Public Lecture 1: Thursday 20 December 2018

At the Royal Society of Victoria

Questions and Answers

The views and opinions expressed in this document are those of the researchers responding to the questions and do not necessarily reflect the official policy or position of any agency of the Victorian Government. The responses given at this public lecture do not represent the views of all researchers, nor does the document comprehensively capture the full range of views and perspectives of those present.

Presentation 1: Understanding community values in Victoria's Public Forests

Questions to Dr Rebecca Ford

How do you ensure that your interview sampling is unbiased and is a representative sample of the population?

These two questions refer to the validity and quality of data used in the study investigating values of members of the Victorian public in relation to forests. In this study we used a two-stage mixed methods approach. The first stage involved 36 in-depth interviews with members of the public likely to hold diverse views on natural forests in Victoria. Results from the interviews were then used to develop a large-scale survey distributed throughout Victoria. The survey was completed by 915 people. The quality of the study should be judged by looking at these two complementary methods together.

The aim of the interviews was not to represent the population, but to identify a range of views about native forests. To do this we used a purposive sampling approach to identify people likely to have very diverse interests and ways of interacting with forests, including recreational users (such as trail-bike riders, campers and bushwalkers), members of environmental and naturalist groups, forest management professionals, and members of the public having a self-described 'love of forests'.

Our choice of sampling approach for the interviews was consistent with findings from previous research demonstrating that people's interests are a better indicator of their values than are demographic factors such as location or gender.

One of the objectives of the survey in the second stage of the study was to measure the relative importance of the values identified in the interviews within a much larger sample of Victorians. Three approaches were used to recruit survey participants: the survey was mailed to 3000 randomly selected addresses in Victoria; it was emailed to people who previously participated in a similar study; and we engaged an online panel of people registered with a market research company. The three methods for distributing the survey were used to reduce bias and achieve as close to a representative sample of Victorians as possible. With the increasing reliance on online communication it is good practice to include an online sampling element, which we did in this survey. Overall the gender balance of survey respondents (54 per cent female and 46 per cent male) was similar to that within the Victorian population. However, respondents in the survey tended to be older, (51 per cent aged over 55 compared to 34 per cent in the Victorian population), and more highly educated than the Victorian population (36 per cent had a Bachelor degree or higher, compared with 10 per cent of

Victorians over 20 years of age). These sample characteristics are typical of surveys conducted in Australia. While the approach used sought to be as unbiased as possible we do not claim that the survey sample was representative of the Victorian population. Results from the survey did however allow us to draw some useful inferences about the way forests are valued in Victoria.

This study is reported in the following publications:

Anderson, N.M., Ford, R.M., Bennett, L.T., Nitschke, C.R., Williams, K.J.H., 2018. Core Values Underpin the Attributes of Forests that Matter to People. Forestry 91, 629-640.
Ford, R.M., Anderson, N.M., Nitschke, C.R., Bennett, L.T., Williams, K.J.H., 2017. Psychological Values and Cues as a Basis for Developing Socially Relevant Criteria and Indicators for Forest Management. Forest Policy and Economics 78, 141-150.

Has your Tasmanian study informed any policy change there?

This question refers to our research on the psychological processes underlying public judgements of the acceptability of forest management in Tasmania. This included two studies, one investigating the social acceptability of the clearfell, burn and sow harvest and regeneration method, and the other investigating public acceptance of management of a particular forested landscape where clearfell, burn and sow was extensively applied. To summarise, in the research we found that people with stronger intrinsic and non-use values for nature tended to believe that clearfelling had negative consequences for the natural environment and was therefore unacceptable, whereas people with stronger use values believed clearfelling to be positive for the timber industry, and therefore more acceptable. Our findings thereby demonstrated that differences in deeply held personal values underlie conflicts about the management of native forests in Tasmania.

