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Emergence and mortality of native prairie forbs seeded into an established stand of grasses

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EMERGENCE AND MORTALITY OF NATIVE PRAIRIE FORBS SEEDED INTO AN ESTABLISHED STAND OF GRASSES

An Abstract of a Thesis
Submitted
In Partial Fulfillment
of the Requirements for the Degree
Master of Science

Dave Williams
University of Northern Iowa
December 2002

ABSTRACT

Thousands of hectares of warm-season grass plantings in Iowa have few to no native forbs. Diversifying these species poor plant communities with native prairie forbs could result in increased resistance to climatic extremes, increased biodiversity, reduced noxious "weedy" plant invasion, and reduced geographic isolation between existing native prairie remnants.

I hypothesized that frequent mowing in the first one or two years after broadcasting forb seed into an established stand of warm-season grasses can increase forb emergence and reduce forb mortality. I further hypothesized that fall seeded forbs would establish better that those seeded in spring.

To test my hypothesis, I seeded 23 forb species at a rate of 3.7 kg/ha or 350 viable seeds/m^2. I assessed and compared forb emergence and mortality using three mowing treatments and two seeding treatments; fall seeding with frequent mowing the first growing season (mow-1), spring seeding with frequent mowing the first growing season (mow-1s) winter seeding with frequent mowing two consecutive growing seasons (mow-2), and fall seeding without mowing (no-mow). I also destructive sampled forb plants to assess growth differences between mow-1 and no-mow treatments.

Over time, forb emergence was significantly ($p<0.020$) higher in mowed plots in year one. Year two forb emergence was not significantly different among treatments. Seeding time was not a significant factor in forb emergence in year one and in year two.

Species richness was significantly ($p<0.031$) higher in no-mow plots in year one. Species richness was not significantly different among mowing treatments in year two. Seeding time was not a significant factor in species richness in year one and in year two.

Over time, forb mortality was significantly ($p<0.047$) greater in no-mow plots in year one. In addition, forb mortality was significantly ($p<0.038$) greater in no-mow plots over-winter (between year one and year two). Over-winter mortality in no-mow plots was 24.3% compared to 2.3% in mow-1 and 3.9% in mow-2 plots. Year two mortality was not significantly different among mowing treatments.

Forbs in mow-1 plots destructive sampled in September of both years had significantly ($p<0.001$) taller shoots and deeper roots and significantly ($p<0.001$) greater root and shoot mass than no-mow plants. By September year two, forbs in mow-1 plots averaged 223% taller shoots and 45% deeper roots over forbs sampled in no-mow plots. In year two, there were 46 times more flowering plants in mow-1 plots than in no-mow plots.

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This Study by: Dave Williams

Entitled: Emergence and Mortality of Native Prairie Forbs Seeded
Into an Established Stand of Grasses

has been approved as meeting the thesis requirement for the

Degree of Master of Science.

11/8/02
Date Dr. Laura Jackson, Co-Chair, Thesis Committee

11/1/02
Date Dr. Daryl Smith, Co-Chair, Thesis Committee

11.1.02
Date Dr. Paul Christiansen, Thesis Committee Member

12/19/02
Date Dr. John W. Somervill, Dean, Graduate College

DEDICATION

For Maureen, Rob, Clair, and Kaylee

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CHAPTER 1

INTRODUCTION

Grasslands have been a dominant part of Iowa's landscape for at least 9000 years (Smith 1998). Nearly all of the 11.54 million hectares of pre-settlement native tallgrass prairie grasslands in Iowa have been eliminated over the last 150 years and replaced by corn and soybeans (Smith 1998). The surviving 11,332 hectares of tallgrass prairie left in the state are highly fragmented and vary in species diversity (Smith 1998).

Presently, most of the 2.39 million hectares of grasslands in the state have little resemblance to pre-settlement tallgrass prairie. Many of these grasslands consist of near monoculture stands of non-native plant species with few to no native prairie plants (Williams unpublished 1999 survey). An example of this can be found in Iowa's road rights-of-ways. Prior to 1970, Iowa's 200,000 hectares of road rights-of ways were seeded with non-native species such as *Bromus inermis* , *Poa pratensis* , *Trifolium spp* and *Phleum pratense* (Ole Skor 1999). Grasslands along Iowa's roadsides continue to reflect these early seeding practices. Over the last 30 years there has been an increased effort to use native tallgrass prairie species for conservation reserve lands, state/county rights-of-ways and pasture (Daryl Smith 1999). Various government agencies currently recommend the use of a few native warm-season grass species for grassland seedings (Barnhart 1996).

Today, thousands of hectares of warm-season grasslands exist throughout the state (Williams unpublished survey 1999). Missing from these grasslands are native prairie wildflowers, or forbs.

The lack of species diversity in Iowa's grasslands may have serious consequences for agriculture, wildlife, and the few remaining prairie remnants. First, species-poor grasslands are less resilient to climatic extremes. Weather extremes can reduce the amount of plant biomass production and increase recovery time in species-poor grasslands. During drought conditions, Tilman and Downing (1994) found that plots in a native Minnesota grassland with fewer than nine species produced less than one-eighth of their pre-drought biomass. Plots with up to 21 plant species had biomass reduced by only half of the pre-drought biomass. They also found that plots with greater plant diversity returned to pre-drought biomass production within four years after the drought. Plots with fewer than 5 species still had significantly less biomass than their pre-drought condition after four years of recovery. Tilman's results suggest that even in the first season of a drought period, dramatic decreases in biomass production in Iowa's species poor grasslands are likely. This could seriously impact wild and domestic animals dependent on plant growth for survival.
In addition, the indicated loss of biomass in the years immediately following a drought could compound those losses.

Second, there is a strong correlation between plant species diversity and the diversity of other living organisms (Tilman 1986). Recent research has shown that an increase in grassland plant diversity results in an increase in arthropod diversity (Siemann et al. 1998, Ries et al. 2001). Siemann et al. (1998) found that a prairie reconstruction consisting of 32 species of grasses and wildflowers attracted a total of 491 species of arthropods. Reis et al. (2001) conducted a butterfly survey along Iowa's roadsides and compared plant diversity to butterfly frequency. The plant community in Ries' study was dominated by native prairie grasses and forbs. This plant community was compared to species poor plant communities dominated by *Bromus inermis* (smooth brome). They found the diverse native prairie plant community had a higher number of both butterfly species and individuals. They also found that fifteen known habitat-sensitive butterfly species preferred roadsides dominated by native prairie grasses and forbs. This study suggests that increasing grassland diversity with forbs can directly increase butterfly diversity and abundance. These results also suggest that enhancing Iowa's species-poor, warm-season grass plantings with native prairie wildflowers could provide refuge for many habitat-sensitive butterflies that are currently restricted to fragmented prairie remnants.

Third, species poor grasslands are clearly more susceptible to invasion by new species.

Tilman (1997) sowed up to fifty-four species of native prairie grasses and forbs into 1m x 1m plots in a native Minnesota grassland. He found plots that were more species rich prior to seeding had fewer species establish from the addition of seed. Tilman's experiment suggests that there were more unused resources available for new plant recruitment in plots with fewer species present.

Plant communities in Iowa's roadsides tend to mirror Tilman's results. Many of Iowa's roadside plant communities undergo constant invasion by non-native noxious "weed" species. The Iowa Department of Transportation and counties spend millions to eradicate "weeds" each year (Williams unpublished survey 1999). These species poor plant communities have excess resources, such as space in the soil and surface light, making them susceptible to new weedy invasion on an annual basis. Diversifying species poor plant communities with native forbs is one alternative to the random invasion of weedy plants. The resulting diverse plant community could reduce weedy invasion and the cost associated to control them.

Fourth, enhancing species poor grasslands with prairie forbs could have a positive impact upon native prairie remnants. Less than one- tenth of one percent of pre-settlement tallgrass prairie remain in Iowa (Smith 1998). These remnants are highly isolated islands surrounded by agriculture, roads, and urbanization (Smith 1998).

Recent research has shown that these remnants are degrading; the number of native tallgrass prairie species disappearing from midwestern prairie remnants is alarming (Leach and Givnish 1996). Habitat fragmentation has been identified as a factor that contributes to the loss of native plant species (Leach and Givnish 1996). Habitat fragmentation isolates and reduces the size of plant populations and can result in an increase of species loss by local extinction (Risser 1996). Researchers in Wisconsin found that 8% to 60% of native plant species disappeared from 54 Wisconsin prairie remnants over the last 52 years (Leach and Givnish 1996). In addition, they found that the fewest species were lost in the largest prairie remnants. These results suggest that increasing the size of a fragmented prairie remnant may reduce its loss of species. Enhancing Iowa's species poor grasslands with native forbs could reduce distances between remnant populations, effectively increasing the population and reducing the potential for species loss.

Thousands of hectares of warm-season grasslands were planted during the early prairie reconstruction era of the 1960's and 1970's. Proceedings from The North American Prairie Conference's of that period reflect a research focus on warm-season grassland establishment. More recent research, of which this is a part, reflect an interest in diversifing those grasslands.

Diversifying Iowa's species poor grasslands with native prairie forbs could enhance their economic value to landowners by maintaining biomass through weather extremes, expand the habitat and diversity of other living organisms including habitat sensitive species, and reduce noxious weed invasion. These steps would also reduce the geographic isolation between existing native prairie remnants, resulting in larger species populations, and stemming local extinction. The first step towards returning native prairie back to Iowa is to enhance its warm-season grasslands with native prairie forbs.

Research Questions and Hypotheses

I believe that species poor, warm-season grass plantings can be enriched with forbs by mowing without destroying the established grasses. I hypothesized that frequent mowing in the first one or two years after broadcast seeding would increase forb emergence and survival, and enhance forb growth relative to unmowed controls. I further hypothesized that fall-seeded forbs would establish better than those seeded in spring.

The objectives of this study were to 1) assess and compare forb emergence, mortality and richness using various mowing treatments in a species poor grassland, 2) assess and compare forb emergence in mowed treatments seeded in spring and fall, and 3) assess and compare forb growth and maturity between mow and no-mow treatments.

Literature Review

This study was developed in response to a published paper presented by Carl Kurtz at the North American Prairie Conference (Kurtz 1994). Kurtz asserted that frequent mowing during the first growing season after seeding prairie would result in a more species diverse plant community. Kurtz cited extensive anecdotal evidence to support his premise. In one of his early attempts at planting prairie, Kurtz found that annual weedy plants that emerged the first growing season had a detrimental affect on the seeded prairie plants. Kurtz suggested that uncontrolled weedy annuals contributed to the poor establishment of the native plants he seeded. He observed in subsequent native prairie plantings that frequent short mowing resulted in weed-free plant communities, diverse with native species.

Kurtz's observations directly support the theory of invasibility proposed by Davis et al. (2000). This theory suggests that invading species must have access to excess light, water, nutrients, and rooting space in order to become established into a plant community (Davis et al. 2000).

Disturbance of the plant community is one way to increase availability of unused resources. Removal of the grass canopy, either by natural disturbances (fire, grazing) or by humans (mowing, tillage), will supress the existing plant community, creating space in the soil and additional light at the soil surface.

In this way, the plant community becomes more susceptible to invasion. Likewise, the theory predicts that invasion of a new species into a plant community without excess resources may not be successful.

A number of studies have demonstrated that growth and abundance of warm-season grasses can be reduced by frequent mowing or grazing. Biswell and Weaver (1933) transplanted mature clumps of the warm-season grass *Andropogon gerardii* into pots. Over a single growing season, plants were subjected to repeated clipping. The researchers found that clipped plants had only 5.3% of root biomass as compared to unclipped plants. In addition, clipped plants failed to produce new rhizomes and many of the old rhizomes died. Other warm-season grass species exhibited the same reduction of biomass when repeatedly clipped. This would suggest that frequent clipping of established warm-season grasses for one or two growing seasons could make above and below ground resources available for new plant emergence.

Zajicek et al. (1986) used mowing treatments to enhance a native Nebraska grassland with forb species. The researchers compared emergence of five forb species seeded into plots mowed once in mid-April to plots mowed once in mid-September. They found no significant differences in emergence of seeded forbs between the two mowing treatments. Zajicek did not reveal what the dominant vegetation was in his experiment.

If their native Nebraska grassland was dominated by warm-season grass "decreasers", one mid-April or mid-September mowing treatment may have had little effect on grass growth because in warm-season grasses most active growth occurs during the summer months.

Mowing research has not been limited to the United States. In a long-term mowing experiment conducted over an eighteen year period, Parr et al. (1988) researched the long term effects of repeated mowing in a right-of-way in the United Kingdom. The rights-of-way sites were diverse plant communities designated as roadside nature reserves. The study involved from one to five mowing repetitions in each growing season for eighteen consecutive years. No seed was added in the experiment. Parr et al. (1988) found that species richness was lowest in the uncut plots and highest in the plots cut twice (mid-spring, mid-summer) during the growing season. They also found that removal of thatch increased species richness of forbs in those plant communities. Results from this study demonstrated that mowing during the growing season over consecutive years can sustain and enhance plant diversity in a species rich grassland.

Collins et al. added to this body of knowledge with a grazing and mowing study in a native tallgrass prairie in Kansas in 1998. They compared species richness in grazed and ungrazed plots and in mowed and unmowed plots during a single growing season.

The plots grazed by *Bison,* and the mowed plots had greater species richness. Their results suggest that increased sunlight at the soil surface was a major factor increasing species richness of the plant community. No seed was added in the experiment, so it is not known if the increase in species richness was from seed or repressed plants. However, increased sunlight to the soil surface as a result of mowing and grazing during the growing season may have provided conditions favorable to forb emergence.

A similar experiment conducted by Howe (1999) in a five year old reconstructed prairie in Wisconsin compared abundance of *Zizia aurea* in plots mowed once in May to plots mowed once in August. No seed was added in the experiment. Plots were mowed in 1995 and sampled in June of the following year. Howe (1999) found that numbers of *Zizia aurea* doubled in plots mowed in August. He also found no significant differences of *Zizia* numbers mowed in May. In addition, there were significantly more flowering plants in plots mowed in August. His results suggest that emergence and development of early cool-season forbs can be increased by mowing mid-summer. It is not known in Howe's (1999) experiment if the increase in emergence of *Zizia aurea* in plots mowed mid-summer was from seed or rootstock from previous years.

Mechanical disruption (tillage) of dominant vegetation in an established grassland is known to promote seedling emergence.

Brown and Bugg (2001) compared the effects of till and no-till treatments on emergence of forbs seeded into an established California grassland. The till treatment area was rototilled to a depth of 10-15 cm prior to sowing. The vegetation was not disturbed in the no-till treatment. Brown (2001) found forb emergence and canopy cover were greater in tilled plots. These results confirm that removal of the grass canopy and disruption of underground roots by tillage can be a successful technique to establish seeded forbs in a species-poor grassland. Tillage may not be an effective treatment in Iowa. Tillage in Iowa's species poor grasslands may promote non-native weedy species present in the soil seed bank. In addition, tillage may increase soil erosion and eliminate the benefits derived from an established plant community. For these reasons, if results similar to Brown and Bugg (2001) are to be achieved, mowing may be a better treatment than tillage.

Disturbance of the dominant vegetation by fire while adding seed will also increase the emergence of new species into an existing grassland. Christiansen (1994) seeded native prairie grasses and forbs into a species poor grassland dominated by cool-season *Bromus inermis* (smooth brome). He found increased emergence of seeded grasses and forbs in plots burned mid-spring over plots not burned. Burning mid-spring when *Bromus inermis* was actively growing provided favorable conditions for emergence of seeded forbs and grasses.

While it is not known if increased emergence in burned plots was due to the removal of the living canopy or the removal of dead thatch from the previous years growth, fire disturbance to the dominant vegetation during its active growth increased new plant emergence and growth.

Plant litter in grasslands can affect plant emergence and growth. Knapp and Seastedt (1986) found that litter (thatch) in a tallgrass prairie greatly reduced light and soil temperatures. These conditions delayed emergence in the spring, reducing reproduction and slowing plant growth (Knapp and Seastedt 1986). They suggest the detrimental effects of thatch could be eliminated by burning or heavy grazing.

Previous research has demonstrated that mowing, burning and tilling the established vegetation can release excess resources, fostering new plant invasion from whatever seed source is present in the plant community. I believe we can pro-actively accelerate plant community change through mowing and seeding, to diversify Iowa's grasslands.

Research is needed to determine if frequent mowing and seeding forbs into an established species poor, warm-season grass planting will result in greater emergence and diversity in the plant community.

CHAPTER 2

MATERIALS AND METHODS

Site Description

My study site (42^{o} 30' 30" N; 92^{o} 27' 00" W) is part of the University of Northern Iowa tallgrass prairie campus preserve in Cedar Falls, Iowa. The soil is classified as a well drained Saude loam (0 - 2% slope) alluvial terrace and the native vegetation was tallgrass prairie (Fouts and Wisner 1982).

Prior to 1973, the site was a *Bromus inermis* (smooth brome), *Agropyron repens* (quackgrass) and *Trifolium pratense* (red clover) hayfield (Smith 1999). In 1973, the hayfield was spring plowed, disked and seeded with 24.7 kg/ha of cultivated varieties of warm-season grasses. The grasses included: *Andropogon gerardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), *Panicum virgatum* (switchgrass), *Bouteloua curtipendula* (side-oats grama), and *Sorghastrum nutans* (Indiangrass) (Smith 1999).

The site was burned on a rotational basis every 2-3 years since seeding. A limited number of forbs have been transplanted into the grasslands. Presently, the site is similar other grass dominated prairie reconstructions of the 1970's. Species include; *Andropogon gerardii* (big bluestem), *Panicum virgatum* (switchgrass), *Sorghastrum nutans* (indiangrass), *Poa pratensis* (Kentucky bluegrass), and *Bromus inermis* (smooth brome).

Portions of the preserve with the least forbs present were used in this experiment.

Experimental Design

The experiment used a randomized block design. Two 60m x 60m blocks each consisted of twelve, 15m x 20m plots (Appendix 1). Each plot was randomly assigned one of four treatments. No-mow plots were fall burned in October 1998, fall seeded in November 1998 and not mowed. Mow-1 plots were fall burned in October 1998, fall seeded in November 1998 and mowed the first growing season. Mow-1s plots were spring burned in April 1999, spring seeded in April 1999, and mowed the first growing season. Mow-2 plots were fall burned in October 1998, winter seeded in Febuary 1999, and mowed two consecutive growing seasons.

Treatments were replicated 3 times in each block. Each plot had 7 randomly placed 0.25m^2 circular quadrats for vegetation sampling. Quadrats constructed of polyvinyl chloride (PVC) potable tubing were permanently stapled to the ground. Vegetation was sampled at the same quadrat sites.

General Statistical Approach

The data were analyzed using analysis of variance (ANOVA) with three factors: block, seeding time, and mow. All possible 2-way interactions were analyzed. Seeding treatments were not crossed with mowing treatments, so no 3-way interactions could be tested.

A block-seeding time-mow model was developed for the experiment. The model included: two block factors (northwest and southeast blocks), two seeding factors (fall/winter and spring seeding), and three mowing factors (no-mow, mow-1, and mow-2). The model also included interactions such as block by seeding time and block by mow. A General Linear Models program was used in Systat (Wilkinson 1989) for the ANOVA. Trends in sample means over time were compared using repeated measures ANOVA. Tukey's protected test for pairwise comparisons was used to compare means among treatments (Wilkinson 1989). All comparisons were made at an alpha level of 0.05.

Skewness (g1) and kurtosis (g2) were calculated for all data sets. A Student's t-Test (alpha = 0.05, with infinite degrees of freedom) was conducted to determine if the data had significant skew or kurtosis from zero (Wilkinson 1989). To normalize the data distribution, all count non-normal data sets were log transformed. Plant length and weight non-normal data sets were square root transformed. Means were back-transformed to report the data.

Seed Preparation and Sowing

Seed used for the experiment was purchased from a Northeast Iowa prairie nursery and was of Iowa origin. Prior to sowing, the seed was stored dry in an unheated building.

Forb species were greenhouse grown in advance of the research project to aid in field identification. From emergence to first true leaf, forb species were drawn and photographed. A field notebook was assembled and used as an aid for forb identification when the experiment began. Legumes were scarified with 100 grit aluminum oxide sandpaper and inoculated with a solution of milk and *Rhizobium* bacteria (Table 1).

Table 1. Legumes used in the experiment. Seeds were inoculated with *Rhizobia* bacteria prior to planting. *Rhizobia* strains were originally isolated from legume hosts (in parentheses).

Forb Species	*Rhizobia* Inoculant (from legume host)
Amorpha canescens	*Rhizobium* sp. (*Amorpha*)
Dalea purpurea	*Rhizobium* sp. (*Onobrychis*)
Desmanthus illinoensis	*Rhizobium* sp. (*Desmanthus*)
Desmodium canadense	*Bradyrhizobium* spp.
Lespedeza capitata	*Rhizobium* sp. (*Onobrychis*)

From tetrazolium tests, pure live seed (pls) was calculated for the forb seed used in the experiment (Table 2).

Table 2. Forb seed used for the experiment. Mean seed weight was calculated from a subsample of 10 seeds from each species. An independent seed lab (Hulsey seed laboratory Inc. 1999) tested for pure live seed.

Species	Mean seed weight (g)	Pure live seed (%)	Viable seeds sowed/m^2
Aster novae-angliae	0.00008	60.00	134.7
Rudbeckia hirta	0.00026	81.94	56.7
Solidago rigida	0.00036	82.25	28.1
Ratibida pinnata	0.00095	89.10	22.2
Dalea purpurea	0.00143	81.93	13.5
Monarda fistulosa	0.00035	80.79	13.1
Coreopsis palmata	0.00084	60.00	12.8
Anemone cylindrica	0.00108	87.92	10.0
Liatris pycnostachya	0.00120	83.52	8.6
Rudbeckia subtomentosa	0.00067	60.00	7.6
Lespedeza capitata	0.00255	87.16	6.1
Euphorbia corollata	0.00246	81.91	4.1
Liatris aspera	0.00180	59.70	4.1
Echinacea pallida	0.00368	82.54	4.0
Heliopsis helianthoides	0.00493	83.34	4.0
Tradescantia ohiensis	0.00382	56.10	3.7
Desmanthus illinoensis	0.00452	90.67	3.6
Amorpha canescens	0.00278	60.33	2.7
Anemone canadensis	0.00319	69.45	2.7
Asclepias tuberosa	0.00504	69.52	2.5
Zizia aurea	0.00341	69.11	2.5
Desmodium canadense	0.00430	85.67	2.4
Silphium laciniatum	0.03234	63.79	0.5

Ten seeds were randomly chosen and weighed for every species. With pure live seed information and individual seed weight, the number of viable seeds sowed per unit area was estimated (Table 2).

Each forb species was divided evenly by mass into 24 lots (one lot per plot) and individually packaged.

Prior to sowing, all twenty-four plots were burned. This was done to remove thatch and enhance seed-to-soil contact. Seed was broadcasted by hand. In order to maximize eveness of seeding, sand was mixed with forb seed to achieve an even distribution of seed throughout the plots. No attempt was made to incorporate seed into the soil.

Mowing

A turf-grass riding mower was used to mow plots in 1999. Mowing the first growing season was done weekly from May 1 to September 1. Mowing height was increased to accommodate forb growth throughout the growing season. The initial mowing height was 5 cm and increased to 10 cm by July 1. The final mowing height was increased to 13.5 cm in August. The direction of mowing was alternated from a north-south to an east-west pattern weekly to minimize tire disturbances in plots.

Mowing the second growing season (2000) was done every two weeks from May 1 to September 1. A three-point rotary mower attached to a small 22 horsepower John Deere tractor with turf tires was used. The initial mowing height was 13.5 cm and increased to 27 cm early July. Mowing direction was alternated to reduce tire disturbances in plots.

Seedling Emergence and Analysis

I counted seedlings in $0.25m^2$ subplots at bimonthly intervals from June through September to maximize detection of forb seedling emergence. This frequency minimized the chance of missing an emerged seedling. I sampled $1.75m^2$ in each plot from seven random $0.25m^2$ subplots. Seedlings were totaled by plot and converted to a seedlings/m^2 mean. Forb seedling means at each sample date were analyzed to determine if significant ($p<0.05$) differences existed between treatments. Data analysis incorporated only three treatments in 1999: no-mow (fall seeded), mow-1 (fall seeded), and mow-1s (spring seeded). Seedling means were analyzed in two ways using the same block-seeding time-mow model. The first was to analyze seedling numbers from each count independently. Results from this analysis would reveal what had occurred at the time of sampling. The second was to analyze seedling means from all eight counts conducted in 1999. Results from this analysis compared the pattern of seedling numbers over time.

I conducted the first seedling count in early June 1999 when the presence of new seedlings appeared in the plots. To reduce incorrect forb identification, a seedling was counted only if it could be positively identified by species. It was possible to correctly identify the species of all 23 species within 2 weeks of emergence.

In the second growing season, I distinguished between newly emerged seedlings (presence of cotyledon leaves) and plants that had re-emerged from the previous growing season. Forbs began to re-emerge in late March with a large flush in early May. Each week during that time, new seedling emergence was also recorded. Fewer than ten new seedlings were counted from all the quadrats in the experiment. Because very few new emerged seedlings were found, seedling counts were made monthly from early May through September of 2000.
The same statistical analysis of emergence used for the first growing season was applied to the second.

Species Richness

Sampling was conducted frequently throughout the growing season to maximize the detection of all forb species and determine if they survived all summer or quickly died. At the same time a forb seedling was counted, it was also recorded by species. The number of species (species richness) were tallied by plot and mean species richness was calculated by treatment. Means were then analyzed after individual counts and in aggregate at the end of the growing season. Species richness was analyzed with the same statistical model used for seedling emergence.

