acrial dispersant spraying equipment, workboats, recovered oil bargcs and tanks, radios and othcr ancilliary equipment, is held at strategically assessed locations around Australia. In addition to stockpiles of dispersant stored at major ports, two complete scts of high capacity pumping equipment for cmcrgcncy transfer of oil cargoes and bunkers and Yokohama fenders for ship to ship transfcr opcrations arc hcld in the Department's stockpiles located in Brisbane and Frcmantlc. All equipmcnt placcd with authoritics on a long term loan basis is available for redeployment to thc site of a major oil pollution incident.

Training

Recognising the problcms of managing oil spill response operations with untrained and inexperienced personnel, the Department of Transport and Communications conducts three levels of oil spill combat training. The training courses are designed to mcct operator, management and contingency planning needs of an oil spill response (basic details of each course are contained in Annex 2). In addition, the Department encourages State authorities to conduct regular tabletop exercises and the exercising and testing of equipment to ensure that personnel are familiar with response, structures and techniques and that the equipment is in working order.

Summary

No single method of response to an oil spill will meet all the various demands, especially as the situation alters. In view of the fact that the initial response has to be made rapidly to be effective, it is important to agree on a basic policy in advance on the use of available techniques. This policy should include details of areas where dispersants may or may not be employed, pre-designated sacrificial areas and so on. Advance planning and an agreed policy are clearly necessary if an effective response is to be mounted in what is usually a fast developing crisis situation.

References

Measures to Combat Oil Pollution	Graham & Trottman Ltd., London
The Basics of Oil Spill Cleanup	Supply & Services, Canada, Quebec
Accidental Oil Pollution of the Sea	Her Majesty's Stationery Office, London
A Field Guide to Coastal Oil Spill Control and Clean-up Techniques	CONCAWE.

Annex 1

State	Equipment	Quantity	Location
New South Wales	Vikoma Seapack	one	Sydney
	MARCO Class 1 oil recovery vessel	one	Port Botany
	JBF DIP 1003 oil recovery vessel	one	Sydney
	Morris Ml30 skimmer	one	Sydney
	Hoyle T-Disc skimmer	one	Sydney
	Walosep W1 oil recovery unit	one	Sydney
	Walosep WM oil recovery unit	one	Sydney
	Vikovac oil recovery unit	one	Sydney
	Barracuda 2000 oil recovery unit	one	Port Botany
	Komara 12K MKIII skimmer	one	Sydney
	OMI MK 1 l-6 DPES oil recovery unit	one	Newcastle
	OMI 260 oil recovery unit	one	Port Kembla
	Expandi trawl boom	one	Sydney
	GP500 boom	510m	Port Kembla
	GP500 boom	885m	Newcastle
	GP500 boom	510m	Sydney
	GP800 boom	300m	Sydney
	Expandi 3000 boom	400m	Sydney
	Versatech 12/18 boom	300m	Sydney
	Roulunds Bay boom	1200m	Port Botany
	UHF Radiocommunications network	one	Sydney
	Computer mapping program		Port Botany
	Sorbent materials	various	All ports
	Simplex helicopter spray unit	two	Port Botany
	Recovered oil barge	one	Port Botany
	Recovered oil barge	one	Sydney
	Transpac bouyant recovered oil containers	six	NS W Ports
Victoria	Vikoma Seapack	one	Melbourne
	MARCO Class 1 oil rccovcry vessel	one	Melbourne
	Troilboom and GT185 skimmcr	one	Westernport
	OMI 6D oil rccovcry unit	one	Port Melbourne
	OMI 4D oil recovery unit	three	Port Melbourne
	Barracuda 2000 oil recovery unit	one	Geelong
	Komara 12K MKII skimmcr	one	Portland

Annex 1 (cont.)

State	Equipment	Quantity	Location
Victoria (cont.)	Komara 12K MKIII skimmer	one	Melbourne
	Skimmex tidal boom	500m	Melbourne
	Aust-Pol Beach boom	60m	Melbourne
	GP800 boom	200m	Melbourne
	Polutek boom	200m	Portland
	Expandi 3000 boom	100m	Portland
	Expandi 3000 boom	300m	Geelong
	Maximax boom	180m	Melbourne
	Versatech 12/18 boom	300m	Melbourne
	Vikoma Oceanic boom,	600m	Westernport
	Vikovac oil recovery unit	one	Melbourne
	Oiled bird cleaning units		Melbourne
	Computer mapping program	•	Melbourne
	Sorbent materials	various	All ports
	Aluminium punts	four	Melbourne (3)/Geelong
	Simplex helicopter spray unit	two	Westernport/Geelong
	Transpac bouyant recovered oil containers	five	Vic Ports
	Oil pollution services craft "CLAM"	one	Melbourne
	Recovered oil barge	one	Westernport
	UHF Radiocommunications network	one	Melbourne
	Dispersant trailer	one	Geelong
Queensland	MARCO Class 1 oil recovery vessel	one	Brisbane
	Slickskim oil recovery unit	one	Brisbane
	OMI 6D oil recovery unit	one	Gladstone
	Hoyle T-Disc skimmer	one	Brisbane
	Komara 12K MKIII skimmer	one	Cairns
	Troilboom and GT 185 skimmer	one	Brisbane
	Polutek Trawlboom and GT185 skimmer	one	Townsville
	Polutek boom	300m	Gladstone
	GP500 boom	120m	Brisbane
	GP800 boom	600m	Brisbane
	GP800 boom	300m	Cairns
	GP800 boom	300m	Townsville
	GP800 boom	200m	Rockhampton

Annex 1 (cont.)

State	Equipment	Quantity	Location
Queensland (cont.)	GP800 boom	200m	Weipa
	Versatech 12/18 boom	300m	Brisbane
	Maximax boom	100m	Brisbane
	Skimmex tidal boom	300m	Brisbane
	Minipak 5 - Hoyle Mini Boom	40m	Brisbane
	Sorbent materials	various	All Ports
	Transpac bouyant recovered oil containers	five	Qld Ports
	Inflatable dinghy	one	Brisbane
	Inflatable dinghy	one	Townsville
	12m GRP catamaran oil pollution services craft "TRITON"	one	Brisbane
	12m GRP Catamaran oil pollution services craft "CHITON"	one	Townsville
	Recovered oil barge	one	Brisbane
	VHF portable radios	various	Brisbane
	UHF Radiocommunications network	one	Brisbane
	Equipment trailer	one	Brisbane
South Australia	Maximax boom	200m	Port Adelaide
	Maximax boom	300m	Port Pixie
	Skimmex tidal boom	500m	Port Pirie
	GP800 boom	300m	Port Lincoln
	GP800 boom	300m	Thevenard
	Troilboom and GT 185 skimmer	one	Port Pirie
	Slickskim oil recovery unit	one	Port Pirie
	Vikovac oil recovery unit	one	Port Adelaide
	Aluminium catamaran oil pollution services craft "CONCH"	one	Port Adelaide
	12m GRP catamaran oil pollution services craft "MUREX"	one	Port Pirie
	Inflatable dinghy	one	Port Adelaide
	Equipment trailers	three	Port Adelaide and Port Pirie
	Sorbent materials	various	SA Ports
	Simplex helicopter spray unit	one	Port Adelaide

Annex 1 (cont.)

State	Equipment	Quantity	Location
South Australia (cont.)	Transpac bouyant recovered oil containers	five	SA Ports
	UHF Radiocommunications network	one	Port Adelaide
Western Australia	Vikoma Seapack	one	Fremantle
	MARCO Class 1 oil recovery unit	one	Fremantle
	Walosep WM skimmer	one	Fremantle
	Komara 12K MKIII skimmer	one	Fremantle
	Komara 12K MKII skimmer	one	Bunbury
	Komara 12K MKII skimmer	one	Geraldton
	Vikovac oil recovery unit	one	Fremantle
	Single Ship Recovery System	one	Fremantle
	Thune Eureka cargo transfer pump	one	Karrakatta
	GP800 boom	300m	Albany
	Versatech 12/18 boom	300m	Geraldton
	Expandi 3000 boom	600m	Fremantle
	Expandi 3000 boom	300m	Bunbury
	GP500 boom	300m	WA Ports
	Aust-Pol boom recovery unit	one	Fremantle
	Sorbent materials	various	WA Ports
	Inflatable dinghy	one	Fremantle
	Simplex helicopter spray unit	one	Fremantle
	Transpac bouyant recovered oil containers	five	Fremantle
	Equipment trailers	five	Bunbury/Geraldton/ Albany/Esperance/ Fremantle
Tasmania	Piranha oil recovery unit	one	Hobart
	Komara 12K MKII skimmer	two	Hobart/Devonport
	CSC 62 oil recovery unit	one	Devonport
	Expandi 3000 boom	200m	Burnie
	Expandi 3000 boom	400m	Hobart
	Polutek boom	500m	Hobart
	Versatech 18/24 boom	465m	Devonport
	Boom trailers	three	Hobart/Devonport/ Burnie

Annex 1 (cont.)

State	Equipment	Quantity	Location
Tasmania (cont.)	Aluminium punts	four	Burnie/Devonport/ Launceston/Hobart
	Sorbent materials	various	Tas Ports
	VHF portable radios & base station	four	Hobart
Northern Territory	Piranha oil recovery unit	one	Darwin
	Versatech 12/18 boom	300m	Darwin
	Sobar boom	300m	Gove
	GP800 boom	300m	Groote Eylandt
	Trailer	one	Darwin
	Dispersant equipment	one	Darwin
	Sorbent materials	various	NT Ports

Annex 2

National Plan Training

Three levels of oil spill response training are conducted by representatives of the Department of Transport and Communications.

1. Equipment Operator Courses. Personnel from port and marine authorities and the oil industry are trained in the operation of equipment available in their area and are shown the basic techniques for combat of a spill.

2. On Scene Co-ordinator Workshops. Officers who may be required to assume the duties of an on scene co-ordinator attend a forum at which all aspects of clean-up management are addressed

3. Contingency Planning Workshops. This training explores the various requirements for protection of a section of coastline, grades the area according to sensitivity and assesses the resources necessary to mount a combat operation. Local involvement of Shire councils, press, police and emergency services organisations is encouraged.

Paper 14: CONTINGENCY PLANNING FOR DISPERSANT USE

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Abstract

The use of dispersants in response to accidental marine oil spills has been considered since oil spill contingency planning began to be taken seriously. The limitations of mechanical systems designed to recover spilled oil and the recognised need to keep the cost of response action within reasonable bounds, have been contribution factors. The development of present day oil spill dispersants, which combine efficiency with acceptable toxicity has further enhanced their use.

A number of factors need to be taken into account when drawing up site specific plans for dispersant use. This paper discusses the value of pre-planning and addresses the conditions and criteria necessary for the preparation of spill contingency plans.

Introduction

Much has been written about the use of oil spill dispersants (OSDs) in the past fifteen years. In fact, since their use was first considered for the treatment of marine spills, probably no other form of spill response has been surrounded by such debate.

A large number of laboratory tests have been devised to quantify dispersant effectiveness and many studies have been carried out to determine the toxicity of dispersants. It is acknowledged that none of the laboratory test methods or experiments can completely simulate conditions applying in the field. A number of test methods do however, closely simulate aspects of dispersant application, for example the test protocols developed by Mackay *et al.* and Martinelli[1] both compare application from surface craft. All tests have contributed to a wider knowledge and understanding of what dispersants do. In achieving this they have promoted widespread discussion between scientists and clean-up managers alike. Conjecture continues on the usefulness of OSDs although sufficient work appears to have been carried out in both the laboratory and the field, to confirm that they do work on specilic oils and their use as a technique warrants serious consideration as a response to be considered.

Lindsvedt-Siva *et* al. state that the decision as to the use of OSDs is one involving trade offs[2]. By dispersing a slick at one location, more oil is introduced into the water column than there would be if a surface slick floated by. What needs to be carefully considered, therefore, is a weighing up of the effect' on the marine environment of the application of this additional pollutant against leaving the released oil to impact a coastal feature or perhaps degrade naturally.

Planning

In any area where oil is carried by ships, either as cargo or as bunker fuel, a risk of accidental pollution exists. In determining the need for, and scope of, contingency plans, a risk assessment needs to be carried out. This assessment will address factors such as weather data, navigational hazards, control of shipping in the area, types of oils carried, etc. Whilst it is generally possible, through liaison with the oil industry, to determine the type of oils, crude or fuel, carried as cargo, it is not possible to know the origin or formulation of oils carried as bunker fuels. It is well known that a number of oils are not amenable to dispersants and when spills of these occur, a response based on OSDs will be a waste of time and resources. An example of this is Bass Strait crude which, because of its high pour point and wax content cannot be dispersed using available OSDs in sea temperatures anywhere close to the pour point. The-Department of Transport, in 1986, commissioned a series of tests, using Bass Strait crude and two third generation dispersants. The results of these tests were made available to state and port authorities and to the oil industry, with the recommendation that those concerned amend their contingency plans accordingly.

In the context of navigation, Australia has a landfall coastline, ie. outside of port limits few areas are enclosed or have sheltered waters. A consequence of this is that it can be accepted that a marine pollution incident occurring in the Australian offshore area will generally occur in exposed waters.

The spill control industry has long since accepted that the recovery of oil in open waters is an operation which cannot be relied upon to be effective. Whilst developments in spill boom design have resulted in some excellent heavy duty pieces of equipment being manufactured, no oil recovery system has been produced which can boast a high or acceptable recovery efficiency in these conditions. Two options therefore remain for the oil spill manager when confronted with a spill in Australian territorial waters. The most preferred is to monitor the movement of the oil and leave it alone. The cost? - a few hours of aircraft time and an assurance to the media that natural dispersion, caused by the wind and the sea, will take care of the oil within an acceptable time.

If however onshore winds indicate that the oil slick threatens the shore, clearly a more active response is invariably required. The adage that the best boom in the world is the foreshore is not always acceptable. This is particularly so should sensitive marine mammal and bird rookery areas be threatened.

The On Scene Co-ordinator, having taken the advice provided by his Scientific Support Co-ordiriator, may well find himself with one option only, that is to apply oil spill dispersants with whatever are the most effective means at his disposal. In the Australian area this response would most probably involve aircraft fitted with appropriate spraying systems. The aerial response may be backed up with offshore surface craft fitted with spraying gear to deal with the smaller breakaway windrows. These craft would ideally be directed to spraying locations by observer aircraft fitted with common air to surface radio frequencies.

No one will disagree that, once having decided to use the dispersant option, speed is essential. The oil should be treated within the first few hours, before weathering has a significant effect and before emulsification takes place. To assist the speed of the response, identification of local sites for aircraft to load and refuel to keep flying times to the minimum (Nichols and White[3]) is an essential part of the contingency plan.

The Response

The task force set up in the USA under the auspices of the American Society for Testing and Materials, decided that dispersants would not be considered as a "last resort" but that they should be considered along with other options[4]. To maximise response, all options should be considered together and in some cases the different strategies combined to maximise effectiveness. It is the nature of the environment under threat and the conditions applying at the time that will influence the strategy to be adopted.

A number of basic rules apply to assist the OSC in decision making:-

- the spilt oil must be of a type that is amenable to dispersants
- the area must not contain larvae or eggs of a commercial fisheries species (this is usually a seasonal consideration)
- the area must have an active water change rate
- the area must have adequate depth of water
- the area should preferably be one of the high energy input

Opinions differ as to the depth of water constraints. In Botany Bay, NSW, a minimum depth of five metres has been recommended[5]. Jones, Field and Hancock[6] state that in Western Australia, dispersant usage is not favoured within 8kms of a shoreline or in waters of less than ten metres depth.

