A Reflective Assessment Process for Promoting Multi-agency Cooperation:

Towards Achieving Cross-sector Policy Objectives for Conserving Freshwater Ecosystems

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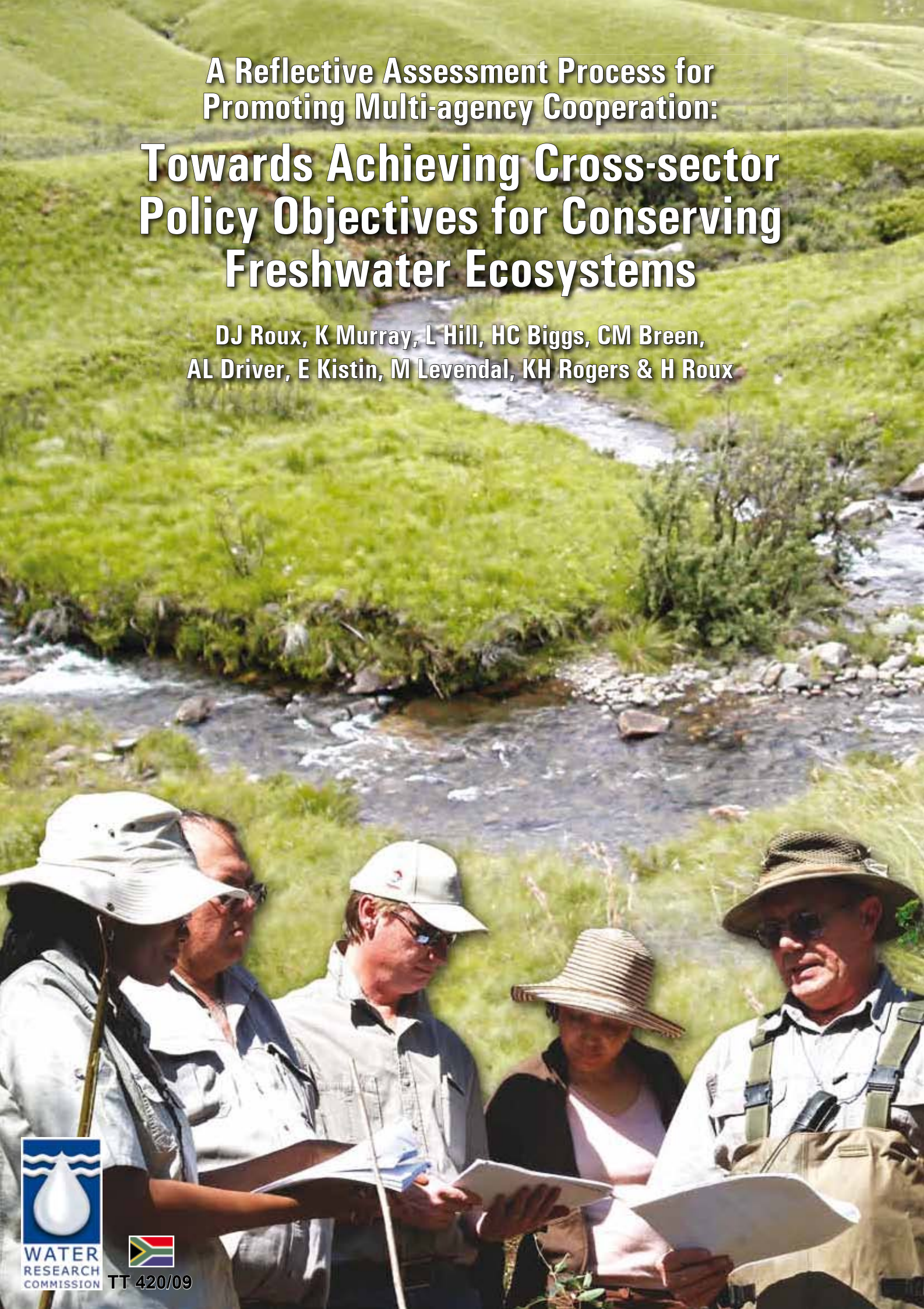

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A reflective assessment process for promoting multi-agency cooperation: *Towards achieving cross-sector policy objectives for conserving freshwater ecosystems*

Report to the
Water Research Commission

by

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ABSTRACT

Formal South African cross-sector policy objectives exist for conserving freshwater ecosystems. These need to be achieved by multiple agencies, each with their own roles and responsibilities. The nature of the objectives requires effective cooperation between these agencies. This requires the agencies to actively work together for mutual benefit. Organisational identities typically remain distinct with active and respectful negotiations occurring within professional boundaries and cultural practices.

Studies have shown that co-learning through face-to-face communication has a positive effect on the development and maintenance of cooperation. A strategic adaptive management framework provides structure to such co-learning. In particular, reflection on the degree to which predicted outcomes of management decisions and actions were actually achieved provides a sound basis for such learning. Cooperation between agencies, or the lack thereof, may be one of a variety of reasons that explains either successes or failures.

Cooperation is multi-facetted with many factors needing to be in place for it to be effective. Indeed, just one such factor not being favourable can significantly jeopardise cooperative efforts. Accordingly, a reflective assessment process is proposed that involves a multi-agency workshop in which representatives, both individually and collectively, reflect on and score the factors affecting cooperation. The scores are captured in a spreadsheet template designed for the purpose.

The scoring is only meant to focus attention on the issues on the day of the workshop. It is deliberately non-threatening and not meant to be used in an auditing context. This is a significant departure from the manner in which scorecards have been used traditionally to measure management effectiveness. The workshop facilitator can also present an overall summary of the results at the end of the day. Again, these summaries are meant to cause reflection, specifically on the degree to which the results “seem right”. Both average scores and the degree of similarity of responses among the agencies are analysed.

The summary also includes a narrative listing of “issues of concern” as well as a list of strengths. This is intended to prompt identification of “compelling issues”, that is, those which need to be packaged into coherent messages and communicated consistently to upper management or even governance levels. Common-sense advice on how to do this includes the following: Be purposeful in any cooperative responses, *i.e.* have a specific objective in mind. Communicate by example whenever possible. Speak the “language” of the most appropriate target audience, whether it is middle or upper management or politicians. Align the message to, for example, management targets. Choose the most appropriate mechanism for conveying the message. Be positively persistent because effecting change may take time in some cases.

It is hoped that this reflective assessment process, with its spreadsheet tool, will foster greater awareness of the issues affecting cooperation and focused attempts to address problems. A number of other issues should be kept in mind when creating and nurturing cooperative behavior: The need for cooperation should be explicitly acknowledged. The need for toleration (of culturally-embedded problem solving behaviours) and coordination (parties informing each other of their activities) should be acknowledged. Acknowledge that self-interest is the individual’s fall-back position. Acknowledge that everyone must perceive a net benefit from cooperation. Work towards assurance of fair play, especially by establishing either implicit or explicit rules. Strengthen networks. Invest in both formal and informal systems of communication. Finally, establish communities of practice among individuals with a shared passion and meet regularly and informally to learn and practice to do things better.

EXECUTIVE SUMMARY

Background (Chapter 1)

This project arose out of a perceived need to promote effective implementation of the national goal and cross-sector policy objectives for conserving freshwater ecosystems by operational agencies at sub-national levels. In particular, the project aimed to develop a tool for facilitating cooperative and sustained conservation action amongst these agencies.

The national goal was "*to conserve a sample of the full variety or diversity of inland water ecosystems that occur in South Africa, including all species and the habitats, landscapes, rivers, and other water bodies in which they occur, together with the ecosystem processes responsible for generating and maintaining this diversity, for present and future generations*."

The five cross-sector policy objectives were to:

1. Set and entrench quantitative conservation targets for freshwater biodiversity;
2. Plan for representation of freshwater biodiversity;
3. Plan for persistence of freshwater biodiversity;
4. Establish a portfolio of freshwater conservation areas (which may include, but are not restricted to, formal protected areas); and
5. Enable effective implementation.

More detail can be found in **Appendix A** of this report.

The original objectives of this project were to:

- In relation to the conservation of freshwater biodiversity, consolidate international experience in, and explore the inter-relatedness between, policy monitoring and evaluation, performance indicators, management effectiveness, scorecards, and cross-sector collaboration.
- Develop, test and refine performance indicators of management effectiveness and an associated scorecard system to measure progress towards the achievement of cross-sector policy objectives for conserving freshwater biodiversity.
- Develop guidelines for the implementation of performance indicators and effectiveness scorecard in South Africa.
- Facilitate a process of dialogue amongst mandated stakeholders that will promote collaborative learning and high-level support/endorsement for the effectiveness measurement guidelines.

Importantly, during the initial stages of the project a series of changes were formally made to these objectives, all in consultation with either the project reference group or stakeholders or both. In particular, the emphasis of the second objective was modified to:

- Address cooperation instead of management effectiveness;
- Be multi-organisational instead of single-organisational;
- Be context specific instead of standardised;
- Be embedded in adaptive management instead of being stand alone; and
- Enable the development of a coherent compelling message to upper management instead of reporting on management effectiveness.

Each of these changes represents breaking away from the conventional way of treating scorecards and as such adds novelty to this project. The above decisions are reflected in the various versions of the assessment tool as presented in **Appendices B**, **C** and **D**.

Assessing management effectiveness (Chapter 2)

A review was undertaken of the literature on evaluation of management effectiveness in protected areas.

Broad frameworks (Section 2.2)

Traditionally, monitoring and evaluation (M&E) efforts in the conservation sector focused on identifying metrics or indicators of conservation impact. Lately, the trend has shifted towards more comprehensive M&E approaches which are characterised by an emphasis on learning, measuring effectiveness, and adapting and improving programmes (Stem *et al*., 2003). Monitoring and evaluation (M&E) is therefore most effective when undertaken in the context of adaptive management (see Chapters 3 and 5).

Because of the multitude of M&E systems that have been developed, the **World Commission on Protected Areas (IUCN-WCPA)** developed an overall framework for assessment, with enough flexibility for a number of different approaches to fit within it.

The **Skukuza Freshwater Group** is a group of freshwater ecologists and conservation specialists from different parts of the world. The group provides general guidelines on how adaptive management, and by implication M&E, could be improved upon (Skukuza Group, 2006).

The **Nature Conservancy (TNC)** group is a leading conservation organisation working around the world to protect ecologically important lands and waters for nature and people (http://www.nature.org/aboutus). It suggests using two types of measures (TNC, 2000), namely, activity measures (focused on actions) and outcome measures (focused on the outcomes of the actions).

The **Foundation of Success (FOS)** is a small, non-profit organisation that is committed to working with practitioners to learn how to do conservation better through the process of adaptive management. They work with other conservation organisations to help them develop adaptive management systems, facilitate cross-project and cross-site learning, and to conduct M&E.

Scopes of assessments (Section 2.3)

The **in-depth, evidence-based approach** entails a site-level assessment of the degree to which management actions achieved management objectives. It typically involves the development of a detailed baseline of key desired outcomes where the assessment is designed to measure changes in these outcomes over time. It is expensive and time consuming.

A **system-wide approach** assesses the management effectiveness of each protected area within a given protected area system. An available tool is World Wide Fund for Nature's (WWF's) Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) (Ervin, 2003b). It has been applied in many areas but is not designed to provide detailed, site-level adaptive management guidance to protected area managers.

A **categorical assumption-based assessment** is an approach in which data are collected centrally regarding an entire protected area system. It is based primarily on literature review and expert opinion, and involves little or no interaction with field staff. An available tool is GAP + (GAP Plus) (Schulz, 2006), a protected area gap analysis (commonly done as part of a systematic biodiversity assessment). This kind of assessment provides the lowest level of certainty.

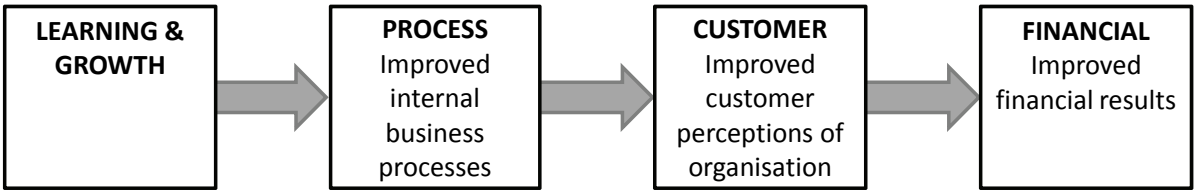
A **rapid scorecard peer-based assessment** involves pre-defined categories and thresholds for a series of indicators. They can be relatively quick and easy to use. The following tools are available:

- Parks in Peril site consolidation scorecard (TNC, 2004)
- ProArca scorecards (www.conserveonline.org)
- World Bank/WWF Site-level Management Effectiveness Tracking Tool (Stolton et al., 2003; Chatterjee and Pittock, 2005).

In choosing an approach, conservation planners and managers should consider the following issues: Implementation; Baseline for scoring performance; Cost; General purpose of assessment; Degree of confidence in results; Time required to implement the assessment (per protected area or per entire system); Strengths of the assessment; and Weaknesses of the assessment.

Scorecards (Section 2.4)

The **Balanced Scorecard** is an example of a scorecard used in the corporate sector (as opposed to the conservation sector). The figure below illustrates the associated perspectives.



Causal relationship between the Balanced Scorecard perspectives.

While in business customers and technology drivers change, it must be borne in mind that in natural systems the drivers are more complex and dynamic.

The **Parks in Peril (PiP) Site Consolidation Scorecard** can be used as a project management tool to track progress over time at two levels (TNC, 2004), either at an individual project area or across an entire PiP project area portfolio. It evaluates process and management capacity rather than conservation outcomes or threat reduction.

The **Programa Ambiental Regional para Centroamérica (PROARCA) / Central American Protected Areas System (CAPAS)** system uses a scorecard approach that is related to the PiP Scorecard approach. It uses a set of criteria as indicators of management effectiveness, with each item scored on a five point scale. Criteria are grouped into related areas of management in a hierarchical classification of scopes and factors of management.

The **World Bank / WWF Management Effectiveness Tracking Tool (METT)** was used to assess progress toward a target of “50 million hectares of existing, but highly threatened forest protected areas to be secured under effective management by the year 2005” (Dudley and Stolton, 1999). It was developed to provide a quick overview of progress.

Facilitation of assessments (Section 2.5)

The evaluation of monitoring effectiveness can be undertaken for various reasons. The ultimate purpose of the evaluation and who the information is intended for, will determine whether the evaluation is to be conducted internally or by an external group. What is most important is to form a team with a common purpose.

If the purpose of the evaluation is for managers and practitioners to improve their projects and programmes and to promote learning, an internal evaluation will suffice (Salafsky and Margolius,

2003). However, if the purpose is to report to outside investors and the public, it would make more sense to undertake an external evaluation or audit, which may be viewed as more credible by third parties (www.fosonline.org). Internal evaluations are likely to be less expensive than external evaluations.

Conclusions (Section 2.6)

It is quite evident that a wealth of expertise and especially experience exists worldwide relating to assessing management effectiveness and scorecards in particular. Much has also been published that assesses the effectiveness of various approaches. When the need arises for a scorecard that specifically assesses management effectiveness this experience should be made use of and relevant literature carefully studied. The scope of the assessment should be defined and the nature of the most appropriate scorecard chosen on the basis of tables such as:

- **Table 2 : Management effectiveness assessment methodology (Ervin, 2006).**
- **Table 7 : Management effectiveness evaluation options: Advantages and constraints.**

It is also evident that each approach has distinct advantages and disadvantages. These should be explicitly explored, discussed and debated, and then documented to explicitly motivate the final choice.

Notwithstanding the above, it is strongly recommended that careful consideration be given to rather using a reflective assessment tool like the one developed in this work instead of one that measures management effectiveness *per se*.

Adaptive management and cooperation (Chapter 3)

Basic premises (Section 3.1)

Natural resource management is complex, multi-disciplinary and can involve a wide range of stakeholders. Accordingly, two fundamental conditions are necessary and are regarded as basic premises of this work:

- To learn and adapt; and
- To do so purposefully with relevant partners.

Cooperation is therefore an apparently important requirement. This chapter investigates this further. A cooperative adaptive environment is specifically about building and empowering, not policing. This is well aligned with the way in which much management nowadays is going.

Management landscape (Section 3.2)

Responsibility for conservation of freshwater systems is usually shared by at least two agencies. The following perspectives characterise the management landscape:

- **Social and ecological systems are linked**;
- **Social-ecological systems (SESs) are complex adaptive systems**;
- **Resilience is the key to their sustainability**;
- **People have some capacity to influence resilience**; and
- **Actors in a SES need to interact across overlapping and mismatching mandates and scales**.

These suggest that the management of SESs needs to be complemented by adaptive, participatory and cooperative frameworks that are capable of working with, and planning for, uncertainties. In particular, these frameworks must acknowledge three fundamental issues:

- **Incomplete understanding**;
- **Multi-stakeholder engagement**; and
- **Decisions as experiments**.

Adaptive management (Section 3.3)

Adaptive management is a structured, iterative process of decision making which treats human interventions in natural ecosystems as experimental probes. It requires knowledge about what needs to be changed, strategies for how to change it, mechanisms to enforce this change and instruments for monitoring the impacts and general management effectiveness.

Adaptive co-management emphasises the need for a polycentric approach (one with multiple centres of authority or control) to management of social-ecological systems. It explicitly caters for cooperation between agencies, researchers and stakeholders.

Strategic adaptive management incorporate the values of adaptive co-management with features such as a vision statement, a hierarchy of objectives, measurable endpoints, and adaptive decision-making.

Adaptive governance operates at larger spatial scales and longer time frames than adaptive management. It is founded on and informs societal perceptions and values.

While able to facilitate useful feedback loops, implementation of adaptive management can be problematic if superimposed on a non-adaptive decision-making environment. Other obstacles include the high cost of monitoring, resistance from those fearing greater transparency, uncertainty of future benefits, and a lack of stable funding.

Cooperation (Section 3.4)

The term cooperation is used broadly to denote a type of collective action performed by individuals or organisations as a strategy for overcoming social dilemmas. These are situations in which, in the absence of cooperation, individually reasonable (*i.e.* rational or understandable) behaviour, typically motivated by self-interest, leads to a situation in which everyone is worse off than they might have been had they cooperated. A variety of hypothetical social dilemmas exist that highlight this tension between self-interest and cooperation. They assume that no structured communication between actors exists (and therefore no cooperation rules already apply).

- **Prisoner's Dilemma**. This involves two prisoners each having to choose between betraying the other or staying silent, each choice having its associated costs or rewards. Study of this situation has revealed that betrayal tends to be the dominant strategy.
- **Assurance Dilemma ('Stag hunt")**. This describes a hunting society in which food security for the society as a whole can be obtained if all members of the community jointly circle the stag. Given the uncertainty of how the other hunters will behave, however, individuals are tempted to leave the community circle and secure their own food requirements by hunting smaller game alone. To avoid the latter, assurances are required about the other's behaviour, for which a variety of mechanisms can exist.
- **Social Fence Dilemma**. This is another multi-person dilemma in which individuals are faced with an immediate cost that generates a benefit that is shared by all. Acting alone, each individual will understandably try to avoid the cost. However, if all avoid the cost then each is worse off than if they had managed to pay the cost, *i.e.* "scale the fence". This illustrates a core problem of the provision of public goods.

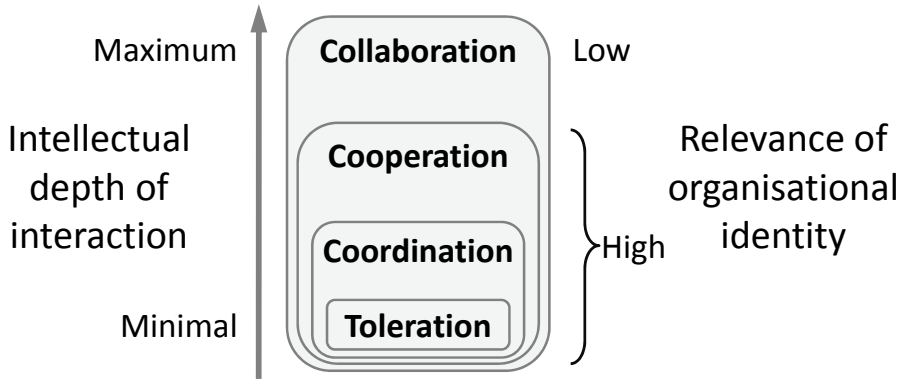
- **Social Trap Dilemma ("Tragedy of the commons")**. In this dilemma individuals are tempted with an immediate benefit that produces a cost shared by all. However, if every individual succumbs to the temptation the outcome is a collective disaster. Often referred to as the "tragedy of the commons", this metaphor describes the challenges of governing common pool resources.

Careful consideration of the social dilemmas highlights inherent uncertainties that naturally exist between stakeholders. These uncertainties can be deep-rooted and exist primarily because of mistrust among the parties. Self-interest is a dominant force in many human beings and the uncertainties in the dilemmas relate directly to this premise.

Kinnaman and Bleich (2004) distinguish between four types of inter-stakeholder behaviour:

- **Toleration** involves routine problem-solving behaviours that are culturally embedded and seldom questioned.
- **Coordination** occurs when two parties inform each other of their activities, although the process is more important than their relationship.
- **Cooperation** involves parties actively working together for mutual benefit. Identities remain distinct with active and respectful negotiations occurring within professional boundaries and cultural practices.
- **Collaboration** suspends professional identities and focuses on the contribution of complementary knowledge and skills. The outcome supersedes hierarchical and professional boundaries.

Based on these descriptions, the figure below illustrates a perspective on how these four behaviours might be related.



Hierarchical nesting of toleration, coordination, cooperation and collaboration.

This perspective has important ramifications for any strategy aiming to facilitate any of the "higher" levels, like cooperation or collaboration. It suggests taking deliberate steps to get basics in place (like toleration and then efficient and effective communication mechanisms that support basic "information sharing", *i.e.* coordination).

In the context of conservation of freshwater ecosystems, each sector or government department is likely to participate in the cross-sector negotiations from a position of their respective identities. Cooperation therefore appears to be the most appropriate behaviour. Equivalently, full collaboration is inappropriate because organisational identities should be retained.

Key controlling variables (Section 3.5)

There are a number of important factors determining the degree of cooperation some of which relate directly to the underlying issues highlighted by the above social dilemmas. These include:

- **Perceived net benefits**. Numerous studies demonstrate that levels of cooperation will be highest when the anticipated benefits from cooperating are high and the returns from defecting are low. There are two main issues:
  - ***Favourable benefits***. These include an increased ability to discharge mandates, access to information, production of joint strategies, efficiency gains, improved individual reputations, respect and pride.
  - ***Low costs***. These include acceptable direct financial costs, manageable managerial resistance, low opportunity costs, and reduced transaction costs.
- **Assurance of fair play**. This is a core issue in the above social dilemmas. There are two specific related issues:
  - ***Establishment of rules***. Implicit rules emerge that increase accountability when interaction is transparent and frequent. Explicit rules also exist, like minutes of meetings or in formal procedures.
  - ***Co-learning***. A natural component of social learning is co-learning through face-to-face communication. Repeated studies have shown that this has a positive effect on the development and maintenance of cooperation.

Summary (Section 3.6)

Accepting that freshwater ecosystems and the social-ecological systems in which they exist are complex adaptive systems, adaptive management is an intuitively sensible approach. However, a reality is that the management responsibility of freshwater ecosystems typically falls across multiple organisations. Therefore, adaptive management inevitably needs more than just toleration and coordination. It demands cooperation. The organisations must actively work together for individual and mutual benefit, this benefit relating to their respective mandates and being experienced by individuals.

The hypothetical social dilemmas noted above exist in an environment initially devoid of cooperation rules that govern the behaviour of the actors involved. The implication of the social dilemmas is that any mechanism that encourages structured communication (and hence opportunities to develop such cooperation rules), like the reflective assessment tool discussed in Chapter 6, is potentially beneficial.

The challenge of initiating cooperation reduces to highlighting the benefits to all parties and creating assurances that all are on board and will adhere to basic rules of fair play. Once the benefits are clear and stakeholders are confident that their individual efforts will be well complemented by the efforts of others, the scene is set for cooperation that is potentially both efficient and effective.

Scorecard case study (Chapter 4)

Scorecard structure (Section 4.1)

The scorecard was structured into five categories: Context, planning, monitoring, management and co-learning. Within these categories 31 key indicators reflected in specific questions either used a simple rating scale (0 to 3) or, in some instances, required *Yes* or *No*. A series of short descriptive answers (the “criteria”) was linked to each question, each corresponding to the rating score. The final version of the scorecard is presented in **Appendix D**.

Dialogue facilitation process (Section 4.2)

A workshop was organised in February 2008 with representatives from:

- Department of Water Affairs & Forestry (DWAF) Gauteng;
- Department of Water Affairs & Forestry (DWAF) North West;

- Gauteng Department of Agriculture, Conservation and the Environment (GDACE);
- North West Department of Agriculture, Conservation and the Environment (NWDACE);
- South African National Biodiversity Institute (SANBI); and
- North West Parks and Tourism (NWPARKS).

The facilitator announced each scorecard question and invited the representatives to choose a score appropriate to their perception of the degree to which that question applied to their organisation or situation. Comments and anecdotes were also recorded.

The primary organisational role players in the water management area are DWAF (Gauteng and North West), GDACE and NWDACE. Accordingly, the assessment of the results was performed with the results of these organisations only as well as for all combined (*i.e.* including NWPARKS and SANBI). The results of both assessments appear in **Appendix F**. The following overall summary assessment was produced:

The main problems lie in misaligned strategies and inadequate implementation of the regulatory tools that are available. The latter may in large part be due to inadequate organisational capacity. However, *inadequate alignment of monitoring data with freshwater conservation priorities is also problematic.*

On the other hand, *the regulatory framework is sound. A high level of trust exists*, *albeit among the active few. The organisations have*, *to some degree*, *a shared value system which bodes well for continued cooperation. While some monitoring problems exist*, *there are positive aspects relating to inter-organisational communication.*

Based on the results a few refinements were made to the scorecard. Follow-up feedback meetings were also held in January 2009 to maintain awareness, update everyone with latest developments, obtain feedback on the usefulness of the work and to discuss a way forward. These meetings were positive and constructive.

Some practical institutional constraints to cooperation emerged from the overall case study. A number of issues are relevant, including the mismatch between departmental and water management area boundaries, an inadequate resource base (equipment, skills, budget, etc.) changing legislation, and the divide between science and management.

The scorecard within adaptive management (Chapter 5)

For the outcomes and outputs of any scorecard assessment to be useful it must provide a sound basis for the participating individuals and organisations to move forward. This requires an understanding of the broader framework within which conservation of freshwater ecosystems is, or should be, taking place. One such framework is strategic adaptive management (SAM).

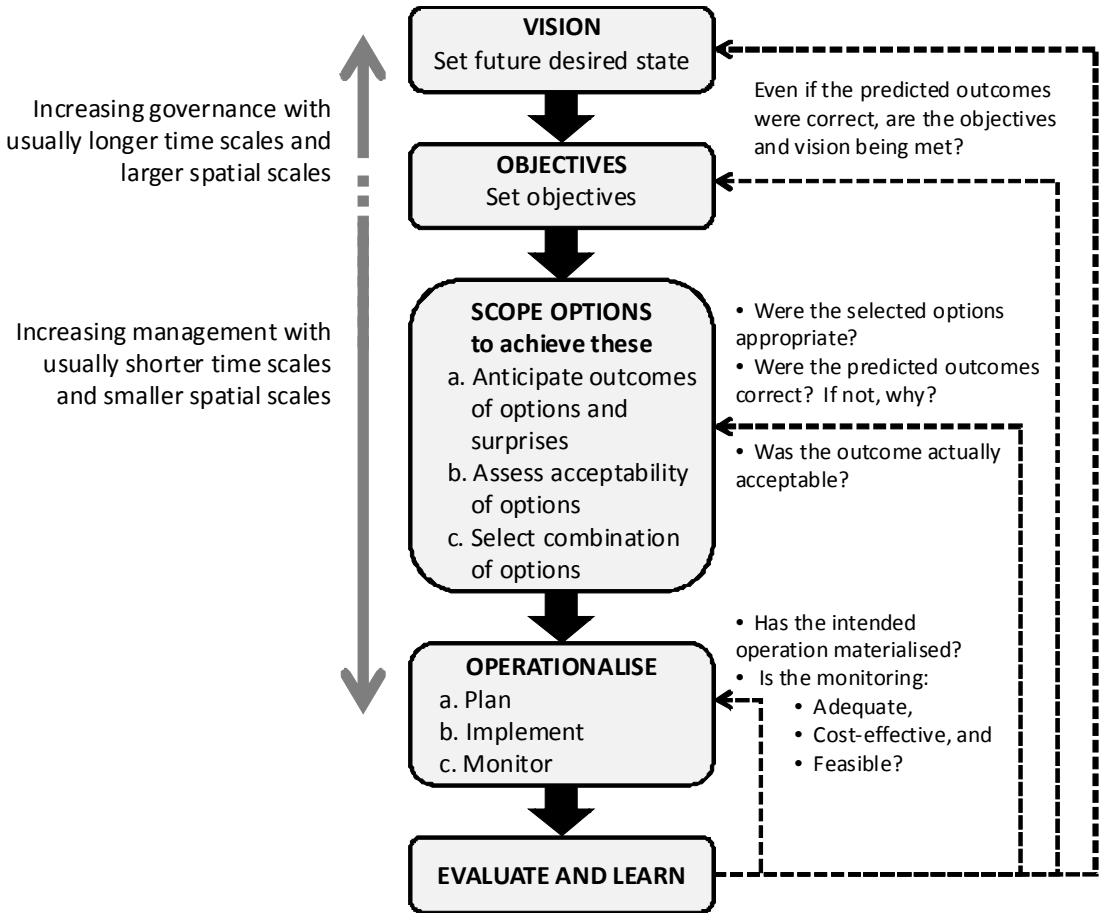
Strategic adaptive management (Section 5.3)

SAM intimately relies on interplay between governance and management. Governance sets the rules of the game and the systems in which we operate. Management seeks to organise behaviours and actions to achieve the intent of such policies.

SAM is a management tool developed in South Africa for conservation and management of natural resources (SANParks, 2008). It is strategic (acting with foresight and purpose), adaptive (learning while doing), and participatory (engaging and empowering stakeholders). Guiding principles include strategic thinking, explicitness in purpose, inclusiveness, co-learning, learning by doing, institutionalisation of the learning, pragmatism, action orientation, flexibility, and continual improvement.

Step-wise and detailed guidelines for the implementation of SAM are presented by Pollard and Du Toit (2007) and captured in the figure below. While the overall process defines SAM, the visioning and setting of objectives is referred to as the adaptive planning process and the evaluation and learning stage is referred to the adaptive decision-making process (SANParks, 2008).

The above SAM process is generic. Practical examples relating to conservation include the following: An objective in the objectives hierarchy may be the maintenance of riverine processes in a wetland park. Making a plan operational might involve implementing rules for releases from a dam. Evaluating and learning might involve asking a question like "how many rivers need to be gauged"?



The strategic adaptive management process.

It is conceptually useful to appreciate that the "evaluate and learn" feedback loops at the various levels indicated in the above figure correspond to what are referred to as single-, double- and triple-loop learning. These learning levels also link directly to the various feedback loops that characterise responses to the outcomes of a reflective assessment workshop.

- **Single-loop learning**. This involves changing actions to meet identified management goals, often through trial and error. For example, harvest rates may be modified to conform to specified catch limits.
- **Double-loop learning**. This includes a reflection process of evaluating underlying assumptions and models that are the basis of defining problems. For example, this may involve revision of indicators and simulation models used to calculate the relationship between fertilizer inputs and crop production based on recent policy outcomes.
- **Triple-loop learning**. This involves the same re-evaluation of assumptions and models as double-loop learning but it also considers whether to alter norms, institutions, and paradigms in ways that would require a fundamental change in governance. For example,

it might entail a shift from an agricultural system focused on supporting farmers to a tourist-based economy requiring a broader, more inclusive form of governance.

The reflective assessment scorecard (Section 5.4)

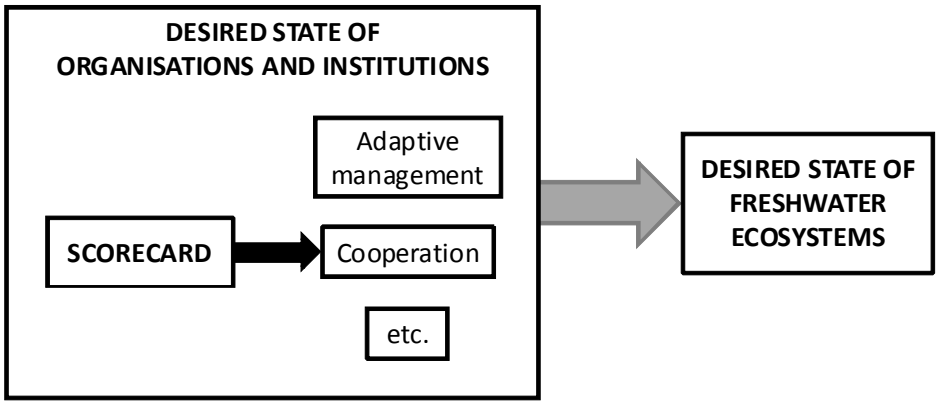
The scorecard has three main purposes.

- It should facilitate reflective assessment on the level of cooperation between individuals in organisations with a mandate for freshwater ecosystem management and governance;
- Motivate participants to do something about shortcomings, at least through creating awareness of those shortcomings; and
- Maintain and enhance cooperation-related aspects that are working.

In respect of SAM, the scorecard is most likely to find its place in the "evaluate and learn" feedback loops (the outermost loops in the above figure). The scorecard specifically facilitates:

- Structured face-to-face dialogue between organisations;
- Identification of some specific weaknesses (that should be addressed);
- Identification of some specific strengths (which can be used as a basis for addressing the weaknesses); and
- The development of a coherent message that people at lower levels in organisations can communicate to upper levels.

The ultimate purpose is to achieve defined desired states of the freshwater ecosystems that fall within the mandate of the respective organisations. These should relate directly to the cross-sector policy objectives (described in **Appendix A**). In so doing a desired organisational or institutional state is also being implied. This is one in which strategic adaptive management is flourishing. To achieve this, an effective degree of cooperation is being assumed necessary. The scorecard helps establish this cooperation (see the figure below).

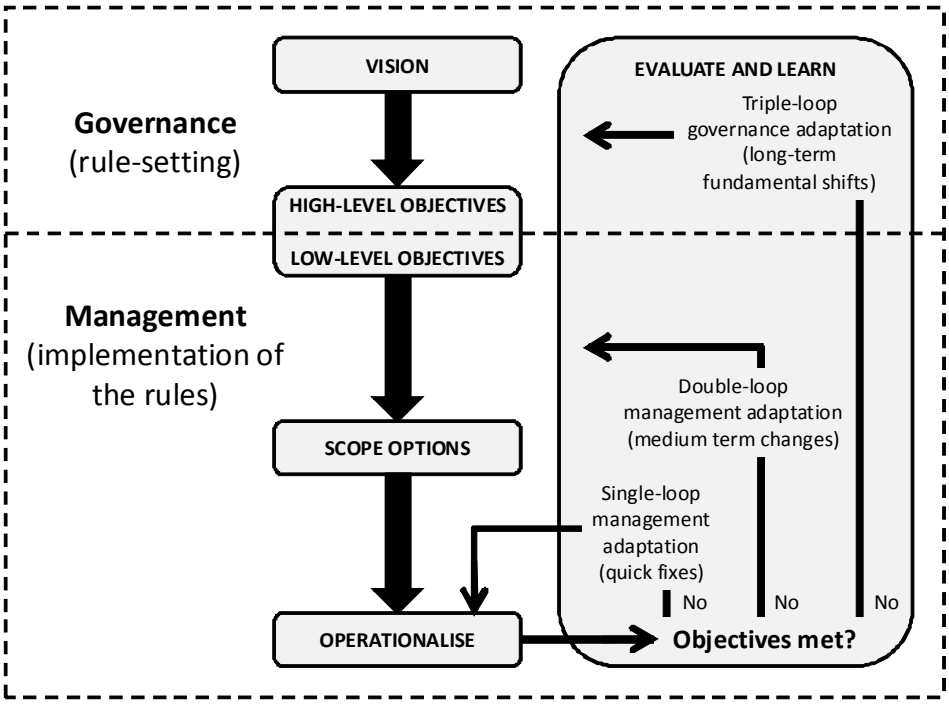


The scorecard and its ultimate purpose.

Importantly, the scorecard must not be seen as a tool for bureaucrats to measure or punish people. It should be used by small groups to decide on what adaptive actions are necessary. The scorecard is aimed primarily at those "at the coal-face" of managing and conserving freshwater ecosystems.

The following figure illustrates how the various feedback loops within the "evaluate and learn" stage relate to the various kinds of learning and how they typically occur over very different time scales. It provides one immediate insight into the nature of any response to a scorecard assessment: It should be clearly established at which level the issue of concern will require revision. Furthermore, the state of the system and the motivation for actions need to be described

and articulated in terms that relate to the policies and goals of the relevant organisations. If objectives are met then monitoring simply continues.



The nature of the feedback loops in strategic adaptive management.

Reflective assessment implementation (Chapter 6)

The essence of reflective assessment is that trust is put in people rather than systems. The scorecard is flexible and people are relied upon to adapt it. Two general contexts are relevant, namely the reflective assessment itself and responding to the assessment.

The assessment workshop (Section 6.2)

A spreadsheet facility has been developed to facilitate the assessment process. It involves three stages:

- **Phase 1: Assessment adaptation**. This occurs before the assessment workshop. It involves defining issues and associated indicators and criteria for scoring.
- **Phase 2: Reflection and data capture**. This comprises the bulk of the assessment workshop. The group scores according to the chosen criteria and records comments.
- **Phase 3: Data assessment**. This occurs towards the end of the workshop. Participants can see basic statistics, bar charts, average scores, similarity among organisations and issues of concern.

The spreadsheet facility provides the main template for structuring the workshop proceedings and capturing the responses of the participants. At all times the quantitative scoring is only a means to an end: they are meant to encourage open and frank reflection by all participants on the issues. The scores are not meant to represent a record by which managers might assess their performance. The reflective assessment spreadsheet tool is primarily for use on the day.

Responding to the assessment (Section 6.3)

The nature of the response to a reflective assessment will depend intimately on the kind of issues of concern and the specific organisation in which it is being experienced. However, a few generic comments can be made that put many of the possible issues of concern in some general context.

It is conceivable that some issues are identified as being of concern because freshwater biodiversity and conservation is not perceived to have sufficient value at either middle or upper management levels or even at the governance level (*i.e.* reflected in policies other than the cross-sector policy). Representations to address this would typically rely heavily on emphasising the cross-sector policy objectives (**Appendix A**).

When governance-level value systems need to be addressed the challenges may be considerable. The challenge initially is to effectively communicate the issue so that it is understood within and across organisations. The second challenge may be to follow up at appropriate levels and in appropriate ways (research for example). The third challenge may be to effect change which is likely to be beyond the scope of the assessment.

Some issues of concern may relate directly to co-learning. Co-learning issues are directly related to the core concept around which the reflective assessment process was developed in the first place, namely cooperation. Increased emphasis on co-learning issues is justified by cross-sector policy objective 5, namely "Enable effective implementation". More specifically, the third implementation principle, namely "to enable cooperative governance in the conservation and management of freshwater ecosystems" is particularly relevant. The issue here is more than the co-learning itself. The ultimate test of co-learning is whether the issues can be articulated in the contexts of the different organisations.

The following are necessary to create and nurture a culture of cooperation:

- **Acknowledge the need for cooperation**.
- **Acknowledge the need for toleration and coordination**.
- **Acknowledge that self-interest is the individual's fall-back position**.
- **Acknowledge that everyone must perceive a net benefit**.
- **Work towards assurance of fair play**.
- **Strengthen networks**.
- **Invest in formal and informal systems of communication**.
- **Establish communities of practice**.
- **Acknowledge that only one missing factor can jeopardise everything**.

It should be clearly established at which level and policy or administration sector the issue of concern will require revision. If the issue may require re-considering fundamental principles or high-level objectives then it is likely to be a time-consuming process. If it is associated with low-level objectives or possibly rethinking likely outcomes the process may still be fairly lengthy. If the issue requires changes to the way the current plan is being implemented then the process may be much quicker.

The following specific factors should always be borne in mind when conveying the message:

- **Be purposeful in your cooperative responses.**
- **Communicate by example by simply changing the way things are done**.
- **Speak the language of those at the level you wish to communicate the message**.
- **Choose the right mechanism**.
- **Be positively persistent**.

Conclusions and Recommendations (Chapter 7)

The following conclusions are drawn from this work.

- **The first original objective** was "in relation to the conservation of freshwater biodiversity, consolidate international experience in, and explore the inter-relatedness between, policy monitoring and evaluation, performance indicators, management effectiveness, scorecards, and cross-sector collaboration". This was achieved and the outcomes are captured in the following Chapters:
  Chapter 2: Assessing management effectiveness;
  Chapter 3: Adaptive management and cooperation; and
  Chapter 5: The scorecard within adaptive management.

- **The second original objective** was to "develop, test and refine performance indicators of management effectiveness and an associated scorecard system to measure progress towards the achievement of cross-sector policy objectives for conserving freshwater biodiversity". The emphasis of this objective was modified to:
  Address cooperation instead of management effectiveness;
  Be multi-organisational instead of single-organisational;
  Be context specific instead of standardised;
  Be embedded in adaptive management instead of being stand alone; and
  Enable the development of a coherent compelling message to upper management instead of reporting on management effectiveness.

  This objective, with the above modifications, was achieved and the outcomes are captured in the following Chapters:
  Chapter 3: Adaptive management and cooperation;
  Chapter 4: Scorecard case study;
  Chapter 5: The scorecard within adaptive management;
  Chapter 6: Reflective assessment implementation; and
  The Appendices.

- **The third original objective** was to "develop guidelines for the implementation of performance indicators and effectiveness scorecard in South Africa". This was achieved and the guidelines are captured in Chapter 6: Implementation guidelines.

- **The fourth original objective** was to "facilitate a process of dialogue amongst mandated stakeholders that will promote collaborative learning and high-level support/endorsement for the effectiveness measurement guidelines". This was achieved and the process and outcomes are captured in the following Chapters:
  Chapter 4: Scorecard case study; and
  The recommendations in Chapter 7: Conclusions and Recommendations.

- There is a wealth of expertise and experience worldwide relating to assessing management effectiveness and scorecards in particular. Much has also been published that assesses the effectiveness of various approaches.

- The well-studied and much-published hypothetical social dilemmas, like those summarised in this report, are useful for improving our understanding of what motivates stakeholders in the complex arena of natural resource management. They emphasise in particular the interplay between individual self interest and cooperation.

- In the context of conservation of freshwater ecosystems, each sector or government department is likely to participate in the cross-sector negotiations from a position of their respective identities. Cooperation (involving parties actively working together for mutual benefit while retaining their respective identities) therefore appears to be the most

appropriate behaviour. Equivalently, full collaboration (which suspends professional identities and focuses on the contribution of complementary knowledge and skills) is inappropriate because identities should be retained.

- Co-learning based on frequent face-to-face communication and joint action is important when facilitating cooperation between organisations.

- The spreadsheet facility developed in this work seems to be a useful tool for facilitating reflective assessment and motivating participants to do something about shortcomings. It also facilitates face-to-face communication, helps identify weaknesses and strengths, and helps develop a coherent message for upper levels.

- The appropriateness of an adaptive management approach to managing freshwater ecosystems (primarily because of their complexity) and the fact that responsibility for such management typically falls across multiple organisations demands a significant degree of cooperation between those organisations.

- Considerable external input may be required to initiate, facilitate and maintain cooperation between different organisations. This ensures an appropriate theoretical and unbiased perspective guides the process although it is important that the organisations share responsibility.

The following recommendations are made, based on this work:

- It is recommended that when the need arises for a scorecard that specifically assesses management effectiveness (as opposed to facilitating reflection and self assessment) existing worldwide experience should be made use of and relevant literature carefully studied. The scope of the assessment should be defined and the nature of the most appropriate scorecard chosen on the basis of tables such as:
  Table 2 : Management effectiveness assessment methodology (Ervin, 2006).
  Table 7 : Management effectiveness evaluation options: Advantages and constraints.

- It is strongly recommended that when considering assessing management effectiveness, careful consideration be given to rather using a reflective assessment tool like the one developed in this work instead of one that measures management effectiveness *per se*. This is because the preferred emphasis is on trusting people rather than systems.