Year One Mortality and Over-Winter Mortality

Calculating total forb mortality in this field experiment presented some challenges.

First, accurate identification of newly emerged seedings by species was critical at an early stage of development so their fate could be followed over time. The use of permanent, small ($0.25m^2$) quadrats, made it possible to locate all forb plants by species with a high degree of confidence that very few went undetected.

Second, forb emergence and mortality in a field experiment can occur throughout the growing season if the conditions are right. To accurately detect new emergence and mortality and minimize the chance that they could emerge and die between counts, seedling counts were conducted bi-monthly in the permanent quadrats. Over twelve hundred forb plants were accurately sampled in permanent quadrats through this method.

Mortality was calculated for year one, year two and over-winter (between year one and year two). All three were analyzed independently. Mortality was calculated from all the seedling counts conducted that year. Over-winter mortality was calculated from the last seedling count in 1999 to the first seedling count of 2000. Mortality data were square root transformed to normalize the data and analyzed with the same block-seeding time-mow model that was used for seedling emergence analysis. Forb seedling mortality was calculated by the following method.

First, a data set of maximum number of seedlings emerged was calculated.

Each plot 'maximum' was determined by summing the maximum number of seedlings for each species that occurred in that plot over all sample times in that year. A 1999 and 2000 data set of 'maximum' plot values were calculated. These two data sets represented the maximum number of seedlings that were counted over all sample times for each year. The 9/13/99 seedling count was used as the maximum for the over-winter mortality analysis.

Second, seedling mortality (%) was calculated for 1999 and 2000 separately. Seedling mortality (%) was calculated by taking the difference between that year's plot maximum and the coresponding plots last seedling count conducted at the end of the growing season, divided by the plot maximum multiplied by 100. Treatment means of seedling mortality (%) were calculated from plot totals.

Over-winter mortality (%) was calculated for each plot by subtracting the first seedling count conducted in 2000 from the last seedling count conducted in 1999, divided by the 1999 plot seedling count, multiplied by 100. Treatment means of seedling mortality (%) were calculated from plot totals.

The same block-seeding time-mow model used for seedling emergence was used for the mortality analysis. A separate ANOVA test on mean mortality (%) was conducted on year one mortality, year two mortality, and over-winter mortality. The model also included interactions such as block by seeding time and block by mow.

Forb Size

In order to determine if mowing had an affect on forb growth, I destructive sampled four forb species in September of the first growing season. Species were selected based upon their high abundance in the plots. This method assured enough availability of individuals in the transects. Perennials were sampled rather than annuals/biennials like *Rudbeckia hirta* (black-eyed susan), which were abundant throughout the plots.

Selection bias of individual plants was minimized by the following method. Ten plants of *Ratibida pinnata* (gray-headed coneflower), *Solidago rigida* (stiff goldenrod), *Echinacea pallida* (pale purple coneflower), and *Monarda fistulosa* (wild bergamot) were destructive sampled from four plots (two mow-1 and two no-mow plots). East-west transects were established at random in these plots. Every individual of the four species that intersected within 0.5m on either side of the transect was collected until ten individuals were found.

A bulb planter was used to extract a plug 5cm in diameter and 15cm deep. The plug was immediately washed with a garden hose in a wood box with a coarse mesh screen bottom. With the soil removed, vegetative parts of other plants were carefully separated to expose a complete plant with roots and shoots intact. Root and shoot lengths were measured and individually bagged in paper sacks for drying.

Plants were oven dried (60^{o}c) for three days. Root and shoot were separated and mass determined to 0.01g with a Mettler AJ100L electronic scale.

The same method of selecting plants was employed for biomass sampling the second growing season. One forb species *Ratibida pinnata* (gray-headed coneflower) was used for biomass sampling the second growing season in September 2000. Twenty individuals of *Ratibida pinnata* were sampled in two mow-1 and two no-mow plots in 2000.

Forb Maturity

In order to determine if mowing affected forb development, I counted flowering forb plants in year two. Flowering plant counts were made late June, early August, and mid-September 2000. Counts were made at these times to capture the maximum number of forb species with different blooming times. A twenty meter belt transect was established at random in each of six mow-1 and no-mow plots to count *Rudbeckia hirta. Rudbeckia hirta* plants that occurred within 0.5 meter on either side of the transect were counted. The total plot area (300 m^2) was used to count all other forb species. The data were pooled over all sample times for the block-seeding time-mow model and ANOVA.

Environmental Sampling-Light

I wanted to compare light intensity in mow and no-mow plots. I hypothesized that removal of the grass canopy by mowing would greatly increase light intensity at the soil surface. I used a Licor quantum light sensor to measure photosynthetic photon flux density (PPFD) differences between mow-1, mow-2, and no-mow plots. This device measured light in the 400 - 700 nm range that is used by plants for photosynthesis (LI-COR Inc. 1999). The unit expressed PPFD as umol $s^{-1}m^{-2}$ and an average reading in full sunlight at ground level was 1800 umol $s^{-1}m^{-2}$. A permanent location in every plot was selected at random and used for all PPFD measurements. At approximately solar noon on a clear day, five readings were taken at the same plot location per plot and the average of these five was used for analysis. Light readings were taken every 2-3 weeks during the growing season.

Environmental Sampling-Water Potential

I wanted to determine if there was adequate soil water for seedling growth during the first growing season. I hypothesized that removing the vegetation by mowing would increase the water available in the soil. I used a Quickdraw tensiometer to measure soil water tension in mow and no-mow plots. The tensiometer was calibrated from 0 kPa (saturated) to -100 (dry) kPa (Soilmoisture Equipment Corp. 1987). One reading was taken in every plot at random at a 15cm depth every 2-3 weeks during the growing season.

CHAPTER 3

RESULTS

Effects of Mowing on Light and Water Availability

Light at the soil surface was increased in mowed plots. I compared light intensity at ground level in mow and no-mow plots and found that mowing significantly ($p<0.001$) increased light intensity in all samples conducted in 1999 (Figure 1). By July 9 development of the warm-season grass canopy reduced light intensity at the soil surface three-fold in no-mow plots from the sample (June 7) taken four weeks prior (Figure 1). I found that the grass canopy greatly reduced, but did not exclude, light in no-mow plots during the 1999 growing season (Figure 1).

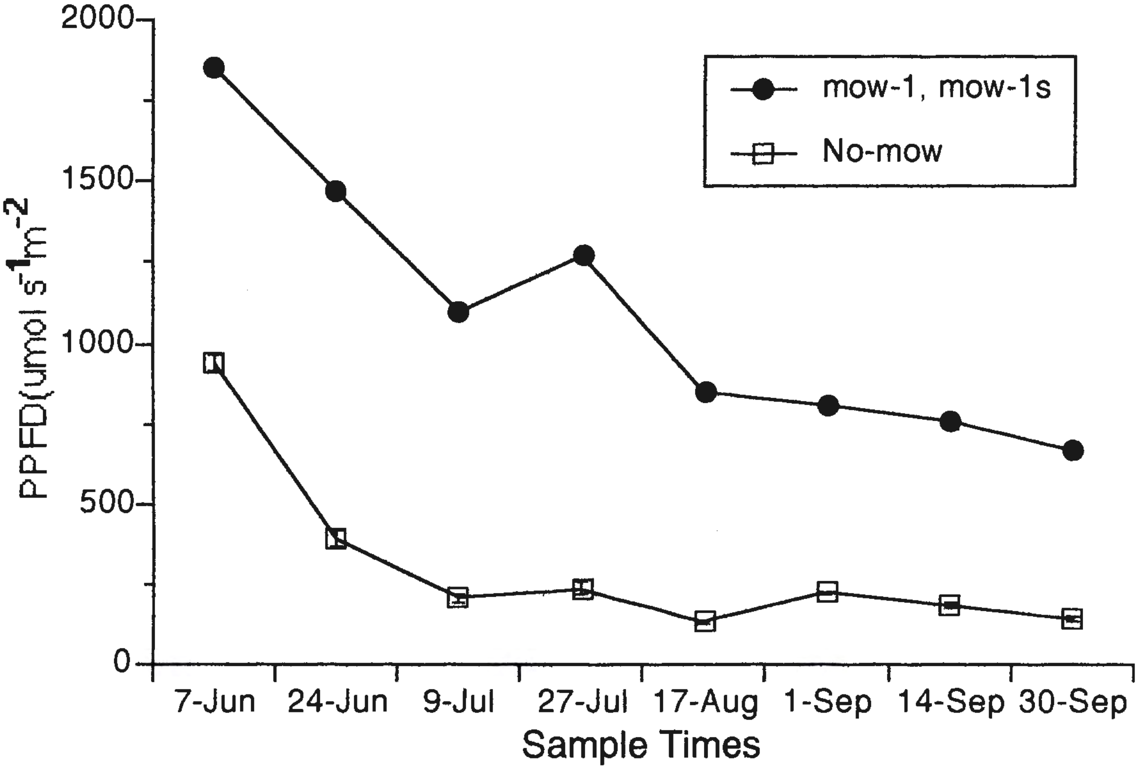


Figure 1. Mean photosynthetic photon flux density (PPFD) was measured at ground level in mow-1, mow-1s, and no-mow plots during the 1999 growing season. PPFD near solar noon was significantly ($p<0.05$) greater in mowed plots for all eight samples conducted in 1999. Increased mowing height and forb growth in mowed plots were factors in decreasing light over the growing season. The canopy of warm-season grasses that developed early July reduced light in no-mow plots. A separate ANOVA test on mean light by nmowing treatment was conducted for each sample time. Standard errors occur inside of treatment symbols for each sample time. Reported results were back-transformed from log transformed data.

Soil water tension was greater in mowed plots. I compared soil water tension at 15cm in mow and no-mow plots bi-monthly throughout the first growing season. I found significantly ($p<0.001$) increased water tension in three of the five samples drawn from mowed plots in 1999 (Figure 2).

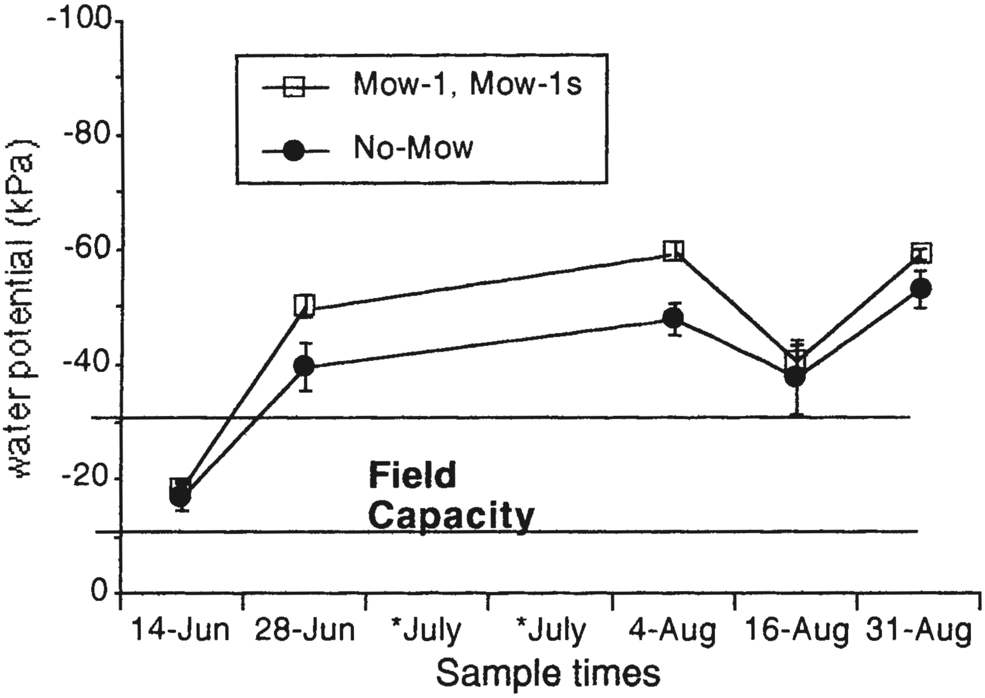


Figure 2. Soil water potential (kPa) was measured at 15 cm depth in mow-1, mow1s and no-mow plots for 1999. Soil water was significantly ($p<0.05$) greater in no-mow plots during year one. A separate ANOVA test on mean soil water was conducted for each sample time. Field capacity is the maximum ammount of water the soil can hold. * Water potential was not measured in July.

The overall water tension in no-mow plots during year one was -39.0 kPa.

In contrast, the average water tension in mowed plots was -45.5 kPa. Rainfall during 1999 was above the 30 year average (Figure 3).

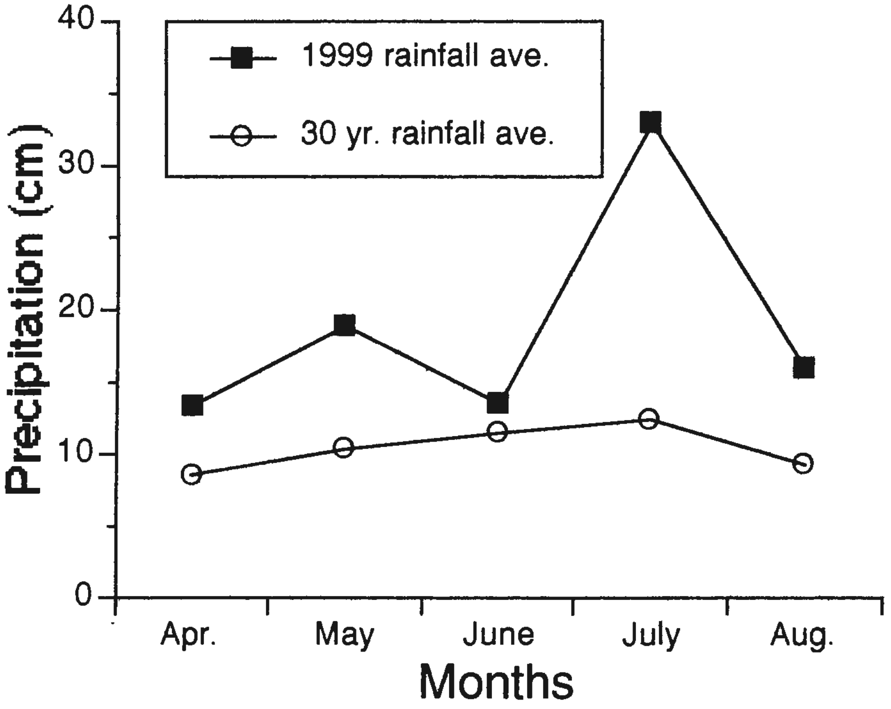


Figure 3. Mean monthly precipitation in Cedar Falls, Iowa during the 1999 growing season. Compared to the 30 year average, precipitation was above average for the region (Reported by NOAA, 1999).

Seedling Emergence

A separate ANOVA for each sample in 1999 revealed no significant differences in seedling means among treatments (Figure 4). However, new seedings were detected in mowed plots as seedling counts progressed throughout the summer (Figure 4).

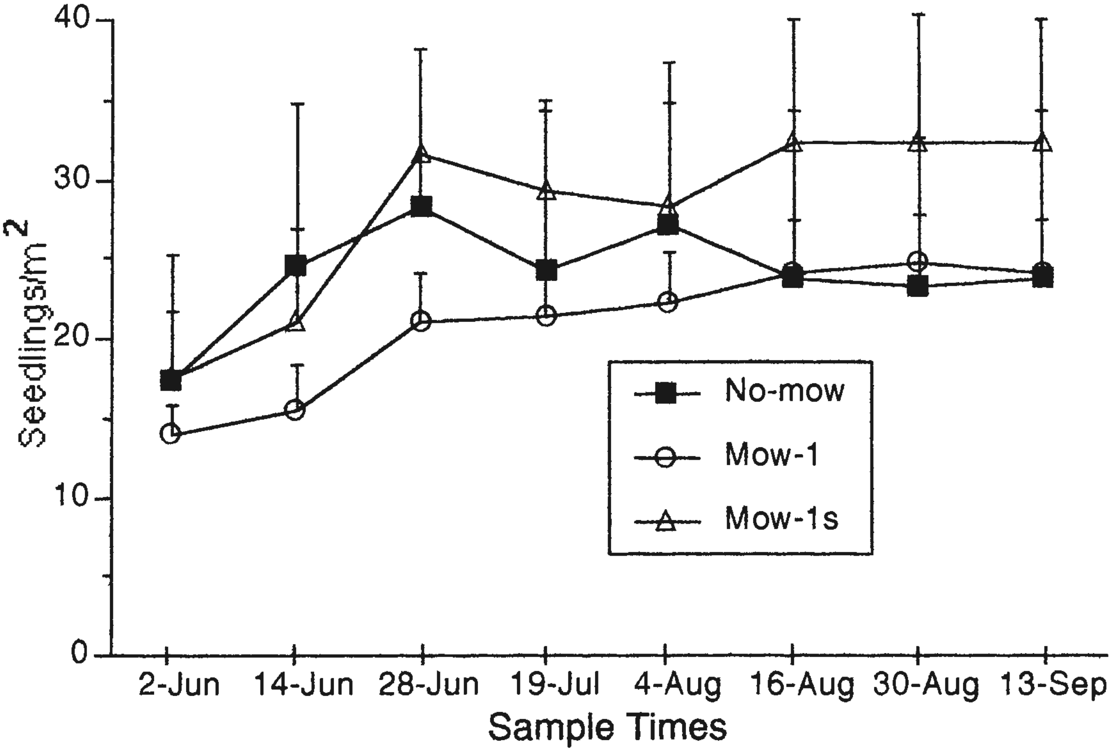


Figure 4. Mean seedling numbers and standard errors (upper limit) for no-mow, mow-1, and mow-1s treatments during the 1999 growing season. A separate ANOVA test for each sample time showed that mean seedling numbers were not significantly ($p>0.05$) different between treatments at any time period. However, a repeated measures (ANOVA) test of eight seedling counts on mean seedlings by treatment showed a significant ($p = 0.02$) linear increase with mowing over time. Mowed plots showed a gradually increasing number of seedlings, while the no-mow plots had a leveling off. Reported means were back-transformed from the log transformed data.

It was clear that seedling emergence was changing over time and that an ANOVA conducted at a single point would not capture this change.

However, a repeated measures ANOVA can analyze the change over time. A repeated measures ANOVA of seedling means for all eight counts conducted in 1999, revealed a significant ($p<0.020$) linear difference of seedling means between mowing treatments (Table 3, Figure 4). Mowed plots showed a gradually increasing number of seedlings, while no-mow plots had a leveling off (Figure 1).

Table 3. Effects of experimental treatments on the number of forb seedlings in summer of 1999 (8 samples taken between June and September) using repeated measures ANOVA. The mean number of seedlings were significantly different between blocks but not with seeding or mowing treatments. Over time, there was a significant difference in the number of seedlings with mowing but not with blocks or seeding times.

Source of variation	df	SS	MS	F_S	p-value
Between subjects					
Block	1	8.784	8.785	5.250	0.035
Seeding time	1	2.514	2.514	1.497	0.237
Mow	1	0.641	0.641	0.382	0.544
Block x Seed	1	0.450	0.450	0.268	0.611
Block x Mow	1	4.562	4.562	2.716	0.117
Error	18	30.237	1.680		
Within Subjects					
Time	7	2.294	0.328	7.159	0.001
Block	7	0.161	0.023	0.503	0.831
Seeding time	7	0.079	0.011	0.242	0.972
Mow	7	0.798	0.114	2.492	0.020
Block x Seed	7	0.181	0.026	0.564	0.784
Block x Mow	7	0.111	0.016	0.346	0.931
Error	126	5.767	0.046		

Over time seedling emergence increased in mowed plots while the number of seedlings in no-mow plots peaked in late June and decreased as the summer progressed (Figure 4).

Year two seedling means were similar between mowing treatments. A repeated measures ANOVA for all four seedling counts in 2000 showed no significant differences among mowing treatments over time (Table 4).

Table 4. Effects of experimental treatments on the number of forb seedlings in the second growing season (4 samples taken between June and September 2000) using repeated measures ANOVA. There were no significant ($p<0.05$) differences of seedling means between treatments over the second growing season.

Source of variation	df	SS	MS	F_S	p-value
Between subjects					
Block	1	1.983	1.983	1.797	0.199
Seeding time	1	3.576	3.576	3.395	0.084
Mow	2	1.392	0.696	0.661	0.530
Block x Seed	1	0.618	0.618	0.587	0.455
Block x Mow	2	5.501	2.750	2.611	0.104
Error	16	16.855	1.053		
Within Subjects					
Time	3	0.026	0.009	1.147	0.340
Block	3	0.012	0.004	0.539	0.658
Seeding time	3	0.010	0.003	0.422	0.738
Mow	6	0.075	0.013	1.658	0.152
Block x Seed	3	0.021	0.007	0.914	0.441
Block x Mow	6	0.077	0.013	1.708	0.140
Error	48	0.363	0.008		

While most of the plants counted in year two were from year one, fewer than twenty new seedlings over all treatments were counted during year two.

Seeding time was not a significant factor in seedling means among mowing treatments in year one and year two (Table 3, 4). Spring seeding favored *Rudbeckia hirta* emergence over fall seeding (Table 6). There were no spring seeded no-mow plots.

Species Richness

Plot totals were analyzed using a separate ANOVA for each sample time conducted in 1999. I found that species richness was significantly ($p<0.05$) greater in no-mow plots in 1999 (Figure 5).

Table 6 shows the maximum number of forb seedlings by species for each treatment. One *Amorpha canescens* plant and one *Liatris pycnostachya* plant was found exclusively in the no-mow treatment in 1999 (Table 5).

Species richness was similar among mowing treatments in the second growing season (Table 6). This was due to the disappearance of *Liatris pycnostachya* , *Liatris aspera* , *Desmodium illinoensis* , and *Amorpha canescens* from all subsample quadrats in year two (Table 5).

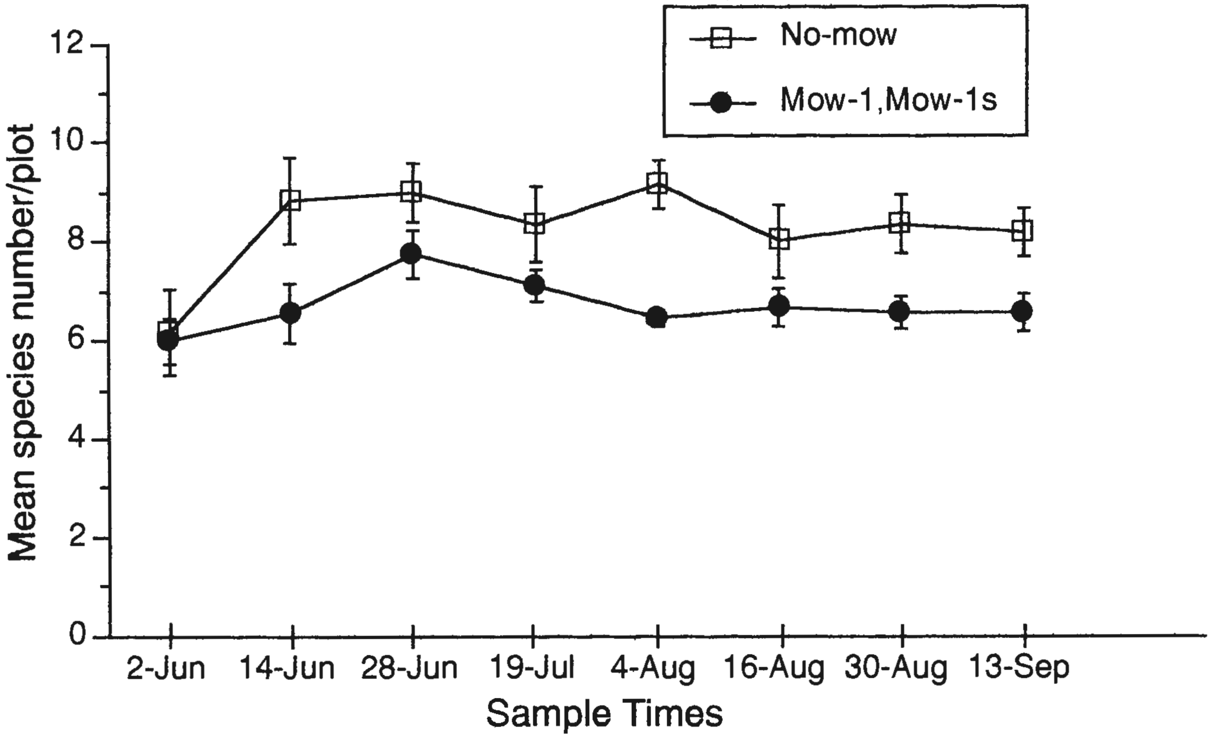


Figure 5. Mean species number and standard errors in no-mow and mow plots sampled during the 1999 growing season. An independent ANOVA test of each sample time on mean species per plot by mowing treatment revealed that there were significantly ($p<0.05$) more species found in no-mow plots in seven of eight samples times. Reported means were back-transformed from log transformed data.

Table 5. Maximum ('99) seedling numbers by treatment. Maximum ('99) numbers were totaled from the highest subplot counts by species that occurred over all 1999 sample times. The final seedling count conducted in September of 2000 was used for the ('00) seedling numbers.