Within the framework of the contingency plan for the general area, a sensitivity index, which assists with the identification of resources and provides a grading or sensitivity designation should be prepared. A useful table to assist with quick decision making is shown[7] below:

Sensitivity designation	Interpretation
Low	- impact on all resources ***negligible***
Sensitive	- impact on at least one resource ***slight***
Sensitive (indirect)	- impact at time of spill ***is negligible,*** but if oil is permitted to persist, impact later in season may be as great as ***slight*** on at least one resource.
Highly sensitive	- impact on at least one resource ***moderate or major***
Highly sensitive (indirect)	- impact at time of spill ***is negligible,*** but impact at later time in season ***moderate*** or ***major*** if oil is permitted to persist

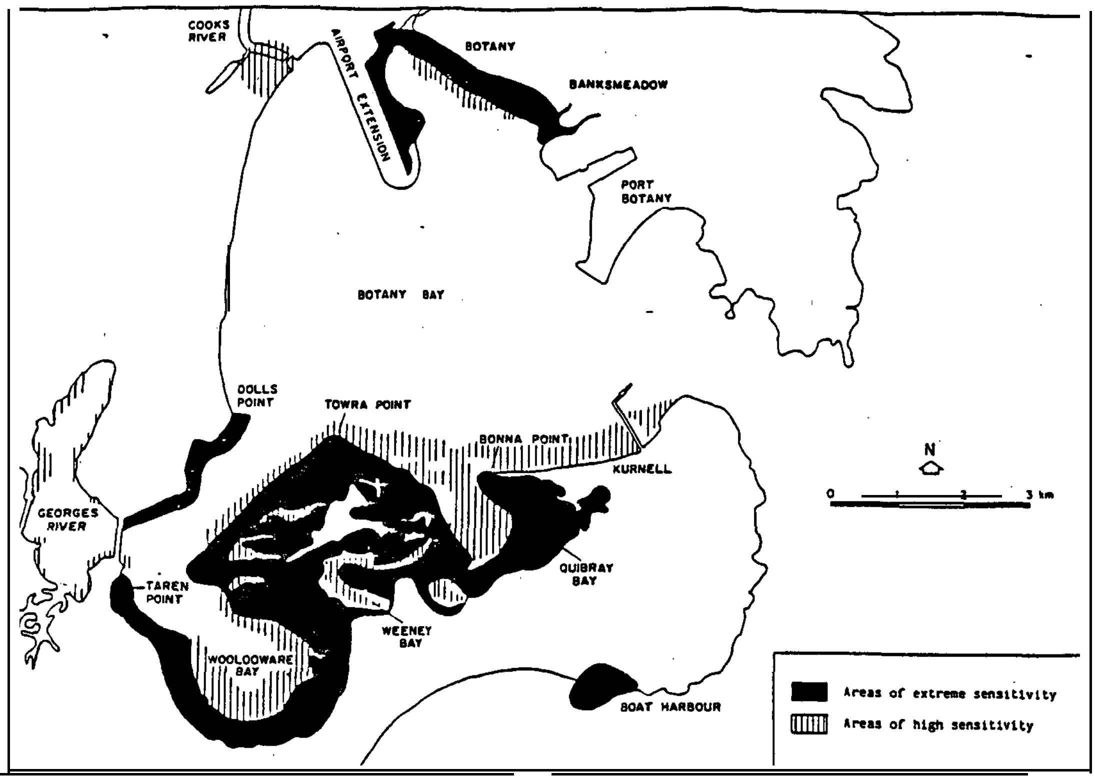

Figure 1 Areas of extreme and high sensitivity to oil pollution in Botany Bay

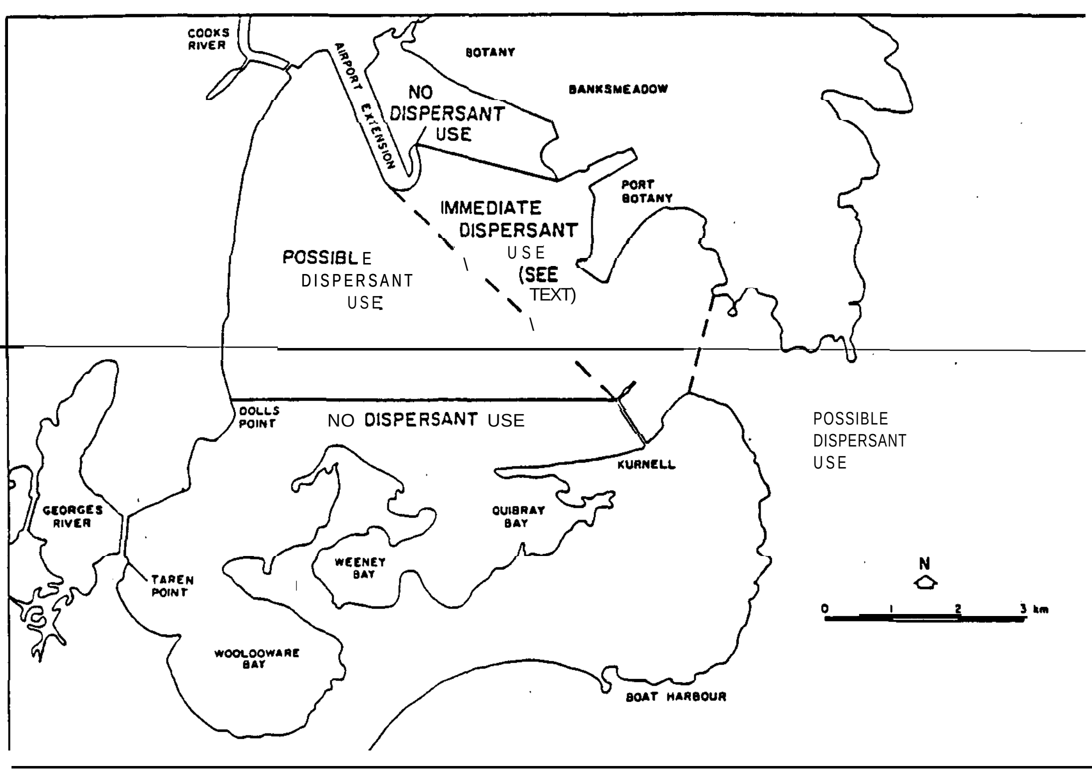

Figure 2 Areas for immediate, possible and no dispersant use in Botany Bay

(Acknowledgement to SPCC of NSW for preparation of chartlets)

Inclusion of maps containing this informalion in site specific plans provides the OSC with immediate guidance as to his response.

Dealing very generally with each habitat type, the following recommendations are made:

1. Coral Reefs: Little work appears to have been carried out to determine the affect of dispersants or dispersed oil on corals. If it is possible to disperse the oil in deeper waters this may be done; it is not recommended that dispersants should be applied in shallow water above a reef.

2. Rocky shores: These vary from those that are exposed to high wave energy, where no man-, made clean-up is necessary, to sheltered rocky shores. Thick oil deposits may be carefully removed from the latter with low pressure hosing. Dispersants are not generally recommended as they can introduce further pollutants to the marine life in the habitat.

3. Sea grass areas: These are generally areas of low energy and shallow water. Opinions vary as to effects of dispersants; generally speaking they should not be used, although the longer term effects of higher untreated oil concentrations in sediments may prove more destabilizing to the habitat as a whole (Little*).

4. Sandy beaches: In high wave energy areas these will be self cleaning. In sheltered beach areas treatment of the oil well before beaching is recommended. Application of dispersants to beached oil is not considered available as this treatment could cause the dispersant mixture to sink into the beach substrata. Mechanical or manual removal of the oil is recommended according to the degree of oiling.

The above are general guidelines. They should be finely tuned at the time of preparation of the contingency plans according to the environmental features of the area.

Conclusion

Whilst the decision to use dispersants rests primarily with the OSC, this decision will not generally be made without consultation with the scientific support advisor and with representatives of local authorities. It is essential that those personnel concerned with this advisory or decision making process, have briefed themselves to the extent that they have a balanced and objective view as to the value of using dispersants in the areas covered by the scope of the contingency plan.

Emotive or biased opinions about the possible effects of dispersants are not acceptable. A considerable amount of work has been carried out to determine their value as a spill control option. Most of this work has been published at authoritative seminars and conference. Documentation is readily available through State oil pollution committees. To have achieved a degree of pre-planning in the decision making process will ensure that the OSC can put into effect the agreed response in the shortest possible time.

References

1. Ed, ASTM Ecological Considerations for the Use of Chemical Dispersants in Oil Spill Response.

2. Lindstedt-Siva, J. ASTM Considerations for the use of Chemical Dispersants in Oil Spill Response.

3. Nichols, J.A. and White, I.C. Marine Pollution Bulletin. July 1979.

4. Lindstedt-Siva, J. 1987 Oil Spill Confcrencc.

5. Coastal Resource Atlas for Oil Spills in Botany Bay, State Pollution Control Commission.

6. Procedures for Protection of the Western Australian Marine Environment from Oil Spills, 1984 Department of Conservation and Environment, WA.

7. Krudel, B.K. and Ross, S.L. 1987 Oil Spill Conference.

8. Little D.I., and Scales, D.L. Proceedings of 1987 Oil Spill Conference.

Paper 15: THE CASE FOR MORE EFFECTIVE SCIENTIFIC SUPPORT IN OIL SPILL RESPONSE

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Introduction

This workshop provides a timely and unusual forum to explore the role of Scientific Support Co-ordinator (SSC), particularly in terms of how that role is implemented at the National and State/regional levels. From the information supplied by the designated SSCs in each State and region (see Workshop Preprints), it would appear that the role of SSC is now recognised as an important element of overall response organisation. Such a conclusion is, however, simplistic. The role of SSC in most States is poorly defined, lacks adequate dedicated resources and has historically been left to those relatively few individuals with the expertise and energy to effectively provide scientific advice. While this situation is improving, as evidenced by the recent activities described in the State Position papers, there appears to be general agreement amongst agencies involved with providing scientific support that more can and should be done to improve the effective provision of such support.

As the objectives for this workshop suggest, there also appears to be general agreement on the need for those involved in other areas of spill response, particularly the "'mainstream areas" of logistical organisation, for these areas to articulate their scientific support needs.

This paper does not seek to provide a comprehensive overview of the role of an SSC. Adequate overviews, already exist in the papers of Healy (1983 and 1987) and in various papers on scientific aspects of oil spills (see, for example, Craik, 1985; SPILLCON, 1985 and 1987; IMO/UNEP, 1982). Rather, this paper seeks to identify some areas of apparent need in relation to clarification or further development of the role of SSC and to outline possible options for meeting these needs. The paper is thus intended to stimulate discussion during the workshop on the nature of problems with SSC role definition and options for improvement of role effectiveness. In the latter case options'are proposed with due recognition of the extremely limited resources available for role implementation and the need to balance the practical requirements for spill response with (often conflicting) scientific requirements for information collection and hypothesis testing.

Current Problems With SSC Role

In assessing whether the role of SSC has been effectively implemented in Australia, questions of relativity quickly emerge - there are no defined Australian "prescriptions" for the role, nor are there suitable global "models" which can be readily adapted to the requirements of Australian spill response. During preparation for this workshop, various SSCs were contacted and asked how effective they believed their activities have been (in developing and implementing the agreed role in a particular State/regional plan context). The responses were extremely mixed, and usually qualified to the extent that comparison between States is seemingly impossible. Each SSC operates within the broad context of the National Plan, however, the "on ground" implementation of this role is then subject to the shaping influences and constraints of policy and resources peculiar to each State/regional response organisation. Thus, the establishment of "benchmarks" for comparison between States or a framework for problem identification is a difficult task.

Despite these limitations, the informal survey did reveal that most SSCs believe that the role has not been as effectively implemented as is possible or desirable under the provisions of the National Plan. The reasons for this include (but are not limited to):

a. the devolvement of priorities for response planning - much of the emphasis in spill response planning to date has been in the necessary areas of logistics and operations, with lesser commitment to what are perceived as desirable (but lower priority) scientific inputs (e.g. sensitivity mapping, monitoring, etc.). The prioritization of response activities reflects IMO/ITOPF guidelines. the administrative framework for spill response, the nature of spill events (under which, for example, there is strong public pressure for a field as opposed to a laboratory-based response) and a myriad of other factors often related to the seeming inability of SSC to define a clear understanding of the importance and value of scientific input. The net result of these influences has been that the role of SSC is somewhat analagous to that of the twelfth man in a cricket team - part of the team on paper, called out to help in routine events and sometimes in a crisis, but not really a central player in the game!

b. the lack of awareness/acceptance of the capabilities of an SSC - while numerous SSCs have made significant contributions to the development of contingency plans, and have played key roles in a number of incidents, for various reasons, there remains a relatively low level of awareness of wider SSC abilities. This has led to a lower level of acceptance of the requirements for SSC input than may otherwise be desirable, particularly if comparison is made with the organisation of scientific advice to other "emergency events" such as whale strandings, road spill of hazardous materials and bushfire response. For example, the current National Plan includes only the following specific comments about scientific input to spill response:

.... 1.2 Scientific Support .... coordination of scientific and environmental advice

.... 2.2.9.4 The Commonwealth, through the DAHE has trained scientific support personnel who

are on call to respond to a request for assistance from any State Committee. They have the use of... (OSSM)...

. . . . 3.2.4 Scientific support is available to- the on-scene coordinator through the State Oil Pollution Committee...,. State supplements.... OSSM . . . . REEFPLAN.... and Commonwealth expertise.... FSSSC advice on currents and communications.... Maritime Services Advisory Committee....

While selective quotation, without due acknowledgement of supporting policies and 'resources (particularly as described in supplements to the National Plan) is potentially unfair, the above excerpts stand in clear contrast to the more detailed and comprehensive material in the Plan relating to other aspects of response. As such, they thus reflect a lack of systematic provision for scientific input to response.

c. the lack of provision for SSC role development in response planning - this issue is interwoven with both (a) and (b) above. It is due to a number of factors, including:

* the lack of operational experience/field testing of SSC abilities and input,
* the sporadic nature of SSC activities - most SSCs assume the role as part of broader, more formally defined employment requirements. There also has been a relatively high "turnover" of SSCs within -State organisations responsible for the provision of scientific advice,
* the lack of resources for role implementation particularly directed towards development of a research base for the acquisition of knowledge relevant to the provision of scientific advice, and
* the limited involvement of SSCs in training activities (most of which are focussed at the operational level).

Against this background of problems, it is encouraging to note that most States are now actively seeking to improve the capability of SSCs to contribute to response. This workshop represents an important complementary initiative at the National level which should lead to better understanding of SSC needs and capabilities and, possibly, to. better integration of scientific input with other areas of response organisation.

Towards a More Effective SSC

Oil spill response organisation essentially comprises three sequential and cyclical phases - Pre-planning, Response and Follow-up. The role of an SSC in each has been discussed at length by Healy (1983 and 1987). It is also addressed to varying degrees in the State and regional supplements to the National Plan. In all of these, and in the extensive IMO/ITOPF literature, there is strong support of the notion that scientific input is fundamental to an. adequate response. Oil spills are highly visible and often catastrophic events - they thus have a high profile amongst the general public, often reinforced by media interest. They are identified by most Australian environmental agencies with responsibility for coastal and offshore areas as a priority environmental threat. For example, at a workshop on contaminants in waters of the Great Barrier Reef (Dutton, 1984), oil spills were identified as the principal pollution threat, amongst a wide range of potential threats.