- It is recommended that whenever there exists a desire to initiate and maintain cooperation, explicit consideration be given to self interest as an understandable human motivation. For example, explicit steps should be taken to ensure that:
  Everyone perceives that the ultimate benefits of cooperation (which are sometimes intangible) will outweigh the costs (which may be tangible and immediate); and
  There are assurances of fair play through the establishment of either implicit or explicit rules.

- It is recommended that when facilitating cooperation, deliberate steps should be taken to get basics in place like:
  Toleration (which involves routine problem-solving behaviours that are culturally embedded in each organisation and seldom questioned); and then
  Efficient and effective communication mechanisms that support basic “information sharing”, *i.e.* coordination. (Coordination occurs when two parties inform each other of their activities, although the process is more important than their relationship.)

- It is recommended that when facilitating cooperation, specific mechanisms, especially like those that result in frequent face-to-face communication, should be identified upon which to base co-learning.

- It is recommended that whenever possible, opportunities for co-learning among the organisations should be created (*i.e.* learning by doing practical things together), for example, a joint River Health survey and associated reporting.

- Issues of concern identified during an assessment should be explicitly captured and done so using the language of the governance or management level at which it will be aimed.

- It is recommended that future application of the scorecard and responses to it be closely associated with the practical implementation of co-learning practices, especially learning by doing.

- It is recommended that the effectiveness of the scorecard as a reflective assessment tool be formally assessed in coming years in the context of the management and conservation of freshwater ecosystems, *i.e.* explicitly linking it to practices such as river health assessment (River Health Programme) and systematic conservation planning.

- Facilitation of reflective assessment should be considered by organisations such as catchment management agencies and even the South African National Biodiversity Institute (SANBI). However, it should be acknowledged that the necessary leadership may well emerge elsewhere.

- It is also recommended that single organisations consider using the reflective assessment process and spreadsheet tool to reflect on cooperation issues.

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ORGANISATIONAL ACRONYMS

CAPAS	Central American Protected Areas System
CMA	Catchment Management Agency
DEAT	Department of Environmental Affairs & Tourism
DWAF	Department of Water Affairs & Forestry
GDACE	Gauteng Department of Agriculture, Conservation and the Environment
IUCN	International Union for the Conservation of Nature and Natural Resources
LEDET	Limpopo Department of Economic Development, Environment and Tourism
NGO	Non-Government Organisation
NWDACE	North West Department of Agriculture, Conservation and the Environment
PROARCA	Programa Ambiental Regional para Centroamérica
SANBI	South African National Biodiversity Institute
WCPA	World Commission on Protected Areas

TECHNICAL ACRONYMS

M&E	Monitoring and Evaluation
METT	Management Effectiveness Tracking Tool
PA	Protected Area
PiP	Parks in Peril
SAM	Strategic Adaptive Management
SES	Social-Ecological System

CHAPTER 1: BACKGROUND

1.1 INTRODUCTION

To achieve effective conservation of freshwater ecosystems, close coordination and cooperation is required among sectors responsible for water resource protection and management, biodiversity conservation, land-use management (including agricultural resources), and integrated development planning (MacKay and Ashton 2004). Of special importance is the coordination between land-related and water-related sectors because freshwater ecosystems are affected by activities that happen throughout their drainage areas (Linke et al., 2007).

Several government departments and national agencies acknowledged the precarious state of freshwater ecosystems in South Africa (Nel et al., 2007), the reality of overlapping and sometimes conflicting sectoral policy mandates and the need for cooperative action. They agreed to participate in a series of small discussion groups and two larger workshops to debate their respective mandates and strategies for managing and conserving freshwater ecosystems. Participants included the national departments of Water Affairs and Forestry, Environment Affairs and Tourism, Agriculture, Development Planning and Local Government, as well as South African National Parks (Roux et al., 2006).

The cross-sector debates revolved around two key questions:

- How many freshwater ecosystems should be conserved?
- How does one choose these systems to ensure maximum conservation benefit at the lowest possible social and economic cost?

The engagement process led to the development of a hierarchical policy framework that links a national goal for conserving freshwater biodiversity through a set of cross-sector policy objectives, implementation principles, and operational policy recommendations.

The national goal articulated by the participants in the cross-sector deliberations was:

"*to conserve a sample of the full variety or diversity of inland water ecosystems that occur in South Africa, including all species and the habitats, landscapes, rivers, and other water bodies in which they occur, together with the ecosystem processes responsible for generating and maintaining this diversity, for present and future generations*."

Subordinate to this goal, five cross-sector policy objectives were agreed to:

1. Set and entrench quantitative conservation targets for freshwater biodiversity;
2. Plan for representation of freshwater biodiversity;
3. Plan for persistence of freshwater biodiversity;
4. Establish a portfolio of freshwater conservation areas (which may include, but are not restricted to, formal protected areas); and
5. Enable effective implementation.

The first three objectives relate to planning and design issues, whereas the final two deal with issues of implementation. The five objectives were further broken down into twenty implementation principles and approximately fifty cross-sector policy recommendations (Roux et al., 2006). These are presented in **Appendix A.**

Some bold policy recommendations were made, for example that at least 20% of each freshwater ecosystem type should be conserved (maintained in or restored to a near-natural state). Several of

the policy recommendations made have institutional and capacity implications. For example, Catchment Management Agencies were identified as primary agencies responsible for achieving conservation targets at the catchment scale. This will require significant coordination of activities and resources within provincial and local spheres of government (whose administrative boundaries do not always coincide with catchment boundaries). These in turn can only happen if these agencies have an appropriate level of internal knowledge and capacity in the fields of conservation science and aquatic ecology.

There is also the intricate issue of coordinating biodiversity assessment, conservation planning, and target setting between national and various sub-national scales, particularly where river catchments and boundaries of water-management areas are not aligned with provincial and district municipality boundaries. An important implication of this finding is that a similar process of stakeholder engagement will be needed at the sub-national level. Indeed, a key need in the wider process of establishing vertical and horizontal linkages is to disaggregate the national policy objectives to sub-national levels, where conservation action takes place.

The overall purpose of this project was to promote effective implementation of the national goal and cross-sector policy objectives by operational agencies at sub-national levels. In particular, the project aimed to develop a tool for facilitating cooperative and sustained conservation action amongst these agencies.

1.2 OBJECTIVES

The original objectives of this project were to:

- In relation to the conservation of freshwater biodiversity, consolidate international experience in, and explore the inter-relatedness between, policy monitoring and evaluation, performance indicators, management effectiveness, scorecards, and cross-sector collaboration.
- Develop, test and refine performance indicators of management effectiveness and an associated scorecard system to measure progress towards the achievement of cross-sector policy objectives for conserving freshwater biodiversity.
- Develop guidelines for the implementation of performance indicators and effectiveness scorecard in South Africa.
- Facilitate a process of dialogue amongst mandated stakeholders that will promote collaborative learning and high-level support/endorsement for the effectiveness measurement guidelines.

1.3 CHANGES TO APPROACH

Prior to commencement of the project (during June 2006), two members of the project team (Hill and Roux) undertook a fact-finding trip to the USA. The overall conclusion drawn from discussions with several groups and individuals was that effective management is integrally linked to well-designed monitoring and evaluation (M&E) systems. Furthermore, there seems to be a reinforcing interplay between the development of action plans, performance monitoring and collaboration among stakeholders (*e.g.* Imperial, 2004; Hooper, 2006). Based on these assumptions, the project started off with a strong focus on designing an M&E system to measure progress towards achievement of the cross-sector policy objectives for freshwater conservation. Scorecards that are used for assessing management effectiveness, as applied mainly to formally protected areas (Hocking et al., 2000; Ervin, 2003), served as a departure point for this project.

During the course of the project, a number of well-considered decisions were made that led to significant changes in the scope and desired outcome of the project. These changes are outlined below:

- **From a scorecard focused on management effectiveness to a scorecard focused on appropriate cooperative behavior**: During the inaugural meeting (May 2007) of the reference group for the project, it was decided that improved cooperation should be the primary focus of the scorecard. Management effectiveness should be seen as a by-product of improved cooperation. It was agreed that the focus of the scorecard should be on stimulating a long-term process of cooperation and co-learning using monitoring and evaluation to promote and sustain cooperation (rather than on measuring any particular outcome). The main reason for this refocus on management effectiveness was to promote resilience rather than a 'steady state'.

- **From a single-organisation scorecard to a multi-agency reflective and motivational assessment tool**: During a stakeholder consultation meeting (October 2007) that was held at SANBI in Pretoria, it was agreed to move away from developing a conventional performance scorecard to developing a *motivational and reflective assessment tool for multi-agency cooperative and adaptive behaviour with the aim of conserving freshwater ecosystems.* Considerations that guided this decision were:
  - A preference to facilitate personal reflection and group learning.
  - An interest in *the spirit of cooperation* more than in complying with *the letter of the tool*. It was agreed to move away from the "IUCN scorecard format" in order to avoid mechanical ticking of boxes/filling in of scores, and rather to get into complex social processes that may require more flexibility and ongoing involvement.
  - The idea is to assess multi-agency cooperation rather than the performance of individual organisations, although the two measures are likely to be interdependent.
  - A preference for a facilitated and interactive assessment process to mailing a questionnaire out for completion. Much of the learning may happen through participating in the process of discussing the questions and compiling an evaluative report.

- **From uniform application to context-specific adaptations**: Scorecards are commonly standardised to allow comparisons over time and among organisations. During a meeting between members of the project team and members of the project reference group (July 2008), it was agreed that the assessment tool should allow flexibility to reflect:
  - Varying contexts over time and among organisations; and
  - Ongoing learning.

  The assessment tool should be dynamic in both structure (questions may change from year to year) and application (format may change over time and among agencies to reflect specific contexts and needs).

- **From stand-alone application to being embedded in an adaptive management process**: During the course of the project it was realised that the concept of adaptive management cannot be ignored in this project. In fact, we believe that adaptive management provides the soundest management framework for dealing with uncertainties inherent to complex social and ecological systems and for integrating monitoring, learning and management action (Section 3.3). An effort was made to establish the link between the assessment tool and adaptive management (Chapter 5). Agencies should use the assessment tool to determine what they should respond to and why, sometimes on their own and sometimes with partner agencies, in an adaptive way.

- **From reporting on performance to communicating a coherent message**: At the onset of the project it was anticipated that the scorecard would enable a central agency (*e.g.* SANBI) to monitor and audit the performance of all provincial agencies. Within this project

the emphasis has shifted towards agencies enabling themselves to effectively construct coherent and compelling messages and communicate such messages in a consistent way to higher levels in the organisational hierarchy. Through participating in the reflective assessment, partner organisations co-discover who they are and what they need to do together. The reflective assessment enables them to extract compelling issues which need to be packaged into coherent messages and communicated consistently. These issues may relate to anything from drivers causing an undesirable state, variables controlling the state to the state and actions required.

The above changes in focus are summarised in **Table 1**.

Table 1: Main issues refocused in the current project.

Original (traditional) focus	Refocus	Reason
Management effectiveness	Cooperation	To improve cooperation and hence management effectiveness (see Chapter 3)
Single-organisational	Multi-organisational	Freshwater ecosystem management falls across multiple organisations
Uniform application (standardised)	Context-specific	To reflect (a) different contexts of stakeholder organisations and (b) ongoing learning
Stand-alone	Embedded in adaptive management	Adaptive management acknowledged as best framework for dealing with uncertainty
Report on management effectiveness	Develop coherent compelling message for upper management	Change often requires lower-level participants to communicate to their upper-levels and to help facilitate an interplay between management and governance processes

Each of these changes represents breaking away from the conventional way of treating scorecards and as such adds novelty to this project. The above decisions are reflected in the various versions of the assessment tool as presented in the Appendices.

1.4 REPORT STRUCTURE

This report is structured as follows:

- **Chapter 2: Assessing management effectiveness**. This chapter reviews various frameworks for evaluating management effectiveness, including scorecards.
- **Chapter 3: Adaptive management and cooperation**. This chapter reviews the need for adaptive management underpinned by cooperation and co-learning.
- **Chapter 4: Scorecard case study**. This chapter describes (a) the evolution of a scorecard facilitating reflective assessment of cooperation and (b) its application in a selected case study area.

- **Chapter 5: The scorecard within adaptive management**. This chapter explores how adaptive management can be used as a framework to respond to issues of concern identified by a scorecard assessment.

- **Chapter 6: Scorecard implementation guidelines**. This chapter provides guidelines on (a) how to apply the reflective assessment tool and (b) how to address issues raised by the assessment. In effect, this chapter synthesises the insights and learning of the previous chapters. It describes how the spreadsheet tool is used to facilitate reflection on the degree of cooperation between organisations. It also describes how responses to such an assessment can be guided by assuming an adaptive management environment.

- **Chapter 7: Conclusions and recommendations**. This chapter presents the conclusions and recommendations arising out of this work.

- **Appendices A-F**: Versions of the scorecard, workshop attendees and scorecard assessments.

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CHAPTER 2: ASSESSING MANAGEMENT EFFECTIVENESS

This chapter reviews various frameworks for evaluating management effectiveness, including scorecards.

2.1 INTRODUCTION

This chapter summarises and synthesises the key points emerging from a review of the literature on evaluation of management effectiveness in protected areas, which provided a valuable basis for discussions in project workshops. Not all parts of the literature synthesis are directly relevant to the form which the final project outputs have taken; they are included here partly to shed light on the process which led to the final project outputs.

The review of assessment of management effectiveness focused mainly although not exclusively on the biodiversity conservation context. This body of literature has a strong focus on management effectiveness in protected areas.

Stem et al., (2005) categorised monitoring and evaluation (M&E) approaches into four basic categories depending on the purpose of the M&E, namely:

- Basic research;
- Accounting and certification;
- Status assessment; and
- Effectiveness measurement.

For the purpose of this project, our interest is chiefly in M&E approaches designed for effectiveness measurement, where programmatic goals, objectives, activities and management processes are explicitly linked to indicators that are used to measure progress towards achieving conservation goals and objectives. In the conservation arena, a number of methods in this regard have been developed for terrestrial ecosystems and, to a lesser degree, marine ecosystems, while freshwater ecosystems have been largely neglected.

This chapter presents a brief overview of literature on the evaluation of management effectiveness, and a summary of existing international approaches, assessment types and tools in this regard in the conservation arena. It is structured as follows:

- Section 2.2 outlines various frameworks for evaluating management effectiveness, with a focus on the World Commission on Protected Areas (WCPA) framework.
- Section 2.3 gives an overview of four types of management effectiveness assessments, including scorecards.
- Section 2.4 gives more detail on scorecard-based management effectiveness assessments, including examples of several scorecard tools.
- Section 2.5 looks at who should conduct management effectiveness evaluations.

2.2 BROAD FRAMEWORKS

2.2.1 Historical development

There has been uncertainty about the effectiveness of conservation efforts and an inability of protected area managers to objectively demonstrate the impact of conservation investments. This has led some to suggest there is growing scepticism among policy-makers and funding agencies about the long-term value of conservation efforts in protected areas in particular (Hockings et al., 2000; Parrish et al., 2003; Stem et al., 2003). On the other hand, in some countries there is continued investment in protected areas through state funding and there is evidence of increased visitation to such areas.

Nevertheless, due to such concerns, various organisations and institutions, including governments and conservation agencies, began to devote attention to the question of how to assess management effectiveness in protected areas. As a result, systems to measure the efficiency and efficacy of such management began to emerge (Hockings et al., 2002).

Traditionally, M&E efforts in the conservation sector focused on identifying metrics or indicators of conservation impact. Lately, the trend has shifted towards more comprehensive M&E approaches which are characterised by an emphasis on learning, measuring effectiveness, and adapting and improving programmes (Stem et al., 2003). M&E is therefore most effective when undertaken in the context of adaptive management (see Chapters 3 and 6).

Over the past few years, the concept of management effectiveness has gained significant ground, and organisations world-wide are increasingly implementing evaluations to measure the effectiveness of their conservation planning and management efforts, in order to know where and how to improve (Hockings et al., 2006; Stem et al., 2003).

This gave rise to the development of several approaches to evaluating management effectiveness. The work has been conducted at different scales, by different organisations and for different purposes. As a result there are various definitions of management effectiveness as well as various systems, approaches and tools to measure it, depending on the context. Although it is unlikely that a single common system for assessing effectiveness would be adopted around the world, too many systems and approaches limit the capacity to compare and learn across systems (Hockings et al., 2006). For this reason the World Commission on Protected Areas (IUCN-WCPA) developed an overall framework for assessment, with enough flexibility for a number of different approaches to fit within it.

Although most of the assessment systems that have emerged draw on the WCPA Framework (Hockings et al., 2006; 2002; Pomeroy et al., 2004), other assessment frameworks have also been developed and applied. These include the Skukuza Freshwater Ecosystems Framework, The Nature Conservancy Framework and the Foundation of Success Framework. Each of these is also briefly discussed below.

2.2.2 The World Commission on Protected Areas Framework

The WCPA Framework provides guidance in the development of assessment systems, and promotes basic standards for assessment and reporting. According to this framework, the process of management starts with a vision, resources are subsequently planned and allocated, and finally goods and services are produced. M&E is a critical part of this cycle, because it enables planners and managers to learn from that experience. It also helps governments, funding agencies and civil society to monitor the effectiveness of protected area networks.

The WCPA framework lists six stages within the management cycle: context, planning, inputs, processes, outputs and outcomes (**Figure 1**). Ideally, assessments should consider all six stages of the management cycle, including the context within which management takes place. This

requires M&E at various stages, each with a different type and focus of assessment. When considering the context or current status, for example, the question to be asked is “Where are we now?” Analysing this question provides information that helps put management decisions into context. For other questions that can be asked see Hockings et al., (2000) and Hockings et al., (2002).

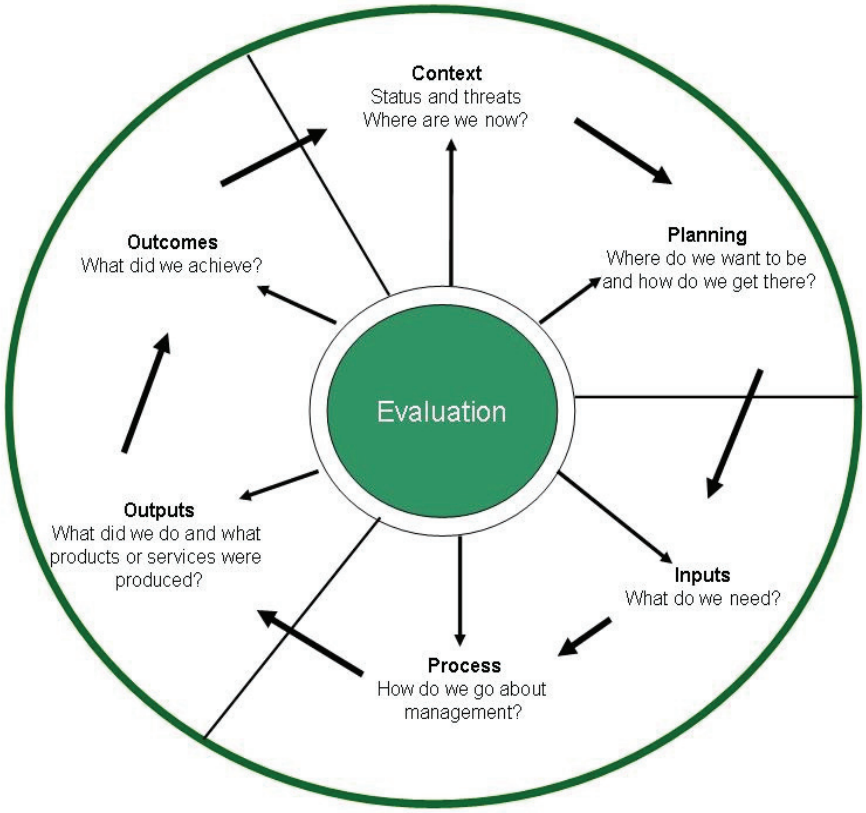

Figure 1 : The WCPA Framework management cycle (from Hockings et al., 2006).

The WPCA Framework includes a number of guidelines that should form the basis of assessment systems. These guidelines explain the steps in designing and conducting an assessment through various phases, including:

- **Phase 1**: Defining and agreeing on evaluation objectives (including selecting your indicators);
- **Phase 2**: Choosing or developing a methodology and planning the evaluation process;
- **Phase 3**: Conducting the evaluation; and
- **Phase 4**: Analysing, communicating and implementing the results (Hockings et al., 2000; Hockings et al., 2006).

Important factors that feature as part of these guidelines are:

- Stakeholder participation;
- Transparency;
- Clear management objectives and criteria for judging management performance;
- Prioritisation of conservation efforts;
- Progressive verification and refinement of the methodology of evaluation; and
- Inclusion of both quantitative and qualitative information (Hockings et al., 2002).

The four major phases and certain common steps in the management effectiveness evaluation cycle are shown in **Figure 2**. These phases and their associated steps are iterative, and learning

and management changes can occur at any time during the process (Barber et al., 2004). The four phases and their characteristics are explained in detail in Hockings et al., (2006).

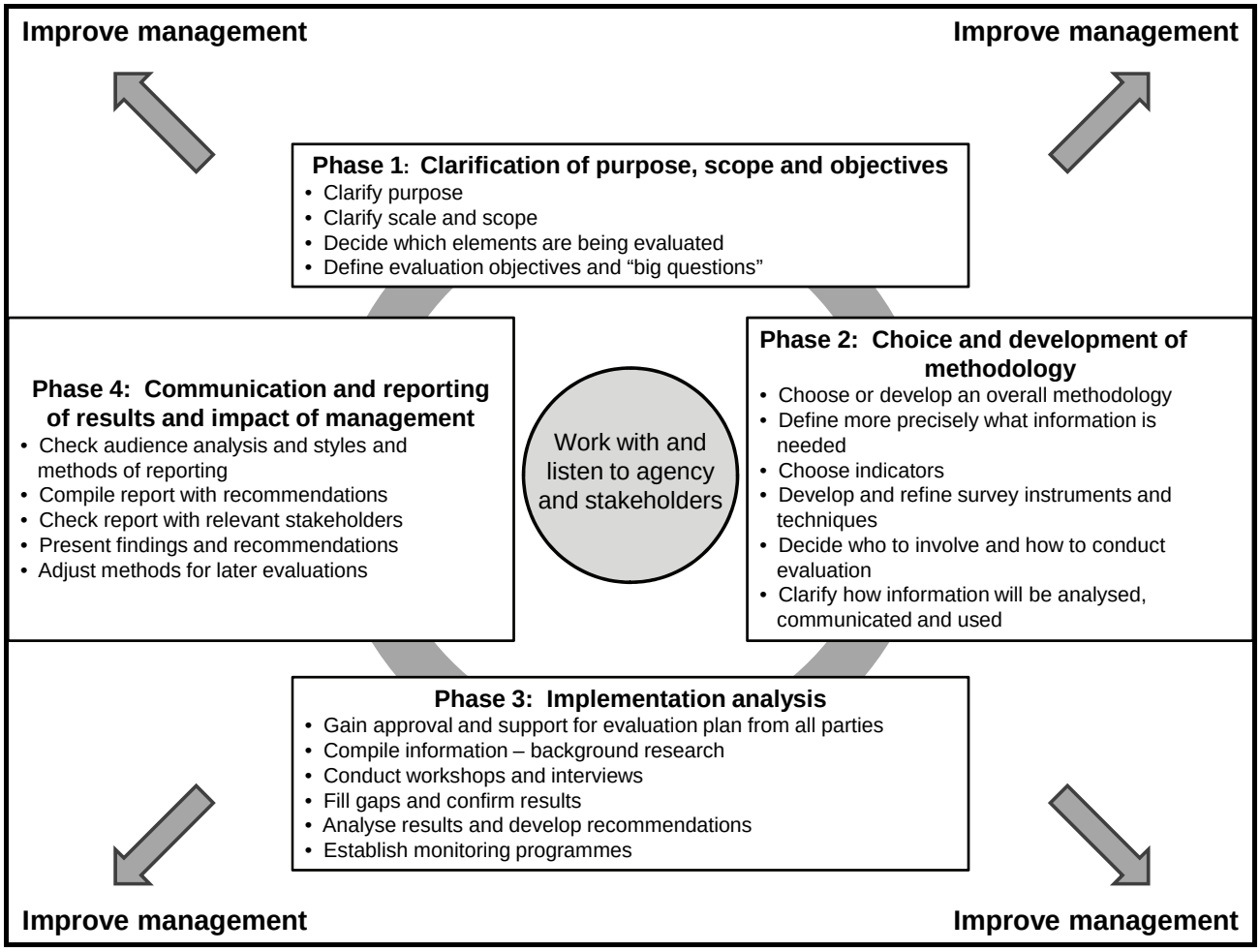

Figure 2 : The WCPA Framework evaluation cycle (from Hockings et al., 2006).

It is important to note that the evaluation of management effectiveness is only worth doing if it results in better managed protected areas. This needs the results of an evaluation to be interpreted to identify practical lessons and to be acted upon. The results can be useful for facilitating adaptive management as they can be used to adapt plans and practices, adjust resource allocation, revise policies and affirm that good work is being undertaken, at a local, regional and global level (Hockings et al., 2000).

In order for M&E tools to be widely adopted as an integral part of protected area management, three important factors need to be in place:

- **Factor 1: Increased awareness**. This is achieved to some extent by the publication of the WCPA framework.
- **Factor 2: Willingness to use such systems**. NGOs, international bodies (such as Conventions and the IUCN), and some managers and management agencies are beginning to recognise the potential for assessment systems to become an integral part of their management practices.
- **Factor 3: Capacity**. Many protected areas around the world are under-funded, which prevents evaluation of management effectiveness. If the methodologies outlined in the WCPA Framework are to be successfully adopted, it is crucial that they be built into the curricula of training institutions (Hockings et al., 2002).

2.2.3 Skukuza Freshwater Group Framework

Another group that provides general guidelines on how adaptive management, and by implication M&E, could be improved upon is the Skukuza Freshwater Group. The Skukuza Freshwater Group is a group of freshwater ecologists and conservation specialists from different parts of the world, concerned about the "general decline in the integrity, functionality and biological diversity of freshwater ecosystems and the roles and opportunities for protected areas in maintaining and improving the status of freshwater ecosystems". The group believes that key steps can help provide effective protection for the variety of life in rivers, lakes and wetlands. These steps depend on a better awareness of the crisis that characterises freshwater conservation efforts and on the development of better tools to address the particular needs of freshwater ecosystems. Suggestions include (Skukuza Statement, 2007):

- Broadening conservation priorities of existing protected areas to improve the state of rivers, lakes and wetlands within their boundaries;
- Redefining freshwater protected areas by developing a new, flexible approach that recognises the specific challenges of protecting river and wetlands while taking into account the reality of the presence of human settlements in most catchments;
- Encouraging governments to celebrate and protect free-flowing rivers; and
- Improving long-term accountability for water decisions by ensuring that all proposed changes to freshwater ecosystems are based on full assessments of the social and ecological costs of such changes.

The group supports an adaptive conservation philosophy that consists of adaptive planning, adaptive management and adaptive evaluation (the last of these three steps being generally the most neglected). Similar to the WCPA framework, the Skukuza Freshwater Group has identified six steps that allow incorporation of freshwater ecosystems issues. The steps refer to:

- Context;
- Planning;
- Inputs;
- Processes;
- Outputs; and
- Outcomes.

Evaluation should form an integral part of the management process. It should occur throughout all steps, but especially after these have been completed. This ensures that all feedbacks are actually functional and that the process is fully adaptive in a complex changing world (Skukuza Group, 2006).

2.2.4 The Nature Conservancy Framework

A third group that has adopted a conservation framework is The Nature Conservancy (TNC). It is a leading conservation organisation working around the world to protect ecologically important lands and waters for nature and people (http://www.nature.org/aboutus). It suggests using two types of measures (TNC, 2000):

- **Activity measures**. These describe the processes and actions they are taking towards realising organisational goals. This helps to inform the likelihood of conservation success by measuring the extent to which key elements of the conservation approach are being implemented.
- **Outcome measures**. These describe the results of those actions in terms of:
  Assessing biodiversity status, threat status and conservation management status, and
  Measuring the effectiveness of the strategies that the TNC is implementing.

2.2.5 The Foundations of Success Framework

The Foundations of Success (FOS) is a small, non-profit organisation that is committed to working with practitioners to learn how to do conservation better through the process of adaptive management. They work with other conservation organisations to help them develop adaptive management systems, facilitate cross-project and cross-site learning, and to conduct M&E (http://www.fosonline.org/). Two components of its work comprise training in the following:

- **Adaptive management**. This entails training conservation managers and practitioners in basic project design, planning, implementation, and monitoring. It includes enhancing their capacity to use what they learn from their monitoring efforts to adapt and improve their work over time.
- **Collaborative learning**. This focuses on ways to accelerate institutional learning through cross-project collaboration and sharing. The Foundation of Success's work in collaborative learning initiatives is based on "the assumption that accelerated learning occurs when it involves sharing experiences across a suite of projects all using a common strategy or tool".

2.3 SCOPES OF ASSESSMENTS

2.3.1 Introduction

Numerous methodologies for assessing management effectiveness in protected areas have been developed and tested around the world (Ervin, 2006; Stern, 2006; Stolton et al., 2003). These methodologies differ considerably in their scale, depth, duration and data collection methods (Ervin, 2006). It is clear that the existence of a wide range of situations and needs requires different methods of assessment (Stolton et al., 2003).

The WCPA framework, which has been broadly accepted by major international bodies, forms the basis of a large majority of the protected area management effectiveness methodologies that have been developed and widely implemented over the past number of years. Examples of evaluation systems based on this framework are provided in Hockings (1998), Hockings and Hobson (2000), Hakizumwani (2000) and Ervin (2000). Hockings (2003) analysed 27 assessment methodologies in relation to this framework. He concluded that few methodologies assess all the WCPA framework elements. He emphasised that more useful information for adaptive management will come from addressing all six elements. The framework can be used to adapt existing methodologies or to design new, more comprehensive methodologies for evaluation, using quantitative monitoring data, qualitative scoring data, or a combination of both (Hockings, 2003).

In general, there are four types of management effectiveness assessments (Ervin, 2006):

- In-depth site-level assessments;
- Comprehensive system-wide assessments;
- Categorical, assumption-based assessments; and
- Rapid score-card assessments.

All can be used to measure management effectiveness (Ervin, 2003a). However, when choosing and adapting methodologies for assessing management effectiveness in protected areas, conservation planners should ensure that indicators from each of the six major elements of the WCPA Framework are included. They should also choose a methodology that best meets the assessment objectives (Ervin, 2006). The following questions may assist in this selection process:

- What are the specific objectives of conducting the assessment?
- How will the information be used and by whom?
- Who will participate in the process?

- How will the results be communicated?
- What resources are available for conducting the assessment?
- Who will be responsible for co-ordinating and undertaking the assessment?
- What is the time frame for completion?
- What are the follow-up steps planned after the assessment is completed?

The remainder of this section provides a summary of each of the four types of management effectiveness assessment, including limitations and examples of available tools (Ervin, 2006).

2.3.2 In-depth site level assessment

The in-depth, evidence-based approach entails a site-level assessment of the degree to which management actions achieved management objectives. It typically involves the development of a detailed baseline of key desired outcomes where the assessment is designed to measure changes in these outcomes over time.

Limitations: It is expensive and time consuming to implement. It is therefore not feasible to apply across many protected areas within a single management system.

Example: World Heritage Site assessments.

2.3.3 Comprehensive system-wide assessments

A system-wide approach assesses the management effectiveness of each protected area within a given protected area system. The assessment is typically conducted in participatory workshops (which should ensure that participants are sufficiently empowered to contribute effectively). The results for each indicator are peer-reviewed by protected area managers, administrators and external stakeholders to ensure relative consistency and accuracy of scoring across the system (Ervin, 2003a). The scoring is usually relative to the threats and critical needs of each protected area within the system.

Available tools: World Wide Fund for Nature's (WWF's) Rapid Assessment and Prioritisation of Protected Area Management (RAPPAM) (Ervin, 2003b).

The RAPPAM methodology provides a rapid assessment of the overall management effectiveness of protected areas within a particular country or region (Ervin 2003b). It identifies key threatened protected areas within a protected area system (Stolton et al., 2003). It includes over 100 indicators organised under the WCPA framework (Ervin 2006). Although this methodology was developed specifically for protected areas in forests, it has been successfully applied in other biomes as well, including grasslands, savannas and wetlands. This was done by modifying and adapting the questions in the Rapid Assessment Questionnaire.

The RAPPAM methodology can:

- Identify management strengths and weaknesses;
- Analyse the scope, severity, prevalence, and distribution of a variety of threats and pressures;
- Identify areas of high ecological and social importance and vulnerability;
- Indicate the urgency and conservation priority for individual protected areas; and
- Help to develop and prioritise appropriate policy interventions and follow-up steps to improve protected area management effectiveness.

The RAPPAM methodology includes five steps, discussed in more detail in Ervin (2003b):

- Step 1: Determining the scope of the assessment;
- Step 2: Assessing existing information for each protected area;
- Step 3: Administering the Rapid Assessment Questionnaire;
- Step 4: Analysing the findings; and
- Step 5: Identifying next steps and recommendations.

Application: The RAPPAM methodology has been applied in over 1 000 protected areas across 30 countries (Ervin, 2006).

In South Africa, the KwaZulu-Natal Parks Department conducted a RAPPAM assessment in 2001 to assess the management effectiveness of protected areas in all 110 of the province's protected areas (Goodman, 2003). The objectives of the assessment were to identify key threats, critical management weaknesses, policy gaps and priorities for improving management practices. Other objectives included the allocation of resources, abating threats and developing system-wide policies. The assessment identified major management weaknesses. These included long-term funding, staffing, biological research and monitoring, natural resource inventories, management planning and community relations. Major threats to biodiversity within the protected areas were also identified. These included invasive plants, isolation of protected areas, land use change, and exotic and indigenous disease.

The report contained major recommendations:

- Improve legal status and resolve disputes;
- Improve management planning process;
- Conduct annual threat analysis;
- Identify and prioritise strategic research needs;
- Improve community outreach efforts; and
- Address invasive species problem.

The full report is available at www.conserveonline.org.

Limitations: In general, the system wide assessment does not result in measurable thresholds for monitoring future performance. The RAPPAM methodology itself is not designed to provide detailed, site-level adaptive management guidance to protected area managers. However, it can complement more detailed site-level assessments by identifying individual protected areas and issues that may require more in-depth study (Ervin, 2003b).

2.3.4 Categorical assumption-based assessments

This is an approach in which data are collected centrally regarding an entire protected area system. It is based primarily on literature review and expert opinion, and involves little or no interaction with field staff. Conservation planners first develop a set of categories based on multiple indicators, and then assess the levels of effectiveness for all protected areas within a given type. The result is a level of management effectiveness for an entire protected area system, rather than a score for each protected area within a system.

Its primary aims are:

- To allow conservation planners to understand broad patterns and major trends;
- To identify where more comprehensive assessments might be needed; and
- To identify protected area systems which need the most urgent support.

It is not intended to be a replacement for a more comprehensive assessment, especially in areas of high conservation significance (Ervin, 2006).

Available tools: GAP + (GAP Plus) (Schulz, 2006), protected area gap analysis (commonly done as part of a systematic biodiversity assessment).

Limitations: Of all the assessments that can be applied, a categorical assessment provides the lowest level of certainty about the degree to which a protected area is likely to be well managed. It provides general information about an entire system, but little or no information about variation within that system.

2.3.5 Rapid scorecard peer-based assessment

A scorecard is defined as an instrument that aids in the undertaking of evaluation (Stem et al., 2005). A scorecard approach to assessing protected area management effectiveness provides important insight to management (Stolton et al., 2003). It involves a scorecard or structured questionnaire that is generally applied to each protected area through an interview or survey (Ervin, 2006). The scorecard typically includes pre-defined categories and thresholds for each indicator. For scorecards and ranking models to be most effective, scoring should be as standardised as possible and weighting mechanisms should be grounded in solid science (Stolton et al., 2003).

Stem et al., (2003) note that scorecards and ranking models can be relatively quick and easy to use. Their clear and simple presentation makes them a powerful communication tool. Scorecards and ranking models have been important tools for demonstrating and effectively communicating impact, especially at the site level. Such ranking models have been particularly prevalent in assessing the effectiveness of protected area management (Stem et al., 2003).

Available tools: The following are discussed in more detail in the next section:

- Parks in Peril site consolidation scorecard (TNC, 2004)
- ProArca scorecards (www.conserveonline.org)
- World Bank/WWF Site-level Management Effectiveness Tracking Tool (Stolton *et al*., 2003; Chatterjee and Pittock, 2005).

The Nature Conservancy has been extensively involved in implementing scorecard assessments of protected area management effectiveness (Ervin, 2006). It has used all three tools.

Limitations: Although scorecards and the tracking tool can provide important insight into management, most are not comprehensive enough to provide sufficient information for evaluation (Stem et al., 2003). They are aimed more towards helping with reporting progress on management effectiveness of individual protected areas. These tools should preferably not be the only tools used for an evaluation since they do not necessarily reflect clear linkages between the intervention used and the desired impact. They should not replace more thorough methods of assessment for the purpose of adaptive management (Stolton et al., 2003). In addition, the creation of composite or average scores can disguise important information. Similarly, items scored often receive equal weight, even though they may not be equally important to achieving conservation success (Stem et al., 2005).

2.3.6 Matching methodology to objectives

Each of the four methodologies for assessing the management effectiveness in protected areas has its own strengths and weaknesses. In choosing an approach, conservation planners should consider the full range of issues shown in **Table 2** to best match the methodology to their objectives (Ervin, 2006).

Table 2 : Management effectiveness assessment methodology (Ervin, 2006).

	Type 1: In-depth assessments	Type 2: System-wide assessments	Type 3: Scorecard-based assessments	Type 4: Categorical assessments
Implementation	Very high levels of interaction with all levels of protected area staff and stakeholders	High to moderate levels of interaction with field staff, stakeholders, and policy level staff	Moderate to low levels of interaction with park staff and with stakeholders	Low or very low levels of interaction with field staff; minimal engagement with policy level staff only
Baseline for scoring performance	Baseline set by specific and measurable scores that are relative to past and future performance indicators	Baseline set by discussion and consensus during workshop. Scores are relative to the system as a whole, as well as to the critical activities and threats in each protected area	Baseline set by predetermined categories of performance, typically using a quintile or quartile approach to setting thresholds	Baseline set by pre-determined categories of performance, typically using a quintile or quartile approach to setting thresholds
Cost	Very high to high, involving a considerable investment in staffing and resources	Moderate, typically involving a three day workshop of PA staff, and involving moderate levels of planning and logistical support	Low, involving telephone conversations or short (one day or less) meetings, and logistical support	Low to very low, involving some core staff time and communication costs with PA policy staff
General purpose of assessment	Best for developing specific thresholds and benchmarks for monitoring improvement and as part of an integrated monitoring programme	Best for identifying system-wide threats, management weaknesses, geographic and strategic priorities, and policy level interventions	Best for developing a series of snapshots in performance and for tracking the overall progress of many sites over time	Best for prioritizing broad categories and geographies for investment at a programmatic level; best when used in tandem with other assessment types
Degree of confidence in results	Very high; generally results are tied to specific, objective, measurable and repeatable indicators	High to moderate; results are broadly peer reviewed by PA experts and staff across entire system	Moderate to low; results are typically based on opinions of single respondent, with low verification	Very low; results are based on discussions with PA policy level staff and literature reviews
Time required to implement the assessment (per protected area or per entire system)	By protected area, generally several weeks, months or longer, depending on the depth of the assessment	By PA system, generally three to four days per region or sub-region, plus planning and analysis (1-2 weeks)	By protected area, generally a day or less, plus planning and co-ordination (typically a week or less)	By PA system, generally a week or less for each national system

	Type 1: In-depth assessments	Type 2: System-wide assessments	Type 3: Scorecard-based assessments	Type 4: Categorical assessments
Strengths of the assessment	Provides robust, repeatable measurements and a transparent process for promoting accountability. Fosters high degree of staff engagement and acceptance of monitoring	Provides high-level, analysis of key threats, management weaknesses and geographic and strategic priorities; and identifies correlations between variables	Provides fast, repeatable snapshots of the overall strengths and weaknesses of a suite of protected areas; helps gauge efficacy of programme interventions and gauges a sites progress towards conservation goals	Provides an ultra-rapid snapshot of the overall status of strengths and weaknesses within a protected area system
Weaknesses of the assessment	Expensive and time consuming to implement; not feasible to apply across many PAs within a system	Does not generally result in measurable thresholds for monitoring future performance	Not well suited for comparisons across a protected area system; does not help prioritize geographies; do not directly link conservation interventions and conservation impact necessarily	Does not differentiate between different levels of management effectiveness within a single category

Barber et al., (2004) also highlight a number of aspects to take into account when choosing the appropriate evaluation methodology:

- Methodologies should be compatible or harmonised as much as possible;
- Consider how the initial phase will link to later phases in the evaluation when designing a methodology;
- Tools need to be appropriate and responsive to needs (*e.g.* cost-effective, replicable, robust and statistically valid, simple, field-tested, documented, credible, able to yield unambiguous results, scalable, and rapid);
- Information should be triangulated where possible; and
- Flexibility should be retained – an iterative approach is helpful.

2.4 SCORECARDS

2.4.1 Introduction

Scorecards have been developed and used not only in the conservation sector but also in business. This section begins by looking briefly at the Balanced Scorecard development by Norton and Kaplan in the corporate context, before moving on to look at scorecards for management effectiveness in protected areas.

Scorecards used for assessing management effectiveness in conservation have focused on management effectiveness in formally protected areas (*e.g.* Hockings et al*.,* 2000). The Nature Conservancy is regarded as the world-leading organisation concerning the application of performance indicators to measure the processes and capacity (both in respect of quantity and competence) for long-term conservation in specific project areas. The Nature Conservancy's Site Consolidation Scorecard and the WCPA framework-based models appear to be the most widely used and adapted scorecards in a conservation context (Stolton et al*.,* 2003).

This section also discusses the following protected area scorecards:

- Parks in Peril site consolidation scorecard (TNC, 2004);
- ProArca scorecards (www.conserveonline.org); and
- World Bank/WWF Site-level Management Effectiveness Tracking Tool (Stolton et al*.,* 2003; Chatterjee and Pittock, 2005).

2.4.2 Balanced Scorecard

Scorecards were originally developed for measuring and managing organisational performance in business (Kaplan, 2001). Traditionally, performance measures focused on financial measures. However, companies recognized that financial measures by themselves are inadequate for measuring and managing their performance (Kaplan, 2001). To remedy this deficiency, Kaplan and Norton (1992; 1996) introduced a new performance management system, called the Balanced Scorecard, for companies. They define the Balanced Scorecard as "a system of linked objectives, measures, targets and initiatives which describes the STRATEGY of an organisation and how the strategy can be ACHIEVED".

Kaplan and Norton (1992; 1993) presented the Balanced Scorecard concept in a series of articles published in the Harvard Business Review. The authors argued that traditional financial accounting measures offer a narrow and incomplete picture of business performance, and that a reliance on such data hinders the creation of future business value. The Balanced Scorecard therefore retained financial measures, but complemented these with measures from three other perspectives: customer, internal processes, learning and growth (**Table 3**)

Table 3 : Perspectives of the Balanced Scorecard (Kaplan & Norton, 1992; 1996).

Perspective	Key Question
Financial	To succeed financially, how should we appear to our stakeholders?
Customer	To achieve our vision, how should we appear to our customers?
Process	To satisfy our customers, at which processes must we excel?
Learning and Growth	How can our organisation continue to learn and improve?

Each perspective is explained by a key question with which it is associated (Bloomfield, 2002). The answers to each question become the objectives associated with that perspective, and performance is then judged by the progress towards achieving these objectives. There is an explicit causal relationship between the perspectives (**Figure 3**): good performance in the learning and growth objectives generally drives improvements in the internal business process objectives, which should improve the organisation in the eyes of the customer, which ultimately leads to improved financial results (Bloomfield, 2002).

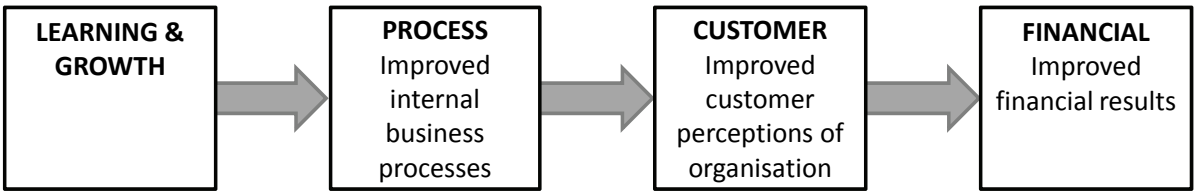

Figure 3 : Causal relationship between the Balanced Scorecard perspectives.

