

Integrated conservation management using CMSi

Anne Brookes

ESDM Ltd on behalf of CMS Consortium, Great House Barn, Talgarth, Powys LD3 0AH, United Kingdom



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ABSTRACT

CMSi (the Conservation Management System *international*) is a software suite of tools providing a dynamic site management system for important conservation areas. With a modular approach, CMSi enables all aspects of site management to be integrated, from management plans to asset inventories and land ownership transactions. CMSi is a very map-centric solution with integral mapping functionality based on open-source components, as well as offering integration with standard GIS packages: QGIS, ArcGIS and MapInfo.

CMSi is owned by the Conservation Management System Consortium (CMSC), an international group of organisations working together to promote best practice in nature conservation and countryside management. The development and day-to-day management of the system is contracted to exeGesIS SDM Ltd – a specialist software development and environmental consultancy.

This paper provides an insight into the early origins of CMS and then presents an overview of the system, describing how the key areas of functionality help support a site manager with the day-to-day tasks of planning and managing information. The paper includes particular reference to the spatial components of CMSi and the recently-developed species observations and vegetation mapping module and smartphone app. CMSi is unique in its approach to management planning and is the only system of its kind that integrates so many aspects of site management in a single suite of tools. It is now in use by more than 2000 staff in over 100 organisations to manage thousands of important conservation sites across several countries.

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1. Background to CMS

The need for management plans has long been recognised and recommended to ensure both continuity and stability of management (NCC, 1991) but their format and structure and how they are produced and subsequently used vary widely. Too often, even where management plans are produced as digital documents, there is a lack of connection between what is described and written about in the published plan and the work that is actually being planned and undertaken on the ground. The development of CMS as a computer-based management planning tool has been as a result of these two main drivers: the need to produce effective management plans that incorporate both the planning and recording work and the recognition of the benefits that management information systems can bring.

The widespread development of computer-based information management systems across all disciplines since the 1970s has been driven not only by the increasing power and accessibility of the technology but also by the growing recognition of the benefits that they bring in terms of consistency, security and integrity of information, the ease of analysis and reporting and efficiency gains in staff time and resources. In the field of nature conservation management, the use of computer systems by site managers is not an obvious fit given the outdoor nature of the job but it was the recognition of the benefits of a standardised system for recording significant events on National Nature Reserves (NNRs) that led to the development of the Event Record System by

the Nature Conservancy Council (NCC) in the 1970s. This system was later reviewed and replaced by the Project Recording System (PRS), which established a central database of all work and events recorded by site managers, using a project classification system and submitting paper-based forms. However, the major failings of both these systems was that there was little direct benefit back to the site managers, who were therefore reluctant to use them, and no link to the site management plans (Alexander, 2008). A major improvement came with the adaptation of the PRS forms to include a description of the planned project work, in addition to recording what was done. It was this information, with other useful additions at the request of site managers, which was turned from a paper-based system into a database and subsequently developed into CMS – a management planning tool.

By the early 1990s, several leading UK nature conservation organisations were trialling and further developing the prototype CMS software, and formed the Countryside Management System Partnership, which took on the ownership of the software. The adaptive management planning approach that underpins CMS and the use of the software as a day-to-day management planning tool became widely adopted by both local authorities and conservation organisations. The current CMS Consortium (CMSC) www.software4conservation.com continues to promote best practice in conservation management not only through the continued development of CMS but also through training, seminars and workshops on management planning. The Integrated Conservation Management using CMSi software is contracted to exeGesIS Spatial

Data Management Ltd (www.esdm.co.uk). In 2010, a partnership of leading Dutch conservation organisations (Natuurmonumenten, Staatsbosbeheer and de12Landschappen) joined the CMS Consortium. They funded a major redevelopment and expansion of the software to include site ownership and legal agreements linked to the management of sites. This was launched in 2012 as CMSi, which is the current version today – see Fig. 1. In 2014, a Species Observation and Vegetation Mapping component was released for the Dutch market, which includes a mobile App for field survey. Future developments include a new module for the management of Cultural Heritage and Landscape.

2. Management planning in CMSi

At its core, CMSi is a planning, recording and reporting system which helps site managers produce and maintain effective management plans for their sites, whereby the outcomes of work plan actions are readily linked back to the objectives of the plan and used to review the effectiveness of the management. Many organisations have identified that whilst management plans may be written, the resulting documents often sit unused. Management plans in CMSi are dynamic because the document is a working tool that staff can interact with on a daily basis, bringing all aspects of work planning and recording into one place. This is a key aspect of the adaptive management approach i.e. that plans are evidence-based and are reviewed regularly with outcomes being used as the basis for ongoing management decisions. By structuring information and ensuring consistency and integrity of data, CMSi helps managers analyse and report on activities across a range of sites. Another key aspect of using a computer-based approach for recording all site management activities is that the information can be readily accessed by staff at all levels within an organisation, and importantly, is available to new staff to ensure continuity.