	Treatments							
Species	No-mow		Mow-1		Mow-1s		Mow-2	
Year	'99	'00	'99	'00	'99	'00	'99	'00
Amorpha canescens	1	0	0	0	0	0	0	0
Anemone canadensis	5	0	0	0	3	0	0	0
Anemone cylindrica	8	10	4	11	5	8	4	7
Asclepias tuberosa	5	6	3	0	6	4	4	2
Aster novae-angliae	29	15	20	13	15	14	23	20
Coreopsis palmata	8	0	2	0	2	1	1	0
Dalea purpurea	27	0	12	2	12	6	25	0
Desmanthus illinoensis	1	0	3	0	1	0	2	0
Desmodium canadense	2	1	0	0	3	2	1	0
Echinacea pallida	14	5	4	2	11	10	4	6
Euphorbia corollata	4	3	1	2	2	4	4	2
Heliopsis helianthoides	9	8	3	13	6	6	4	14
Lespedeza capitata	3	1	4	2	11	7	7	3
Liatris pycnostachya	1	0	0	0	0	0	0	0
Liatris aspera	4	0	1	0	6	0	3	0
Monarda fistulosa	35	20	26	18	32	26	35	23
Ratibida pinnata	95	60	81	73	68	81	80	72
Rubeckia hirta	186	160	108	116	289	300	132	131
Rudbeckia subtomentosa	18	0	20	12	7	1	9	1
Silphium laciniatum	2	2	0	0	2	2	1	1
Solidago rigida	46	23	46	32	25	23	71	40
Tradescantia ohiensis	0	0	0	0	0	0	0	0
Zizia aurea	3	4	2	2	0	3	1	2

A repeated measures ANOVA test on species means from four species counts in year two showed that the number of forb species was not significantly different among mowing treatments (Table 6).

Table 6. Effects of experimental treatments on the number of species per plot in the second growing season (4 samples taken between June and September 2000) using repeated measures ANOVA. There were no significant ($p<0.05$) differences among treatments over the second growing season.

Source of variation	df	SS	MS	F_S	p-value
Between subjects					
Block	1	0.192	0.192	0.792	0.387
Seeding time	1	0.475	0.475	1.956	0.181
Mow	2	0.188	0.094	0.388	0.685
Block x Seed	1	0.021	0.021	0.086	0.773
Block x Mow	2	0.191	0.096	0.394	0.681
Error	16	3.886	0.243		
Within Subjects					
Time	3	0.009	0.003	0.214	0.886
Block	3	0.008	0.003	0.208	0.890
Seeding time	3	0.014	0.005	0.352	0.788
Mow	6	0.058	0.010	0.722	0.634
Block x Seed	3	0.011	0.004	0.281	0.839
Block x Mow	6	0.035	0.006	0.428	0.857
Error	48	0.648	0.013		

Seeding time did not influence species richness in this experiment. The number of species were similar between mowed plots seeded in fall/winter and those plots seeded in spring (Tables 6, 7).

Table 7. Effect of experimental treatments on the number of species per plot in summer of 1999 (8 samples taken between June and September) using repeated measures ANOVA. The number of forb species were significantly greater in no-mow plots. Species numbers changed over time in 1999 but this was not dependent on experimental treatments.

Source of variation	df	SS	MS	F_S	p-value
Between subjects					
Block	1	0.025	0.025	0.113	0.740
Seeding time	1	0.006	0.006	0.028	0.870
Mow	1	1.230	1.230	5.493	0.031
Block x Seed	1	0.102	0.102	0.454	0.509
Block x Mow	1	0.001	0.001	0.001	0.989
Error	18	4.029	0.224		
Within Subjects					
Time	7	0.602	0.086	2.985	0.006
Block	7	0.200	0.029	0.992	0.440
Seeding time	7	0.038	0.005	0.187	0.988
Mow	7	0.199	0.028	0.985	0.445
Block x Seed	7	0.265	0.038	1.314	0.249
Block x Mow	7	0.205	0.029	1.014	0.425
Error	126	3.632	0.029		

Growing Season Mortality

I observed the small, permanent sub-plots frequently, so it was possible to calculate a conservative estimate of seedling mortality. An ANOVA of mean mortality calculated from eight seedling counts in 1999, was significantly (p = 0.047) greater in no-mow plots (Table 8).

Table 8. Effects of experimental treatments on forb seedling mortality in summer of 1999 (calculated from 8 counts taken between June and September) using ANOVA. Seedling mortality was significantly affected by mowing. Block x seedling and block x mowing interactions were not significant.

Source of variation	df	SS	MS	F_S	p-value
Block	1	1.048	1.048	0.804	0.382
Seeding time	1	0.030	0.030	0.023	0.882
Mow	1	5.958	5.958	4.569	0.047
Block x Seed	1	0.051	0.051	0.039	0.846
Block x Mow	1	0.423	0.423	0.325	0.576
Error	18	23.427	1.304		

Mean Seedling mortality during the first growing season in no-mow plots was 35.5 % compared to 21.4% in mowed plots (Figure 6).

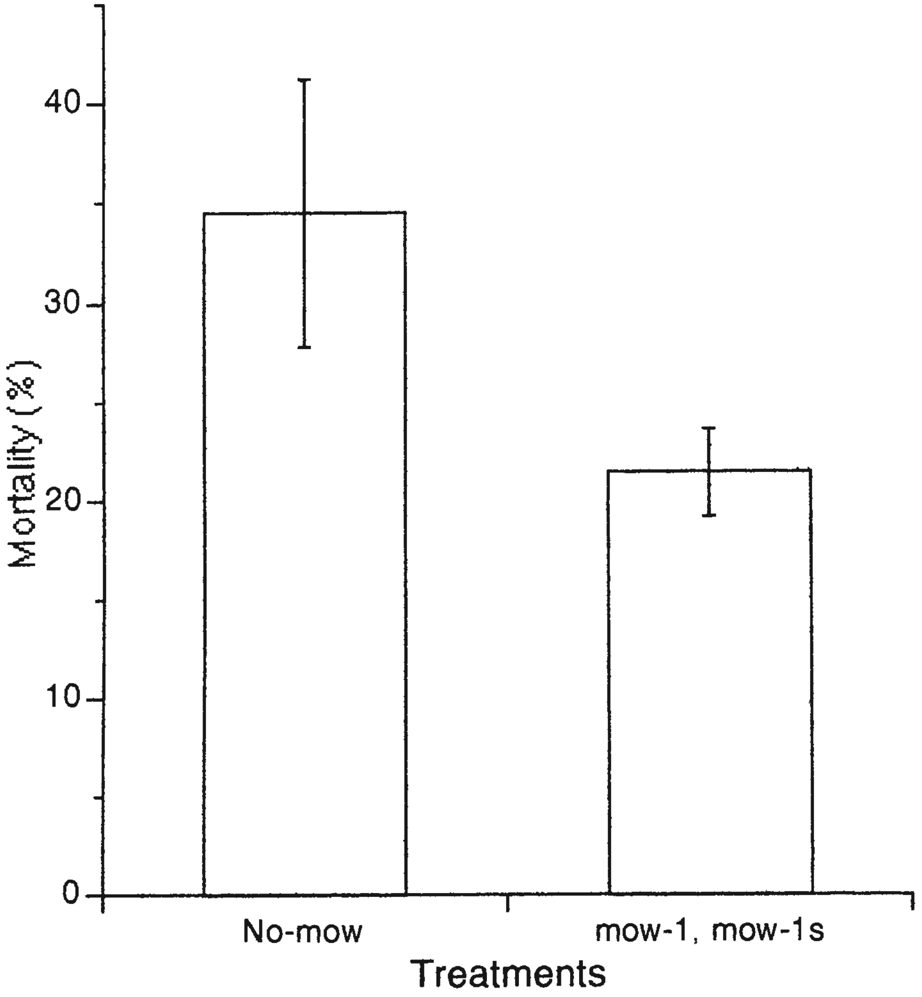


Figure 6. Year one (1999) mortality calculated from eight 1999 seedling counts sampled in permanently marked plots. An ANOVA test on mean mortality by mowing treatment showed mortality was significantly (p = 0.047) greater in no-mow plots in 1999. Reported means were back-transformed from log transformed data.

An ANOVA of mean mortality calculated from four seedling counts in 2000, was not significantly different among mowing treatments (Table 9).

Table 9. Effects of experimental treatments on forb seedling mortality in the second growing season (calculated from 4 counts taken between June and September 2000) using ANOVA. There were no significant ($p<0.05$) differences of seedling mortalities between treatments. There were no significant block x seedling and block x mowing interactions.

Source of variation	df	SS	MS	F_S	p-value
Block	1	0.352	0.352	0.264	0.614
Seeding time	1	2.121	2.121	1.592	0.225
Mow	2	2.779	1.390	1.403	0.375
Block x Seed	1	0.008	0.008	0.006	0.938
Block x Mow	2	3.474	1.737	1.304	0.299
Error	16	21.318	1.332		

Forb seedling mortality was similar between mowed plots seeded in fall/winter and those plots seeded in spring (Tables 8, 9).

Winter Mortality

More forb seedlings died over the winter in plots not mowed. There was a 31% reduction in the number of seedlings between the last count conducted in Sept. of 1999 to the first count in June of 2000 in no-mow plots (Figure 7).

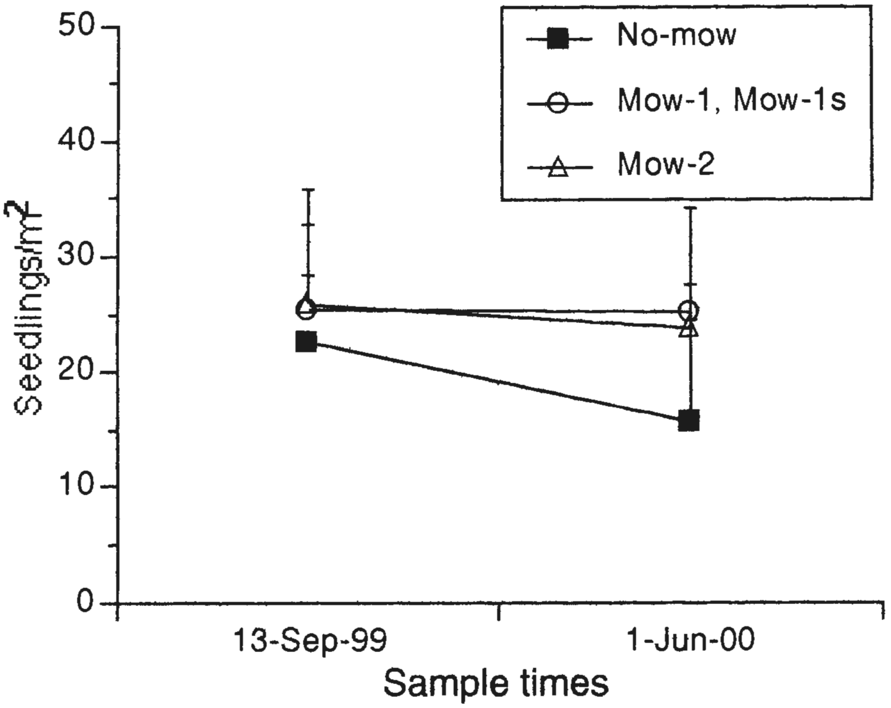


Figure 7. Over-winter mortality and standard errors (upper limits) shown by change in mean seedling numbers between September 1999 and June 2000. There were no significant differences in seedling means among mowing treatments when each sample time was analyzed independently. A repeated measures ANOVA of seedling means by treatment revealed a significant ($p<0.046$) decrease in the number of seedlings in no-mow plots over-winter. Results were back-transformed from log transformed data.

An ANOVA test on over-winter seedling mortality calculated from these two sample times showed significantly ($p = 0.038$) reduced seedling mortality in mowed plots (Table 10). Over-winter forb seedling mortality was similar between mowed plots seeded in fall/winter and those plots seeded in spring (Table 10).

Table 10. Effects of experimental treatments on forb mortality over-winter (calculated from September 1999 and June 2000 seedling counts) using an ANOVA. Forb mortality over-winter was significantly reduced in mowed plots.

Source of variation	df	SS	MS	F_S	p-value
Block	1	0.630	0.630	0.165	0.690
Seeding time	1	8.709	8.709	2.275	0.151
Mow	2	30.978	15.493	4.048	0.038
Block x Seed	1	0.050	0.050	0.013	0.911
Block x Mow	2	3.798	1.899	0.496	0.618
Error	16	61.246	3.828		

The over-winter seedling mortality in no-mow plots was ten times greater than in mow-1 plots and six times greater than in mow-2 plots (Figure 8).

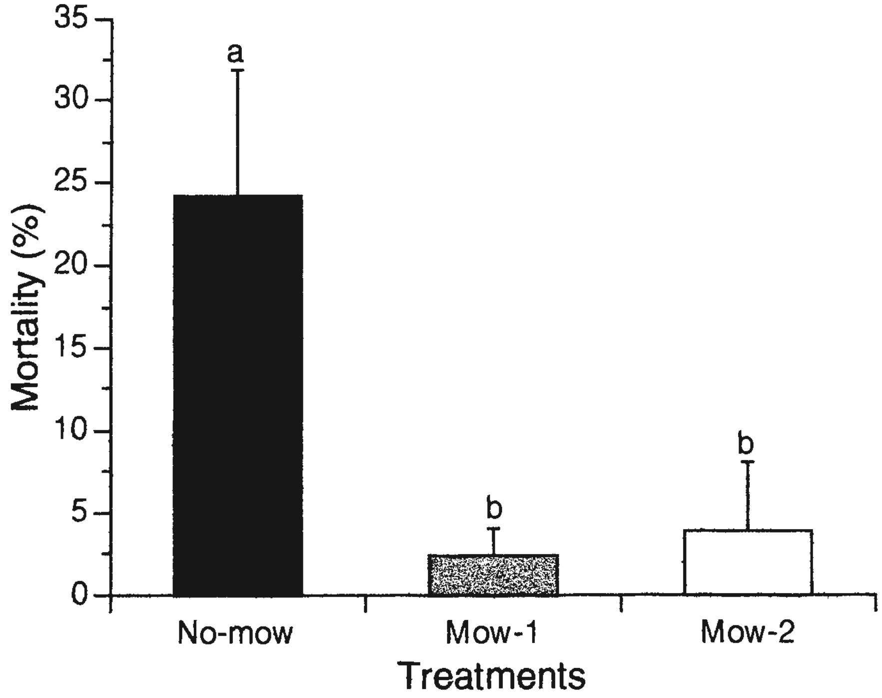


Figure 4. Over-winter mortality calculated from September 1999 and June 2000 seedling counts in permanently marked plots. An analysis of variance (ANOVA) test on mean mortality by mowing treatment showed mortality was significantly ($p = 0.038$) lower in mowed plots. Different letters denotes significant ($p<0.05$) differences. Reported means were back-transformed from log transformed data.

Forb Size

Forbs in mowed plots were larger and more deeply rooted than forbs in the no-mow plots. Most of the above ground growth of the forbs was unaffected by mowing, due to an increase in mowing height during the growing season.

Forbs, destructive sampled in mowed plots in September of 1999, had significantly taller shoots and deeper roots than plants in no-mow plots (Table 11).

Table 11. Mean shoot and root lengths and standard errors of forb plants destructive sampled in September 1999. Forty plants were sampled in mow-1 and in no-mow plots. Means were log transformed and analyzed by a one-way ANOVA. Reported means were back-transformed.

Plant part	No Mow length(cm) (s.e.)	Mow-1 length(cm) (s.e.)	p-value
Shoot	5.4 (0.49)	8.9 (0.33)	<0.001
Root	6.3 (0.45)	8.2 (0.44)	<0.001

In addition, root and shoot mass for these plants were also significantly greater in mowed plots (Table 12).

Table 12. Mean shoot and root biomass (dry weight) and standard errors of forb plants destructive sampled in September 1999. Forty plants were sampled in mow-1 and in no-mow plots. Means were log transformed and analyzed by a one-way ANOVA. Reported means were back-transformed.

Plant part	No Mow mass(g) (s.e.)	Mow-1 mass(g) (s.e.)	p-value
Shoot	0.019 (0.010)	0.134 (0.018)	<0.001
Root	0.008 (0.010)	0.034 (0.013)	<0.001

This trend continued into the second year. Two year old plants destructive sampled in mowed plots in September of 2000 were significantly larger by length and weight compared to plants from no-mow plots. These plants averaged 223% taller shoots and 45% deeper roots (Table 13).

Table 13. Mean shoot and root lengths and standard errors of forb plants destructive sampled in September 2000. Forty plants were destructive sampled in mow-1 and in no-mow plots. Means were log transformed and analyzed by a one-way ANOVA. Reported means were back-transformed.

Plant part	No Mow length(cm) (s.e.)	Mow-1 length(cm) (s.e.)	p-value
Shoot	13.7 (0.96)	30.5 (1.12)	<0.001
Root	9.9 (0.57)	14.4 (0.27)	<0.001

They also had 16.5 times more shoot mass and 13 times more root mass than no-mow plants (Table 14).

Table 14. Mean shoot and root biomass (dry weight) and standard errors of forb plants destructive sampled in September 2000. Forty plants were sampled in mow-1 and in no-mow plots. Means were log transformed and analyzed by a one-way ANOVA. Reported means were back-transformed.

Plant part	No Mow mass(g) (s.e.)	Mow-1 mass(g) (s.e.)	p-value
Shoot	0.08 (0.016)	1.32 (0.239)	<0.001
Root	0.02 (0.097)	0.26 (0.048)	<0.001

Forb Maturity

Flowering plant counts were not conducted until the second growing season, because only a single *Rudbeckia hirta* plant flowered in 1999 in all experimental plots.

By year two, mowed plots had significantly more flowering forbs (both species and individuals) than plots not mowed. During year two, the average number of flowering plants in mowed plots were 46 times greater than in no-mow plots (Figure 9).

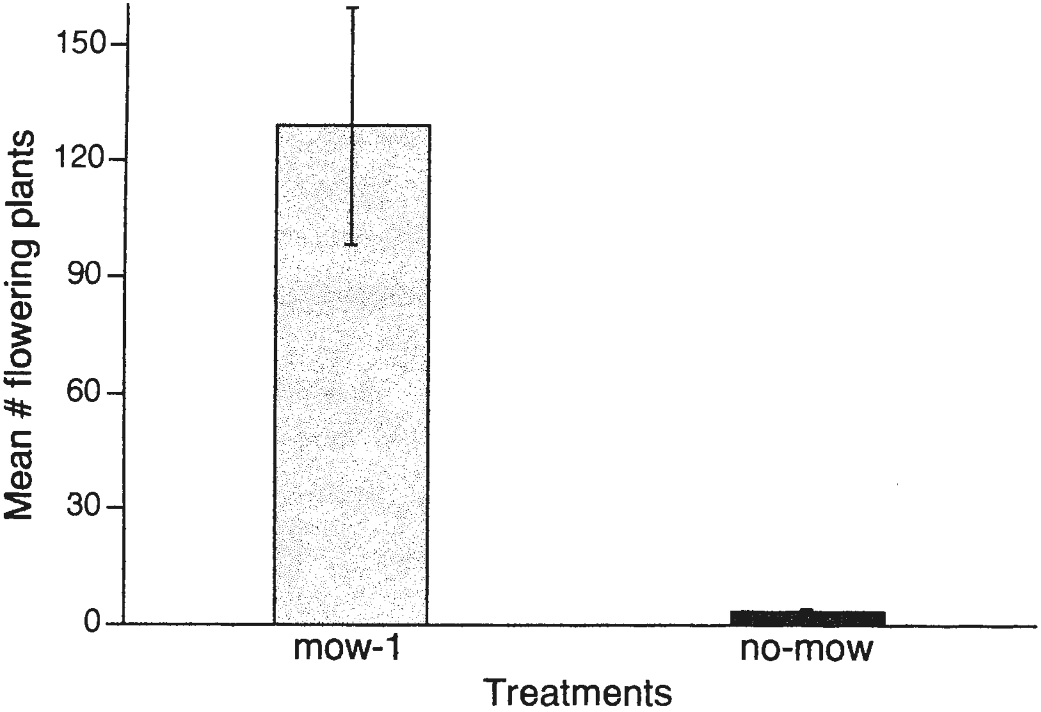


Figure 9. The number of forbs in flower by mowing treatment counted in year two. The number of flowering plants was significantly ($p = 0.002$) greater in mowed plots in 2000. Three separate counts were conducted during the 2000 growing season in six mow-1 and in six no-mow plots. The data were pooled and analyzed by a one-way (ANOVA). Mow-2 plots were not sampled. Reported means were back-transformed from log transformed data.

Mowed plots had significantly more forb species flowering than in no-mow plots (Table 15).

Table 15. Total number of forbs flowering in six mow-1 and six no-mow plots in year two. Three samples were conducted throughout the summer to capture the maximum number of flowering plants. All flowering plants were counted in each plot ($300m^2$) in June, August, and September. *Not all *Rudbeckia hirta* counted. Results were pooled from these three counts.

Species	Mow-1 (n=6)	No-mow (n=6)
**Rudbeckia hirta*	444	14
Aster novae-angliae	164	0
Heliopsis helianthoides	114	0
Solidago rigida	43	0
Ratibida pinnata	7	0
Desmodium canadense	3	0
Dalea purpurea	1	1
Lespedeza capitata	2	0

CHAPTER 4

DISCUSSION

It seems counterintuitive that mowing, which is generally destructive to plants, can aid in the establishment of plants. I hypothesized that mowing established grassland vegetation after seeding native forbs would create favorable growing conditions for emergence and development. The results of this experiment supported my hypothesis.

Mowing changed a number of environmental conditions within the grassland. Mowing increased the amount of light reaching the soil surface. This may have been a major factor in the ongoing emergence of sowed seeds throughout the entire growing season in mowed plots. This is further supported by the seedling emergence trend in the no-mow plots. Seedling emergence in no-mow plots leveled off as sunlight was reduced by growth of the grass canopy in mid-summer (Figures 1, 4).

Mowing decreased soil water levels in my experiment but the effects were minimal (Figure 2). In 1999, precipitation was above the thirty year average every month throughout the spring and summer (Figure 3). Rainfall occurred almost weekly during the summer months. There was no period during the first growing season that soil moisture was not available for plant growth at the 15cm depth. In a dry year, reduced soil water as a result of mowing might have reduced forb emergence and growth.

There is evidence in my experiment that changes below ground created by mowing contributed to forb emergence. Without space to grow, plants cannot successfully emerge and develop. I believe that repeated mowing set back existing vegetation in the plant community, much as Weaver's (1933) repeated clipping of established grasses. Weaver found that frequent above ground leaf clipping of big bluestem (*Andropogon gerardii*) and switchgrass (*Panicum virgatum*) greatly reduced root biomass and rhizome growth within one growing season, creating gaps in the root zone for forb seedlings to occupy. Mowing, like clipping may have set back the existing plant community, contributing to forb seedling development in mowed plots. Repeated mowing in the first growing season extended these favorable conditions, providing opportunity for the newly emerged seedlings to establish root and shoot mass (Tables 12, 14).

The repeated measure ANOVA captured important trends in seedling emergence and mortality that an analysis of an individual sample time did not detect (Figure 4). Forb emergence in year one increased as a result of mowing but this result was not found with an independent ANOVA at each sample time (Figure 4). Rather, the change over time measured with repeated measures ANOVA captured significant differences in seedling means.

I hypothesized that mowing in the second year would increase emergence. I found however, that mowing did not affect forb emergence in year two (Table 4). Less than twenty new seedlings occurred in subsample quadrats in the second year. The results suggest that there were few viable forb seeds in the soil in the second growing season or excess unused resources created by mowing in year one were also used up by new forb seedlings in the first growing season. Mowing in the first year may have substantially reduced the underground root systems of the established grasses. This in turn created space used by seeded forbs in the first growing season to emerge and establish.

Mowing had a tremendous impact on forb development in both years of the experiment. Plant size both above and below ground was greatly increased by mowing (Tables 11, 12, 13, 14). Above ground plant size was impacted by the mowing treatment. The mower blade height was incrementally increased during both growing seasons to accomodate for forb growth without mechanically damaging the plants. In year two however, plants had grown large enough to be damaged by mowing even with an increase in mowing height. I suspect that this contributed to the trend of higher forb mortality measured in mow-2 plots (Figure 8). I believe that this trend would have increased as the plants grew taller. Below ground plant size was enhanced dramatically by repeated mowing.

Roots in mowed plots were 45% deeper and had 13 times more root mass than plants sampled from no-mow plots (Tables 13, 14).

The effect of mowing on forb development was clearly visible in the second growing season. Mowing greatly accelerated forb maturity. Forty-six forbs flowered in mow-1 plots for every one that flowered in the no-mow plots (Table 15). In only the second growing season, plants in mowed plots set seed which became part of the seed bank.

Mowing reduced forb mortality both in year one and over-winter between year one and year two (Figures 6, 8).
I suspect that accelerated growth and development of seeded forbs as a result of mowing, enhanced their competitive ability both above and below ground with other established plants. This may have aided in the survival of these plants.

Species richness was not increased by mowing (Figure 5, Tables 6, 7). I found that 87% and 96% of the total species sowed in the experiment emerged in the mow and no-mow plots respectively (Table 5). Species richness may depend upon the number of species and the amount of seed sowed per species. I observed that there was a trend in the greatest number of seeds sowed had the greatest number of seedlings emerge (Tables 2, 5).

Betz's (1986) prairie matrix hypothesis described how species in reconstructed prairies change over time.