Since the Balanced Scorecard's inception in 1987, many organisations have adapted the balanced scorecard to their situations (Kaplan, 2001).

Kaplan and Norton (1996) identified the following essential steps to effectively implement the Balanced Scorecard as a strategic management tool:

- Clarify and update strategy;
- Communicate strategy;
- Align individual and unit goals with strategy;
- Link objectives to long-term targets and budgets; and
- Conduct performance reviews to learn and improve strategy.

While in business customers and technology drive change, it must be borne in mind that in natural systems the drivers are more complex and dynamic.

2.4.3 Parks in Peril Site Consolidation Scorecard

The Nature Conservancy launched its Parks in Peril (PiP) Program in 1990. It comprises a multi-year, multi-country programme financed largely by the U.S. Agency for International Development (USAID). The aim of the programme is to strengthen the long-term management capacity of 60 parks across 18 countries (Brandon et al., 1998). The programme provides training, technical assistance and financial resources to in-country conservation organisations to install a long-term effective conservation presence for important protected areas. Parks in Peril's goals are:

- To build an on-site logistic capacity to manage parks in the hemisphere's most imperilled ecosystems;
- To develop the analytic and strategic capacity necessary for long-term management of these areas;
- To create long-term financial mechanisms to sustain the local management of these areas;
- To integrate PiP conservation project areas into the economic lives of local society; and
- To use PiP site-based activities and the methodologies developed there, to influence conservation in other sites in the region's most imperilled ecosystems (TNC, 2000).

The PiP Program strengthens local capacity to manage conservation project areas in Latin America and the Caribbean. This is done through a process called site consolidation, which brings together the resources necessary to support long-term conservation in specific project areas. These resources include financial, technical and human resources, adequate infrastructure, a supportive local constituency, strong capacity for strategic planning, political support, and ecological information. A consolidated site is one in which the institutions charged with its management have the tools to deal with current threats and management challenges, as well as the capacity to respond to threats that arise in the future.

To manage this process, the Parks in Peril Site Consolidation Scorecard was developed. This vital tool helps site managers to set priorities for building conservation capacity, measure their progress, and employ adaptive management to improve program efficiency and impact. Since 1997, the Parks in Peril Scorecard has been applied 271 times across 45 protected areas (Ervin, 2006).

The PiP Scorecard can be used as a project management tool to track progress over time at two levels (TNC, 2004):

- **At an individual PiP project area**. The scorecard is designed to aid project managers in measuring advances towards multi-year goals. Equally important, it identifies indicators that are not advancing as planned, where additional infusion of human, technical and/or financial resources might be required.
- **Across the entire PiP project area portfolio**. The PiP Scorecard is also designed as a general and flexible programme monitoring instrument to track progress at a diverse suite of project areas. This enables TNC, USAID and conservation partners to focus technical and financial assistance strategically to achieve site consolidation objectives.

The PiP Scorecard evaluates management capacity rather than conservation outcomes or threat reduction. It is designed to measure a project area or site's progress towards consolidation, rather than direct conservation impact or a project area's success in reducing threats and conserving biodiversity. The focus is on measuring processes that lead to site consolidation and the capacity for conservation of a given project area. When properly developed and implemented, a site-specific monitoring plan, included as one of the 17 indicators, will provide an ongoing measure of conservation impact through changes in threat and biodiversity health indicators (TNC, 2000).

The PiP Scorecard therefore assesses progress towards development of a "functional" protected area, defined as an area that has the capacity to protect its biodiversity indefinitely (Hockings, 2000). This capacity is assessed by scoring management capacity against pre-defined benchmarks based on the functionality of protected areas. The elements of the PiP Scorecard are grouped into four categories with 17 key indicators as shown in **Table 4** (Martin, 2005).

Table 4 : Categories in the PiP Scorecard with associated indicators (TNC, 2000).

A. Strategic Planning	B. Protection Activities	C. Long-term Financing	D. Site Constituency
Zoning	Infrastructure	Financial plan	Management committee
Management plan	Personnel		Compatible resource use
Science needs	Training plan		Stakeholder support for area
Monitoring plan	Land tenure		Policy agenda
	Threats analysis		Environmental communication and education plans
	Official declaration		Institutional leadership

Each of these 17 indicators is assessed on the following 5-point scale:

- **5 = Excellent** (the protected area is likely to be properly managed);
- **4 = Adequate** (protected area is adequately managed for the most critical threats and highest conservation targets);
- **3 = Progress made** (protected area is becoming adequately managed, but is not yet);
- **2 = Work begun** (little actual progress towards adequate management of the project area; and
- **1 = No work has been done** (project area is not being managed).

As a general rule, a project area that has achieved at least 4 points in all 17 indicators is considered consolidated. The specific circumstances of individual project areas will vary, and it is the role of the TNC project manager and in-country partners to determine the level of achievement for each indicator that best represents the consolidation of a given project area. On a case-by-case basis, TNC and the partners may decide that certain indicators do not apply to a given project area; they may also decide that over the life of the PiP Program, it will not be possible to boost every indicator to a score of 4 or greater. Ideally, this should be established at the beginning of the project, when baseline conditions are being determined.

Indicator summaries and benchmark guidelines are provided for all 17 indicators of the PiP Scorecard (TNC, 2000). In addition to the scorecard itself, a tool has also been designed to complement the scorecard. The tool provides a section to record information relevant to each indicator. Although the documentation requirements vary from indicator to indicator, the types of documentation can be categorised as follows:

- Goals for achieving levels 4 and 5;
- Check lists;
- Brief descriptions of processes or products;
- Limitations and lessons learned; and
- Sources of information.

An example of one indicator from each of the four elements of the PiPs Scorecard is discussed in more detail in **Appendix 2A of this chapter**. It provides the indicator summary, benchmark guidelines, product and the documentation requirements for each indicator.

2.4.4 PROARCA / CAPAS Scorecard

The Programa Ambiental Regional para Centroamérica (PROARCA) / Central American Protected Areas System (CAPAS) system uses a scorecard approach that is related to the PiP Scorecard approach. It uses a set of criteria as indicators of management effectiveness, with each item scored on a five point scale. Criteria are grouped into related areas of management in a hierarchical classification of scopes and factors of management. The scopes used in the assessment are:

- Administrative;
- Natural and cultural resources;
- Political-legal; and
- Economic / financial (Hockings, 2000; Courrau, 1999).

A list of the scopes, factors and criteria used in the methodology is given in **Table 5**. In terms of the WCPA Framework, criteria used in this system are all input and process indicators.

At the start of the assessment process the optimal position in relation to each criterion is defined by park management (*e.g.* what facilities and equipment are required, what staffing is required, what arrangements with co-operating institutions need to be established). If a management plan exists, this will help define the optimal scenario. The scenario may provide for a staged improvement in management capacity and performance over time (a five year planning horizon is recommended).

Assessments are carried out in a workshop that brings together park managers, monitoring staff, stakeholder representatives, and others with knowledge and expertise relevant to the area in question. While the definition of the optimal scenario sets the target levels for each criterion, the criteria are pre-set in the construction of the assessment table. The five-point performance scales vary from one criterion to another to match the details of the criterion, although many items are rated on a percentage achievement basis (0%; 25%, 50%, 75%, 100%). Overall management effectiveness can be expressed by totalling the actual score and calculating this as a percentage of the total possible score. Evaluations are conducted on a regular basis (6 to12 monthly) in each protected area to assess progress (Hockings, 2000; Courrau, 1999).

Table 5 : PROARCA / CAPAS indicators of management effectiveness (Courrau, 1999).

Scope	Factor	Criteria
Social	Communications	Existence of a communication plan
	Participation	Participation of interest groups
	Education	Conduct of environmental education programme
	Land Tenure	Availability of land tenure information
Administrative	Infrastructure	Management access within PA
		Availability of equipment
		Availability of facilities
	Personnel	Number of personnel
		Level of training
		Stability of staff
		Suitability of staff

Scope	Factor	Criteria
	Planning	Existence/Implementation of management plan
		Existence/implementation of operational plan
		Use of zoning in management
		Analysis of threats
Natural and Cultural Resources	Use	Compatibility of use with management objectives
		Impacts of use on natural/cultural resources
		Impacts of use on neighbouring communities
	Protection	Existence/Implementation of law enforcement plan
		Extent of illegal activity
		Extent of boundary demarcation
	Knowledge	Research programme tailored to management needs
		Administration of research
		Management of resource information
	Environmental Monitoring	Indicator species identified and monitored
		Evaluation of habitat connectivity around PA
		Monitoring of relevant abiotic factors
Political-Legal	Legal framework	Legal status of PA
		Adequacy of law enforcement provisions
	Institutional framework	Arrangements with cooperating institutions
Economic / Financial	Self sustainability	Long term financial plan and adequate funds
		Return of generated revenue to PA
	Production of goods and services	Knowledge of benefits (goods and services) generated by PA
		Stakeholder awareness of benefits from PA
	Benefits	Extent to which interest groups benefit directly from the PA

2.4.5 World Bank / WWF Management Effectiveness Tracking Tool

The World Bank / WWF Alliance for Forest Conservation and Sustainable Use ("the Alliance") was formed in 1998 in response to the continued depletion of the world's forest biodiversity (Stolton et al., 2003). The Alliance set a target relating to management effectiveness of protected areas: "50 million hectares of existing, but highly threatened forest protected areas to be secured under effective management by the year 2005" (Dudley and Stolton, 1999). To assess progress towards this target, the Alliance developed a simple site-level Management Effectiveness Tracking Tool (METT) to facilitate reporting on management effectiveness of protected areas within WWF and World Bank projects (Stolton et al., 2003)

An example of is its use by the Global Environment Facility. The METT has been developed on the basis of the WCPA Framework.

The Alliance has identified that the METT needs to be (from Stolton et al., 2003):

- Capable of providing a harmonised reporting system for protected area assessment within both the World Bank and WWF;
- Suitable for replication;

- Able to supply consistent data to allow tracking of progress over time;
- Relatively quick and easy to complete by protected area staff, so as not to be reliant on high levels of funding or other resources;
- Capable of providing a "score" if required;
- Based around a system that provides four alternative text answers to each question, strengthening the scoring system;
- Easily understood by non-specialists; and
- Nested within existing reporting systems to avoid duplication of effort.

Limitations: The METT reports on progress of management effectiveness and should not replace more thorough methods of assessment for the purposes of adaptive management (Stolton et al*.,* 2003). It was developed to provide a quick overview of progress for improving the effectiveness of management in individual protected areas, to be filled in by the protected area manager or other relevant site staff.

As such, it is clear that there are strict limitations on what the METT can achieve: it should not for example be regarded as an independent assessment, or as the sole basis for adaptive management (Hockings et al*.,* 2006). Because of the great differences between expectations, resources and needs around the world, the METT also has strict limitations in terms of allowing comparison between sites; it is most useful for tracking progress over time in one site or a closely related group of sites. Lastly, the METT is too limited to allow a detailed evaluation of outcomes and is really aimed at providing a quick overview of the management steps identified in the WCPA Framework up to and including outputs. Although it includes some questions relating to outcomes, the limitations of these should be noted (Stolton et al*.,* 2003). The process should however, also acknowledge that pragmatism is often necessary, for example in developing countries.

The tracking tool comprises two sections, both of which must be completed:

- **Datasheet**, which details key information on the site, its characteristics and management objectives, and includes an overview of WWF/World Bank involvement.
- **Assessment form**, which includes three distinct sections, all of which should be completed (see **Table 6**).

The METT can be completed by protected area staff or project staff, with input from other protected area staff. The tracking tool has been designed to be easily answered by those managing the protected area without any additional research (Stolton et al*.,* 2003).

Table 6 : METT assessment form: questions and answers examples (Stolton et al., 2003).

Issue	Criteria	Score	Comments	Next steps
Law enforcement	The staff have no effective capacity/resources to enforce protected area legislation and regulations	0		
Can staff enforce protected area rules well enough?	There are major deficiencies in staff capacity/resources to enforce protected area legislation and regulations (e.g. lack of skills, no patrol budget)	1		
	The staff have acceptable capacity/resources to enforce protected area legislation and regulations, but some deficiencies remain	2		
Context	The staff have excellent capacity/resources to enforce protected area legislation and regulations	3		
Protected area objectives	No firm objectives have been agreed for the protected area	0		
Have objectives been agreed?	The protected area has agreed objectives, but is not managed according to these objectives	1		
	The protected area has agreed objectives, but these are only partially implemented	2		
Planning	The protected area has agreed objectives and is managed to meet these objectives	3		
Current budget	There is no budget for the protected area	0		
Is the current budget sufficient?	The available budget is inadequate for basic management needs and presents a serious constraint to the capacity to manage	1		
	The available budget is acceptable, but could be further improved to fully achieve effective management	2		
Inputs	The available budget is sufficient and meets the full management needs of the protected area	3		

The main part of the assessment form is a series of 30 questions that can be answered by assigning a simple score from 0 (poor) to 3 (excellent). Four alternative answers are provided for each question to help assessors to make judgements about what score to give. Questions that are not relevant to a particular protected area should be omitted, with a reason given in the comments section. In addition, there are six supplementary questions which elaborate on key themes in the previous questions and provide additional information and points.

This is inevitably an approximate process and there will be situations in which none of the four alternative answers appear to fit conditions in the protected area precisely. Questionnaire respondents should choose the answer that is nearest and use the comments section to elaborate.

A box next to each question allows for qualitative judgements to be justified by explaining why they were made (this could range from personal opinion, a reference document, monitoring results or external studies and assessments).

For each question respondents are asked to identify a long-term management need to improve adaptive management at the site, if this is relevant.

A final total of the score from completing the assessment form can be calculated as a percentage of scores from those questions that were relevant to a particular protected area. For example, if five questions are believed to be irrelevant (and this is justified in the comments column) then the final score would be multiplied by 30/25 to offset the fact that some questions were not applicable (Stolton et al., 2003).

2.5 FACILITATION OF ASSESSMENTS

The evaluation of monitoring effectiveness can be undertaken for various reasons. The ultimate purpose of the evaluation and who the information is intended for, will determine whether the evaluation is to be conducted internally or by an external group. What is important though, is to form a team with a common purpose.

If the purpose of the evaluation is for managers and practitioners to improve their projects and programmes and to promote learning, an internal evaluation will suffice (Salafsky and Margolius, 2003). However, if the purpose of the evaluation is to report to outside investors and the public, it would make more sense to undertake an external evaluation or audit, which may be viewed as more credible by third parties (www.fosonline.org). Internal evaluations are likely to be less expensive than external evaluations.

Some of the advantages and constraints of conducting evaluations primarily by internal and external operators, and of including community involvement, are presented in **Table 7** (Barber et al., 2004).

Table 7 : Management effectiveness evaluation options: Advantages and constraints.

	Internal evaluation	External evaluation	Community involvement
Truthfulness in discussions and questionnaires	Staff are more likely to be honest and open in an internal process. However, even internal evaluations will be threatening to some staff and all results require some mediation to ensure accuracy. There could also be bias in their opinions.	Some staff may wish to hide unpalatable truths – in some cultures will not wish to "lose face" or cause other staff to lose face. Agencies may be punitive if staff reveal unpalatable facts or are critical of policies and procedures.	Agency staff may be reluctant to reveal weaknesses or be self-critical in front of community members. Community members may be most open with external evaluators without park staff present.
Open reporting	Reports may be repressed or edited by senior staff or relevant politicians. May not be able to openly criticize *e.g.* statements of inadequate funding.	External evaluators are generally regarded as unbiased and highly credible. Reports can be totally open and critical where necessary	Community involvement means that reports are more likely to be open and complete.
Access to agency information	Will generally be free and complete access to any information needed.	May be inversely related to the openness and public profile of reporting. Freedom of information in some jurisdictions may be helpful, but information can still be very difficult to obtain and interpret, especially when not in written form.	Access to certain information will be restricted (*e.g.* Information relating to location and status of rare animals, special cultural sites)
Availability of resource information	Park staff should have all information available – but in practice are often unaware of important findings of research etc. High level of local Knowledge.	External evaluators (*e.g.* scientists) may have access to a different set of resource information than that known to park staff.	Community members may have a wealth of resource information including traditional knowledge.
Learning processes	Critical outcome of evaluation is organisational learning and encouragement of reflection.	External evaluators *(e.g.* consultants) may take valuable knowledge away so it is not institutionalised.	Involvement of community in this process can be extremely valuable for their increased capacity in environmental management.
Advocacy and community relations	Less likely to contribute unless used with community relations or publicity campaign.	Can be used to advocate better funding.	Likely to contribute to positive working relationships – unless criticism by community members of park staff create rifts.
Cost of evaluation	Relatively inexpensive.	Expensive, but may be externally funded.	Adds considerably to time and cost of process.

2.6 CONCLUSIONS

This review has looked at various approaches and tools for evaluating management effectiveness in protected areas, with a focus on the scorecard approach and its associated tools.

Most of the assessment systems are based on the World Commission on Protected Areas (WCPA) framework although other assessment frameworks have also been developed and applied. The scope of assessments typically varies from those that focus in detail on a particular protected area to those that have a much broader spatial scope. Scorecards in particular have been used in a traditional business context (the so-called "Balanced Scorecard") where the ultimate objective is to assess factors considered critical to financial success. However, others have been developed specifically for protected areas (*e.g.* the Parks in Peril Scorecard, PROARCA / CAPAS Scorecard, and the World Bank / WWF Management Effectiveness Tracking Tool). The ultimate aim of these is to assess management factors critical to effective conservation.

It is quite evident that a wealth of expertise and especially experience exists worldwide relating to assessing management effectiveness and scorecards in particular. Much has also been published that assesses the effectiveness of various approaches. When the need arises for a scorecard that specifically assesses management effectiveness, this experience should be made use of and relevant literature carefully studied. The scope of the assessment should be defined and the nature of the most appropriate scorecard chosen on the basis of tables such as:

- **Table 2 : Management effectiveness assessment methodology (Ervin, 2006).**
- Table 7 : Management effectiveness evaluation options: Advantages and constraints.

It is also evident that each approach has distinct advantages and disadvantages. These should be explicitly explored, discussed and debated, and then documented to explicitly motivate the final choice.

Notwithstanding the above, it is strongly recommended that careful consideration be given to rather using a reflective assessment tool like the one developed in this work instead of one that measures management effectiveness *per se*.

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2.8 APPENDIX 2A: PARKS IN PERIL INDICATORS

This Appendix gives an example of one indicator from each of the four elements of The Nature Conservancy's Parks in Peril Scorecard (TNC, 2000). For each indicator, the following are provided: the indicator summary, benchmarks, benchmark guidelines, product and documentation requirements.

2.8.1 Strategic planning

Example indicator: Monitoring plan

Indicator summary

Effective monitoring tracks the impact of threats on biodiversity values or "targets" and thus enables conservation project managers to measure the effectiveness of management actions. Ideally, managers use this information to adjust management activities and revise management plans. Different types of monitoring can be carried out at protected areas. Monitoring can focus on biodiversity targets (populations of vulnerable species and natural communities, for example), on threats to targets, or on management capacity (this scorecard, for example).

For the purposes of achieving consolidation, this indicator focuses on monitoring priority conservation targets and critical threats to those targets, within a realistic budget, as identified in Conservation Area Planning or a similar, threats-based analysis. Monitoring should track major threats as directly as possible, choosing variables and monitoring techniques that are within the means of project managers or support groups to track continually and at a relatively low cost. Variables must provide an accurate measure of targets and threats, and the monitoring plan must be implemented according to a schedule that provides information timed to support recurring management decisions. Once variables are identified, initial data-collection is required to establish a baseline against which future data can be compared. To be considered consolidated, a project area should have a completed monitoring plan that is being implemented so that priority biodiversity targets and critical threats are being monitored.

Benchmarks

5 = Monitoring plan completed and fully implemented. Timely monitoring information and analysis related to priority biodiversity targets and critical threats are in conservation project managers' hands, and being used for management purposes.

4 = Monitoring plan completed, accurate variables related to priority biodiversity targets and critical threats being monitored.

3 = Accurate variables related to priority biodiversity targets and critical threats identified, baseline information being collected and classified; monitoring plan not completed.

2 = Some baseline information being gathered, but with no clear relation to priority biodiversity targets and critical threats identified in a monitoring plan.

1 = No environmental monitoring of any significance being carried out

Benchmark guidelines

Monitoring in this scorecard refers to data that are collected at predetermined intervals to assess changes over time. Sometimes inventories are needed to set baselines in a monitoring programme, but not all inventories qualify as monitoring – for example, some inventories may need to be conducted as part of the science and information needs assessment

Benchmark 2 refers to a stage in which information is being gathered without any analysis of its potential relevance to the monitoring of priority targets or critical threats.

Benchmark 3 indicates that Conservation Area Planning or a similar threats-based analysis has identified priority targets and critical threats, conservation project managers have determined relevant monitoring variables, and some useful data are becoming available – but the formal monitoring plan is not yet complete.

Benchmark 4 indicates that data are being collected at predetermined intervals according to a completed monitoring plan, and they are establishing or being compared to baseline levels. Socio-economic variables as well as biological ones should be considered as they relate to threats.

Benchmark 5 indicates that the monitoring plan is fully implemented, and project managers are using the information to adjust management activities and the project area's management plan.

Product

A monitoring plan should propose the most appropriate variables to measure for each priority conservation target and critical threat, the best ways of measuring them, and the frequency with which they should be measured. In many cases, information that is already being collected by other groups or agencies can be used to provide information on threats; these cases should be noted in the plan. The key to an effective monitoring plan is the selection of variables that are faithful indicators of the state of targets and threats being measured. Also important is designing a monitoring strategy that is feasible given expected financial and human resource levels in the medium-term.

Documentation

- *Process for completing the monitoring plan:* What process has been used to design the monitoring plan? At what stage is that process?
- *Quality of the design and implementation of the monitoring plan (Optional):*
- *Limitations and lessons learned for completing the monitoring plan (Optional):*
- *Sources of information:* What is the source of the prioritisation of targets and threats – Conservation Area Planning, or a similar analysis? When was that analysis completed?
- *Additional comments:*

2.8.2 Basic protection activities

Example indicator: Physical infrastructure for project area

Indicator summary

Physical infrastructure refers to on-site improvements (including ranger stations, radio systems, vehicles, boundary demarcation, educational and management-related signs, road and trail systems, etc.) necessary for effective management of a protected area. At a minimum, infrastructure should support "basic" reserve management. This refers to management activities that confront the most pressing threats and support appropriate conservation of biodiversity.

Infrastructure needed for basic reserve management will vary from place to place. Those groups participating in the management of the reserve are best suited to determine the specific infrastructure needs of the project area. Managers must define, at the outset, the infrastructure necessary to support conservation at the site, and construction or acquisition of infrastructure should follow a prioritisation of the most needed infrastructure to confront the most pressing threats efficiently. Infrastructure needs should be defined as part of a Conservation Area Planning process, in a threats-based management plan for the project area, or in another threat-based analysis of infrastructure needs. At least the basic necessary infrastructure to address the most critical threats must be in place for a site to be considered consolidated.

Benchmarks

5 = All physical infrastructure necessary (according to the priorities in the management plan or Conservation Area Plan) for basic reserve management in place. No significant gaps exist.

4= Most physical infrastructure recommended by Conservation Area Planning process or management plan (or other threats-based analysis of infrastructure needs) in place for basic reserve management; good capacity to address critical threats and other priority management issues.

3= Some physical infrastructure recommended by Conservation Area Planning process or management plan (or other threats-based analysis of infrastructure needs) for basic reserve management in place, but significant gaps exist.

2= Physical infrastructure for basic reserve management has been prioritized for threat reduction in a management plan, Conservation Area Plan, or other threats-based analysis of infrastructure needs.

1= No physical infrastructure recommended by Conservation Area Planning process or management plan (or other threats-based analysis of infrastructure needs) for reserve management is in place.

Benchmark guidelines

Project managers define the level of infrastructure necessary to meet the criteria for adequate management (“4”) and excellent management (“5”). If any element of infrastructure needs does not reach the level required for a “4”, the project area is scored as a “3.” If Conservation Area Planning has not commenced, and if no threats-based management plan is available, project managers should undertake another form of threats-based analysis to identify priority infrastructure needs to qualify for the adequate and excellent levels. It is particularly important that the need for major infrastructure improvements (*i.e.* buildings and vehicles) be recommended by a thorough Conservation Area Plan or management plan. Requirements to meet these levels are defined in the documentation area for this indicator.

Documentation

- *Goal for achieving level 5:* Describe the major infrastructure (expensive items such as buildings, vehicles, motor boats, etc.) that must be in place to reach a level of 5. Relate physical infrastructure to all threats and management issues at the project area. Why is this infrastructure particularly important for managing priority conservation targets and critical threats?
- *Goal for achieving level 4:* Describe the infrastructure that must be in place to achieve a level “4” for physical infrastructure. Relate the infrastructure to the critical threats and priority management issues that will be addressed by this level of physical infrastructure.

Relate high-cost items (*e.g.* buildings, vehicles, boats, outboard motors, motorcycles, etc.) to the critical threats and management issues that they are intended to address.

- *Condition of current physical infrastructure (Optional):* Please describe the current state (quantity and/or quality) of physical infrastructure. For example, practitioners at a project area might explain that there is one guard station that is run-down and needs to be renovated.
- *Limitations and lessons learned for staffing the project area (Optional):*
- *Source of information for determining target levels of infrastructure:*
- *Additional comments:*

2.8.3 Long-term financing

Example indicator: Long-term financial plan for sites in the project area

Indicator summary

A long-term financial plan is an indispensable component of a successful long-term conservation strategy. The plan should analyse funding for basic reserve management activities and identify a diverse funding base to pay for these activities. TNC has a methodology for long-term financial planning for project areas, but other methodologies are available. Each project area's access to sustainable and/or recurrent sources will vary. For some project areas, no viable options for sustainable or recurrent funding may be apparent. These project areas should be analysed to see if they are in fact viable.

The financial planning process should identify a project area's best available options and should outline a strategy for pursuing them. Sources could include host-country budget allocations, entrance fees or visitor donations, user fees, concessions, capitalized endowments, multiple and multi-year sources of foreign funding, and many more. Generally, bringing these sources on-line will require months or even years of preparatory work by project managers and support groups. Therefore, the plan should include short-term funding sources to cover reserve management until longer-term mechanisms can be put in place. There should be sufficient diversification of funding mechanisms to protect the site from financial disaster if one or more components of the financial plan fail to meet projected levels. The extra work load required to achieve and sustain this diversity should also be acknowledged. Successful implementation of a financial plan also requires that appropriate staff be dedicated to implementation. To be considered consolidated, a site should have completed a financial plan and begun to implement its recommended measures to achieve recurrent and/or sustainable sources of financing, with funding sufficient for the next fiscal year.

Benchmarks

5 =	Long-term financial plan completed; diversified portfolio of funding sources and mechanisms in place to cover basic reserve management costs, with funding identified two-to-five years into the future.
4 =	Long-term financial plan completed; recurrent and/or sustainable sources and mechanisms to cover basic reserve management costs are being implemented, with sufficient funding to cover basic reserve manage costs for the next fiscal year.
3 =	Draft financial plan completed; recurrent and/or sustainable sources and mechanisms identified to cover basic reserve management costs
2 =	Financial planning under way
1 =	No financial planning or diversification of funding sources in evidence

Benchmark guidelines

The benchmarks for this indicator reflect the process of financial planning to cover basic reserve management costs – management activities that confront the most pressing threats and support critical conservation of biodiversity. In benchmark 2 this process has begun. In benchmark 3, a draft document has been finished that identifies the best potential options for the site's financial security. In benchmark 4, the financial management plan is complete, and project managers and support groups have begun implementing some of these funding options, although long-term mechanisms may not yet have begun generating revenue. However, the site has sufficient resources from various sources to cover the next fiscal year's operations. By benchmark 5, these long-term mechanisms are providing enough income to pay for basic, recurrent reserve costs over a two- to five-year period.

Product

A PiP site long-term financial plan contains projections of the protected area's operational costs and income sources and should answer the following questions: How much will the basic management of the reserve cost over the next two to five years? Where will the funds come from to cover these costs? What actions need to be carried out, when, and by whom, to ensure that there is sufficient funding available to pay for basic reserve management? These components together constitute the financial plan for the reserve.

Documentation

- *What are the critical steps for development of the financial plan or its implementation in the coming year*? At what stage is this process?
- *Financial needs and mechanisms for the project area once a plan is drafted*: What are the main mechanisms proposed in the financial plan for the next fiscal year, and for two to five years into the future? What are the annual funding needs of the project area, and how much funding is currently assured per year over the next five years? Optional: Include a table with relevant financial information.
- *Quality of the financial plan or planning process (Optional)*:
- *Limitations and lessons learned for completing and implementing the financial plan (Optional)*:
- *Sources of information*:
- *Additional comments*: Provide any additional comments about the process for completing and implementing the financial plan for the project area.

2.8.4 Site constituency

Example indicator: Institutional leadership

Indicator summary

Institutional leadership is essential for achieving conservation success within the site consolidation model. Leadership capacity needs to be built within the core institutions at a project area – whether there is one lead institution or a combination of institutions – across three key leadership components: vision, focus for implementation, and motivation.

- Creating and demonstrating a vision of long-term success involves clearly defining and expressing a future for the project area based on both contextual (external) and institutional (internal) factors.
- Focusing efforts to implement and monitor strategies involves providing resources and support for strategy achievement, monitoring performance, improving effectiveness, holding individuals and institutions accountable for achieving their goals, tackling problems before they become crises, and resolving problems efficiently and effectively.

- Motivating stakeholders to work willingly towards the implementation of priority strategies involves building a broad base of support, negotiating win/win solutions by understanding the needs and perspectives of a variety of stakeholders, and creating a climate that fosters individual and institutional investment, development, excellence, and learning.

Collaboration mechanisms – including defined structure, authority, roles and responsibilities – should be in place to promote teamwork across institutional boundaries in pursuit of the shared long-term vision.

In a consolidated site, clear leadership is provided in critical areas of the site by one or more institutions that:

- Create and demonstrate a vision of long-term success;
- Ensure implementation and monitoring of priority strategies by focusing efforts and using an adaptive management approach; and
- Motivate stakeholders to work willingly towards the implementation of priority strategies.

Institutional leadership and collaboration is sufficient to achieve implementation and monitoring of priority strategies in these critical areas.

Benchmarks

5 = Clear leadership is provided in the entire site by one or a combination of institutions that (1) create and demonstrate a vision of long-term success; (2) ensure implementation and monitoring of priority strategies by focusing efforts and using an adaptive management approach; and (3) motivate stakeholders to work willingly towards the implementation of priority strategies. If multiple institutions are involved they share the vision of success and have clear collaboration mechanisms – including defined structure, authority, roles and responsibilities – in place.

4 = Clear leadership is provided in critical areas of the site by one or a combination of institutions that (1) create and demonstrate a vision of long-term success; (2) ensure implementation and monitoring of priority strategies by focusing efforts and using an adaptive management approach; and (3) motivate stakeholders to work willingly towards the implementation of priority strategies. If multiple institutions are involved they share the vision of success and have some collaboration mechanisms in place.

3 = One or a combination of institutions demonstrate any two, but not all three elements of institutional leadership (vision, focus, motivation) in some portion of the project area. If multiple institutions are involved, there may be some difficulties in collaboration.

2 = One or a combination of institutions demonstrate one of the three elements of institutional leadership (vision, focus for implementation, motivation) in some portion of the project area. If multiple institutions are involved, they may have conflicting visions of success and no collaboration mechanisms.

1 = No institution or institutions demonstrate leadership in the project area.

Benchmark guidelines

In the scorecard, vision, focus and motivation are viewed as three integral components of institutional leadership for conservation. Adequate institutional leadership, as described in benchmark 4, involves articulating a future vision for success for the site, focusing efforts to implement and monitor priority strategies, and motivating stakeholders to willingly work towards the implementation of priority strategies. The vision might be expressed in a management plan or other document, but it is also actively demonstrated by the lead institution(s). Structures, processes and systems are created or modified to support strategic priorities and an adaptive management approach. A variety of stakeholders are willingly – not coercively – motivated to work towards site consolidation and conservation success as a result of strong institutional leadership. At benchmark 4, the aforementioned institutional leadership is evident only in critical areas of the site. To achieve a level 5, leadership is expressed across the entire project area. Benchmarks 2 and 3 represent only partial fulfilment of the three institutional leadership criteria in some portions of the site. Difficulties with defining a common vision and creating collaboration mechanisms are also evident. Benchmark 1 is the case where no clear leadership is demonstrated by any institutions in the project area, creating challenges for achieving consolidation across a number of indicators.

Documentation

- *Structure*, *authority*, *roles and responsibilities of lead institution(s):* Please briefly describe the institution(s) involved in the management of the project area, along with the respective institutional structure, authority, roles and responsibilities of each. What collaboration mechanisms are planned or in place?
- *Vision of long-term success for the project area:* Please state the vision here.
- *Goal for achieving level 4:* Describe the vision, focus for implementation, and motivation needed for the institutional leadership to reach a level 4. What are the critical geographic or thematic areas within the project area that need institutional leadership?
- *Limitations and lessons learned for achieving institutional leadership and progress towards the long-term vision of success:*
- *Sources of information:* What sources of information have you used to identify lead institutions and their capacities?
- *Additional comments:*

CHAPTER 3: ADAPTIVE MANAGEMENT & COOPERATION

This chapter reviews the need for adaptive management underpinned by cooperation and co-learning.

3.1 BASIC PREMISES

Natural resource management is characterised by complex problems, high uncertainties, limited predictability, the need for integration across disciplines, and the need for coordination and cooperation across overlapping mandates. There are multiple stakeholders involved and the expectations of stakeholders are diverse and clouded, if not misguided, by different mental models which are based on different knowledge forms. Under these circumstances, management cannot be a search for the optimal solution for one problem but should be an ongoing learning and negotiation process where a high priority is given to participative sense-making and adaptation (Pahl-Wostl and Hare, 2004).

This suggests that there are two fundamental conditions necessary for effective management of natural resources (including freshwater ecosystems):

- To learn and adapt; and
- To do so purposefully with relevant partners.

These are regarded as basic premises of this work.

Cooperation is therefore an apparently important requirement. This chapter investigates this further.

3.2 MANAGEMENT LANDSCAPE

The responsibilities to manage and conserve freshwater ecosystems in any catchment or Water Management Area are usually shared by at least two mandated agencies. There are various perspectives that describe a management landscape that place very particular demands on such organisations.

- **Social and ecological systems are linked**: People essentially exist within coupled social-ecological systems (SESs). Changes in one domain of the linked system inevitably have impacts on the other domain. It is not possible to meaningfully understand the dynamics of one of the domains in isolation from the other (Walker and Salt, 2006). This demands that social and ecological systems be treated as complexes of interrelated problems with dependencies and feedbacks.

- **Social-ecological systems are complex adaptive systems**: The behaviour of social as well as ecological systems typically has the following attributes (Stafford Smith and Reynolds, 2002):

  It is emergent rather than predetermined;
  It can rarely if ever be reversed to some exact prior state; and
  It has a changing path that is often unpredictable.

These make them complex adaptive systems. The implication of this is that decision-making is inherently associated with low levels of certainty about the outcome. Usually, cause-and-effect relationships can only be established in retrospect. Within this context of uncertainty, surprise, shocks and disturbances can easily drive such systems across a threshold into a different regime in which their function, structure and feedbacks are quite different (Walker and Salt, 2006).

- **Resilience is the key to their sustainability**: Resilience is the capacity of a system to absorb disturbance and undergo change yet still retain essentially the same function, structure and feedbacks. In other words the system can undergo some change without crossing a threshold to a different system regime (with a different identity). Conventional management for achieving maximum yield, usually through greater efficiencies, poses a direct threat to the resilience of ecosystems. In contrast, management for resilience embraces the dynamic nature of social-ecological systems and explicitly promotes diversity in all forms (biological, landscape, social, and economic) as well as ecological variability (Walker and Salt, 2006).

- **People have some capacity to influence resilience**: Adaptability or adaptive capacity is the capacity of the actors in a system to manage the resilience of that system, for example whether or not they can intentionally avoid crossing into an undesirable system regime. This might be achieved by moving thresholds, moving the current state of a system away from or towards a threshold, or making a threshold more difficult or easy to reach (Walker et al., 2004). Adaptability is strongly linked to having a critical level of appropriate knowledge within the system as well as the necessary social capital. The latter includes trust, well developed social networks, and leadership.

- **Actors in a SES need to interact across overlapping and mismatching mandates and scales**: The interdisciplinary and even trans-disciplinary nature of most social-ecological dilemmas highlights the overlapping nature of service sector mandates and the need to shift away from managing individual resources (*e.g.* water, fish, biodiversity) independently. Under these conditions, adaptability depends on effective coordination between relevant government agencies. At a higher level, knowledge interfacing is also required between government agencies, science and the rest of society (Turton et al., 2007). This aims to provide vision and direction and to resolve trade-offs regarding the distribution of the costs and benefits of resource use. Ideally interactions should also be about being open to new ideas and co-learning. A complicating factor is that significant mismatches typically occur between the management areas of the respective agencies. These mismatches between areas of responsibility are compounded by mismatches between the scale of management and the scales of the ecological processes that should be managed (Cumming et al., 2006).

The above perspectives strongly suggest that the management of SESs needs to be complemented by adaptive, participatory and cooperative frameworks that are capable of working with, and planning for, uncertainties. In particular, these frameworks must acknowledge three fundamental issues:

- **Incomplete understanding**. Our understanding (of social-ecological processes and behaviour) will never be complete; and
- **Multi-stakeholder engagement**. Sustainable management of natural resources is inherently dependent upon multi-stakeholder engagement and empowerment in the design, implementation and maintenance of management activities.
- **Decisions as experiments**. Ideally, a management mindset should exist that regards decisions as experiments to be tested.

Adaptive management is the most widely recognised model for managing uncertainty in interactive social and ecological systems (Rogers, 2003). It is commonly proposed as a more realistic

approach to deal with ecosystem complexity than management for optimal use and control of resources (Holling, 2001). This is the first basic premise noted above.

The intimate interdependence of social and ecological systems, the assertion that people can make a difference (*i.e.* influence resilience), and the spread of responsibilities across many organisations suggests an inevitable need for some degree of working together. Furthermore, if resources are to be invested in such work, then it best be with appropriate partners. This is the second basic premise above.

In the context of participation and cooperation, a wealth of relevant knowledge exists within the domains of cooperation, co-management and social learning. The following sub-sections explore the links between adaptive management and cooperation in the practical context of conserving freshwater ecosystems. First, we present a brief overview of adaptive management. We then introduce cooperation as an important component of adaptive management. Key characteristics of cooperation and its role in solving certain social dilemmas are discussed.

3.3 ADAPTIVE MANAGEMENT

3.3.1 What is it?

First referred to as Adaptive Environmental Assessment and Management (AEAM) (Holling, 1978, Walters, 1986), adaptive management is about learning-by-doing in a scientific way to deal with uncertainty. It is a structured, iterative process of decision making which treats human interventions in natural ecosystems as experimental probes. When adaptive management is practised, policies become hypotheses and management actions become the experiments to test those hypotheses (Folke et al*.,* 2005).

A key feature of adaptive management is the ability to recognise that current patterns of resource use are unsustainable over the long run (Karshenas and Allan, 1996). Perceptions about unsustainable patterns of resource use provoke a desire to change and the motivation for shifting course (Turton, 2003). Acting on this desire for change then requires knowledge about what needs to be changed, strategies for how to change it, mechanisms to enforce this change and instruments for monitoring the impacts and general management effectiveness. The process of adaptation thus requires the mobilisation of intellectual, institutional, financial, social and technical capital within a society in order to collect data, devise plans, and implement policy (Ohlsson, 1999).

This cooperative adaptive environment is about building and empowering, not policing. This is well aligned with the way in which much management nowadays is going.

3.3.1.1 Adaptive co-management

The term “adaptive co-management” has been introduced to emphasise the need for a polycentric approach to management (one with multiple centres of authority or control) of social-ecological systems. Adaptive co-management strives to jointly share rights and responsibilities by (*e.g.* Borrini-Feyerabend et al*.,* 2000):

- The iterative learning dimension of adaptive management; and
- The linkage dimension of co-management.

It explicitly caters for cooperation between agencies, researchers and stakeholders. In this sense, adaptive co-management is compatible with the trialogue model of ecosystem governance (Turton et al*.,* 2007), which suggests that ecosystem governance is a function of the quality of knowledge interfacing between government, science and the rest of society.

Key definitions of adaptive co-management are:

- "A long-term management structure that permits stakeholders to share management responsibility within a specific system of natural resources, and to learn from their actions" (Ruitenbeek and Cartier, 2001).

- "Flexible, community-based systems of resource management tailored to specific places and situations, and supported by and working with, various organisations at different scales" (Olsson et al*.,* 2004).

Features of adaptive co-management include (Armitage et al*.,* 2007):

- Shared vision, goal and problem definition to provide a common focus among actors and interests;
- A high degree of dialogue, interaction, and collaboration among multi-scaled actors;
- Distributed or joint control across multiple levels, with shared responsibility for action and decision making;
- A degree of autonomy for different actors at multiple levels;
- Commitment to the pluralistic generation and sharing of knowledge; and
- A flexible and negotiated orientation with an inherent recognition of uncertainty.

3.3.1.2 Strategic Adaptive Management

Strategic Adaptive Management (SAM) is a version of adaptive management that has been developed in South Africa and is applied in the management of Kruger National Park (Biggs and Rogers, 2003). SAM seems to incorporate most of the features of adaptive co-management, with its core elements being the following:

- **Vision statement**. This is developed through a participatory process with stakeholders. The Kruger National Park vision embraces the dynamic nature of and natural variation in ecosystems (*i.e.* spatiotemporal heterogeneity) and reads, "To maintain biodiversity in all its natural facets and fluxes and to provide human benefits in keeping with the mission of the South African National Parks in a manner which detracts as little as possible from the wilderness qualities of the Kruger National Park" (Braack, 1997).
- **Hierarchy of objectives**. This branches down from value-laden statements (starting with the vision) to increasingly detailed and technical goals.
- **Measurable endpoints**. These are Thresholds of Potential Concern (TPCs) that constitute the lower or more detailed end of the objectives hierarchy. They are often specified as upper and lower levels along a continuum of change. Care is taken to set these TPCs as hypotheses that can be tested and modified. Their validity and appropriateness are open to challenge and they must be adaptively modified as understanding and experience of the system being managed increase (Rogers and Bestbier, 1997). The suite of TPCs represents a multidimensional envelope within which variation of ecosystem parameters is acceptable to both scientists and managers operating under the vision.
- **Adaptive decision-making**. This is a process in which strategy implementation (based on visioning and goal-setting) is always accompanied by monitoring and evaluation in a conscious feedback loop. When monitoring indicates that a TPC has been reached, it serves as an amber light for management by requiring some form of action (Biggs and Rogers, 2003).

A more in-depth discussion of strategic adaptive management (SAM) and how the scorecard relates to it is presented in Chapter 5.

3.3.1.3 Adaptive governance

Nkhata and Breen (In Prep.) propose that adaptive management and adaptive governance are two interfacing processes that take place at different spatial and temporal scales. Adaptive governance operates at larger spatial scales and longer time frames. It is founded on and informs societal perceptions and values which over time are translated through societal principles into policies, laws

and regulations. The degree to which implementation of these policies, laws and regulations is effective is monitored and evaluated. This facilitates adaptation.

Adaptive management operates at smaller spatial scales and shorter time frames and focuses on management values, principles and vision. These are eventually transformed through management goals and objectives into management strategies. The implementation of these strategies is also subjected to continuous monitoring and evaluation of management effectiveness. Like adaptive governance, this also facilitates adaptation.

3.3.2 Implementation challenges

There is general consensus that adaptive management and adaptive co-management can facilitate functional feedback loops between societal actions and ecological responses (*e.g.* Olsson et al*.,* 2004). This enhances the resilience of linked social-ecological systems. However, embedding of such adaptive processes in institutions has proven problematic (Walters, 1997). A key reason for implementation failure seems to be the tendency to superimpose an adaptive approach on a non-adaptive (*e.g.* command-and-control or bureaucratic) decision-making environment (Rogers et al*.,* 2000). Through inherent self-interest, agencies, groups or individuals responsible for ecosystem management may see adaptive management as a threat to existing research paradigms, programmes and management regimes, rather than as an opportunity for improvement. Institutional capacity to adapt to and shape change is therefore an important prerequisite for effecting adaptive management of ecosystems (Berkes et al*.,* 2003)

Other obstacles that may impede the implementation of adaptive management are (Lee, 1993):

- The high cost of monitoring;
- Resistance from managers who may fear increased transparency and loss of control;
- Uncertainty of future benefits; and
- Lack of stable funding.