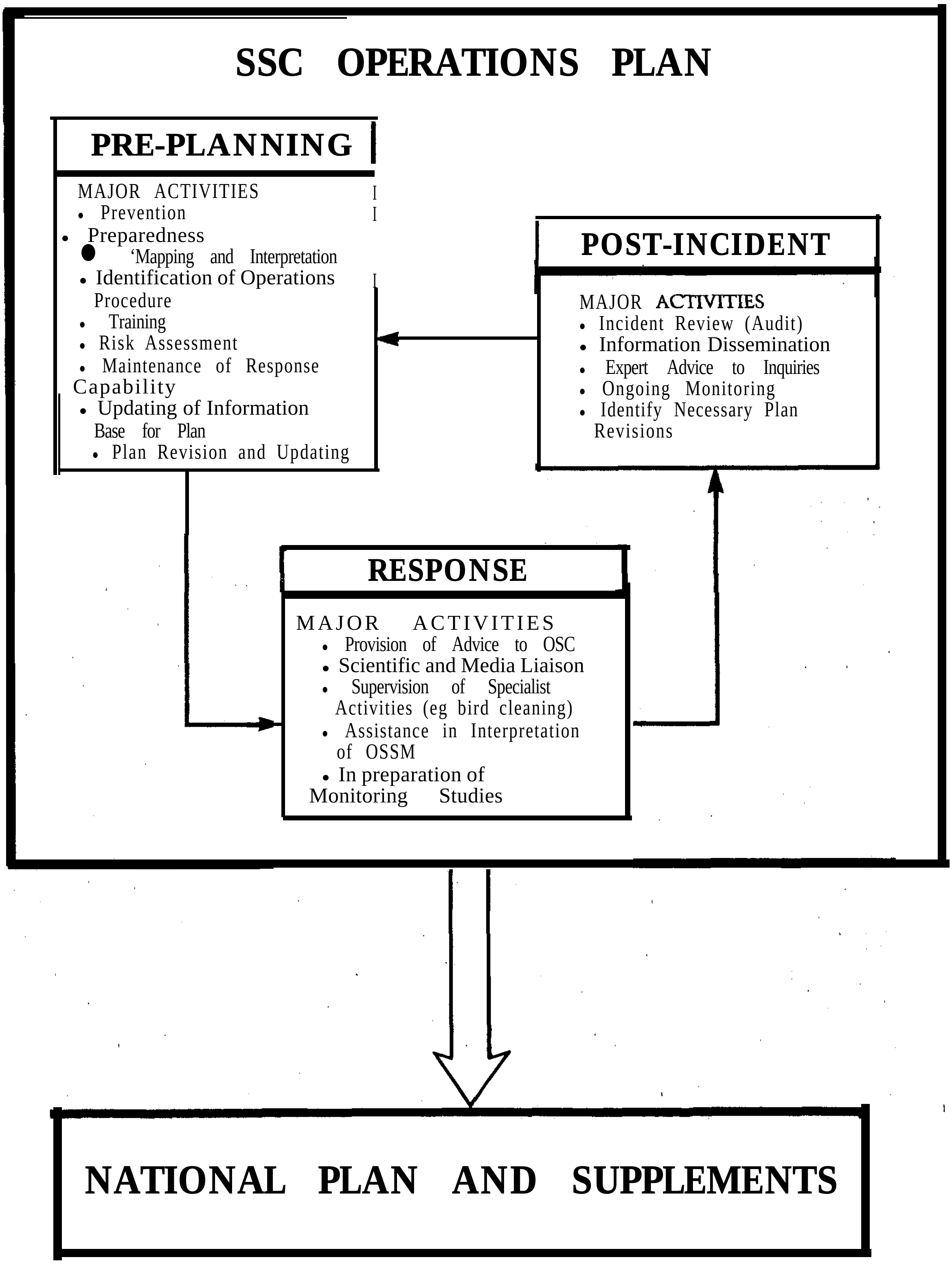
Given the perceived importance of the threat and the statutory obligations on environmental management agencies, it is therefore surprising that more attention has not been paid to the capacity to input environmental information/considerations to spill response. The capacity for such input is closely linked with the adequacy of the three phase response system defined previously. While theoretically sound, as noted above, a range of factors preclude the effective implementation of the response system. For example, the theoretical feedback loop between Follow-up and Pre-planning is compromised by the return period between events and the pressures of other issues on the day to day activities of SSCs.

How can we therefore develop a model which more closely matches the day to day realities of SSC input? To resolve this question a multi-dimensional adaptive approach is recommended comprising of five principal elements.

1. An Integrative Planning Model

The Figure below outlines an expanded version of the current three phase response planning model - the difference between this and the prevailing approach is esscniially based on better linkage between the three phases, under the overall guidance of an SSC "Operations Plan". The latter is discussed in more detail below, but in model terms, provides the core guidelines for SSC involvement in each phase of the overall contingency plan.

Figure 1: **An Integrative Model for SSC Involvenent in Rem-Planning**



As the Figure indicates, implementalion of this model would require improved facilitation and coordination between plan elements by National Plan and State Plan Committees, as well as improved role definition by SSCs. To ensure that the model remains responsive to change, an emphasis on adaptive methods would also be required. This involves, for example, a commitment to use monitoring and evaluation methodologies to validate and improve scientific advice. These methodologies are most effective in the context of operational experience, but can also be related to information derived from training and simulation exercises.

2. Information 'Catch up'

Reference material for Australian SSCs is limited. This reflects both the lack of Australian research in areas such as the environmental effects of spills and the lack of critical assessment of international literature in the Australian context. Thus, in comparison with the empirical basis for scientific advice available to scientific response teams in other countries, Australian SSCs suffer a relative paucity of information necessary for input to decision-making.

To fully redress this situation would require an ongoing research commitment which, in view of current priorities and constraints, may not be feasible. Until such research is undertaken, two priority actions are recommend&

a. the compilation of a national bibliographic database on scientific information relevant to oil spills; and

b. the compilation and dissemination of incident and response assessment reports. Ideally, such reports would focus on aspects of the role of SSC and include an assessment of the effectiveness of various scientific inputs to the response (e.g. what additional field measurements would have made predictive advice more realistic/usable?).

Both measures would require relatively little effort on the part of National Plan agencies.

3. SSC Operations Plan

As indicated in the figure, the vertical and horizontal integration of SSC input with other aspects of the overall response organisation, could bc enhanced if SSCs have a clear understanding of their role and requirements. Such an understanding could bc dcvclopcd in the production of a handbook (operations plan) which outlines activities and procedures specific to the role of SSC in all phases of response organisation, including:

* commonly referenced sources of information (guidelines on oil types, dispersant characteristics, a listing of experts for specific advice, etc.);

* sensitivity maps and procedures for operations in specific areas (similar to those produced by the NSW SPCC); and

* periodically updated material (e.g. tide timetables, policy decisions relevant to environmental protection, etc.).

The production of such a handbook would be a relatively inexpensive undertaking by each SSC and would greatly enhance SSC role effectivness, particularly in rapid response situations, or where there are problems of SSC staff continuity. It may also be possible to "package" parts of the handbook for use by OSCs and others involved in response organisation.

4. National Atlas of Coastal and Offshore Environments

While maps of most parts of the Australian coast arc readily available, and sensitivity assessments have been prepared for most areas at risk from an oil spill, the quality and utility of this information in 'real time response' is highly variable. Perhaps the most advanced sensitivity assessments currently available are those produced by the NSW SPCC.

In common with most other States, the SPCC maps provide fundamental information on the location and nature of particular environments. In addition, they provide policy and practical guidance on response options under a range of conditions in particular areas. Such information makes the reports usable by OSCs without the specific need for SSC consultation in the first instance - a critical factor in emergency situations and/or where ready communication between SSC and OSC is not possible. A micro-computer based system extension of the SPCC approach is currently under development at the Great Barrier Reef Marine Park Authority (W. Craik, pers. comm.). Computer systems provide the additional advantages of being readily updated and extcndable to new sources of data, although they suffer the potential disadvantage of not being as "field usable".

The variable quality and patchiness of Australian sensitivity maps is of concern, as these effectively limit the quality of scientific advice which can be provided (given that such advice is often critical early in the response organisation when expert local knowledge may not be available to substitute for sensitivity maps).

To redress current deficiencies requires filling of current information gaps and, desirably, upgrading of existing map systems to include guidelines for map interpretation. To meet these needs is likely to remain beyond the resources of individual SSCs in the near term, and yet is of such priority that an acceleration of effort is critical to effective establishment of SSC capability in all parts of Australia. For this reason, there is a strong case for deployment of National Plan funds to this activity and/or additional funding from external agencies. If undertaken on a national basis, it is likely that such a mapping effort would achieve considerable 'economics of scale' and would lead to 'spin-off benefits' to a wide range of applications (e.g. fishcries management, tourism planning, management of recreational use of near shore waters, conservation area definition, etc.)

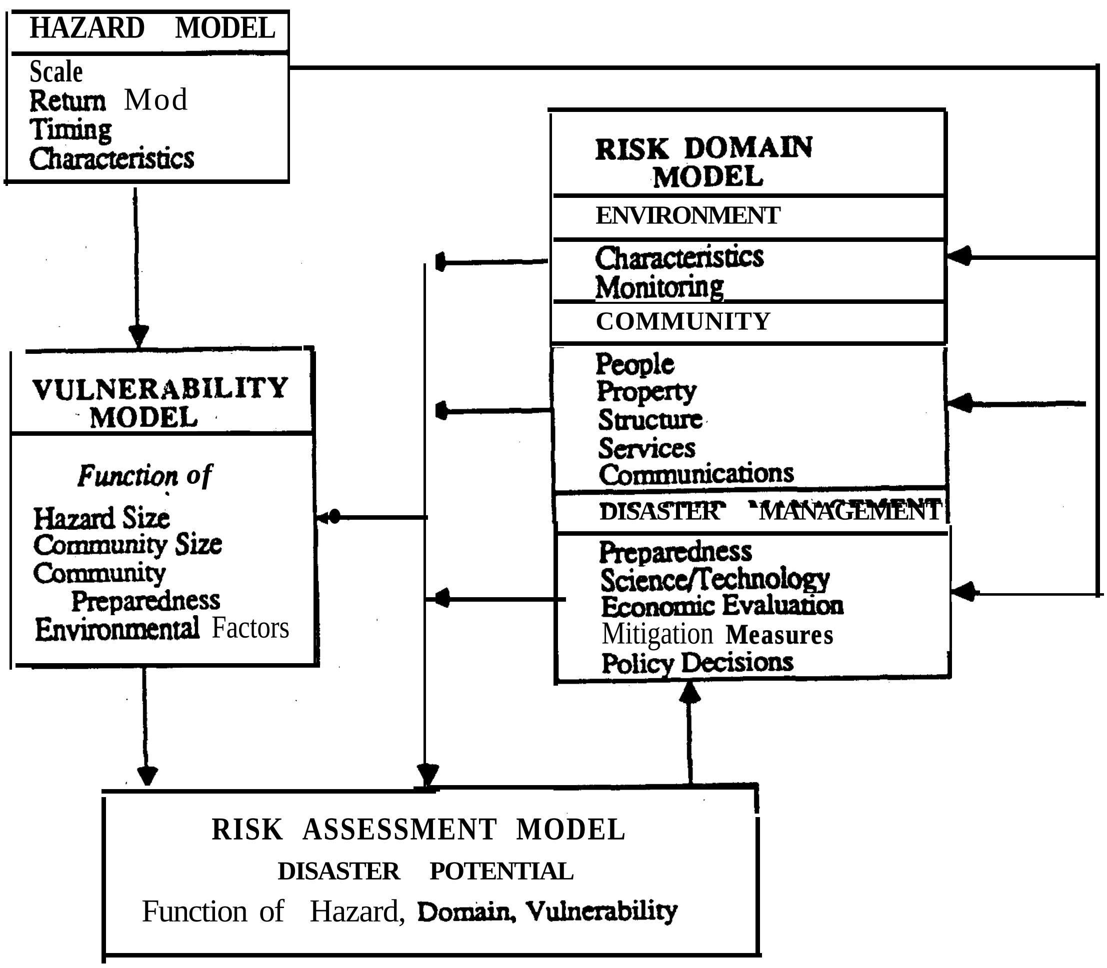
This workshop should provide an important forum for the discussion of mapping formats, funding and scheduling of mapping activities.

5. Risk Assessment

Despite the best efforts of contingency planners, the only certainty in such activities is that the problem/decision making environment(s) relevant to those plans will continue to change. Thus in order to improve our capacity to make judgements and provide advice in emergency situations requires an SSC to develop systems for coping with uncertainty. The application and incorporation of such systems requires the decision maker to make explicit the notion that uncertainty will continue to exist, and thus SSCs should be sceptical of any plan which claims to be able to deal with all emergencies.

Possible systems for dealing with uncertainty are still under development. However, lessons may be drawn from research in areas such as risk assessment and adaptive environmental assessment and management. The figure below sets out an approach to risk assessment which, if implemented by SSCs may lead to further refinement of other aspects of State and regional supplements to the National Plan. A number of fundamental inputs to risk assessment by SSCs already exist (e.g. BIE, 1974, James et al, 1985, Aldwinckle and Pomeroy, 1983; and the various local contingency plans for ports and other areas of identified "higher risk"). The risk assessment system set out in Figure 2 provides the SSC with a useful checklist of factors to be considered in preparation of the SSC Operations Plan discussed above.

Figure 2: **Risk Assessment System**



Source: Stark, James and Dight (1987)

The incorporation of environmental assessment and management techniques requires the adoption of carefully identified monitoring and review activities in the overall contingency planning process. The use of these is discussed further in the scsssion on monitoring later in the workshop.

Prognosis

The suggestions made above are relalively minor, but important incremental steps in improving the effectiveness of scientific input to oil spill response. Their adoption in the current schedule of activities of most SSCs would not require significant additional resources from State agencies. They may also lead to a more effective National response system, by allowing for the interchange of ideas and experience between States/regions.

It is hoped that the workshop will provide opportunities to discuss these and other proposals - through our further deliberations, we may just bc able to elevate the role of SSC from twelfth man to at least that of an out of form batsman, someone who the press suggests is often harder to get out of a team than to get into one!

References

Aldwinckle, D.S. and Pomeroy, R.V. (1983) Reliability and Safety Assessment Methods. for Ships and Other Installations, Lloyd's Technical Paper No. 82, London.

Craik, G.J.S. (ed.) (1985) Hazardous Chemical Spills in the Great Barrier Reef Region, Workshop Series No. 6, GBRMPA, Townsville.

Dutton. I.M. (ed.) (1984) Contaminants in Waters of the Great Barrier Reef, Workshop Series No. 5, GBRMPA, Townsville.

Healy, B. (1983) Role of Scientific Support Co-ordinator, OSC Workshop Papers, Adelaide.

Healy, B. (1987) Role of Scientific Support Co-ordinator, in SPILLCON '87, Australian Institute of Petroleum and Department of Transport, Melbourne.

International Maritime Organisation, (1982) IMO/UNEP Guidelines on Oil Spill Dispersant Application and Environmental Considerations, IMO, London.

