



HOME RANGE TOOLS for ArcGIS®

The screenshot shows the ArcGIS interface with the 'HRT Tools' menu open. The menu items are: Kernel Density Estimation, MCP Analysis, Calculate Travel Times and Distances, Remove Time2 Field Duplicates, Remove X/Y Duplicates, Display Travel, Import Lotek MDB Files, and About... The background shows a map with animal tracks and several analysis results: a 3D surface plot of utilization distribution, a 2D map with a core area boundary, and a travel path animation window.

1. The Home Range Tools (HRT) drop down menu.
2. Kernel Density Estimation for generating Utilization Distributions.
3. Estimation of home range areas by Minimum Convex Polygons.
4. Calculate time and distance between locations, as well as cumulative values.
5. The HRT has a direct import filter for LOTEK GPS collar data files – other file types may be imported using standard ArcGIS procedures.
6. Multiple files for individual animals can be displayed and checked for records with duplicate times or co-ordinates.
7. The Display Travel data animation tool follows an animal's path as it moves from point to point.
8. Areas enclosed by selected isopleths of Utilization Distributions are calculated and may be used as indices of core area and home range size.
9. Utilization Distributions from kernel analyses output as rasters are easily rendered as 3D images for visual comparisons.

WHAT IS THE HOME RANGE TOOLS (HRT) FOR ArcGIS®?

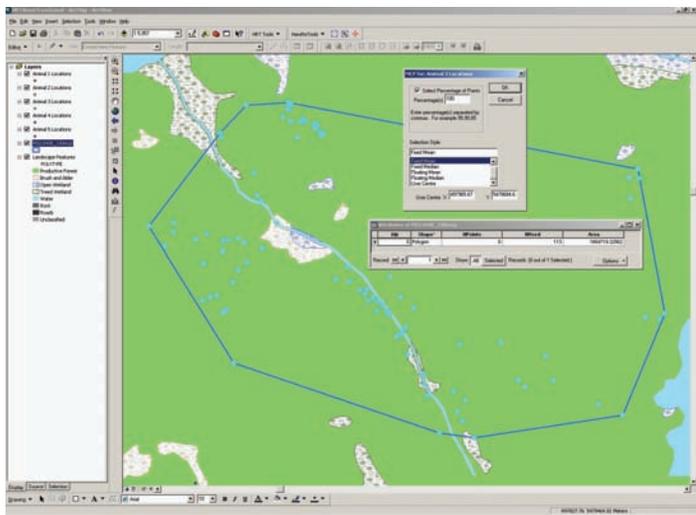
The Home Range Tools (HRT) software is an ArcGIS version of the Home Range Extension (HRE) for ArcView GIS. The HRT extends ArcGIS to analyze home ranges of animals. The program has been written for novice GIS users who already understand basic wildlife telemetry issues and who are familiar with the concepts of “home range” and “utilization distributions”.

The ability to use large data sets and carry out all required home range analyses within a single software environment was the primary reason for developing the HRT for ArcGIS.

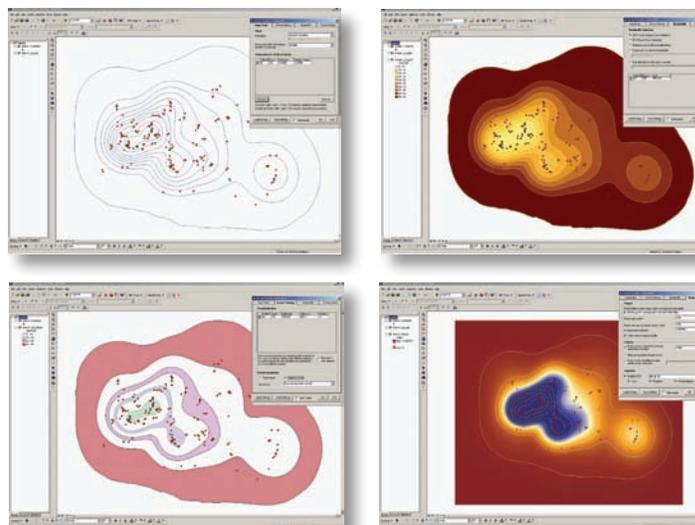
DATA EXPLORATION

- An important feature of the HRT is the “Display Travel” tool that follows an animal’s path as it moves from point to point.
- Calculated speeds and distances between fixes are displayed and the travel path can be saved for later analysis or addition of buffers.
- Point data can be used to calculate average distance moved between fixes, average elapsed time between fixes, speed of movement, total distance moved in a given period, or home range polygons.

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Minimum convex polygons and associated areas can be generated for all fixes or a subset using one of several percentage selection methods available in the HRT.



Utilization Distributions from kernel analyses can be output as simple lines (isopleths), "donut" polygons, enclosed area polygons, or rasters.

CALCULATING HOME RANGES

- The HRT includes 2 home range analysis models: minimum convex polygons (MCPs) and kernel methods.
- Because different computer software programs may produce large differences in home range estimates based on these models, the HRT includes most of the options offered in earlier programs for calculation of estimators and values input for various parameters.

KERNEL METHODS

- The HRT includes both fixed and adaptive kernel methods.
- Smoothing parameters (bandwidth) may be based on standardized or non-standardized data, and may be input directly by the user or estimated by Least Squares Cross Validation (LSCV).
- Both Schoener's index and the Swihart and Slade index of autocorrelation are calculated in conjunction with kernel analyses.
- The HRT for ArcGIS provides batch processing of kernel analyses for multiple animals.

DEVELOPMENT TEAM

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SYSTEM REQUIREMENTS

The HRT requires ArcGIS 9.x, running under Windows XP (Service Pack 2).

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To obtain a copy of this software visit:

<http://flash.lakeheadu.ca/~arodgers/hre/>