3.4 COOPERATION

3.4.1 What is it?

The term cooperation is used broadly to denote a type of collective action performed by individuals or organisations as a strategy for overcoming social dilemmas in which, in the absence of cooperation, individually reasonable (*i.e.* rational or understandable) behaviour leads to a situation in which everyone is worse off than they might have been had they cooperated (Sandler, 1992; Kollock, 1998).

As Kollock (1998) points out, “many of the most challenging problems we face, from the interpersonal to the international are at their core social dilemmas.” Efforts to understand the variety of social dilemmas and the likelihood and influence of human cooperation has inspired a wide range of study and theorising across multiple disciplines including sociology, anthropology, political science, psychology, business, economics, biology and international relations.

3.4.2 Social dilemmas

The literature on social dilemmas and human cooperation covers a wide range of metaphorical depictions of dyadic dilemmas (involving only two actors) and N-person dilemmas (involving more than two actors). While a comprehensive overview of the vast and varied literature on cooperation and social dilemmas is beyond the scope of this project, the following section provides a brief description of four of the most widely cited metaphors – the Prisoner’s Dilemma, the Assurance

Dilemma, the Social Fence and the Social Trap. Their relevance to the challenges of conserving freshwater ecosystems is also discussed.

It might be noted here that the following scenarios assume that no structured communication between the people involved. In particular, no cooperation rules already apply.

3.4.2.1 Prisoner's Dilemma

The Prisoner's Dilemma is the most cited and studied two-person dilemma. Two suspects, A and B, are arrested by the police. The police have insufficient evidence for a conviction, and, having separated both prisoners, visit each of them to offer the following deal to both:

- If one testifies for the prosecution against the other and the other remains silent, the betrayer goes free and the silent accomplice receives the full 10-year sentence.
- If both stay silent, both prisoners are sentenced to only six months in jail for a minor charge.
- If each betrays the other, each receives a two-year sentence.

Each prisoner is now required to make the choice of whether to betray the other or to remain silent. However, neither prisoner knows for sure what choice the other will make.

Assuming that both prisoners only care about minimizing their own jail terms, betraying becomes a dominant strategy even though they would be better off (collectively) if they had cooperated, *i.e.* both remained silent (Axelrod, 1984). In other words, assuming the understandable self-interest, cooperation is not a dominant strategy. Both remaining silent would, in effect, amount to a high degree of cooperation between them, each confident that the other (a) will not betray and (b) is willing to make a relatively small sacrifice (6 months in prison) to minimise the prison sentence of the other (**Table 8**). It might be noted that the "cooperation" referred to in this dilemma occurs implicitly, not through face-to-face communication (since the prisoners are separated). It is nevertheless a form of cooperation heavily based on trust, solidarity and a common future focus.

Table 8 : Prisoner's Dilemma: Ranked strategies from prisoner A's point of view.

Rank of strategy	Strategy	Outcome
1st (best)	A betrays B; B remains silent	A goes free; B gets 10 years
2nd	Each betrays the other	Both get 2 years
3rd	Both remain silent	Both get 6 months
4th (worst)	A remains silent; B betrays A	A gets 10 years; B goes free

3.4.2.2 Assurance Dilemma ("Stag Hunt")

In addition to the Prisoner's dilemma, there are a number of other dyadic dilemmas characterised by different relative values for the possible outcomes of party interaction (Kollock, 1998; Dombrowsky, 2007). One example is the Assurance Dilemma, also known as the Stag Hunt. The metaphor used to illustrate this dilemma describes a hunting society in which food security for the society as a whole can be obtained if all members of the community jointly circle the stag. Given the uncertainty of how the other hunters will behave, however, individuals are tempted to leave the community circle and secure their own food requirements by hunting smaller game alone (Dombrowsky, 2007).

In this scenario, it is in the interest of both parties (those wanting to hunt the stag as a community and those tempted to hunt individually) to cooperate. Yet, the lack of confidence that the other hunters will cooperate makes it rational for individuals to defect. Ensuring a successful stag hunt thus requires the introduction of assurance mechanisms which stabilize each individual's expectations about the other's behaviour and diminishes the incentives to defect. Assurance mechanisms may range from formal rules and sanction to communication strategies and efforts to strengthen trust.

3.4.2.3 Social Fence Dilemma

The metaphor of the Social Fence is a multi-person social dilemma in which individuals are faced with an immediate cost that generates a benefit that is shared by all. Acting alone, each individual will understandably try to avoid the cost. However, if all avoid the cost then each is worse off than if they had managed to pay the cost, *i.e.* "scale the fence" (Kollock, 1998). This illustrates a core problem of the provision of public goods.

Two distinguishing features of public goods are that they are "non-excludable" and "non-rival" (Olson, 1965):

- **Non-excludable** means that public goods are resources from which all may benefit regardless of whether they have helped to provide the good (*e.g.* one can enjoy a public library in Pretoria even if one doesn't pay municipal taxes).
- **Non-rival** means that one person's use of the good does not diminish its availability to another person (*e.g.* one's use of the public library does not make it less available to anyone else).

Because public goods are non-excludable, the temptation is to free-ride (*i.e.* enjoy the good without contributing to its maintenance). But if everyone free-rides then the good will not be provided and everyone loses out. Barriers to scaling the social fence include greed and mistrust, for in addition to the individual incentive to free-ride, there may also exist a fear of acting alone and hence throwing one's efforts away on a lost cause (Kollock, 1998).

Key to understanding public goods dilemmas is understanding the relationship between the level of resources contributed toward the production of a public good and the level of public good provided known as the production function (Kollock, 1998; Ostrom, 2005), of which there are at least four basic kinds (**Figure 4**):

- **Linear production function**: Each unit of resource produces the same return;
- **Decelerating production function**: Initial contributions have the greatest effect, while additional contributions generate increasingly diminishing returns;
- **Accelerating production function**: Produces small returns with initial contributions and increasing returns as the contributions increase;
- **Step-level production function**: There are thresholds at which no amount of public good will be produced until a certain level of resource input is reached.

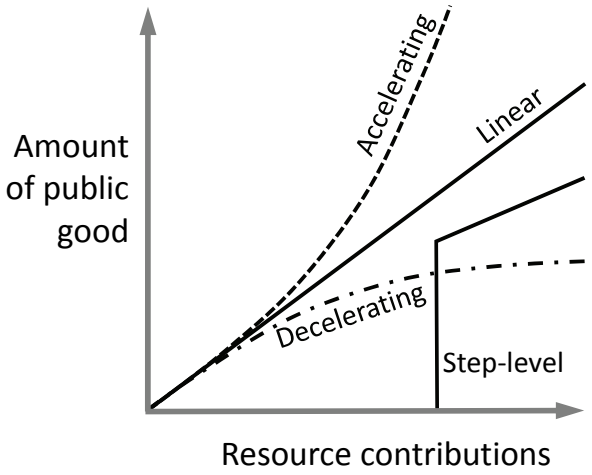

Figure 4 : Basic public good production functions.

Understanding that various production functions can yield N-person versions of the Prisoner's Dilemma or the Assurance Game is important for tailoring cooperative strategies to address the critical issues (*i.e.* combating free-riding versus the need for information and assurance) that arise from different dilemmas (Heckathorn, 1996; Kollock, 1998).

3.4.2.4 Social Trap Dilemma ("Tragedy of the commons")

The metaphor of the Social Trap illustrates another type of multi-person dilemma with a different distribution of individual costs and benefits to the ones described in the Social Fence. In a social trap dilemma individuals are tempted with an immediate benefit that produces a cost shared by all. However, if every individual succumbs to the temptation the outcome is a collective disaster (Kollock, 1998). Often referred to as the "tragedy of the commons" (Hardin, 1968), this metaphor describes the challenges of governing common pool resources.

Key features of the commons dilemma are the non-excludability (see Section 3.4.2.3) and subtractability of the benefits obtained through cooperation. The subtractability of a good signifies that one person's use of the good diminishes the availability of that good to others, *i.e.* the opposite of a good being non-rival (Section 3.4.2.3). Consequently, efforts to overcome commons dilemmas are confronted with the problems of free-riding mentioned above for the provision of public goods, as well as problems of carrying capacity such as over-harvesting and crowding (Kollock, 1998; Ostrom, 2005).

3.4.2.5 Social dilemmas and freshwater conservation

An understanding of the basic features of the above social dilemmas is important when developing the strategies and cooperative initiatives to overcome them (Dombrowsky, 2007).

- The Prisoner's Dilemma suggests that motivating or sustaining cooperation between individuals concerned primarily with their own benefit requires changing the variables which contribute to this non-cooperative outcome (see Section 3.5 for a description of some key controlling variables). Several studies have demonstrated, for example, that if interaction between parties is repeated infinitely, cooperation between self-interested actors may emerge (*e.g.* Axelrod and D'Ambrosio, 1994). In the Prisoner's Dilemma this would need to occur before they were arrested. The studies suggest that two people ending up as such suspects are more likely to cooperate if they knew each other well (*i.e.* had met frequently) than two who had only just met. This insight has direct implications for multi-stakeholder engagement in a freshwater conservation context.

- The Assurance Dilemma and Social Fence Dilemma are also very relevant to management of common goods like freshwater ecosystems. Why should an individual invest resources

in freshwater conservation (so that they can enjoy the benefits of that resource in future) when there is no guarantee that others will do the same? Is it not a better strategy for the individual to try to achieve independence of the others by securing those desired benefits in a way less dependent of those others (if this is possible)? One way of avoiding this is to provide convincing assurance that the "others" will not behave in their own interests to the extent that the interests of the whole are significantly compromised. No simple task.

- The Social Trap Dilemma also clearly aligns with a core challenge of conserving freshwater ecosystems. These systems constitute a non-excludable, subtractable resource utilized by multiple parties. For example, if one actor (*e.g.* an organisation, like a mine) uses a water resource and thereby diminishes its quality, this affects all who might wish to use that resource, *i.e.* the cost of that single use is shared by others. Furthermore, if everyone decided, either independently or collectively, to make use of the resource, the impact on the resource is very likely to be a "collective disaster".

- In a sense, multi-agency plans (or rules) to govern the common pool resources can also be seen as a public good insofar as all of the agencies are likely to benefit from integrated strategies but some may not be willing to commit to the cost required for debating and developing such measures. This may be because of simplistic thinking, specifically not acknowledging that cause and effect are not linearly related.

The "dilemma" in each of the above social dilemmas highlights inherent uncertainties that naturally exist between stakeholders. These uncertainties can be deep-rooted and exist primarily because of mistrust among the parties. Self-interest is a dominant force in many human beings and the uncertainties in the dilemmas relate directly to this premise. It should be stressed that self-interest *per se* is not a bad thing. It is the extent to which it overrides the common good that makes it a problematic issue.

3.4.3 Cooperation in perspective

Kinnaman and Bleich (2004) distinguish between four types of inter-stakeholder behaviour:

- **Toleration** involves routine problem-solving behaviours that are culturally embedded and seldom questioned.
- **Coordination** occurs when two parties inform each other of their activities, although the process is more important than their relationship.
- **Cooperation** involves parties actively working together for mutual benefit. Identities remain distinct with active and respectful negotiations occurring within professional boundaries and cultural practices.
- **Collaboration** suspends professional identities and focuses on the contribution of complementary knowledge and skills. The outcome supersedes hierarchical and professional boundaries.

Based on these descriptions, **Figure 5** illustrates a perspective on how these four behaviours might be related.

The depth refers to the degree to which the interaction is based on empathetic co-learning which is founded on:

- Extensive factual knowledge; and
- Insightful contextual and theoretical knowledge.

The depth that can be achieved is very likely to depend heavily on the frequency of interaction.

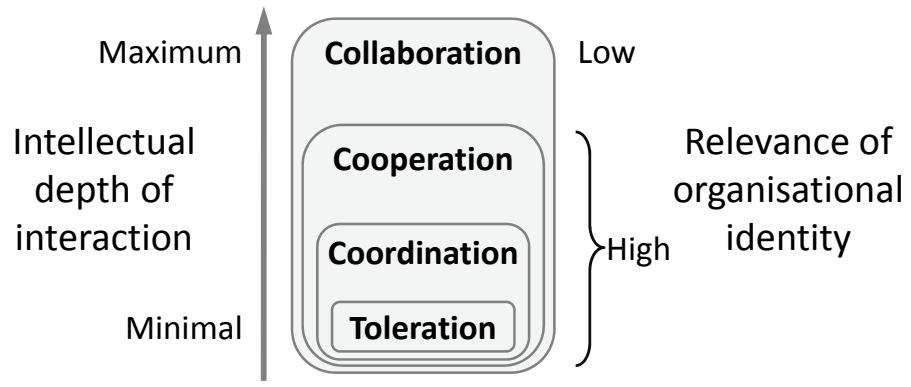

Figure 5 : Hierarchical nesting of toleration, coordination, cooperation and collaboration.

Toleration has the least depth. The level of communication is minimal. Each party is more concerned with its own way of solving problems but they not affected by the approaches of the others. Little or no co-learning occurs. The degree of empathy is at best neutral, that is, neither positively so nor destructively so.

Coordination involves some degree of direct communication. This occurs either through impersonal communication (exchange of reports, emails, etc.) or face-to-face communication (*e.g.* in meetings). This creates the potential for interchange of knowledge that could influence the actions of other parties. Some co-learning occurs but it might be incidental. Some degree of empathy is present (otherwise the incoming knowledge would, in effect, be ignored which would make the interaction little more than toleration). Importantly though, toleration is very likely to be a precursor to coordination. Equivalently, coordination is unlikely to be successful if there is, or has been, no tolerance.

Cooperation involves a more deliberate interaction driven by a common purpose. The degree of empathy is much higher than for coordination because each realises the other has something to offer. Solutions are explored by careful co-examination of the facts relevant to the context and some degree of theory is also beneficial. As toleration is a pre-requisite for coordination, so is coordination a natural precursor for cooperation. In other words, if cooperation is a desirable outcome, then the getting the mechanics of coordination in place (and hence a sense of toleration) would be a sensible first step.

Collaboration is distinctly different from the others because professional identities no longer constrain the interaction. A higher goal drives unfettered interactive behaviour beyond the call of duty. There is a high degree of face-to-face co-learning and empathy. Again however, collaboration is likely to be an unattainable ultimate goal if cooperation is not already in place.

This perspective on the relationship between the four types of interactive behaviour proposed by Kinnaman and Bleich (2004) has important ramifications for any strategy aiming to facilitate any of the "higher" levels. It suggests taking deliberate steps to get basics in place (like toleration and then efficient and effective communication mechanisms that support basic "information sharing", *i.e.* coordination).

In the current organisational context, not only is it likely that toleration, coordination, and cooperation are respective precursors of collaboration, it is also conceivable that if a higher level is operational, then the lower levels are also likely to be operating simultaneously, because not all goals require collaborative behaviour. This is depicted in the nesting of the four behaviours in **Figure 5**. If a high level of cooperation is occurring, there may still be "culturally embedded and seldom questioned" behaviours occurring (typical of toleration) and simple coordination behaviours occurring like basic information-exchange mechanisms. Furthermore, these have a positive effect on the overall cooperative behaviour.

It is also very likely that individuals will also be cooperating even when full collaboration is occurring. That is, there will be activities strictly within their respective professional identities that will contribute to the higher mutually beneficial goal which is driving the "external" collaboration.

3.4.4 Cooperation: an appropriate goal

Where the mandate for managing freshwater resources is distributed among several government agencies spanning different service sectors, discharging this mandate by the respective agencies will require a certain level of inter-agency cooperation, depending on the nature of the need (the second basic premise of this work).

For example, the conservation of freshwater ecosystems requires knowledge about what water resources and ecosystems exist in the region (*e.g.* where the water is located, how much is available, what the quality is and how it moves and changes over time) and how these resources are currently being used and impacted. Obtaining this information becomes complicated when water resources are cross-cut by jurisdictional boundaries. While the water flows freely across the politically-constructed borders, the movement of data and information concerning these water resources and how they are used is rarely so fluid.

Achieving water policy goals and enabling adaptation thus requires close and sustained cooperation amongst all agencies responsible for policies and activities that affect, or are influenced by, water (MacKay and Ashton, 2004).

In addition to the resource-jurisdictional mismatch, the complexity and uncertainty which characterises freshwater ecosystems also have implications for the level of interaction required between the parties. Four types of inter-stakeholder behaviour (toleration, coordination, cooperation and collaboration) were noted above. Each level of interaction will differ in terms of resource requirements (including direct costs). The most appropriate strategy for a given situation will depend on the following (Kinnaman and Bleich, 2004):

- The attributes and competencies of those involved in joint problem solving (cooperation and collaboration being the more demanding strategies);
- The level of agreement over the appropriate course of action (cooperation and collaboration are appropriate where low levels of agreement prevail); and
- The amount of certainty that specified actions will produce certain outcomes (cooperation and collaboration are appropriate where cause-effect relationships are less well defined).

Given the complexity inherent to social-ecological systems, there will always be uncertainty regarding cause-effect relationships between, for example, social actions and ecological responses. Furthermore, the differences in disciplinary background, application contexts and operational cultures that exist in different government departments are likely to result in relatively low levels of agreement on key issues of concern. Based on these two factors only, cooperation and collaboration would seem the appropriate modes of inter-stakeholder behaviour for freshwater conservation. (Equivalently, toleration and coordination are insufficient.)

However, as each sector or government department is likely to participate in the cross-sector negotiations from a position of their respective identities (working cultures, professional disciplines and operational contexts) cooperation appears to be the more appropriate of the two behaviours (see **Figure 5**). (Equivalently, full collaboration is inappropriate because identities should be retained.)

3.5 KEY CONTROLLING VARIABLES

The wide body of cooperation literature is filled with theoretical and empirical studies which strive to understand how different variables affect the emergence and effects of cooperation (Ostrom, 2005). This section highlights a few key variables which are likely to influence the likelihood of cooperation in the context of conservation of freshwater resources. There are a number of important factors some of which relate directly to the underlying issues highlighted by the above social dilemmas. They are depicted in **Figure 6** and described in the following sub-sections.

3.5.1 Perceived net benefits

3.5.1.1 Favourable benefits

Numerous studies demonstrate that the levels of cooperation will be highest when the anticipated benefits from cooperating are high and the returns from defecting are low (Kollock, 1998). The benefits parties anticipate from cooperation include both tangible and intangible goods likely to be achieved at different points in the cooperative process. For example, in the context of the current project, cooperating agencies are working towards the tangible benefits that arise from freshwater ecosystem conservation. Intermediate benefits also include access to information held by other agencies, the production of joint strategies, and efficiency gains in implementation (by eliminating overlapping or parallel work).

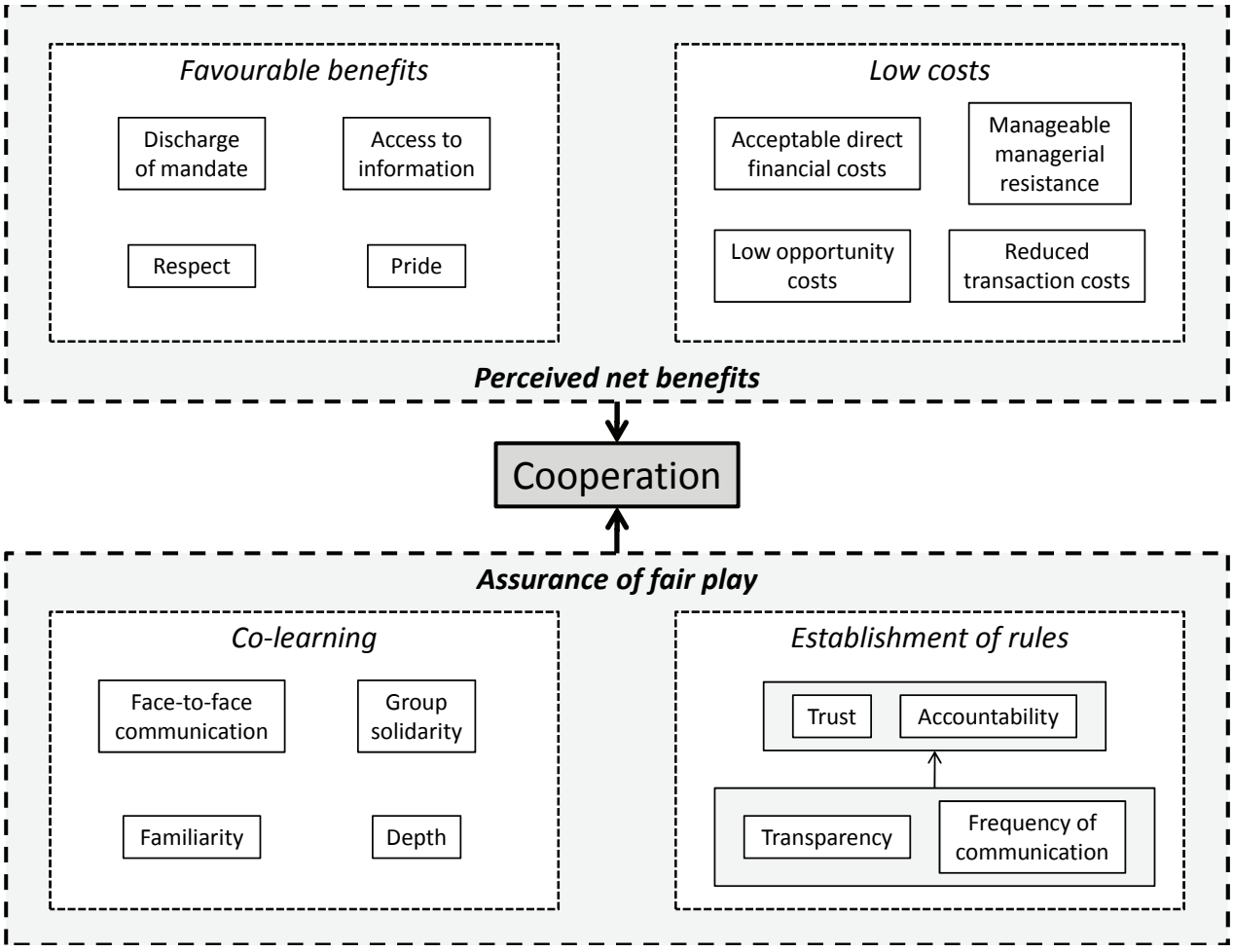

Figure 6 : Some examples of key controlling variables of cooperation.

Less tangible goods like reputation, respect and pride are also benefits which may motivate some parties to cooperate (Olson, 1965; Bowles and Gintis, 2002; Ostrom, 2005). With government

agencies the benefits are not derived directly from the resource but rather from perceptions of the benefits to others. So they tend to be less tangible and more difficult to measure.

The benefits referred to here are those to individuals or the organisations they represent. If these individuals or organisations are focussed on the broader common good of freshwater conservation, then it is likely that this broader good will also benefit.

3.5.1.2 Low costs

Cooperation does not come free. Costs include the direct costs of travelling to or hosting meetings, the opportunity costs (what could have been done with the time spent cooperating) and the non-monetary cost of dealing with resistance from managers. A lack of cooperation may simply be reflecting that these costs outweigh the perceived benefits.

3.5.1.3 Implications

Facilitators must be respectful of the time and travel constraints confronting agency representatives and seek strategies for accommodating these needs when planning opportunities for face-to-face interaction. (See Section 4.2.5 for examples of practical difficulties faced by some government departments.) Efforts to make the impact of each agency or representative more noticeable may also help convince managers of the importance of the initiative. Additional efforts could be made to work with these managers to examine how the cost of travel and time spent working on collaborative initiatives in the short term may increase efficiency in the long run by decreasing the amount of overlap between agencies and increasing the amount of funding.

3.5.2 Assurance of fair play

This core issue in the above social dilemmas can be influenced by a number of variables, described in the following sub-sections.

3.5.2.1 Establishment of rules

Axelrod (1984) noted that individuals are motivated to behave selfishly if they are not held accountable for their actions. Thus, creating an environment where interaction is more durable or frequent and information about individual actions is widely shared may help improve cooperation (Kollock, 1998). It was specifically noted above that increased interaction between parties may result in cooperation emerging (*e.g.* Axelrod and D'Ambrosio, 1994). Pretty and Ward (2001) also identified the importance of reciprocity between actors and note that the development of long-term obligations between people is an important component of achieving positive environmental outcomes. Actors should ask how what they do can be translated into benefits for other organisations.

In effect, implicit rules emerge that increase accountability when interaction is transparent and frequent. Of course, explicit rules can also be developed. These might simply take the form of actions noted in minutes of meetings or more formally in detailed documented procedures.

The establishment of rules often comprises an important strategy for overcoming social dilemmas by stabilizing the expectations of group members. According to Pretty and Ward (2001) rules give participants the confidence to invest their time and energy in an initiative by providing some level of certainty that others will do so as well. This is the "assurance" referred to in the Assurance Dilemma described in Section 3.4.2.2. Stern et al., (2002) note that for rules to be effective they must be:

- Appropriate to the local conditions;
- Considered legitimate by the members of the group;
- Enforced consistently; and

- Subject to change by the people they are imposed on. Ostrom and Dolsak (2003) note that institutionalising effective processes for ongoing negotiation of the rules is more important than the rules themselves. This is particularly important for adaptation.

Rules work well in organisations but less well among organisations. A common goal is perhaps more influential under these circumstances because more formal inter-agency rules are also difficult to establish.

3.5.2.2 Co-learning

Social learning is a broad term that refers to processes of learning and change in individuals as well as in social systems. In the process of social learning, individuals engage in actions and interactions within a "community of practice" and gain experience that is situated in a specific context (Wenger, 1998). Implicit in this is a degree of cooperation towards a common goal or interest.

A very natural component of social learning is co-learning through face-to-face communication. Repeated studies have shown that this has a positive effect on the development and maintenance of cooperation (Ostrom, 2005). While there is a range of theories for why this is so, most explanations are related to the increased levels of trust established when individuals interact in a face-to-face setting. Kerr and Kaufman-Gilliland (1994) conclude, for example, that communication creates a sense of group solidarity and enhances the likelihood that individuals keep promises to cooperate. (In effect, implicit rules are established).

This kind of trust can reduce the transaction costs of interaction by decreasing the need to monitor others (Pretty and Ward, 2001). Over time, increases in familiarity may also decrease the transaction costs of inter-agency collaboration as participants note the ease with which they can "just pick up the phone and call" their counterparts in other agencies as opposed to battling with a more anonymous bureaucracy.

While the "how" of social learning (*e.g.* through face-to-face communication) is important, so is "what" is learned, particularly relating to the depth of knowledge. Stakeholders with depth can contribute meaningfully to social interactions, raising the benefits perceived by others and hence, for some, raising their status in the relationship.

As Argyris and Schön (1996) illustrate, social learning may occur in several different levels, or loops (**Figure 7**):

- **Single-loop learning** refers to learning concerned with skills, practices and actions (*e.g.* resulting in changes such as would arise from routine quality control);
- **Double-loop learning** facilitates the examination of those assumptions that drive our actions and behaviour patterns; and
- **Triple-loop learning** allows for challenging and changing the values and norms that form the foundation of our governing assumptions.

Multiple-loop learning provides a deeper understanding of the contexts, power dynamics and values that prevail in a social system.

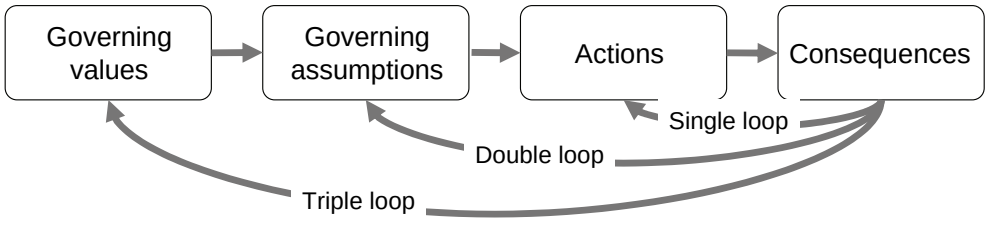

Figure 7 : Single-, double- and triple-loop social learning.

3.5.3 Implications

Of course, the perception of net benefits and the assurance of fair play are not entirely mutually exclusive. Issues within one area can influence issues in the other. If the above analysis is a reasonable reflection of the main key controlling issues, then efforts to improve management effectiveness relating to freshwater conservation should focus on initiating and maintaining cooperation. To achieve this, effort should be applied to:

- Improving the perceived net benefits from the outset of those involved, which requires shared goals to be explicit; and
- Simultaneously creating a level playing field in which the lurking motivation of self-interest (the inevitable fall-back position) is minimised and hence the often-unacceptable consequences avoided.

This should inform the establishment of rules within the group of agency representatives regarding communication and the exchange of information. It includes responsibilities for organising meetings, recording decisions, etc. This should also inform future processes of crafting and adopting rules (potentially including policies and associated legislation) which affect the management and use of water across the jurisdiction. This is likely to affect a wider body of stakeholders and users.

The importance of strengthening networks is also highlighted. All agencies whose mandates cover some aspect of freshwater ecosystem management should at least be provided with channels for the exchange of information, expertise and ideas. This relies on having confidence that information sharing is inherent in the organisational culture and will be rewarded.

The wide-ranging advantages of face-to-face communication suggest careful investment in formal and informal systems of communication. Consistent and frequent communication between agency representatives can contribute not only to the effective exchange of information but can also build trust between parties which may help to solidify commitment to the cooperative endeavour.

In-depth learning can shape and confirm the identity of the individual in the community of practice. The collective practice and associated interpretation of the environment within the community is also changed and confirmed. This can create a sense of common identity in the group. It may also serve to bridge the divides between sectors and disciplines while drawing on individual strengths of members to share their expertise with the group. Pahl-Wostl *et al*., (2007) have also found that the process of co-learning is a critical requirement for enabling adaptation over time.

Given that most large-scale ecosystems are fragmented politically and by ownership, cooperation across boundaries is critical to an effective ecosystem management approach (Wondolleck and Yaffee, 2000). Different groups often have to co-discover ways of working together that will result in mutual benefit. A particularly effective form of cooperation is co-learning in which stakeholders share information, negotiate meaning and co-create new knowledge which is useful to both parties. A long-term commitment by stakeholders to a process of co-learning is required (Pahl-Wostl et al., 2007). Co-learning promotes institutional capacity for adaptive management which in turn provides guidance on what should be learned. They are therefore mutually reinforcing activities.

A common contention in the cooperation literature is that large groups are less likely to succeed in collective action in comparison to smaller groups. For Olson (1965), this hypothesis was grounded in two key reasons. The first is the logistical observation that coming to an internal agreement about coordinated strategies involves higher transaction costs in large groups. The second is that as group size increases, the visibility of individual inputs to the provision of a public good will decline and the ratio of input to output changes, increasing the likelihood of free-riders and decreasing the chances the good will be provided. Yet, as several authors note, none of these effects are inevitable as group size increases (Kollock, 1998; Agrawal, 2002; Ostrom, 2005). In fact, some researchers have found that in certain scenarios group size increases the provision of a public good (Bates and Shepsle, 1995 cited in Ostrom, 2005). The effect of group size on the

likelihood of cooperation depends largely on how other structural variables like the production function and payoff structure are affected by the size of the group (Ostrom, 2005).

The number of agencies and representatives involved in the process will therefore not necessarily dictate the level or effectiveness of cooperation for the conservation of freshwater ecosystems. In fact there are certain scenarios in which a larger number of agencies might be beneficial to the process of planning and implementation. However, as numbers increase it will be important to modify strategies for communication, debate and decision-making within the group and structure the process to maintain noticeable impact by individual agencies. In the end it is the output that motivates input. So there needs o be a strong focus on ensuring outputs and outcomes that relate to every participant's goals.

What is evident from the above is that a wide variety of factors can play a role in determining how behaviour might change towards being more cooperative in respect of freshwater conservation. Stern (2000) has also noted that the initiation of pro-environmental behaviour is affected by several interacting factors. These include environmental concern, attitudes, information, beliefs, etc. Stern notes that just one can be a limiting factor. In other words, several conditions must be favourable and the absence of one can prevent behavioural change. This means that the facilitation of cooperation demands a very wide perspective. It also suggests that capitalising on serendipitous synergy may be an important aspect of any cooperative strategy (Biggs et al., 2008).

3.6 SUMMARY

The premises upon which this chapter was based referred to learning and adapting and doing this with the appropriate partners (Section 3.1). Accepting that freshwater ecosystems and the social-ecological systems in which they exist are complex adaptive systems, the sensibility of an adaptive management approach was noted. However, a reality is that the management responsibility of freshwater ecosystems typically falls across multiple organisations. Therefore, adaptive management inevitably needs more than just toleration and coordination (see **Figure 5**). It demands cooperation. The organisations must actively work together for individual and mutual benefit, this benefit relating to their respective mandates and being experienced by individuals.

The challenge therefore becomes one of facilitating this cooperation. Well known and widely studied hypothetical "social dilemmas" reveal the underlying mistrust even well-intentioned stakeholders often have in others. This mistrust drives behaviour that is not necessarily in the best interests of (a) effective freshwater ecosystem management or (b) sustainable use of those ecosystems. The challenge of initiating cooperation then reduces to highlighting the benefits to all parties and creating assurances that all are on board and will adhere to basic rules of fair play. Once the benefits are clear and stakeholders are confident that their individual efforts will be well complemented by the efforts of others, the scene is set for cooperation that is potentially both efficient and effective.

As noted in Section 3.4.2, the social dilemmas exist in an environment initially devoid of prior cooperation rules that govern the behaviour of the actors involved. The implication is that any mechanism that encourages structured communication (and hence opportunities to develop such cooperation rules), like the reflective assessment tool discussed in Chapter 6, is potentially beneficial.

Once initiated, co-learning, especially based on frequent face-to-face communication, becomes a critical activity for the road forward in which cooperation must be maintained and indeed strengthened. Co-learning not only creates real benefits for stakeholders but also contributes to assurances of fair play. Co-learning is therefore a fundamentally enabling activity for cooperation and adaptive management. The outcome is specifically knowledge that is relevant to the individuals and the group.

Given the variety of issues that need to be in place to facilitate cooperation, it is inevitable that it will take time. There will be setbacks and successes. A strategy is called for that requires positive persistence, patience, an empathetic receptiveness and a depth and readiness to respond to windows of opportunity.

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CHAPTER 4: SCORECARD CASE STUDY

This chapter describes (a) the development of a scorecard facilitating reflective assessment of cooperation and (b) its application in a selected case study area.

4.1 SCORECARD STRUCTURE

A series of issues, indicators and criteria was developed to encourage reflective assessment on the degree to which organisations are cooperating. This was captured in a so-called "scorecard". Initially this occurred as a hard copy printed list of issues. These were ultimately captured in a spreadsheet facility in which scores could be captured interactively during a workshop (see Chapter 6 for more details).

The scorecard was structured into five categories:

- Context (where are we now?)
- Planning (where do we want to be?)
- Monitoring (what data are we collecting and how?)
- Management (how do we want to go about making a difference?), and
- Co-learning as a cross-cutting aspect.

Within these categories 31 key indicators were reflected in specific questions which either used a simple rating scale (0 to 3) or, in some instances, required *Yes* or *No*. A series of short descriptive answers (the "criteria") was linked to each question, each corresponding to the rating score.

Section 1.3 described how the original scope of the project evolved and is summarised in **Table 1**. The associated evolution of the scorecard is reflected in various versions. The scorecard was applied in the Crocodile (West) and Marico Water Management Area (WMA) in two interactive assessment workshops in February 2008 and one year later in February 2009 with representatives of a cluster of agencies with a mandate to manage and conserve freshwater ecosystems in this WMA. The following four versions of the scorecard appear in appendices:

- **Appendix B**. The original version of the scorecard.
- **Appendix D**. The version used in the February 2008 workshop.
- **Appendix G**. The version used in the February 2009 workshop.
- **Appendix I**: The final refined version.

4.2 DIALOGUE FACILITATION PROCESS

4.2.1 Key role players

Organisations with a mandate to manage and conserve freshwater ecosystems in the Crocodile (West) and Marico Water Management Area (WMA) include:

- The DWAF Regional Offices of Gauteng, North West Province and Limpopo;
- Environmental and Conservation Departments of Gauteng, North West Province and Limpopo:
  - Gauteng Department of Agriculture, Conservation and the Environment (GDACE);
  - North West Department of Agriculture; Conservation and the Environment (NW DACE); and

Limpopo Department of Economic Development, Environment and Tourism (LEDET);
- Provincial Parks Boards (*i.e.* North West Parks and Tourism Board); and
- The South African National Biodiversity Institute (SANBI).

Other role players to be considered for future assessments include the provincial Department of Agriculture (DoA) in Limpopo province, provincial Minerals and Energy (M&E) Affairs, local and district municipalities and NGOs.

4.2.2 February 2008 workshop

4.2.2.1 Organisation

The assessment workshop was planned for the beginning of February 2008. Representatives from each of the above organisations were identified and a letter of invitation was emailed to each during the first week in December 2007. Only one response was received from the fourteen invitees by the confirmation date. The email invitation was followed up by a telephone call and in some instances a second and a third call. It became evident that the email invitation did not reach some of the invitees. This could be ascribed to electricity load shedding, upgrading of servers during this period as well as not being able to access emails due to sick or vacation leave, attending field trips and being in the process of moving offices. It turned out to be particularly challenging to get the different individuals to commit themselves to a date two months in advance.

Although the idea was to keep the group of participants fairly small (between 10 and 15), invitees were nevertheless encouraged to nominate other individuals or organisations in the WMA that could contribute to the process.

4.2.2.2 Execution

Eight representatives (**Appendix C**) ultimately attended the workshop in February 2008 (**Table 9**).

Table 9 : Numbers of organisational representatives attending first case study workshop.

Organisation	Number
Department of Water Affairs & Forestry (DWAF) Gauteng	2
Department of Water Affairs & Forestry (DWAF) North West	1
Gauteng Department of Agriculture, Conservation and the Environment (GDACE)	1
North West Department of Agriculture, Conservation and the Environment (NWDACE)	2
South African National Biodiversity Institute (SANBI)	1
North West Parks and Tourism (NWPARKS)	1
TOTAL	**8**

The facilitator announced each scorecard question (**Appendix D**) and invited the representatives to choose a score appropriate to their perception of the degree to which that question applied to their organisation or situation. When multiple representatives of a single organisation were present, they reached consensus on their score. The regional DWAF representatives (Gauteng and North West) were considered to be representing a single organisation (DWAF). Importantly, representatives were also given the opportunity to reflect on and motivate their choice or provide anecdotal evidence or stories of relevance. These were also captured.

4.2.2.3 Results

In order to facilitate the analysis of the results of the workshop a spreadsheet facility was developed. This facility was not only designed to help with this analysis but also to be a tool for facilitating future workshops. It allows for scores to be captured during the workshop in a way that allows a simple data assessment to be done on the day. This can be presented to participants and discussed with them and in so doing become part of the overall day's reflective assessment exercise.

The quantitative scores chosen by the participating organisations and the assessment produced by the spreadsheet facility are shown in **Appendix E**. Scores for the 27 quantitative indicators are given. (The blank rows are those requiring Yes/No responses. These are not analysed here.) The indicator numbers correspond with those in the questionnaire (**Appendix D**) which gives the criteria the participants used to choose their scores.

The primary organisational role players in the water management area are DWAF (Gauteng and North West), GDACE and NWDACE. Accordingly, the assessment of the results was performed with the results of these organisations only as well as for all combined (*i.e.* including NWPARKS and SANBI). The results of both assessments appear in **Appendix E**.

4.2.2.4 Assessment

Issues of concern

For both analyses (*i.e.* with three and five organisations) five out of the six main issues of concern were the following:

- CONTEXT Issue 7 : Capacity to effectively implement regulations (the organisations scored this similarly)
- CONTEXT Issue 6 : Use of existing statutes (the organisations scored this similarly)
- CONTEXT Issue 11 : Ability to influence budget (however, one or more organisations scored highly)
- CONTEXT Issue 14 : Existence of a champion (all organisations scored this identically)
- MANAGEMENT Issue 27 : Management plans (the organisations scored this fairly differently)

When all five organisations were analysed, the following was the sixth issue of concern:

- MONITORING Issue 23 : Alignment of monitoring (the organisations scored this fairly differently)

When only the main three organisations were analysed, the following was the sixth issue of concern:

- MANAGEMENT Issue 29 : Impact of conservation plan on decision making (the organisations scored this fairly differently)

The "main issues of concern" are based on average scores. However, it is evident from the above that for most of these issues the organisations scored differently, sometimes only slightly, though sometimes significantly.

Strengths

The top ten strengths for both analyses (*i.e.* with 3 and 5 organisations) are the same, namely:

- CONTEXT Issue 4 : Current culture of cooperation (the organisations scored this similarly)
- CONTEXT Issue 5 : Appropriate statutes (all organisations scored this identically)

- CONTEXT Issue 9 : Staff training (the organisations scored this similarly)
- CONTEXT Issue 13 : Social learning (all organisations scored this identically)
- CONTEXT Issue 15 : Networking support (the organisations scored this similarly)
- CONTEXT Issue 16 : Trust (all organisations scored this identically)
- MANAGEMENT Issue 25 : Monitoring-reporting-management integration (the organisations scored this similarly)
- CONTEXT Issue 3 : Clarity of respective mandates (all organisations scored this identically)
- CONTEXT Issue 8 : Staff numbers (the organisations scored this similarly)
- CONTEXT Issue 10 : Equipment (the organisations scored this similarly)

There was also good or high similarity among the organisations on these issues.

Narrative assessment

Importantly, during the workshop assessment process, the supporting comments were also recorded. These coupled with the assessment of the above quantitative results are summarised here for each indicator in turn. The indicator numbers correspond to those in the questionnaire (see **Appendix D**). Comments from all organisations are included. However, there is no significant difference in what follows if only the three main organisations are considered.

Context issues

1. **Relevance of participation**. The agencies all agreed that their organisations have a responsibility to contribute to the integrated management and conservation of freshwater ecosystems.

2. **Need for cooperation**. All agreed that cooperation is necessary to achieve effective conservation. Different forums exist in the Water Management Area (WMA). Wetland and river forums are examples. This provides a social mechanism where individuals can meet and learn to know their counterparts in partner organisations. An important issue is compliance. Joint site visits are also undertaken.

3. **Clarity of respective mandates**. Good performance; good commonality. It was general felt that each organisation understood its own mandate. However, there was not a good understanding of partner mandates. Some mandates overlap although there is lack of clarity on ultimate responsibilities. This has lead to finger-pointing. It was thought that a champion could help deal with these issues.

4. **Current culture of cooperation**. Cooperation is regular although voluntary and not formalised. It is dependent on the commitment of a few individuals.

5. **Appropriate statutes**. It was perceived that sufficient legislative and legal mechanisms are in place for the conservation of freshwater ecosystems.

6. **Use of existing statutes**. There was good agreement that the mechanisms exist but that they are not adequately implemented. DWAF noted differences over time and space. According to the GDACE, there are often major complications in mining license applications that require a DWAF license. It also happens that DME approves a mining license while DWAF refuses the required water use licence, highlighting a lack of cooperation.

7. **Capacity to effectively implement regulations**. Major staff deficiencies were noted by all.

8. **Staff numbers**. All agreed that staff numbers are between inadequate and below optimum.

9. **Staff training**. Both practical and theoretical staff training was noted as a strong point within DWAF. However, once trained they are offered highly competitive salaries in the private sector resulting in a high staff turnover rate, especially in the regional offices.

10. **Equipment**. All noted they had equipment and facilities but that these were not maintained. The Government procurement process for purchasing new equipment is very cumbersome. It can take up to two years in some instances to buy new equipment.

11. **Ability to influence budget**. It was felt that budget is usually available, but due to poor internal communication and other government processes, the amount of budget available is sometimes only known half way through the year. There is then not enough time left to spend the budget allocated.

12. **Adequacy of budget**. DWAF staff felt that their budget is adequate, but that staff numbers are too low to spend it. Provinces experienced this differently - it varied between having reasonably secure internal funding in some to requiring external funding in others to ensure that objectives are achieved.

13. **Social learning**. Social learning is taking place although to different degrees between the organisations. Forums are invaluable. One of the DWAF participants, an engineer, mentioned that the Wetlands forum was his first “green experience” where he learnt about the importance of peat.

14. **Champion**. There is no coordination champion for freshwater conservation in this WMA. It is believed that once the CMA is established, this will be addressed. Key issues highlighted include a lack of clarity on how freshwater conservation is accommodated in different legislations and which legislation is more applicable when. As a result uncertainty exists concerning responsibility for freshwater conservation. It was also mentioned that many water resource quality managers do not have an ecological background.

15. **Networking support**. It was agreed by all that their organisations provide support from a logistical, technological and financial point of view. However, government red tape was again an issue. Some provinces have a limit of 2000 km per month to attend meetings and do field work. This makes it very difficult (also in terms of obtaining permission) to attend meetings / workshops, etc. in other provinces.