According to Betz, early successional "aggressive" species (stage 1) in the first few years of a reconstructed prairie prepare the site for colonization of later successional "conservative" species (stages 2,3,4) (Betz 1996). Yet twelve of twenty-two forb species that emerged in year one were classified as stage 2 by Betz (1996). I found no evidence of a successional matrix of species establishment in our experiment. Some of these stage 2 species were very small, inconspicuous seedlings well hidden by grasses after two growing seasons and it is possible that Betz did not see them early in his study. Perhaps differences in growth rates between species were responsible for creating the appearance of matrix groups.

Herbivore damage may have contributed to increased forb seedling mortality in no-mow plots. I observed more herbivore damaged seedlings in no-mow plots. Herbivores may have found refuge from predators in the tall dense vegetation and herbivory damage may have been concentrated in those areas. I also observed that most of the herbivore damaged seedlings in no-mow plots did not recover between sample periods. However, many forb seedlings damaged by herbivores in mowed plots recovered quickly between two week sampling periods. In the no-mow area, herbivore damage may have contributed to increased forb seedling mortality.

It is clear that mowing provided concrete benefits to forb seedling emergence and development.

It is also apparent that the maximum benefits to establishment are found in mowing the first season. First year mowing provided light, space in the soil, but less moisture than no-mow treatments. Not only did more seedlings emerge, but their growth was greatly enhanced, resulting in rapid maturation. Any benefits of second year mowing were overshadowed by the damage to the forbs that had developed rapidly under the first year mowing regime. Flowering parts of plants in year two were severed and the foliage was damaged by the mower. For these reasons, mowing two consecutive years was not a desirable treatment to establish forbs in our study.

Future Research

Research has focused on determining factors that contribute to the invasion by new plant species into a plant community (Rejmanek 1996, Tilman 1993, Burke 1996). This study took a step toward evaluating the effects of mowing on species introduced by seed into an established grassland. Changes in species abundance and richness will likely occur over time in my experimental site. Future research should focus on the long term changes of species composition within plant communities containing species introduced by seed, to determine if these species will disappear over time.

Herbivory damage on small seedlings observed in my experiment may have been a major factor in seedling mortality.

Future research should determine if herbivory is a significant factor in seedling mortality under various strategies to enhance native grass plantings with forbs.

The floristic quality assessment developed by Swink and Wilhelm (1994) quantified the quality of tallgrass prairie remnants. A "conservative" value assigned a prairie species was based on how common it was to high-quality prairie remnants in the Chicago area. Species with the lowest conservative values were least abundant in high-quality prairie remnants. Future research is needed to link the conservative nature of a native prairie plant species with its ability to be successfully introduced into a new plant community. From this research, a model can be developed integrating both the Swink and Wilhelm (1994) Index of Conservatism and a native plant's ability to be successfully established into a new plant community. This would give resource managers the ability to develop seed mixes to maximize species diversity for enhancing a given plant community.

Management Implications

"Successional restoration" was described by Packard (1994) as enhanced diversity by sowing native species without destroying the established vegetation. Christiansen (1994) found spring burning was a successful management technique to increase native prairie grasses and forbs sowed into an established stand of cool-season grasses.

There are many instances however, where burning is not an optimal treatment and mowing is already employed. Along Iowa's county and state public right of ways, burning is often not allowed for safety concerns. In the past five years, Iowa DOT has become much more involved in right of way native planting, but management has been difficult because burning is not allowed. My research suggests that the addition of seed and a single year of managed mowing could transform right of way grasslands strips into diverse plant communities, with seed as the only new incremental cost. These enhanced grassland strips could create a living roadway for plant, animal and insect life to develop and travel -and potentially connect the remaining fragments of Iowa's native prairies.

This study has far reaching implications for all prairie reconstructions (with forbs) in Iowa as well. This research offers a strategy for building upon the work of the early prairie reconstruction era of the 1960's and 70's. My initial research suggests that this type of successional restoration does not require intensive management beyond the first growing season, provides direct economic benefit to the landowner and is relatively inexpensive to implement. Transformation of these previously enhanced grasslands into more complex plant communities will take us one more step towards restoring some of the native prairie to Iowa's landscape.

Future research will provide direction for how to best quantify what we've learned, measure the direct economic benefits, and manage long term diversity in these restorations.

Conclusion

Iowa's landscape has been inexorably changed in the past 150 years at our hand, and it is by our hand that most change will come in the future. It is a well known fact that only minute portions of our native tallgrass prairie remain in the state, it is not as well recognized that those remaining remnants and early restoration grasslands are a natural resource in distress. It became clear to me, as I researched the literature for this project, that Iowa's grasslands and native tallgrass prairie remnants are closely tied. The health of one is directly related to the health of the other. It is important therefore, for this kind of research to continue; to discover and test effective, cost efficient methods to enhance Iowa's grasslands and slow the species loss in native tallgrass prairie remnants. It is my hope that this research provides one more useful tool to assist with those efforts.

LITERATURE CITED

Barnhart S, 1996. Steps to establish and maintain legume-grass pastures. Iowa State University. Ames, Iowa.

Betz R, 1986. One decade of research in prairie restoration at the Fermi National Accelerator Laboratory (Fermilab) Batavia, Illinios. pp. 179-185. In Clambey G, Pemble R, eds., Proceedings of the Ninth North American Prairie Conference. Tri-College University Center for Environmental Studies. Fargo, North Dakota-Moorhead, Minnesota.

Betz R, 1996. Two decades of prairie restoration at Fermilab Batavia, Illinois. Warwick C. editor. Proceedings 15th North American Prairie Conference. St. Charles, Illinois.

Biswell H, Weaver J, 1933. Effect of frequent clipping on the development of roots and tops of grasses in prairie sod. Ecology14: 368-390.

Brown C, Bugg R, 2001. Effects of established perennial grasses on introduction of native forbs in California. Restoration Ecology 9: 38-48.

Burke M, Grime J, 1996. An experimental study of plant community invasibility. Ecology 77: 776-790.

Christiansen P, 1994. Establishment of prairie species by overseeding into burned roadside vegetation. Hartnett D. editor. Proceedings of the 14th North American Prairie Conference. Kansas State University. Manhattan, Kansas.

Collins S, Knapp A, Briggs J, Blair J, Steinauer E, 1998. Modulation of diversity by grazing and mowing in a native tallgrass prairie. Science 280: 745-747.

Davis M, Grime J, Thompson K, 2000. Fluctuating resources in plant communities: A general theory of invasibility. Journal of Ecology 88: 528-534.

Fouts W, Wisner R, 1982. Soil survey of Black Hawk County, Iowa. United States Department of Agriculture-Soil Conservation Service, State of Iowa.

Howe H, 1999. Response of Zizia aurea to seasonal mowing and fire in a restored prairie. American Midland Naturalist 141:373-380.

Hulsey Seed Laboratory Inc. 1999. P.O. Box 132. Decatur, Ga. 30031-0132.

Knapp A, Seastedt T, 1986. Detritus accumulation limits productivity of tallgrass prairie. Bioscience 68: 622-668.

Kurtz C, 1994. Effects of post planting mowing on prairie reconstructions. Hartnett D. editor. Proceedings of the 14th North American Prairie Conference. Kansas State University. Manhattan, Kansas.

Leach M, Givnish T. 1996. Ecological determinants of species loss in remnant prairies. Science 273: 1555-1558.

Li-cor Inc. 1999. P.O. Box 4425. 4421 Superior Street. Lincoln, Nebraska. 68504.

National Oceanic Atmospheric Administration (NOAA), 1999. Climatological data (form F-6) for Waterloo, Iowa. http://www.crh.noaa.gov/dmx/data/cli/0499alo.txt

Packard S, 1994. Successional restoration: Thinking like a prairie. Restoration and Management Notes. 12: 32-39.

Parr T, Way J, 1988. Management of roadside vegetation: The long-term effects of cutting. Journal of Applied Ecology 25: 1073-1087.

Rejmanek M, Richardson D, 1996. What attributes make some plant species more invasive? Ecology 77: 1655-1661.

Ries L, Debinski D, Wieland M, 2001. Conservation value of roadside prairie restoration to butterfly communities. Conservation Biology 15: 401-411.

Risser P, 1996. A new framework for prairie conservation. pp. 261- 274. In Samson F, Knopf F, editors. Prairie conservation: Preserving North America's most endangered ecosystem. Washington, D.C. Island Press.

Siemann E, Tilman D, Haarstad J, Ritchie M, 1998. Experimental tests of the dependence of arthropod diversity on plant diversity. The American Naturalist 152: 738-750.

Skor Ole, Personal communciation. 2000. Iowa Department of Transportation (IDOT). Ames, Iowa.

Smith D, 1998. Iowa prairie: Original extent and loss, preservation and recovery attempts. Iowa Academy of Science 105: 98-108.

Soilmoisture Equipment Corporation 1987. P.O. Box 30025. Santa Barbara, CA. 93105. U.S.A.

Swink F, Wilhelm G, 1994. Plants of the Chicago region. Indiana Academy of Science. Indianapolis, Indiana

Tilman D, 1986. A consumer approach to community structure. American Zoologist 26: 5-22.

Tilman D, 1993. Species richness of experimental productivity gradients: How important is colonization limitation? Ecology 74: 2179-2191.

Tilman D, 1997. Community invasibility, recruitment limitation, and grassland biodiversity. Ecology 78: 81-92.

Tilman D, Downing J, 1994. Biodiversity and stability in grasslands. Nature 367: 363-356.

Weaver J, Hougen V, 1939. Effect of frequent clipping on plant production in prairie and pasture. American Midland Naturalist 21: 396-414.

Wilkinson L, 1989. SYSTAT: The System for Statistics. Evanston, Illinois. SYSTAT, Inc.

Williams D, 1999. Unpublished survey of grassland types in Iowa. University of Northern Iowa. Cedar Falls, Iowa.

Zajicek J, Sutton R, Salac S, 1986. Direct seeding of selected forbs into an established grassland. HortScience 21: 90-91.

APPENDIX 1

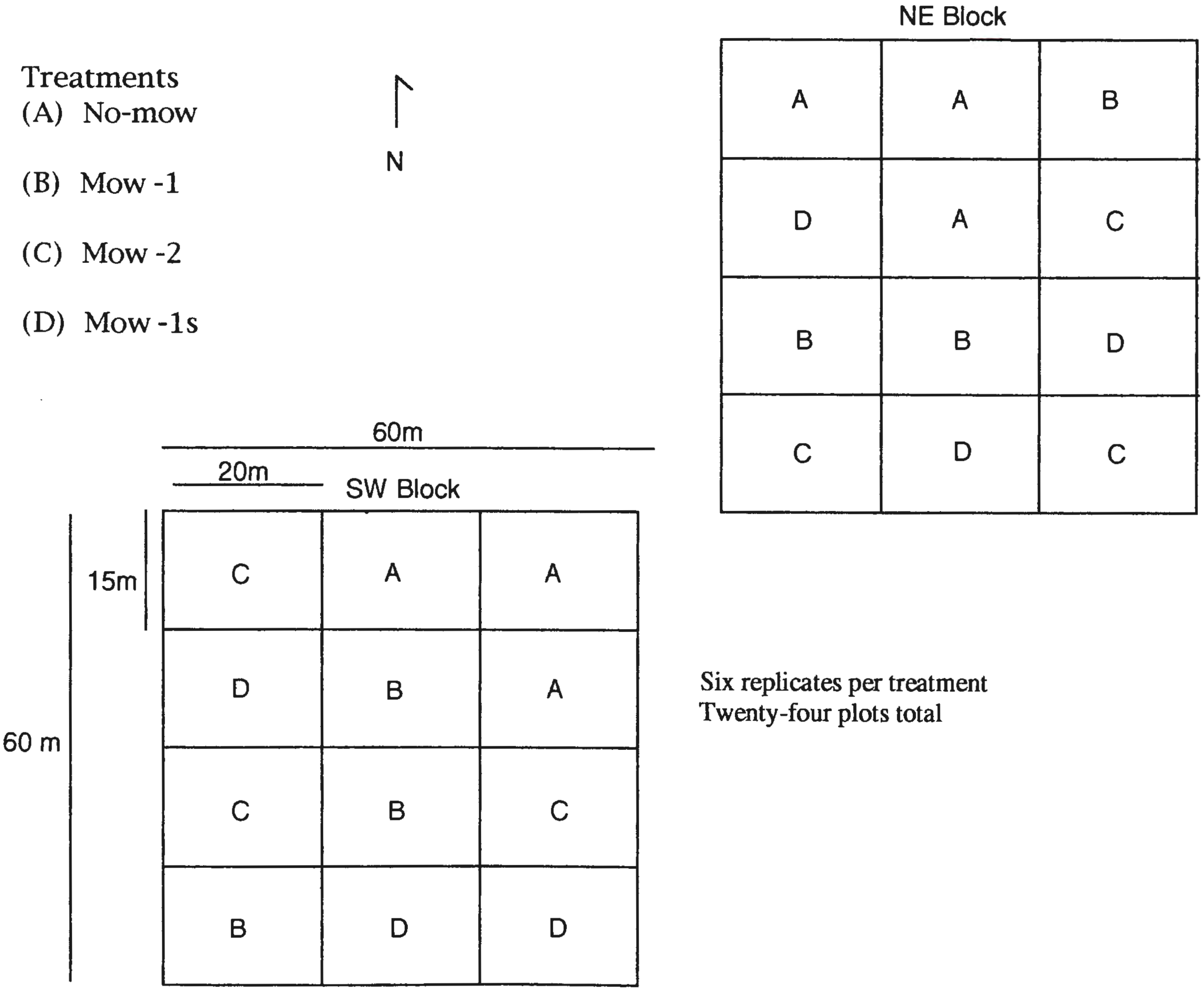
DIAGRAM OF EXPERIMENTAL DESIGN

Treatments
(A) No-mow

(B) Mow -1

(C) Mow -2

(D) Mow -1s



NE Block

A	A	B
D	A	C
B	B	D
C	D	C

SW Block

C	A	A
D	B	A
C	B	C
B	D	D

Six replicates per treatment
Twenty-four plots total

APPENDIX 2

SPECIES CODE FOR RAW DATA

ruhi - *Rudbeckia hirta*
asno - *Aster novae-angliae*
rapi - *Ratibida pinnata*
sori - *Solidago rigida*
dapu - *Dalea purpurea*
mofi - *Monarda fistulosa*
rusu - *Rudbeckia subtomentosa*
amca - *Amorpha canescens*
troh - *Tradescantia ohiensis*
lias - *Liatris aspera*
leca - *Lespedeza capitata*
ancy - *Anemone cylindrica*
ziau - *Zizia aurea*
hehe - *Heliopsis helianthoides*
lipy - *Liatris pycnostachya*
ecpa - *Echinacea pallida*
astu - *Asclepias tuberosa*
evco - *Euphorbia corollata*
copa - *Coreopsis palmata*
deca - *Desmodium canadense*
anca - *Anemone canadensis*
sila - *Silphium laciniatum*
deil - *Desmanthus illinoensis*

APPENDIX 3

BLOCK AND PLOT TREATMENTS

BLOCK	PLOT	TREATMENT
SW	1	Mow-2
SW	2	No-mow
SW	3	No-mow
SW	4	Mow-1s
SW	5	Mow-1
SW	6	No-mow
SW	7	Mow-2
SW	8	Mow-1
SW	9	Mow-2
SW	10	Mow-1
SW	11	Mow-1s
SW	12	Mow-1s
NE	1	No-mow
NE	2	No-mow
NE	3	Mow-1
NE	4	Mow-1s
NE	5	No-mow
NE	6	Mow-2
NE	7	Mow-1
NE	8	Mow-1
NE	9	Mow-1s
NE	10	Mow-2
NE	11	Mow-1s
NE	12	Mow-2

APPENDIX 4

SEEDLING COUNT RAW DATA

		September 06 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	10											
NE	7	5	10											
NE	7	6	20						1					
NE	7	7	30		2									
NE	8	1	10											
NE	8	2	10											
NE	8	3	10											
NE	8	4	20											
NE	8	5	10											
NE	8	6	30		3									
NE	8	7	10											
NE	9	1	10											
NE	9	2	20				1	1						
NE	9	3	10		1									
NE	9	4	20								1			
NE	9	5	20											
NE	9	6	20								1			
NE	9	7	30										1	
NE	10	1	20											
NE	10	2	20				1							
NE	10	3	10											
NE	10	4	10		1									
NE	10	5	30											
NE	10	6	10				1							
NE	10	7	20											
NE	11	1	10											
NE	11	2	10											
NE	11	3	10											
NE	11	4	10				1	2						
NE	11	5	10											
NE	11	6	10											
NE	11	7	10											
NE	12	1	10											
NE	12	2	10											
NE	12	3	10											
NE	12	4	10											
NE	12	5	20		1									
NE	12	6	10						1					
NE	12	7	20											

		September 06 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	10											
NE	7	5	10											
NE	7	6	20						1					
NE	7	7	30		2									
NE	8	1	10											
NE	8	2	10											
NE	8	3	10											
NE	8	4	20											
NE	8	5	10											
NE	8	6	30		3									
NE	8	7	10											
NE	9	1	10											
NE	9	2	20				1	1						
NE	9	3	10		1									
NE	9	4	20								1			
NE	9	5	20											
NE	9	6	20								1			
NE	9	7	30										1	
NE	10	1	20											
NE	10	2	20				1							
NE	10	3	10											
NE	10	4	10		1									
NE	10	5	30											
NE	10	6	10				1							
NE	10	7	20											
NE	11	1	10											
NE	11	2	10											
NE	11	3	10											
NE	11	4	10				1	2						
NE	11	5	10											
NE	11	6	10											
NE	11	7	10											
NE	12	1	10											
NE	12	2	10											
NE	12	3	10											
NE	12	4	10											
NE	12	5	20		1									
NE	12	6	10						1					
NE	12	7	20											

		September 06 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	10												
NE	7	5	10	4	1	4	1								
NE	7	6	20						2						2
NE	7	7	30	4	1		1	2							
NE	8	1	10			1	1								
NE	8	2	10	1											
NE	8	3	10												1
NE	8	4	20	2		1									
NE	8	5	10	1										1	
NE	8	6	30												
NE	8	7	10												
NE	9	1	10	16		3									1
NE	9	2	20	8		3	1								
NE	9	3	10	8		1		1							
NE	9	4	20	2											
NE	9	5	20	1											
NE	9	6	20	1											
NE	9	7	30	7											
NE	10	1	20	2	1	1			1						
NE	10	2	20	6		2									
NE	10	3	10	1											
NE	10	4	10	1	1		1		1						
NE	10	5	30	7	1	3									
NE	10	6	10	9		4	1		1						1
NE	10	7	20	1											
NE	11	1	10	7		2			2						
NE	11	2	10	3											
NE	11	3	10												
NE	11	4	10	16		2	2								
NE	11	5	10	2											
NE	11	6	10	6	1	1								1	
NE	11	7	10	1											
NE	12	1	10												
NE	12	2	10						8						
NE	12	3	10												
NE	12	4	10												
NE	12	5	20												
NE	12	6	10	6	5		4		1						
NE	12	7	20			2									

		September 06 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	10											
NE	1	4	10											
NE	1	5	10											
NE	1	6	10											
NE	1	7	10											
NE	2	1	10											
NE	2	2	10	1					1					
NE	2	3	10		1									
NE	2	4	10											
NE	2	5	10											
NE	2	6	10					1						
NE	2	7	10											
NE	3	1	10											
NE	3	2	20		1									
NE	3	3	10	1										
NE	3	4	10											
NE	3	5	10											
NE	3	6	20											
NE	3	7	10											
NE	4	1	10											
NE	4	2	10											
NE	4	3	40											
NE	4	4	10											
NE	4	5	10											
NE	4	6	10				1							
NE	4	7	10											
NE	5	1	10											
NE	5	2	10				1							
NE	5	3	10											
NE	5	4	10	1										
NE	5	5	10											
NE	5	6	10											
NE	5	7	10											
NE	6	1	10											
NE	6	2	40											
NE	6	3	30		1									
NE	6	4	20		1									
NE	6	5	10											
NE	6	6	10											
NE	6	7	10											
NE	7	1	10		1									
NE	7	2	10		1									
NE	7	3	20											

		September 06 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	10	1											
NE	1	4	10	1		1									
NE	1	5	10						1						
NE	1	6	10												
NE	1	7	10	1											
NE	2	1	10	2											
NE	2	2	10			1									
NE	2	3	10	1		5									
NE	2	4	10	5			1		1						
NE	2	5	10	1											
NE	2	6	10												
NE	2	7	10	6											
NE	3	1	10												
NE	3	2	20	6		1	2								
NE	3	3	10	1		1	1								
NE	3	4	10	4	1	2	2								1
NE	3	5	10												
NE	3	6	20	3		2									
NE	3	7	10	2			1								
NE	4	1	10	13	1	3	2		1						
NE	4	2	10	6		1			1						
NE	4	3	40	2	2	2	1		1						
NE	4	4	10	2	1	3			1						
NE	4	5	10	1			1		1						
NE	4	6	10	9			1		1						
NE	4	7	10	1		2			1						1
NE	5	1	10	1		1	2								
NE	5	2	10			2									
NE	5	3	10												
NE	5	4	10			6									1
NE	5	5	10						1						
NE	5	6	10												
NE	5	7	10	1											
NE	6	1	10	10	1	4	2								
NE	6	2	40	4			1								
NE	6	3	30	3	2	3									2
NE	6	4	20	4		2	1								
NE	6	5	10			2	1		1						
NE	6	6	10	2			2								
NE	6	7	10	1											
NE	7	1	10	1		3									
NE	7	2	10	2		6			1						
NE	7	3	20			1									1

		September 06 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	10											
SW	7	3	10											
SW	7	4	10											
SW	7	5	10		1									
SW	7	6	30											
SW	7	7	10		1									
SW	8	1	10	1	1									
SW	8	2	20											
SW	8	3	20											
SW	8	4	10											
SW	8	5	20											
SW	8	6	10											
SW	8	7	20											
SW	9	1	10											
SW	9	2	20											
SW	9	3	20		1									
SW	9	4	20					1						
SW	9	5	30											
SW	9	6	20											
SW	9	7	10		1		2							
SW	10	1	10											
SW	10	2	10											
SW	10	3	20											
SW	10	4	20											
SW	10	5	20											
SW	10	6	10				1							
SW	10	7	10											
SW	11	1	40		1									
SW	11	2	40		1		1			1				
SW	11	3	30											
SW	11	4	20	2					1					
SW	11	5	20				2							
SW	11	6	10				2							
SW	11	7	30											
SW	12	1	10						1					
SW	12	2	20						1					
SW	12	3	10											
SW	12	4	20				1							
SW	12	5	20											
SW	12	6	50											
SW	12	7	20		1									
NE	1	1	10		1									
NE	1	2	10											

		September 06 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	10	2			1								
SW	7	3	10	2										1	
SW	7	4	10	2					2						
SW	7	5	10			2									1
SW	7	6	30				3								1
SW	7	7	10			3	5								
SW	8	1	10	2		1	1								1
SW	8	2	20	3					2						
SW	8	3	20	1	1	3	7								
SW	8	4	10												
SW	8	5	20	12			1		1						
SW	8	6	10	6		3									
SW	8	7	20	2											
SW	9	1	10			1									
SW	9	2	20				1								
SW	9	3	20	7	1	4	3		1						
SW	9	4	20	6		3	1								
SW	9	5	30	2		1									
SW	9	6	20	3		4	1								
SW	9	7	10	2			1								
SW	10	1	10				1								
SW	10	2	10	5											
SW	10	3	20	9											1
SW	10	4	20			7			2						
SW	10	5	20	3		2									
SW	10	6	10	2		14									1
SW	10	7	10												
SW	11	1	40	9	1	1									
SW	11	2	40	10	1	5								2	
SW	11	3	30	4			2	3	2						1
SW	11	4	20	20	1	9	1		1						1
SW	11	5	20	12	1	3	2							1	
SW	11	6	10	14	3	4	1		3						1
SW	11	7	30	17		2	5	1	1					1	
SW	12	1	10	3											
SW	12	2	20	3											
SW	12	3	10												
SW	12	4	20	4			1		2						
SW	12	5	20	7		2			1						
SW	12	6	50	2		2									
SW	12	7	20	5		2									
NE	1	1	10												
NE	1	2	10												

		September 06 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	20	1										
SW	1	2	10											
SW	1	3	10											
SW	1	4	10											
SW	1	5	40		1									
SW	1	6	10											
SW	1	7	20		2									
SW	2	1	10	1	1									
SW	2	2	10		1		1						1	
SW	2	3	10											
SW	2	4	10		1			1						
SW	2	5	20											
SW	2	6	20											
SW	2	7	10		1		1	1	1				1	
SW	3	1	10											
SW	3	2	10											
SW	3	3	10											
SW	3	4	10											
SW	3	5	10											
SW	3	6	20		2									
SW	3	7	10											
SW	4	1	20										1	
SW	4	2	30											
SW	4	3	30		1									
SW	4	4	20											
SW	4	5	10											
SW	4	6	20											
SW	4	7	30											
SW	5	1	40											
SW	5	2	30											
SW	5	3	20											
SW	5	4	30											
SW	5	5	40											
SW	5	6	40		3									
SW	5	7	30				1							
SW	6	1	10											
SW	6	2	10											
SW	6	3	10											
SW	6	4	10											
SW	6	5	10											
SW	6	6	20											
SW	6	7	20											
SW	7	1	10											

