DOC's Inventory and Monitoring Toolbox
## —Why are we standardising monitoring methods?

What are the issues?

The data the Department of Conservation (DOC) uses to make management decisions must be sound and robust.

For example, a manager needs to be confident that declines in bird counts for a particular species over several years reflect real changes in bird numbers rather than a change in the way the survey was conducted, or changes in environmental conditions, or observer bias.

What is happening?

Within DOC, appropriate monitoring programmes are being developed to allow systematic detection, recording and reporting of changes for a range of purposes.

A national inventory and monitoring project aims to develop an overall framework for biodiversity assessment, and systems to identify and implement monitoring techniques that enable reporting on natural heritage outcomes. Key to this is the Inventory and Monitoring Toolbox.
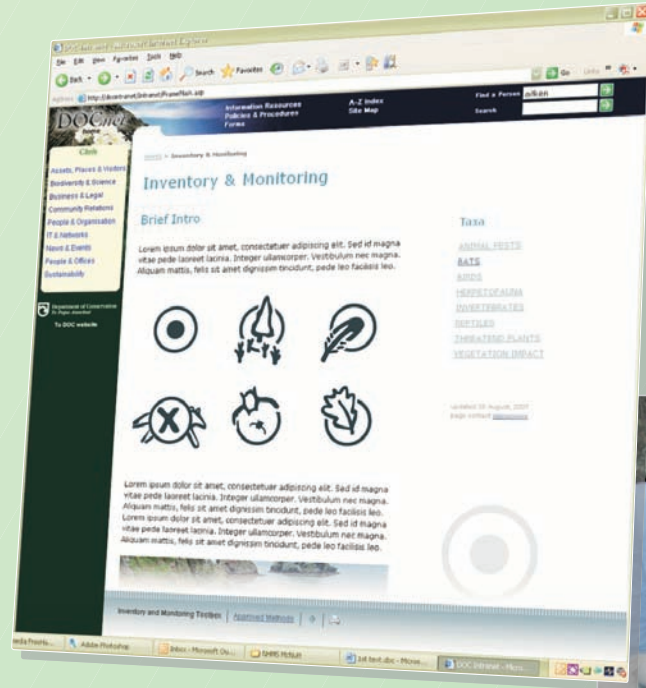
Sample of the front page of the I&M Toolbox on the DOC Intranet site.

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The Inventory and Monitoring Toolbox establishes national standards and specifications for inventory and monitoring methods.

What does the Toolbox do?

The Inventory and Monitoring Toolbox establishes national standards and specifications for inventory and monitoring methods.

Step-by-step descriptions of the specifications for each method are provided, along with information on the method's advantages and disadvantages, underlying assumptions, minimum attributes that must be recorded, resource and skill requirements, and data analysis procedures.

The Toolbox has supportive frameworks to ensure users make good decisions about the methods they choose. For example, comparative tables summarise and compare the attributes of methods. Decision trees lead users through a series of prompting questions to direct them towards the most appropriate method(s).

The Toolbox will only be available electronically—through the DOC Intranet—because of the volume of material and rapidly changing nature of the content.
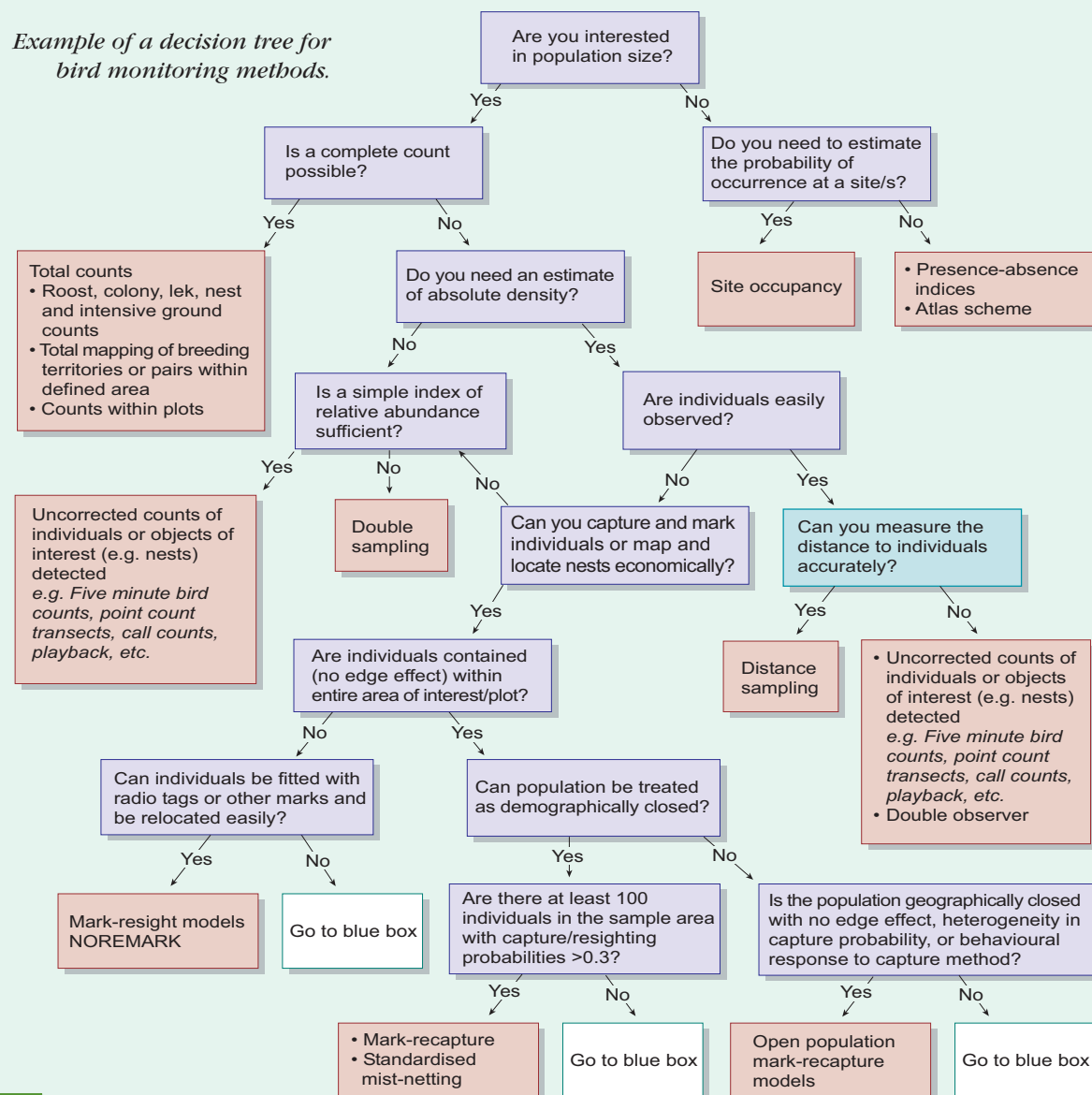
What is in the Toolbox?