International Tanker Owners Pollution Control Federation Ltd. (1985) Contingency Planning for Oil Spills, Technical Information Paper No. 9, ITOPF, London.

James, M.K., Jenssen, T., Lamberton, N.G. and Stark, K.P. (1985) Shipping Risk Analysis, Department of Civil and Systems Engineering, James Cook University, Townsville.

Stark, K., James, M. and Dight, I. (1987) Environmental Risk Analysis, in Hundloe, T and Neumann, R. (eds.) Environmental Practice in Australia, Environment Institute of Australia, Griffith University, Brisbane.

State Pollution Control Commission (NSW) (1984) Coastal Resource Atlas for Botany Bay, Govt. Printer, Sydney

Paper 16: OIL SPILL MONITORING: AN INTRODUCTION

I

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Introduction

Monitoring is considered by most Australian scientific agencies involved with spill response to be an important component of the response process. As noted elsewhere in these proceedings, monitoring may provide a range of information of relevance to both the type of response undertaken, and to the overall design of future response systems. Monitoring is less frequently used as a tool for ongoing data collection and damage assessment in Australia, although these activities are common in other countries.

The historical reluctance of Australian response agencies to implement comprehensive monitoring systems in overall response design relates to a range of factors including:

* the limited incidence of major spills where monitoring may have been employed to obtain data necessary for purposes such as damages recovery, impact research or assessment of ecosystem recovery;
* the apparent lack' of provision for recovery of costs of monitoring under National plan arrangements (this problem is also related to difficulties in determining and apportioning costs between the agencies responsible for monitoring and other involved agencies, including the polluter);
* the lack of agreed monitoring protocols;
* the difficulties involved in mounting an adequate monitoring response in the context of other response priorities and in situations where resources and expertise are often required for more urgent purposes (e.g. containment, clean-up or recovery of oil); and
* the lack of adequate "baseline information" against which the effects of spill impacts can be compared has tended to reinforce after the event monitoring as a the pre-eminent approach - this approach tends to lack adequate rigour and is further undermined by the factors listed above.

Despite, these limitations, there is general agreement amongst Australian response agencies that monitoring is an important part of the role of scientific input to spill response. Because of the widely varying requirements of Australian response agencies and uncertainties about the legitimacy of various aspects of monitoring under National Plan arrangements, this paper will not seek to prescribe a monitoring system for adoption by SSCs. Rather, the paper will attempt to provide an overview of some common elements of monitoring programs which may be developed on a State by State basis. Particular attention is paid to the objectives of monitoring and factors to be considered in the design of monitoring activities.

Monitoring Purposes

The reasons for monitoring are as variable as the nature of the spilt threat. Considerable discussion has occurred amongst international scientific and managerial agencies about the justification and efficacy of monitoring and a wide range of views exist about the level and type of monitoring response which could or should be undertaken in relation to any incident. As Lewis (1979) notes....

What justification is there now, after a decade of experience, for biologists and chemical oceanographers to jump to action stations and abandon other and perhaps long-running work and to converge from many different directions, just to record the consequences of yet another spill ? The adrenalin may flow, it may seem very heroic - 'our scientists are keeping careful watch on the damage' - but does it, can it serve any other purpose other than to excite further the frequently hysterical reporting that such tragedies call forth ? .... If we can at most only slightly mitigate the effects of a spill, can we turn the event to any scienttjic advantage ?

While those views may seem at odds with the potential benefits of monitoring argued by researchers such as Segar and Stamman (1986a), they reflect the dilemma which monitoring commonly poses to the SSC and response organisation generally - what difference does it make ? That dilemma is not capable of resolution until the relationship between monitoring and other aspects of the response system are clearly understood.

Kinsey and Ottcsen (1987) suggest that the role of monitoring can be defined in two principal ways. Firstly, monitoring can be seen as having a regulatory role .... ***to detect the harmful impacts from specific activities.*** Secondly, monitoring can provide data which . . . . . . ***can be useful in advancing the understanding of an ecosystem, and its dynamics, and as such represents contemporary baseline information to detecting and understanding the effects of a pollutant being monitored .*** Both of these roles relate to understanding the environmental costs and consequences of spills - an approach which to date has not been a significant element of the advice given by Australian SSCs, but one which is considered to be important in:

a. establishing the nature and overall level of damage/impact associated with a spill; and
b. establishing the efficacy of scientific advice and overall response (e.g. did action x,y,z make a difference in minimising the impact of a spill ?).

Both of the roles of monitoring discuscd by Kinsey and Ottesen (1987) are analagous to one of the two principal roles for marine environmental monitoring identified by a U.S. Interagency marine pollution committee (Segar and Stamman (1986b) ...... ***to obtain time series data for detecting significant changes.*** A second role identified by that Committee, expands upon the views of Kinsey and Ottesen (1987). It seeks to . . . ..***provide timely warning and other advice to management so appropriate actions may be taken*** . While in most cases this role relates to detection of ongoing impact (e.g. discharge from industry), in the case of oil spills it could be seen as the "real time" monitoring component of spill response (e.g. trajectory modelling and prediction of risk, concurrent assessment of the efficacy of clean-up measures, chemical analysis of the condition of oil in water, etc.). This role is perhaps the most common form of monitoring input to spill response at present, although the extent of SSC control over these activities is variable (most are routine operational actions).

To distil these roles for further evaluation by participants, it can be seen that monitoring has a range of purposes in spill response, the thrce principal ones being:

a. to provide feedback and information during an incident on the efficacy of operational actions and the need for further action;
b. to provide input to evaluation of an incident. This can include both evaluation of the efficacy of the response and assessment of the immediate environmental and socio-economic impacts of a spill; and
c. to advance understanding of the longer term impacts of a spill to facilitate both future response planning and improve knowledge of the bchaviour of the system(s) under threat from future incidents.

Monitoring Approaches

Possibly, the most important step in the design of a monitoring program is to have a clear understanding of the objectives of the program. In many cases the lack of clear understanding of the objectives of monitoring has resulted in mis-application of resources, a lack of adequate coordination of monitoring activities, inconclusive results, inappropriate investigation techniques and excessive cost. The net result of these being that monitoring may not fulfil a justifiable role within the overall response system.

In setting objectives for a monitoring program. the SSC will need to determine why the data are needed (the purpose(s) of monitoring) and how monitoring activities relate to the overall response system. Objective setting is primarily a managerial responsibility as it involves'policy judgements relating to the nature of the concern(s) and effect(s). Input by the SSC is, however, essential in making judgements, particularly in reconciling what is desirable and what is achievable. Such input should also make explicit the differences between necessary monitoring activities and necessary research activities. While it is sometimes difficult to separate between these activities, such distinction is critical to the acceptability of any data collection under the National Plan.

Once objectives are derived for each monitoring activity and the relationship to the rest of the response system is clarified, detailed design of each activity can commence. This step is potentially controversial as there are wide ranging views amongst researchers about the most appropriate techniques for data collection and analysis, particularly where specific impacts are to be interpreted in the context of the functioning of ecosystems. Nevertheless, as Kinsey and Ottesen (1987) suggest, there are a range of existing techniques available for adoption by monitoring agencies. In assessing the utility of existing techniques or in developing new techniques, Segar and Stamman (1986b) suggest that their design must take into acount:

* sources and magnitude of variance;
* optimum sampling strategies to achieve the necessary levels of statistical resolution (which will vary depending on the purpose of the activity); and
* the nature of the potential change/impact to be monitored, having regard to ambient environmental conditions.

Each of these factors has an important bearing on the validity of results and the extent to which monitoring objectives can be met. For example, if it is not possible to sustain sampling over a sufficiently long period to address questions about the nature of an impact, then that effort may not meet the defined objective and thus may represent a waste of effort/resources.

To avoid such undesirable outcomes, it is recommended that SSCs develop a standardised set of agreed techniques as part of the SSC operations plan.

Relationship to National Plan Activities

While monitoring for purposes other than those related to "real-time" data collection/feedback are somewhat of a "grey area" under the present interpretation of National Plan provisions, there are strong arguments for an expanded view of the use of monitoring by SSCs. As noted in the discussion of monitoring purposes, the net benefit of the three types of monitoring is to improve the efficiency of all aspects of future response.

Consideration of monitoring requirements is best undertaken in the design of the SSC operations outlined elsewhere in these proccdings. For illustrative purposes, the following activities related to monitoring design and implementation in the main phases of response organisation are recommended:

Pre-danning

Monitoring and related activities in this phase include:

* definition of purposes in specific context of State/regional plan,
* establishment of monitoring objectives (with other agencies involved in response),
* approval of monitoring activities and basis for funding,
* compilation of "baseline" data for comparative purposes,
* development of agreed protocols/techniques, and
* identification of corollary research needs.

Incident

Monitoring activities in this phase include:

* selection of monitoring activities to be undertaken in relation to incident (based on operations plan guidelines),
* collection and provision of operational data (e.g. environmental conditions, updated predictions on threats, etc.),
* implementation of recording systems for later evaluation activities (e.g. quantity of dispersant used, where and under what conditions, etc.),
* formulation of hypotheses/questions for later evaluation in ongoing monitoring,
* initiation of data collection programs for next phase (e.g. damage assessment), and
* briefing and supervision of scientific workers who are not specifically involved in immediate response to avoid conflict with operations activities.

Post-Incident

Monitoring and related activities in this phase include:

* measurement of impacts and estimation of damages for litigation purposes,
* compilation of costs records for cost recovery,
* assessment of recovery patterns and processes (may be linked with research projects, or could relate to assessment of efficacy of a particular response action),
* development of database on spill impacts, response techniques, etc.,
* reporting of information derived from incident and dissemination to other SSCs, and
* revision of objectives, protocols, operations procedures for monitoring, etc.

These activities are indicative only and require further evaluation in the context of available resources and operational priorities. Their scope also suggests that the question of funding support for monitoring activities under the National Plan be clarified as a matter of urgency.

Conclusion

Monitoring is an important part of oil spill response. Responsibility for the design and implementation of monitoring activities rests largely with the SSC, by virtue of the expertise and resources available to the SSC.

For the SSC to effectively utilise monitoring as a tool for improving the adequacy and efficiency of spill response, a clear understanding of monitoring purposes and a formal commitment of support to meet those purposes is required. Contrary to the views of Lewis (1979), monitoring can make a difference in terms of both the level of impact and the costs which may result from future spills.

References

Kinsey, D.W. and Ottesen, P. (1987) Environmental Monitoring of Marine Oil Spills in Tropical Waters of the Great Barrier Reef, *Spillcon* '87, Paper 5.

Lewis, J.R. (1979) Oil Pollution - How Much Misplaced Effort ?, Mar. ***Poll. Bull.***, **10:4, 94 - *95.***

Segar, D.A. and Stamman, E. (1986a) Monitoring in Support of Estuarine Pollution Management ***Needs, Oceans '86 Conference Record,*** Vol. 3,874 - 877.

Segar, D.A. and Stamman, E. (1986b) Fundamentals of Marine Pollution Monitoring Programme Design, ***Mar. Poll. Bull.,*** 17:5, 194 - 200.

Paper 17: IMPLEMENTATION AND FURTHER DEVELOPMENT OF OSSM - 11

, (Quicker, more accessible, easier to use) ,

Russell Colman,
Victorian Institute of Marine Sciences,

In conjunction with
Swinburne Limited

Oil spill response plans are presently being upgraded to make use of newer "Mac" based versions of On-Scene Spill Model now available, and to take advantage of the proliferation of facsimile machines. Also OSSM's coverage is being expanded to include all major ports in Australia. On behalf of the Department of Transport and Communications (DOTC) VIMS and Swinbume are establishing a new modus operandi for OSSM, implementing the latest version (OSSM-1 1), and providing "user friendly" software so that officers of the SAR surveillance centre can operate OSSM. For the On Scene Co-ordinator the new system will be more accessible, easier to use, and will give output that is more readily interpreted in the field.

The essential features of these developments are:-

- The previous OSSM-9 that was on the CSIRONET system is being decommissioned and will be replaced by OSSM-11 which runs on an "Apple Mac II" which will be based in DoTC's Canberra offices.

- As an interim measure intended to provide a short-term predictive capability for oil-spill movement during the development of this new system, DoTC will use their SAR programs to give some 'indication of the general direction of a spill. These programs cannot provide predictions the spread, evaporation, beaching, etc. that OSSM can.

- A database of the bathymetry and prevailing water currents for most Australian ports is being developed by VIMS for use with OSSM.

- OSSM-11 is having a "front-end" developed by VIMS that will tie-in the database to the general operation of OSSM and make it easier to use.

- Output from OSSM will be more graphically explicit than that previously available via the TI S700 type terminals.

Densities of oil and the extent of the spill will be presented in a more intuitively readable form for the field response crews to interpret.

- The new implementation of OSSM is expected to be commissioned in the second quarter of 1989.

This new system will replace the previous requirement to log-in to a mainframe computer from the field and thus remove the access problems that were so often encountered using CSIRONET.
Access to a facsimile machine will now be the only requirement for use of OSSM in the field. To get predictions of the movement and spread of an oil spill, all the On Scene Co-ordinator will need to do will be to fax to DoTC a diagram/chart of the location and details of the spill, together with the prevailing meteorological conditions.

The typical procedure will thus be:-

1. The On Scene Co-ordinator will need to provide information of the following items to the DoTC 24-hour surveillance centre in Canberra;

   a) the time and location of the spill
   b) the quantity and type of oil
   c) whether the spill is continuing or one-time

   also, if possible

   d) the prevailing wind and time of tide
   e) forecast wind conditions
   f) observations on water currents
   g) any other relevant information, eg. quantities already beached etc.

   Ideally this information would accompany a photocopy of the relevant marine chart with the location of the oil spill marked; this information can be faxed directly to the DoTC operators.

2. Operators of OSSM at the DoTC surveillance centre will select appropriate databases for the spill location and oil-type, and will commence running OSSM to provide predictions of the path and spread of the oil at appropriate time intervals. Output is faxed directly back to the On Scene Coordinator.

3. During the clean-up, periodic updates of the prevailing winds and movement of the spill are faxed back to DoTC for inclusion as necessary in the continuing OSSM simulations.

4. Debriefing of the On Scene Co-ordinator and review of the response data take place soon after the clean-up is completed.

It is intended that VIMS will train a number of DoTC operators who will be responsible for the day-to-day operation of OSSM. These operators will be rostered on a 24 hour basis at the surveillance centre.

VIMS will provide technical maintenace and an update service, for OSSM to ensure' that operators remain well trained, and that the best software support is available.

Paper 18: POWER WITHOUT RESPONSIBILITY THE AUSTRALIAN MEDIA

John Durham,
Department of Transport and Communications

(The views expressed in this paper are entirely personal and are not in any way those of the Department)

Synopsis

The Australian media are one of the toughest in the world. They give and therefore expect no quarter. This paper will attempt to explain why and give brief hints on how to deal with the media if required. From a background of the workings of the media, details will be given on how to prepare for an interview with the electronic media.

Background

In a democracy, citizens claim one right thought to be the foundation of their way of life - freedom of the press. In this phrase is embodied the hope that the voice of the masses represented by the press could raise a protest on your behalf and make sure something was being done.

That constitutes a major misunderstanding of the media and most of those involved with any branch of it.

Freedom of the press was a slogan invented by politicians. Put simply it is the unquestionable liberty to publish the likes and dislikes of those who control the press.