		September 06 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	20			6									
SW	1	2	10	1		4									
SW	1	3	10	8	4	1									
SW	1	4	10												
SW	1	5	40												
SW	1	6	10	8			1		1						
SW	1	7	20			1	1								
SW	2	1	10	13	3	3	2		2						1
SW	2	2	10	7	2	5			1						
SW	2	3	10	4		1	1		1						
SW	2	4	10	3		4	1		2						
SW	2	5	20			1			2						
SW	2	6	20	5	2	2	1		1						2
SW	2	7	10	25	3	7	1		3						2
SW	3	1	10			2	1								1
SW	3	2	10				1		1						
SW	3	3	10	11		1									
SW	3	4	10		1	1									
SW	3	5	10	28										1	
SW	3	6	20	1											
SW	3	7	10			1	2								
SW	4	1	20	11	1	6			1					1	
SW	4	2	30	5		3									
SW	4	3	30	6		2	1								
SW	4	4	20	10		6									
SW	4	5	10	1											
SW	4	6	20	6	1	2									
SW	4	7	30	4		1									
SW	5	1	40	2	9	2									
SW	5	2	30				1		2						
SW	5	3	20	16		7									
SW	5	4	30	1		3									
SW	5	5	40	3		1									
SW	5	6	40	2					1						
SW	5	7	30	6		1			1						
SW	6	1	10	9	1										
SW	6	2	10	2		1									
SW	6	3	10												
SW	6	4	10	1											
SW	6	5	10	1											
SW	6	6	20	2					1						
SW	6	7	20	1		1			1						
SW	7	1	10	1		2									

		August 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	10											
NE	7	5	20											
NE	7	6	20						1					
NE	7	7	40		2									
NE	8	1	10											
NE	8	2	10											
NE	8	3	10											
NE	8	4	30											
NE	8	5	10											
NE	8	6	30		3									
NE	8	7	10											
NE	9	1	10											
NE	9	2	20				1	1						
NE	9	3	10		1									
NE	9	4	20								1			
NE	9	5	30											
NE	9	6	20								1			
NE	9	7	40										1	
NE	10	1	10				1							
NE	10	2	20				1							
NE	10	3	20											
NE	10	4	10		1									
NE	10	5	30											
NE	10	6	10				1							
NE	10	7	30											
NE	11	1	20											
NE	11	2	10											
NE	11	3	10											
NE	11	4	10				1	1						
NE	11	5	10											
NE	11	6	10											
NE	11	7	20											
NE	12	1	10											
NE	12	2	10											
NE	12	3	10											
NE	12	4	10											
NE	12	5	10		1									
NE	12	6	20											
NE	12	7	10											

		August 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	10												
NE	7	5	20	4	1	4	1								
NE	7	6	20						2						2
NE	7	7	40	4	1		1								
NE	8	1	10			1	1								
NE	8	2	10	1											
NE	8	3	10												
NE	8	4	30	2		1									
NE	8	5	10	1										1	
NE	8	6	30												
NE	8	7	10												
NE	9	1	10	16		3									
NE	9	2	20	8		3	1								
NE	9	3	10	8		1		1							
NE	9	4	20	2											
NE	9	5	30	1											
NE	9	6	20	1											
NE	9	7	40	7											
NE	10	1	10	2	1	1			1						
NE	10	2	20	5		2									
NE	10	3	20	1											
NE	10	4	10	3	1				1						
NE	10	5	30	8		3									
NE	10	6	10	9		4	1		1						
NE	10	7	30	1											
NE	11	1	20	7		2			2						
NE	11	2	10	3											
NE	11	3	10												
NE	11	4	10	16		2	2								
NE	11	5	10	2											
NE	11	6	10	6	1	1								1	
NE	11	7	20	1											
NE	12	1	10												
NE	12	2	10						9						
NE	12	3	10												
NE	12	4	10												
NE	12	5	10												
NE	12	6	20	6	5		4		1						
NE	12	7	10			3									1

		August 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	10											
NE	1	4	10											
NE	1	5	10											
NE	1	6	10											
NE	1	7	10											
NE	2	1	10											
NE	2	2	10	1					1					
NE	2	3	10		1									
NE	2	4	10				1							
NE	2	5	10											
NE	2	6	10					1						
NE	2	7	10											
NE	3	1	10											
NE	3	2	30		1									
NE	3	3	10	1										
NE	3	4	20											
NE	3	5	10											
NE	3	6	10											
NE	3	7	20											
NE	4	1	10											
NE	4	2	10											
NE	4	3	50											
NE	4	4	10											
NE	4	5	20											
NE	4	6	20				1							
NE	4	7	10											
NE	5	1	10					1						
NE	5	2	10				1							
NE	5	3	10											
NE	5	4	10	1										
NE	5	5	10											
NE	5	6	10											
NE	5	7	10											
NE	6	1	10											
NE	6	2	40											
NE	6	3	40		1									
NE	6	4	30		1									
NE	6	5	20											
NE	6	6	10											
NE	6	7	10											
NE	7	1	10		1									
NE	7	2	10		1									
NE	7	3	20											

		August 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	10												
NE	1	4	10	1		1									
NE	1	5	10												
NE	1	6	10												
NE	1	7	10	2											
NE	2	1	10	2											
NE	2	2	10												
NE	2	3	10			3									
NE	2	4	10	4			1		1						
NE	2	5	10	1											
NE	2	6	10												
NE	2	7	10	7											
NE	3	1	10												
NE	3	2	30	6		1	1								
NE	3	3	10	1		1	1								
NE	3	4	20	4	1	2	2								
NE	3	5	10												
NE	3	6	10	2		2	1								1
NE	3	7	20	2			1								
NE	4	1	10	13	1	3	2		1						
NE	4	2	10	6		1			1						
NE	4	3	50	2	2	2	1		1						
NE	4	4	10	2	1	3			1						
NE	4	5	20	1		1	1								
NE	4	6	20	9			1		1						
NE	4	7	10	1		1									1
NE	5	1	10	2		1	2								
NE	5	2	10			3									
NE	5	3	10												
NE	5	4	10	1		5									1
NE	5	5	10												
NE	5	6	10												
NE	5	7	10												
NE	6	1	10	10	1	4	2								
NE	6	2	40	4		1	1								
NE	6	3	40	3	2	3									3
NE	6	4	30	4		2	1								
NE	6	5	20			2	1		1						
NE	6	6	10	3		1	2								
NE	6	7	10	1					1						
NE	7	1	10	1		3									
NE	7	2	10	2		6			1						
NE	7	3	20			1									1

		August 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	10											
SW	7	3	20											
SW	7	4	20											
SW	7	5	10		1									
SW	7	6	20											
SW	7	7	30		1									
SW	8	1	20	1	1									
SW	8	2	20											
SW	8	3	30											
SW	8	4	10											
SW	8	5	20											
SW	8	6	20											
SW	8	7	30											
SW	9	1	30											
SW	9	2	20											
SW	9	3	30										1	
SW	9	4	30						1					
SW	9	5	30											
SW	9	6	10											
SW	9	7	30		1		2							
SW	10	1	20											
SW	10	2	20											
SW	10	3	30											
SW	10	4	30											
SW	10	5	20											
SW	10	6	20				1							
SW	10	7	20											
SW	11	1	40											
SW	11	2	30		1		1							
SW	11	3	40											
SW	11	4	20	1					1					
SW	11	5	30				1							
SW	11	6	20				2							
SW	11	7	20											
SW	12	1	10											
SW	12	2	20						1					
SW	12	3	10											
SW	12	4	20				1							
SW	12	5	30											
SW	12	6	50											
SW	12	7	20		1			1						
NE	1	1	10											
NE	1	2	10											

		August 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	10	2			1								
SW	7	3	20	2										1	
SW	7	4	20	2					2						
SW	7	5	10			2									
SW	7	6	20				2								1
SW	7	7	30			3	5								
SW	8	1	20	2											
SW	8	2	20	3					2						
SW	8	3	30	1	1	3	8								
SW	8	4	10												
SW	8	5	20	12					1						
SW	8	6	20	6		3	1								
SW	8	7	30												
SW	9	1	30			1									
SW	9	2	20				1								
SW	9	3	30	7	1	5	3								
SW	9	4	30	5		1									
SW	9	5	30	2		1									
SW	9	6	10	3		4	1								
SW	9	7	30	2		1									
SW	10	1	20				1								
SW	10	2	20	5											
SW	10	3	30	9											1
SW	10	4	30			5			5						
SW	10	5	20	4		2									
SW	10	6	20	2		15									1
SW	10	7	20												
SW	11	1	40	9		1									
SW	11	2	30	10	1	4			1					2	
SW	11	3	40	4		4	4		2						1
SW	11	4	20	22	1	11	2		1						
SW	11	5	30	12	1	4	1		1					1	
SW	11	6	20	14	3	4			3						1
SW	11	7	20	17		2	3		1						
SW	12	1	10	3											
SW	12	2	20	3				1							
SW	12	3	10												
SW	12	4	20	4			1		3						
SW	12	5	30	7		1			1						
SW	12	6	50	2		3									
SW	12	7	20	5		2	1								
NE	1	1	10												
NE	1	2	10												

		August 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	20	1										
SW	1	2	10											
SW	1	3	20											
SW	1	4	20											
SW	1	5	50		1									
SW	1	6	10											
SW	1	7	30		2									
SW	2	1	10	1	1									
SW	2	2	20				1							
SW	2	3	10											
SW	2	4	10					1						
SW	2	5	20											
SW	2	6	20											
SW	2	7	20		1		1	1	1				1	
SW	3	1	20											
SW	3	2	10											
SW	3	3	10											
SW	3	4	10											
SW	3	5	10											
SW	3	6	20		2									
SW	3	7	10											
SW	4	1	20										1	
SW	4	2	20											
SW	4	3	30		1									
SW	4	4	10											
SW	4	5	10											
SW	4	6	20											
SW	4	7	20											
SW	5	1	30											
SW	5	2	20											
SW	5	3	10											
SW	5	4	20											
SW	5	5	30											
SW	5	6	30		3									
SW	5	7	20				1							
SW	6	1	10											
SW	6	2	10											
SW	6	3	10											
SW	6	4	10											
SW	6	5	10											
SW	6	6	10											
SW	6	7	10											
SW	7	1	10											

		August 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	20			6								1	
SW	1	2	10			5									
SW	1	3	20	8	4	2									
SW	1	4	20												
SW	1	5	50	1											
SW	1	6	10	9											
SW	1	7	30			1	1								
SW	2	1	10	12	3	6	2		2						1
SW	2	2	20	7	3	7			1						1
SW	2	3	10	4		1			1						
SW	2	4	10	3	1	3	1		2						
SW	2	5	20			1			2						
SW	2	6	20	7	2	2	1		2						2
SW	2	7	20	25	3	7	1		3						2
SW	3	1	20			3	1								1
SW	3	2	10						1						
SW	3	3	10	10		1									
SW	3	4	10		1	1	1								
SW	3	5	10	28											
SW	3	6	20	1											
SW	3	7	10			1	2								
SW	4	1	20	11	1	7								1	
SW	4	2	20	5		3									
SW	4	3	30	7		2	1								
SW	4	4	10	10		6									
SW	4	5	10	1											
SW	4	6	20	6	1	1									
SW	4	7	20	4		1									
SW	5	1	30	2	7	2									
SW	5	2	20				1		2						
SW	5	3	10	16		8									
SW	5	4	20	1		3	1								
SW	5	5	30	3		1									
SW	5	6	30	2					1						
SW	5	7	20	6		1			1						
SW	6	1	10	9	1										
SW	6	2	10	2		1									
SW	6	3	10												
SW	6	4	10	1											
SW	6	5	10	1											
SW	6	6	10	2			1		1						
SW	6	7	10	1		1			1						
SW	7	1	10	1		2									1

		July 07 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	30											
NE	7	5	30											
NE	7	6	10											
NE	7	7	40		2									
NE	8	1	20											
NE	8	2	5											
NE	8	3	5											
NE	8	4	30											
NE	8	5	20											
NE	8	6	30		2									
NE	8	7	20											
NE	9	1	10											
NE	9	2	30				1	1						
NE	9	3	10		1									
NE	9	4	20								1			
NE	9	5	30											
NE	9	6	10								1			
NE	9	7	30										1	
NE	10	1	10				1							
NE	10	2	30											
NE	10	3	10											
NE	10	4	10		1									
NE	10	5	40											
NE	10	6	20				1							
NE	10	7	20											
NE	11	1	10											
NE	11	2	20											
NE	11	3	20											
NE	11	4	10				1							
NE	11	5	5											
NE	11	6	10											
NE	11	7	20											
NE	12	1	10											
NE	12	2	10											
NE	12	3	30											
NE	12	4	30											
NE	12	5	20		1									
NE	12	6	20						1					
NE	12	7	10											

		July 07 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	30												
NE	7	5	30	4	1	4	1								
NE	7	6	10				1		1						2
NE	7	7	40	4	1			2							
NE	8	1	20	1		1									
NE	8	2	5	1											
NE	8	3	5												1
NE	8	4	30	2		1									
NE	8	5	20	2										1	
NE	8	6	30												
NE	8	7	20												
NE	9	1	10	14		4									1
NE	9	2	30	8		3									
NE	9	3	10	8		1		1							
NE	9	4	20	3											
NE	9	5	30	1											
NE	9	6	10	1											
NE	9	7	30	7											1
NE	10	1	10	2	1	1			1						
NE	10	2	30	7		2									
NE	10	3	10	1											
NE	10	4	10	4	1		1		1						
NE	10	5	40	7		2									
NE	10	6	20	12		4	1								
NE	10	7	20	2											
NE	11	1	10	5		3									
NE	11	2	20	3											
NE	11	3	20												
NE	11	4	10	15		2	3								
NE	11	5	5												
NE	11	6	10	4	1	1								1	
NE	11	7	20	1											
NE	12	1	10												
NE	12	2	10						10						
NE	12	3	30												
NE	12	4	30												
NE	12	5	20												
NE	12	6	20	5	2		7		1					1	
NE	12	7	10			3					1				1

		July 07 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	5											
NE	1	4	5					1						
NE	1	5	5											
NE	1	6	5											
NE	1	7	5											
NE	2	1	10	1										
NE	2	2	20	1										
NE	2	3	10		1									
NE	2	4	10								1			
NE	2	5	10											
NE	2	6	10					1						
NE	2	7	10											
NE	3	1	10											
NE	3	2	30		1									
NE	3	3	20											
NE	3	4	20											
NE	3	5	30											
NE	3	6	30											
NE	3	7	20											
NE	4	1	10											
NE	4	2	10											
NE	4	3	50											
NE	4	4	10											
NE	4	5	20											
NE	4	6	10				1							
NE	4	7	10											
NE	5	1	20					1						
NE	5	2	10				1							
NE	5	3	10											
NE	5	4	10	1										
NE	5	5	5											
NE	5	6	5											
NE	5	7	5											
NE	6	1	30											
NE	6	2	60											
NE	6	3	40		1									
NE	6	4	30		1									
NE	6	5	20											
NE	6	6	20											
NE	6	7	10											
NE	7	1	10		1									
NE	7	2	20		1									
NE	7	3	20											

		July 07 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	5	1											
NE	1	4	5	1		1									
NE	1	5	5						1						
NE	1	6	5												
NE	1	7	5	2		1									
NE	2	1	10	1											
NE	2	2	20			1									
NE	2	3	10			4									
NE	2	4	10	5		1	1		1						
NE	2	5	10	1											
NE	2	6	10												
NE	2	7	10	9											
NE	3	1	10												
NE	3	2	30	6		1	3								
NE	3	3	20	1		1	1								1
NE	3	4	20	4	1	2	2								1
NE	3	5	30												
NE	3	6	30	2		2	1								
NE	3	7	20	2			1								
NE	4	1	10	13		2	2		1						
NE	4	2	10	8		1			1						
NE	4	3	50	4	2	2			1						
NE	4	4	10	2		2			1						
NE	4	5	20	1			1		1						
NE	4	6	10	9			1		1						
NE	4	7	10	1		1			1						
NE	5	1	20	2		1	2								
NE	5	2	10			5									
NE	5	3	10												
NE	5	4	10	1		5									1
NE	5	5	5												
NE	5	6	5												
NE	5	7	5												
NE	6	1	30	12	1	3	2								
NE	6	2	60	3			1								
NE	6	3	40	6	3	2									
NE	6	4	30	4		2	1								
NE	6	5	20			2	1								1
NE	6	6	20	3		1	2								
NE	6	7	10	1					1						
NE	7	1	10			3									
NE	7	2	20	2		6			1						
NE	7	3	20			1									1

		July 07 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	20											
SW	7	3	10											
SW	7	4	20											
SW	7	5	10		1									
SW	7	6	20											
SW	7	7	30		1									
SW	8	1	20	1	2									
SW	8	2	30											
SW	8	3	30											
SW	8	4	10											
SW	8	5	20											
SW	8	6	10											
SW	8	7	30											
SW	9	1	30											
SW	9	2	30											
SW	9	3	30		1								1	
SW	9	4	10						1					
SW	9	5	30											
SW	9	6	30											
SW	9	7	30		1		1							
SW	10	1	20											
SW	10	2	20											
SW	10	3	30											
SW	10	4	20											
SW	10	5	20						1					
SW	10	6	10				1							
SW	10	7	10											
SW	11	1	50		1									
SW	11	2	50		1		1							
SW	11	3	30											
SW	11	4	30	1					2					
SW	11	5	40				1							
SW	11	6	30				1							
SW	11	7	20											
SW	12	1	10											
SW	12	2	20						1					
SW	12	3	20											
SW	12	4	10				2							
SW	12	5	30											
SW	12	6	50											
SW	12	7	20		1									
NE	1	1	5					1						
NE	1	2	5											

		July 07 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	20	2		1	3								
SW	7	3	10	1										1	
SW	7	4	20	2					3						
SW	7	5	10			1									
SW	7	6	20				2								
SW	7	7	30			3	4								
SW	8	1	20	2											
SW	8	2	30	3					2						
SW	8	3	30	1	1	3	7								
SW	8	4	10												
SW	8	5	20	13					1						
SW	8	6	10	10		3	1								
SW	8	7	30				1								
SW	9	1	30	1		1									
SW	9	2	30				1								
SW	9	3	30	7	1	3	3		2						
SW	9	4	10	9		3	1								
SW	9	5	30	3		1			1						
SW	9	6	30	3		3									
SW	9	7	30	2		1									
SW	10	1	20				1								1
SW	10	2	20	5											
SW	10	3	30	8											1
SW	10	4	20			5	1		7						
SW	10	5	20	2		2									
SW	10	6	10	2		16									1
SW	10	7	10												
SW	11	1	50	9		1									
SW	11	2	50	12	1	4			1					1	
SW	11	3	30	5		3	2		2						1
SW	11	4	30	21	1	8	2		3						
SW	11	5	40	14		2		1	1					1	
SW	11	6	30	13	1	4			2						1
SW	11	7	20	20		2	4		1					1	
SW	12	1	10	4											
SW	12	2	20	3				1							
SW	12	3	20	1											
SW	12	4	10	4			1		3						1
SW	12	5	30	6		1			1						
SW	12	6	50	4		2									
SW	12	7	20	6		2	1								
NE	1	1	5			1									
NE	1	2	5			1									

		July 07 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	30	1										
SW	1	2	10											
SW	1	3	20											
SW	1	4	20											
SW	1	5	40		1									
SW	1	6	10											
SW	1	7	20		2									
SW	2	1	10	1	1									
SW	2	2	20				1						1	
SW	2	3	10											
SW	2	4	20					1						
SW	2	5	30											
SW	2	6	20											
SW	2	7	20				1		1					
SW	3	1	10											
SW	3	2	10											
SW	3	3	10						1					
SW	3	4	10											
SW	3	5	10											
SW	3	6	20		2									
SW	3	7	10											
SW	4	1	20										1	
SW	4	2	40											
SW	4	3	30		1									
SW	4	4	20											
SW	4	5	10											
SW	4	6	20											
SW	4	7	30		1									
SW	5	1	40											
SW	5	2	20											
SW	5	3	10											
SW	5	4	30											
SW	5	5	40											
SW	5	6	30		3									
SW	5	7	30				1							
SW	6	1	20											
SW	6	2	10											
SW	6	3	10											
SW	6	4	10											
SW	6	5	10											
SW	6	6	10											
SW	6	7	10											
SW	7	1	10											

		July 07 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	30			6									
SW	1	2	10	1		5									
SW	1	3	20	5	4	5									
SW	1	4	20												
SW	1	5	40	1			1								
SW	1	6	10	9											
SW	1	7	20	1		1	1								
SW	2	1	10	11	3	3	2								1
SW	2	2	20	7	1	7									
SW	2	3	10	3		1	1		1						
SW	2	4	20	5	1	3	4		2						
SW	2	5	30			1	1		2						
SW	2	6	20	6	2	2	1		2						2
SW	2	7	20	18	2	7	3		4						2
SW	3	1	10			3									1
SW	3	2	10				1		1						
SW	3	3	10	10		1									
SW	3	4	10		1	2	1								
SW	3	5	10	30											
SW	3	6	20	1											
SW	3	7	10			1	2								
SW	4	1	20	9	1	5			1					1	
SW	4	2	40	5		3									
SW	4	3	30	6		2								1	
SW	4	4	20	12		4									
SW	4	5	10	1											
SW	4	6	20	5		1									
SW	4	7	30	4		1									
SW	5	1	40	2	9	2									
SW	5	2	20				1		2						
SW	5	3	10	14		7	1								
SW	5	4	30			3									
SW	5	5	40	4		1									
SW	5	6	30	2					1						
SW	5	7	30	7		1			2						
SW	6	1	20	10											
SW	6	2	10	1		1	1								
SW	6	3	10												
SW	6	4	10	2											
SW	6	5	10	1											
SW	6	6	10	1			2		1						
SW	6	7	10	1		2			1						
SW	7	1	10			2									1

		June 02 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	10											
NE	7	5	10											
NE	7	6	20						1					
NE	7	7	20		1									
NE	8	1	10											
NE	8	2	0											
NE	8	3	0											
NE	8	4	30											
NE	8	5	20											
NE	8	6	20		2									
NE	8	7	10											
NE	9	1	10											
NE	9	2	30				1							
NE	9	3	20											
NE	9	4	30								1			
NE	9	5	20											
NE	9	6	10								1			
NE	9	7	20										1	
NE	10	1	10				1							
NE	10	2	30											
NE	10	3	0											
NE	10	4	10											
NE	10	5	30											
NE	10	6	10											
NE	10	7	20											
NE	11	1	10											
NE	11	2	10											
NE	11	3	20											
NE	11	4	10				1	2						
NE	11	5	10											
NE	11	6	10											
NE	11	7	20											
NE	12	1	10											
NE	12	2	0											
NE	12	3	20											
NE	12	4	0											
NE	12	5	10		2									
NE	12	6	10		1									
NE	12	7	0											

		June 02 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	10	0		0			0						
NE	7	5	10	2	1	4	1		0						
NE	7	6	20	0		0	1		1						1
NE	7	7	20	3	1	1		2							
NE	8	1	10	0		1	1								
NE	8	2	0	1		0									
NE	8	3	0	0		0								1	
NE	8	4	30	2		1									
NE	8	5	20	1										1	
NE	8	6	20				1								
NE	8	7	10												
NE	9	1	10	16		2									
NE	9	2	30	9		4	1								
NE	9	3	20	6		1		1							
NE	9	4	30	3											
NE	9	5	20	1											
NE	9	6	10	1											
NE	9	7	20	7											1
NE	10	1	10	2	1	1	2		1						
NE	10	2	30	6	0	2			0						
NE	10	3	0	2	0	0			0						
NE	10	4	10	5	1	1			1						
NE	10	5	30	8	1	2									
NE	10	6	10	11		3	1								1
NE	10	7	20	2		0									
NE	11	1	10	8		3			2						
NE	11	2	10	3		0			0						
NE	11	3	20	0		0			0						
NE	11	4	10	12		1	2		1						
NE	11	5	10	0		0									
NE	11	6	10	6	1	1								1	
NE	11	7	20	1											
NE	12	1	10												
NE	12	2	0						6						
NE	12	3	20												
NE	12	4	0												
NE	12	5	10												
NE	12	6	10	7	4		6							1	
NE	12	7	0			1									1

		June 02 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	0											
NE	1	4	10											
NE	1	5	10											
NE	1	6	10											
NE	1	7	10											
NE	2	1	10											
NE	2	2	20											
NE	2	3	10											
NE	2	4	10											
NE	2	5	10											
NE	2	6	10											
NE	2	7	20											
NE	3	1	10											
NE	3	2	20											
NE	3	3	10											
NE	3	4	20											
NE	3	5	10											
NE	3	6	10											
NE	3	7	10											
NE	4	1	0											
NE	4	2	0											
NE	4	3	50											
NE	4	4	10											
NE	4	5	10											
NE	4	6	10				1							
NE	4	7	10											
NE	5	1	0											
NE	5	2	10				1							
NE	5	3	0											
NE	5	4	10	1										
NE	5	5	0											
NE	5	6	0											
NE	5	7	0					1						
NE	6	1	10											
NE	6	2	40											
NE	6	3	30		1									
NE	6	4	30											
NE	6	5	20		1									
NE	6	6	20											
NE	6	7	10											
NE	7	1	0		1									
NE	7	2	10											
NE	7	3	10											