16. **Trust**. Everyone agreed that it comes naturally to phone their counterparts and freely discuss issues related to freshwater conservation, including mutual problem solving across organisational boundaries. Forums are invaluable and provide the opportunity to meet counterparts in partner organisations. It is therefore natural to rather phone an individual that you know, than to phone a particular department to try to establish who the right contact person is. (“It is all about individuals and not the logo”). There is also a very formal (letter writing) route that should be followed, according to government procedure, in order to work with partner organisations. Due to existing networks and by knowing and trusting your counterparts in partner organisations, this very formal and time consuming approach can be avoided.

17. **Freshwater biodiversity value assessment**. In the provinces the conservation of freshwater biodiversity is an integral and active part of ecological and cultural conservation. The Kgaswane Mountain Reserve was used as an example of a reserve that is being managed around its water, as well as Suikerbosrand. Traditionally, terrestrial ecosystems were the determining factor. The Crocodile (West) Marico freshwater biodiversity plan is being incorporated into the WMAs BioRegional plan and Working for Wetlands uses this plan to prioritise rehabilitation actions. It however important to understand the value.

Planning issues

18. **Shared conservation goals**. There was good performance and good commonality that there are shared and endorsed freshwater conservation goals in their respective domains.

19. **Participatory target setting**. Although on average it was perceived that this applied, there was only fair commonality. Although involved in target setting, inclusive ownership was lacking. Reports and information were also distributed to certain individuals and done so haphazardly.

20. **Integration of spatial plans**. Again on average it was perceived that this applied, though not very effectively, although there was only fair commonality. It was felt that certain frameworks, such as the classification system for water resources, are needed but they are not in place. It was agreed that SANBI should fulfil an integration role.

21. **Integration between conservation plan and strategic / work plans**. There were wide differences in perceptions on this issues although on average performance was good. In the provinces, conservation priorities are reflected in the respective organisational strategic plan. However, real conservation protection is not at a stage where it is being implemented. The fact that DWAF (and often this is the responsibility of one individual) has to play both a conservation and development role is problematic. Since biodiversity is the core business of provinces, plans are mostly well aligned.

Monitoring issues

22. **Resource inventory**. It was generally agreed that information on the critical habitats, species and cultural values of the area is being collected by the provinces, but that it is not sufficient to support planning and decision making. In some instances survey work is being maintained by the province, and other instances not. It was also felt that although large amounts of data (for quantity and quality purposes) are being gathered by DWAF, it is not for conservation purposes. It was also noted that it is difficult to integrate data and that ecological data is often not used, because they “don’t know how”.

23. **Alignment of monitoring**. In general the organisations actively participate in relevant monitoring such as the River Health Programme but results are not directly linked to conservation objectives. Lack of resources was highlighted as a problem.

24. **Cooperation in monitoring**. Sometimes good cooperation in monitoring takes place. However, it is based on informal cooperation with people tending to assist those they know. Various examples were mentioned of uncoordinated monitoring efforts, such as in the Blesbokspruit (Gauteng) were at least nine institutions are involved in monitoring on the same river. Typically where no cooperation takes place it is due to an individual’s busy monitoring schedule of his own organisation. There is no time to cooperate. Cooperation is not formalised.

Management issues

25. **Monitoring-reporting-management integration**. The provinces mostly have an integrated monitoring, reporting and management system. Regular monitoring and reporting takes place and these are mutually reinforcing and often linked to conservation targets. Adaptive management was practised in only some instances.

26. **Adaptive management**. Where adaptive management is not being practised all the following were perceived to have a negative impact: slow response times (*i.e.* putting results into action), high staff-turnover rates, not understanding conservation biology, organisational realities and legal constraints. Furthermore, strategic plans and strategies are not in place to manage changed circumstances. It was noted that “individuals may

learn new things, but it is very difficult or almost impossible to change organisational learning."

27. **Management plans**. In general, these plans are not in place. SANBI has such plans in place for their wetlands, but not for the bigger picture. Plans that are in place do not all relate to freshwater *per se*.

28. **Science-management interfacing**. In general it was thought that scientists and managers work together to some extent. It was felt by some that this interfacing is fairly effective up to mid-management level. After that political issues often have a huge influence. "There is always this thing between managers and scientists."

29. **Impact of conservation plan on decision making**. Guidelines to make land-use decisions in the area exist and compliance with these guidelines are monitored. However, a significant number of decisions are not made in accordance with the guidelines. At this stage the freshwater conservation plan does not influence decision-making in terms of water resources in some instances. Guidance and assistance is needed on how to include this information in water use licensing.

30. **Reporting**. Reports on the status of freshwater biodiversity are produced regularly. However there was only fair commonality on this issue.

31. **Trends in conservation status**. The general feeling was that the integrity of freshwater ecosystems in the WMA is declining.

Systems assessment

The individual indicator issues and the other issues noted in the assessment workshop can also be explored as a whole. A strategy should address issues of concern currently debilitating efforts towards effective freshwater conservation. It should build on the strengths, of which some are particularly powerful and enabling, like the level of trust that exists (at least between the active individuals).

Figure 8 and **Figure 9** present the issues in these two categories (strengths and issues of concern) and various subcategories. If these two qualitative systems models are taken at face value, then the status quo in freshwater conservation in the Crocodile (West) Marico Water Management Area may be summarised as follows:

Summary Assessment

The main problems lie in misaligned strategies and inadequate implementation of the regulatory tools that are available. The latter may in large part be due to inadequate organisational capacity. However, inadequate alignment of monitoring data with freshwater conservation priorities is also problematic.

On the other hand, the regulatory framework is sound. A high level of trust exists, albeit among the active few. The organisations have, to some degree, a shared value system which bodes well for continued cooperation. While some monitoring problems exist, there are positive aspects relating to inter-organisational communication.

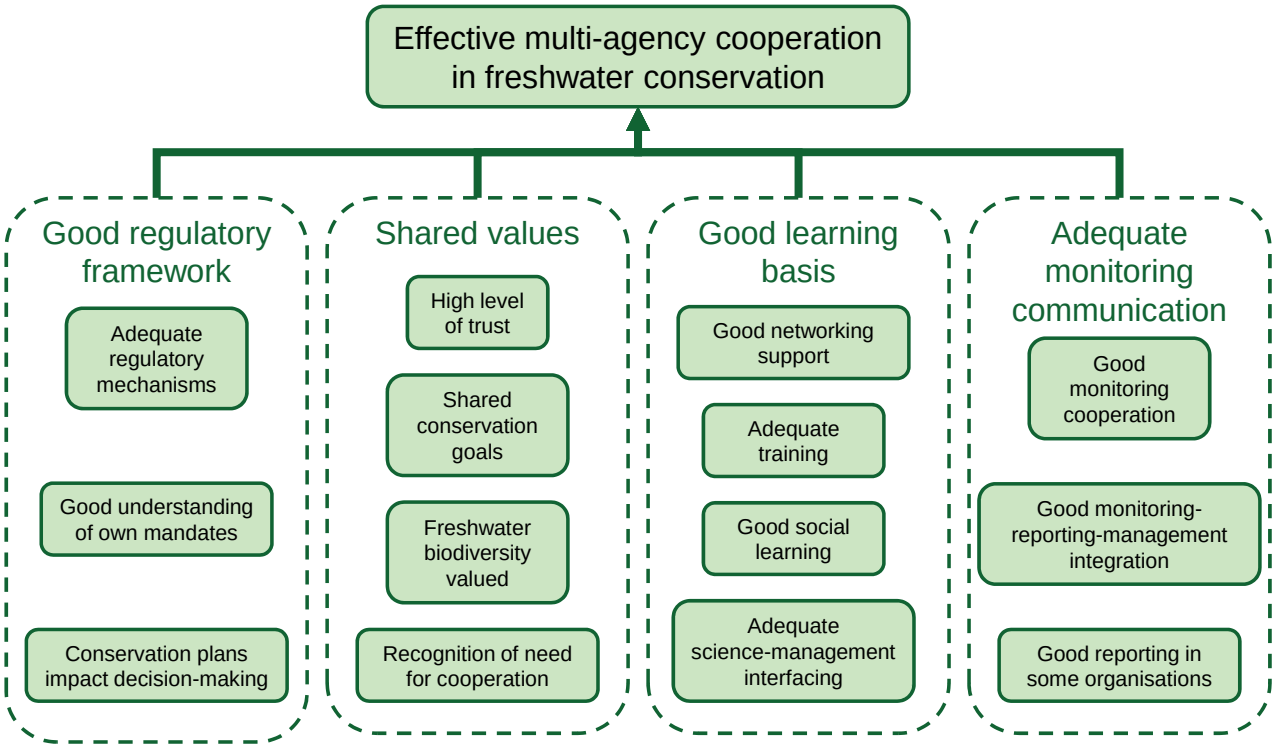

Figure 8 : Current strengths that enable effective multi-agency cooperation.

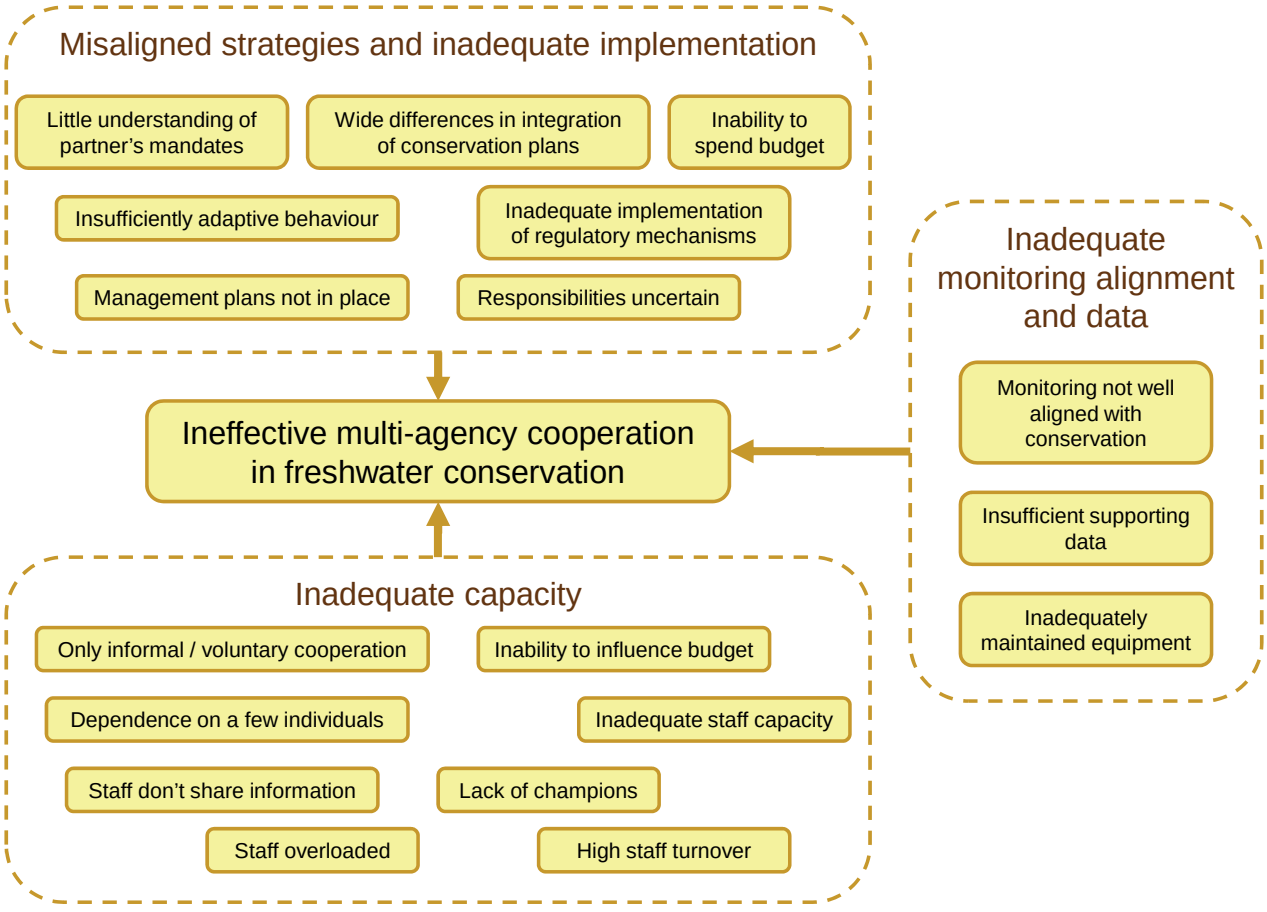

Figure 9 : Issues of concern that do not enable effective multi-agency cooperation.

4.2.2.5 Scorecard refinement

During the February 2008 workshop it appeared that a few indicators and associated questions were not immediately clear to participants. These were carefully considered and appropriate improvements made to the wording. The following indicators were affected:

- **Resource Inventory (no. 22)**. The question was changed to "Does your organisation (department) have adequate access to information to manage the area?"
- **Trends in ecosystem integrity (no. 31)**. The question was changed to "In general in your area, is the integrity of the freshwater ecosystems improving?"

In the process of re-examining the layout of the scorecard, the project team members were also concerned about the apparent inconsistency of four of the indicators. Part of the problem is that the responses are Yes/No and not 0, 1, 2, or 3 as required for the others. Changes were introduced for these four, based on the following reasoning.

1. **Relevance of participation (no. 1)**. It was felt that participants will have been invited to an assessment workshop specifically because their organisations inherently have a "responsibility to contribute to the integrated management and conservation of freshwater ecosystems". This question is therefore superfluous. It will therefore be removed.

2. **Need for cooperation (no. 2)**. Requiring a simple Yes or No as a response seems too simplistic. It is unlikely that any participant will answer No, implying that absolutely no cooperation is required. However, it is conceivable that some organisations may think different degrees of cooperation may be necessary. Therefore it is proposed that a range of responses is permitted and scored from 0 through 3. The wording of each can be as follows:
    a. 0 = Very little cooperation is required to achieve effective freshwater conservation.
    b. 1 = Good cooperation in some contexts would be beneficial to achieving effective freshwater conservation.
    c. 2 = Good cooperation in many contexts would be very beneficial to achieving effective freshwater conservation.
    d. 3 = A considerable degree of cooperation in many contexts is essential to achieving effective freshwater conservation.

3. **Shared conservation goals (no. 18)**. This is an important factor on which to have data. Accordingly this should remain though be scored from 0 through 3 as follows:
    a. 0 = Very few freshwater conservation goals in your domain are shared and endorsed.
    b. 1 = Some freshwater conservation goals in your domain are shared and endorsed.
    c. 2 = Many freshwater conservation goals in your domain are shared and endorsed.
    d. 3 = Nearly all or all freshwater conservation goals in your domain are shared and endorsed.

4. **Adaptive management (no. 26)**. Again this is an important issue on which to get the perceptions of participants. It is also necessary to be somewhat more explanatory about exactly what "adaptive management" means. The following explanatory text will suffice: "*Does your organisation acknowledge uncertainty in decision making and have a culture of regarding decisions as somewhat experimental*, *learning from the consequences and adapting its subsequent behaviour when necessary.*" Furthermore, it should also be scored from 0 through 3, as follows:
    a. 0 = There is very little experimental decision making and subsequent learning and adapting.
    b. 1 = There is some degree of experimental decision making and subsequent learning and adapting.
    c. 2 = There is a good degree of experimental decision making and subsequent learning and adapting.

d. 3 = There is a very high degree of experimental decision making and subsequent learning and adapting.

Along with various other minor formatting improvements, the above changes were implemented to produce a refined questionnaire (see **Appendix G**).

4.2.3 January 2009 feedback meetings

In January 2009 two meetings were held respectively with representatives of North West Department of Agriculture, Conservation and the Environment and the Department of Water Affairs and Forestry Gauteng regional office. The objectives of these meetings were:

- To maintain awareness of the scorecard initiative;
- To provide an update on developments within the project;
- To obtain feedback on perceptions of the usefulness of the project; and
- To discuss a way forward in respect of:
  - Maintaining the momentum of the project; and
  - Finding specific opportunities for application of the scorecard facility.

These meetings were well attended with interest also being shown from relatively high organisational levels. The spreadsheet facility was demonstrated partly with the view to encouraging attendance at the upcoming February workshop (Section 4.2.4) which would constitute the second formal reflective assessment workshop. However, it also demonstrated the flexibility of the facility which should encourage its future application in a number of different contexts.

There was a positive reception to the assessment tool and the concept of a reflective assessment. In particular, the need for reflection was acknowledged although they typically did not allocate time for such an activity. The need was also acknowledged for future application of the assessment to be externally facilitated, particularly in the initial stages of the any new application area. Indeed, some saw a number of potential applications for the spreadsheet tool.

4.2.4 February 2009 workshop

4.2.4.1 Organisation

The second reflective assessment workshop was planned for February 2009, one year after the first (Section 4.2.2). A workshop is critical for the success of the reflective assessment tool, at least in the manner envisaged, namely involving joint assessment with face-to-face communication. Difficulties were again experienced in organisation of the workshop. These are outlined here because:

- They illustrate the kind of problems that can be experienced in getting a group of people together in one place at one time;
- They improve understanding of the challenges to cooperation in general; and
- A better understanding of such difficulties will hopefully lead to organisation of future workshops being more effective, which in turn should increase the effectiveness of the scorecard approach.

Invitations to the second assessment workshop were emailed three months prior to the workshop. Invitees were asked to confirm their attendance within two weeks. Only four out of 14 responded by that deadline. A reminder was emailed to everyone (and another two invitees) during January. Five more people responded. This was followed up by a telephone call to those invitees that had

not responded to either of the email messages. This revealed that some had not read either email. The following are possible reasons:

- Individuals spending periods of time away from the office doing field work where they do not have access to email.
- Many of the participating organisations are understaffed so individuals have high workloads. Emails are not very often read.

Of the eventual nine confirmations received, only five attended the workshop. However, two others attended from whom no reply had been received. In total therefore seven attended the workshop. A national DWAF workshop held on the same day had forced two DWAF invitees to withdraw at short notice. Another invitee from Limpopo province withdrew a day before the workshop due to work commitments.

4.2.4.2 Execution

Seven representatives (**Appendix F**) attended the workshop in February 2009 (**Table 10**).

Table 10 : Numbers of organisational representatives attending second case study workshop.

Organisation	Number
Department of Water Affairs & Forestry (DWAF) Gauteng	1
Department of Water Affairs & Forestry (DWAF) North West	3
Gauteng Department of Agriculture, Conservation and the Environment (GDACE)	1
North West Department of Agriculture, Conservation and the Environment (NWDACE)	1
North West Parks and Tourism (NWPARKS)	1
TOTAL	**7**

The spreadsheet facility described above was used to facilitate the workshop. (Its use is described more fully in Section 6.2 below.) As in the first workshop, the facilitator announced each scorecard question (**Appendix G**) and invited the representatives to choose a score appropriate to their perception of the degree to which that question applied to their organisation or situation. When multiple representatives of a single organisation were present, they reached consensus on their score. As before, the regional DWAF representatives (Gauteng and North West) were considered to be representing a single organisation (DWAF). Anecdotal evidence and comments were also captured in the spreadsheet facility.

Besides facilitating reflection on individual issues, the spreadsheet facility was also used to provide an overall assessment of each organisation's results at the end of the day. In each case, the representatives were asked to reflect on whether or not this was a reasonable reflection of their organisation as a whole. In a few cases, one or two issues were revisited and scores changed. Ultimately the representatives confirmed the results were accurate.

The use of the spreadsheet facility was being tested for the first time in this workshop. Participants confirmed that the use of the facility was an improvement on the first workshop.

4.2.4.3 Results

The quantitative scores chosen by the participating organisations and the assessment produced by the spreadsheet facility are shown in **Appendix H**. As for the first workshop, the primary organisational role players in the water management area are regarded to be DWAF (Gauteng and North West), GDACE and NWDACE. However, the results for these organisations only were very

similar to the results of all organisations together (*i.e.* including NWPARKS). Separate assessments are therefore not presented here.

4.2.4.4 Assessment

Issues of concern

The issues of concern were as follows:

- CONTEXT Issue 6 : Use of existing statutes (the organisations scored this fairly differently)
- CONTEXT Issue 8 : Staff numbers (the organisations scored this fairly differently)
- CONTEXT Issue 11 : Ability to influence budget (the organisations scored this fairly differently)
- CONTEXT Issue 17 : Perceived value of freshwater biodiversity (the organisations scored this similarly)
- MANAGEMENT Issue 27 : Management plans (all organisations scored this identically)
- MANAGEMENT Issue 29 : Impact of conservation plan on decision making (the organisations scored this fairly differently)
- MANAGEMENT Issue 30 : Reporting (the organisations scored this similarly)

Top 10 strengths

The main strengths were:

- CONTEXT Issue 15 : Networking support (the organisations scored this similarly)
- CONTEXT Issue 16 : Trust (the organisations scored this similarly)
- PLANNING Issue 21 : Integration between conservation plan and strategic/work plans (the organisations scored this similarly)
- CONTEXT Issue 3 : Clarity of respective mandates (however, one or more organisations did not score well)
- CONTEXT Issue 4 : Current culture of cooperation (the organisations scored this similarly)
- CONTEXT Issue 5 : Appropriate statutes (the organisations scored this fairly differently)
- CONTEXT Issue 7 : Capacity to effectively implement regulations (the organisations scored this fairly differently)
- CONTEXT Issue 9 : Staff training (all organisations scored this identically)
- CONTEXT Issue 10 : Equipment (the organisations scored this similarly)
- CONTEXT Issue 12 : Adequacy of budget (the organisations scored this fairly differently)

The comments recorded during the workshop were not felt to add significant insights beyond those provide by the spreadsheet facility. These were therefore not analysed further.

4.2.4.5 Scorecard refinement

The second workshop provided another opportunity for testing the wording of the issues, indicators and criteria used in the scorecard. As a result, a number of small improvements were made that should result in greater clarity in future workshops. The final version of the scorecard, including these improvements, is presented in **Appendix I**.

4.2.5 Institutional constraints to cooperation

It was noted in Section 3.5 that many variables need to be in place simultaneously for effective cooperation to take place. The absence of just one important variable can significantly impede, if not totally prevent cooperation. The degree to which institutional issues play a role is a critically important context for any strategy aimed at facilitating cooperation. The following identifies some such issues relevant in the case study area but which also occur in other parts of the country to varying extents.

- **Multi-organisational responsibility**. The original context of this work, namely "cross-sector policy objectives", itself acknowledges the challenging fact that a number of government departments share the responsibility for freshwater conservation. In the Crocodile (West) Marico WMA (the case study area), water resource management and conservation are largely the responsibility of the following:

  Department of Water Affairs and Forestry;
  The Catchment Management Agency (CMA) (which currently operates as a "proto CMA" comprising the DWAF Regional Offices of North West Province and Gauteng);
  The North West, Gauteng and Limpopo provincial departments of agriculture, conservation and the environment; and
  North West Parks and Tourism.

  The management and conservation of water resources in this WMA can only be achieved by the shared responsibility and efforts of these institutions.

- **Departmental boundaries – water management area mismatch**. While the largest part of the Crocodile (West) Marico WMA is situated in the North West province, the south eastern part of the WMA falls in Gauteng and the north eastern part in Limpopo province. There are therefore various government departments from three different provinces that have a mandate to manage and conserve the WMA's water resources. Cooperation within provincial boundaries is challenging in itself. Cooperation across provincial boundaries is even more so. The following are two practical issues:

  The number of official kilometres allowed per month for field visits and meeting or workshop attendance is limited.
  Special permission must be obtained to travel outside provincial boundaries to attend meetings, workshops, etc. partly for travel insurance reasons. This is often difficult and time-consuming to obtain. One reason for this is that new or acting managers may not be familiar with the necessary procedures. Another contributing factor may be related to the "science – management" divide mentioned below. Because the manager may not fully understand the scientific technicalities, lengthy motivations may be required.

- **Inadequate resource base**. The following internal factors directly affect the ability of an organisation to discharge its mandate:

  Inadequate equipment. In some departments equipment is not always in an entirely suitable state to be used in the field.
  Laborious procurement procedures. Red tape abounds and procurement procedures are lengthy (for obtaining, for example, field equipment). This delays staff involvement in meaningful field work and discourages them from obtaining critical equipment.
  Lack of continuity. High general staff turnover rates directly affect the ability of organisations to create trusting working relationships. The specific dependence on the enthusiasm and commitment of individual champions is a particular weakness that manifests when the champion leaves the organisation. It can take a long time to subsequently re-create the same level of interaction.
  Limited pool of skilled staff. The limited number of ecologically-skilled staff is often over-committed (partially for the reasons above) and hence it is difficult to make time to cooperate effectively with counterparts from other organisations.
  Delayed budget availability. Budget allocations are sometimes only known half way through the financial year. This makes it difficult to mobilise resources and to spend the budget by the end of a financial year or to commit to shared funding initiatives.

- **Changing legislation**. A wide variety of policies and legislation impact on the implementation of freshwater conservation strategies, some of which came into effect fairly recently. Uncertainty therefore exists about respective mandates and exact roles and responsibilities.

- **Functional divides**. There is still inadequate communication between scientists and managers as well as between people responsible for scientific line functions and those responsible for resource planning and policy making in the various departments. The effective integration of ecological information into management actions is not well understood. There is no formal approach to ensure that ecological information is integrated into decision-making.

CHAPTER 5: THE SCORECARD WITHIN ADAPTIVE MANAGEMENT

This chapter explores how adaptive management can be used as a framework to respond to issues of concern identified by a scorecard assessment.

5.1 INTRODUCTION

An application of the scorecard and the immediate assessment it facilitated in a specific case study has been described in Chapter 4. For the outcomes and outputs of any scorecard assessment to be useful they must provide a sound basis for the participating individuals and organisations to move forward. That is, they must result in real change when necessary.

One framework within which conservation of freshwater ecosystems should be taking place is adaptive management. The practices of adaptive management and strategic adaptive management (SAM) were outlined in Chapter 3. Specifically, their relation to inter-agency cooperation was addressed. SAM is a forward-looking (strategic) application. It relies on longer-term visions and objectives and adaptation to feedback that modifies understanding and management actions on an ongoing basis. SAM has been applied in South Africa, specifically in the Kruger National Park (Pollard and Du Toit, 2007) and is in the process of being extended to the other SANParks reserves. Being so intimately dependent on monitoring and evaluation and how this feeds back into management and governance, this is a framework that can provide useful guidance for responding to issues of concern identified by a scorecard assessment. Unfortunately, while many organisations might consider themselves adaptive, it is possible that many do not have the functioning feedback mechanisms that characterise true adaptive management.

This chapter explores these issues specifically in the context of SAM. It is a basis for the more specific "guidelines" that appear in Chapter 6 (which are presented in a more "user manual" format).

5.2 GOVERNANCE AND MANAGEMENT

The practice of SAM intimately relies on interplay between governance and management. Accordingly, this section differentiates between the two concepts.

Policy is an outcome of governance processes through which society is enabled "to accept or reject alternative political agendas or societal visions" and so "In short, governance sets the rules of the game and the systems in which we operate" (Hall, 2006). Management is a coordinated implementation process in support of the policies established through governance (Nina-Marie and Kay, 1999; Folke et al., 2005; Checkland, 1985). Thus whilst governance establishes a context for societal behaviour, management seeks to organise behaviours and actions to achieve the intent of policies that define the contextual envelope.

Both governance and management are responsive to changing circumstances and are thus learning processes. But, whereas management learning is tactical and directed at fostering efficiency, governance learning is strategic and fosters organisational renewal (Leavy, 2004). Both need to be adaptive in order to cope, but they also need to be creative, focusing on "generative" learning (Senge, 1990; Rogers, 1998). The functionality of the linkages between them defines the

extent to which management is informed about and responsive to the visions of society and governance is informed about and responsive to the practicality of attainment of those visions.

Both governance and management are hierarchically scale dependent. For example, national scale policies and the associated management actions set the context for those at provincial or local scale. The different intentions of governance and management, the differences in learning with governance engaging double- and triple-loop learning whilst management is predominantly single- and double-loop learning, and the differences in scale cause governance to respond more slowly than management. Cilliers (2006) has suggested that slowing the response of governance is desirable and should be purposive because when change is too frequent it creates instability that may cause the system to lose identity.

This understanding suggests that for management to be effective at the organisational level:

- Its plans and actions must be framed by and explicitly directed at achieving the intentions of cross-sector policy;
- It must regularly assess whether its approach and actions are achieving the policy intent and if not, it should adapt its approach and actions to better achieve the policy intent;
- It should regularly assess the feasibility of achieving policy intent;
- It should encourage and facilitate purposive cross-sector communication and co-learning that encourages responsiveness.

Because management is an implementation support process used by societies to foster coordinated human actions (Nina-Marie and Kay, 1999; Folke et al., 2005; Checkland, 1985), management effectiveness should also be assessed at individual level. This exposes the central importance of:

- Relational connectedness (the linkages between (a) individuals and (b) individuals and agencies), and
- Relational capital (the potential for knowledge creation based on trust and commitment between (a) individuals and (b) individuals and agencies).

This is particularly important to those concerned with management effectiveness in implementing cross-sector policy objectives (Nkhata et al., 2008). These variables are fundamentally important for linking individual and collective learning (Dyer and Nobeoka, 2000).

This suggests that for management to be effective at individual level:

- Individuals should be well connected within and across policy sectors;
- Behaviours should foster trust and mutual cooperation and possibly even collaboration (see Section 3.4.3 and 3.4.4) within and between policy sectors;
- There should be repeated policy and management oriented interactions and information exchanges among individuals within and between policy sectors;
- Individuals should frame and communicate issues and conduct dialogue in both governance (policy) and management terms, and facilitate dialogue between these levels, as this enhances perceptions of legitimacy and promotes responsiveness.

5.3 STRATEGIC ADAPTIVE MANAGEMENT

5.3.1 Introduction

Strategic adaptive management (SAM) is a management tool developed in South Africa for conservation and management of natural resources (Grant et al., 2008). It is:

- **Strategic**, acting with foresight and purpose;
- **Adaptive**, learning while doing; and
- **Participatory**, engaging and empowering stakeholders.

There is therefore forward-looking thinking that helps relate the joint vision of stakeholders with options for moving forward, and practical ways of doing this in the face of inevitable uncertainty regarding outcomes. There are also feedback loops based on reflection on outcomes in a way that learning not only happens but changes (if necessary) what is done thereafter. That is, SAM facilitates adaptation.

5.3.2 Principles

The principles that characterise SAM are the following (mainly based on Pollard and Du Toit, 2007):

- **Strategic thinking**. Forward-looking visioning and thinking is important.
- **Explicitness in purpose**. Everyone should have an explicit common future focus.
- **Inclusiveness**. All stakeholders should be on board.
- **Co-learning**. Learning, including sharing information, must occur together with stakeholders.
- **Learning by doing**. Learning must take place through explicit reflection on the observed outcomes at both strategic and operational levels. Random trial and error is inappropriate.
- **Institutionalisation of the learning**. Use of the learning must directly inform management decisions. Institutionalisation will facilitate this.
- **Pragmatism**. The emphasis is on immediate though sensible easily-implementable action that has been carefully thought through (at the options scoping step).
- **Action orientation**. The organisation must explicitly promote and enable action.
- **Flexibility**. First, people need to be flexible enough to want to adapt so that they can drive organisational adaptation without losing strategic direction. Secondly, the organisation must be able to adapt readily to (a) new implementation and monitoring plans and to (b) the learning that comes from reflection on the monitoring results.
- **Continual improvement**. A mindset must exist that always strives for doing something better and not necessarily achieving ultimate perfection.

5.3.3 The generic process

Step-wise and detailed guidelines for the implementation of SAM are presented by Pollard and Du Toit (2007) and captured in **Figure 10**. While the overall process defines SAM, the visioning and setting of objectives is referred to as the adaptive planning process and the evaluation and learning stage is referred to as the adaptive decision-making process (Grant et al., 2008). The adaptive planning process is particularly important in the current context because part of the reflection being encouraged by the reflective assessment tool should be against the outcomes anticipated, and objectives identified, at this planning stage.

While the figure suggests the steps occur in sequence, this is not always the case. The smaller feedback evaluation and learning loops facilitate shorter and faster management response cycles.

However, these should not occur so frequently that management actions drift away from governance-level visions. On the other hand, when they do occur frequently they can create an upward pressure for governance change.

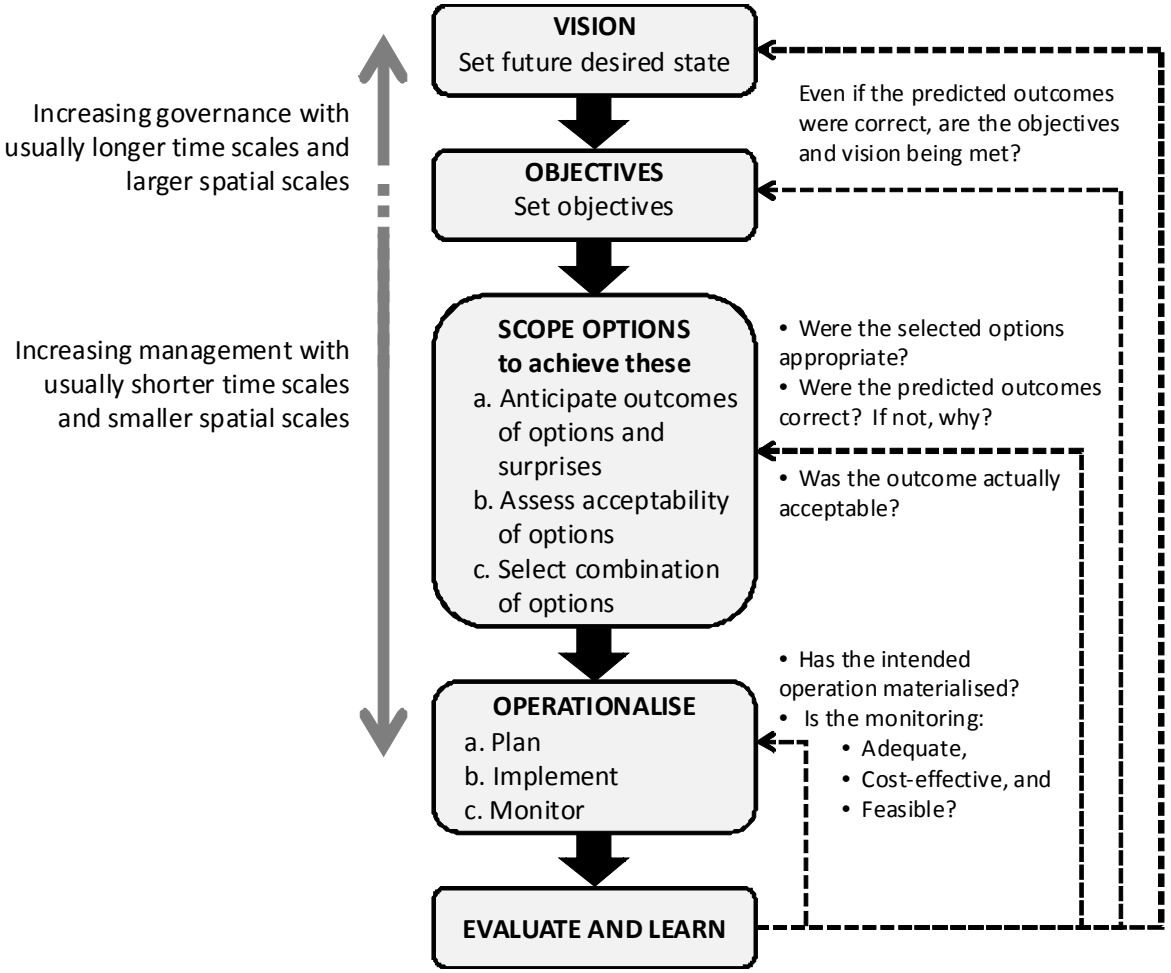

Figure 10 : The strategic adaptive management process.

The five components can be described as follows (adapted from Pollard and Du Toit, 2007):

- **Create a vision**
  a. *Understand the context and operating principles*. The V-STEEP framework can help ensure the full spectrum of values is covered: Values: Social – Technical – Ecological – Economic – Political.
  b. *Reach consensus on the vision, operating principles and the meaning of the context*.
  c. *Document*, *evaluate and consolidate the vital attributes of the system to be managed and their determinants*. In the current context, vital attributes are distinctive features that make freshwater ecosystems and their management special.
- **Develop objectives hierarchy**
  a. *Formulate and prioritise the high level objectives*.
  b. *Set lower level objectives.* These arise from the unpacking of the detail that emerges from the high-level objectives.
  c. *Identify connections between the objectives.*
  d. *Set measurable endpoints for each objective*.
- **Scope options**
  a. *Scope out the range of management options*.

b. *Assess the acceptability of the outcomes*.
c. *Select and implement the best options*.

- **Operationalise**
  a. *Plan how best to implement the chosen option(s)*.
  b. *Implement the plan*.
  c. *Monitor*.
- **Evaluate and learn**. Ask the following questions:
  a. *Is the monitoring adequate*, *cost effective and feasible*?
     i. If so, continue to monitor and evaluate and learn.
     ii. If not, refine plan to make options operational, if possible. If not, revise existing options or scope new ones.
  b. *Has the intended plan of operation materialised*?
     i. If so, continue to monitor and evaluate and learn.
     ii. If not, refine plan to make options operational, if possible. If not, revise existing options or scope new ones.
  c. *Were the selected options appropriate*?
     i. If so, continue to monitor and evaluate and learn.
     ii. If not, revise existing options or scope new ones or if necessary revisit objectives hierarchy and re-examine in particular the chosen measureable endpoints.
  d. *Did the actual outcomes accord with the predicted outcomes*?
     i. If so, hypothesis has been confirmed. Ask the question "A*re the objectives and vision being met*?".
        1. If so, go to following question (*Was the outcome actually acceptable?*).
        2. If not, revise existing options or scope new ones, or revisit objectives hierarchy or revisit the vision.
     ii. If not, determine why not. Ask whether or not provision was made for the real possibility of surprises. Return to revise existing options or scope new ones and re-examine options and likely outcomes.
  e. *Was the outcome actually acceptable*?
     i. If so, continue to monitor and evaluate and learn.
     ii. If not, revise existing options or scope new ones and re-examine options and likely outcomes.

It is evident that the first four steps (from visioning to making the options operational), while not trivial to implement, are likely to be more well-defined and more easily implementable than the feedback loops demanded by "Evaluate and learn". They may be less easily systematised and formalised because they may require more critical thinking to better understand why things are the way they are. They not only question and refine operational procedures (*e.g.* like how the monitoring may be improved almost in a quality control sense) but may also need to probe what might be underlying (implicit) assumptions and paradigms. They also encourage reflection on the adequacy of current operating procedures.

It is precisely the existence of these feedback loops that were referred to in the introduction above that characterise a working adaptive management environment.

5.3.4 SAM for conservation

5.3.4.1 General examples

The above SAM process is generic. While intuitively sensible, unless users can clearly identify where and how it applies to their particular context, SAM may not necessarily be adopted. This section addresses this issue by briefly pointing out some key practical situations relating to conservation.

- **Create a vision**. This process also involves recognition and statement of key values and operating principles, as well as the international, national and local contextual factors. Typically values strived for by conservation-related organisations, would be ones like:
  Recognition of complexity (ever-changing and patchy environments);
  Maintenance of natural processes and cultural heritage;
  A healthy flow of ecosystem and cultural goods and services; and
  Complementing natural processes when intervening.

  Typically, international context includes signed conventions (such as the Convention on Biodiversity; the Ramsar Convention; the SADC Protocol on Shared Watercourses, etc.); national context includes Acts (such as the National Environmental Management Act; the National Water Act etc) and local includes municipal Integrated Development Plans etc. Consideration of these values and this type of context invariably produces a certain brand of high level vision statements, usually emphasising themes such as biodiversity, collaborative adaptive approaches, wilderness, etc.

- **Develop objectives hierarchy**. Objectives hierarchies generated in conservation establishments characteristically contain high level objectives based on the above, but usually filtered down to the key ones which the particular organisation strives for most explicitly - such as maintenance of riverine processes in a wetland park, conservation of rare species if that is the major goal in a park, building conservation capacity if it is perceived as crucial, etc.

  These high-level objectives are unpacked into as much detail as is necessary to make it quite clear what exactly must be done by who in what time frame. Typically this includes research statements, such as “develop an understanding of influence of industrial pollutants downstream or downwind of neighbouring factories” and this might be unpacked further with specific cases actually being mentioned.

- **Scope options**. This involves systematically going through candidate interventions. For instance, if it is believed, based on the above, that elephant numbers need to be controlled if unacceptable thresholds in riparian ecosystems are being approached, then scoping may include a “pros and cons” analysis of translocation, fencing out, contraception, culling, etc. The acceptability of each of these to relevant stakeholders is included, as are the predicted outcomes of each. The most appropriate option or combination at that time is then chosen.

- **Operationalise**. This means that the choice just made needs to be converted into management action in a way that enables effective implementation on the ground by the staff. This normally means that the more strategic decision above is expressed as a series of management steps detailing how exactly it will be carried out. Normally this involves some form of rule, such as operating rules for releases from a dam which will achieve (say) environmental flows which have been chosen, or perhaps standard operating rules around alien vegetation removal procedures.

- **Evaluate and learn**. This is at the heart of the SAM process. The following are examples relating to the key sub-steps:
  Is the monitoring adequate, cost effective and feasible? How many rivers need to be gauged? Are we doing this gauging in the most sensible way? If resources are constraining, how can we manage?
  Has the intended plan of operation materialised? If we expected factories to reduce effluent to a particular level, has this actually happened?
  Were the selected options appropriate? Did the filters they installed work? Should we not be considering others?
  Were the predicted outcomes correct? Given that the releases from a dam were done under particular recommended circumstances, did this produce the reduction in silt we modelled or expected?

Was the outcome actually acceptable? Even though society felt that if the water looked clean, it would be suitable, how did it happen that some key biota are still not recovering?

Looked at overall, there may be important differences between adaptive management as applied to conservation goals, and adaptive management in another setting. Both settings may be complex, but the conservation setting will need to consider an integrated landscape (or seascape) setting. That is, one may need to take a particularly holistic view. This may reflect in the way in which the bioregional mosaic emerges. The way sustainability is interpreted may also differ.

5.3.4.2 Single-, double- and triple-loop learning

It is conceptually useful to appreciate that the "evaluate and learn" feedback loops at the various levels indicated in **Figure 10** correspond to what are referred to as single-, double- and triple-loop learning (**Figure 11**).

- **Single-loop learning**. This involves changing actions to meet identified management goals, often through trial and error. For example, harvest rates may be modified to conform to specified catch limits.
- **Double-loop learning**. This includes a reflection process of evaluating underlying assumptions and models that are the basis of defining problems. For example, this may involve revision of indicators and simulation models used to calculate the relationship between fertilizer inputs and crop production based on recent policy outcomes.
- **Triple-loop learning**. This involves the same re-evaluation of assumptions and models as double-loop learning but it also considers whether to alter norms, institutions, and paradigms in ways that would require a fundamental change in governance. For example, it might entail a shift from an agricultural system focused on supporting farmers to a tourist-based economy requiring a broader, more inclusive form of governance.

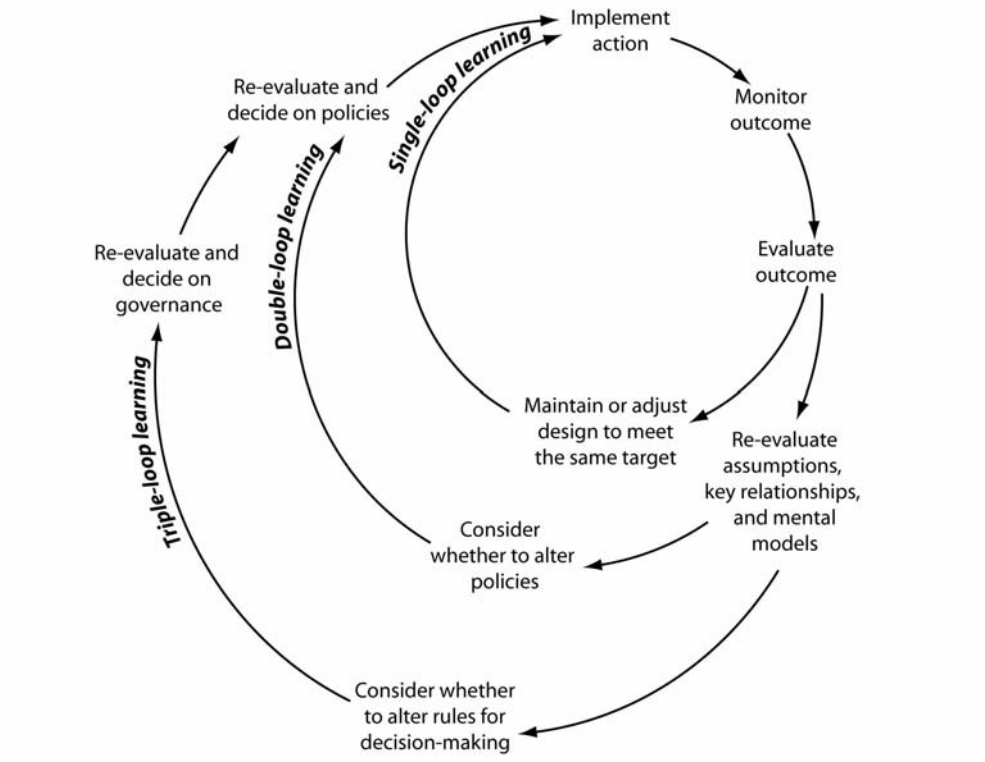

Figure 11 : Single-, double- and triple-loop learning (Stafford Smith et al., in press).

