



## Species Conservation Toolkit Initiative Working Group Report

**Convenor** Bob Lacy

**Recorder** Taylor Callicrate & Kathy Traylor-Holzer

**Presenter** Kristin Leus

### **Participants**

Lisa Banfield, Taylor Callicrate, Meyer de Kock, Gerald Dick, Myfanwy Griffith, Markus Gusset, Mansoor Al Jahdhami, Nian-Hong Jang-Liaw, Stacey Johnson, Bob Lacy, Kristin Leus, Philip Miller, Paul Pearce-Kelly, Oliver Ryder, Akiko Shimosaka, Kazutoshi Takami, Kathy Traylor-Holzer, Jonathan Wilcken

### **Summary**

Kathy Traylor-Holzer and Bob Lacy presented about the need for software tools and current capabilities of the SCTI tools, and the group discussed current needs. The main points of group discussion centered on these topics:

1. How should SCTI be supported? Within the imposed limitations, what are our options for obtaining financial support?
2. Who are the users/audience of the tools?
3. What kinds of support are needed to enable people to use the tools effectively? How should we prevent misuse—and enable proper use—of the tools?
4. What should the structure of the SCTI be going forward?

The group determined that basic users would be best served by providing a ‘light’ version of the software, or some sort of interactive help and/or tutorials that would reduce or eliminate the need to understand complicated manuals. However, power users would benefit from added features for more complex data and situations, and could benefit from detailed manuals including the underlying mechanics, as well as detailed worked examples for complex usage problems.

The structure of SCTI going forward is linked with its support. It is difficult to determine what the permanent structure should be without knowing that long-term support will be in place.

### **Narrative of the Discussion**

Kathy introduced the Species Conservation Toolkit Initiative (SCTI), explaining briefly the PHVA process and which tools could be used at which point in the process. She summarized the four main tools—PMx, Vortex, Outbreak, and MetaModelManager—and gave some examples of PHVAs where they had been used, sometimes in combination, to address species conservation needs. Tools can be used in combination for a One Plan approach to developing a plan for a species.

At this point, there was a question in the group about how the outcome of the PHVA process might be better integrated into the broader IUCN framework, perhaps by being used to inform the Red Listing process for a species. The discussion included the point that often the results from SCTI tools (and

PHVA) are used to publish papers, but those papers don't always directly inform or change policy, whereas changing the Red List status of a species does cause changes in policy for that species. PVA outcome could be a criteria for Red Listing (or an optional criteria), just as it is a recommended action in the situation where animals are going to be collected from the wild for ex situ conservation.

Next, Bob presented about the current status of SCTI and what is planned to extend the tools, and provided some questions for group discussion. Since the initial workshop describing the need for the SCTI, several organizations have contributed financially, enough to launch SCTI with the hiring of the first full-time postdoctoral fellowship position. This person (Taylor Callicrate) will work for three years on programming of the SCTI software. Ongoing outreach and fundraising are being used to enable SCTI to hire additional training and documentation personnel.

Planned extensions to the tools in the immediate future are as follows: For PMx, the planned features focused on advances in genomics that could be used for conservation, included integrating genomics (or extensive genetic data) into the management. Collaborators of SCTI are conducting research into how genomic data can be most effectively used for species management, possibly moving to empirical management of genetic diversity/genotypes rather than just through kinship estimates alone. (This work is being done in collaboration with San Diego Zoo and the University of Wisconsin.) Another addition for PMx will be the ability to incorporate genetic/gamete banking systems for a species so that genetic diversity could be maintained more optimally. This module would include the ability to use several types of genetic/gamete banks that could be described with a banking analogy: a checking account, which would be frequently withdrawn from and contributed to in order to moderate population/species genetic diversity; a savings bank with greater variation that could be withdrawn from in case of emergency or population collapse, to replenish species/population genetic diversity; and a federal reserve, housing the breadth of genetic diversity for the species. Finally, methods for managing group living species are also in the works for PMx, with collaboration from EAZA.

New tools being planned include SimSocial, which can be used to include the effects of social interactions in models; Spatial, to incorporate geolocation and animal movement across landscapes; and Vortex Adaptive Manager, which will help users optimize management strategy in a way that is robust to uncertainty in the model parameters.