This finding challenged previous assumptions held by many forest managers in Tasmania and internationally that the public dislike of clearfelling was due mainly to its negative visual impacts and as such could be addressed through visual management of forest harvesting. Together with other research, our findings contributed to a shift in management practices to replace clearfell logging with less intensive methods in some Tasmanian native forests in the mid to late 2000s.

The Tasmanian research is reported in the following publications, among others:

Ford, R.M., Williams, K.J., Bishop, I.D., Webb, T.J., 2009. A Value Basis for the Social Acceptability of Clearfelling in Tasmania, Australia. Landsc. Urban Plann. 90, 196-206.
Ford, R.M., Williams, K.J.H., Smith, E.L., Bishop, I.D., 2014. Beauty, Belief, and Trust: Toward a Model of Psychological Processes in Public Acceptance of Forest Management. Environ. Behav. 46, 476-506.

Rebecca, how do we assess and manage points of conflict in forests such as the erection of telecommunications towers which disturb the skyline?

This question refers to an issue in forest management that we have not studied, although the impact of telecommunication and other technology infrastructure such as renewable energy towers or high voltage powerlines on scenic beauty and public acceptance has been studied fairly extensively elsewhere. Building on these findings, if we were to assess this issue it would be helpful to identify the range of positive or negative concerns people have about telecommunication towers, which values, beliefs and other psychological factors underlie these concerns, as well as whether physical characteristics, such as the colour of the towers, or their location, influence acceptance of the infrastructure in the landscape.

Rebecca, 36 respondents, but only 35 responses in the Education values question. How come?

This question refers to the interview sample used to identify the values of members of the Victorian public for forests. Of the 36 respondents, only 35 answered the question about their level of education. Participation in this research was entirely voluntary, as is required under social research ethics policies and protocols. Participants were free to choose not to answer a question if they wished and were not required to provide an explanation for this. One participant failing to answer the question about education did not have a negative impact on the study overall, as the primary aim was to identify participant's values, as outlined in response to other questions.

Presentation 2: Distribution of rainforest and species' habitats

Questions to Dr Graeme Newell

You noted you were involved in the RFAs the last time. What is your take on the science and technology informing them this time around compared to last?

Some aspects of the science have become much more mature and accessible over the last two decades, e.g. spatial sciences / 'mapping'. Technologies such as camera trapping and call recording have also been developed which are now regularly used in field surveys making them more effective and efficient.

Graeme, you suggest that historical maps are human constructs, but aren't modern derived maps determining attributes also human constructs?

Yes, maps are a human construct to highlight specific values of interest, whether they were created in the past or now. Newer methods however provide improvements in the repeatability and transparency of the mapping processes

How much species decline have you tracked in the last 20 years? Can you please provide a link to data?

Our research does not currently track changes in distribution or abundance for individual species using the habitat distribution models. However, other Arthur Rylah Institute's research projects and the collation of data from a wide range of sources have been able to infer changes in species status over time, which has been used for a range of purposes, including in the listing of species as threatened under the Flora and Fauna Guarantee Act. All data collected during Arthur Rylah Institute projects is submitted to the Victorian Biodiversity Atlas.

Graeme, can you measure the accuracy of rainforest maps from satellite images?

Yes. The accuracy of the spatial model of the likelihood of rainforest is determined as part of the process.

How much decline of rainforest have you tracked over 20 years? Can you please provide links to data/papers?

Our current project is to provide a consistent representation of rainforest across Victoria. Our research has not focussed upon tracking changes in rainforest extent.

Graeme, can any conclusions be drawn about the health of rainforests from the satellite data?

No, the current project is focussed on delivering consistent data products on the spatial extent of rainforest, but not health or condition.

Graeme, is the internet of things the future solution to monitor and measuring the forest understory?

Potentially, but this is unlikely to eventuate in the near future.

Can members of the public submit data to DELWP that can be used in your habitat distribution modelling?