5.3.4.3 Thresholds of potential concern (TPCs)

An approach used by the Kruger National Park can be used to implement the above and link it to the monitoring in the programmes specific to each organisation. In particular, thresholds of potential concern are specific tools used to facilitate the single-, double-, and triple-loop learning mentioned above. This is depicted in **Figure 12**.

Water resource managers require a reasonably high degree of heterogeneity (over space) and variation (over time). TPCs define the acceptable limits of each. If the system remains within these limits, monitoring continues. If management objectives are met despite the TPC being exceeded, the threshold value is changed, but monitoring continues. If the TPC is exceeded and management fails to meet its objectives, a more fundamental re-assessment occurs of whether current norms and mental models allow the broad objectives to be achieved by taking corrective action. If so, a variety of policy options are considered and appropriate corrective actions are taken. If the broad objectives cannot be achieved in this fashion, fundamental changes in mental models, institutions, values, and/or paradigms must be considered, leading to changes in governance and the implementation of new management approaches. A similar fundamental re-evaluation can be triggered by external surprises or paradigms that have emerged elsewhere (Rogers and Biggs 1999).

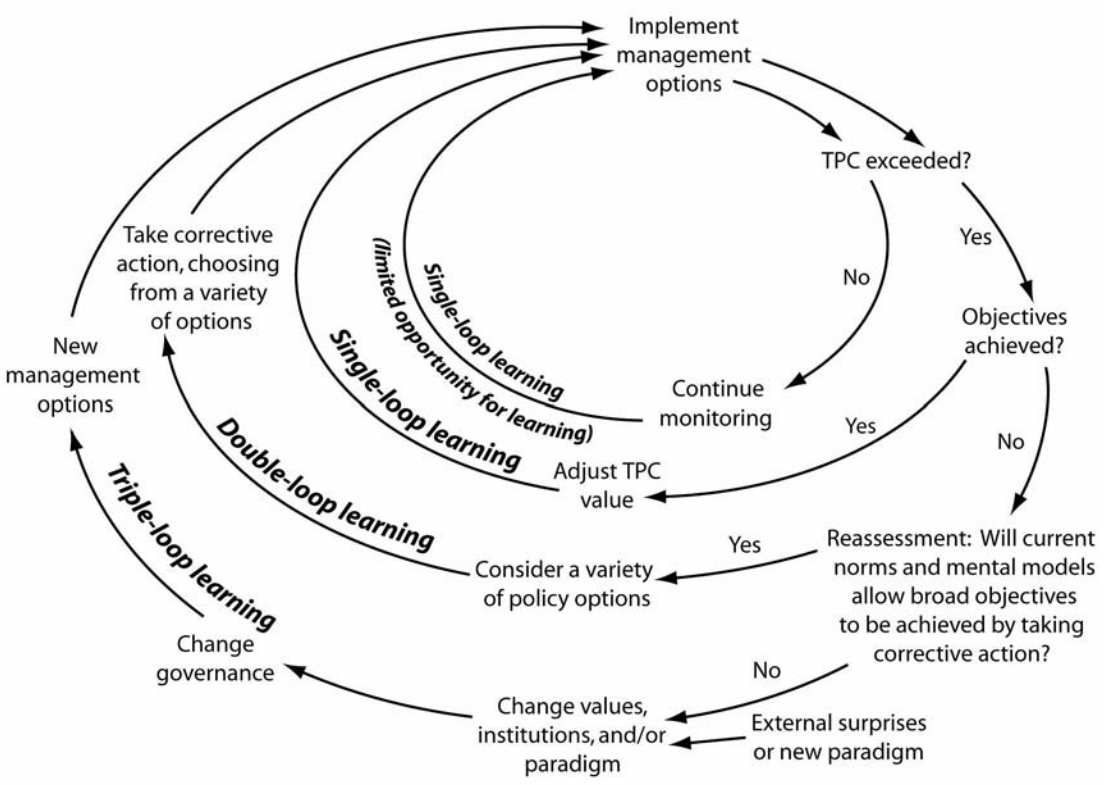

Figure 12 : Learning facilitated by thresholds of potential concern (Stafford Smith et al., in press).

5.4 THE REFLECTIVE ASSESSMENT SCORECARD

5.4.1 Its role

The scorecard has three main immediate purposes.

- It should facilitate reflective assessment on the level of cooperation between individuals in organisations with a mandate for freshwater ecosystem management and governance;
- Motivate participants to do something about shortcomings, at least through creating awareness of those shortcomings; and
- Maintain and enhance cooperation-related aspects that are working.

In respect of SAM, the scorecard is most likely to find its place in the "evaluate and learn" feedback loops (the outermost loops in **Figure 11** and **Figure 12**). It can potentially facilitate the "more critical thinking" referred to above. By encouraging explicit reflection on the current level and nature of cooperation, it is likely to help reveal the degree to which shortcomings in this critical aspect might be responsible for an unacceptable *status quo*.

The scorecard specifically facilitates:

- Structured face-to-face dialogue between organisations with a mandate for freshwater conservation;
- Identification of specific weaknesses, especially in cooperation, that should be addressed;
- Identification of specific strengths, especially in cooperation, which can be used as a basis for addressing the weaknesses; and
- The development of a coherent message that people at lower levels in organisations can communicate to upper levels.

Importantly, the scorecard must not be seen as a tool for bureaucrats to measure or punish people. It should be used by small groups to decide on what adaptive actions are necessary.

It is important to remember that the ultimate purpose is to achieve defined desired states of the freshwater ecosystems that fall within the mandate of the respective organisations. These should relate directly to the cross-sector policy objectives (described in **Appendix A**). In so doing a desired organisational or institutional state is also being implied. This is one in which strategic adaptive management is flourishing. To achieve this, an effective degree of cooperation is being assumed necessary. The scorecard helps establish this cooperation. These relationships are depicted in **Figure 13**.

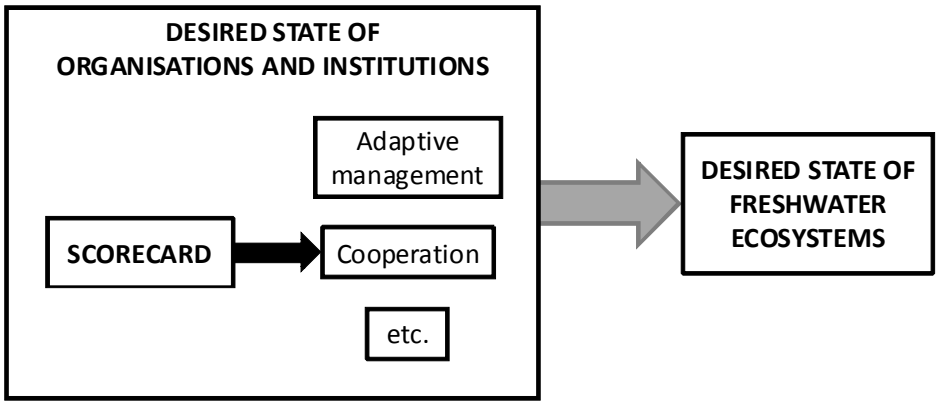

Figure 13 : The scorecard and its ultimate purpose.

It is also worth noting that just as adaptive management is appropriate for achieving a desired state of freshwater ecosystems (with, for example, TPCs related directly to measurable ecosystem

endpoints), it is also likely to be useful in moving an organisation or institution towards being more adaptive (with TPCs related directly to organisational of institutional endpoints). In other words, the more social aspects of management, in the current context typified by cooperation, can have an adaptive life of their own.

5.4.2 Target audience

The scorecard is aimed primarily at those "at the coal-face" of managing and conserving freshwater ecosystems. It is possible that such people may not be as focused on high-level visions and cross-sector policy objectives as those who developed the visions and objectives in the first place. They are people who typically face a variety of everyday practical and administrative difficulties in the execution of their duties (see Section 4.2.5 for examples).

Their hands-on engagement causes issues to emerge (for example, in a scorecard assessment workshop) that they perceive as being sufficiently compelling to warrant doing something about them. In respect of SAM, their entry point into the SAM process occurs when they scope the options of the various approaches they might choose. However, the real practical challenges start when they enter the feedback loops and try to bring about real change, *i.e.* make the system truly adaptive.

5.4.3 Level of response

The above description of strategic adaptive management (SAM) and the distinction between governance and management sketch a framework within which an appropriate level of response can be couched.

Figure 14 illustrates how the various feedback loops within the "evaluate and learn" stage relate to the various kinds of learning and how they typically occur over very different time scales. It provides one immediate insight into the nature of any response to a scorecard assessment: It should be clearly established at which level the issue of concern will require revision. Furthermore, the state of the system and the motivation for actions need to be described and articulated in terms that relate to the policies and goals of the relevant organisations. If objectives are met then monitoring simply continues.

The more a SAM process is followed the more explicit the mechanisms will be that result in adaptive change. Explicit mechanisms help everyone understand how and when change can be initiated.

As noted above, some organisations may not be practicing adaptive management explicitly. In these organisations feedback mechanisms may either be non-existent or not being used appropriately. In the former case, there may simply not be procedures in place that allow messages to be conveyed effectively to the necessary levels within the organisation. In either case, for responses to issues of concern to be at all effective, it may be necessary to create new mechanisms or change existing mechanisms so that an effective response is possible. In other words, procedural organisational change may be necessary to achieve the kind of organisational change identified by the issue of concern (that in turn improves cooperation). To adapt the organisation at this level, it is best to start with the adaptive planning process (*i.e.* visioning and setting objectives).

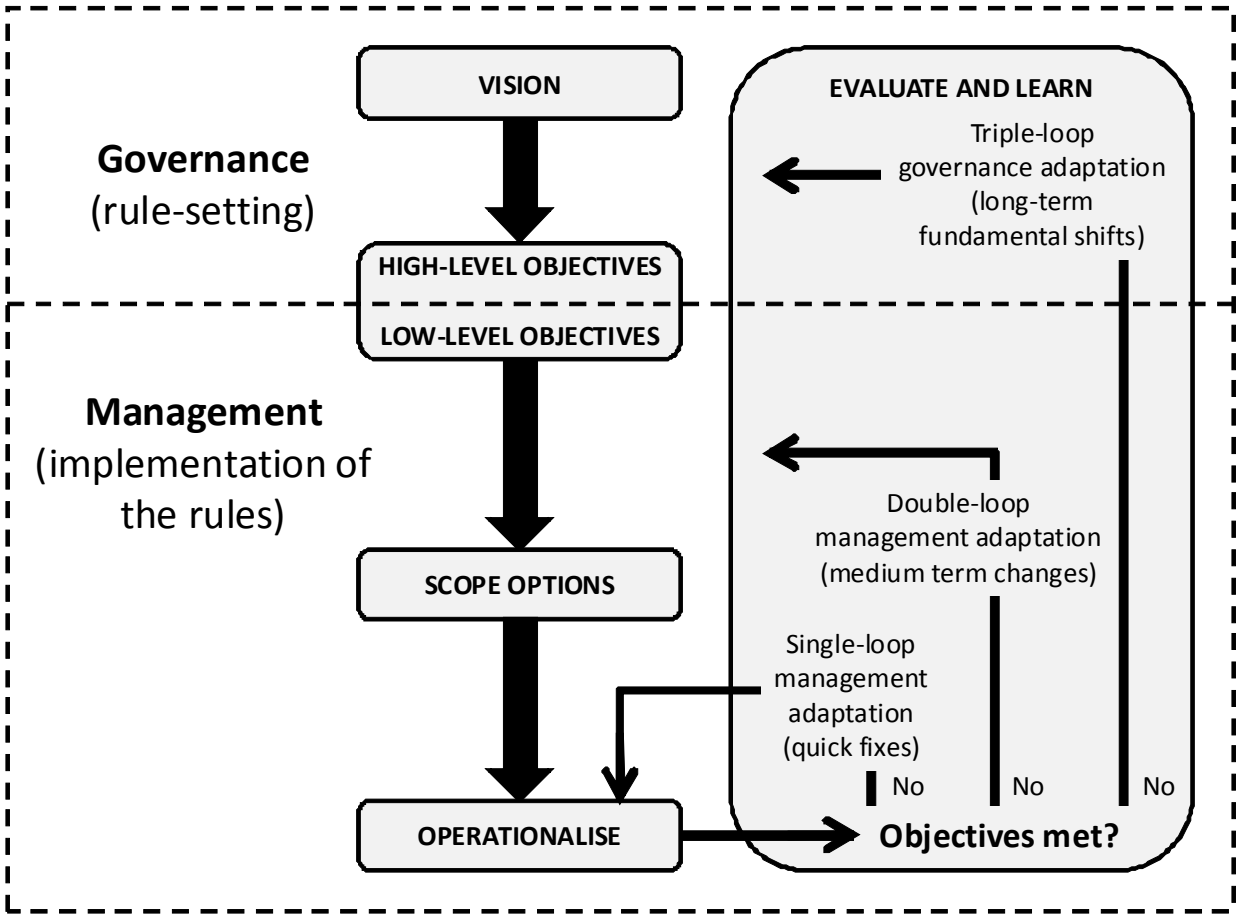

Figure 14 : The nature of the feedback loops in strategic adaptive management.

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CHAPTER 6: REFLECTIVE ASSESSMENT IMPLEMENTATION

This chapter provides guidelines on (a) how to apply the reflective assessment tool and (b) how to address issues raised by the assessment.

6.1 INTRODUCTION

The scorecard is intended as a tool for facilitating, assessing and reflecting on the degree of multi-agency cooperation and adaptive management in respect of freshwater conservation. Naturally, such an assessment is of little use unless shortcomings highlighted by the process are acted upon so that the situation is improved. Accordingly, this chapter addresses both aspects:

- The assessment workshop (from preparation through to immediate post-workshop actions); and
- How to address the issues.

This chapter is presented in a more prescriptive "guideline manual" format. It is based on the more detailed background presented in previous chapters.

The essence of the application of the reflective assessment tool is that trust is put in people rather than systems while remembering that the ultimate purpose is healthy freshwater ecosystems. The tool is flexible and people are relied upon to adapt it.

6.2 THE ASSESSMENT WORKSHOP

6.2.1 Overview

The box on the following page provides a summary of the overall process of using the reflective assessment spreadsheet tool before and during the reflective assessment workshop. The spreadsheet facility to which it refers provides the following advantages:

- **Adaptability**. The categories, issues, indicators, questions and associated criteria are conveniently stored and updated. They can also easily be refined from one assessment workshop to the next.
- **Convenience for information capture**. The individual scores for participating organisations and the associated supporting comments can be directly captured in electronic format during the workshop.
- **Increased depth of reflection**. The simple built-in data assessment facilities allow the captured scores to be analysed and the results presented to the participants on the day of the workshop. They provide an overall picture of the results upon which participants can further reflect.
- **Immediacy and coherence of messages**. The data assessment facilities provide an immediate summary of the main issues of concern (and strengths) which all participants can take away with them. This may be a sufficient basis to initiate a strategy for addressing the issues without having to wait for the facilitator to assess results in detail after the workshop.

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The overall process comprises the following three phases:

Phase 1: Assessment Adaptation

> *This phase occurs before the assessment workshop.*

Section A: Define Categories

Define up to 8 categories of issues (e.g. Context, Planning, etc.).

Section B: Define Issues, Indicators and Criteria

Identify issues relevant to multi-agency cooperation and adaptive behaviour.
Define appropriate indicators and associated criteria for scoring the issues.
Adapt and refine the issues with stakeholder participation.

Section C: Print Issues, Indicators and Criteria

Print the current set of issues, indicators and criteria for easy perusal.

Phase 2: Reflection & Data Capture

> *This phase comprises the bulk of the assessment workshop.*

Section A: Define Organisations

Define up to 8 participating organistions.

Section B: Score the Criteria

Record a score for each organisation for each indicator.

Section C: Record Comments

Record comments, if any, made by the organisation representatives.

Phase 3: Data Assessment

> *This phase occurs towards the end of the assessment workshop.*
> *The purpose is to facilitate an overall reflection on the scores captured in Phase 2.*
> *At any time participants can ask to return to Phase 2 to re-consider scores (and change them if they desire).*
> *This phase can be repeated with different combinations of organisations and categories, as requested by the participants. For example, an individual organisation can be assessed alone or all organisations assessed together.*
> *Hard-copy printouts of the results of each section can also be produced.*

Section A: Specify What's in and What's out

Specify the organisations and categories to be assessed.

Section B: See Basic Statistics

Display and discuss the basic statistics.

Section C: See Bar Charts

Display and discuss bar charts of the numbers of average scores and similarity.

Section D: See Issues of Concern

See and discuss the issues of concern and strengths.

Section E: See Average Scores and Similarity

Display and discuss the average scores and similarity among organisations.

6.2.2 Preparation

6.2.2.1 Workshop organisation

If sufficient trust does not exist between participants then an independent broker should be considered to facilitate the process. The following would be typical tasks:

- **Identification of participants**. The following should be considered:
  The most appropriate organisations. These should be those with a mandate for freshwater conservation or those whose cooperation is important for such mandates to be discharged.
  The most appropriate representatives. These should be people who are actively involved in the daily practice of discharging freshwater conservation mandates. More than one representative may be suitable. In this case, they would be asked on the day of the workshop to reach consensus on an appropriate score for their organisation.
- **Identification of an appropriate day and venue**. This should take account of potential logistical and organisational difficulties (see, for example, Section 4.2.5 for examples of the kinds of difficulties faced by some organisations).
- **Finalising attendance list**. This includes preparing and distributing invitations.
- **Securing the venue**.
- **What to take**.
  Projector (if not supplied by the venue). This allows everyone to focus on the current indicator and criteria and be able to read the text themselves.
  Printer (if not supplied by the venue). Use this to provide printouts of the assessments for participants to take home.
  Laptop (with spreadsheet).

6.2.2.2 Spreadsheet tool adaptation

As noted in the above text box, Phase 1 of the reflective assessment takes place before the workshop itself. It involves coming to consensus with all stakeholders on the most appropriate categories, issues, indicators, questions and criteria.

Ideally, all stakeholders should be comfortable with the issues, indicators and criteria in the spreadsheet tool before the workshop. However, should there be any outstanding issues they can be addressed on the day of the workshop and changes recorded directly in the spreadsheet. Consensus on the appropriateness of the changes can then be reached at that time.

Two general scenarios can be envisaged:

- **Preparation for first workshop**. This will require careful consideration of the issues, indicators, questions and criteria by all participants. The participants can be met on a one-on-one basis if this is easier to organise. This will however be time consuming and require much travelling. Email and telephonic discussions may be preferable. The template of issues etc. provided by this project could be used as the initial draft.
- **Preparation for subsequent workshops**. Any categories, issues, indicators, questions and criteria there were noted as problematic in the previous workshop can now be refined. Any changes that may have occurred in the overall context of freshwater conservation in the intervening year can also be addressed, if necessary with new issues and indicators. If substantial, changes should be checked with the stakeholders.

6.2.3 Running the workshop

The spreadsheet facility provides the main template for structuring the workshop proceedings and capturing the responses of the participants. Remember at all times (and stress to participants) that the quantitative scoring is only a means to an end: they are meant to encourage open and frank assessment and reflection by all participants on issues relating to cooperation (not management effectiveness) within the context of freshwater conservation in their area of joint jurisdiction. The scores are not meant to represent a record by which managers might assess their performance. The spreadsheet tool is primarily for use on the day.

The instructions for using each worksheet are contained in the spreadsheet itself. The facilitator must be familiar with each worksheet and its function before the workshop.

The spreadsheet has a worksheet that allows comments to be recorded. However, it may be preferable to appoint a person other than the facilitator to record comments and observations in a copy of the spreadsheet.

Participants can have the results of the workshop supplied to them in any of the following ways:

- **Electronically**. The spreadsheet itself can be emailed to participants immediately after the meeting. (While it is obviously technically possible to copy the spreadsheet directly onto participant's flash/memory disks at the meeting, this should perhaps be avoided because of the ease with which viruses are transmitted via such disks. Emailing is safer.) Alternatively, if time permits, the spreadsheet can be copied onto CDs or DVDs and distributed immediately.
- **Hard-copy printouts**. All of the Phase 3 worksheets are formatted to allow printing of the results.

Finally, participants should be asked whether or not a more detailed assessment of the results of the day will be useful to them. Equivalently, they should be asked specifically whether the outputs of the day (the spreadsheet or printouts) are sufficient for them to begin follow-up actions.

6.2.4 Immediate post-workshop actions

There are various possible actions that can occur after the workshop (typically executed by the facilitator):

- **Consolidating all comments**. In order to have the spreadsheet as the main vehicle for recording the workshop data and information, it will be necessary after the workshop to copy other recorded comments into the "COMMENTS" worksheet in the spreadsheet.
- **Summarising comments**. It is also possible to assess the comments made for each indicator and record a brief summary in the "COMMENTS" worksheet.
- **Performing a detailed assessment**. A more detailed assessment of the results as a whole (than performed by the spreadsheet facility on the day) may be considered appropriate. The decision to undertake such an assessment can be taken at the workshop. This would be driven particularly by the degree to which all participants feel that the workshop itself has provided an adequate basis for action to address the issues of concern. Should it be thought inadequate, then a more detailed analysis can be undertaken.

  It is an assessment such as this that might identify the true "compelling" issues, namely those that should drive actions deliberately aimed at improving levels of cooperation in freshwater conservation. This assessment would typically be recorded in a separate document and then circulated to participants for comment and input.

6.3 RESPONDING TO THE ASSESSMENT

6.3.1 Specific issues

The nature of the response to a reflective assessment will depend intimately on the kind of issues of concern and the specific organisation in which it is being experienced. However, a few generic comments can be made that put many of the possible issues of concern in some general context.

6.3.1.1 Regulatory tool issues

The following issues are relevant:

- **Appropriate statutes**;
- **Shared conservation goals**;
- **Integration of spatial plans**;
- **Integration between conservation plan and strategic/work plans**; and
- **Perceived value of freshwater ecosystems and biodiversity**.

Inadequate statutes are an issue that may need to be addressed at a governance level.

Goals that are not shared, spatial plans that are not integrated, and conservation plans that are not integrated with strategic/work plans are issues that can potentially be addressed through carefully worded representations or submissions to middle and upper management in all the participating organisations. If the process of submitting such representations is sanctioned then a group may make the representations although individuals may also do so.

It is conceivable that some of the above issues may be problematic because freshwater biodiversity and conservation is not perceived to have sufficient value at either middle or upper management levels or even at the governance level (*i.e.* reflected in policies other than the cross-sector policy). Representations to address this would typically rely heavily on emphasising the cross-sector policy objectives (**Appendix A**), in particular objective 1, namely “Set and entrench quantitative conservation targets for freshwater ecosystems”.

6.3.1.2 Capacity and resource issues

The following issues are relevant:

- **Adequacy of budget**;
- **Capacity to effectively implement regulations**;
- **Staff numbers**;
- **Staff training**;
- **Equipment**;
- **Networking support**; and
- **Resource inventory**.

It is conceivable that if any of these is an issue of concern it is a direct result of decisions made by middle or upper management. In this case representations on the relative importance of freshwater conservation may need to be made to this level, stressing as above, cross-sector policy objectives. Objective 5, namely “Enable effective implementation”, is particularly relevant.

It is also conceivable that such decisions are the result of high-level objectives set at a governance level. Governance-level value systems may then need to be addressed. In this case the challenges are considerable. The challenge initially is to effectively communicate the issue so that it is understood within and across organisations. The second challenge may be to follow up at appropriate levels and in appropriate ways (research for example). The third challenge may be to effect change which is likely to be beyond the scope of the assessment.

6.3.1.3 Process issues

The following issues are relevant:

- **Use of existing statutes**;
- **Clarity of respective mandates**;
- **Ability to influence budget**;
- **Participatory target setting**;
- **Alignment of monitoring**;
- **Monitoring-reporting-management integration**;
- **Adaptive management**;
- **Management plans**;
- **Science-management interfacing**;
- **Impact of conservation plan on decision making**; and
- **Reporting**.

In some cases inadequate processes may simply be the result of a lack of capacity and competency. On the other hand, some issues (like the ability to influence budget) may require a concerted effort to convince those responsible for budget allocation to consider representations submitted to them that motivate conservation of freshwater ecosystems. Cross-sector policy objective 5, namely "Enable effective implementation", is particularly relevant.

In other cases, inadequate process may simply require a period of some dedication to developing the necessary process ("just doing it") and then ensuring it is implemented. For example, inadequate clarity on respective mandates will require an action, like a workshop, focused on achieving a common understanding of the mandates of the respective organisations.

6.3.1.4 Co-learning issues

The following issues are relevant:

- **Current culture of cooperation**;
- **Social learning**;
- **Existence of a champion**;
- **Trust**; and
- **Cooperation in monitoring**.

These co-learning issues are directly related to the core concept around which the reflective assessment process was developed in the first place, namely cooperation. The above-mentioned regulatory tool issues, capacity and resource issues, and process issues are the regulatory and managerial aspects that facilitate cooperation relating to freshwater conservation. The co-learning issues are more personal.

Increased emphasis on co-learning issues is justified by cross-sector policy objective 5, namely "Enable effective implementation". More specifically, the third implementation principle, namely "to enable cooperative governance in the conservation and management of freshwater ecosystems" is particularly relevant. The issue here is more than the co-learning itself. The ultimate test of co-learning is whether the issues can be articulated in the contexts of the different organisations.

6.3.2 Creating and nurturing cooperation

To create and nurture a culture of cooperation do the following:

- **Acknowledge the need for cooperation**. Cooperation involves parties actively working together for mutual benefit. Identities remain distinct with active and respectful negotiations occurring within professional boundaries and cultural practices. See Section 3.4.

- **Acknowledge the need for toleration and coordination**. Cooperation cannot begin without (Section 3.4.3):

  Toleration. There will be routine problem-solving behaviours that are culturally embedded in the respective organisation that are seldom questioned.

  Coordination. Parties inform each other of their activities.

- **Acknowledge that self-interest is the individual's fall-back position**. The force opposing cooperation is self-interest. Self-interest is a dominant force in many human beings and the uncertainties in the hypothetical social dilemmas described in Section 3.4.2 relate directly to this premise. Importantly, self-interest *per se* is not a bad thing. It is the extent to which it overrides the common good that makes it a problematic issue.

- **Acknowledge that everyone must perceive a net benefit**. To get people to cooperate, positive benefits must be perceived for the individuals and their organisations (see Section 3.5). They must also be perceived as outweighing the costs of cooperation. Facilitators must be respectful of the time and travel constraints confronting agency representatives and seek strategies for accommodating these needs when planning opportunities for face-to-face interaction. Efforts to make the impact of each agency or representative more noticeable may also help convince managers of the importance of the initiative. Additional efforts could be made to work with these managers to examine how the cost of travel and time spent working on collaborative initiatives in the short term may increase efficiency in the long run by decreasing the amount of overlap between agencies and increasing the amount of funding.

- **Work towards assurance of fair play**. A number of issues contribute to a general perception of fair play (Section 3.5.2):

  Establish rules. Implicit rules emerge that increase accountability when interaction is transparent and frequent. Explicit rules can also be developed. These might simply take the form of actions noted in minutes of meetings or more formally in detailed documented procedures. Note that the rules must be:

  - *Appropriate to the local conditions*;
  - *Considered legitimate by the members of the group*;
  - *Enforced consistently*; and
  - *Subject to change by the people they are imposed on*.

  Co-learn. Have frequent face-to-face communication. It can create a sense of group solidarity and enhance the likelihood that individuals keep promises to cooperate.

- **Strengthen networks**. All agencies whose mandates cover some aspect of freshwater ecosystem management should at least be provided with channels for the exchange of information, expertise and ideas. This is also related to the coordination necessary to facilitate cooperation.

- **Invest in formal and informal systems of communication**. Consistent and frequent communication between agency representatives can contribute not only to the effective exchange of information but can also build trust between parties which may help to solidify commitment to the cooperative endeavour.

- **Establish communities of practice**. A community of practice is group of people who (a) share a passion and (b) meet regularly and informally to learn and practice how to do things better (see Section 3.5.2.2). They can be powerful forces for good although have to be managed with sensitivity for them to remain effective. A community of practice focused on learning more about freshwater ecosystems directly addresses the fifth implementation principle of cross-sector policy objective 5, namely, "to promote discovery, inventory and improved understanding of freshwater biodiversity".

- **Acknowledge that only one missing factor can jeopardise everything**. Effective cooperation requires many conditions to be favourable. Facilitation of cooperation therefore demands a very wide perspective to ensure everything is in place.

6.3.3 Target levels for responses

Even if strategic adaptive management as described in Section 5.3 is not being practiced explicitly, it is possible that current practices will at least conform to some degree to the different levels of management depicted in **Figure 14**.

It should be clearly established at which level and policy or administration sector the issue of concern will require revision. Some examples were given above in Section 6.3.1. Generically, the following series of questions might be asked:

- *Does the issue require re-considering fundamental principles or high-level objectives*, for example, like those contained in the cross-sector policy for conservation of freshwater ecosystems? (See **Appendix A**.)

  If so, use appropriate channels (*e.g.* going up through the ranks) and mechanisms to initiate a process to bring shortcomings to the attention of those with the authority to change fundamental policy or high-level objectives. Understand that this will be a lengthy process (possibly years).

  If not, *does the issue require re-considering low-level objectives or possibly re-thinking likely outcomes*?

  - **If so**, again using appropriate channels and mechanisms initiate a process for ensuring that the people with the appropriate authority re-consider these issues and make binding decisions on alternative ways forward. Understand that this may be a fairly lengthy process.

  - **If not**, *does the issue require changes to the way the current plan is being implemented* (*e.g.* how and where monitoring is done)?

    - **If so**, initiate the necessary process to ensure the necessary changes are made. This is likely to be a much quicker process than any of the above.

In each of the above cases, if the necessary channels or mechanisms do not exist or do not function effectively, then it may be necessary to bring about the organisational change necessary to ensure they do exist and function effectively. That is, it may be necessary to create the channels or mechanisms. Such adaptation may take time and should also be guided by an underlying adaptive management process with a vision, associated objectives and even down to thresholds of potential concern that can be monitored. When the mechanisms exist but do not function effectively, following through with a response at the appropriate level may create an awareness of adaptive management and begin to establish such a culture.

6.3.4 What to say and do

6.3.4.1 Be purposeful in your cooperative responses

Ensure that whatever actions are taken in response to the reflective assessment, they are done so cooperatively (when appropriate) and purposefully (*i.e.* have a specific objective in mind).

6.3.4.2 Communicate by example

If possible (and within your power) simply change the way you do things, even in small ways. This demonstrates commitment to your fellow workers in your own organisation and in those who you cooperate with. This raises the assurance in their minds that you will play the game fairly and therefore increases the chances of them committing to greater cooperation.

6.3.4.3 Speak their language

It should always be borne in mind that the people working at the various levels in **Figure 14** (from field workers to policy makers) and in different sectors may each have a completely different reference system that they use to determine whether an issue is of real concern or not. The field worker may be concerned about personal safety or being able to do the required monitoring round more quickly. Middle management may be concerned about budget constraints. Senior management may be concerned about being seen to be implementing current policy. Politicians may be concerned about being popular and being seen to do be doing the right thing in the region's or nation's interest.

The message generated by those freshwater conservation practitioners wishing to cause change (to deal with what *they* perceive as a compelling issue) must therefore be worded in such a way that it takes account of these reference systems. In other words, any communication with other levels must be couched in their management or governance language and take account of their priorities. The higher the level the more fundamentally they tend to think. Expressing the message in their terms (like policies and goals) will immediately increase the legitimacy and relevance of your issue.

Communications must explicitly note how making, for example, some low-level change is aligned with a management target or underlying principle. For example, simplifying procedures for travel outside provincial boundaries will facilitate "cooperative governance". Also refer explicitly to the original cross-sector policy objectives (**Appendix A**) whenever possible.

6.3.4.4 Choose the right mechanism

Change at the different levels indicated in **Figure 14** typically occurs through widely different mechanisms. It is critical that these mechanisms are clearly identified and that the timing associated with them is also known. Submissions to appropriate people or bodies must be made on time and in an appropriate format.

6.3.4.5 Be positively persistent

As noted in Section 5.4.3, some things will inevitably take a long time to change. Always be positive and persistent in your efforts to pursue your beliefs. Make a deliberate effort to understand what drives those with the necessary authority to implement the necessary changes. Also appreciate that there may be considerable lag times between your action and any reaction.

Don't get disheartened when you can't get your message through to upper levels. Keep trying. Nudge and influence the system whenever possible. Appreciate even the smallest advance.

6.4 REFERENCES

Wenger E (2004). Knowledge management as a doughnut: Shaping your knowledge strategy through communities of practice. *Ivey Business Journal.* January/February 2004: 1-8.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions and recommendations arising out of this work.

7.1 CONCLUSIONS

The following conclusions are drawn from this work.

- **The first original objective** was "in relation to the conservation of freshwater biodiversity, consolidate international experience in, and explore the inter-relatedness between, policy monitoring and evaluation, performance indicators, management effectiveness, scorecards, and cross-sector collaboration". This was achieved and the outcomes are captured in the following Chapters:
  - Chapter 2: Assessing management effectiveness;
  - Chapter 3: Adaptive management and cooperation; and
  - Chapter 5: The scorecard within adaptive management.

- **The second original objective** was to "develop, test and refine performance indicators of management effectiveness and an associated scorecard system to measure progress towards the achievement of cross-sector policy objectives for conserving freshwater biodiversity". The emphasis of this objective was modified to:
  - Address cooperation instead of management effectiveness;
  - Be multi-organisational instead of single-organisational;
  - Be context specific instead of standardised;
  - Be embedded in adaptive management instead of being stand alone; and
  - Enable the development of a coherent compelling message to upper management instead of reporting on management effectiveness.

  This objective, with the above modifications, was achieved and the outcomes are captured in the following Chapters:
  - Chapter 3: Adaptive management and cooperation;
  - Chapter 4: Scorecard case study;
  - Chapter 5: The scorecard within adaptive management;
  - Chapter 6: Reflective assessment implementation; and
  - The Appendices.

- **The third original objective** was to "develop guidelines for the implementation of performance indicators and effectiveness scorecard in South Africa". This was achieved and the guidelines are captured in Chapter 6: Implementation guidelines.

- **The fourth original objective** was to "facilitate a process of dialogue amongst mandated stakeholders that will promote collaborative learning and high-level support/endorsement for the effectiveness measurement guidelines". This was achieved and the process and outcomes are captured in the following Chapters:
  - Chapter 4: Scorecard case study; and
  - The recommendations in Chapter 7: Conclusions and Recommendations.

- There is a wealth of expertise and experience worldwide relating to assessing management effectiveness and scorecards in particular. Much has also been published that assesses the effectiveness of various approaches.

- The well-studied and much-published hypothetical social dilemmas, like those summarised in this report, are useful for improving our understanding of what motivates stakeholders in the complex arena of natural resource management. They emphasise in particular the interplay between individual self interest and cooperation.

- In the context of conservation of freshwater ecosystems, each sector or government department is likely to participate in the cross-sector negotiations from a position of their respective identities. Cooperation (involving parties actively working together for mutual benefit while retaining their respective identities) therefore appears to be the most appropriate behaviour. Equivalently, full collaboration (which suspends professional identities and focuses on the contribution of complementary knowledge and skills) is inappropriate because identities should be retained.

- Co-learning based on frequent face-to-face communication and joint action is important when facilitating cooperation between organisations.

- The spreadsheet facility developed in this work seems to be a useful tool for facilitating reflective assessment and motivating participants to do something about shortcomings. It also facilitates face-to-face communication, helps identify weaknesses and strengths, and helps develop a coherent message for upper levels.

- The appropriateness of an adaptive management approach to managing freshwater ecosystems (primarily because of their complexity) and the fact that responsibility for such management typically falls across multiple organisations demands a significant degree of cooperation between those organisations.

- Considerable external input may be required to initiate, facilitate and maintain cooperation between different organisations. This ensures an appropriate theoretical and unbiased perspective guides the process although it is important that the organisations share responsibility.

7.2 RECOMMENDATIONS

The following recommendations are made, based on this work:

- It is recommended that when the need arises for a scorecard that specifically assesses management effectiveness (as opposed to facilitating reflection and self assessment) existing worldwide experience should be made use of and relevant literature carefully studied. The scope of the assessment should be defined and the nature of the most appropriate scorecard chosen on the basis of tables such as:
  Table 2 : Management effectiveness assessment methodology (Ervin, 2006).
  Table 7 : Management effectiveness evaluation options: Advantages and constraints.

- It is strongly recommended that when considering assessing management effectiveness, careful consideration be given to rather using a reflective assessment tool like the one developed in this work instead of one that measures management effectiveness *per se*. This is because the preferred emphasis is on trusting people rather than systems.

- It is recommended that whenever there exists a desire to initiate and maintain cooperation, explicit consideration be given to self interest as an understandable human motivation. For example, explicit steps should be taken to ensure that:
  Everyone perceives that the ultimate benefits of cooperation (which are sometimes intangible) will outweigh the costs (which may be tangible and immediate); and
  There are assurances of fair play through the establishment of either implicit or explicit rules.

- It is recommended that when facilitating cooperation, deliberate steps should be taken to get basics in place like:
  Toleration (which involves routine problem-solving behaviours that are culturally embedded in each organisation and seldom questioned); and then
  Efficient and effective communication mechanisms that support basic "information sharing", *i.e.* coordination. (Coordination occurs when two parties inform each other of their activities, although the process is more important than their relationship.)

- It is recommended that when facilitating cooperation, specific mechanisms, especially like those that result in frequent face-to-face communication, should be identified upon which to base co-learning.

- It is recommended that whenever possible, opportunities for co-learning among the organisations should be created (*i.e.* learning by doing practical things together), for example, a joint River Health survey and associated reporting.

- Issues of concern identified during an assessment should be explicitly captured and done so using the language of the governance or management level at which it will be aimed.

- It is recommended that future application of the scorecard and responses to it be closely associated with the practical implementation of co-learning practices, especially learning by doing.

- It is recommended that the effectiveness of the scorecard as a reflective assessment tool be formally assessed in coming years in the context of the management and conservation of freshwater ecosystems, *i.e.* explicitly linking it to practices such as river health assessment (River Health Programme) and systematic conservation planning.

- Facilitation of reflective assessment should be considered by organisations such as catchment management agencies and even the South African National Biodiversity Institute (SANBI). However, it should be acknowledged that the necessary leadership may well emerge elsewhere.

- It is also recommended that single organisations consider using the reflective assessment process and spreadsheet tool to reflect on cooperation issues.

7.3 REFERENCES

Ervin J (2006). *Assessing Protected Area Management Effectiveness: A Quick Guide.* Arlington VA: The Nature Conservancy. 18pp.

Appendix A: Cross-sector policy for conservation of freshwater ecosystems:

Objectives, implementation principles and recommendations

The five cross-sector policy objectives and their supporting implementation principles and associated recommendations are summarised from:

Roux DJ, Nel J, MacKay HM and Ashton PJ (2006). *Cross-sector policy objectives for conserving South Africa's inland water biodiversity.* Report TT 276/06. Water Research Commission, Pretoria. Available [online] at website: http://www.waternet.co.za/rivercons /publish.html

Objective 1: Set and entrench quantitative conservation targets for freshwater ecosystems

This objective aims to set minimum requirements for freshwater ecosystem conservation in order to: (a) allow an evaluation of whether existing conservation efforts represent the biodiversity of a region adequately; (b) provide guidance for planners who are balancing a number of competing demands for natural resources in a region; and (c) provide water resource management and biodiversity conservation agencies with common quantitative measures for which to aim.

There are three implementation principles associated with this objective. The first implementation principle is to **set and endorse national targets for conservation of freshwater ecosystems**. To support this principle, the following policy recommendations were agreed to:

- The quantitative target for freshwater ecosystem conservation in South Africa should be to maintain (and restore where necessary) at least 20% *of each freshwater ecosystem type* in a Natural Class, where Natural Class refers to the highest level of protection afforded by DWAF's Water Resource Classification System.
- The national government departments responsible for water resources, biodiversity, land management and integrated planning should officially endorse the national conservation target for fresh waters and integrate this target into their respective policy and planning processes.
- National government is, and should remain, accountable for achieving the 20% conservation target. However, all spheres of government (national, provincial and local) should have a role in prioritising freshwater ecosystems for conservation, and share a responsibility for achieving effective conservation of identified systems. National government should be responsible for driving the process of harmonising conservation prioritisation and implementation between national, provincial and local spheres of government.
- The conservation of freshwater ecosystems that are shared with neighbouring countries should be addressed through the development of bi-national or multi-national agreements.

The second implementation principle is to **disaggregate the national targets differentially to sub-national implementation levels**. To support this principle, the following policy recommendations were agreed to:

The national freshwater conservation target should be disaggregated down as sub-national targets to correlate with the 19 Water Management Areas set out by the National Water Resources Strategy.

- Where specific freshwater ecosystems are shared between two or more WMAs, the national target need not necessarily be met uniformly across these areas of administrative responsibility. Rather, the constitution of the national target through sub-national component targets may reflect variation in the richness of freshwater biodiversity as well as achievability due to present levels of ecological transformation across the landscape. Overall, a fair and equitable distribution of responsibility regarding biodiversity conservation should be achieved; and responsibilities should be matched with appropriate resources (in terms of skilled staff, equipment, information and funding).
- Sub-national targets should be set in collaboration with the relevant sub-national government agencies; ideally, these should be juxtaposed with biodiversity assessment and conservation planning exercises. It should be the overall responsibility of national government, and specifically DEAT (primarily through SANBI), to facilitate and oversee the spatially nested processes of biodiversity assessment, conservation planning and target setting.
- It should be the responsibility of DWAF, primarily through its CMAs and the practice of integrated water resource management (IWRM), to implement the conservation targets at sub-national level. CMAs should be responsible for fostering horizontal and vertical coherence and coordination of conservation actions. For example, planning for the conservation of freshwater ecosystems should engage with the National Biodiversity

Framework and its responsible parties, the relevant Catchment Management Strategy(s) and its responsible parties, and local development planning and decision-making structures including municipalities within the jurisdiction of the relevant Catchment Management Agency.

The third implementation principle is to **improve and refine national and sub-national targets over time**. To support this principle, the following policy recommendations were agreed to:

- The national conservation targets for freshwater ecosystems should be subject to review every five years. Review should be coordinated by SANBI, with inputs from all of the relevant national custodians and stakeholders of these targets, for example DWAF, DEAT, DoA, DPLG, and SANParks.
- The national custodians of the freshwater conservation targets should identify and support the research needed to enable informed revision of the national targets over time.

Objective 2: Plan for representation of freshwater ecosystems

The objective of representing freshwater ecosystems is to ensure adequate representation of the full spectrum of freshwater biodiversity, based on the systematic description and depiction of the freshwater ecosystems within the region of concern. A key objective of conserving representative examples of freshwater ecosystems is the promotion of a systematic approach to the identification, prioritisation and conservation of freshwater ecosystems, as opposed to a focus on well-studied, relatively unmodified, or biologically more diverse systems. Three implementation principles inform the achievement of this objective. The first implementation principle is to **use surrogate measures as indictors to describe and classify freshwater ecosystems**. To support this principle, the following policy recommendations were agreed to:

- As a pragmatic consideration, landscape or ecoregion-level measures of heterogeneity in freshwater ecosystems may be used as surrogates for achieving representation of freshwater ecosystem features in conservation planning;
- Surrogates should be tested and validated through proper hypothesis testing to ensure their scientific rigour; and
- Ecoregional surrogates (as coarse filters of biodiversity) should be supplemented wherever possible with fine filter surrogates (such as species or community level data).

