

Governance Framework For The AADC System For Indicator Monitoring & Reporting (SIMR)

1. Purpose & Function of SIMR Tool

The requirement for an Antarctic component to the 2001 Australian State of the Environment (SOE) report initiated the development of a state of the environment system to collate, analyse and manage Antarctic SOE information. This system is managed by the Australian Antarctic Data Centre (AADC) on behalf of the Australian Antarctic Division.

The system consists of a set of environmental indicators that adhere to the Condition-Pressure-Response (CPR) model originally promulgated by the Organisation for Economic Cooperation and Development (OECD 1993). *Condition* indicators provide insight into the status of an environmental quality. *Pressure* indicators include those anthropogenic pressures or stresses that are applied to environmental quality and *Response* indicators usually detail what we are doing to mitigate environmental pressures.

In 2001, a series of environmental indicators were developed and refined by a group of experts over a period of 18 months. A simple descriptive template and data for each indicator were incorporated into a web-accessible database system called SIMR (System for Indicator Management and Reporting). The system captures indicator data dynamically from sensors, or through web input by indicator custodians. The system also prompts custodians for regular input of evaluations of indicator status.

The system has entry points on the web for the public, custodians and administrators. The latter two are password protected.

The system will only ever be as good as the quality and comprehensiveness of the information it holds. It is therefore important that there are appropriate governance arrangements in place to manage and maintain the system into the future that adequately ensure the integrity of the information in the system. The following sections outline the protocols which are in place for:

- (a) Indicator Management
- (b) Custodian Governance
- (c) SIMR Tool Management

2. Roles Within The SIMR Governance Framework

There are several roles performed within the SIMR governance framework:

- SIMR Manager
- SIMR Administrator
- Indicator Custodian
- Indicator Data Contributor
- Public User

(a) SIMR Manager

The SIMR Manager is responsible for the execution and ongoing relevance of the SIMR Governance Framework. The SIMR Manager reports to the Chief Scientist, Australian Antarctic Division on SIMR governance issues. The role is “trusted” and has access to all system areas and administration privileges. This role involves:

- Monitoring of governance framework elements through periodic reviews and audits,
- Management of the system’s overall integrity through the evaluation of regular reports on aspects of governance operations,
- Management of the custodial network,
- Responsibility for the approval of new Indicators,
- Responsibility for approving discontinuation of existing Indicators,
- Responsibility for approving system updates (functional and systemic)

(b) SIMR Administrator

The SIMR Administrator is responsible for the operational management of the SIMR. The SIMR Administrator reports to the SIMR Manager, Australian Antarctic Division on SIMR operational issues. The role is “trusted” and has access to all system areas and administration privileges. This role involves:

- Monitoring and periodically reporting on system technology issues,
- Liaison with the custodial network to ensure indicator update and evaluation cycles are maintained and feedback is provided,
- Moderation of indicator updates and evaluations to ensure that system integrity is maintained,
- Notifying the SIMR Manager of technology or custodial issues that require action,
- Maintenance of all SIMR content via appropriate audit and back-up procedures,
- Maintenance of AADC web site components that inform users about SIMR,
- Maintenance of the SIMR toolset (including any links to external systems and in particular the custodial data entry interfaces) via liaison with AADC programmers,
- Providing assistance to custodians, or data contributors to enter SIMR content,
- Registration of new custodians and Indicators in the SIMR.

(c) Indicator Custodian

The SIMR Indicator Custodian is responsible for regularly reporting information for one, or more, indicators registered in SIMR. The SIMR Indicator Custodian must be responsive to the SIMR Manager and the SIMR Administrator on SIMR operational issues and manage their Indicator in accordance with published SIMR protocols and guidelines. The role is “trusted” and has access to a limited set of interfaces and has more restricted privileges than a SIMR Administrator. This role involves:

- Responsibility for entering template information, data and evaluations into SIMR regarding a registered Indicator, according to an agreed update cycle,
- Responsibility for the quality of template information, data and evaluations entered into SIMR regarding a registered Indicator,

- Point of contact and expert authority for any issues arising from publication of the Indicator information,

(d) Indicator Data Contributor

The SIMR Indicator Data Contributor is a role distinct from the Indicator Custodian in that the Contributor does not bear overall responsibility for the content, nor the evaluation entered for a particular Indicator. The Contributor is usually nominated by an Indicator Custodian to help them enter data for the Indicator. The role is “trusted” and has access to a limited set of interfaces and has more restricted privileges than a SIMR Administrator but the same privileges as an Indicator Custodian.