What is disemminaied in the media is not the 'truth'. Originally polidcians controlled the media. But as the authority of politicians continued to diminish they attempted to re-establish their power by revealing non-attributable secrets (leaks, off the record quotes). The great modem conspiracy had begun. The media claimed to be the guardians of the public interest - but only the media had the means to broadcast their opinions, their likes and dislikes, and to debate what they liked.

The media owners and journalists, without any authority from the peopie, have taken on the democratic right to speak directly for the masses and at the same time decide what people should be told each day.

Media people thrive on unhappiness and disasters - not on good news.

In a young journalist the excitement of the power without responsibility produces frantic enthusiasm.

As maturity and world weariness sets in, sccpticism from realising that the power is empty produces cynicism and usually alcoholism.

Most journalists are too irresponsible to realise what they are doing to modem society - they are too busy looking' for a 'good story which is all too often negative,

Television News

The story will be shot on lightweight portable videotape gear ENG (electronic news gathering) - usually a self contained Sony Betacam or high band U-Matic. No lights will be required unless shooting indoors. You will tend to look thinner and paler than in real life although the effect varies.

Unless the story is a major lead the reporter will hope to shoot for a maximum of five minutes and select 2 short sound 'bites' of about 30 seconds. In a fast breaking news story the reporter will be looking for a rapid response from the experts but will wait several minutes while you collect your thoughts.

In a major story it is possible that the transmission could be live. The advantage of this is that it cannot be edited - but there will be no chance to correct errors of fact or presentation.

In any interview there are important points Lo remember:

i. Be yourself - if you are not comfortable with that underact.
ii. Be brief and precise
111. Take the interview seriously - you are addressing millions of people.
iv. Do your homework - you must know more than the interviewer.
v. Keep on-side - the interviewer will edit the tape so don't alienate.
vi. Speak spoken English.
vii. When you have made your point - SHUT UP.
viii. Keep cool, remember you are being watched - don't pull faces, pull your ear or move your hands around.
ix. Don't respond to rhetorical questions.
x. Decide the main point you want to get across and convert that to a quotable phrase.

An average news story will last for a maximum of 1 minute 20 seconds and will consist of:

Introduction	0.15 secs
Background	0.15 secs
Grab No 1	0.15 secs
Grab No 2	0.15 secs
Wrap up	0.15 secs

NB They are looking for a snappy entertaining line, not a speech. but don't worry if you are boring but accurate.

In a current affairs program more time will be available ▪ more time to get over your point of view or dig youself in deeper.

Preparations

i. What will I be asked?

ii. What is the main message I wish to convey?

iii. What are the best phrases?

iv. Can I provide visual material ▪ maps, statistics, photos or video?

v. How do I look?

FINALLY- DONT SPEAK OFF THE RECORD

PAPER 19: Workshop Programme

Day	Item/Activity	Responsibility
Mondav 21 Nov		
p.m.	Participant arrival MKY • check into venue (Pour Dice Motel)	Participants
Evening	Informal discussion	
Tuesday 22 Nov		
0845	Opening Statement . workshop aims and objectives . overview of National Plan . administrative matters	D. Brodie (DoTC) W. Craik (GBRMPA)
0930	Outline of role of OSC and Response Structure	R. Lipscombe (DoTC)
1030	Break	
1100	Outline of the scientific support needs' of an OSC a. general comments b. case studies and examples	R. Worrall (Port of Brisbane Authority) and D. Oliver (Marine and Harbours, WA)
1200	LUNCH	
1330	State Arrangements and Approaches . D. Palmer/C. Gibbs (VIC) . R. Cowell (NSW) . B. Wagstaff (SA) . D. Gordon (WA) . J. Isaacs (TAS) . P. Wright (NT) . P. Cosser/R. Perron (QLD) . W. Craik (QLD)	
1630	Break	
1700	Overview of the role of SSC in the key phases of pre-planning, response and monitoring/evaluation	I. Dutton
1730	Small Group Discussions a. Planning Scientific Support b. Implementing Scicntilic Support	As per List
1800	Dinner Adjournment	

Day	Item/Activity	Responsibility
2000	Spill Mitigation Options and the Use of Dispersants	D. Brodie
2100	**End Day 1 Programme**	

Wednesday 23 November

0830	Briefiig on Field Exercise	GBRMPA/DoTC
0900	Transport to field location and aerial/ground inspection of environments at risk: . coral reefs . high islands and fringing reefs . open waters . low energy coastal forcshores and estuaries . coastal and offshore infrastructure	
1500	Return to MKY (venue)	
1530	Review of Field Exercise	
1600	Oil Spill Monitoring - an Introduction	I. Dutton
1615	Assessment of Incident Monitoring Needs and Approaches a. Group 1 - Coral Reefs b. Islands and Open Waters c. Coasts and Estuaries	 W. Craik I. Dutton G. Thompson (SPCC)
1715	**End Day 2 Programme**	
1930	Workshop Dinner	

Thursdav 24 November

0830	Spill Trajectory Modclling	R. Colman (VIMS)
1015	Break	
1045	Marine Salvage Operations	K. Ross (AUSTPAC)
1230	Lunch	
1330	Syndicate Formation and Briefing on Scenarios	R. Lipscombe
1345	Syndicate Exercise	See list for groups
1545	Break	
1600	Syndicate Exercise (continued)	

Day	Item/Activity	Responsibility
1700	Analysis of an Incident . includes follow-up discussion	D. Brodie
1730	Dinner adjournment	
1930	The Public Face of Oil Spills . external pressures and interests . dealing with the media	J. Durham (DoTC)
2100	**End Day 3 Programm'e**	

Friday 25 November

0830	Syndicate Discussions (continued)	
0930	Break	
0945	Syndicate Presentations	
1030	Dealing With the Media (Part 2) . role playing and simulation . evaluation of presentations	J. Durham
1130	Plenary discussion	
1200	Workshop Critique and Close	D. Brodie/W. Craik
1230	Lunch and Departure	
	End of Workshop	

Paper 20: SSC ROLE DISCUSSION - GROUP REPORTS

GROUP A (SSC Role Requirements in Preplanning)

Essential requirements for implementing the role of SSC in pre-planning of oil spills:

1. Good communications and expectations of OSC of SSC and SSC of OSC needs. Clear instructions on what is expected of SSC.

2. Basic information handled by SSC. Perceived value in knowing;

   - probability statistics on spill for regions
   - nature of oils and how they are affected by different conditions; alert special care needed;
   - clear information on where and what are the appropriate (and authorized) disposal sites; these should be specified in a contingency plan.
   - distribution of communities
   - susceptibility-to-oils------ --

3. Discussion moved to the necessary (minimum) professional requirements to take responsibility as SSC;

   - training needs
   - at very least we need to be able to recognize and call in expertise, discuss the scientific aspects, communicate and evaluate our opinions on this and provide sound interpretation of the arguments placed by 'conflicting' experts.

Who has this experience? Only biologists? Others? (needs further evaluation)

GROUP B (SSC Role Requirements during Response)

SSC needs:

- access to detailed environmental information
- sufficient scientific background
  - to liaise with experts
  - to synthesise their inputs into sensible advice (need for management training?)

- up-to-date contact list of experts
- need for detailed local knowledge of area in question in some cases and need for broad logistical knowledge **of area** in question in some areas
- familiarity with control techniques so that advice **is** realistic
- adequate pre-planning and training
- communications
  - telephones }
  - radio } and support staff to
  - fax } operate these
  - telex etc. }
- clear definition, somewhere, of responsibilities of SSC. (to avoid redundancies, conflict etc., **with** other aspects of contingency plan)

GROUP C (SSC Role in Post- Incident Phase)

Essential

1. Prosecution
2. Define aims of post-spill monitoring
3. Identify problems with contingency plans and rectify major problems
4. Identify future environmental research needs
5. Complete and circulate incident report
6. Validate adequacy of emergency decisions

Desirable

1. Rectify minor problems
2. Improve comfort of response team
3. Check that response recommendations were reasonable
4. Feedback to support and interest groups

Paper 21: OIL SPILL RESPONSE EXERCISE BRIEFS

Department of Transport and Communications

EXERCISE NO. 1 (MACKAY - WHITSUNDAY AREA)

Scenario

At 2130 Wednesday 23 November 1988 the 25,000 DWT bulk carrier Black Gold experienced main engine problems whilst transitting Cumberland Channel bound Newcastle from Singapore. On the advice of his Chief Engineer the Master decided to stop his vessel so that repairs could be made to the engine. At 2215 Black Gold anchored 1.5nm north of Carlisle Island.

Repairs to the main engine were completed at 0900 Thursday 24 November and recovery of the port anchor commenced shortly afterwards. At 0925 the anchor snagged the starboard side of the vessels bulbous bow before freeing suddenly. As a result of the sudden release the anchor swung, one of the flukes striking the vessels shell plating and punching a hole in the port forward deep tank. This tank contained 1200 tonnes of heavy fuel oil bunkers, with an estimated 650 tonnes located above the level of the hole.

Immediately the damage occurred the Master ordered a bunker transfer from the port tank to the empty starboard deep tank. The transfer pump has a capacity of 30 tonne per hour.

Early indications are the bunkers are escaping from the hole at the rate of 45 - 55 tonne per hour. Crew of Black Gold are unable to plug the leak externally.

Task

The Scientific Support Co-ordinator is to assist the OSC in planning his response. The SSC will assess environmental protection priorities and provide balanced advice to the OSC. The SSC will be assisted by other environmental officers.

The task of the OSC is to respond to this incident. He will:

- indicate first actions taken on receipt of this report
- assess the threat. Determine the area which will be affected by the spill

- determine specific areas which he considers have features and assets which need to be protected. Provide reasons.

indicate what equipment is required to combat the oil spill and to protect the areas identified above

if specialist response equipment is not immediately available, what other measures can be taken to mitigate the effects of pollution. Indicate actions taken.

Further update advice for this and the other exercise is not reproduced here.

EXERCISE NO. 2 (BASS STRAIT AREA)

Scenario

At 0635 24 November 1988 the following message was received at Melbourne Radio/VIM from the Cypriot oil tanker **ALLENISS**

"Have structural damage to ship starboard side. Lose some oil. Am changing course now to 'Marshall Bay at Flinders Island and look at problem. Position 3940S 14705E. Speed slowed to 10 Knots. Wind force 6 from NE. Strong sea from east. Reply soon please.
Rgds Karranopolis
Master 24/0630"

Melbourne Radio advises that **ALLENISS** is enroute to New Zealand from the middle east. Ship is 35,000DWT fully ladden with Arabian Light crude.

Weather conditions are expected to remain force 6 from NE for the next 12 hours before abating to force 4 from the east.

Task

The Scientific Support Co-ordinator is to assist the OSC in planning his response. The SSC will assess environmental protection priorities and provide balanced advice to the OSC. The SSC will be assisted by other environmental officers.

The task of the OSC is to respond to this incident. He will:

- indicate first actions taken on receipt of this report

- assess the threat. Determine the area which will be affected by the spill

- indicate what equipment is required to combat and mitigate the effects of the oil spill and protect the areas identified above.

Paper 22: MONITORING DISCUSSION REPORT

Background

Following the field inspection of islands, reefs, open waters, estuaries and low energy coastal environments in the Mackay - Whitsunday area, participants discussed possible approaches to hazard identification in planning an oil spill response in these types of areas. Following the analysis of threats to these areas, participants commenced a discussion of the role of monitoring in spill response. This paper summarises principal items of discussion.

Threats

The assessment of risks to various environments which oil spills pose depends to a significant extent on factors such as:

* time,' nature and extent of spill,
* location of spill and influence of prevailing environmental factors, and
* types of control/containment options available/used.

Areas of priority concern identified from the field excursion were as follows (lists are not internally prioritized):

Islands/Coral Reefs	Open Waters	Coasts/Estuaries
Intertidal zone	Mammals	Seagrass/mangroves
Reef flats	Fish/cetaceans	Intertidal wetlands
Corals and sessile invertebrates	Prawns (esp. larval stage)	Seabird rookeries/breeding areas
Birdlife and turtles (esp. in breeding season)	Phyto/zooplankton	Fisheries habitat
Cay vegetation	Biodegradation rates	Tourists and recreational users
Persistence of oil	Socio-economic impacts (e.g. fisheries)	Intakes (e.g. desalination plants)
Coral spawning		Mariculture

In addition to the above, local features of importance need to be identified (e.g. tidal bathing pools). Participants were in agreement that most sensitivity maps should also interpret the importance of particular features and provide guidance on the types of control options available, special considerations (e.g. seasonal -effects) and access/jurisdiction matters. If possible, it would further be desirable to compile a register of local expertise relevant to spill response (e.g. list of avifauna experts who may assist with information on rookery use, bird cleaning, etc.).

Monitoring

Time precluded a full discussion of the options for monitoring of these types of environments. Participants identified that a range of acceptable monitoring techniques are available for these areas and that any monitoring should take into account studies undertaken, or in progress, at identified sites. Emphasis should also be given to the protection of "reference sites", which may be sites for existing research, or which may form part of any monitoring studies associated with a spill incident (comparison sites). Throughout the discussion it was emphasized that monitoring has a special role to play in response planning and that it is not a surrogate control technique. For these reasons agencies stressed the need to carefully evaluate the likely costs and benefits of any monitoring proposals before measurements/observations commence.

Participants noted that at the next SSC meeting, it would be desirable to make provision in the agenda for the design of a monitoring program for sites of concern. Other points of discussion included:

* the need to clarify funding for monitoring activities;
* the lack of understanding of the impacts of dispersants, particularly under Australian conditions (Paper 25 includes information on dispersant toxicity, based largely on overseas studies);
* the desirability of expanding the use of monitoring as an evaluative tool in post-incident assessment; and
* the importance of'establishing clear objectives for any monitoring activities. In this regard, it would be desirable to also identify pre-conditions or "trigger" criteria for the commencement of such activities.

Paper 23: HARBOURS OF REFUGE

Donald Brodie,
Department of Transport, Canberra, 1983.

The Working Group on the National Plan was asked to consider the question of safe havens or harbours of refuge for vessels which may be in difficulty and at the same time pose a potential pollution threat.

To date two instances come to mind in the Australian area, those of PRINCESS ANNE MARIE in 1975 and FARID FARES in 1980. When the former vessel suffered structural damage in the Indian Ocean, whilst en route Arabian Gulf to Kwinana fully laden with crude oil, sufficient time was available for the West Australian State Committee to decide on a course of action. First consideration was selection of a suitable haven. Fortunately the authorities at Dampier indicated a willingness to receive the vessel. The port offered appropriate shelter, deep water and availability of resources required for a transfer operation.

In the second case, that of FARID FARES, a livestock carrier en route from Tasmania to the Arabian Gulf, the situation was not so simple. The vessel was fully loaded with several thousand sheep and was on fire. Whilst oil 'fuel carried as bunkers posed a potential pollution problem, a more complex situation was posed by the thought of a derelict vessel laden with several thousand sheep carcasses threatening a coastline. It was fortunate that extensive fire damage caused the vessel to sink thus removing the problem.

Clearly in each case the facts of the incident need to be gathered and any intervention action considered with the minimum delay. To assist with the decision making process it is considered necessary to have a number of options available to support the overall contingency plan. Australia would appear to be placed in a better position than many maritime nations in that passing traffic, not calling at Australian ports, is minimal and that the State responsible authority may have sufficient jurisdiction over waters and areas of the coast which would lend themselves to selection of safe havens.

