**Material and Methods**

*Site Description*. The study was conducted in four locations in Nebraska (Figure 1). The sites were along the Missouri River near Newcastle (Dixon County), along the Niobrara River near Atkinson (Holt County), along the Platte River near Kearney (Buffalo County), and along the Niobrara River north of Johnstown (Brown county). The selected sites were part of a larger wetland habitat that was under standing water for at least two to three months of the season (March to May). Sites had been known to be infested with purple loosestrife three to five years before the initiation of these experiments, with percent ground cover (infestations levels) ranging from 80 to 95% depending on the site.

Other commonly found species infesting the sites were NAME OF SPECIES HERE. These species represent local vegetation present at the sites in the beginning of the experiments or resulting from secondary succession attributed to the selective nature of the herbicides used. The four sites had soils containing 70% sand. Also, the aboveground water level ranged from 30 cm of water depth during the March to May period to none for the rest of the year. The underground water table across all sites was within 50 cm of the soil surface.

Monthly rainfall from April to October varied in total amount between years and locations. Total rainfall was less than the 30-yr average in 2000 but greater in 2001. For example, in 2000 there was 373 and 263 mm rainfall compared with 30-yr averages of 472 and 443 mm for the Newcastle and Atkinson sites, respectively. In 2001, there was 526 and 430 mm compared with 30-yr aver- ages of 474 and 420 mm for the Kearney and Johnstown sites, respectively. Average daily temperatures for the 3- yr study were similar to the 30-yr averages. For example, in 2000, the daily average temperatures at Newcastle for June, July, and August were 20, 23, and 25 C compared with 30-yr averages of 21, 25, and 23 C, respectively. Similar temperatures were observed at other locations.

*Experimental Design*. The experiments were established as a randomized complete block design with 15 treatments, including a nontreated control, with four replications (Table 1). The experimental unit was 10 m long and 2 m wide. Herbicides were applied when at least 50% of purple loosestrife plants were blooming, which was approximately the third week of June. Application at this time facilitates identification of plants (purple flowers) by landowners or herbicide applicators. Furthermore, perennial plants are vulnerable to chemical control during flowering. Herbicide treatments were applied with a CO2- pressurized backpack sprayer calibrated to deliver 200 L ha-1 aqueous solution at 208 kPa through XR TeeJet® 11002 flat fan nozzles at a speed of 4 km h-1. The first herbicide application was performed in 2000 (Atkinson and Newcastle) and 2001 (Johnstown and Kearney). After a year after application treatment (YAT), if herbicide control < 100% of species, herbicide application occurred again in the same experimental unit. This procedure was performed until the end of the study; therefore, less effective herbicides were applied multiple times throughout the study. In contrary, if control of species equal 100%, herbicide application did not occur. The weather conditions shortly before, during, and after herbicide applications were favorable for herbicide uptake.

Visual ratings of percent suppression of all major plant species, including purple loosestrife, were conducted at approximately 4 and 10 wk after treatment (WAT), as well as 1 to 5 yr after the first herbicide application treatment. Control ratings were based on a scale from 0 to 100 (where 0 no injury and 100 plant death). Control ratings were based on symptoms such as chlorosis, necrosis, and stunting of plants compared to non-treated plants. The rating at 10 WAT was considered a season-long control. The yearly ratings provided a basis for determining the level of purple loosestrife control in the following seasons. There was also an overall ground cover rating done yearly, which included all plant species present at the site. These data provided information on the overall effect of these herbicides on plant species composition at the site. Species composition was reported based on the plant categories (grasses and broadleaf). Species composition and ground cover were assessed six times during a 6-yr period of the study: (1) before herbicide application, (2) 1 YAT, and (3) 2 YAT, (4) 3 YAT, (5) 4 YAT, (6) 5 YAT using a visual percentage scale ranging from 0 to 100%. A species composition rating of 100% indicates a complete ground cover by plant biomass, whereas a 30% rating represents the level of ground cover indicating a 70% bare ground (no vegetation).

**Data Analysis.** ANOVA of visual ratings data was performed using to test NEED More details about STAT ANALYSIS.