		June 02 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	0	0		0									
NE	1	4	10	1		1									
NE	1	5	10	0					1						
NE	1	6	10	0											
NE	1	7	10	2											
NE	2	1	10	1		0									
NE	2	2	20	0		2									1
NE	2	3	10	1		4									1
NE	2	4	10	2			1		1		1				
NE	2	5	10	0											
NE	2	6	10	0											
NE	2	7	20	8											
NE	3	1	10	0		0									
NE	3	2	20	6		1	1								
NE	3	3	10	1		1	0								
NE	3	4	20	4		2	2								1
NE	3	5	10	0		0	0								
NE	3	6	10	2		2	1								
NE	3	7	10	2											
NE	4	1	0	16	1	2	1		1						
NE	4	2	0	10	0	1			1						
NE	4	3	50	4	2	2			0						
NE	4	4	10	2	1	1			1						
NE	4	5	10	2		0			1						
NE	4	6	10	10		0	1		1						1
NE	4	7	10	2		1									
NE	5	1	0	0		1	2								
NE	5	2	10	0		4	1								
NE	5	3	0	0		0									
NE	5	4	10	1		6									1
NE	5	5	0			1									
NE	5	6	0												
NE	5	7	0		1										
NE	6	1	10	12	1	3	4								
NE	6	2	40	3	0	0	1								
NE	6	3	30	5	3	2	1								2
NE	6	4	30	4		4	1								
NE	6	5	20	0		2	1								
NE	6	6	20	3		1	1								
NE	6	7	10	1					2						
NE	7	1	0	1		3			0						
NE	7	2	10	2		7			1						
NE	7	3	10	0		1			0						1

		June 02 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	10											
SW	7	3	0											
SW	7	4	30											
SW	7	5	10		1									
SW	7	6	20											
SW	7	7	20		1									
SW	8	1	40	1										
SW	8	2	30											
SW	8	3	50											
SW	8	4	20											
SW	8	5	30											
SW	8	6	30											
SW	8	7	30											
SW	9	1	20											
SW	9	2	30											
SW	9	3	30										1	
SW	9	4	20	1				1						
SW	9	5	30											
SW	9	6	30											
SW	9	7	30		1		1							
SW	10	1	20											
SW	10	2	30											
SW	10	3	30											
SW	10	4	20											
SW	10	5	30											
SW	10	6	20				1							
SW	10	7	20											
SW	11	1	50											
SW	11	2	50		1		1			1				
SW	11	3	40											
SW	11	4	30		1									
SW	11	5	40				2							
SW	11	6	30				2							
SW	11	7	40											
SW	12	1	10											
SW	12	2	30											
SW	12	3	20											
SW	12	4	30											
SW	12	5	30											
SW	12	6	40											
SW	12	7	20		1									
NE	1	1	10											
NE	1	2	0											

		June 02 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	10	2		1	3								
SW	7	3	0	2		0	0							1	
SW	7	4	30	1		0	0		3						
SW	7	5	10			2	0								
SW	7	6	20			0	3								
SW	7	7	20			3	3								
SW	8	1	40	2		2	0								
SW	8	2	30	3		0	0		1						
SW	8	3	50	1	1	2	9		0						
SW	8	4	20	0		0	0		0						
SW	8	5	30	12		0	0		1						
SW	8	6	30	9		3	1								
SW	8	7	30	0		0	0								
SW	9	1	20	2		1	0								
SW	9	2	30	0		0	0								
SW	9	3	30	9	1	5	3		1						
SW	9	4	20	9	2	4	1								
SW	9	5	30	3	0	1									
SW	9	6	30	3	0	5									
SW	9	7	30	3	1	1									
SW	10	1	20	0		0									
SW	10	2	30	4		0									
SW	10	3	30	8		0									1
SW	10	4	20	0		5			4						
SW	10	5	30	3		2									
SW	10	6	20	2		16									
SW	10	7	20	0		0									
SW	11	1	50	10		2									
SW	11	2	50	12	1	4			1					1	
SW	11	3	40	6	0	3	3		2						
SW	11	4	30	23	1	6	1		3						
SW	11	5	40	12	0	3	1		1						
SW	11	6	30	16	3	2	0		4						1
SW	11	7	40	17		2	2								
SW	12	1	10	4		0	0								
SW	12	2	30	3		0	0								
SW	12	3	20	0		0	0								
SW	12	4	30	2		0	1		3						1
SW	12	5	30	4		1	0								
SW	12	6	40	3		1	0								
SW	12	7	20	5		1	1								
NE	1	1	10	0		0									
NE	1	2	0	0		1									

		June 02 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	30											
SW	1	2	10											
SW	1	3	10											
SW	1	4	10											
SW	1	5	50											
SW	1	6	0				1							
SW	1	7	10		2									
SW	2	1	10	1	1									
SW	2	2	20				1						1	
SW	2	3	10											
SW	2	4	10											
SW	2	5	20											
SW	2	6	20											
SW	2	7	30				1		1					
SW	3	1	20											
SW	3	2	0											
SW	3	3	10											
SW	3	4	10											
SW	3	5	10											
SW	3	6	30		2									
SW	3	7	0											
SW	4	1	30										1	
SW	4	2	30											
SW	4	3	40		1									
SW	4	4	20	1										
SW	4	5	20											
SW	4	6	20											
SW	4	7	40											
SW	5	1	40											
SW	5	2	30											
SW	5	3	20											
SW	5	4	40											
SW	5	5	30											
SW	5	6	50											
SW	5	7	30				1							
SW	6	1	10											
SW	6	2	0											
SW	6	3	0											
SW	6	4	10											
SW	6	5	0											
SW	6	6	10											
SW	6	7	20											
SW	7	1	10											

		June 02 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	30	0	0	5	0								
SW	1	2	10	0	0	5	0								
SW	1	3	10	6	3	1	0								
SW	1	4	10	0	0	0	0								
SW	1	5	50	1	0	1	1								
SW	1	6	0	11	0	0	0								
SW	1	7	10	0	1	1	1								
SW	2	1	10	14	3	4	2		2						1
SW	2	2	20	5	1	6	0		0						0
SW	2	3	10	4	0	1	0		0						0
SW	2	4	10	4	0	2	3		2						0
SW	2	5	20	0	0	1	1		2						0
SW	2	6	20	6	2	2	1		1						2
SW	2	7	30	24	3	11	5		5						3
SW	3	1	20	0	0	3	1		0						
SW	3	2	0	0	0	0	1		1						
SW	3	3	10	10	0	1	0								
SW	3	4	10	0	1	3	1								
SW	3	5	10	40	0	0	0								
SW	3	6	30	1	0	0	0								
SW	3	7	0	0	0	1	1								
SW	4	1	30	8	0	7			1					1	
SW	4	2	30	5	0	3									
SW	4	3	40	5	0	2									
SW	4	4	20	13	0	4									
SW	4	5	20	1	0	0									
SW	4	6	20	6	1	0									
SW	4	7	40	4	0	1									
SW	5	1	40	2	9	2	0		0						
SW	5	2	30	0	0	0	1		2						
SW	5	3	20	17	0	5	0		0						
SW	5	4	40	1	0	3	1		0						
SW	5	5	30	2	0	1	1		0						1
SW	5	6	50	3	0	2			1						
SW	5	7	30	7	0	1			2						
SW	6	1	10	9	1	0	1		1						
SW	6	2	0	3		1	0		0						
SW	6	3	0	0		1	0		0						
SW	6	4	10	1		0	0		0						
SW	6	5	0	1		0	0		0						
SW	6	6	10	1		0	2		1						
SW	6	7	20	0		1	0		0						
SW	7	1	10	1		2	0								1

		May 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	20											
NE	7	5	20											
NE	7	6	30											
NE	7	7	50		1									
NE	8	1	20											
NE	8	2	0											
NE	8	3	0											
NE	8	4	50											
NE	8	5	30											
NE	8	6	50											
NE	8	7	20											
NE	9	1	20											
NE	9	2	50				1							
NE	9	3	40											
NE	9	4	30											
NE	9	5	30											
NE	9	6	30											
NE	9	7	40									1		
NE	10	1	20				1							
NE	10	2	50											
NE	10	3	10											
NE	10	4	30											
NE	10	5	50											
NE	10	6	30				1							
NE	10	7	40											
NE	11	1	30											
NE	11	2	30											
NE	11	3	30											
NE	11	4	20					1						
NE	11	5	30											
NE	11	6	30											
NE	11	7	40											
NE	12	1	30											
NE	12	2	10											
NE	12	3	30					1						
NE	12	4	20											
NE	12	5	30		1									
NE	12	6	20											
NE	12	7	10											

		May 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	20												
NE	7	5	20	3	1	5	1								
NE	7	6	30												1
NE	7	7	50	4	1	1		2							
NE	8	1	20			1	1								
NE	8	2	0	1											
NE	8	3	0												
NE	8	4	50	2		1									
NE	8	5	30	1											
NE	8	6	50	1		2									
NE	8	7	20												
NE	9	1	20	16		4									
NE	9	2	50	10		2									
NE	9	3	40	2		1		1							
NE	9	4	30	3											
NE	9	5	30	1											
NE	9	6	30	1											
NE	9	7	40	4											
NE	10	1	20	2	1	2	1		1						
NE	10	2	50	4		3	1								
NE	10	3	10	2		1									
NE	10	4	30	6	1	1	1								
NE	10	5	50	6	1	3	1								
NE	10	6	30	10		3	1								
NE	10	7	40	2											
NE	11	1	30	5		3			2						
NE	11	2	30	3											
NE	11	3	30												
NE	11	4	20	10		1	3								
NE	11	5	30												
NE	11	6	30	2											
NE	11	7	40	1											
NE	12	1	30												
NE	12	2	10						10						
NE	12	3	30												
NE	12	4	20												
NE	12	5	30												
NE	12	6	20	8	2		6								
NE	12	7	10			1									

		May 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	10											
NE	1	4	10				1							
NE	1	5	0											
NE	1	6	0											
NE	1	7	0											
NE	2	1	0											
NE	2	2	20	1										
NE	2	3	10											
NE	2	4	10											
NE	2	5	10											
NE	2	6	0											
NE	2	7	10											
NE	3	1	20											
NE	3	2	30											
NE	3	3	30											
NE	3	4	30											
NE	3	5	40											
NE	3	6	30											
NE	3	7	20											
NE	4	1	10											
NE	4	2	0											
NE	4	3	60											
NE	4	4	10											
NE	4	5	30											
NE	4	6	30											
NE	4	7	10											
NE	5	1	10											
NE	5	2	10											
NE	5	3	0											
NE	5	4	10											
NE	5	5	0											
NE	5	6	0											
NE	5	7	0											
NE	6	1	10											
NE	6	2	60											
NE	6	3	50											
NE	6	4	40											
NE	6	5	40											
NE	6	6	20											
NE	6	7	20											
NE	7	1	10		1									
NE	7	2	10											
NE	7	3	30											

		May 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	10												
NE	1	4	10	1											
NE	1	5	0												
NE	1	6	0												
NE	1	7	0	1											
NE	2	1	0	1											
NE	2	2	20			2									
NE	2	3	10			3									
NE	2	4	10	4					1						
NE	2	5	10												
NE	2	6	0												
NE	2	7	10	10											
NE	3	1	20												
NE	3	2	30	5		1	1								
NE	3	3	30	1		1									
NE	3	4	30	3		2	2								1
NE	3	5	40												
NE	3	6	30	2		2									
NE	3	7	20	2			1								
NE	4	1	10	16		3	1		1						
NE	4	2	0	7		1									
NE	4	3	60	5	1	2	2								
NE	4	4	10	2		1			1						
NE	4	5	30	2					1						
NE	4	6	30	10			1		1						
NE	4	7	10	2											
NE	5	1	10			3	1								
NE	5	2	10			2									
NE	5	3	0												
NE	5	4	10	1		2									
NE	5	5	0												
NE	5	6	0												
NE	5	7	0		1										
NE	6	1	10	13		4	2								
NE	6	2	60	3			1								
NE	6	3	50	6		4	1								1
NE	6	4	40	4		3	1								
NE	6	5	40			2	1								
NE	6	6	20	2		1	1								
NE	6	7	20	1			1		1						
NE	7	1	10	1		3									
NE	7	2	10	2		7									
NE	7	3	30			1									1

		May 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	10											
SW	7	3	20											
SW	7	4	40											
SW	7	5	10		1									
SW	7	6	30											
SW	7	7	30		2									
SW	8	1	30											
SW	8	2	10											
SW	8	3	50											
SW	8	4	20											
SW	8	5	40											
SW	8	6	30											
SW	8	7	40											
SW	9	1	30											
SW	9	2	40											
SW	9	3	50											
SW	9	4	20											
SW	9	5	30											
SW	9	6	30											
SW	9	7	40		1		1							
SW	10	1	30											
SW	10	2	30											
SW	10	3	40											
SW	10	4	30											
SW	10	5	30											
SW	10	6	20				1							
SW	10	7	10											
SW	11	1	60											
SW	11	2	50		1					1				
SW	11	3	50											
SW	11	4	40											
SW	11	5	50				1							
SW	11	6	30				1							
SW	11	7	40											
SW	12	1	20											
SW	12	2	30											
SW	12	3	30											
SW	12	4	30											
SW	12	5	30											
SW	12	6	50											
SW	12	7	20		1									
NE	1	1	0											
NE	1	2	0											

		May 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	10	2			1								
SW	7	3	20	1											
SW	7	4	40	1					3						
SW	7	5	10			2									
SW	7	6	30				2								
SW	7	7	30			2	2								
SW	8	1	30	2			2								
SW	8	2	10	3					1						
SW	8	3	50	1	1	2	9								
SW	8	4	20												
SW	8	5	40	12			2								
SW	8	6	30	3		3	1			4					
SW	8	7	40												
SW	9	1	30			1	1			1					
SW	9	2	40				1								
SW	9	3	50	9		4	1		2						
SW	9	4	20	7	1	3									
SW	9	5	30	2		1	1								
SW	9	6	30	3		5	1								
SW	9	7	40	3		1	1								
SW	10	1	30												
SW	10	2	30	5											
SW	10	3	40	8			1								
SW	10	4	30			4			5						
SW	10	5	30	6		1									
SW	10	6	20	3		16									
SW	10	7	10												
SW	11	1	60	9		2									
SW	11	2	50	15	1	4			1						
SW	11	3	50	5		2	1		3						1
SW	11	4	40	23		3	1		1						
SW	11	5	50	19		5			1						
SW	11	6	30	15	1	4			3						
SW	11	7	40	18		2	2		1						
SW	12	1	20	4											
SW	12	2	30	3											
SW	12	3	30	2											
SW	12	4	30	3					1						1
SW	12	5	30	7		2									1
SW	12	6	50	4		1				1					
SW	12	7	20	5		1									
NE	1	1	0												
NE	1	2	0												

		May 01 2000												
block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	30											
SW	1	2	10											
SW	1	3	10											
SW	1	4	20											
SW	1	5	50											
SW	1	6	10											
SW	1	7	20											
SW	2	1	10											
SW	2	2	30				1							
SW	2	3	10											
SW	2	4	10											
SW	2	5	30											
SW	2	6	40											
SW	2	7	40				1							
SW	3	1	20											
SW	3	2	10											
SW	3	3	10											
SW	3	4	10											
SW	3	5	10											
SW	3	6	20											
SW	3	7	10											
SW	4	1	40											
SW	4	2	40											
SW	4	3	40											
SW	4	4	20											
SW	4	5	20											
SW	4	6	20											
SW	4	7	30											
SW	5	1	40											
SW	5	2	30											
SW	5	3	10											
SW	5	4	50											
SW	5	5	20											
SW	5	6	40											
SW	5	7	20				1							
SW	6	1	10											
SW	6	2	0											
SW	6	3	0											
SW	6	4	10											
SW	6	5	0											
SW	6	6	10											
SW	6	7	10											
SW	7	1	20											

		May 01 2000													
block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	30			7									
SW	1	2	10			3									
SW	1	3	10	9	2										
SW	1	4	20			1									
SW	1	5	50	1		1									
SW	1	6	10	12											
SW	1	7	20			1	3								
SW	2	1	10	19	3	3	2		1						1
SW	2	2	30	6		6									1
SW	2	3	10	2		1									
SW	2	4	10	5	1	3	4		1						
SW	2	5	30			1			1						
SW	2	6	40	6	1	2	1		3						3
SW	2	7	40	27	6	11	3		3						1
SW	3	1	20			4									
SW	3	2	10						1						
SW	3	3	10	10		1									
SW	3	4	10		1	1	1								
SW	3	5	10	45											
SW	3	6	20	1					1						
SW	3	7	10			1	1								
SW	4	1	40	11		5									
SW	4	2	40	5		2									
SW	4	3	40	3		1	1								
SW	4	4	20	12		1									
SW	4	5	20	1											
SW	4	6	20	4											
SW	4	7	30	4		1									
SW	5	1	40	2	8	2									
SW	5	2	30	1			1		1						
SW	5	3	10	17		6	1			1					
SW	5	4	50	1		3	1								
SW	5	5	20	2		1									
SW	5	6	40	2		3	1		1	7					
SW	5	7	20	7		1			2						
SW	6	1	10	10	1										
SW	6	2	0												
SW	6	3	0												
SW	6	4	10	1											
SW	6	5	0												
SW	6	6	10	1											
SW	6	7	10			1			1						
SW	7	1	20			2									1

		September 13 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	20											
NE	7	5	30											
NE	7	6	30											
NE	7	7	40		1									
NE	8	1	30											
NE	8	2	30											
NE	8	3	20											
NE	8	4	40											
NE	8	5	40											
NE	8	6	30											
NE	8	7	20											
NE	9	1	10											
NE	9	2	30					1						
NE	9	3	30											
NE	9	4	30								2			
NE	9	5	40											
NE	9	6	30								1			
NE	9	7	50										1	
NE	10	1	20											
NE	10	2	40											
NE	10	3	20											
NE	10	4	20											
NE	10	5	50											
NE	10	6	30				1							
NE	10	7	40											
NE	11	1	20											
NE	11	2	30											
NE	11	3	30											
NE	11	4	20				1	1						
NE	11	5	30											
NE	11	6	10											
NE	11	7	40											
NE	12	1	20											
NE	12	2	10											
NE	12	3	30											
NE	12	4	30											
NE	12	5	30		1									
NE	12	6	20											
NE	12	7	20											1

		September 13 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	20												
NE	7	5	30	3	2	5									
NE	7	6	30				1		2						
NE	7	7	40	3	1	1	1	1							
NE	8	1	30			1	1								
NE	8	2	30	1											
NE	8	3	20											1	
NE	8	4	40	2		1									
NE	8	5	40	2											
NE	8	6	30			2				1					
NE	8	7	20			1									
NE	9	1	10	14		4									
NE	9	2	30	12		2	1								
NE	9	3	30	4		1		1						1	
NE	9	4	30	3											
NE	9	5	40												
NE	9	6	30	1											
NE	9	7	50	4											
NE	10	1	20	2	1	1	2		1						
NE	10	2	40	3		2	2								
NE	10	3	20	2		1	1								
NE	10	4	20	6	1	2	2		2						
NE	10	5	50	6	1	3	1								
NE	10	6	30	9		5	1								
NE	10	7	40	1											
NE	11	1	20	7		1			2						
NE	11	2	30	3											
NE	11	3	30												
NE	11	4	20	17		1									
NE	11	5	30												
NE	11	6	10	4		2									
NE	11	7	40	1											
NE	12	1	20				1								
NE	12	2	10						13						
NE	12	3	30				1								
NE	12	4	30				2								
NE	12	5	30												
NE	12	6	20	9	3		8		1					1	
NE	12	7	20			2									

		September 13 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	20											
NE	1	4	20				1							
NE	1	5	30											
NE	1	6	30											
NE	1	7	20	1										
NE	2	1	30											
NE	2	2	40	1			1		1					
NE	2	3	30											
NE	2	4	30											
NE	2	5	20											
NE	2	6	20					1						
NE	2	7	30											
NE	3	1	30											
NE	3	2	30											
NE	3	3	30	1										
NE	3	4	40											
NE	3	5	40											
NE	3	6	30											
NE	3	7	30											
NE	4	1	20											
NE	4	2	20											
NE	4	3	60											
NE	4	4	30											
NE	4	5	30											
NE	4	6	30				1							
NE	4	7	30											
NE	5	1	20					1						
NE	5	2	30				2							
NE	5	3	30				1							
NE	5	4	10											
NE	5	5	10											
NE	5	6	10											
NE	5	7	20					1						
NE	6	1	20											
NE	6	2	60											
NE	6	3	40											
NE	6	4	40											
NE	6	5	50											
NE	6	6	30											
NE	6	7	20											
NE	7	1	20		1									
NE	7	2	30											
NE	7	3	30											

		September 13 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	20												
NE	1	4	20	1		1									
NE	1	5	30				2		1						
NE	1	6	30				1								
NE	1	7	20	1		1									
NE	2	1	30	2		1									
NE	2	2	40			2									
NE	2	3	30			4			1						
NE	2	4	30	10			1		2						
NE	2	5	20	1											
NE	2	6	20												
NE	2	7	30	10			1							1	
NE	3	1	30												
NE	3	2	30	8		2	3								
NE	3	3	30	1		1									
NE	3	4	40	5			2								
NE	3	5	40				6								
NE	3	6	30	3		2	2								
NE	3	7	30	2			2								
NE	4	1	20	17		2	1		1						
NE	4	2	20	9		1									
NE	4	3	60	6		1	3		3						
NE	4	4	30	3	4	1	1		3						
NE	4	5	30	2					2						
NE	4	6	30	11			1		1						
NE	4	7	30	3											
NE	5	1	20			1	3								
NE	5	2	30			6	2		1						
NE	5	3	30												
NE	5	4	10	1		4									
NE	5	5	10												1
NE	5	6	10												
NE	5	7	20		1										
NE	6	1	20	13		3	4								
NE	6	2	60	2			2								
NE	6	3	40	8		4	9								
NE	6	4	40	3		3	2								
NE	6	5	50			3	1		1						
NE	6	6	30	3		2	2								
NE	6	7	20	1			1		1						
NE	7	1	20	1		4									
NE	7	2	30	2		7	1		2						
NE	7	3	30			1									

		September 13 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	20											
SW	7	3	20											
SW	7	4	30											
SW	7	5	20		1									
SW	7	6	40											
SW	7	7	30		1									
SW	8	1	30											
SW	8	2	30											
SW	8	3	40											
SW	8	4	30											
SW	8	5	40											
SW	8	6	30											
SW	8	7	40											
SW	9	1	40											
SW	9	2	60											
SW	9	3	40											
SW	9	4	30											
SW	9	5	40											
SW	9	6	30											
SW	9	7	50	1	1		1							
SW	10	1	30											
SW	10	2	50											
SW	10	3	40				1							
SW	10	4	40											
SW	10	5	30											
SW	10	6	30				1							
SW	10	7	30					1						
SW	11	1	60											
SW	11	2	50		1		1							
SW	11	3	40											
SW	11	4	40											
SW	11	5	50				1							
SW	11	6	30				2							
SW	11	7	60											
SW	12	1	30						1					
SW	12	2	40											
SW	12	3	30											
SW	12	4	30											
SW	12	5	40											
SW	12	6	40											
SW	12	7	40		1									
NE	1	1	20											
NE	1	2	30											

		September 13 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	20	2			2								
SW	7	3	20	1										1	
SW	7	4	30	2			2		6						
SW	7	5	20			2									
SW	7	6	40				2								
SW	7	7	30		1	1	4								
SW	8	1	30	2		1									
SW	8	2	30	3					1						
SW	8	3	40	1	1	2	10								
SW	8	4	30												
SW	8	5	40	12			1								
SW	8	6	30	6		3	1			3					
SW	8	7	40												
SW	9	1	40			2				2					
SW	9	2	60				1								
SW	9	3	40	10	1	5	4		2						
SW	9	4	30	11	2	4	1								
SW	9	5	40	2		1	2		1						
SW	9	6	30	3		4	1								
SW	9	7	50	3	1	1	2								1
SW	10	1	30												
SW	10	2	50	4											1
SW	10	3	40	10			1								
SW	10	4	40			6	1		10						
SW	10	5	30	3		2									
SW	10	6	30	2	1	14	1								
SW	10	7	30				1								
SW	11	1	60	6		3									
SW	11	2	50	13		1			1						
SW	11	3	40	5		3	2		1						
SW	11	4	40	18	1	3	1		1						
SW	11	5	50	13		4			1						1
SW	11	6	30	13	2	2			4	2					
SW	11	7	60	24		3	3								
SW	12	1	30	4											
SW	12	2	40	3			2								
SW	12	3	30			1				1					
SW	12	4	30	3					3						
SW	12	5	40	6											
SW	12	6	40	1		1				2					
SW	12	7	40	3		1	1								
NE	1	1	20												
NE	1	2	30		1	2				2					

		September 13 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	50											
SW	1	2	30											
SW	1	3	30											
SW	1	4	30											
SW	1	5	50											
SW	1	6	20											
SW	1	7	50											
SW	2	1	40											
SW	2	2	50				1						1	
SW	2	3	20											
SW	2	4	40											
SW	2	5	50											
SW	2	6	60		1									
SW	2	7	60				1	1						
SW	3	1	40											
SW	3	2	30											
SW	3	3	40											
SW	3	4	30											
SW	3	5	30											
SW	3	6	40											
SW	3	7	30											1
SW	4	1	30										1	
SW	4	2	40											
SW	4	3	30											
SW	4	4	30											
SW	4	5	20											
SW	4	6	30											
SW	4	7	30											
SW	5	1	40											
SW	5	2	30											
SW	5	3	30											
SW	5	4	40											
SW	5	5	30											
SW	5	6	40											
SW	5	7	30											
SW	6	1	40											
SW	6	2	20											
SW	6	3	10											
SW	6	4	10											
SW	6	5	10											
SW	6	6	30											
SW	6	7	20				1							
SW	7	1	20											