A number of criteria are suggested for selection of safe havens:

- sufficient depth of water
- good holding ground
- shelter from prevailing wind/swell conditions
- relatively unobstructed approach from seaward

- environmental classification of adjacent coastline and fisheries activity
- access to air transport facilities
- access to loading/unloading facilities for emergency equipment.

The above do not necessarily cover all requirements but are suggested as a basis for discussion.

Section 3.6 of the IMO Manual on Oil Pollution, Section III, Salvage, in discussing Harbours of Refuge states the following:

. . . ..Port authorities, mindful of the risks involved, may be reluctant to accept a distressed ship which may be leaking oil. However, it is rarely possible to deal satisfactorily and expeditiously with a casualty in open sea conditions and the longer a damaged ship is forced to remain at the mercy of the open sea, the greater is the risk of its condition deteriorating and thereby becoming a greater pollution hazard.....

The provision of special sheltered areas as "harbours of refuge" should be carefully examined but if such areas cannot be determined, port authorities should be encouraged to permit (with all reasonable precautions, e.g. a requirement that the salvor could not disengage before the owner had complied with all required preventive measures and the posting of an adequate bond) a distressed vessel to enter its harbour to facilitate its salvage and minimise damage.

Whilst it is recognised that identification of harbours of refuge does not present an immediate solution to the problem it is a first step in the process. To flag the subject with State environmental agencies, local authorities and other interested organisations would probably result in lengthy and involved discussions and a request for environmental impact statements. It is felt that involvement to this degree would be unnecessary at this stage as considerable time and effort would be spent on discussions for a situation which would in all likelihood not arise. However some thought could be given by members to:

a. firstly, identification of areas having the basic criteria outlined above, and

b. secondly, the steps which would need to be taken in the decision making process should an incident occur.

It would be useful if an inventory of selected refuges could be included within the National Plan Operations and Procedures Manual and State supplements at a future date. This may however be too ambitious an aim to achieve.

Paper 24: STRATEGIC ATLAS FOR OIL SPILL MANAGEMENT

Wendy Craik[1] and Brett Kettle[2]

1. Great Barrier Reef Marine Park Authority, P.O. Box 1379, Townsville, Queensland 4810

2. Marine Bio Logic Pty Ltd., P.O. Box 959, Townsville, Queensland 4810

The objectives of this atlas are:.

- to show coastal resources
- to indicate relevant management actions in the event of an oil spill, and
- to make access to the atlas rapid, simple and not requiring computer knowledge.

The atlas is developed (as a HyperCard application) for use on a Macintosh. Depending on the geographical site and level of resource information required, a Macintosh with 1 megabyte of RAM and a 20 megabyte hard disc will be more than adequate.

The system relies on a series of nested maps which are accessed by clicking the mouse on the required location. The system can display biological and commercial resources for an area thus providing relevant information for the Scientific Support Co-ordinator (SSC) and On Scene Co-ordinator (OSC) on resources of specific significance or conservational value.

Additionally, for each area and on the same screen as the specific resources information, recommended actions for the OSC to take or avoid can be listed eg. to use dispersants or not.

Any amount of additional information can be added to the atlas. Examples might include:

- list of available equipment for each area
- local tidal information calculated from tidal coefficients at the time of each request
- local wind conditions by accessing local weather stations (via a modem)
- local currents (from pre-determined set/flow charts or by linking to a trajectory model for the area).

An example of such an atlas is presented in the following figures.

The atlas is simple to access and does not require any specialised computer knowledge. It is designed so that it could be accessed in the event of a spill by the OSC (and SSC), for instant information, particularly if a Macintosh was installed in the combat response co-ordination centre.

A printout of the information can be obtained in the normal manner.

STRATEGIC ATLAS for Oil Spill Management

A DEMONSTRATION PACKAGE

prepared by

MARINE BIO LOGIC
Environmental Consultants
and the
Great Barrier Reef Marine Park Authority