The group discussed how the software could be designed to increase user-friendliness. There was a suggestion that it might all be incorporated into one software package, or at least to make the controls and feel of the different software packages similar so that it would be easier for users to transition between each tool. This would also help to unify the toolkit if all tools are thought of as being part of the same toolkit, and help users identify that multiple tools might be of use to them (especially considering the new emphasis on One Plan Approach). When homogenizing the control environment for the SCTI tools, it was suggested that the language should be consistent with IUCN usage, so that it is formalized to match with what is used in policy.

The SCTI tools will be able to interact with and receive input from ZIMS R3, but will also continue to accept input data from SPARKs and PopLink, and from Excel for users who don't have access to other database tools.

The flow of discussion moved towards usage of the tools and the structure of their development. First, the group discussed the need to know who was using the tools and what for. A downside of the free software model is that there is no control of who is using it or for what, so it could become associated with poor publications or recommendations as the result of misuse by uninformed users. There was a suggestion made to include on the website a place where people could share how they had used the

software and provide examples that others could follow. This might contribute to the community of users and enable the community to provide suggestions for additions and new tools also. The group briefly discussed the merits of having truly open-source software, as well as ownership of the software and the SCTI itself. Because of the complicated programmatic structure of the tools, making them open-source could lead to errors, bugs, or incorrect models. Instead, SCTI will have open-source add-ons where collaborators will be able to design modules to add new capabilities, for example the genomic data module being developed with collaborators at San Diego Zoo.

The SCTI tools were developed with funding from granting agencies that require them to be freely available, so there will be no charge for users. It is still necessary to provide the tools free of charge, but because of their critical importance to many organizations, maintaining and improving them (as well as developing new tools) is vital. These services have been provided on a volunteer basis by Bob Lacy and Jon Ballou until now, but this model is not sustainable, which is why the SCTI was formed to create a way for these tools to continue to develop. However, it emerged from the group discussion that although good progress has occurred with initial fundraising for SCTI and hiring of the first programmer, much remained to be done. Some of the future developments have been defined, including hiring a training and documentation person and the goals for additions to tools and creation of new tools as discussed above, but the actual structure or governance of the SCTI itself remains unclear. Group members indicated that this might be a key reason why some of the organizations which are heavy users of the tools have not contributed financially to SCTI. Without further buy-in from key user organizations, it will be difficult to proceed with hiring of training and documentation people and to create a permanent structure for SCTI. So far, there are approximately 12 organizations that have provided financial support; the management team of SCTI includes Bob Lacy, Jon Ballou, Onnie Byers, and International Species Information System.

There was further discussion about how funds might be raised outside of getting more sponsor institutions, and most of these points were also related to use or training in the tools. There was a suggestion that training or customer service might be provided with a charge. Several zoo associations now offer training workshops and video tools to help users, but personalized training or expert help in creating models might be provided by SCTI. The counterpoint was made that many users, especially of Vortex, are students or might otherwise not be able to pay for training. However, these same non-expert users are also the group highest at risk of creating inappropriate or otherwise incorrect models which could lead to inaccurate inferences or interpretations of the situation. This problem in particular (dangerously inaccurate inferences from poor modeling) was highlighted as a key problem, and sparked further discussion about the types of users and what the SCTI could do to encourage proper software use and guard against misuse. Several examples of bad data, bad users, and misuse of tools were brought up; these could be good teaching examples.

From the discussion, it emerged that there are several main types of users: students, academics using the software for research, CBSG staff and members who are power users, and people who implement the recommendations or results (managers). These groups have different backgrounds and varied levels of skill in using the software and also in knowledge of population biology; this makes it difficult to decide what type of help, manuals, or training to provide. Many different options and caveats were discussed.

For average/basic users, the group agreed that most of them don't understand all of the options in the tools or all of the output, including (for PMx), the data quality tab which could help a user decide if their data was sufficient to create reliable results. Group members who had taught courses in SCTI tool use agreed that teaching basic usage was sufficiently complicated and that advanced topics were beyond the scope of basic courses. One suggestion that was repeatedly brought up was to have some sort of

interactive help (or an interactive help version of the tools for new users, or even a 'light' version with limited/basic options only). Many users, especially basic users, are unlikely to read manuals, however helpful or important the manual might be, so interactive help could possibly replace a basic manual. Interactive help could take the form of more extensive mouse-over tool tips, a Siri-like voice instruction or tutorial, or short videos for some of the common tool usage needs. Another interactive thing that would help prevent misuse is warnings that would pop up if a user entered an invalid or unrealistic value for a parameter, or if the data input was insufficient for reliable inference. However, there was also discussion of how 'quality' should be interpreted in regard to data- it is very subjective.