		September 13 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	50			8									
SW	1	2	30			5									
SW	1	3	30	8	4	1	1								
SW	1	4	30				1			1					
SW	1	5	50	1						1					
SW	1	6	20	12			1								
SW	1	7	50			1	3								
SW	2	1	40	13	2	4	4		2						1
SW	2	2	50	7	1	8	1		4						1
SW	2	3	20	4	1	2	1		1						
SW	2	4	40	6	1	4	4		5						
SW	2	5	50			1			1						
SW	2	6	60	3		2	1		2						1
SW	2	7	60	28	7	8	2		7						1
SW	3	1	40			5		3							
SW	3	2	30				3		1						
SW	3	3	40	12		2									
SW	3	4	30		1	3	1								
SW	3	5	30	60											
SW	3	6	40	1											
SW	3	7	30		1	2	2	1							
SW	4	1	30	10	1	5									
SW	4	2	40	7		2									
SW	4	3	30	3	1	2	1							1	
SW	4	4	30	13		3								1	
SW	4	5	20	1											
SW	4	6	30	6			1								
SW	4	7	30	4		1									
SW	5	1	40	1	13	2									
SW	5	2	30				1			1					
SW	5	3	30	14		6	3			1					
SW	5	4	40	1		3									
SW	5	5	30	1						8					
SW	5	6	40	3		3	1		2						
SW	5	7	30	6		1			1						
SW	6	1	40	9	1										1
SW	6	2	20	2	1	3	1								1
SW	6	3	10												
SW	6	4	10	2			4	1							
SW	6	5	10			1									
SW	6	6	30	3			1		1						
SW	6	7	20			1		1							
SW	7	1	20	1		2									1

		August 30 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	30											
NE	7	5	30											
NE	7	6	40											
NE	7	7	40		1									
NE	8	1	30											
NE	8	2	20											
NE	8	3	20											
NE	8	4	50											
NE	8	5	40											
NE	8	6	40											
NE	8	7	20											
NE	9	1	10											
NE	9	2	30					1						
NE	9	3	30											
NE	9	4	30								2			
NE	9	5	30											
NE	9	6	40								1			
NE	9	7	40											
NE	10	1	10											
NE	10	2	40											
NE	10	3	30											
NE	10	4	10											
NE	10	5	40											
NE	10	6	30				1							
NE	10	7	30											
NE	11	1	20											
NE	11	2	30											
NE	11	3	40											
NE	11	4	30				1	2						
NE	11	5	30											
NE	11	6	10											
NE	11	7	30											
NE	12	1	10											
NE	12	2	10											
NE	12	3	20					1						
NE	12	4	30											
NE	12	5	20		1									
NE	12	6	20											
NE	12	7	20											

		August 30 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	30												
NE	7	5	30	3	2	5									
NE	7	6	40				1		2						1
NE	7	7	40	3	1	1	1	1							
NE	8	1	30			1	1								
NE	8	2	20	1											
NE	8	3	20				1							1	
NE	8	4	50	2	1	1									
NE	8	5	40	1										1	
NE	8	6	40			2				1					
NE	8	7	20	1			1								
NE	9	1	10	11		4									
NE	9	2	30	9		2	1								
NE	9	3	30	3		1								1	
NE	9	4	30	3		1									
NE	9	5	30	1											
NE	9	6	40	1											
NE	9	7	40	3											
NE	10	1	10	2	2	2	1		1						
NE	10	2	40	4		2	1								
NE	10	3	30	2											
NE	10	4	10	3	1	2	2								
NE	10	5	40	5	1	3	1								
NE	10	6	30	9		4	1								
NE	10	7	30	1											
NE	11	1	20	7		1			2						
NE	11	2	30	3											
NE	11	3	40												
NE	11	4	30	13			1								
NE	11	5	30												
NE	11	6	10	3		1									
NE	11	7	30	1											
NE	12	1	10												
NE	12	2	10						11						
NE	12	3	20				1								
NE	12	4	30				3								
NE	12	5	20												
NE	12	6	20	10	4		9		1					1	
NE	12	7	20			1									

		August 30 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	10											
NE	1	4	30				1							
NE	1	5	30											
NE	1	6	20											
NE	1	7	10											
NE	2	1	30											
NE	2	2	40	1			1		1					
NE	2	3	30											
NE	2	4	20								1			
NE	2	5	20											
NE	2	6	20											
NE	2	7	30											
NE	3	1	20											
NE	3	2	40											
NE	3	3	30											
NE	3	4	40					1						
NE	3	5	40											
NE	3	6	30											
NE	3	7	30											
NE	4	1	10											
NE	4	2	20											
NE	4	3	50											
NE	4	4	20											
NE	4	5	30											
NE	4	6	20				1							
NE	4	7	20											
NE	5	1	20											
NE	5	2	20				2							
NE	5	3	20				1							
NE	5	4	20											
NE	5	5	10											
NE	5	6	10											
NE	5	7	20						1					
NE	6	1	20											
NE	6	2	60											
NE	6	3	30								1			
NE	6	4	40											
NE	6	5	50											
NE	6	6	40											
NE	6	7	20											
NE	7	1	10											
NE	7	2	30											
NE	7	3	40											

		August 30 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	10												
NE	1	4	30	1		1									
NE	1	5	30				1		2						
NE	1	6	20				1								
NE	1	7	10	2		1	2							1	1
NE	2	1	30	2										1	
NE	2	2	40			2									
NE	2	3	30			5			1						
NE	2	4	20	2			1		1						
NE	2	5	20	1											
NE	2	6	20						1						
NE	2	7	30	11											
NE	3	1	20												
NE	3	2	40	6		1	3								
NE	3	3	30	1		1									
NE	3	4	40	4	1	1	2								1
NE	3	5	40				7								
NE	3	6	30	2		2	3								
NE	3	7	30	1			2								
NE	4	1	10	17	1	2	1		1						
NE	4	2	20	17	1	1	1		1						
NE	4	3	50	8	4	2	3								
NE	4	4	20	3		3			2						
NE	4	5	30	2					2						
NE	4	6	20	9		1		1							
NE	4	7	20	3					1						
NE	5	1	20			1	3			1					
NE	5	2	20			8	1								
NE	5	3	20												
NE	5	4	20	1		8									
NE	5	5	10												
NE	5	6	10												
NE	5	7	20		1										
NE	6	1	20	14	1	4	3								
NE	6	2	60	3			2								
NE	6	3	30	7	3	4	3								
NE	6	4	40	4		3	2								
NE	6	5	50			2	1								
NE	6	6	40	3		1									
NE	6	7	20	1			1		2						
NE	7	1	10	1		4									
NE	7	2	30	2		8	1								
NE	7	3	40			1									

		August 30 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	10											
SW	7	3	20											
SW	7	4	30											
SW	7	5	20		1									
SW	7	6	40											
SW	7	7	20		1									
SW	8	1	20											
SW	8	2	20											
SW	8	3	30											
SW	8	4	20					1						
SW	8	5	30											
SW	8	6	20											
SW	8	7	30											
SW	9	1	30											
SW	9	2	30											
SW	9	3	30											
SW	9	4	20					1						
SW	9	5	40											
SW	9	6	30											
SW	9	7	30		1									
SW	10	1	30											
SW	10	2	40											
SW	10	3	40											
SW	10	4	30											
SW	10	5	30											
SW	10	6	20				1							
SW	10	7	30					1						
SW	11	1	60		1		1							
SW	11	2	40											
SW	11	3	40											
SW	11	4	30											
SW	11	5	40				1							
SW	11	6	30				1							
SW	11	7	40											
SW	12	1	20						1					
SW	12	2	40											
SW	12	3	20											
SW	12	4	20				1							
SW	12	5	30											
SW	12	6	40											
SW	12	7	30											
NE	1	1	20											
NE	1	2	30											

		August 30 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	10	1			2								
SW	7	3	20	2											
SW	7	4	30	1			1		6						
SW	7	5	20			2									
SW	7	6	40				2								
SW	7	7	20			2	3								
SW	8	1	20	2		1									
SW	8	2	20	3					1						
SW	8	3	30	1	1	3	11		1						
SW	8	4	20												
SW	8	5	30				1			1					
SW	8	6	20	11		3	1			3					
SW	8	7	30	4											
SW	9	1	30			1				2					
SW	9	2	30												
SW	9	3	30	7	1	5	1		3						
SW	9	4	20	7	1	4	1								
SW	9	5	40	2		3	2		1						
SW	9	6	30	3		5									
SW	9	7	30	3	1	1	1								
SW	10	1	30												
SW	10	2	40	4											
SW	10	3	40	8			1			1					
SW	10	4	30			4			5						
SW	10	5	30	4		2									
SW	10	6	20	2		11									
SW	10	7	30				1								
SW	11	1	60	7		3									
SW	11	2	40	13		3			1						
SW	11	3	40	5		2			3						
SW	11	4	30	19		7	1		2						
SW	11	5	40	12	1	5			2					1	
SW	11	6	30	10	2	3			5	1					
SW	11	7	40	19	1	2	3								
SW	12	1	20	3											
SW	12	2	40	3			1								
SW	12	3	20							2					
SW	12	4	20	3					3						
SW	12	5	30	5		2			1						
SW	12	6	40	1						1					
SW	12	7	30	3		2	1		1						
NE	1	1	20			1									
NE	1	2	30		1	2									

		August 30 1999												
Block	Plot	Subpl	Cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	40											
SW	1	2	20											
SW	1	3	20											
SW	1	4	20											
SW	1	5	40											
SW	1	6	10											
SW	1	7	30											
SW	2	1	40											
SW	2	2	50				2						1	
SW	2	3	20											
SW	2	4	30					1						
SW	2	5	50											
SW	2	6	60											
SW	2	7	50				1							
SW	3	1	30											
SW	3	2	40											
SW	3	3	30											
SW	3	4	40											
SW	3	5	30											
SW	3	6	40											
SW	3	7	30											1
SW	4	1	30				1							
SW	4	2	40											
SW	4	3	30											
SW	4	4	30											
SW	4	5	20											
SW	4	6	30											
SW	4	7	20											
SW	5	1	30											
SW	5	2	20											
SW	5	3	20											
SW	5	4	30											
SW	5	5	30											
SW	5	6	40											
SW	5	7	30				1							
SW	6	1	30											
SW	6	2	20											
SW	6	3	10											
SW	6	4	20											
SW	6	5	10											
SW	6	6	30											
SW	6	7	20				1							
SW	7	1	30											

		August 30 1999													
Block	Plot	Subpl	Cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	40			6									
SW	1	2	20			4									
SW	1	3	20	8	4	4									
SW	1	4	20			1	1								
SW	1	5	40	1		1									
SW	1	6	10	13			1								
SW	1	7	30			1	3								
SW	2	1	40	7	5	5	4			2					1
SW	2	2	50	7	1	6									
SW	2	3	20	3	1	2									
SW	2	4	30	7	1	4	3		3						
SW	2	5	50			1			1						
SW	2	6	60	4	1	2	1		3						
SW	2	7	50	28	7	13	4	1	8						1
SW	3	1	30			4									1
SW	3	2	40				2		1						
SW	3	3	30	9		2									
SW	3	4	40		1	4	1	2							
SW	3	5	30	56											
SW	3	6	40	1											
SW	3	7	30		1	2	3								
SW	4	1	30	9		7									
SW	4	2	40	5		2									
SW	4	3	30	1		1									
SW	4	4	30	11		1									
SW	4	5	20	1											
SW	4	6	30	4			1								
SW	4	7	20	4		1									
SW	5	1	30	2	12	3									
SW	5	2	20				1			1					
SW	5	3	20	16		7	3			1					
SW	5	4	30	1		3									
SW	5	5	30	1						6					
SW	5	6	40	2		2	1		2						
SW	5	7	30	5		1			2						
SW	6	1	30	5	1										
SW	6	2	20			2									1
SW	6	3	10												
SW	6	4	20	1		1									
SW	6	5	10	1											
SW	6	6	30	3											
SW	6	7	20			2	1		1						
SW	7	1	30	1		2									1

	August 16 1999													
block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	30											
NE	7	5	30											
NE	7	6	40											
NE	7	7	50		1									1
NE	8	1	30											
NE	8	2	20											
NE	8	3	20											
NE	8	4	50											
NE	8	5	40											
NE	8	6	40											
NE	8	7	20											
NE	9	1	20											1
NE	9	2	40											
NE	9	3	40											
NE	9	4	40								2			
NE	9	5	40											
NE	9	6	50								1			
NE	9	7	60											
NE	10	1	30				1							
NE	10	2	60											
NE	10	3	30											
NE	10	4	30											
NE	10	5	50											
NE	10	6	50				1							
NE	10	7	40											
NE	11	1	40											
NE	11	2	30											
NE	11	3	50											
NE	11	4	50				1	4						
NE	11	5	40											
NE	11	6	30											
NE	11	7	40											
NE	12	1	30											
NE	12	2	30											
NE	12	3	30											
NE	12	4	30											
NE	12	5	30											
NE	12	6	30											
NE	12	7	30											1

	August 16 1999													
block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	30											
NE	1	4	40											
NE	1	5	30											
NE	1	6	40											
NE	1	7	20											
NE	2	1	40											
NE	2	2	40						1					
NE	2	3	30											
NE	2	4	30		1						1			
NE	2	5	30											
NE	2	6	30											
NE	2	7	20											
NE	3	1	20											
NE	3	2	40											
NE	3	3	20											
NE	3	4	40											
NE	3	5	40											
NE	3	6	30											
NE	3	7	40											
NE	4	1	20											
NE	4	2	20											
NE	4	3	70											
NE	4	4	20											
NE	4	5	30											
NE	4	6	20				1							
NE	4	7	20											
NE	5	1	20					1						
NE	5	2	20				2							
NE	5	3	30				1							
NE	5	4	30											
NE	5	5	10											
NE	5	6	10											
NE	5	7	30					1						
NE	6	1	20											
NE	6	2	60											
NE	6	3	50											
NE	6	4	40											
NE	6	5	50											
NE	6	6	30											
NE	6	7	20											
NE	7	1	20		1									
NE	7	2	30											
NE	7	3	40											

	August 16 1999													
block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	30											
SW	7	3	30											
SW	7	4	50											
SW	7	5	30											
SW	7	6	40											
SW	7	7	30											
SW	8	1	30											
SW	8	2	40											
SW	8	3	50											
SW	8	4	40					1						
SW	8	5	50											
SW	8	6	40											
SW	8	7	50											
SW	9	1	40											
SW	9	2	50											
SW	9	3	40											
SW	9	4	30											
SW	9	5	40											
SW	9	6	30											
SW	9	7	40		1									
SW	10	1	30											
SW	10	2	50											
SW	10	3	50											
SW	10	4	40											
SW	10	5	40											
SW	10	6	30				1							
SW	10	7	30											
SW	11	1	60											
SW	11	2	40		1		1							
SW	11	3	40											
SW	11	4	40											
SW	11	5	50				2							
SW	11	6	40				2							
SW	11	7	50											
SW	12	1	30											
SW	12	2	40											
SW	12	3	30											
SW	12	4	40				1							
SW	12	5	50											
SW	12	6	50											
SW	12	7	40											
NE	1	1	20											
NE	1	2	30											

	August 16 1999													
block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	40											
SW	1	2	20											
SW	1	3	30											
SW	1	4	30											
SW	1	5	40											
SW	1	6	20											
SW	1	7	30											
SW	2	1	30											
SW	2	2	50				2						1	
SW	2	3	30											
SW	2	4	30					1			1			
SW	2	5	60											
SW	2	6	50											
SW	2	7	50				1	1	1					
SW	3	1	30											
SW	3	2	40											
SW	3	3	30						1					
SW	3	4	40											
SW	3	5	50											
SW	3	6	60											
SW	3	7	30											
SW	4	1	40											
SW	4	2	50											
SW	4	3	40											
SW	4	4	40											
SW	4	5	30											
SW	4	6	30											
SW	4	7	40											
SW	5	1	50											
SW	5	2	40											
SW	5	3	40											
SW	5	4	40											
SW	5	5	40											
SW	5	6	50											
SW	5	7	40											
SW	6	1	30											
SW	6	2	20											
SW	6	3	10											
SW	6	4	20											
SW	6	5	10											
SW	6	6	30											
SW	6	7	20											
SW	7	1	30											

	August 16 1999														
block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	30												
NE	7	5	30	4	2	5									
NE	7	6	40						1						
NE	7	7	50	3	1	1		2							
NE	8	1	30			1	1								
NE	8	2	20	1											
NE	8	3	20											1	
NE	8	4	50	2	1	1									
NE	8	5	40	1											
NE	8	6	40			2				1					
NE	8	7	20				1								
NE	9	1	20	15		5			1						
NE	9	2	40	9		2	1								
NE	9	3	40	2				1							
NE	9	4	40	3											
NE	9	5	40	1											
NE	9	6	50	1											
NE	9	7	60	3											
NE	10	1	30	2	1	2	3		1						
NE	10	2	60	3			1								
NE	10	3	30	2		1									
NE	10	4	30	5	1	2	2								
NE	10	5	50	5	1	3	1		1						
NE	10	6	50	10		3									
NE	10	7	40	1											1
NE	11	1	40	9		3			2						
NE	11	2	30	2											
NE	11	3	50												
NE	11	4	50	15		3	2								
NE	11	5	40												
NE	11	6	30	5			1								
NE	11	7	40												
NE	12	1	30												
NE	12	2	30						9						
NE	12	3	30				1	1							
NE	12	4	30				2								
NE	12	5	30				1		1						
NE	12	6	30	8	3		10		1					1	
NE	12	7	30			1									

	August 16 1999														
block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	30												
NE	1	4	40	1		1									
NE	1	5	30				1		2						
NE	1	6	40				1								
NE	1	7	20	2		1	1							1	
NE	2	1	40	1		2									
NE	2	2	40			3									
NE	2	3	30			4			1						
NE	2	4	30	3		1	1		1						
NE	2	5	30	1											
NE	2	6	30						1						
NE	2	7	20	9											
NE	3	1	20												
NE	3	2	40	5		1	1								
NE	3	3	20	1		1									
NE	3	4	40	4	1	3	2								1
NE	3	5	40				1								
NE	3	6	30	3		3									
NE	3	7	40	2			2								
NE	4	1	20	15	1	1									
NE	4	2	20	8		1									
NE	4	3	70	5	3	2	1								
NE	4	4	20	2		2	1		1						
NE	4	5	30	2					2						
NE	4	6	20	9											
NE	4	7	20	3											
NE	5	1	20				3		1					1	
NE	5	2	20	1		6									
NE	5	3	30												
NE	5	4	30	1		7									
NE	5	5	10												
NE	5	6	10												
NE	5	7	30		1										
NE	6	1	20	12		4	5								
NE	6	2	60	3			2								
NE	6	3	50	7	3	1	5								
NE	6	4	40	3		2	1								
NE	6	5	50			3	1								
NE	6	6	30	1		1									
NE	6	7	20	1			1		2						
NE	7	1	20			3								1	
NE	7	2	30	2		6	1								
NE	7	3	40			1									1

	August 16 1999														
block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	30	1			2								
SW	7	3	30	2											
SW	7	4	50	2			3		9						
SW	7	5	30			2			1						
SW	7	6	40				2								
SW	7	7	30		1	1	3		1						
SW	8	1	30	2		1									
SW	8	2	40	3											
SW	8	3	50	1	1	3	11								
SW	8	4	40												
SW	8	5	50	11			1								
SW	8	6	40	4		3	1			4					
SW	8	7	50												
SW	9	1	40			1				3					
SW	9	2	50												
SW	9	3	40	7	1	5	1		3						
SW	9	4	30	7	2	4	1								
SW	9	5	40	2		1									
SW	9	6	30	2		7	1								
SW	9	7	40	3	1	1	1								
SW	10	1	30												
SW	10	2	50	3		1									
SW	10	3	50	9											
SW	10	4	40			4			8						
SW	10	5	40	6		2									
SW	10	6	30	2	1	17	1								
SW	10	7	30							1					
SW	11	1	60	8		2									
SW	11	2	40	14	1	2			1					2	
SW	11	3	40	4		3	1		2						
SW	11	4	40	23		5	1		1						
SW	11	5	50	12		3		2	1					1	1
SW	11	6	40	12	2	2	1		4	1					1
SW	11	7	50	21	1	3	4	1	1					1	
SW	12	1	30	4											
SW	12	2	40	3											
SW	12	3	30							1					
SW	12	4	40	3		1	1		2						
SW	12	5	50	4		1			2						
SW	12	6	50			1				1					
SW	12	7	40	4		1	1		1						
NE	1	1	20			1									
NE	1	2	30		1	2									

	August 16 1999														
block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	40			9		2							
SW	1	2	20			5									
SW	1	3	30	8	4	2									
SW	1	4	30			1				1					
SW	1	5	40	1		1	1								
SW	1	6	20	9										1	
SW	1	7	30			1	2								
SW	2	1	30	12	5	5	3		3						1
SW	2	2	50	5	2	7			2						
SW	2	3	30	2	2	2	1		1						
SW	2	4	30	5	2	4	5		3						
SW	2	5	60			1			1						
SW	2	6	50	3	1	2			4						1
SW	2	7	50	30	8	8	3		6						1
SW	3	1	30			4		2							1
SW	3	2	40				3		1						
SW	3	3	30	11		2									
SW	3	4	40		1	5	1	3							
SW	3	5	50	61											
SW	3	6	60	1											
SW	3	7	30		2	1	2								
SW	4	1	40	6	1	6								1	
SW	4	2	50	5		2									
SW	4	3	40	2		1	1							1	
SW	4	4	40	6		5								1	
SW	4	5	30												
SW	4	6	30	5	1	1									
SW	4	7	40	3		1									
SW	5	1	50	2	10	2									
SW	5	2	40							2					
SW	5	3	40	18		6	3			1					
SW	5	4	40	1		3									
SW	5	5	40	2						7					
SW	5	6	50	2		3	1								
SW	5	7	40	4		1			4						
SW	6	1	30	9	1										
SW	6	2	20	1		1									1
SW	6	3	10							1					
SW	6	4	20	1		1		7							
SW	6	5	10												
SW	6	6	30	1					1						
SW	6	7	20						1						
SW	7	1	30			2									

		August 04 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	50											
NE	7	5	50											
NE	7	6	40											
NE	7	7	60		1									1
NE	8	1	40											
NE	8	2	30											
NE	8	3	30											
NE	8	4	60											
NE	8	5	60											
NE	8	6	50											
NE	8	7	30											
NE	9	1	30											
NE	9	2	50											
NE	9	3	40								2			
NE	9	4	50											
NE	9	5	50								1			
NE	9	6	60											
NE	9	7	60				1							
NE	10	1	30				1							
NE	10	2	50				1							
NE	10	3	30											
NE	10	4	30											
NE	10	5	60											
NE	10	6	50											
NE	10	7	40											
NE	11	1	40											
NE	11	2	50											
NE	11	3	50											
NE	11	4	50				1	4						
NE	11	5	40											
NE	11	6	40											
NE	11	7	50											
NE	12	1	30											
NE	12	2	30											
NE	12	3	30											
NE	12	4	40											
NE	12	5	30											
NE	12	6	50											
NE	12	7	30											

		August 04 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	50												
NE	7	5	50	3	2	7									
NE	7	6	40	3											
NE	7	7	60		1	1	1	2							
NE	8	1	40			1									
NE	8	2	30	1											
NE	8	3	30											1	
NE	8	4	60	2	1	1									
NE	8	5	60	1											
NE	8	6	50			2				1					
NE	8	7	30				1								
NE	9	1	30	13		5			1						
NE	9	2	50	9		1	1								
NE	9	3	40	2											
NE	9	4	50	3											
NE	9	5	50												
NE	9	6	60	1											
NE	9	7	60	2											
NE	10	1	30	2	1	2									
NE	10	2	50	2		1	1								
NE	10	3	30	2			2								
NE	10	4	30	5	1	2	1		1	1					
NE	10	5	60	4		3	1								
NE	10	6	50	10		3	4								
NE	10	7	40	2											
NE	11	1	40	7					2						
NE	11	2	50	3											
NE	11	3	50												
NE	11	4	50	12		3	2								
NE	11	5	40												
NE	11	6	40	3	1										
NE	11	7	50	1											
NE	12	1	30												
NE	12	2	30						10						
NE	12	3	30				1								
NE	12	4	40				1								
NE	12	5	30				1		1						
NE	12	6	50	12	4		9		1					2	
NE	12	7	30			2									

		August 04 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	20											
NE	1	4	30				1							
NE	1	5	20											
NE	1	6	30											
NE	1	7	20											
NE	2	1	30											
NE	2	2	40	1					1					
NE	2	3	30											
NE	2	4	30				1				1			
NE	2	5	30											
NE	2	6	30					1						
NE	2	7	50											
NE	3	1	40											
NE	3	2	50											
NE	3	3	40											
NE	3	4	50											
NE	3	5	60											
NE	3	6	40											
NE	3	7	50											
NE	4	1	30											
NE	4	2	30											
NE	4	3	70											
NE	4	4	40											
NE	4	5	40											
NE	4	6	40				1							
NE	4	7	40											
NE	5	1	30					1						
NE	5	2	20				1							
NE	5	3	30				1							
NE	5	4	30											
NE	5	5	0											
NE	5	6	10											
NE	5	7	30					1						
NE	6	1	30											
NE	6	2	70											
NE	6	3	60											
NE	6	4	60											
NE	6	5	60											
NE	6	6	40											
NE	6	7	30											
NE	7	1	30											
NE	7	2	40											
NE	7	3	50											

