

## **Preface**

Pestiferous rangeland grasshopper population outbreaks can be extremely detrimental to the plant resources of a region, which in turn, can have devastating consequences for the livestock that depend on those plants for forage and for the beef producers that depend on the nutrients produced by the forage plants for family income. The information in this report explains what, why, how, and when Northern Plains beef producers and land managers could change traditional grazingland management practices three years before the next grasshopper problem to prevent or reduce the damaging ecological and economical impacts caused by pestiferous rangeland grasshopper population increases. These paradigm changes are proactive long-term land management strategies that are favorable for livestock production and create habitat unfavorable for pest grasshopper production and that are sensible alternatives to the typical reactive short-term chemical insecticide spray treatments implemented after the grasshopper numbers have intensified.

These guidelines for proactive management of pestiferous rangeland grasshopper habitat of the Northern Plains are based on recent discoveries of grasshopper biology and population dynamics and on the latest technologies for activation of the defoliation resistance mechanisms within grass plants and activation of the biogeochemical processes within rangeland ecosystems. The resulting habitat changes in residuum vegetation structure during the growing season inhibit access to direct sunlight that decreases day-degrees of heat reaching the eggs, reducing embryonic development, and delaying hatch date, and that restricts thermoregulation of grasshopper body temperature at optimal high levels, reducing developmental growth rates of nymphs and adults, increasing mortality rates, and reducing population numbers to tolerable densities.