The second implementation principle is to **define the appropriate scale**. To support this principle, the following policy recommendations were agreed to:

- Conservation planning should follow a spatially nested approach with coordination and alignment between at least three scales:

  National planning: The CBD calls for the development of **countrywide** conservation plans and conservation of representative samples of all **major ecosystem types**. As such, the delineation, analysis and representation of freshwater ecosystems at a national scale should be viewed as a priority.

  Sub-national planning: Since planning and allocation of water resources takes place at a sub-national and catchment level, catchment-based biodiversity representation and planning should be closely aligned with and complement national-level plans.

  Regional planning: The regional significance (e.g. uniqueness) of freshwater ecosystems should also be considered. In this regard the region of the Southern African Development Community (SADC) becomes a relevant planning unit. At present, there are serious data discrepancies between South Africa and its neighbouring countries. This should be addressed through the development of minimum data and monitoring requirements for the region, and by spelling out shared responsibilities and time frames for generating basic and uniform data layers for the region.

The third implementation principle is to **incorporate local ecological knowledge**. To support this principle, the following policy recommendation was agreed to:

- People with local ecological knowledge – whether experts who have worked in the area or local inhabitants such as farmers or community members – should be involved wherever possible to point out areas of special interest and to review planning outputs; this is especially important for fine-scale freshwater conservation plans. To facilitate its use in conservation planning, this knowledge must be recorded in a spatially explicit manner with clear explanations as to why each mapped feature is important, and options for how they could be managed in a conservation-friendly manner.

Objective 3: Plan for persistence of freshwater ecosystem processes

The objective of planning for persistence is to conserve the ecological and evolutionary processes that generate and maintain freshwater biodiversity. Conserving species and habitats, as considered under biodiversity representation, provides a snapshot of the biodiversity that currently exists. If we wish this biodiversity to persist and naturally evolve over time, we also need to make sure that: (a) populations, communities or ecosystems that are both viable and of high ecological integrity are selected; (b) natural ecological processes (functional elements) and disturbance regimes such as floods, droughts and fires continue to operate within their natural ranges of variability; and (c) the size of a conservation design is sufficient to allow a system to recover from natural disturbances.

There are four implementation principles associated with achieving this objective, the first of which is to **select freshwater ecosystems of high integrity**. To support this principle, the following policy recommendations were agreed to:

- Only ecosystems that reflect a present ecological state of A or B will contribute to achieving freshwater conservation targets; and
- Where necessary, and subject to feasibility, ecological restoration or rehabilitation should be undertaken to achieve the set conservation target.

The second implementation principle is to **ensure connectivity**. To support this principle, the following policy recommendations were agreed to:

- In many instances it is virtually impossible to find an un-dammed or un-regulated river system. Given that virtually all of South Africa's main rivers have been dammed or regulated in some way, longitudinal connectivity for selected rivers should be enhanced as far as possible, for example through construction of appropriate fish ladders and adoption of water release regimes that adhere to environmental flow requirements.
- In order to optimise the protection of the functional elements of freshwater ecosystems, adjacent river reaches rather than isolated reaches should, wherever possible, be selected for contributing towards conservation targets. Where this is not attainable, river ecosystems that are designated for conservation (in an A or B ecological state) should, where relevant, be connected through river ecosystems that are in an ecological state that will support ecological connectivity. This functionality commonly concurs within a C ecological state. However, this relationship should not be seen as a given and each potential connecting river should be assessed carefully, based on process attributes such as its ability to allow the migration of a key species.
- Where ecosystems are in an ecological state that is lower than A or B but are deemed important for providing connectivity, such ecosystems should be considered part of an overall design for freshwater conservation. The maintenance of their ecological state will be necessary for achievement of the overall conservation target. However, they should not contribute towards satisfying the quantitative conservation target.

- The management and conservation of freshwater ecosystems must address maintenance or re-establishment of environmental gradients along longitudinal, lateral and vertical dimensions.
- The need for lateral connectivity emphasises the importance of aligning land and water biodiversity priorities and management strategies. Similarly, the need for vertical connectivity emphasises the importance of aligning surface and groundwater management strategies.

The third implementation principle is to **include large-scale ecosystem processes**. To support this principle, the following policy recommendations were agreed to:

- Where appropriate (in catchments that are designated for conserving freshwater ecosystems), natural disturbance regimes, such as floods, droughts and fires, should be allowed to operate within their natural ranges of variability; and
- There are few places in the world where completely unaltered environmental regimes and natural disturbances currently exist. Therefore the potential to restore regimes and disturbances through active management (e.g., releases from dams according to in-stream flow requirements, including floods) should be evaluated when selecting conservation areas.

The fourth implementation principle is to **select areas of sufficient size**. To support this principle, the following policy recommendations were agreed to:

- Freshwater conservation actions should cover multiple spatial scales, from local (e.g. small-patch ecosystems) to large landscapes. At least some larger scale efforts should interface with terrestrial and marine conservation plans.
- Since administrative boundaries are often smaller than, or poorly aligned with, the span of ecological processes, a national conservation planning framework should provide clear guidance regarding the conservation of ecological and evolutionary processes at sub-national levels. Such a planning framework for conserving freshwater processes should form part of South Africa's National Biodiversity Framework.

Objective 4: Establishing a portfolio of freshwater conservation areas (FCAs)

The objective of establishing freshwater conservation areas is to incorporate the first three objectives into spatial configurations that will constitute the portfolio of freshwater conservation areas (FCAs) of South Africa. There are five implementation principles associated with achieving this objective. The first implementation principle is to **legislate IWCAs through complementary legal mechanisms**. To support this principle, the following policy recommendations were agreed to:

- Departments responsible for biodiversity conservation, water resource management, land use (agriculture) and integrated development planning should promote coherence between their respective policies and strategies. Coherence can be enhanced by actively incorporating the policy objectives and principles of this document into their future policy and strategy processes.
- Freshwater conservation priorities should be linked to appropriate legal mechanisms for implementation.

The second implementation principle is to **strive for optimal land-use efficiency**. To support this principle, the following policy recommendations were agreed to:

- Integrated planning and management of natural resources (both aquatic and terrestrial) should be regarded as a priority for achieving efficient conservation of freshwater ecosystems. Appropriate mechanisms for achieving this, for example the appointment of

natural resource management coordinators at district levels, should be carefully investigated.
- Since the conservation of freshwater ecosystems is dependent on an ability to achieve appropriate land management practices within associated drainage areas, the least conflicting cross-sector options should be sought wherever possible; i.e. to steer away from allocating freshwater conservation priorities in catchment areas designated for types of development that conflict with conservation objectives.
- Ideally, freshwater conservation plans should be carried out in parallel to terrestrial, and marine conservation plans and all plans should be well-integrated.
- Freshwater conservation planners should design, in collaboration with terrestrial and marine conservation planners, one or two large conservation areas that would focus on integrating conservation objectives for terrestrial, freshwater, estuarine and marine ecosystems.
- Prioritisation systems that consider biodiversity together with social and economic realities should be developed and tested.

The third implementation principle is to **prioritise and initiate conservation actions timeously**. To support this principle, the following policy recommendations were agreed to:

- The allocation of resources for conserving freshwater ecosystems should be guided by (a) an assessment of the vulnerability of each freshwater ecosystem to threats or resource use pressures; and (b) an assessment of the options available for conserving each freshwater ecosystem.
- Investigative research should be initiated to improve our understanding of the vulnerability of freshwater ecosystems.

The fourth implementation principle is to **conserve first where appropriate, rather than restore later**. To support this principle, the following policy recommendations were agreed to:

- Freshwater ecosystems that are ecologically intact should receive priority in the selection for achieving representation.
- In instances where the sub-national conservation target cannot be met owing to past or current over-utilisation of certain freshwater ecosystems, the restoration of these ecosystems should be considered on the basis of ecological feasibility and affordability.

The fifth implementation principle is to **provide explicit selection options and management guidelines**. To support this principle, the following policy recommendations were agreed to:

- When prioritising freshwater ecosystems for conservation, explicit information should be provided about the biodiversity features contained by these ecosystems as well as the regional significance of these features, e.g. are they endemic to the Water Management Area or to the country.
- For each potential selection, some information should be provided on the main pressures on biodiversity and how best to mitigate these.
- Catchment zoning, in which the most deleterious activities for the resource are relegated to the furthest part of the catchment, should be investigated as a management option in instances where whole catchments cannot be conserved.
- All selected catchments should have management plans for the removal and management of alien species.

Objective 5: Enable effective implementation

Acknowledging that the value of a conservation design is only realised through its effective application, the objective of effective implementation is to create an institutional environment that promotes sustained conservation actions for all designated freshwater conservation areas.

There are five implementation principles underpinning this objective. The first implementation principle is to **facilitate stakeholder adoption of freshwater conservation targets and priority areas**. To support this principle, the following policy recommendations were agreed to:

- Stakeholders (key decision makers and water user groups) should be engaged at the outset of the planning process, and at various stages through the planning process rather than only at the end of the process.
- Conservation plans for freshwater ecosystems need to be aligned with the frameworks and terminology used by the targeted resource managers, e.g. Bioregional Plans and Catchment Management Strategies.

The second implementation principle is to **reflect the conservation of freshwater ecosystems as an explicit function in institutional design**. To support this principle, the following policy recommendations were agreed to:

- Every sub-national implementation agency responsible for conserving freshwater ecosystems should plan for and acquire internal capacity for effectively executing their responsibilities in this regard. Capacity implies both the skills to facilitate networking and collaboration among relevant agencies, as well as sufficient depth of knowledge in aquatic ecology and conservation science to harness external knowledge in this regard and to effectively apply such knowledge.
- CMAs, provincial conservation departments / agencies, and district and local municipalities should plan and budget for the financial and human resource implications associated with effective implementation of their agreed component of the freshwater conservation objectives and targets in their geographic areas of responsibility.

The third implementation principle is to **enable cooperative governance in the conservation and management of freshwater ecosystems**. To support this principle, the following policy recommendations were agreed to:

- Performance management in a cooperative governance setting should be promoted through the development, testing and demonstration of suitable quantitative and qualitative indicators.
- The establishing of regular interaction with counterparts in cooperative agencies should be encouraged. Regular and quality interactions are necessary for building personal and professional relationships; especially where stakeholders are geographically dispersed.

The fourth implementation principle is to **facilitate a science-management continuum**. To support this principle, the following policy recommendation was agreed to:

- National custodian departments should institute and support suitable mechanisms and processes that will promote an adaptive management framework for conservation of freshwater ecosystems.

The fifth implementation principle is to **promote discovery, inventory and improved understanding of freshwater biodiversity**. To support this principle, the following policy recommendations were agreed to:

- Clear responsibilities should be established regarding biodiversity collections and inventories, as well as the means to coordinate actions and responsibilities at national level.
- Priority monitoring gaps and limitations should be identified, responsible parties should be identified, and appropriate interventions should be developed.
- A protocol for the systematic collection and curation of species data should be drawn up to guide museums and other collectors.

Appendix B: Scorecard: Original version

As noted in the background chapter, the project has moved away from the development of a conventional management effectiveness scorecard for a single organisation, towards the development of a motivational / reflective assessment tool for multi-agency co-operative and adaptive behaviour. Nevertheless, several elements of the scorecard approach (see Chapter 2) have been drawn upon and incorporated, including:

- The use of an explicit framework to provide structure to the assessment tool;
- The use of a series of questions related to each element of the framework;
- The use of a simple rating scale (yes-no or 0-3) for each question, with a short descriptive answer linked to each score; and
- Emphasis on self-assessment by those involved, rather than external assessment;

This means that that the reflective assessment tool has the “look and feel” of a scorecard (which may assist with uptake) even though it has some fundamental differences from the scorecard approach. Key differences include:

- Interactive facilitated multi-agency process to complete the assessment tool (this could arguably be applied to a conventional scorecard, even though it usually isn’t);
- Questions may change from year to year (whereas in a scorecard they are the same from year to year);
- Structure follows a context-planning-monitoring-management-social learning sequence, rather than the WCPA Framework (context, planning, processes, inputs, outputs, outcomes) although this latter structure was used in version in this Appendix. The former structure was used in subsequent versions.

CONTEXT (WHERE ARE WE NOW?)

Issue	Criteria	Score	Comments/next steps
1. Legal Status Are legal mechanisms in place for the conservation of fresh water biodiversity?	There are no legal mechanisms for the conservation of freshwater biodiversity.	0	
	Relevant parties are in agreement on the need for legal mechanisms for the conservation of freshwater biodiversity. The process of drawing up legal mechanisms has begun but is still incomplete.	1	
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place.	2	
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place and priority freshwater ecosystems are explicitly and effectively linked to these mechanisms.	3	
2. Land- and Water Use Regulations Are agricultural and industrial uses of land and water being regulated?	No mechanisms exist for regulating agricultural and industrial uses of land and water.	0	
	Mechanisms for regulating agricultural and industrial uses of land and water exist but there are major problems in implementing them effectively.	1	
	Mechanisms for regulating agricultural and industrial uses of land and water exist but there are some problems in implementing them effectively.	2	
	Mechanisms for regulating agricultural and industrial uses of land and water exist and are implemented effectively.	3	
3. Capacity to effectively implement regulations Can staff implement agricultural and industrial water and land use regulations effectively?	The staff have no effective capacity/resources to implement agricultural and industrial water and land use regulations effectively	0	
	There are major deficiencies in staff capacity/resources to implement agricultural and industrial water and land use regulations effectively (for example, high staff turnover and insufficient budget)	1	
	Staff have reasonable capacity to implement agricultural and industrial water and land use regulations effectively, but some deficiencies remain	2	
	Staff have excellent capacity/resources to implement agricultural and industrial water and land use regulations effectively	3	
4. Resource Inventory Does your organisation (department) have enough information to manage the area?	There is little or no information available on the critical habitats, species and cultural values of the area (province or management area)	0	
	Information on the critical habitats, species and cultural values of the area (province or management area) is not sufficient to support planning and decision making	1	
	Information on the critical habitats, species and cultural values of the area (province or management area)is not sufficient to support planning and decision making, BUT necessary survey work is not being maintained	2	
	Information on the critical habitats, species and cultural values of the area (province or management area) is not sufficient to support planning and decision making and is being maintained	3	
5. Current Culture of Co-operation What is the current culture of co-operation between you and your partner organisation/s regarding various aspects of natural resource monitoring and management?	Virtually no co-operation takes place between you and your partner organisation/s.	0	
	There is informal co-operation between you and your partner organisation/s	1	
	There is regular but not formalised co-operation between you and your partner organisation/s	2	
	There is regular AND formalised co-operation between you and your partner organisation/s regarding the conservation of freshwater biodiversity	3	

PLANNING (WHERE DO WE WANT TO BE?)

Issue	Criteria	Score	Comments/next steps
6. Systematic conservation planning Do you have a systematic conservation plan indicating how many and which freshwater biodiversity features you need to conserve?	There is no plan	0	
	A plan is in the process of being designed	1	
	There is a plan but with no implementation guidelines	2	
	There is a plan with detailed implementation guidelines	3	
7. Integration between conservation plan and strategic/work plans Are these priorities reflected in your organisation's strategic plan / work plan?	Conservation priorities and actions are not reflected in the strategic plan of the organisation and work plans of individuals	0	
	Priorities are reflected in the strategic and work plans but are only partially implemented	1	
	Priorities are fully integrated in strategic and work plans and implemented	2	
	Priorities are fully integrated in strategic and work plans, implemented and are regularly reviewed	3	

INPUTS (WHAT DO WE NEED?)

Issue	Criteria	Score	Comments/next steps
8. Staff numbers Do you have all the required skills to effectively conserve freshwater biodiversity?	There are no staff	0	
	Staff numbers are inadequate and staff are unqualified	1	
	Staff numbers are below optimum level, but staff are well qualified	2	
	Staff numbers are adequate and staff are qualified to undertake freshwater conservation planning	3	
	Do you have the following skills or capacity?		
	Fish water biologist	+1/3	
	Aquatic invertebrate specialist	+1/3	
	Water quality specialist	+1/3	
	Hydrologist	+1/3	
	Aquatic plant specialist	+1/3	
	Geomorphologist	+1/3	
	Wetland ecologist	+1/3	
	GIS specialist	+1/3	
	Conservation Planner	+1/3	
9. Staff training Do staff receive appropriate training?	Staff undergo no training	0	
	Staff receive generic training only	1	
	Staff receive only theoretical (e.g. conferences or courses) or practical training (e.g. fieldwork and application of methodologies) on freshwater conservation	2	
	Staff receive both practical and theoretical training on a regular basis (at least twice per year)	3	
10. Equipment Do you have sufficient equipment to effectively conserve freshwater biodiversity?	There are limited or no equipment and facilities	0	
	There are some equipment and facilities, but these are wholly inadequate	1	
	There are equipment and facilities, but still some major gaps that constrain management	2	
	There are adequate equipment and facilities	3	

11. Ability to influence budget Do you know your available budget for freshwater conservation and can you influence it?	The size of the budget is not made known and it is impossible to influence it.	0	
	The size of the budget is only made known after the start of the financial year and cannot be influenced	1	
	The size of the budget is made known at the beginning of the financial year and can be influenced to a certain extent	2	
	The size of the budget is known at least one year in advance and can be influenced it prior to allocation	3	
12. Adequacy of budget Do you have an adequate budget for the implementation of your freshwater objectives?	There is no secure budget for freshwater conservation and management for your organisation, which is wholly reliant on external funding	0	
	There is very little secure funding, and your organisation cannot function without external funding	1	
	There is a reasonably secure core budget	2	
	There is a secure budget for freshwater conservation planning and implementation on a multi-year cycle	3	

PROCESSES (HOW DO WE GO ABOUT IT?)

Issue	Criteria	Score	Comments/next steps
13. Cooperative conservation planning To what degree do partners that share the mandate for freshwater management and conservation cooperate in identifying spatial conservation priorities?	Your organisation does not know who its key partners are or does not have formal contact with them regarding systematic conservation planning	0	
	Systematic conservation planning is coordinated by one organisation and results are shared with partners	1	
	Systematic conservation planning is coordinated by one organisation and some partners are involved in some steps	2	
	Key partners actively participate in all aspects of systematic conservation planning and endorse the spatial priorities	3	
14. Alignment of monitoring Is monitoring aligned with the achievement of freshwater conservation objectives? (intra-organisation)	No relevant monitoring is undertaken by your organisation	0	
	Some relevant monitoring is undertaken	1	
	Your organisation actively participates in relevant monitoring programme, e.g. the River Health Programme, but does not link results directly to conservation objectives	2	
	A monitoring programme that is aligned with freshwater conservation objectives and targets has official status and is being maintained	3	
15. Cooperation in monitoring Are monitoring responsibilities shared amongst partners? (inter-organisation)	Different monitoring activities take place in isolation; not familiar with partners' monitoring activities	0	
	Aware of partners' monitoring activities, but no cooperation is taking place	1	
	Some cooperation in monitoring, but information management systems remain independent	2	
	Integrated design (agreed on indicators) and coordination in monitoring amongst all partners; compatibility, access, transfer of data sorted	3	
16. Monitoring-reporting-management integration Do you have an integrated monitoring, reporting and management system? (intra-organisation)	No monitoring or reporting takes place	0	
	Monitoring or reporting takes place but not as a linked system	1	
	Regular monitoring and reporting take place and are mutually reinforcing	2	
	Regular monitoring and reporting activities take place, are mutually reinforcing, and a clear mechanism exists for results to inform management decisions (adaptive management)	3	
17. Social learning Are you learning with your partners?	No social learning takes place between partners	0	
	Limited and mostly ad hoc social learning takes place, either in the field or during meetings	1	

(inter-organisation)	Planned events take place occasionally during which social learning includes both theory and practice	2	
	Regular and planned events take place during which social learning includes both theory (e.g. conceptual discussions) and practice (e.g. fieldwork)	3	
18. Champion Do you have a coordination champion (individual or core group)? (inter-organisation)	No individual or core group has emerged as a champion for partner cooperation	0	
	Partners meet on ad hoc basis and without the direction of a champion	1	
	A champion coordinates some relevant activities on an annual basis	2	
	A champion is accepted by all partners and he/she actively facilitates coordinated action and co-learning and this role is supported by your organisation	3	
19. Networking support Does your organisation provide support for networking with partners? (intra-organisation)	Your organisation provides no support for external networking	0	
	Your organisation provides limited support for networking with immediate partner organisations.	1	
	Your organisation provides logistical, technological and financial support for networking with partner organisations	2	
	Your organisation actively promotes and provides logistical, technological and financial support for networking with partner organisations as well as with external, but relevant knowledge sources (e.g. universities, conferences)	3	
20. Trust Is there a healthy level of trust between partners? (inter-organisation)	You do not know who your counterparts are or have virtually no contact with them	0	
	Limited and ad hoc interaction between counterparts takes place, including some discussion of freshwater conservation issues	1	
	You feel comfortable to ask your counterpart(s) for assistance in achieving your mandate	2	
	It comes naturally to phone your counterparts and freely discuss issues related to freshwater conservation, including mutual problem solving across organisational boundaries	3	
21. Integration of spatial plans Are different forms of spatial planning in your region well aligned? (inter-organisation)	Each form of spatial planning takes place in isolation	0	
	Some sharing of data and products takes place between planning initiatives	1	
	Sharing is common and some integration takes place	2	
	Full integration takes place between spatial planning, including freshwater and terrestrial conservation planning, catchment management planning and spatial development planning	3	

OUTPUTS (WHAT WERE THE RESULTS?)

Issue	Criteria	Score	Comments/next steps
22. Impact of conservation plan on decision making Are land-use decisions in the area made in accordance with specific guidelines based on your conservation plan?	Decisions are not made according to any set process or guidelines	0	
	Guidelines exist but there is a lack of clarity on whether decisions are made in accordance with them	1	
	Guidelines exist and the compliance of decisions to the guidelines are monitored, but a significant number of decisions are not made in accordance with the guidelines	2	
	Guidelines exist and the compliance of decisions is monitored and the majority of the decisions are in compliance with the guidelines	3	
23. Reporting Are regular reports produced on the status of freshwater biodiversity?	No reports are produced	0	
	Reports are produced irregularly and not based on quantitative data	1	
	Reports are produced regularly and are based on quantitative data, but do not show trends over time or relate directly to decision-making	2	

	Reports are produced regularly based on consistent indicators which track changes over time and feed directly into decision-making	3	
24. Trends in conservation status Has the conservation status of your portfolio of freshwater conservation areas improved?	No areas have improved or there is no data to assess improvement	0	
	Less than 25% of the freshwater conservation areas meet their designated conservation status / integrity class	1	
	Less than 50% of the freshwater conservation areas meet their designated conservation status / integrity class	2	
	More than 75% of the freshwater conservation areas meet their designated conservation status / integrity class	3	

OUTCOMES (WHAT DID WE ACHIEVE?)

Issue	Criteria	Score	Comments/next steps
25. Freshwater biodiversity value assessment Is freshwater biodiversity valued?	Conservation of freshwater biodiversity has no or low priority in your organisation and freshwater resources are characterised by widespread degradation	0	
	Conservation of freshwater biodiversity is actively taking place in less than 25% of the freshwater conservation areas	1	
	Conservation of freshwater biodiversity is actively taking place in less than 50% of the freshwater conservation areas	2	
	Conservation of freshwater biodiversity is an integral and active part of ecological and cultural conservation and with a secure future in more than 75% of the freshwater conservation areas	3	

Appendix C: February 2008 Workshop Attendance List

Name	Affiliation
Piet Muller	GDACE
Hermien Roux	NWDACE
Mashudu Ranwedzi	NWDACE
Pieter van Heerden	North West Parks and Tourism
Rens Botha	DWAF: North West
Petrus Venter	DWAF: North West
Botse Molokwane	DWAF: Gauteng
Eric Munzedhzi	SANBI
Project Team	
Dirk Roux	CSIR
Minnelise Levendal	CSIR
Liesl Hill	CSIR
Mao Angua Amis	University of Cape Town
Observer	
Craig McLoughlin	SANParks

Appendix D: February 2008 Workshop Scorecard

On the basis of a workshop held on 30-31 October 2007, the first version of the scorecard (**Appendix B**) was refined in order to make it more explicitly useful as a reflective assessment and motivational tool for multi-agency cooperative and adaptive behaviour with the ultimate aim of conserving freshwater ecosystems. This updated version (presented in the following pages) was used in the February 2008 reflective assessment workshop.

Version: 20080108

General scoring guidelines:

a) Answer Yes/No or 0-3
b) If Yes or 2-3, tell us how
c) If No or <2, who should be doing this, what do we need to do to improve, and/or is there a social mechanism that can help us?

A. CONTEXT (WHERE ARE WE NOW?)

Issue	Criteria	Score
1. Relevance of participation Does your organisation have a responsibility to contribute to the integrated management and conservation of freshwater ecosystems?	If yes, this meeting is for you. If no, can we convince you otherwise?	No
		Yes
2. Need for cooperation Is cooperation necessary to achieve effective freshwater conservation?	If yes: • What benefits would your organisation get from cooperation? • Are there certain actions that will be better achieved with cooperation than without? • What was your best/worst experience regarding cooperation? • Should agencies extend beyond their mandate, in the spirit of cooperation? If no, can we convince you otherwise?	No
		Yes
3. Clarity of respective mandates Do you have a clear understanding of the mandate of your and relevant other organisations?	Do not have a clear understanding of my organisation's mandate	0
	Understand my organisation's mandate	1
	Understand my organisation's mandate and have some understanding of the mandates of partner organisations	2
	Have a clear understanding of the complementarity between the mandates of my organisation and those of partner organisations	3
4. Current culture of cooperation What is the current culture of cooperation between you and your partner organisation/s regarding various aspects of natural resource monitoring and management?	Virtually no co-operation takes place between you and your partner organisation/s.	0
	There is informal co-operation between you and your partner organisation/s on an irregular basis	1
	There is regular but not formalised co-operation between you and your partner organisation/s	2
	There is regular AND formalised co-operation between you and your partner organisation/s regarding the conservation of freshwater biodiversity	3
5. Appropriate statutes Are legal mechanisms in place for the conservation of freshwater ecosystems?	There are no legal mechanisms for the conservation of freshwater biodiversity.	0
	Relevant parties are in agreement on the need for legal mechanisms for the conservation of freshwater biodiversity. The process of drawing up legal mechanisms has begun but is still incomplete.	1
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place.	2
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place and priority freshwater ecosystems are explicitly and effectively linked to these mechanisms.	3
6. Use of existing statutes	No mechanisms exist for regulating agricultural, mining and industrial uses of land and water.	0
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist but there are major	1

Are agricultural, mining and industrial uses of land and water being regulated?	problems in implementing them effectively.	
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist but there are some problems in implementing them effectively.	2
	Mechanisms for regulating agricultural and industrial uses of land and water exist and are implemented effectively.	3
7. Capacity to effectively implement regulations Can staff implement agricultural, mining and industrial water and land use regulations effectively?	The staff have no effective capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	0
	There are major deficiencies in staff capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively (for example, high staff turnover and insufficient budget)	1
	Staff have reasonable capacity to implement agricultural, mining and industrial water and land use regulations effectively, but some deficiencies remain	2
	Staff have excellent capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	3
8. Staff numbers Do you have sufficient staff and all the required skills (in your organisation) to effectively conserve freshwater biodiversity?	There are no staff	0
	Staff numbers are inadequate and staff are unqualified	1
	Staff numbers are below optimum level, but staff are well qualified	2
	Staff numbers are adequate and staff are qualified to undertake freshwater conservation planning *Consider whether you have the following skills or capacity?* Fish biologist; aquatic invertebrate specialist; water quality specialist; hydrologist; botanist; geomorphologist; wetland ecologist; GIS specialist; conservation planner	3
9. Staff training Do staff receive appropriate training?	Staff undergo no training	0
	Staff receive generic training only	1
	Staff receive only theoretical (e.g. conferences or courses) or practical training (e.g. fieldwork and application of methodologies) on freshwater conservation	2
	Staff receive both practical and theoretical training on a regular basis (at least twice per year)	3
10. Equipment Do you have sufficient equipment to effectively conserve freshwater biodiversity?	There are limited or no equipment and facilities	0
	There are some equipment and facilities, but these are wholly inadequate	1
	There are equipment and facilities, but still some major gaps that constrain management	2
	There are adequate equipment and facilities	3
11. Ability to influence budget Do you know your available budget for freshwater conservation and can you influence it?	The size of the budget is not made known and it is impossible to influence it.	0
	The size of the budget is only made known after the start of the financial year and cannot be influenced	1
	The size of the budget is made known at the beginning of the financial year and can be influenced to a certain extent	2
	The size of the budget is known at least one year in advance and can be influenced prior to allocation	3
12. Adequacy of budget Do you have an adequate budget for the implementation of your freshwater objectives?	There is no secure budget for freshwater conservation and management for your organisation, which is wholly reliant on external funding	0
	There is very little secure funding, and your organisation cannot implement freshwater objectives without external funding	1

	There is a reasonably secure core budget	2
	There is a secure budget for freshwater conservation planning and implementation on a multi-year cycle	3
13. Social learning Are you learning with your partners? (inter-organisation)	No social learning takes place between partners	0
	Limited and mostly ad hoc social learning takes place, either in the field or during meetings	1
	Planned events take place occasionally during which social learning includes both theory and practice	2
	Regular and planned events take place during which social learning includes both theory (e.g. conceptual discussions) and practice (e.g. fieldwork)	3
14. Champion Do you have a coordination champion for freshwater conservation (individual or core group)? (inter-organisation)	No individual or core group has emerged as a champion for partner cooperation	0
	Partners meet on an ad hoc basis and without the direction of a champion	1
	A champion coordinates some relevant activities on an annual basis	2
	A champion is accepted by all partners and he/she actively facilitates coordinated action and co-learning and this role is supported by your organisation	3
15. Networking support Does your organisation provide support for networking with partners? (intra-organisation)	Your organisation provides no support for external networking	0
	Your organisation provides limited support for networking with immediate partner organisations.	1
	Your organisation provides logistical, technological and financial support for networking with partner organisations	2
	Your organisation actively promotes and provides logistical, technological and financial support for networking with partner organisations as well as with external, but relevant knowledge sources (e.g. universities, conferences)	3
16. Trust Is there a healthy level of trust between partners? (inter-organisation)	You do not know who your counterparts are or have virtually no contact with them	0
	Limited and ad hoc interaction between counterparts takes place, including some discussion of freshwater conservation issues	1
	You feel comfortable to ask your counterpart(s) for assistance in achieving your mandate	2
	It comes naturally to phone your counterparts and freely discuss issues related to freshwater conservation, including mutual problem solving across organisational boundaries	3
17. Freshwater biodiversity value assessment Is freshwater biodiversity valued?	The need to conserve freshwater ecosystems is rather invisible or obscure within the portfolio of organisational priorities.	0
	Your organisation shows significant intent to conserve freshwater ecosystems; but action generally lacks.	1
	The need to conserve freshwater ecosystems is widely understood in your organisation and some success stories exist.	2
	Conservation of freshwater biodiversity features as a high priority on management and policy agendas. This is reflected in strong support for and active initiatives to understand, identify and conserve this biodiversity.	3

B. PLANNING (WHERE DO WE WANT TO BE?)

Issue	Criteria	Score
18. Shared conservation goals Are there shared and endorsed freshwater conservation goals in your domain (this could include vision, targets, thresholds, desired future state, systematic conservation plan)?	If yes, specify them (e.g. in terms of spatial priorities) and discuss their relevance and acceptability.	No
	If no, do you know that you can get assistance from SANBI?	Yes
19. Participatory target setting Is there a social mechanism for sharing complementarity of target allocation, keeping in mind land use planning, high value conservation areas, connecting gradients, recognition of natural	No targets have been set	0
	Conservation targets have been set but we were not involved	1
	We were involved in target setting but inclusive ownership lacks.	2
	Target setting is an ongoing and fully participatory process, including involvement from	3

disturbances?	organisations outside our domain of responsibility to ensure that large-scale ecosystem processes are covered.	
20. Integration of spatial plans Are different forms of spatial planning in your region well aligned? (inter-organisation)	Each form of spatial planning takes place in isolation	0
	Some sharing of data and products takes place between planning initiatives	1
	Sharing is common and some integration takes place	2
	Full integration takes place between spatial planning, including freshwater and terrestrial conservation planning, catchment management planning and spatial development planning	3
21. Integration between conservation plan and strategic/work plans Are these priorities reflected in your organisation's strategic plan / work plan?	Conservation priorities and actions are not reflected in the strategic plan of the organisation and work plans of individuals	0
	Priorities are reflected in the strategic and work plans but are only partially implemented	1
	Priorities are fully integrated in strategic and work plans and implemented	2
	Priorities are fully integrated in strategic and work plans, implemented and are regularly reviewed	3

C. MONITORING (WHAT INFORMATION ARE WE COLLECTING AND HOW ARE WE GOING ABOUT IT?)

Issue	Criteria	Score
22. Resource Inventory Does your organisation (department) have enough information to manage the area?	There is little or no information available on the critical habitats, species and cultural values of the area (province or management area)	0
	Information on the critical habitats, species and cultural values of the area (province or management area) is insufficient to support planning and decision making	1
	Information on the critical habitats, species and cultural values of the area (province or management area) is not quite sufficient to support planning and decision making but necessary survey work is in place.	2
	Information on the critical habitats, species and cultural values of the area (province or management area) is sufficient to support planning and decision making and necessary survey work is being maintained	3
23. Alignment of monitoring Is monitoring aligned with the achievement of freshwater conservation objectives? (intra-organisation)	No relevant monitoring is undertaken by your organisation	0
	Some relevant monitoring is undertaken	1
	Your organisation actively participates in relevant monitoring programme, e.g. the River Health Programme, but does not link results directly to conservation objectives	2
	A monitoring programme that is aligned with freshwater conservation objectives and targets (e.g. the River Health Programme) has official status and is being maintained	3
24. Cooperation in monitoring Are monitoring responsibilities shared amongst partners? (inter-organisation)	Different monitoring activities take place in isolation; not familiar with partners' monitoring activities	0
	Aware of partners' monitoring activities, but no cooperation is taking place	1
	Some cooperation in monitoring, but information management systems remain independent	2
	There is integrated design (agreed on indicators) and coordination in monitoring amongst all partners; compatibility of, access to, and transfer of data are well advanced	3

D. MANAGING (HOW DO WE GO ABOUT MAKING A DIFFERENCE?)

Issue	Criteria	Score
25. Monitoring-reporting-management integration Do you have an integrated monitoring, reporting and management system? (intra-organisation)	No monitoring or reporting takes place	0
	Monitoring or reporting takes place but not as a linked system	1
	Regular monitoring and reporting take place and are mutually reinforcing	2
	Regular monitoring and reporting activities take place, are mutually reinforcing, linked to conservation targets, and a clear mechanism exists for results to inform management decisions (adaptive management)	3

26. Adaptive management Does your organisation practise adaptive management?	If yes, explain how. If no, what needs to be done?	No Yes
27. Management plans Are there management plans for freshwater conservation areas?	There are no management plans for freshwater conservation areas	0
	Some management plans exist or are being developed	1
	Management plans exist for the majority of identified freshwater conservation areas.	2
	Each identified freshwater conservation area has a management plan that includes required actions, target objectives, timeframes and responsibilities.	3
28. Science-management interfacing Is there a science-management link/continuum in place [where some scientists act as managers and some managers act as scientists]?	We do not have any scientists	0
	Scientists and managers work completely separate	1
	Scientists and managers work together to some extent	2
	Scientists and managers actively and constructively influence each other's thinking and actions	3
29. Impact of conservation plan on decision making Are land-use decisions and water use allocations in the area made in accordance with specific guidelines based on your conservation plan?	Decisions are not made according to any set process or guidelines	0
	Guidelines exist but there is a lack of clarity on whether decisions are made in accordance with them	1
	Guidelines exist and the compliance of decisions to the guidelines are monitored, but a significant number of decisions are not made in accordance with the guidelines	2
	Guidelines exist and the compliance of decisions is monitored and the majority of the decisions are in compliance with the guidelines	3
30. Reporting Are regular reports produced on the status of freshwater ecosystems?	No reports are produced	0
	Reports are produced irregularly and not based on quantitative data	1
	Reports are produced regularly and are based on quantitative data, but do not show trends over time or relate directly to decision-making	2
	Reports are produced regularly based on consistent indicators which track changes over time and feed directly into decision-making	3
31. Trends in ecosystem integrity Has the ecological integrity of your portfolio of freshwater conservation areas improved as a result of planned conservation action?	No areas have improved or there is no data to assess improvement	0
	Less than 25% of the freshwater conservation areas meet their designated conservation status / integrity class	1
	Less than 50% of the freshwater conservation areas meet their designated conservation status / integrity class	2
	More than 75% of the freshwater conservation areas meet their designated conservation status / integrity class	3

Appendix E: February 2008 Workshop Assessment

The results presented in the following pages are copied and pasted directly (without background colour) from the spreadsheet facility. They also illustrate the results that can be presented at workshops *on the day*.

Phase 3: Data Assessment *Section B: Basic Statistics*

Organisations included: DWAF, GDACE, NWDACE, NWPARKS, SANBI
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	DWAF	GDACE	NWDACE	NWPARKS	SANBI	N	Min	Mean	Max	Range
1											
2											
3	CONTEXT Issue 3 : Clarity of respective mandates	2	2	2	1		4	1	1.75	2	1
4	CONTEXT Issue 4 : Current culture of cooperation	2	2	3			3	2	2.333	3	1
5	CONTEXT Issue 5 : Appropriate statutes	3	3	3	3	3	5	3	3	3	0
6	CONTEXT Issue 6 : Use of existing statutes	2	1	1			3	1	1.333	2	1
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	1	1	1	0		4	0	0.75	1	1
8	CONTEXT Issue 8 : Staff numbers	1	2	2			3	1	1.667	2	1
9	CONTEXT Issue 9 : Staff training	3	3	2	1		4	1	2.25	3	2
10	CONTEXT Issue 10 : Equipment	2	2	1		3	4	1	2	3	2
11	CONTEXT Issue 11 : Ability to influence budget	1	2	0		3	4	0	1.5	3	3
12	CONTEXT Issue 12 : Adequacy of budget	3	2	1		1	4	1	1.75	3	2
13	CONTEXT Issue 13 : Social learning	3	3	3		3	4	3	3	3	0
14	CONTEXT Issue 14 : Existence of a champion	1	1	1	1		4	1	1	1	0
15	CONTEXT Issue 15 : Networking support	2	3	2	3	3	5	2	2.6	3	1
16	CONTEXT Issue 16 : Trust	3	3	3	3		4	3	3	3	0
17	CONTEXT Issue 17 : Freshwater biodiversity value assessment	1	1	3	3	3	5	1	2.2	3	2
18											
19	PLANNING Issue 19 : Participatory target setting	2	2	2	1		4	1	1.75	2	1
20	PLANNING Issue 20 : Integration of spatial plans	1	2	2	3	2	5	1	2	3	2
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	1	3	2	2	3	5	1	2.2	3	2
22	MONITORING Issue 22 : Resource Inventory	0	3	2	3	1	5	0	1.8	3	3
23	MONITORING Issue 23 : Alignment of monitoring	2	2	2	0	1	5	0	1.4	2	2
24	MONITORING Issue 24 : Cooperation in monitoring	2	2	2	1	1	5	1	1.6	2	1
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	2	3	2	3	3	5	2	2.6	3	1
26											
27	MANAGEMENT Issue 27 : Management plans	0	0	0	2	2	5	0	0.8	2	2
28	MANAGEMENT Issue 28 : Science-management interfacing	2	2	2	2	3	5	2	2.2	3	1
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	0	2	2	2	2	5	0	1.6	2	2
30	MANAGEMENT Issue 30 : Reporting	2	2	2	0	2	5	0	1.6	2	2

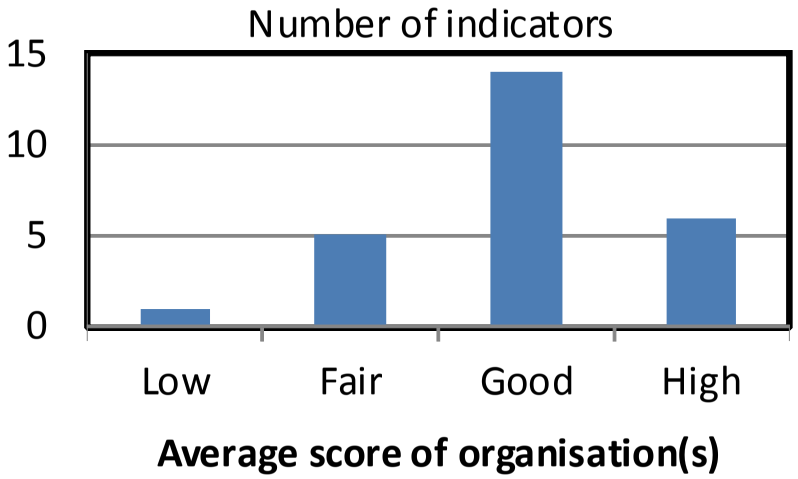
Phase 3: Data Assessment *Section C: Scores and similarity*

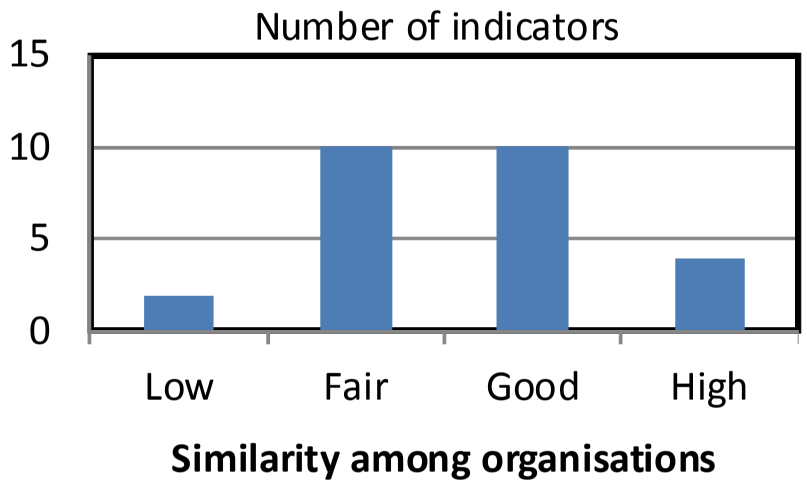
Organisations included: DWAF, GDACE, NWDACE, NWPARKS, SANBI
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	Average Score	Similarity among organisations
1			
2			
3	CONTEXT Issue 3 : Clarity of respective mandates	Good	Good
4	CONTEXT Issue 4 : Current culture of cooperation	High	Good
5	CONTEXT Issue 5 : Appropriate statutes	High	High
6	CONTEXT Issue 6 : Use of existing statutes	Fair	Good
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	Low	Good
8	CONTEXT Issue 8 : Staff numbers	Good	Good
9	CONTEXT Issue 9 : Staff training	Good	Fair
10	CONTEXT Issue 10 : Equipment	Good	Fair
11	CONTEXT Issue 11 : Ability to influence budget	Fair	Low
12	CONTEXT Issue 12 : Adequacy of budget	Good	Fair
13	CONTEXT Issue 13 : Social learning	High	High
14	CONTEXT Issue 14 : Existence of a champion	Fair	High
15	CONTEXT Issue 15 : Networking support	High	Good
16	CONTEXT Issue 16 : Trust	High	High
17	CONTEXT Issue 17 : Freshwater biodiversity value assessment	Good	Fair
18			
19	PLANNING Issue 19 : Participatory target setting	Good	Good
20	PLANNING Issue 20 : Integration of spatial plans	Good	Fair
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	Good	Fair
22	MONITORING Issue 22 : Resource Inventory	Good	Low
23	MONITORING Issue 23 : Alignment of monitoring	Fair	Fair
24	MONITORING Issue 24 : Cooperation in monitoring	Good	Good
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	High	Good
26			
27	MANAGEMENT Issue 27 : Management plans	Fair	Fair
28	MANAGEMENT Issue 28 : Science-management interfacing	Good	Good
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	Good	Fair
30	MANAGEMENT Issue 30 : Reporting	Good	Fair

Phase 3: Data Assessment *Section E: Bar Charts*

Organisations included: DWAF, GDACE, NWDACE, NWPARKS, SANBI
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none





Phase 3: Data Assessment *Section E: Issues of Concern*

Organisations included: DWAF, GDACE, NWDACE, NWPARKS, SANBI
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

The main issues of concern (those with low or fair average scores) are:

CONTEXT Issue 7 : Capacity to effectively implement regulations (the organisations scored this similarly)
CONTEXT Issue 6 : Use of existing statutes (the organisations scored this similarly)
CONTEXT Issue 11 : Ability to influence budget (however, one or more organisations scored highly)
CONTEXT Issue 14 : Existence of a champion (all organisations scored this identically)
MONITORING Issue 23 : Alignment of monitoring (the organisations scored this fairly differently)
MANAGEMENT Issue 27 : Management plans (the organisations scored this fairly differently)