(e) Public User

The SIMR Public User accesses publicly available components of the SIMR tool. The SIMR Public User generally wants to review or extract data/information of interest from the system, via searches, reports or via direct data download. The role is not “trusted” and has access to only public interfaces and has restricted privileges.

3. Protocols For Indicator Management

The following protocols should be observed for indicator management within the SIMR:

(a) Adding New Indicators

New Indicators can be added to the system at any time, providing that they relate to the state of the environment in Antarctic or sub-Antarctic zones. However, regular periodic reviews of the Indicators, orchestrated by the SIMR Manager will often present an opportunity for the nomination of new indicators.

Each new indicator must undergo a selection/development process which involves the participation of, and ultimately approval from the SIMR Manager. Due to the individuality of each indicator, the process requires flexibility and considerable discussion with potential custodians, interested parties and experts.

The generic steps involved consist of:

1. New indicator proposed – This usually occurs as a result of discussion with recognised experts.
2. When considering a new indicator it is important to assess it against the 15 selection criteria outlined below in Table 1.

Table 1 – Indicator Selection Criteria

| Number | Criteria description |
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| 1 | Serve as a robust indicator of environmental change |
| 2 | Reflect a fundamental or highly valued aspect of the environment |
| 3 | Either national in scope or applicable to regional environmental |

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| | issues of national significance |
| 4 | Provide an early warning of potential problems |
| 5 | Capable of being monitored to provide statistically verifiable and reproducible data that shows trends over time and preferably apply to a broad range of environmental regions |
| 6 | Scientifically credible |
| 7 | Easy to understand |
| 8 | Can be monitored regularly with relative ease |
| 9 | Cost-effective |
| 10 | Relevant to policy and management needs |
| 11 | Contribute to monitoring progress towards implementing commitments in nationally significant environmental policies |
| 12 | Where possible and appropriate, facilitate community needs |
| 13 | Contribute to the fulfillment of reporting obligations under international agreements |
| 14 | Where possible and appropriate, use existing commercial and managerial indicators |
| 15 | Where possible and appropriate, be consistent and comparable with other countries and state and territory indicators |

3. SIMR Manager grants “preliminary” approval for the inclusion of the indicator.
4. SIMR Manager consults with relevant experts to decide upon a custodian – the monitoring and maintenance of an indicator requires sustained input from a responsible ‘custodian’. The role of the custodian consists of a range of tasks aimed at providing support and justification for the inclusion and ongoing monitoring of their indicator.
5. SIMR Administrator requests indicator description from the appointed Custodian. The description must contain a wide range of information and data that covers the topics outlined below in Table 2.
6. The custodian must then complete the SIMR template with information listed in Table 2. This will require the establishment of any necessary data management protocols. Each indicator requires data for it to be meaningful. The process by which this data is collected and entered into the SIMR database must be established. Data management may be as simple as custodians entering a figure per year into the template and making an evaluation of that data, or require programming assistance from the AADC to load data.
7. The SIMR Administrator then moderates the entry and makes any necessary changes to format or wording to make the document more suitable for public consumption. The Custodian must, however, approve any changes made.
8. Once the Custodian has completed entering information into the SIMR template, the SIMR Manager generally grants approval for the Indicator to change its status from “preliminary” to “approved”.