Yes, DELWP operates the Victorian Biodiversity Atlas (VBA) which provides a portal for submitting new data. Verified new data from the VBA can then be used when refining the habitat distribution models. We encourage everyone to contribute their data. 'VBA Go' is a simple, mobile recording tool for submitting observational records. For larger datasets contact the DELWP VBA team at vba.help@delwp.vic.gov.au.

We have doubts around the currency of data relating to threatened species. How can we have confidence using 'generalised' modelled data sets to inform existing logging activity?

The currency of any species observation will understandably decay with time, our modelling always aims to use the most contemporary data available. To supplement existing data, the Government is existing in Forest Protection Survey Program and Landscape Scale Surveys to obtain new data about priority forest-dependent species likely to be impacted by timer harvesting activity.

Graeme, if native forest logging were stopped how much impact would it have on your colleagues' jobs and research direction at the Arthur Rylah Institute?

ARI undertakes applied ecological research to inform government policy and management across many Victorian ecosystems and landscapes. The Arthur Rylah Institute does not receive funding from the timber industry or VicForests, with all forest-related research funded by DELWP. While the Arthur Rylah Institute currently has a team focusing on the impact of timber harvesting on threatened species, these staff have a diverse range of expertise and should native forest timber harvesting cease, their research direction would shift to other government priorities.

Presentation 3: Mapping high conservation value forests using LiDAR

Questions to Professor Craig Nitschke

Rather than trying to map 'old growth' according to a narrow definition should we be trying to describe old growth values and manage these across the landscape?

I agree that the definition of 'old-growth' is too narrow. Many forests with high conservation value will not conform to this strict definition. 'Old-growth' and 'large' trees in regrowth forests are prime examples of 'old-growth' values in younger forests that have high conservation value and high social value. The objective of this project is to use this mapping to identify both 'old-growth' trees and stands. An important element of the work will be to identify how abundant these values are and where they are distributed on the landscape. This will enable strategic planning and management decisions to be made based on the occurrence of these values irrespective of what definition of 'old-growth' is used.

Can climate scenarios be overlaid on the HDMs?

Climate scenarios can be overlaid on HDMs if the HDM is forced by climate parameters. If HDMs contain non-climate predictors or utilise remote sensing variables, then the integration of climate scenarios may not be possible. For some non-climatic parameters such as those related to topography this is not an issue but for variables related to forest structure or disturbances (such as fire) this is problematic as you would also need to account for how these variables change over time or assume that they will not change. The latter assumption is problematic when dealing with dynamic systems such as forests.

How do HDMs take into account the presence of key food sources required for different species rather than just modelling structural elements or greenness?

Models are typically built with predictors that correlate with the occurrence of a species. These predictors may relate to food sources, but this is dependent on the species and the variables. It is important to

recognise that these models are correlative and do not reflect key mechanisms. The correlative nature makes them a coarse-filter model which comes with an assumption that the underlying ecological processes and functioning are represented by the model predictors based on climate, structure, remote sensing etc. Because these models do not address ecosystem functioning directly one must interpret the outputs with care. There are more complex models that use more mechanistic approaches to address ecological processes and functioning, but these require a large amount of knowledge and data which is not available for most species.

Is proximity to hollows and distance from hollows included in habitat models?

The current habitat distribution models reflect the environmental envelop in which suitable habitat for a species occurs. They do not include the density or locations of hollow-bearing trees. As part of a separate project, LiDAR data from the Central Highlands has been used to develop spatial models of large old trees as a surrogate for hollows, data currently being incorporated into occupancy models for Leadbeater's Possum.

How much work is occurring to identify how different species respond to timber harvesting and how harvesting might be modified to improve conservation outcomes?

Through research funded by the Australian Research Council, DELWP and VicForests are investigating the impact of current timber harvesting on plant composition, a component of this research seeking to understand what species are being potentially lost from the harvested areas and how long species take to recruit, if at all, following timber harvesting. This work will help inform how plant species diversity should be managed to ensure their conservation in timber harvesting areas.

In relation to LiDAR, how is it connected to data about what is below the ground?