3. Core management questions addressed by CMSi

The key functionality that CMSi provides is to address the fundamental questions that management plans seek to answer (Alexander, 2010): (1) why are we here, (2) what have we got, (3) what is important, (4) what do we want and (5) what must we do? Within CMSi, a *Site Description* form houses information that answers the first two questions and provides the headings structure for information

relating to the underlying policy and general description for a site. Further information is added via tabs on the site data form.

The *Site Tree* provides a structure for addressing question 3 by allowing the creation of *Features*. These can be important wildlife and natural features, such as habitats or species, but can also be important cultural features and other aspects of a site that reflects its purpose e.g. visitor management, or access and recreation. The external influences on important features can be explored by representing them in the data structure as *Factors*, for example, grazing. The *Feature* form thus provides the means to explain question 4 in terms of the objective for each feature and how to measure whether that specific objective is being achieved. Assessment of the conservation status of a *Feature* is achieved via a *Status* tab which enables a history of condition assessments to be recorded over time.

The *Attributes* of a feature identify the characteristics of a *Feature* that can be monitored to assess its condition. *Management* operations are also identified for each *Feature*. Finally, *Projects* and the creation of work plans are the CMSi answer to question 5. *Project* plans are the monitoring or management operations identified under each *Factor*, attribute or management, such as measuring sward height to monitor the impact of grazing, or undertaking mowing as part of the ongoing management of a meadow. Annual projects can then be created, using a wizard, for each year that work is planned to take place in. The *work plans* for each financial year are where staff, finance and equipment resources can be planned and allocated as well as the programme of work for that year actually described – see Fig. 2.

Further data forms are available for managing projects by adjusting budgets and diary entry forms for staff to record actual work done on specific projects. Underpinning all these elements of CMSi is the mapping functionality. This allows spatial features to be imported or drawn into the map for showing the location of sites, compartments, features or where work has taken place. The mapping functionality is provided by open-source tools and requires no specialist GIS knowledge. However, the system also provides tools to link directly into standard GIS software to allow for more advanced levels of editing, analysis or map production.

Finally, the Reporting and Querying functionalities within CMSi provide the means of rapidly producing standard output for disseminating information to stakeholders, as well as staff within an organisation. Reports can include maps, linked photographs, tables and graphs.

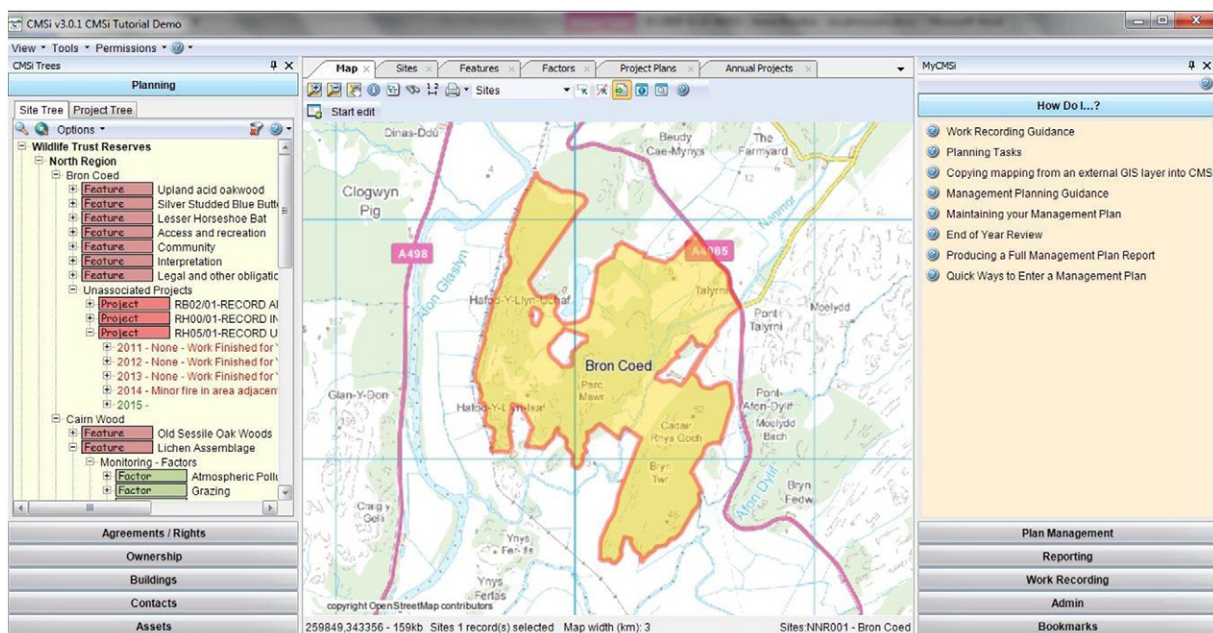


Fig. 1. CMSi overview showing *Site Tree*, Map window and MyCMSi.

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