Table 2 – Indicator Template Metadata/Data

| Metadata | Description |
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| Indicator definition | The specific “what and where” of the parameter measured. This provides a précis of the indicator, allowing viewers to determine their interest without perusing the whole document. |
| Environmental theme | Based on the 2001 Australian SOE report, these themes were defined by Environment Australia to address the variety of environmental issues discussed in the report. The application of these theme areas to Antarctica has been largely successful with only a few exceptions. The theme areas are: Atmosphere; Biodiversity; Coasts and Oceans (estuaries and the sea); Human settlements; Inland waters; Land; Natural and Cultural Heritage. |
| Type of indicator | A Condition, Pressure, Response framework (C, P, R) has been used in the definition of the Indicators. The three types of Indicators: describe the CONDITION of important elements of a system; show the extent of the major PRESSURES exerted on a system; determine RESPONSES to either condition or changes in the condition of a system. |
| Rationale for indicator selection | For an indicator to be considered as appropriate and useful in the SoE sense it must have a strong justification and direct relevance to environmental issues. The rationale identifies the reasons for measuring this parameter. |
| Analysis of indicator data | For indicators to provide meaningful information on trends and changes in the environment, analysis must be performed and the shortcomings of the data itself must be identified. This section identifies the form the data take and the considerations and methodologies that are required for adequate interpretation of the indicator. Furthermore, this section may also outline possible implications for changes that are detected. |
| Design and strategy for indicator monitoring program | Each indicator measures something very specific. The validity and robustness of an indicator is reflected in the methods used in its monitoring. All aspects of the measurement of the indicator are outlined in this section and form an indispensable resource for the checking validity and the modelling of new indicators. |
| Research issues | This section provides an outline of additional work required and issues arising. The identification and development of an indicator may pose more questions than provide answers. These questions and the development of procedures to provide answers is an important aspect of environmental monitoring. Some of the emergent issues may stimulate important research or bring about a more suitable measure of a parameter |

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| | or associated mechanisms. “If you had additional research funding to address known or arising issues what would you spend it on?”. |
| Links to other indicators | An important aspect of the developmental process was the obvious synergy that exists when a variety of datasets are listed in a similar format. Determining links between indicators not only serves to group indicators operationally it also provides insight into the complex interactions that exist in the monitoring process and within monitored ecosystems. |
| Development status | This provides information on the stage of development of an indicator, preliminary, in review, approved, or obsolete. An indicator is cited as preliminary when it has been tabled as a possibility, but has no custodian, in review means that a custodian has been identified and the indicator is currently undergoing development, approved indicators have a description and data management protocols put into place, obsolete indicators have been deemed intractable due to logistic or technical reasons or by being unsuitable scientifically or lacking relevance to SoE monitoring in Antarctica) |
| Program area | This identifies the area of science the indicator is related to, within the AAD and externally. Groups are derived from AAD science programs. |
| Responsible organization | This identifies the organization the custodian belongs to. This may be the Antarctic Division or any number of external agencies. |
| Criteria satisfied by indicator | A list of criteria were published by Environment Australia along with the indicators developed from the review of the 1996 SoE report for Australia (Pearson, et al, 1997). These criteria provide an important indication of the relevance and tractability of each indicator. A list of 15 was derived from OECD guidelines (OECD, 1993) established to aid the development of indicators for environmental performance review – see Table 1. |
| Data update frequency | This identifies how often data for this indicator is entered. Data can be entered daily, monthly, quarterly, annually or biannually. |
| Notification time for missing data | When data is not entered the database automatically sends out an email reminder to the custodian. This field identifies the gap between when data is expected and when it is asked for. This can be set for entry: daily, monthly, quarterly, annually or biannually) |
| Notification time for missing custodial comments | Each custodian is required to make an evaluation of data at a nominated time, this field identifies the timeframe for a reminder to be sent to custodians telling them when they need to make these comments. This can be set for entry: daily, monthly, quarterly, |

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| | annually or biannually. |
| Web entry date format | Defines the date type for the indicator, whether it is a daily figure (dd/mm/yyyy), monthly (mm/yyyy), annual (yyyy), biannual (yyyy), or seasonal (yyyy/yyyy) |
| Monitoring location format | This identifies the location(s) the indicator is monitored at. This is either a tick box for the stations and Heard Island or a pick list (named location/lat-long/no location needed). This is linked to our Antarctic gazetteer. |
| Data loading format | This defines the method used to enter data into the database. There are three main types: Database load; Webform; and other. |
| Comments on the data entry process | This is a text box for entering details of any methodology, required in the handling of data. |
| Data display format | Wherever possible we have aimed to make indicators plotted as a graph, however some cannot be arranged in this way, due to sparse data or the nature of information. We have provided the option to present information in a table. |
| Indicator view | Generally most indicators will be available to the public, however in some cases indicators may be blocked from public view. The most obvious reason for this is if an indicator is “preliminary” or has been made obsolete. Instead of removing these indicators from the system these are retained, not only for record keeping, but in case future programs enable their inclusion. |
| Indicator data | Most indicators have data presented as a graph, with a table as an alternative. All indicator data is shown and is available for download from a hotlink on the display page. |
| Custodian evaluation | Custodians are asked to provide their evaluation of the indicator according to the data available. Although indicators have a designated timeframe for custodial evaluations, as defined by the custodians, comments can be added at any stage. |
| Accompanying image details | Each indicator has an image on its display, these images come from the AADC image database administered by the AAD multimedia section. Each image is referenced and copies can be obtained from the AAD using assigned reference numbers. |