LiDAR data does not have the ability to measure below ground attributes. You can however develop high resolution digital elevation models that can be used in the identification of landforms such as creeks and drainage lines. Models that relate aboveground attributes to belowground attributes can use LiDAR data as predictors to model certain processes. An example is carbon stored in roots; by identifying the amount of aboveground carbon in trees you can model the amount of belowground carbon in roots. Repeated acquisition of LiDAR for the same area over time can be used to determine tree growth which can then be used to estimate site productivity which may relate to belowground processes that govern resource availability (i.e. water, nutrients). Key point: LiDAR provides a set of variables that can be used in developing predictive models of belowground processes, it does not measure them directly.

Crystal ball gazing. How will rain forest and old growth be mapped in 5 years' time? LiDAR from the international space station?

LiDAR data is a relatively inexpensive approach to monitoring landscape change over time. It costs ~$1.10 to $1.30 per hectare. I would advocate for Lidar to be flown every 5-10 years (and following major bushfires) to monitor landscape changes in these forest types (plus other values). Lidar data from space will be available soon but this data will be at lower resolution then you get from airborne platforms. There will be a need to determine if space-borne lidar has the appropriate resolution to address some of the mapping questions at hand. If it does than this would provide a very affordable method for mapping over time.

Craig, if you can get all this great data from LiDAR, presumably VicForests could also get better timber volume data as well. Will this be part of the review?

The datasets we will develop from the mapping project will provide a basis from which estimates of timber volume, carbon, water yield (from sapwood area), and habitat models for fauna/ flora can be derived.

Are the survey techniques being used consistent with international standards or best practice?

Yes, we use survey techniques that have been peer-reviewed and allow for robust analyses to be undertaken. Using scientifically robust approaches is critical for developing knowledge and tools that can be used by policy makers and planners to inform their decision making. Our field survey techniques are of international standard and best practice and use the latest technology and approaches. We will be employing techniques for which we have previously determined detection probabilities, i.e. we can quantify the likelihood of detecting the target species, if it is present on the site, given a specified amount of survey effort. This is important information to provide confidence in the resulting data and infer absences.

Presentation 4: Landscape scale surveys for threatened species

Questions to Dr Lindsey Lumsden

Can we understand 'true absence data'? How sure can you be over time if species are forced to move due to growing habitat degradation from logging?

The currency of any species observation will understandably decay with time, including both absence and presence data. The ability to infer a species is absent when it is not detected during a survey depends on the species and the technique. For some species we have developed approaches with a high likelihood of detection if they are present (e.g. using heat and motion cameras for Leadbeater's Possum and Long-footed Potoroos, where the detection probability is greater than 85%). In contrast, for highly cryptic species, such as the Giant Burrowing Frog, the likelihood of detection is much lower, and hence where they are not found it is not possible to infer they are absent.

Lindy, are Rikali and broad-toothed rat being surveyed?

Neither the Broad-toothed Rat or Rikali are being targeted during the Landscape Scale Surveys, however any incidental sightings will be recorded. The Endangered Broad-toothed Rat occurs in swampy habitats surrounded by areas available for timber harvesting, and while new data would be useful to update its habitat distribution model, it is not possible to survey for all forest-dependent species during this program. Rikali (the native water rat) was not included as it is not a threatened, forest-dependent species, which are the focus of the Landscape Scale Surveys.

Lindy, what happens when you're out looking for one species and you spot another species, do you record it? And does this happen often?

Yes, we record all species that are detected during the field sampling, and we do regularly detect species other than the target species. This includes both threatened and non-threatened native species, and any invasive species found.

Where threatened species are found in previously harvested areas, is that evidence that this disturbance regime should continue?

Not necessarily as the pattern is more complex than this, and spatial and temporal patterns need to be considered.

How excited are you in seeing this type of investment in new information on our forest estate?

Very excited, as this is a fantastic opportunity to update the data on which models are being built, and to develop more complex and informative models, to improve the management of threatened species in forests.