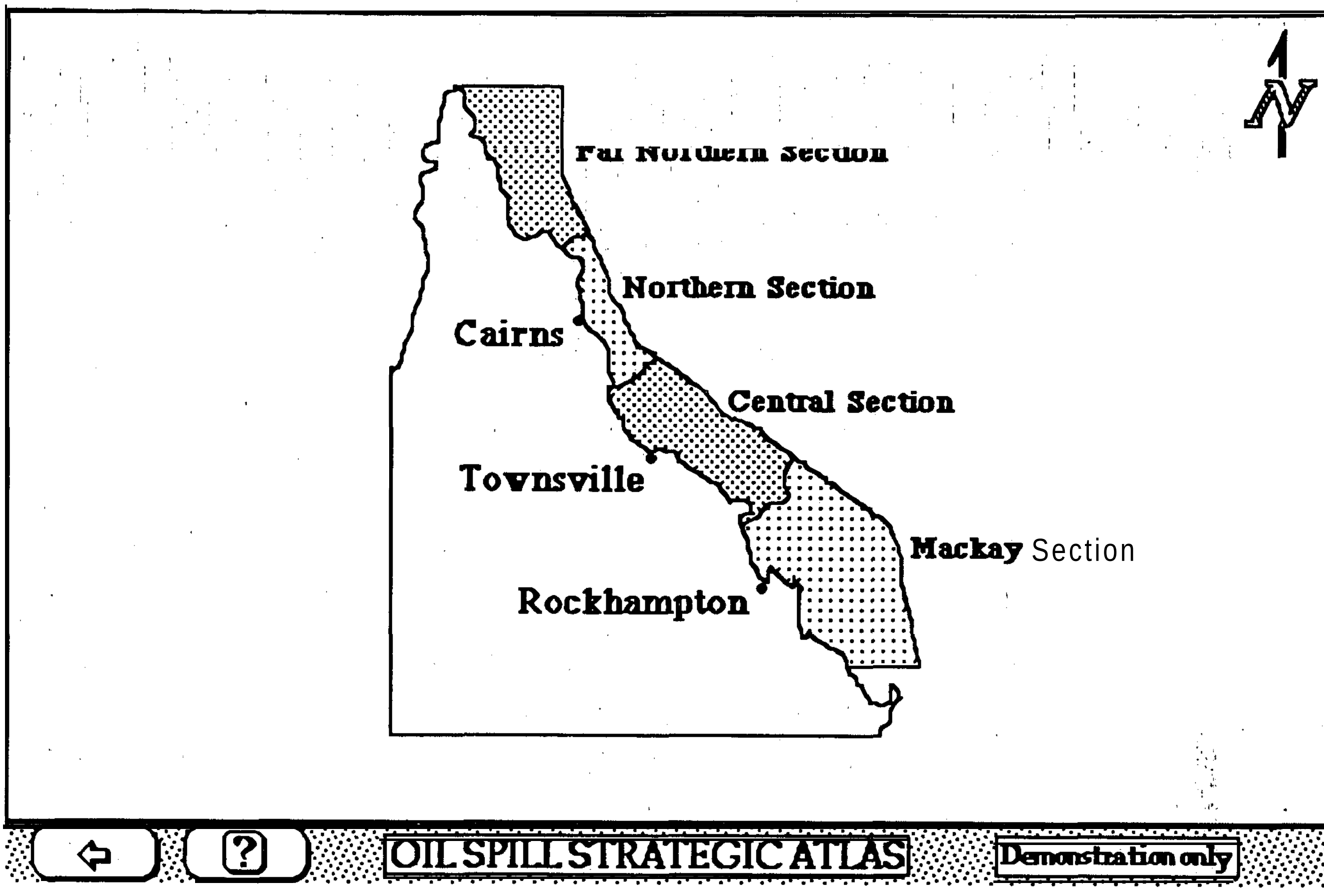
OK

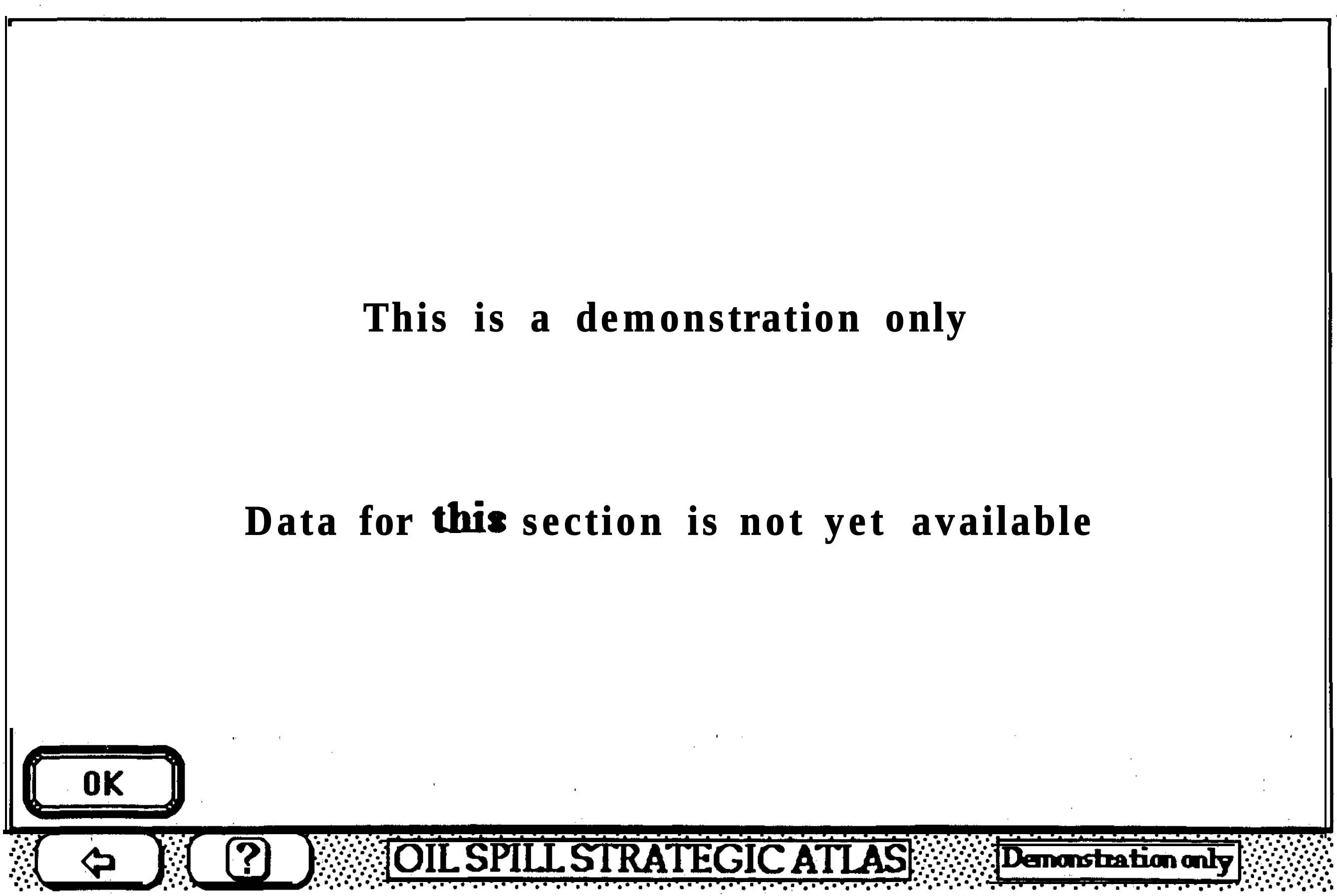
Throughout this demonstration simply

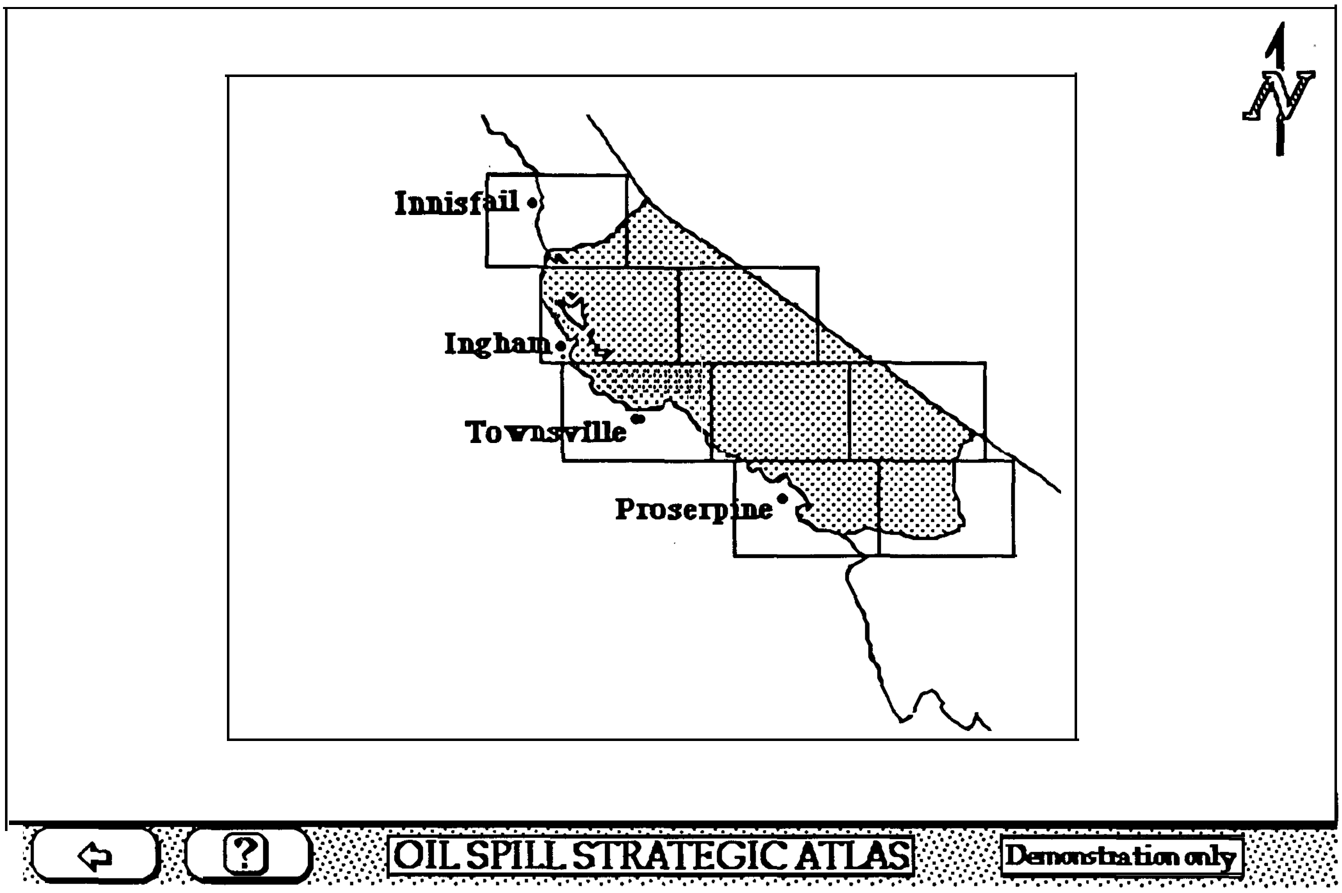
point and click

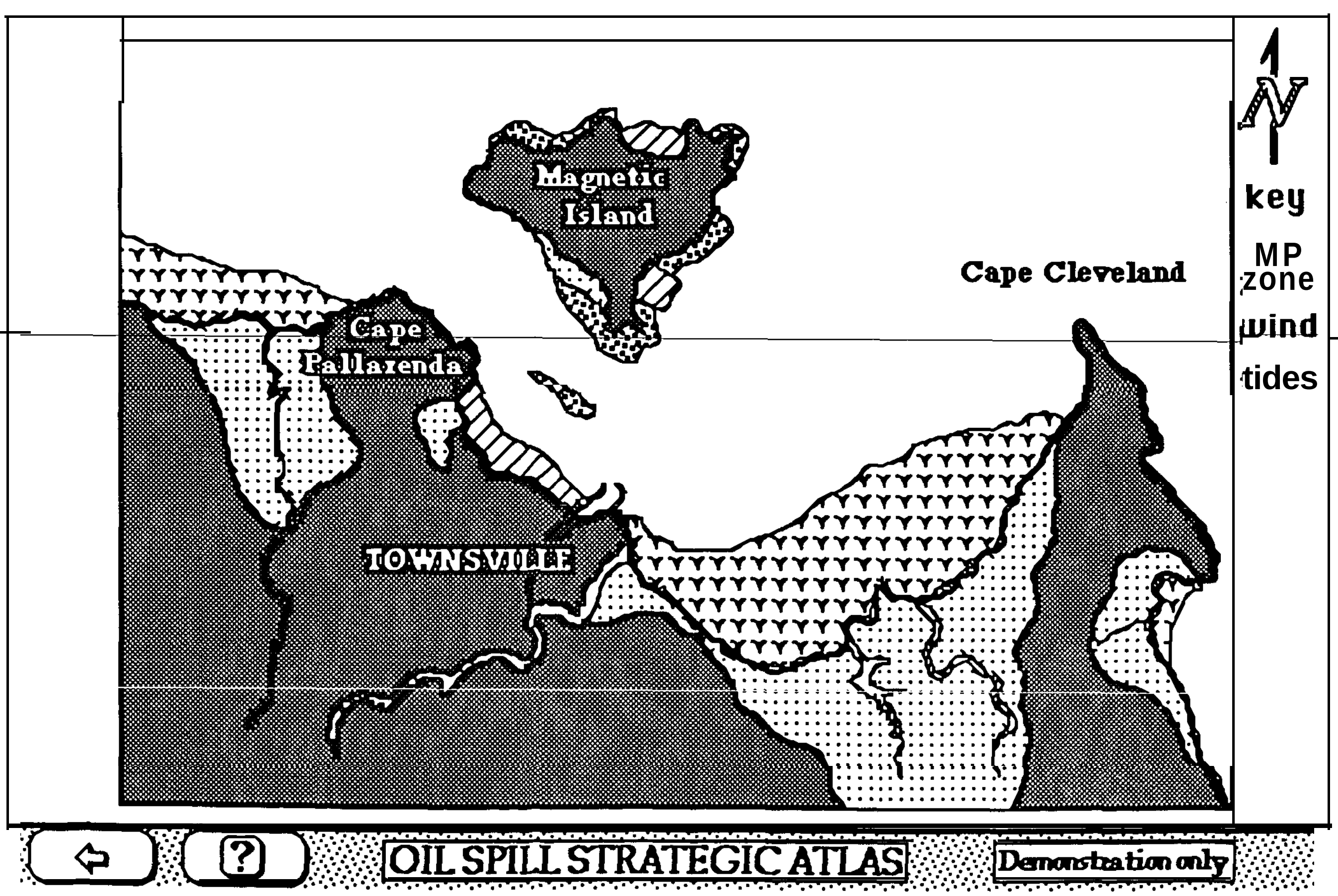
at the area of interest

OK


Northern Section
Cairns
Central Section
Townsville
Mackay Section
Rockhampton
OIL SPILL STRATEGIC ATLAS
Demonstration only


This is a demonstration only
Data for this section is not yet available
OK
OIL SPILL STRATEGIC ATLAS
Demonstration only


Innisfail
Ingham
Townsville
Proserpine
OIL SPILL STRATEGIC ATLAS
Demonstration only


Magnetic Island
Cape Cleveland
Cape Pallarenda
TOWNSVILLE
key
MP zone
wind
tides
OIL SPILL STRATEGIC ATLAS
Demonstration only

HABITAT SHEET — SEAGRASS AREAS - CLEVELAND BAY

Dominant organisms Halophila dicipiens in multi-specific seagrass beds,,

Values High primary productivity, important nursery for commercially important crustacean and fish species, Important role in substrate stability,

Reservatianstatus Moderate,

Action to be taken No dispersants.
Physical containment if possible,
High priority to affected Dugongs.
May pose difficulties at low tide periods,

OK

HABITAT SHEET — FRINGING CORAL REEFS, - PICNIC BAY

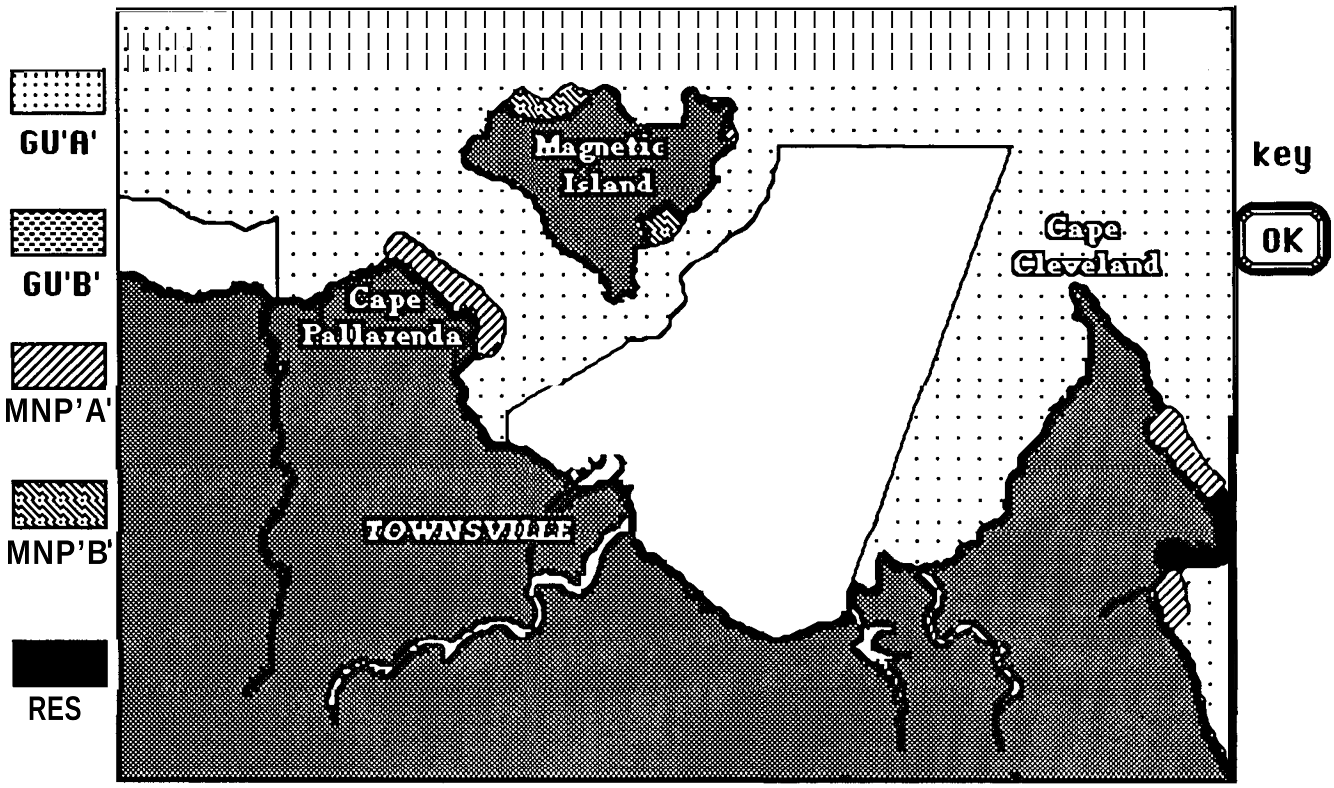
Dominant organisms Seasonal shift in dominance from hard corals (Autumn) to macroalgae (Spring). Algae tend to dominate shallower areas, corals in deeper water to 5m.

Values Low recreational appeal, Moderate scientific value,

Preservation status Moderate,

Action to be taken Only suitable dispersant is “XYZ 123".
Dispersed oil preferred to natural oil,
In winter widespread detachment of macroalgae will lead to odour problems and warrants quick removal.

OK



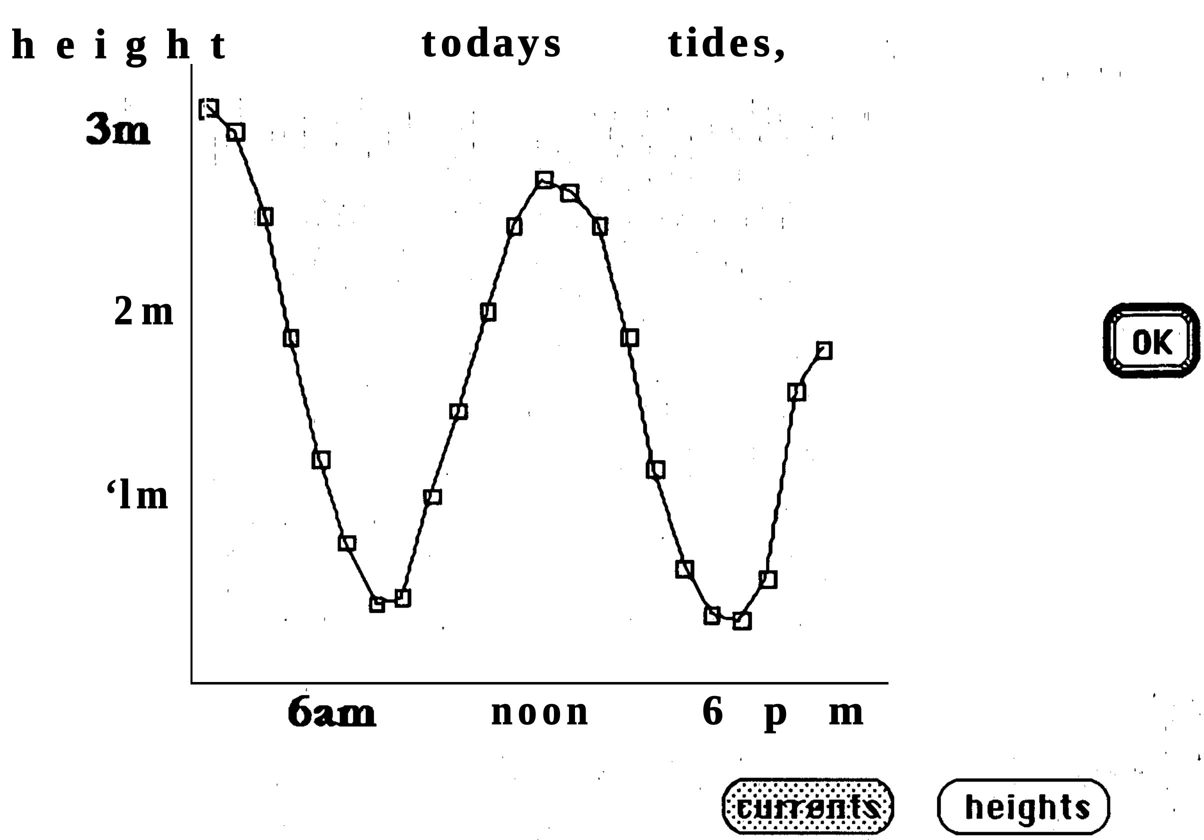
Great Barrier Reef Marine Park Zones

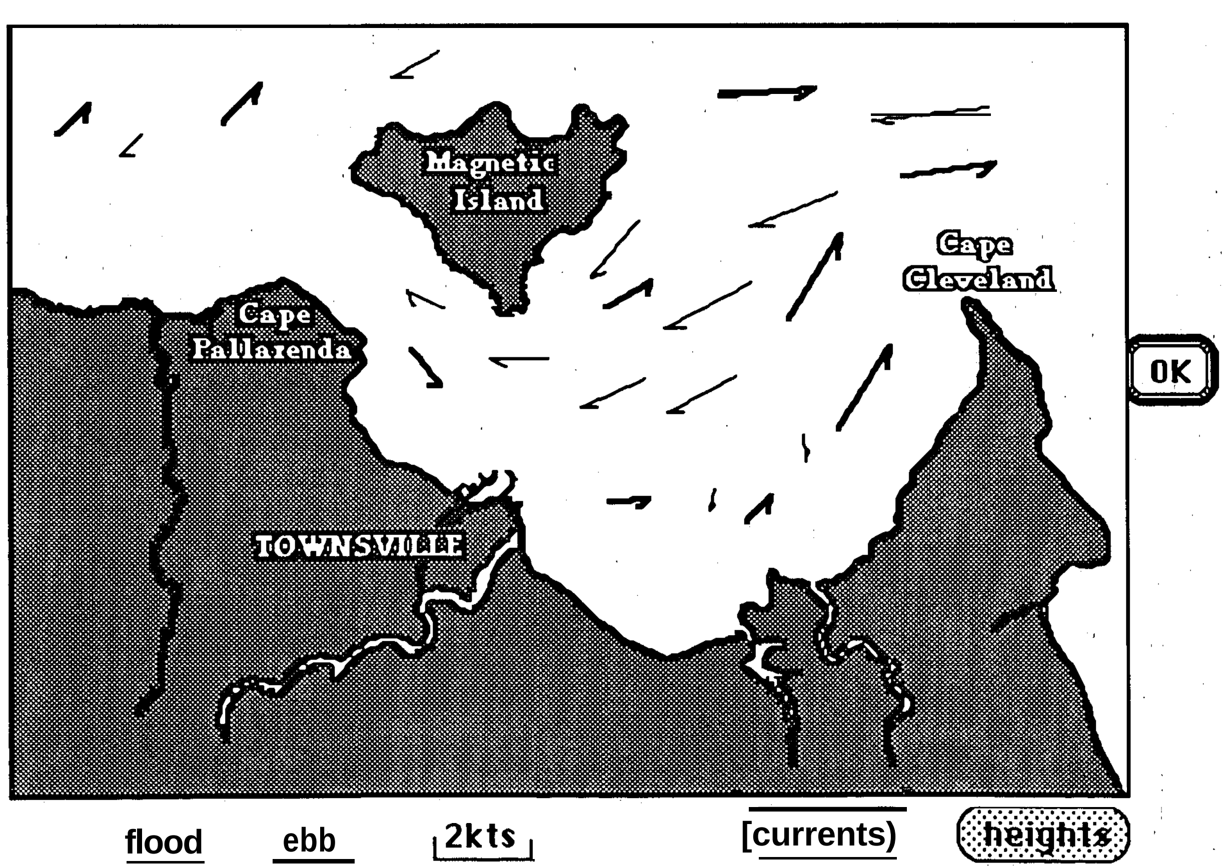
KEY TO MARINE PARK ZONES

(click for information on zoning objectives)

OK

- General Use "A"
- General Use "B"
- Marine National Park "A"
- Marine National Park "B"
- Scientific Research Zone
- Preservation Zone

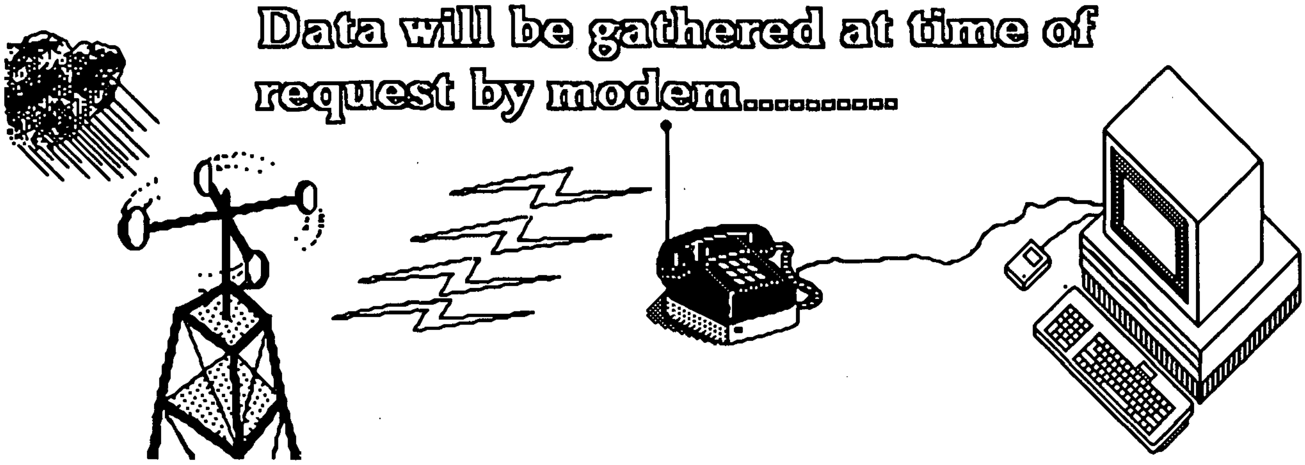

height todays tides,
3m
2 m
'1m
6am
noon
6 pm
OK
currents
heights


Magnetic Island
Cape Pallarenda
Cape Cleveland
TOWNSVILLE
OK
flood
ebb
2kts
[currents)
heights

In the completed program this segment will provide real-time wind conditions from the closest telemetering weather station, eg. John Brewer Reef.