(b) Discontinuing Indicators

The decision to discontinue monitoring an indicator requires the approval of the SIMR Manager. Several situations may arise that could lead to discontinuation of an indicator:

- A custodian may find themselves in a situation where they can no longer act as the custodian for a particular indicator and it is difficult to recruit a replacement custodian,

- The source of data for the indicator suddenly becomes unavailable or the collection becomes unviable or uneconomical, or
- Peer review of the indicator warrants that it no longer be considered a relevant indicator.

Whatever the circumstance the SIMR Manager must notify the Chief Scientist if it is no longer possible to monitor the indicator in question. The indicator must then be set to a status of “obsolete” in the SIMR database. This will remove the indicator from display, but will not remove it from the system and all indicator records will be retained.

(c) Indicator Update Status

The status of SIMR indicators should be monitored by the SIMR Administrator. The system provides for an indicator status report which should be regularly reviewed and acted upon. Notes on actions taken, or Administrators comments should be entered directly into the SIMR database so that a complete record of interactions regarding indicators is maintained.

Although the SIMR system automatically prompts custodians to update their indicator information, the SIMR Administrator will personally contact custodians that continuously miss update deadlines to encourage submission of information. If the custodian is more than 6 months late with their update, despite reminders, the Administrator must bring the situation to the notice of the SIMR Manager.

The SIMR Administrator is generally the first point of contact for indicator custodians regarding most SIMR tool and content issues.

(d) Indicator Reviews

The SIMR Manager should coordinate regular peer reviews of SIMR indicators to ensure that:

- Indicators remain relevant,
- Evaluations are consistent with observed trends and patterns, and/or
- We are not missing opportunities to add new indicators that can advance our understanding of the status of the environment.

These formal reviews, undertaken by recognised experts, should be performed every three years and the report should be provided to the Chief Scientist.

4. Protocols For Custodian Governance

The following protocols should be observed for custodian governance within the SIMR:

(a) Registering New Custodians

The process of nominating and then selecting a new indicator custodian is a “fuzzy” process that requires action by the SIMR Manager. Please see section 3 (a) “Adding New Indicators”.

(b) Discontinuing Custodians

If a custodian can no longer perform his/her custodial role, they are obligated to inform either the SIMR Administrator or the SIMR Manager in advance of the time they wish to cease the role. This notification should be done via email. It is not sufficient to informally pass the role onto an alternative, without first consulting the SIMR Manager.

The SIMR Manager will then attempt, perhaps with the assistance of the discontinuing custodian, to find a replacement. If an alternative custodian can not be found the SIMR Manager must evaluate whether to discontinue the indicator. The ramifications of discontinuing the indicator under these circumstances should be reported to the Chief Scientist.

5. Protocols For SIMR Tool Management

The following protocols should be observed for SIMR tool management:

(a) Monitoring SIMR Performance & Functionality

The SIMR Administrator should regularly monitor the performance, accessibility and functionality offered by the SIMR system. This will be achieved through automated reporting available via an Administrator's dashboard.

No programmatic changes will be made to the system, other than those required to port the system to new versions of operating systems or applications, without explicit direction from the SIMR Administrator.

Any system bugs, performance or accessibility issues should be logged by the Administrator and an AADC programmer will be requested to ameliorate the problem.

(b) Requesting Changes to SIMR Functionality

The SIMR system should be as "user-friendly" and as stable as possible, to simplify custodian and user interactions with the system. This is particularly important because custodians will not in the main be regular users of the system. Update cycles are usually annual or longer. The frequency of an individual's usage can therefore be quite low, and if the system continuously changes, the task of navigation between site visits can become bewildering.

The need to change functionality, navigation, interface layout or the database schema within SIMR can arise for several reasons:

- Custodians or public users request additional features or functionality,
- AADC staff determine that additional features or functionality are required or the existing features can be improved upon, or
- New indicators generate the need for systemic changes.

In all cases a formal "change request" must be made through the SIMR web site, which will be registered and received by the SIMR Administrator. In consultation with the SIMR

Manager, requests for change will be evaluated, prioritised and then actioned as resources permit. All requests for change will be evaluated within two weeks of receipt, and notification of the action to be taken will be provided back to the requestor.