

VORTEX

Model Uses	VORTEX is a Population Viability Analysis model that is used to understand deterministic forces as well as genetic, environmental and genetic events on wildlife populations.	
Major Categories	Population Modeling	<u>Subject Knowledge Level</u> Advanced
Minor Categories	Population Viability Analysis	<u>Technical Difficulty Level</u> Intermediate
Model Type	Physical Model	<u>Geographic in Nature?</u> No

Abstract

VORTEX is an individual-based simulation model for population viability analysis (PVA). This program will help you understand the effects of deterministic forces as well as demographic, environmental, and genetic stochastic (or random) events on the dynamics of wildlife populations. VORTEX models population dynamics as discrete, sequential events (e.g., births, deaths, catastrophes, etc.) that occur according to defined probabilities. The probabilities of events are modeled as constants or as random variables that follow specified distributions. Since the growth or decline of a simulated population is strongly influenced by these random events, separate model iterations or “runs” using the exact same input parameters will produce different results. Consequently, the model is repeated many times to reveal the distribution of fates that the population might experience under a given set of input conditions.

VORTEX simulates a population by stepping through a series of events that describe the typical life cycle of sexually reproducing, diploid organisms. The program was written originally to model mammalian and avian populations, but its capabilities have improved so that it can now be used for modeling some reptiles and amphibians and perhaps could be used for fish, invertebrates, or even plants—if they have relatively low fecundity or could be modeled as if they do. The purpose of this manual is to provide you with complete instructions on how to install and use VORTEX. It is not intended as a primer on population biology; you must be conversant with this discipline to use the program appropriately and effectively. In addition, you must know something about the biology of the species that you intend to model. You should gather as much information as possible in order for VORTEX simulations to be meaningful. The old computer adage of “garbage in, garbage out” is aptly applied to population viability analysis, and PVA using VORTEX is certainly no exception. It is important to recognize that many of the questions VORTEX asks as users construct the population model cannot be answered simply because the data do not exist and the user will have to input a best guess.

Future Developments

Unknown

Model Limitations

Unknown

Model Features

- Stochastic based model
- Uses typical life cycle information for sexually reproducing diploid organisms including:
 - Mammal
 - Avian
 - Reptiles
 - Amphibians
 - Fish

Required Data Types

Users input variables and information in 13 different sections based in separate windows before the model is executed.

Model Outputs

Text Output, including: Data Input Summary, Deterministic Calculations, and an Output Summary; Graphs and Tables.

Hardware Requirements

Pentium (or newer) processors

DOS

Supported Platforms

UNIX

Software Requirements

All versions of Windows after 95

Windows

Macintosh

Cost, Licensing and Availability

VORTEX is copyrighted, but is distributed without cost for the purpose of furthering conservation and research.

Individuals and not-for-profit organizations are hereby given licenses for using VORTEX in research and conservation.

Source

Department of Conservation Biology

Source URL<http://pw1.netcom.com/~rlacy/vortex.html>