The top 10 strengths are:

CONTEXT Issue 4 : Current culture of cooperation (the organisations scored this similarly)
CONTEXT Issue 5 : Appropriate statutes (all organisations scored this identically)
CONTEXT Issue 13 : Social learning (all organisations scored this identically)
CONTEXT Issue 15 : Networking support (the organisations scored this similarly)
CONTEXT Issue 16 : Trust (all organisations scored this identically)
MANAGEMENT Issue 25 : Monitoring-reporting-management integration (the organisations scored this similarly)
CONTEXT Issue 3 : Clarity of respective mandates (the organisations scored this similarly)
CONTEXT Issue 8 : Staff numbers (the organisations scored this similarly)
CONTEXT Issue 9 : Staff training (the organisations scored this fairly differently)
CONTEXT Issue 10 : Equipment (the organisations scored this fairly differently)

Phase 3: Data Assessment *Section B: Basic Statistics*

Organisations included: DWAF, GDACE, NWDACE
Organisations excluded: NWPARKS, SANBI
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	DWAF	GDACE	NWDACE	NWPARKS	SANBI	N	Min	Mean	Max	Range
1											
2											
3	CONTEXT Issue 3 : Clarity of respective mandates	2	2	2			3	2	2	2	0
4	CONTEXT Issue 4 : Current culture of cooperation	2	2	3			3	2	2.333	3	1
5	CONTEXT Issue 5 : Appropriate statutes	3	3	3			3	3	3	3	0
6	CONTEXT Issue 6 : Use of existing statutes	2	1	1			3	1	1.333	2	1
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	1	1	1			3	1	1	1	0
8	CONTEXT Issue 8 : Staff numbers	1	2	2			3	1	1.667	2	1
9	CONTEXT Issue 9 : Staff training	3	3	2			3	2	2.667	3	1
10	CONTEXT Issue 10 : Equipment	2	2	1			3	1	1.667	2	1
11	CONTEXT Issue 11 : Ability to influence budget	1	2	0			3	0	1	2	2
12	CONTEXT Issue 12 : Adequacy of budget	3	2	1			3	1	2	3	2
13	CONTEXT Issue 13 : Social learning	3	3	3			3	3	3	3	0
14	CONTEXT Issue 14 : Existence of a champion	1	1	1			3	1	1	1	0
15	CONTEXT Issue 15 : Networking support	2	3	2			3	2	2.333	3	1
16	CONTEXT Issue 16 : Trust	3	3	3			3	3	3	3	0
17	CONTEXT Issue 17 : Freshwater biodiversity value assessment	1	1	3			3	1	1.667	3	2
18											
19	PLANNING Issue 19 : Participatory target setting	2	2	2			3	2	2	2	0
20	PLANNING Issue 20 : Integration of spatial plans	1	2	2			3	1	1.667	2	1
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	1	3	2			3	1	2	3	2
22	MONITORING Issue 22 : Resource Inventory	0	3	2			3	0	1.667	3	3
23	MONITORING Issue 23 : Alignment of monitoring	2	2	2			3	2	2	2	0
24	MONITORING Issue 24 : Cooperation in monitoring	2	2	2			3	2	2	2	0
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	2	3	2			3	2	2.333	3	1
26											
27	MANAGEMENT Issue 27 : Management plans	0	0	0			3	0	0	0	0
28	MANAGEMENT Issue 28 : Science-management interfacing	2	2	2			3	2	2	2	0
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	0	2	2			3	0	1.333	2	2
30	MANAGEMENT Issue 30 : Reporting	2	2	2			3	2	2	2	0

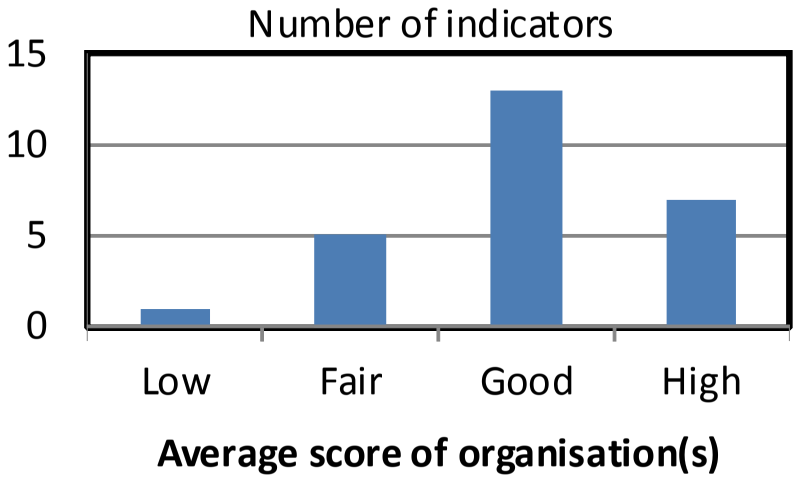
Phase 3: Data Assessment *Section C: Scores and similarity*

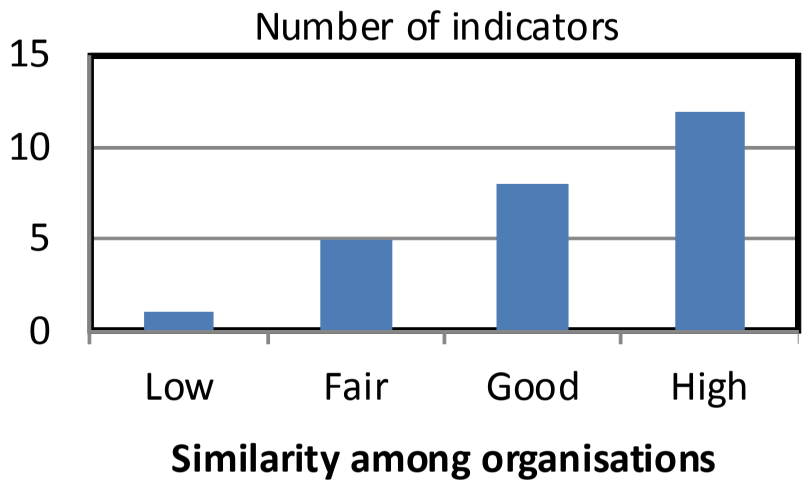
Organisations included: DWAF, GDACE, NWDACE
Organisations excluded: NWPARKS, SANBI
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	Average Score	Similarity among organisations
1			
2			
3	CONTEXT Issue 3 : Clarity of respective mandates	Good	High
4	CONTEXT Issue 4 : Current culture of cooperation	High	Good
5	CONTEXT Issue 5 : Appropriate statutes	High	High
6	CONTEXT Issue 6 : Use of existing statutes	Fair	Good
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	Fair	High
8	CONTEXT Issue 8 : Staff numbers	Good	Good
9	CONTEXT Issue 9 : Staff training	High	Good
10	CONTEXT Issue 10 : Equipment	Good	Good
11	CONTEXT Issue 11 : Ability to influence budget	Fair	Fair
12	CONTEXT Issue 12 : Adequacy of budget	Good	Fair
13	CONTEXT Issue 13 : Social learning	High	High
14	CONTEXT Issue 14 : Existence of a champion	Fair	High
15	CONTEXT Issue 15 : Networking support	High	Good
16	CONTEXT Issue 16 : Trust	High	High
17	CONTEXT Issue 17 : Freshwater biodiversity value assessment	Good	Fair
18			
19	PLANNING Issue 19 : Participatory target setting	Good	High
20	PLANNING Issue 20 : Integration of spatial plans	Good	Good
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	Good	Fair
22	MONITORING Issue 22 : Resource Inventory	Good	Low
23	MONITORING Issue 23 : Alignment of monitoring	Good	High
24	MONITORING Issue 24 : Cooperation in monitoring	Good	High
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	High	Good
26			
27	MANAGEMENT Issue 27 : Management plans	Low	High
28	MANAGEMENT Issue 28 : Science-management interfacing	Good	High
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	Fair	Fair
30	MANAGEMENT Issue 30 : Reporting	Good	High

Phase 3: Data Assessment *Section E: Bar Charts*

Organisations included: DWAF, GDACE, NWDACE
Organisations excluded: NWPARKS, SANBI
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none





Phase 3: Data Assessment *Section E: Issues of Concern*

Organisations included: DWAF, GDACE, NWDACE
Organisations excluded: NWPARKS, SANBI
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

The main issues of concern (those with low or fair average scores) are:

MANAGEMENT Issue 27 : Management plans (all organisations scored this identically)
CONTEXT Issue 6 : Use of existing statutes (the organisations scored this similarly)
CONTEXT Issue 7 : Capacity to effectively implement regulations (all organisations scored this identically)
CONTEXT Issue 11 : Ability to influence budget (the organisations scored this fairly differently)
CONTEXT Issue 14 : Existence of a champion (all organisations scored this identically)
MANAGEMENT Issue 29 : Impact of conservation plan on decision making (the organisations scored this fairly differently)

The top 10 strengths are:

CONTEXT Issue 4 : Current culture of cooperation (the organisations scored this similarly)
CONTEXT Issue 5 : Appropriate statutes (all organisations scored this identically)
CONTEXT Issue 9 : Staff training (the organisations scored this similarly)
CONTEXT Issue 13 : Social learning (all organisations scored this identically)
CONTEXT Issue 15 : Networking support (the organisations scored this similarly)
CONTEXT Issue 16 : Trust (all organisations scored this identically)
MANAGEMENT Issue 25 : Monitoring-reporting-management integration (the organisations scored this similarly)
CONTEXT Issue 3 : Clarity of respective mandates (all organisations scored this identically)
CONTEXT Issue 8 : Staff numbers (the organisations scored this similarly)
CONTEXT Issue 10 : Equipment (the organisations scored this similarly)

Appendix F: February 2009 Workshop Attendance List

Name	Affiliation
Piet Muller	GDACE
Hermien Roux	NWDACE
Pieter van Heerden	North West Parks and Tourism
Botse Molokwane	DWAF: Gauteng
Paul van Rooyen	DWAF: North West
Sebenzile Ntshangase	DWAF: North West
Charles Nemutandani	DWAF: North West
Project Team	
Dirk Roux	Monash South Africa
Linda Downsborough	Monash South Africa
Liesl Hill	CSIR
Kevin Murray	Insight Modelling Services
Observer	
Anne Grattidge	Australia

Appendix G: February 2009 Workshop Scorecard

The February 2008 workshop highlighted some shortcomings of the wording within the scorecard. These problems were solved and the version presented here is the one used in the February 2009 reflective assessment workshop.

Version: 20080530

General scoring guidelines:

d) Answer 0, 1, 2 or 3
e) If you answer 2 or 3, tell us how
f) If you answer 0 or 1, who should be doing this, what do we need to do to improve, and/or is there a social mechanism that can help us?

A. CONTEXT (WHERE ARE WE NOW?)

Issue	Criteria	Score
1. Need for cooperation Is cooperation necessary to achieve effective freshwater conservation?	Very little cooperation is required to achieve effective freshwater conservation	0
	Good cooperation in some contexts would be beneficial to achieving effective freshwater conservation	1
	Good cooperation in many contexts would be very beneficial to achieving effective freshwater conservation	2
	A considerable degree of cooperation in many contexts is essential to achieving effective freshwater conservation	3
2. Clarity of respective mandates Do you have a clear understanding of the mandate of your and relevant other organisations?	Do not have a clear understanding of my organisation's mandate	0
	Understand my organisation's mandate	1
	Understand my organisation's mandate and have some understanding of the mandates of partner organisations	2
	Have a clear understanding of the complementarity between the mandates of my organisation and those of partner organisations	3
3. Current culture of cooperation What is the current culture of cooperation between you and your partner organisation/s regarding natural resource monitoring and management?	Virtually no co-operation takes place between you and your partner organisation/s.	0
	There is informal co-operation between you and your partner organisation/s on an irregular basis	1
	There is regular but not formalised co-operation between you and your partner organisation/s	2
	There is regular AND formalised co-operation between you and your partner organisation/s regarding the conservation of freshwater biodiversity	3
4. Appropriate statutes Are legal mechanisms in place for the conservation of freshwater ecosystems?	There are no legal mechanisms for the conservation of freshwater biodiversity	0
	Relevant parties are in agreement on the need for legal mechanisms for the conservation of freshwater biodiversity. The process of drawing up legal mechanisms has begun but is still incomplete	1
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place	2
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place and priority freshwater ecosystems are explicitly and effectively linked to these mechanisms	3
5. Use of existing statutes Are agricultural, mining and industrial uses of land and water being regulated?	No mechanisms exist for regulating agricultural, mining and industrial uses of land and water	0
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist but there are major problems in implementing them effectively	1
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist but there are some problems in implementing them effectively	2
	Mechanisms for regulating agricultural and industrial uses of land and water exist and are implemented effectively	3
6. Capacity to effectively implement regulations Can staff implement agricultural, mining and industrial water and land use	The staff have no effective capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	0
	There are major deficiencies in staff capacity/resources to implement agricultural, mining and industrial water and	1

regulations effectively?	land use regulations effectively (for example, high staff turnover and insufficient budget)	
	Staff have reasonable capacity to implement agricultural, mining and industrial water and land use regulations effectively, but some deficiencies remain	2
	Staff have excellent capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	3
7. Staff numbers Do you have sufficient staff and all the required skills (in your organisation) to effectively conserve freshwater biodiversity?	There are no staff	0
	Staff numbers are inadequate and staff are unqualified	1
	Staff numbers are below optimum level, but staff are well qualified	2
	Staff numbers are adequate and staff are qualified to undertake freshwater conservation planning *Consider whether you have the following skills or capacity?* Fish biologist; aquatic invertebrate specialist; water quality specialist; hydrologist; botanist; geomorphologist; wetland ecologist; GIS specialist; conservation planner	3
8. Staff training Do staff receive appropriate training?	Staff undergo no training	0
	Staff receive generic training only	1
	Staff receive only theoretical (e.g. conferences or courses) or practical training (e.g. fieldwork and application of methodologies) on freshwater conservation	2
	Staff receive both practical and theoretical training on a regular basis (at least twice per year)	3
9. Equipment Do you have sufficient equipment to effectively conserve freshwater biodiversity?	There are limited or no equipment and facilities	0
	There are some equipment and facilities, but these are wholly inadequate	1
	There are equipment and facilities, but still some major gaps that constrain management	2
	There are adequate equipment and facilities	3
10. Ability to influence budget Do you know your available budget for freshwater conservation and can you influence it?	The size of the budget is not made known and it is impossible to influence it.	0
	The size of the budget is only made known after the start of the financial year and cannot be influenced	1
	The size of the budget is made known at the beginning of the financial year and can be influenced to a certain extent	2
	The size of the budget is known at least one year in advance and can be influenced prior to allocation	3
11. Adequacy of budget Do you have an adequate budget for the implementation of your freshwater objectives?	There is no secure budget for freshwater conservation and management for your organisation, which is wholly reliant on external funding	0
	There is very little secure funding, and your organisation cannot implement freshwater objectives without external funding	1
	There is a reasonably secure core budget	2
	There is a secure budget for freshwater conservation planning and implementation on a multi-year cycle	3
12. Social learning Are you learning with your partners? (inter-organisation)	No social learning takes place between partners	0
	Limited and mostly ad hoc social learning takes place, either in the field or during meetings	1
	Planned events take place occasionally during which social learning includes both theory and practice	2
	Regular and planned events take place during which social learning includes both theory (e.g. conceptual discussions) and practice (e.g. fieldwork)	3

13. Champion Do you have a coordination champion for freshwater conservation (individual or core group)? (inter-organisation)	No individual or core group has emerged as a champion for partner cooperation	0
	Partners meet on an ad hoc basis and without the direction of a champion	1
	A champion coordinates some relevant activities on an annual basis	2
	A champion is accepted by all partners and he/she actively facilitates coordinated action and co-learning and this role is supported by your organisation	3
14. Networking support Does your organisation provide support for networking with partners? (intra-organisation)	Your organisation provides no support for external networking	0
	Your organisation provides limited support for networking with immediate partner organisations.	1
	Your organisation provides logistical, technological and financial support for networking with partner organisations	2
	Your organisation actively promotes and provides logistical, technological and financial support for networking with partner organisations as well as with external, but relevant knowledge sources (e.g. universities, conferences)	3
15. Trust Is there a healthy level of trust between partners? (inter-organisation)	You do not know who your counterparts are or have virtually no contact with them	0
	Limited and ad hoc interaction between counterparts takes place, including some discussion of freshwater conservation issues	1
	You feel comfortable to ask your counterpart(s) for assistance in achieving your mandate	2
	It comes naturally to phone your counterparts and freely discuss issues related to freshwater conservation, including mutual problem solving across organisational boundaries	3
16. Freshwater biodiversity value assessment Is freshwater biodiversity valued?	The need to conserve freshwater ecosystems is rather invisible or obscure within the portfolio of organisational priorities	0
	Your organisation shows significant intent to conserve freshwater ecosystems; but action generally lacks	1
	The need to conserve freshwater ecosystems is widely understood in your organisation and some success stories exist	2
	Conservation of freshwater biodiversity features as a high priority on management and policy agendas. This is reflected in strong support for and active initiatives to understand, identify and conserve this biodiversity	3

B. PLANNING (WHERE DO WE WANT TO BE?)

Issue	Criteria	Score
17. Shared conservation goals Are there shared and endorsed freshwater conservation goals in your domain (this could include vision, targets, thresholds, desired future state, systematic conservation plan)?	Very few freshwater conservation goals in your domain are shared and endorsed	0
	Some freshwater conservation goals in your domain are shared and endorsed	1
	Many freshwater conservation goals in your domain are shared and endorsed	2
	Nearly all or all freshwater conservation goals in your domain are shared and endorsed	3
18. Participatory target setting Is there a social mechanism for sharing complementarity of target allocation, keeping in mind land use planning, high value conservation areas, connecting gradients, recognition of natural disturbances?	No targets have been set	0
	Conservation targets have been set but we were not involved	1
	We were involved in target setting but inclusive ownership lacks	2
	Target setting is an ongoing and fully participatory process, including involvement from organisations outside our domain of responsibility to ensure that large-scale ecosystem processes are covered	3
19. Integration of spatial plans Are different forms of spatial planning in your region well aligned? (inter-organisation)	Each form of spatial planning takes place in isolation	0
	Some sharing of data and products takes place between planning initiatives	1
	Sharing is common and some integration takes place	2
	Full integration takes place between spatial planning, including freshwater and terrestrial conservation planning, catchment management planning and spatial development planning	3
20. Integration between conservation plan and strategic/work plans	Conservation priorities and actions are not reflected in the strategic plan of the organisation and work plans of individuals	0

Are these priorities reflected in your organisation's strategic plan / work plan?	Priorities are reflected in the strategic and work plans but are only partially implemented	1
	Priorities are fully integrated in strategic and work plans and implemented	2
	Priorities are fully integrated in strategic and work plans, implemented and are regularly reviewed	3

C. MONITORING (WHAT INFORMATION ARE WE COLLECTING AND HOW ARE WE GOING ABOUT IT?)

Issue	Criteria	Score
21. Resource Inventory Does your organisation (department) have adequate access to information to manage the area?	There is little or no information available on the critical habitats, species and cultural values of the area (province or management area)	0
	Information on the critical habitats, species and cultural values of the area (province or management area) is insufficient to support planning and decision making	1
	Information on the critical habitats, species and cultural values of the area (province or management area) is not quite sufficient to support planning and decision making but necessary survey work is in place.	2
	Information on the critical habitats, species and cultural values of the area (province or management area) is sufficient to support planning and decision making and necessary survey work is being maintained	3
22. Intra-organisational alignment of monitoring Is monitoring aligned with the achievement of freshwater conservation objectives within your organisation?	No relevant monitoring is undertaken by your organisation	0
	Some relevant monitoring is undertaken	1
	Your organisation actively participates in relevant monitoring programme, e.g. the River Health Programme, but does not link results directly to conservation objectives	2
	A monitoring programme that is aligned with freshwater conservation objectives and targets (e.g. the River Health Programme) has official status and is being maintained	3
23. Inter-organisational cooperation in monitoring Are monitoring responsibilities shared amongst partners? (inter-organisation)	Different monitoring activities take place in isolation; not familiar with partners' monitoring activities	0
	Aware of partners' monitoring activities, but no cooperation is taking place	1
	Some cooperation in monitoring, but information management systems remain independent	2
	There is integrated design (agreed on indicators) and coordination in monitoring amongst all partners; compatibility of, access to, and transfer of data are well advanced	3

D. MANAGING (HOW DO WE GO ABOUT MAKING A DIFFERENCE?)

Issue	Criteria	Score
24. Monitoring-reporting-management integration Do you have an integrated monitoring, reporting and management system? (intra-organisation)	No monitoring or reporting takes place	0
	Monitoring or reporting takes place but not as a linked system	1
	Regular monitoring and reporting take place and are mutually reinforcing	2
	Regular monitoring and reporting activities take place, are mutually reinforcing, linked to conservation targets, and a clear mechanism exists for results to inform management decisions (adaptive management)	3
25. Adaptive management Does your organisation practise adaptive management?	There is very little experimental decision making and subsequent learning and adapting	0
	There is some degree of experimental decision making and subsequent learning and adapting	1
	There is a good degree of experimental decision making and subsequent learning and adapting	2
	There is a very high degree of experimental decision making and subsequent learning and adapting	3
26. Management plans Are there management plans for freshwater conservation areas?	There are no management plans for freshwater conservation areas	0
	Some management plans exist or are being developed	1
	Management plans exist for the majority of identified freshwater conservation areas.	2
	Each identified freshwater conservation area has a management plan that includes required actions, target	3

	objectives, timeframes and responsibilities.	
27. Science-management interfacing Is there a science-management link/continuum in place (where some scientists act as managers and some managers act as scientists)?	We do not have any scientists	0
	Scientists and managers work completely separate	1
	Scientists and managers work together to some extent	2
	Scientists and managers actively and constructively influence each other's thinking and actions	3
28. Impact of conservation plan on decision making Are land-use decisions and water use allocations in the area made in accordance with specific guidelines based on your conservation plan?	Decisions are not made according to any set process or guidelines	0
	Guidelines exist but there is a lack of clarity on whether decisions are made in accordance with them	1
	Guidelines exist and the compliance of decisions to the guidelines are monitored, but a significant number of decisions are not made in accordance with the guidelines	2
	Guidelines exist and the compliance of decisions is monitored and the majority of the decisions are in compliance with the guidelines	3
29. Reporting Are regular reports produced on the status of freshwater ecosystems?	No reports are produced	0
	Reports are produced irregularly and not based on quantitative data	1
	Reports are produced regularly and are based on quantitative data, but do not show trends over time or relate directly to decision-making	2
	Reports are produced regularly based on consistent indicators which track changes over time and feed directly into decision-making	3
30. Trends in ecosystem integrity Has the ecological integrity of your portfolio of freshwater conservation areas improved as a result of planned conservation action?	No areas have improved or there are no data to assess improvement	0
	Less than 33% of the freshwater conservation areas meet their designated conservation status / integrity class	1
	Less than 67% of the freshwater conservation areas meet their designated conservation status / integrity class	2
	More than 67% of the freshwater conservation areas meet their designated conservation status / integrity class	3

Appendix H: February 2009 Workshop Assessment

The results presented in the following pages are copied and pasted directly (without background colour) from the spreadsheet facility.

Phase 3: Data Assessment_Section B: See Basic Statistics

Organisations included: DWAF, GDACE, NWDACE, NWPARKS
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	DWAF	GDACE	NWDACE	NWPARKS	N	Min	Mean	Max	Range
1										
2										
3	CONTEXT Issue 3 : Clarity of respective mandates	2	3	3	0	4	0	2	3	3
4	CONTEXT Issue 4 : Current culture of cooperation	1	2	2	2	4	1	1.75	2	1
5	CONTEXT Issue 5 : Appropriate statutes	1	3	2	2	4	1	2	3	2
6	CONTEXT Issue 6 : Use of existing statutes	1	2	1	0	4	0	1	2	2
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	1	2	1	3	4	1	1.75	3	2
8	CONTEXT Issue 8 : Staff numbers	1	2	1	0	4	0	1	2	2
9	CONTEXT Issue 9 : Staff training	2	2	2	2	4	2	2	2	0
10	CONTEXT Issue 10 : Equipment	2	3	2	2	4	2	2.25	3	1
11	CONTEXT Issue 11 : Ability to influence budget	0	2	0	2	4	0	1	2	2
12	CONTEXT Issue 12 : Adequacy of budget	2	3	1	2	4	1	2	3	2
13	CONTEXT Issue 13 : Social learning	2	2	2	2	4	2	2	2	0
14	CONTEXT Issue 14 : Existence of a champion	0	3	2	2	4	0	1.75	3	3
15	CONTEXT Issue 15 : Networking support	3	3	2	3	4	2	2.75	3	1
16	CONTEXT Issue 16 : Trust	2	2	3	3	4	2	2.5	3	1
17	CONTEXT Issue 17 : Perceived value of freshwater biodiversity	1	2	1	2	4	1	1.5	2	1
18										
19	PLANNING Issue 19 : Participatory target setting	1	3	2	2	4	1	2	3	2
20	PLANNING Issue 20 : Integration of spatial plans	1	3	2	2	4	1	2	3	2
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	3	2	2	3	4	2	2.5	3	1
22	MONITORING Issue 22 : Resource inventory	1	2	2	2	4	1	1.75	2	1
23	MONITORING Issue 23 : Alignment of monitoring	2	3	2	2	4	2	2.25	3	1
24	MONITORING Issue 24 : Cooperation in monitoring	2	2	2	2	4	2	2	2	0
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	2	2	2	1	4	1	1.75	2	1
26										
27	MANAGEMENT Issue 27 : Management plans	1	1	1	1	4	1	1	1	0
28	MANAGEMENT Issue 28 : Science-management interfacing	1	3	2	3	4	1	2.25	3	2
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	0	2	2		3	0	1.33	2	2
30	MANAGEMENT Issue 30 : Reporting	1	2	2	1	4	1	1.5	2	1

Phase 3: Data Assessment_Section C: See Average Scores and Similarity

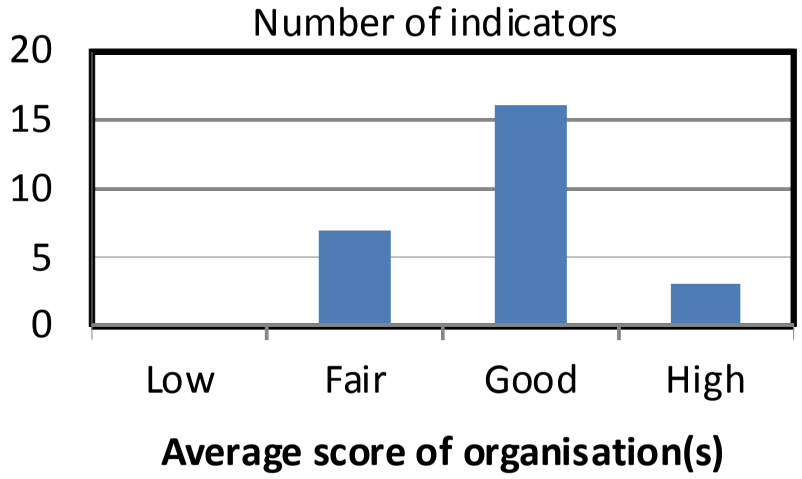
Organisations included: DWAF, GDACE, NWDACE, NWPARKS
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

No.	Indicators	Average Score	Similarity among organisations
1			
2			
3	CONTEXT Issue 3 : Clarity of respective mandates	Good	Low
4	CONTEXT Issue 4 : Current culture of cooperation	Good	Good
5	CONTEXT Issue 5 : Appropriate statutes	Good	Fair
6	CONTEXT Issue 6 : Use of existing statutes	Fair	Fair
7	CONTEXT Issue 7 : Capacity to effectively implement regulations	Good	Fair
8	CONTEXT Issue 8 : Staff numbers	Fair	Fair
9	CONTEXT Issue 9 : Staff training	Good	High
10	CONTEXT Issue 10 : Equipment	Good	Good
11	CONTEXT Issue 11 : Ability to influence budget	Fair	Fair
12	CONTEXT Issue 12 : Adequacy of budget	Good	Fair
13	CONTEXT Issue 13 : Social learning	Good	High
14	CONTEXT Issue 14 : Existence of a champion	Good	Low
15	CONTEXT Issue 15 : Networking support	High	Good
16	CONTEXT Issue 16 : Trust	High	Good
17	CONTEXT Issue 17 : Perceived value of freshwater biodiversity	Fair	Good
18			
19	PLANNING Issue 19 : Participatory target setting	Good	Fair
20	PLANNING Issue 20 : Integration of spatial plans	Good	Fair
21	PLANNING Issue 21 : Integration between conservation plan and strategic/work plans	High	Good
22	MONITORING Issue 22 : Resource inventory	Good	Good
23	MONITORING Issue 23 : Alignment of monitoring	Good	Good
24	MONITORING Issue 24 : Cooperation in monitoring	Good	High
25	MANAGEMENT Issue 25 : Monitoring-reporting-management integration	Good	Good
26			
27	MANAGEMENT Issue 27 : Management plans	Fair	High
28	MANAGEMENT Issue 28 : Science-management interfacing	Good	Fair
29	MANAGEMENT Issue 29 : Impact of conservation plan on decision making	Fair	Fair
30	MANAGEMENT Issue 30 : Reporting	Fair	Good

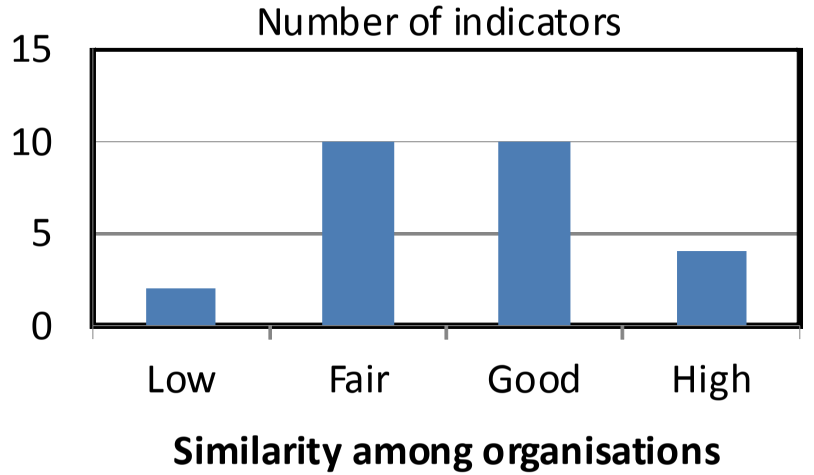
Phase 3: Data Assessment_Section D: See Bar Charts

Organisations included: DWAF, GDACE, NWDACE, NWPARKS
Organisations excluded: none
Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT
Categories excluded: none

Total number of indicators with data: 26



Average score of organisation(s)



Similarity among organisations

Phase 3: Data Assessment_Section E: See Issues of Concern

Organisations included: DWAF, GDACE, NWDACE, NWPARKS

Organisations excluded: none

Categories included: CONTEXT, PLANNING, MONITORING, MANAGEMENT

Categories excluded: none

The main issues of concern (those with low or fair average scores) are:

CONTEXT Issue 6 : Use of existing statutes (the organisations scored this fairly differently)

CONTEXT Issue 8 : Staff numbers (the organisations scored this fairly differently)

CONTEXT Issue 11 : Ability to influence budget (the organisations scored this fairly differently)

CONTEXT Issue 17 : Perceived value of freshwater biodiversity (the organisations scored this similarly)

MANAGEMENT Issue 27 : Management plans (all organisations scored this identically)

MANAGEMENT Issue 29 : Impact of conservation plan on decision making (the organisations scored this fairly differently)

MANAGEMENT Issue 30 : Reporting (the organisations scored this similarly)

The top 10 strengths are:

CONTEXT Issue 15 : Networking support (the organisations scored this similarly)

CONTEXT Issue 16 : Trust (the organisations scored this similarly)

PLANNING Issue 21 : Integration between conservation plan and strategic/work plans (the organisations scored this similarly)

CONTEXT Issue 3 : Clarity of respective mandates (however, one or more organisations did not score well)

CONTEXT Issue 4 : Current culture of cooperation (the organisations scored this similarly)

CONTEXT Issue 5 : Appropriate statutes (the organisations scored this fairly differently)

CONTEXT Issue 7 : Capacity to effectively implement regulations (the organisations scored this fairly differently)

CONTEXT Issue 9 : Staff training (all organisations scored this identically)

CONTEXT Issue 10 : Equipment (the organisations scored this similarly)

CONTEXT Issue 12 : Adequacy of budget (the organisations scored this fairly differently)

Appendix I: Scorecard: Refined version

The February 2009 workshop highlighted a few shortcomings of the wording of some of the criteria. The wording was accordingly improved and the version presented here is the final refined version of the scorecard.

No.	Issues, indicators and criteria	
1	**CONTEXT Issue 1 : Clarity of respective mandates**	
	Do you have a clear understanding of the mandate of your and relevant other organisations?	
	Do not have a clear understanding of my organisation's mandate	0
	Understand my organisation's mandate	1
	Understand my organisation's mandate and have some understanding of the mandates of partner organisations	2
	Have a clear understanding of the complementarity between the mandates of my organisation and those of partner organisations	3
2	**CONTEXT Issue 2 : Current culture of cooperation**	
	What is the current culture of cooperation between you and your partner organisation/s regarding various aspects of natural resource monitoring and management?	
	Virtually no co-operation takes place between you and your partner organisation/s	0
	There is informal co-operation between you and your partner organisation/s on an irregular basis	1
	There is regular but not formalised co-operation between you and your partner organisation/s	2
	There is regular AND formalised co-operation between you and your partner organisation/s regarding the conservation of freshwater biodiversity	3
3	**CONTEXT Issue 3 : Appropriate statutes**	
	Are legal mechanisms in place for the conservation of freshwater ecosystems?	
	There are no legal mechanisms for the conservation of freshwater biodiversity	0
	Relevant parties are in agreement on the need for legal mechanisms for the conservation of freshwater biodiversity but the process of drawing up legal mechanisms has begun but is still incomplete	1
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place	2
	Sufficient legal mechanisms for the conservation of freshwater biodiversity are in place and priority freshwater ecosystems are explicitly and effectively linked to these mechanisms	3
4	**CONTEXT Issue 4 : Use of existing statutes**	
	Are agricultural, mining and industrial uses of land and water being regulated?	
	No mechanisms exist for regulating agricultural, mining and industrial uses of land and water	0
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist but there are major problems in implementing them effectively	1
	Mechanisms for regulating agricultural, mining and industrial uses of land and water exist with few problems in implementing them effectively	2
	Mechanisms for regulating agricultural and industrial uses of land and water exist and are implemented effectively	3
5	**CONTEXT Issue 5 : Capacity to effectively implement regulations**	
	Can staff implement agricultural, mining and industrial water and land use regulations effectively?	
	The staff have no effective capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	0
	There are major deficiencies in staff capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively (for example, high staff turnover and insufficient budget)	1
	Staff have reasonable capacity to implement agricultural, mining and industrial water and land use regulations effectively, but some deficiencies remain	2
	Staff have excellent capacity/resources to implement agricultural, mining and industrial water and land use regulations effectively	3
6	**CONTEXT Issue 6 : Staff numbers**	
	Do you have sufficient staff and all the required skills (in your organisation) to effectively conserve freshwater biodiversity? Consider whether you have the following skills or capacity: Fish biologist; aquatic invertebrate specialist; water quality specialist; hydrologist; botanist; geomorphologist; wetland ecologist; GIS specialist; conservation planner	
	There are no staff	0
	Staff numbers are inadequate and staff are unqualified	1
	Staff numbers are below optimum level, but staff are well qualified	2
	Staff numbers are adequate and staff are qualified to undertake freshwater conservation planning	3
7	**CONTEXT Issue 7 : Staff training**	
	Do staff receive appropriate training?	

	Staff undergo no training	0
	Staff receive generic training only	1
	Staff receive only theoretical (e.g. conferences or courses) or practical training (e.g. fieldwork and application of methodologies) on freshwater conservation	2
	Staff receive both practical and theoretical training on a regular basis (at least twice per year)	3
8	**CONTEXT Issue 8 : Equipment**	
	Do you have sufficient equipment to effectively conserve freshwater biodiversity?	
	There are limited or no equipment and facilities	0
	There are some equipment and facilities, but these are wholly inadequate	1
	There are equipment and facilities, but still some major gaps that constrain management	2
	There are adequate equipment and facilities	3
9	**CONTEXT Issue 9 : Ability to influence budget**	
	Do you know your available budget for freshwater conservation and can you influence it?	
	The size of the budget is not made known and it is impossible to influence it	0
	The size of the budget is only made known after the start of the financial year and cannot be influenced	1
	The size of the budget is made known at the beginning of the financial year and can be influenced to a certain extent	2
	The size of the budget is known at least one year in advance and can be influenced prior to allocation	3
10	**CONTEXT Issue 10 : Adequacy of budget**	
	Do you have an adequate budget for the implementation of your freshwater objectives?	
	There is no secure budget for freshwater conservation and management for your organisation, which is wholly reliant on external funding	0
	There is very little secure funding, and your organisation cannot implement freshwater objectives without external funding	1
	There is a reasonably secure core budget	2
	There is a secure budget for freshwater conservation planning and implementation on a multi-year cycle	3
11	**CONTEXT Issue 11 : Social learning**	
	Are you learning with your partners? (inter-organisation)	
	No social learning takes place between partners	0
	Limited and mostly ad hoc social learning takes place, either in the field or during meetings	1
	Planned events take place occasionally during which social learning includes both theory and practice	2
	Regular and planned events take place during which social learning includes both theory (e.g. conceptual discussions) and practice (e.g. fieldwork)	3
12	**CONTEXT Issue 12 : Existence of a champion**	
	Do you have a coordination champion for freshwater conservation (individual or core group)? (inter-organisation)	
	No individual or core group has emerged as a champion for partner cooperation	0
	Partners meet on an ad hoc basis and without the direction of a champion	1
	A champion coordinates some relevant activities on an annual basis	2
	A champion is accepted by all partners and he/she actively facilitates coordinated action and co-learning and this role is supported by your organisation	3
13	**CONTEXT Issue 13 : Networking support**	
	Does your organisation provide support for networking with partners? (intra-organisation)	
	Your organisation provides no support for external networking	0
	Your organisation provides limited support for networking with immediate partner organisations	1
	Your organisation provides logistical, technological and financial support for networking with partner organisations	2
	Your organisation actively promotes and provides logistical, technological and financial support for networking with partner organisations as well as with external, but relevant knowledge sources (e.g. universities, conferences)	3
14	**CONTEXT Issue 14 : Trust**	
	Is there a healthy level of trust between partners? (inter-organisation)	
	You do not know who your counterparts are or have virtually no contact with them	0
	Limited and ad hoc interaction between counterparts takes place, including some discussion of freshwater conservation issues	1
	You feel comfortable to ask your counterpart(s) for assistance in achieving your mandate	2

	It comes naturally to phone your counterparts and freely discuss issues related to freshwater conservation, including mutual problem solving across organisational boundaries	3
15	**CONTEXT Issue 15 : Perceived value of freshwater biodiversity**	
	Is freshwater biodiversity valued?	
	The need to conserve freshwater ecosystems is rather invisible or obscure within the portfolio of organisational priorities	0
	Your organisation shows significant intent to conserve freshwater ecosystems, but action generally lacks	1
	The need to conserve freshwater ecosystems is widely understood in your organisation and some success stories exist	2
	Conservation of freshwater biodiversity features as a high priority on management and policy agendas and this is reflected in strong support for and active initiatives to understand, identify and conserve this biodiversity	3
16	**PLANNING Issue 16 : Participatory target setting**	
	Is there a social mechanism for sharing complementarity of target allocation, keeping in mind land use planning, high value conservation areas, connecting gradients, recognition of natural disturbances?	
	No targets have been set	0
	Conservation targets have been set but we were not involved	1
	We were involved in target setting but inclusive ownership lacks	2
	Target setting is an ongoing and fully participatory process, including involvement from organisations outside our domain of responsibility to ensure that large-scale ecosystem processes are covered	3
17	**PLANNING Issue 17 : Integration of spatial plans**	
	Are different forms of spatial planning in your region well aligned? (inter-organisation)	
	Each form of spatial planning takes place in isolation	0
	Some sharing of data and products takes place between planning initiatives	1
	Sharing is common and some integration takes place	2
	Full integration takes place between spatial planning, including freshwater and terrestrial conservation planning, catchment management planning and spatial development planning	3
18	**PLANNING Issue 18 : Integration between conservation plan and strategic/work plans**	
	Are these priorities reflected in your organisation's strategic plan / work plan?	
	Conservation priorities and actions are not reflected in the strategic plan of the organisation and work plans of individuals	0
	Priorities are reflected in the strategic and work plans but are only partially implemented	1
	Priorities are fully integrated in strategic and work plans and implemented	2
	Priorities are fully integrated in strategic and work plans, implemented and are regularly reviewed	3
19	**MONITORING Issue 19 : Resource inventory**	
	Does your organisation (department) have enough information to manage the area?	
	There is little or no information available on the critical habitats, species and cultural values of the area (province or management area)	0
	Information on the critical habitats, species and cultural values of the area (province or management area) is insufficient to support planning and decision making	1
	Information on the critical habitats, species and cultural values of the area (province or management area) is not quite sufficient to support planning and decision making but necessary survey work is in place	2
	Information on the critical habitats, species and cultural values of the area (province or management area) is sufficient to support planning and decision making and necessary survey work is being maintained	3
20	**MONITORING Issue 20 : Alignment of monitoring**	
	Is monitoring aligned with the achievement of freshwater conservation objectives? (intra-organisation)	
	No relevant monitoring is undertaken by your organisation	0
	Some relevant monitoring is undertaken	1
	Your organisation actively participates in relevant monitoring programme, e.g. the River Health Programme, but does not link results directly to conservation objectives	2
	A monitoring programme that is aligned with freshwater conservation objectives and targets (e.g. the River Health Programme) has official status and is being maintained	3
21	**MONITORING Issue 21 : Cooperation in monitoring**	
	Are monitoring responsibilities shared amongst partners? (inter-organisation)	
	Different monitoring activities take place in isolation; not familiar with partners' monitoring activities	0

	Aware of partners' monitoring activities, but no cooperation is taking place	1
	Some cooperation in monitoring, but information management systems remain independent	2
	There is integrated design (agreed-on indicators) and coordination in monitoring amongst all partners; compatibility of, access to, and transfer of data are well advanced	3
22	**MANAGEMENT Issue 22 : Monitoring-reporting-management integration**	
	Do you have an integrated monitoring, reporting and management system? (intra-organisation)	
	No monitoring or reporting takes place	0
	Monitoring or reporting takes place but not as a linked system	1
	Regular monitoring and reporting take place and are mutually reinforcing	2
	Regular monitoring and reporting activities take place, are mutually reinforcing, linked to conservation targets, and a clear mechanism exists for results to inform management decisions (adaptive management)	3
23	**MANAGEMENT Issue 23 : Management plans**	
	Are there management plans for freshwater conservation areas?	
	There are no management plans for freshwater conservation areas	0
	Some management plans exist or are being developed	1
	Management plans exist for the majority of identified freshwater conservation areas	2
	Each identified freshwater conservation area has a management plan that includes required actions, target objectives, timeframes and responsibilities	3
24	**MANAGEMENT Issue 24 : Science-management interfacing**	
	Is there a science-management link/continuum in place (where some scientists act as managers and some managers act as scientists)?	
	We do not have any scientists	0
	Scientists and managers work completely separately	1
	Scientists and managers work together to some extent	2
	Scientists and managers actively and constructively influence each other's thinking and actions	3
25	**MANAGEMENT Issue 25 : Impact of conservation plan on decision making**	
	Are land-use decisions and water use allocations in the area made in accordance with specific guidelines based on your conservation plan?	
	Decisions are not made according to any set process or guidelines	0
	Guidelines exist but there is a lack of clarity on whether decisions are made in accordance with them	1
	Guidelines exist and the compliance of decisions to the guidelines are monitored, but a significant number of decisions are not made in accordance with the guidelines	2
	Guidelines exist and the compliance of decisions is monitored and the majority of the decisions are in compliance with the guidelines	3
26	**MANAGEMENT Issue 26 : Reporting**	
	Are regular reports produced on the status of freshwater ecosystems?	
	No reports are produced	0
	Reports are produced irregularly and not based on quantitative data	1
	Reports are produced regularly and are based on quantitative data, but do not show trends over time or relate directly to decision-making	2
	Reports are produced regularly based on consistent indicators which track changes over time and feed directly into decision-making	3