Other types of audiences/users like regional species coordinators and possibly industry members (agriculture, fisheries, etc.) might also not need to know the details of what the software is doing, but should be aware of the underlying concepts (population biology knowledge, risk assessment, etc.) and the robustness of the approach that their management recommendations are based on. The results can only be as good as the data and the skill of the user. For this reason, there was discussion about having some sort of expert/peer review process where power users could verify correct usage of the tools and validity of the results by others.

Other suggestions for types of tool usage help included online refresher courses for those that had already taken an in-depth training workshop, providing different versions of the manual for basic vs. power users (quick-start-guide vs. in depth with details on algorithms), and templates or walk-throughs for how to use the software for common tasks and also for unusual tasks that might be difficult for people to figure out. San Diego Global Academy already provides online training videos for using some of the tools, and this could be linked to through the SCTI website. There was also a suggestion to provide sample data sets for other tools, as for Vortex, which users could use to learn the software interactively using a guided walk-through or tutorial.

Finally, there was further discussion of how to carry out the immediate needs for manuals and training, and to define the structure of SCTI. The group determined that SCTI does not have the resources currently to develop all of the training, software development, and user support that is needed, but did not come to a conclusion as to how these items might be accomplished. There is an urgent need for development of these tools and to create infrastructure, including training, to support them, but this structure cannot be developed without support from the user community. It is difficult to define a permanent or ongoing structure without knowing how much permanent or ongoing support will be available. Adding to the confusion, the current suite of users is very broad, and knowing who will be new users of the tools going forward is difficult to predict. The group suggested that creating a firmer definition of the long-term goals for the SCTI would help us to work out the ideal structure and obtain endorsements from high level organizations such as WAZA, SSC, or IUCN. Such endorsements might increase buy-in and recognition from the conservation community and thus help increase the probability of SCTI's success.

## **Discussion Day Two**

SCTI Working Group Part II: Next Steps

Lisa Banfield, Taylor Callicrate, Bob Lacy, Kristin Leus, Paul Pearce Kelly, Kazutoshi Takami, Kathy Traylor-Holzer, Eric Tsao, Nian-Hong Jang-Liaw, Meyer de Kock, Kumiko Yoneda, Mohammed Ali Reza Khan

General Discussion of Long-Term Plan – How to define the future of SCTI?

Current partners that are discussing long-range plans are Bob, Jon, and Onnie; we need a larger group of partners/potential partners to discuss how to move ahead (but there is some reluctance by potential partners to join until we have long range plan).

How to bring in new partners, especially beyond zoos?

Challenge: Viability of zoos is more directly tied to the tools (PMx is core tool for zoo business) than for the field community (second hand connection to tools, other tool options, other work that doesn't require tools).

Challenge: Field scientists are less aware of tools; need to "sell" tool value to them

OPA – integrate and get everyone all working together  
Tools need to be available in range country and to field people

Suggestion: survey who is using the tools and who isn't; who is working on what?; develop a global database on how the tools are used, and for what species?

Could do survey on Vortex listserve

Could search for citations for software use

Could do survey through regional zoo associations, Specialist Groups, etc.

Could add pop-up box to software to (voluntarily) register use

Possible online database

For the next generation toolkit, we need to respond to future emerging needs, which may be hard to determine from surveys of past on current users.

Need to clarify the scope of the SCTI

1) Technical software only?

2) Software + facilitators + links + more? (e.g., what is being discussed within EAZA)

Where does expert advisors on IMP modeling lie?

Consider relevancy to Red Listing process – can tool inform RL process?

Meet with SG Chairs to help build next generation toolkit?

What is our vision, scope, ambition, plans?

Identify what we think the toolkit could do – as a way to begin to move there

Propose meeting in next 6 months or so – Jon, Bob, someone from ISIS, someone from CBSG, reps from other partners

Who?

- Sponsors would certainly be invited
- Reps of other partners could be useful
  - o WAZA?
  - o Other practitioners (e.g., CBSG members, PM advisors; active users rather than top level administrators from organizations)
  - o Strategic IUCN colleagues (e.g., RedList person, key SSC colleagues?)

When?

In conjunction with mid-year CBSG Strategic Committee meeting and ISIS board?

In conjunction with Joint TAG-Chairs meeting?

Maybe only via email discussions?