OK

Data will be gathered at time of request by modem..........



Paper 25: OILS AND'DISPERSANTS IN MANGROVE AND SEAGRASS AREAS

Extract from Thorhaug **(1987)**

TABLE 1: Tropical and Subtropical Seagrass Dispersant Oil and Oil Effects on Seagrasses

LOCATION	AUTHOUR & DATE	TYPE	DISPERSANT USED & DILUTION	CONC. OF DISPERSANT	AMOUNT OF SPILL	DATE	RESOURCE AFFECTED	IMPACT	DISPERSANT EFFECT
	Baca and Getter (1985)	LAB. out of doors	Corexit 9527	50 ppm oil 1:20 24 hr.	50 ppm oil lab.	1984	*Thalassia testudinum*	LD 50 12 & 96 hr bioassays oil & dispersed oil	oil with' dispersant has lower toxicity than without dispersant.
Miami, FL.	Thorhaug & Marcus, (1985)	Lab. out doors	Corexit 9527 1:20	La Crude Murban	Lab.	1983 -84	*Thalassia Halodule Syringudium*	LD 50 vs. time a conc.	at medium conc. high high
Miami, FL.	Thorhaug & Marcus, (1985)	Lab. out doors	corexit 9527 1:20	La. Crude Murban					at 5 to 100 hr.
Miami, FL.	Thorhaug & Marcus, (1967a)	Lab. out doors	ARco D-609 1:10	La. Crude Murban			*Thalassia Halodule Syringudium*	LD 50 5 hr. 100 hr.	low to medium low to medium low to medium at 75 a 125ml
Miami, FL	Thorhaug a Marcus, (1967b)	Lab. out doors	Conco K (K) 1:10	La. Crude Murban			*Thalassia Halodule Syringudium*	LD 50 at 5 & 100 hr.	medium to high high high
Panama	Getter et al. (1966)	field	Corexit 9527	50 ppm @ 24 hr.	Exp. Prudhoe Bay Crude	1985	*Thalassia testudinum*	none to *Thalassia*	no effect on *Thalassia*
Miami, FL	Thorhaug & Marcus, (1987a)	Lab. out doors	Corexit 9556	25 a 75 ml oil 1:20 disp. in 100,000cc	La. Crude exper.	1986	*Thalassia Halodule Syringudium*	100 hr.	low medium low to medium
Miami, FL.	Thorhaug & Marcus (1967a)	Lab. out doors	OFC-D-607	SW La. Crude 75 a 125 ml oil La. Crude	La. Crude exper.	1986	*Thalassia Halodule Syringudium*	100 hr.	low low medium
Miami, FL	Thorhaug & Marcus, (1967b)	Lab. put doors	Cold Clean 500	La. Crude 5 & 125 ml in 100,000cc SW		1966	*Thalassia Halodule Syringudium*	LD 50 100 hr.	low low to medium low
Miami, FL.	Thorhaug & Marcus	lab.	Finsol OSP-7	La Crude 5 8.125 ml in 100,000cc SW		1966	*Thalassia Halodule Syringudium*	LD 50 100 hr.	med-low low low-med/low

TABLE 2: Dispersed Oil and Oil Effects on Mangroves

LOCATION	AUTHOUR & DATE	TYPE	DISPERSANT USED & DILUTION	TYPE OF OIL	AMOUNT OF SPILL	DATE	RESOURCE AFFECTED	IMPACT	DISPERSANT EFFECT
Panama	Getter, 1986	field	Corexit 9527 24 hr. 1:20	50 ppm Prudhoe Bay crude	Exp.	1964	Mangroves	Defoliation Death	Dispersed oil before it reached mangroves.
Turkey Pt. Biscayne Bay, FL.	Teas et al 1987	field	Corexit 9527 1:20	La. Crude	Exp.		*R. mangle*		
Coast on Caribbean side of Panama	Cubit et al 1987	Accidental	Corexit 9527, approx. 21,000 litres 1:20	med. wt. crude	55,000-60,000	Apr 27 1966	*R. mangle*	Defoliation Death	
Coast on Caribbean side of Panama	Getter & Ballou 1987	Exper.	Corexit 9527 1:20	Prudhoe Bay crude	Exp.	1965	*R. mangle*	28% trees defoliated	No defoliation at sites with dispersant
South Florida	Teas, 1986	field	Corexit 9527 1:20	50 ppm	Exp.	1962 -66	*R. mangle*		
Panama	Teas, 1987	field spill	Corexit 9527 1:20	med. wt. crude		fall, 1966	mangroves	observed 'mangrove death	If dispersed before oil on mangroves, less mortality

Paper 26: ADDITIONAL REFERENCE LITERATURE

This reference list is based on material supplied by workshop participants. It contains material which has been found to be of use by SSCs throughout Australia in the derivation of scientific advice in pre-planning and response. The list is not meant to be a definitive bibliography. Rather, it serves as an introduction to relevant literature. Additional material is held by the Department of Transport and Communications, the Great Barrier Reef Marine Park Authority and the Centre for Coastal Management (Northern Rivers CAE).

Amstutz, D.E. and Samuels, W.B. (1984) Offshore oil spills: Analysis of risks. Marine Environmental Research, Vol.13. pp. 303-319.

Anink, P.J., Roberts, D.E., Hunt, D.R. and Jacobs, N.E. (1981) Oil Spill in Botany Bay: Short Term Effects and Long Term Implications. Marine Biology Unit, State Pollution Control Commission, Sydney.

Anon. (1982) Oil Spill Studies: Measurement of Environmental Effects and Recovery. American Petroleum Institute.

Anon. (1984) Pollution - Emphasis shifts to platform discharges. Offshore Engineer, December.

Anon. (1984) Oil Spill Control: A Study of Methods Currently Available. Marine Pollution Section, Marine Operations Division, Department of Transport, Canberra.

Anon. (1985) Spillcon One. Australian National Oil Spills Conference, Sydney. Australian Institute of Petroleum Ltd and Federal Department of Transport, Sydney.

Anon. (1987) Spillcon '87. Australian National Oil Spills Conference, Melbourne. Australian Institute of Petroleum Ltd and Federal Department of Transport, Melbourne.

Bac, R.P.M. (1987) Effects of chronic oil pollution on a Carribean coral reef. Marine Pollution Bulletin, Vol.18, No. 10, pp. 534-539.

Beer, T., Humphries, R.B. and Bouwhuis, R. (1983) Modelling nearshore oil slick trajectories. Marine Pollution Bulletin, Vol. 14, No. 4, pp. 141-144.

Brodie, D. (1987) Oil Pollution Response Arrangements in Australia: The Government View (Including an Update on Dispersant Testing). Proc. 1987 Oil Spill Conference (U.S.)

Champ. (1984) NOAA's Scientific support co-ordinators (SSC) and hazardous materials response project. In: Craik, W. (ed.) Hazardous Chemical Spills in the Great Barrier Reef Region. Workshop Series No. 6. Great Barrier Reef Marine Park Authority, Townsville.

Cohen, M.A. (1986) The costs and benefits of oil spill prevention and enforcement. Journal of Environmental Economics and Management. Vol13, pp. 167-188.

Cox, G.V. and Cowell, E.B. (1979) Mitigating oil spill damage • ecologically responsible cleanup techniques. In: Swanson, G.A. (ed.) The Mitigation Symposium. General Technical Report RM-65, Forest Service, US Department of Agriculture, Ft. Collins, Colorado.

Cumming, J.A. and Jenssen, T.K. (1984) Risk analysis of shipping and offshore operation. Journal of Navigation, Vol. 37, No. 1.

Dutton, I.M. (1984) Environmental considerations relating to oil spills. National Plan to Combat Pollution of the Sea by Oil • Basic Operators Training Course, Townsville, September, 16 pp.

Farke, H., Wonneberger, K., Gunkel, W., and Dahlmann, G. (1985) Effects of oil and a dispersant on intertidal organisms in field experiments with a Mesocosm, the Bremerhaven Caisson. Marine Environmental Research, Vol. 15, pp. 97-l 14.

Foget, CR., Schrier, E., Cramer, M. and Castle, R. (1979) Manual of Practice for Protection and Cleanup of Shorelines. I. Decision Guide and II. Implementation Guide. Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio.

Getter, C.D., Ballou, T.G. and Koons, C.B. (1985) Effects of dispersed oil on mangroves, synthesis of a seven year study. Marine Pollution Bulletin, Vo1.16, No. 8, pp. 318-324.

Goodman, K.s. and Baker, J. (1982) A Preliminary Ecological Survey of the Coastline of Abu Dhabi, United Arab Emirates. A Report Prepared for the Abu Dhabi Marine Operating Company (ADMA-OPCO) by British Petroleum International Ltd., Environmental Control Centre, London, Vol. 1.

Healy, B.O. (1983) Role of the Scientific Support Co-ordinator. National Plan for the Combat of Pollution of the Sea by Oil, On-Scene Co-ordinator Workshop, Adelaide.

International Petroleum Industry Environmental Conservation Association. (1984) Management of Oil Spill Response, A Petroleum Industry Guide. IPIECA, London.

International Maritime Organization. (1982) IMO/UNEP Guidelines on Oil Spill Dispersant Application and Environmental Considerations. IMO, London.

Lindstedt-Siva, J. (1985) Oil spill response and ecological impacts - 15 years beyond Santa Barbara. MTS Journal, Vol. 18, No. 3, pp. 43-50.

Lindstedt-Siva, J. (1987) Advance planning for dispersant use. Proc. 1987 Oil Spill Conference (U.S.).

Lopez, J.M. (1978) Ecological consequences of petroleum spillage in Puerto Rico. Presented at, Conference on Assessment of Ecological impacts of Oil Spills, Keystone, USA, June.

McLaren, P. (1981) Coastal geology and oil spills. Episodes, Vol. 1981, No. 3.

Middleditch, B.S. (1984) Ecological effects of produced water effluents from offshore oil and gas production platforms. Ocean Management, Vol. 9, pp. 191-3 16.

Natural Systems Research Pty. Ltd. (1981) Cooper Basin Liquids Project, Oil Spill Trajectory Study. Final Report to Santos Ltd., Natural Systems Research, Environmental Consultants, Hawthorn, Victoria.

O'Connor, J.S. and Dewling, R.T. (1986) Indices of Marine Degradation: Their utility. Environmental Management, Vol. 10, No. 3, pp. 335-343.

Palmer, S. (1982) Oil spill response - the current picture. Environmental Pollution Management, Vol. 12, No. 3.

Report from the House of Representatives Standing Committee on Environment and Conservation (1978) Oil Spills, Prevention and Control of Oil Pollution in the Marine Environment. Australian Government Publishing Service, Canberra.

Russell, L.T., Mackay, G.D.M., Carson, W and Skinner, D. (1979) The removal of spilled oil from recreational beaches, Arctic Marine Oil spill Program Technical Seminar preprints, Supply and Services Canada, Fisheries and Environment Canada: 24-1-24-12.

Segar, D.A. and Stamman, E. (1986) Fundamentals of marine pollution monitoring programme design. Marine Pollution Bulletin, Vol. 17, No. 5, pp. 194-200.

State Pollution Control Commission (1984) Coastal Resource Atlas for Oil Spills in Botany Bay. SPCC, Sydney.

Sutherland, G.B., Jones, I.W. and Smith, R.W. (1983) Oil spill protection planning for natural resources in Oregon. Proceedings 1983 Oil Spill Conference, American Petroleum Institute Publication 4356, pp. 183-186.

Teal, J.M. and Howarth, R.W. (1984) Oil spill studies: A review of ecological effects. Environmental Management, Vol. 8, No. 1, pp. 2744.

Ter Keurs, W.J. and Meelis, E. (1986) Monitoring the biotic aspects of our environment as a policy instrument. Environmental Monitoring and Assessment Journal, Vol. 7, pp. 161-168.

The International Tanker Owners Pollution Federation Ltd. (1982) Contingency Planning for Oil Spills. Technical Information Paper Number 3, ITOPF, London.

The International Tanker Owners Pollution Federation Ltd. (1985) Aerial Application of Oil Spill Dispersants. Technical Information Paper Number 9, ITOPF, London.

The International Tanker Owners Pollution Federation Ltd. (1986) Fate of Marine Oil Spills. Technical Information Paper Number 11, ITOPF, London.

The International Tanker Owners Pollution Federation Ltd. (1986) Action: Oil Spills. Technical Information Paper Number 12, ITOPF, London.

Trudel, B.K. and Ross, S.L. (1987) Method for making dispersant-use decisions based on environmental impact considerations, Proc. 1987. Oil Spill Conference (U.S.)

UNESCO (1980) Monitoring biological variables related to marine pollution. Reports and Studies No. 12 of the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP), UNESCO.

Valencia, M.J., Kaul, H.L. and Galt, J. (1983) South China Sea: hypothetical oil spill trajectories and transnational impact. Ocean Management, Vol. 8, pp. 335-351.

Wells, P.G. (1984) The toxicity of oil spill dispersants to marine organisms: a current perspective. In. Allen, T.E. (ed.) Oil Spill Dispersants : Five Years of Research. ASTM, Philadelphia, Pennsylvania.

Yearn Hong Choi (1984) Conflicting energy and environmental policies: the Portsmouth Oil Refinery. Environmental Management, Vol. 8, No. 2, pp. 101-108.