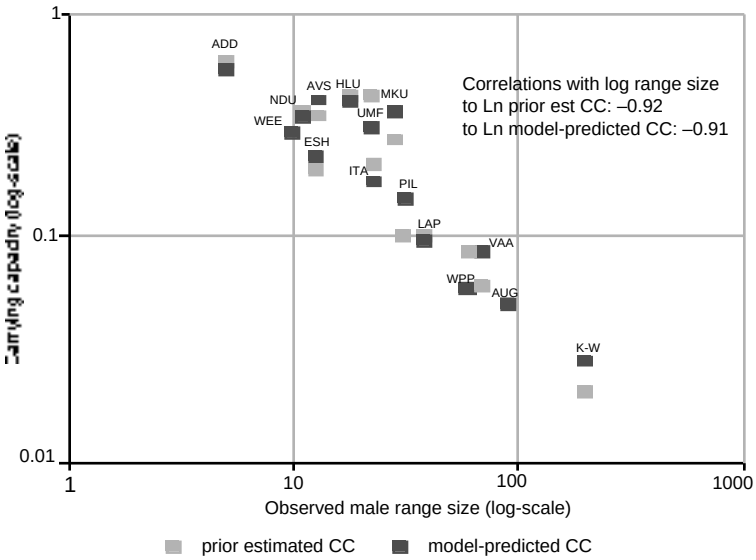

Figure 2. Relationship between CC estimates made by experts and model-predicted CC, and estimates of average male home range sizes. This strong relationship acts as independent confirmation of the general appropriateness of the carrying-capacity model.

As this is the first comprehensive CC estimation model for black rhino, several prominent workers in black rhino ecology and conservation or browser ecology are to evaluate the model and make suggested improvements. Additional work to refine the model is being funded by the SADC Regional Rhino Programme. This will include improvement of the browse-availability index used in the model, and it will incorporate better data from several of the benchmark sites where other workers have recently completed more detailed studies of black rhino. Zimbabwean and Kenyan rhino conservation workers have also indicated they plan to undertake similar research and model building, to cover CC predictions for black rhinos in their areas. In future, we hope to expand the model to cover an even wider range of habitat types.

WILDb rhino database

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A new rhino database, WILDb, has been produced by the SADC programme and is currently being field tested in several rhino areas in Zimbabwe, including populations in government IPZs and conservancies. The database comprises components for use in monitoring and tracking the performance of individual rhino populations both locally and nationally. It is designed so that it can be readily customized for use in different rhino population areas in SADC rhino range states. Anyone interested in obtaining a copy should contact Dr Rob Brett at the above address.

RHINO rewrite: an update

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Since 1991, RHINO Bayesian Mark-Recapture software has been used in an increasing number of populations, to produce annual rhino population estimates (with confidence levels) by analysing sighting data

of both identifiable and clean rhino. RHINO is designed to deal with various violations of classical mark-recapture assumptions (such as births, deaths, ear-notching, removals, introductions, sighting-happy rhinos, non-independence of calves and calves becoming independent). Over the years, RHINO has worked well in practice. However, the software was last revised in 1993 (version 1.21) and is written in the now fossilized DOS-based PAL language. While RHINO 1.21 was still usable on Windows NT and older versions of Windows 95, it no longer ran on Windows 98 machines. This is a problem, given that the software is used annually to produce population estimates for a number of annual status reports to the Rhino Management Group. The need was therefore urgent to produce a revised version of the software that can run on Windows 98 machines. Over the years there have also been a number of suggestions from field users on how the software could be improved and made more useful. The time was therefore opportune for a major revision of the software.

(Recently KZN Wildlife's Owen Howison did what many in the IT world had failed to do—figure out how to get RHINO 1.21 to run under Windows 98. Thus in the interim until RHINO ver 2.0 is released, RHINO 1.21 can continue to be used. Windows 98 users should contact the AfRSG Scientific Officer, Richard Emslie, for details of how to configure Windows 98 to enable RHINO 1.21 to run.)

The original developer of RHINO, Richard Emslie of Ecoscot Consultancy Services, has teamed up with a statistician and programmer at the Zoological Society of London, Raj Amin, to completely rewrite and produce a major revision of RHINO. This work, currently under way, is being funded by the SADC regional rhino conservation programme. RHINO 2.0 is scheduled for release by the end of September 2001. As with previous versions, the software will be available free of charge to all rhino managers and scientists who want it, both inside and outside of SADC.

RHINO 2.0 is being recoded in MATLAB 6 and will be computationally much more efficient than earlier versions. Documentation will also now be bundled with the software on CD-Rom. In developing design specifications for the new version, all the main users of RHINO through the years were canvassed for suggestions as to how they would like to see the software improved.

The new version is being designed to accept data in Access or Excel formats. The plan is to add enhanced automated identification routines for trap-happy animals. The simulation capabilities of the package will be significantly enhanced to help users assess the costs and benefits of notching more animals as compared with hiring a dedicated observer to increase the number of sightings. These simulation options should also help improve the guidelines on the minimum percentage of animals that should be identifiable in populations of different sizes. As a measure to reduce bias, automated routines are to be included to identify cross-boundary movers and to allocate all their sightings to the section of a park in which they spend most of their time. Additional planned options include testing for differences in population size over time and making it easier to combine population estimates for different sections into a combined park population estimate.

In 1991, RHINO 1.0 became the first mark-recapture population estimator to account for clean rhinos and so provide a total population estimate. Later that same year Gareth Stead produced an alternative Bayesian Mark-Recapture estimator, which also dealt with clean rhino, and many, but not all, of the major violations of classical mark-recapture assumptions. The Stead estimator was written for a mainframe only and thus has not been suitable for field use on PCs. RHINO and the Stead estimator use different algorithms to estimate both independent and dependent (calf) population segments. To determine 1) whether it would be worth developing the Stead estimator further to enable it to deal with more major violations of classical mark-recapture assumptions (like RHINO), and 2) whether or not the Stead estimator should be offered as an analysis option, and perhaps be made the recommended analysis option, it was first necessary to assess the relative performance of the two estimators. The Stead estimator and some of the main RHINO routines have been coded in MATLAB. Provisional modelling has revealed that RHINO (by virtue of its narrower confidence levels) appears to outperform the Stead estimator. RHINO 2.0 will therefore continue to be built using the RHINO rather the Stead algorithms.

Training courses in the use of the new version of RHINO will be held when it is has been completed.