So far, the Toolbox incorporates methods for counting populations of birds, bats, animal pests, threatened plants and for assessing impacts of animal pests on vegetation.

Specifications for some methods are already quite clear because they use well-established approaches (such as five minute bird counts, and permanent 20 x 20 plots), but others are having to be specifically established, (e.g. estimating bat populations at roost sites).

The Toolbox is under continual improvement

The Toolbox is continually improving and evolving. For example, programmes to validate and calibrate existing methods for bird monitoring are underway. Other research initiatives are likely to extend methods to include further taxa, such as invertebrates and herpetofauna.

The use of interactive multimedia will be explored as a way of showing particular techniques (e.g. videos on using mist nets).

The electronic capture of inventory and monitoring data using hand-held dataloggers has been successfully trialled for five minute bird counts, foliar browse index and predator trapping. Based on feedback, these applications will be improved over the next few months.

How do people learn to use the Toolbox methods?

Training will be available for some staff, to ensure they meet competency levels, but most staff will be expected to access the specifications in the Toolbox via the DOC Intranet, and apply the method themselves, knowing what the minimum standards are.

The future

Over the next two years, method specifications for reptiles, amphibians, invertebrates and freshwater species will be developed. Further out, the Toolbox will move on to other methods that measure ecosystem functions and the components that drive population dynamics. In time, the Toolbox will be made available to external agencies and organisations.

Example of a decision tree for bird monitoring methods.

- Are you interested in population size?
  - Yes → Is a complete count possible?
    - Yes → Total counts
      - Roost, colony, lek, nest and intensive ground counts
      - Total mapping of breeding territories or pairs within defined area
      - Counts within plots
    - No → Do you need an estimate of absolute density?
      - No → Is a simple index of relative abundance sufficient?
        - Yes → Uncorrected counts of individuals or objects of interest (e.g. nests) detected *e.g. Five minute bird counts, point count transects, call counts, playback, etc.*
        - No → Double sampling
      - Yes → Are individuals easily observed?
        - No → Can you capture and mark individuals or map and locate nests economically?
          - Yes → Are individuals contained (no edge effect) within entire area of interest/plot?
            - No → Can individuals be fitted with radio tags or other marks and be relocated easily?
              - Yes → Mark-resight models NOREMARK
              - No → Go to blue box
            - Yes → Can population be treated as demographically closed?
              - Yes → Are there at least 100 individuals in the sample area with capture/resighting probabilities >0.3?
                - Yes → Mark-recapture / Standardised mist-netting
                - No → Go to blue box
              - No → Is the population geographically closed with no edge effect, heterogeneity in capture probability, or behavioural response to capture method?
                - Yes → Open population mark-recapture models
                - No → Go to blue box
        - Yes → Can you measure the distance to individuals accurately?
          - Yes → Distance sampling
          - No → Uncorrected counts of individuals or objects of interest (e.g. nests) detected *e.g. Five minute bird counts, point count transects, call counts, playback, etc.* / Double observer
  - No → Do you need to estimate the probability of occurrence at a site/s?
    - Yes → Site occupancy
    - No → Presence-absence indices / Atlas scheme

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