APPENDIX B
Recommendations for Further Research

One of the more important outcomes of the process of holding workshops around the world to investigate the environmental consequences of nuclear war has been the recognition of the broad subject areas that have not yet received adequate research treatment. It is instructive to realize that many of the following listed topic areas involve the field of stress ecology; thus, improved understanding of the environmental consequences of nuclear war will progress in concert with advances in stress ecology.

During the synthesis workshop held at the Wivenhoe Conference Center, University of Essex in June, 1985, the review committee for this volume compiled their recommendations for further research. (See Appendix A for a listing of review committee members.) Those recommendations are listed below, supplemented by a more detailed list compiled by M. Harwell, T. Hutchinson, W. Cropper, Jr., and C. Harwell.

Review Committee Preamble:

'We recognized that progress in this field will be strongly dependent on research efforts in stress ecology, but we are confident that these investigations will continue to enjoy strong support.'

REVIEW COMMITTEE RECOMMENDATIONS:

1.) Biological and physical scientists should work cooperatively in developing regional and global models that reflect the climatic consequences of nuclear war, with particular attention to feedback from the biological analysts. This would help to produce the types of information needed for ecological considerations.

2.) There is a need for models of environmental and ecosystem responses extending into the chronic post-nuclear war phase. These should include better estimates of chronic phase parameters of temperature, light, and precipitation. These should also include much more experimental work on the effects of beta-radiation on plants and crops. Microcosm or enclosure experiments would be appropriate.

3.) Interactive atmosphere–ocean models need to be improved to allow simulations of post-nuclear war climatic disturbances.

4.) Experiments are needed to give a better understanding of the importance and role of seed and seedling banks in world ecosystems and their vulnerability to climatic perturbations.

5.) Explicit experimentation is needed to investigate synergisms including, for example, the interactive effects on biota of radiation, UV-B, and air pollution.

ADDITIONAL RESEARCH NEEDS (from the Volume II authors):

1.) Synthetic studies addressing the specific conditions at local, regional, and national levels are the next logical step in the process of understanding the effects of global nuclear war.

2.) There is a need for further analysis of food stores, the likelihood of their destruction in a major nuclear war, their location, and other data, on a country-by-country basis.

3.) Experiments need to be conducted using microcosms and enclosed whole ecosystems and agricultural systems to examine systems-level responses to climatic disturbances; particular attention can be given to recovery processes by using this approach.

4.) New model development is needed to determine responses of ecosystems to climatic perturbations. Such models will have general applicability to other important issues in addition nuclear war.

5.) Experimental manipulations of grasslands, such as the response of their root system when subjected to cold temperatures, would provide a good example of the response of perennials to post-nuclear war climatic alterations.

6.) Environmental triggers for pest outbreaks need investigation; this should deal particularly with the relationship of pest outbreaks to unusual climatic events.

7.) There needs to be an enhanced cooperation between physical and biological scientists in identifying the research priorities of the physical scientists. Examples of biologically based suggestions include:

- Climatologists need to do research on short-term variability in climate and the relationships between average climatic conditions and variances in climatic conditions in a post-nuclear war framework.
- Better resolution is needed of the potential levels of air pollution

likely to result from a nuclear war.

- Better resolution is needed of the potential levels of precipitation reductions likely to result from a nuclear war.
- The potential for long-term climatic changes needs investigation, particularly involving feedback mechanisms, such as albedo changes, ice pack dynamics, and greenhouse-effect gases.

8.) Existing sophisticated models of local fallout patterns need to be used to evaluate the range of dose levels that would be experienced after a nuclear war, based on a variety of nuclear war scenarios and weather conditions. Similarly, existing dose models need to be used to evaluate the range of internal radiation doses to be expected in the aftermath of a large-scale nuclear war.

9.) There is a critical need for comprehensive and concerted study of the potential societal responses to nuclear war.

10.) Full consideration of the policy implications of the above kinds of research needs to be addressed.