		August 04 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	20												
NE	1	4	30	1		1									
NE	1	5	20				2		2						1
NE	1	6	30						1						
NE	1	7	20	1		2	1	1							
NE	2	1	30	1		1									
NE	2	2	40			3									
NE	2	3	30			5			1						
NE	2	4	30	9			1		1						
NE	2	5	30	1											
NE	2	6	30						1						
NE	2	7	50	10			1								
NE	3	1	40												
NE	3	2	50	4		1	2			1					
NE	3	3	40	1		1			1						
NE	3	4	50	3	1	2	2								
NE	3	5	60				1								
NE	3	6	40	3		1									
NE	3	7	50	2			1								
NE	4	1	30	15	1	3	1		1						
NE	4	2	30	7		1									
NE	4	3	70	5		2	4								
NE	4	4	40	2		2	1		1						
NE	4	5	40	2			1		1						
NE	4	6	40	10			1								
NE	4	7	40	2											
NE	5	1	30			1	3		1					1	
NE	5	2	20			6	1								
NE	5	3	30												
NE	5	4	30	1		7									1
NE	5	5	0												
NE	5	6	10												
NE	5	7	30		2		1								
NE	6	1	30	12		4	4								
NE	6	2	70	3			2								
NE	6	3	60	6	1	4	4								
NE	6	4	60	3		1	1			1					
NE	6	5	60			2	1								
NE	6	6	40	2		1									
NE	6	7	30	1			1		1						
NE	7	1	30			3			1						
NE	7	2	40	2		7			1						
NE	7	3	50			1									

		August 04 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	30											
SW	7	3	30											
SW	7	4	50											
SW	7	5	30											
SW	7	6	50											
SW	7	7	30											
SW	8	1	30											
SW	8	2	40											
SW	8	3	50											
SW	8	4	50					1						
SW	8	5	40											
SW	8	6	40											
SW	8	7	50											
SW	9	1	60											
SW	9	2	60											
SW	9	3	50											
SW	9	4	50					1						
SW	9	5	60											
SW	9	6	40											
SW	9	7	50											
SW	10	1	40											
SW	10	2	60											1
SW	10	3	50											
SW	10	4	50											
SW	10	5	40											
SW	10	6	30				1							
SW	10	7	40											
SW	11	1	70											
SW	11	2	50											
SW	11	3	50											
SW	11	4	60											
SW	11	5	50											
SW	11	6	60											
SW	11	7	60											
SW	12	1	30											
SW	12	2	50											
SW	12	3	40											
SW	12	4	40				1							
SW	12	5	60											
SW	12	6	60											
SW	12	7	50											
NE	1	1	20											
NE	1	2	20											

		August 04 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	30	1			2								
SW	7	3	30	1										1	
SW	7	4	50	2					6						
SW	7	5	30			2			1						
SW	7	6	50				1								
SW	7	7	30		1	2	2		1						
SW	8	1	30	1		2									
SW	8	2	40	3											
SW	8	3	50	1	1	2	10		1						
SW	8	4	50												
SW	8	5	40	13		1				1					
SW	8	6	40	4		3	1	1		3					
SW	8	7	50												
SW	9	1	60			1				2					
SW	9	2	60				1								
SW	9	3	50	7	1	4			2						
SW	9	4	50	6	1	4									
SW	9	5	60	1		1									
SW	9	6	40	2		4									
SW	9	7	50	3	1	2	1								
SW	10	1	40												
SW	10	2	60	6											1
SW	10	3	50	9		1									
SW	10	4	50			4			5						
SW	10	5	40	6		1									
SW	10	6	30	1		13									
SW	10	7	40				1								
SW	11	1	70	5		1									
SW	11	2	50	12	1	1			2						
SW	11	3	50	4		2	2		3						
SW	11	4	60	23		6	2		3						
SW	11	5	50	12		6	1		1					1	
SW	11	6	60												
SW	11	7	60	21	1	4	3		1						
SW	12	1	30	3											
SW	12	2	50	3											
SW	12	3	40							1					
SW	12	4	40	1					2						
SW	12	5	60	5		1			1						
SW	12	6	60	2		1				1					
SW	12	7	50	3		1	1		1						
NE	1	1	20			1									
NE	1	2	20		1	2									

		August 04 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	50											
SW	1	2	20											
SW	1	3	30											
SW	1	4	20											
SW	1	5	40											
SW	1	6	20											
SW	1	7	40											
SW	2	1	40		1							1		
SW	2	2	60				2						1	
SW	2	3	30											
SW	2	4	50					1						
SW	2	5	60											
SW	2	6	70											
SW	2	7	60				1					1		
SW	3	1	30											
SW	3	2	30											
SW	3	3	40						1					
SW	3	4	40											
SW	3	5	50											
SW	3	6	60											
SW	3	7	50				1							1
SW	4	1	40										1	
SW	4	2	50											
SW	4	3	50											
SW	4	4	40											
SW	4	5	40											
SW	4	6	30											
SW	4	7	50											
SW	5	1	50											
SW	5	2	50											
SW	5	3	40											
SW	5	4	40											
SW	5	5	40											
SW	5	6	60											
SW	5	7	40											
SW	6	1	30											
SW	6	2	20									1		
SW	6	3	20											
SW	6	4	20											
SW	6	5	10											
SW	6	6	30											
SW	6	7	20											
SW	7	1	40											

		August 04 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	50			6	1							2	
SW	1	2	20			4									
SW	1	3	30	8	4	1									
SW	1	4	20							1					
SW	1	5	40	1			1			1					
SW	1	6	20	12			1							1	
SW	1	7	40				1								
SW	2	1	40	9	5	7	2		1						
SW	2	2	60	7	2	7	1		3						
SW	2	3	30	4	1	1			1						
SW	2	4	50	6	2	4	3		4						
SW	2	5	60			1									
SW	2	6	70	2	1	2	1		3						
SW	2	7	60	27	6	8	3		8	1					
SW	3	1	30			4		2							1
SW	3	2	30				3		1						
SW	3	3	40	10		2									
SW	3	4	40		1	5	1	3							
SW	3	5	50	62											
SW	3	6	60	1											
SW	3	7	50		2	2	2								
SW	4	1	40	8	1	5									
SW	4	2	50	3		1									
SW	4	3	50	3		3			1					1	
SW	4	4	40	6		2									
SW	4	5	40												
SW	4	6	30	2		1									
SW	4	7	50	3		1									
SW	5	1	50	1	11	2									
SW	5	2	50						1	1					
SW	5	3	40	17		6	2			1					
SW	5	4	40	1		2									
SW	5	5	40	1			1			4					
SW	5	6	60	2		2			2	1					
SW	5	7	40	3		1									
SW	6	1	30	10	1				1						
SW	6	2	20	2		2									
SW	6	3	20												
SW	6	4	20	1		1	2	6		1					
SW	6	5	10	1											
SW	6	6	30	3											
SW	6	7	20	1					1	1					
SW	7	1	40			2									

		July 19 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	50											
NE	7	5	50											
NE	7	6	50											
NE	7	7	60											1
NE	8	1	40											
NE	8	2	30											
NE	8	3	30											
NE	8	4	50											
NE	8	5	50											
NE	8	6	40											
NE	8	7	40											
NE	9	1	30											1
NE	9	2	60					1						
NE	9	3	50											
NE	9	4	40								1			
NE	9	5	60											
NE	9	6	60								1			
NE	9	7	60											
NE	10	1	40				1							
NE	10	2	60											
NE	10	3	40											
NE	10	4	40											
NE	10	5	50											
NE	10	6	50											
NE	10	7	50											
NE	11	1	50											
NE	11	2	50											
NE	11	3	60											
NE	11	4	60				1	2						
NE	11	5	50											
NE	11	6	40											
NE	11	7	60											
NE	12	1	30											
NE	12	2	30											
NE	12	3	30											
NE	12	4	40											
NE	12	5	40											
NE	12	6	50											
NE	12	7	40											

		July 19 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	50												
NE	7	5	50	3	1	4									
NE	7	6	50												
NE	7	7	60	2	1			1	1						
NE	8	1	40			1	1								
NE	8	2	30	1											
NE	8	3	30				1							1	
NE	8	4	50	2		1	1								
NE	8	5	50	1											
NE	8	6	40				1								
NE	8	7	40												
NE	9	1	30	17		5									1
NE	9	2	60	5		1	1								
NE	9	3	50	6		1									
NE	9	4	40	2											
NE	9	5	60												
NE	9	6	60	1											
NE	9	7	60	4		1									
NE	10	1	40	1	1	1									
NE	10	2	60	2		2	1								
NE	10	3	40	2											
NE	10	4	40	3	1	2	2								
NE	10	5	50	4		4	2								
NE	10	6	50	8	1	4	3								
NE	10	7	50	2											1
NE	11	1	50	10		1			1						
NE	11	2	50	4											
NE	11	3	60												
NE	11	4	60	12		2									
NE	11	5	50												
NE	11	6	40	4	1					1				1	
NE	11	7	60	1											
NE	12	1	30												
NE	12	2	30						7						
NE	12	3	30				2								
NE	12	4	40				1								
NE	12	5	40						1						
NE	12	6	50	10	4		7	1	1					1	
NE	12	7	40			2									1

		July 19 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	40											
NE	1	4	50				1							
NE	1	5	40											
NE	1	6	50											
NE	1	7	10											
NE	2	1	50											
NE	2	2	40						1					
NE	2	3	50											
NE	2	4	40				1				1			
NE	2	5	40											
NE	2	6	50					1						
NE	2	7	50											
NE	3	1	40											
NE	3	2	50											
NE	3	3	40											
NE	3	4	60											
NE	3	5	50											
NE	3	6	50											
NE	3	7	50											
NE	4	1	40											
NE	4	2	30											
NE	4	3	60											
NE	4	4	50											
NE	4	5	50											
NE	4	6	50				1							
NE	4	7	50											
NE	5	1	10					1						
NE	5	2	30				2							
NE	5	3	30				1							
NE	5	4	30											
NE	5	5	10											
NE	5	6	10											
NE	5	7	30				1							
NE	6	1	30											
NE	6	2	70											
NE	6	3	50											
NE	6	4	50											
NE	6	5	50											
NE	6	6	40											
NE	6	7	30											
NE	7	1	40											
NE	7	2	50											
NE	7	3	60											

		July 19 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	40												
NE	1	4	50	1		1									
NE	1	5	40				1		2						1
NE	1	6	50				1								
NE	1	7	10	1		1	1								
NE	2	1	50	2		1								1	
NE	2	2	40			3									
NE	2	3	50			4									
NE	2	4	40	10			1	2	1						
NE	2	5	40						1						
NE	2	6	50												
NE	2	7	50	8			1								
NE	3	1	40												
NE	3	2	50	4											
NE	3	3	40	1		2									
NE	3	4	60	3	1	1	2								1
NE	3	5	50												
NE	3	6	50	2		1									
NE	3	7	50	1											
NE	4	1	40	12		2	1								
NE	4	2	30	6		1	1								
NE	4	3	60	5	1	2									
NE	4	4	50	3		1			1						
NE	4	5	50	2					1						
NE	4	6	50	8				1	1						
NE	4	7	50	2					1						
NE	5	1	10	1		2	1		1					1	
NE	5	2	30			7									
NE	5	3	30												
NE	5	4	30			5									
NE	5	5	10												
NE	5	6	10												
NE	5	7	30												
NE	6	1	30	14		3	3								
NE	6	2	70	1			1								
NE	6	3	50	6	3	1	1								
NE	6	4	50	3		2	2			1					
NE	6	5	50			2	1								
NE	6	6	40	1		1									
NE	6	7	30	1		1		1							
NE	7	1	40			3			1					1	
NE	7	2	50			5			1						
NE	7	3	60			1									1

		July 19 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	40											
SW	7	3	30											
SW	7	4	60											
SW	7	5	30		1									
SW	7	6	60											
SW	7	7	50											
SW	8	1	50											
SW	8	2	30											
SW	8	3	50											
SW	8	4	50					1						
SW	8	5	50											
SW	8	6	40											
SW	8	7	40											
SW	9	1	60											
SW	9	2	60											
SW	9	3	40											
SW	9	4	50					1						
SW	9	5	60											
SW	9	6	50											
SW	9	7	60											
SW	10	1	30											
SW	10	2	40		1									1
SW	10	3	50											
SW	10	4	60											
SW	10	5	50											
SW	10	6	30					1						
SW	10	7	40											
SW	11	1	60											
SW	11	2	40				1							
SW	11	3	50											
SW	11	4	40											
SW	11	5	40				2							
SW	11	6	30				1							
SW	11	7	60											
SW	12	1	30											
SW	12	2	50											
SW	12	3	40											
SW	12	4	40											
SW	12	5	50											
SW	12	6	50											
SW	12	7	50											
NE	1	1	10											
NE	1	2	30											

		July 19 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	40	1			3								
SW	7	3	30	2											
SW	7	4	60	2		1	2		3						
SW	7	5	30			2									
SW	7	6	60				1								
SW	7	7	50	1	1	4	2		1						
SW	8	1	50	1		2									
SW	8	2	30	3					1						
SW	8	3	50		1	2	9	1	1						
SW	8	4	50												
SW	8	5	50	14					1						
SW	8	6	40	6		3		1		2					
SW	8	7	40												
SW	9	1	60			1									
SW	9	2	60				1								
SW	9	3	40	9	1	2	2		1	1					
SW	9	4	50	7	3	2	1								
SW	9	5	60	3		1									
SW	9	6	50	2		1	1			1					
SW	9	7	60	1	1	2	1		1						
SW	10	1	30												
SW	10	2	40	4		2									1
SW	10	3	50	9											
SW	10	4	60	1		7			6						
SW	10	5	50	6	1	2									
SW	10	6	30			14	1								
SW	10	7	40												
SW	11	1	60	6						1					
SW	11	2	40	12	1	1			1					1	
SW	11	3	50	4		2	1			1					
SW	11	4	40	22		2	1		1						
SW	11	5	40	8			1		4					1	
SW	11	6	30	5	2	2	2		2						
SW	11	7	60	16	1	3	2	1	1					1	
SW	12	1	30	4											
SW	12	2	50	3											
SW	12	3	40							1					
SW	12	4	40	2			1		2						
SW	12	5	50	3			1		1						
SW	12	6	50	2						1					
SW	12	7	50	5		2	1		1						
NE	1	1	10		1										
NE	1	2	30		1	2									

		July 19 1999												
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	60											
SW	1	2	20											
SW	1	3	40											
SW	1	4	30											
SW	1	5	50											
SW	1	6	30				1							
SW	1	7	50											
SW	2	1	50											
SW	2	2	50				2						1	
SW	2	3	40											
SW	2	4	40					1						
SW	2	5	60											
SW	2	6	70											
SW	2	7	40				1		1				1	
SW	3	1	30	1										
SW	3	2	40											
SW	3	3	40						1					
SW	3	4	50											
SW	3	5	60											
SW	3	6	50											
SW	3	7	30											1
SW	4	1	40											
SW	4	2	50											
SW	4	3	50											
SW	4	4	40											
SW	4	5	20											
SW	4	6	30											
SW	4	7	50											
SW	5	1	50											
SW	5	2	30											
SW	5	3	50											
SW	5	4	40											
SW	5	5	40											
SW	5	6	60											
SW	5	7	50				1							
SW	6	1	40											
SW	6	2	20											
SW	6	3	30											
SW	6	4	20											
SW	6	5	10											
SW	6	6	20											
SW	6	7	20											
SW	7	1	30											

		July 19 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	60			9	1	2						2	
SW	1	2	20			4									
SW	1	3	40	7	2	1		1							
SW	1	4	30							2					
SW	1	5	50	1			1			1					
SW	1	6	30	10				1						1	
SW	1	7	50		1	1	1								
SW	2	1	50	11	6	7	3		3						
SW	2	2	50	6	1	7	1	1	1						
SW	2	3	40	2	1	2			1						
SW	2	4	40	3	1	4	2		2						
SW	2	5	60			1			1						
SW	2	6	70	2	1	2			3						
SW	2	7	40	24	6	12	4		8						
SW	3	1	30			4		2							
SW	3	2	40				1		1	1					
SW	3	3	40	10		1									
SW	3	4	50		1	4	1	2							
SW	3	5	60	60			1	1							
SW	3	6	50	1											
SW	3	7	30		2	2	1		1						
SW	4	1	40	9		4								1	
SW	4	2	50	5		1									
SW	4	3	50	3	1	1				1				2	
SW	4	4	40	10		1									
SW	4	5	20												
SW	4	6	30	6		1	1								
SW	4	7	50	2		1									
SW	5	1	50	2	10	2									
SW	5	2	30				1		2	1					
SW	5	3	50	16	1	9	1			1				1	
SW	5	4	40	1		1	1								
SW	5	5	40	2		1				5					
SW	5	6	60	2		2			1	1					
SW	5	7	50	4		1		1							
SW	6	1	40	9	1				1						
SW	6	2	20	1		3									
SW	6	3	30												
SW	6	4	20			7		4		1					
SW	6	5	10												
SW	6	6	20	1											
SW	6	7	20						1	1					
SW	7	1	30			2									

					June 28 1999									
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4	50											
NE	7	5	40											
NE	7	6	50											
NE	7	7	60											1
NE	8	1	60											
NE	8	2	50											
NE	8	3	50											
NE	8	4	60											
NE	8	5	50											
NE	8	6	50											
NE	8	7	40											
NE	9	1	40											1
NE	9	2	60											
NE	9	3	50											
NE	9	4	50								2			
NE	9	5	50											
NE	9	6	60											
NE	9	7	50											
NE	10	1	40											
NE	10	2	60											
NE	10	3	40											
NE	10	4	40											
NE	10	5	50											
NE	10	6	50				1							
NE	10	7	50											
NE	11	1	50											
NE	11	2	70											
NE	11	3	60											
NE	11	4	70				1	4						
NE	11	5	50											
NE	11	6	50											
NE	11	7	60											
NE	12	1	30											
NE	12	2	40											
NE	12	3	40					1						
NE	12	4	50											
NE	12	5	50		1									
NE	12	6	50						1					
NE	12	7	40											1

		June 28 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	50												
NE	7	5	40	3	2	5									
NE	7	6	50												
NE	7	7	60	3	1	1		1							
NE	8	1	60				1								
NE	8	2	50	2											
NE	8	3	50				2							1	
NE	8	4	60	2		1									
NE	8	5	50	1											
NE	8	6	50			2	1			1					
NE	8	7	40												
NE	9	1	40	15		4			1						
NE	9	2	60	8											
NE	9	3	50	4		1								1	
NE	9	4	50	3											
NE	9	5	50												
NE	9	6	60	1											
NE	9	7	50	5		1									
NE	10	1	40	2	1	2									
NE	10	2	60	2		2									
NE	10	3	40	2		1									
NE	10	4	40	2	1	1	2								
NE	10	5	50	2		2									
NE	10	6	50	8	1	4	3	1							
NE	10	7	50	1											1
NE	11	1	50	10				1					1		
NE	11	2	70	2											
NE	11	3	60												
NE	11	4	70	10		3	1						1		
NE	11	5	50												
NE	11	6	50	4			2							1	
NE	11	7	60	1											
NE	12	1	30												
NE	12	2	40					9							
NE	12	3	40				1								
NE	12	4	50												
NE	12	5	50												
NE	12	6	50	7	5			8						1	
NE	12	7	40			1									1

					June 28 1999									
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3	30											
NE	1	4	50				2							
NE	1	5	50											
NE	1	6	60											
NE	1	7	30									2		
NE	2	1	50											
NE	2	2	60				1		1					
NE	2	3	50											
NE	2	4	50				1							
NE	2	5	40											
NE	2	6	50											
NE	2	7	50											
NE	3	1	50											
NE	3	2	50											
NE	3	3	40											
NE	3	4	60											
NE	3	5	50											
NE	3	6	50											
NE	3	7	50											
NE	4	1	50											
NE	4	2	40											
NE	4	3	70											
NE	4	4	50											
NE	4	5	60											
NE	4	6	60											
NE	4	7	50											
NE	5	1	20					1						
NE	5	2	20				2							
NE	5	3	50				1							
NE	5	4	40											
NE	5	5	30											
NE	5	6	10											
NE	5	7	30					1						
NE	6	1	50											
NE	6	2	70											
NE	6	3	60								1			
NE	6	4	60											
NE	6	5	60											
NE	6	6	50											
NE	6	7	50						1					
NE	7	1	40											
NE	7	2	50											
NE	7	3	50											

		June 28 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	30												
NE	1	4	50			1									
NE	1	5	50				4		2						
NE	1	6	60				1								
NE	1	7	30	2		3	3							1	
NE	2	1	50	2		1								1	
NE	2	2	60			3				2					
NE	2	3	50			2		2	1	2					
NE	2	4	50	5			1		1						
NE	2	5	40												
NE	2	6	50												
NE	2	7	50	8			1								
NE	3	1	50												
NE	3	2	50	5	1					1					
NE	3	3	40	1		1									
NE	3	4	60	4		1	1								
NE	3	5	50												
NE	3	6	50	1		1	1								
NE	3	7	50												
NE	4	1	50	16	1		1								
NE	4	2	40	8		1	1								
NE	4	3	70	5	1	3	1		2						1
NE	4	4	50	1		1			1						
NE	4	5	60	2			1		1						
NE	4	6	60	7			1								
NE	4	7	50	4		1			1						
NE	5	1	20			1	3	2	1					1	
NE	5	2	20			5									
NE	5	3	50												
NE	5	4	40			7									
NE	5	5	30												
NE	5	6	10												
NE	5	7	30		1										
NE	6	1	50	14		2	1								
NE	6	2	70	1			1								
NE	6	3	60	5	3	3	2								
NE	6	4	60	4		2	1								
NE	6	5	60		1	2	1								
NE	6	6	50	2		1	2		1						
NE	6	7	50				2		2						
NE	7	1	40			3				1					
NE	7	2	50	2		7				1					
NE	7	3	50			1									

					June 28 1999									
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2	50											
SW	7	3	50											
SW	7	4	60											
SW	7	5	50											
SW	7	6	50											
SW	7	7	40											
SW	8	1	40											
SW	8	2	40											
SW	8	3	50											
SW	8	4	50					1						
SW	8	5	60											
SW	8	6	40											
SW	8	7	40											
SW	9	1	50											
SW	9	2	70											
SW	9	3	40										1	
SW	9	4	50					1	1					
SW	9	5	60											
SW	9	6	30											
SW	9	7	50		1		1							
SW	10	1	30											
SW	10	2	60											1
SW	10	3	40				1							
SW	10	4	50							1				
SW	10	5	50						1	1				
SW	10	6	40				1							
SW	10	7	40											
SW	11	1	60											
SW	11	2	40											
SW	11	3	50											
SW	11	4	50							1				
SW	11	5	50				2							
SW	11	6	40				2							
SW	11	7	60											
SW	12	1	30						1					
SW	12	2	40											
SW	12	3	50											
SW	12	4	40				1							
SW	12	5	60									1		
SW	12	6	50											
SW	12	7	50											
NE	1	1	30											
NE	1	2	40											

		June 28 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	50	2			3								
SW	7	3	50	1										1	
SW	7	4	60	2		1			6						
SW	7	5	50			2									
SW	7	6	50				1								
SW	7	7	40		1	4	2		1						
SW	8	1	40	1		1				1					
SW	8	2	40	2					2						
SW	8	3	50	1	1	1	9			1					
SW	8	4	50												
SW	8	5	60	11			1		1						
SW	8	6	40	7		2	1	1							
SW	8	7	40												
SW	9	1	50			1									
SW	9	2	70				1								
SW	9	3	40	5		2	1		1	1				1	
SW	9	4	50	6		3	1								
SW	9	5	60	2		1	1								
SW	9	6	30	1		3									
SW	9	7	50	2	1	2									
SW	10	1	30				2								
SW	10	2	60	3		1		1							1
SW	10	3	40	7			1								
SW	10	4	50			4	1		6	1					
SW	10	5	50	5		2									
SW	10	6	40	1		18		1							
SW	10	7	40												
SW	11	1	60	6		1	1								
SW	11	2	40	11	1	2			2					1	
SW	11	3	50	5		1	1	1	2						
SW	11	4	50	23		4									
SW	11	5	50	9		4	1	4	2						
SW	11	6	40	12	2	3	3		4						
SW	11	7	60	17	1		1			1					
SW	12	1	30	5											
SW	12	2	40	2											
SW	12	3	50												
SW	12	4	40	4					1						
SW	12	5	60	7	1	3		1	1						
SW	12	6	50							1					
SW	12	7	50	4		1	1								
NE	1	1	30		1										
NE	1	2	40			1				1					

					June 28 1999									
Block	Plot	Subpl	cover	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1	60											
SW	1	2	40											
SW	1	3	50											
SW	1	4	30											
SW	1	5	70											
SW	1	6	50											
SW	1	7	70											
SW	2	1	50		1		1							
SW	2	2	60				2						1	
SW	2	3	20											
SW	2	4	50											
SW	2	5	70											
SW	2	6	70		1									
SW	2	7	60				1							
SW	3	1	50											
SW	3	2	50											
SW	3	3	50						1					
SW	3	4	60											
SW	3	5	70											
SW	3	6	60											
SW	3	7	30							3				1
SW	4	1	50										1	
SW	4	2	60											
SW	4	3	60											
SW	4	4	50											
SW	4	5	40											
SW	4	6	50											
SW	4	7	60											
SW	5	1	60											
SW	5	2	40											
SW	5	3	60											
SW	5	4	30											
SW	5	5	40											
SW	5	6	50											
SW	5	7	50				1							
SW	6	1	60											
SW	6	2	10											
SW	6	3	30											
SW	6	4	10											
SW	6	5	10											
SW	6	6	30											
SW	6	7	40											
SW	7	1	50											

		June 28 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	60			6	1	2						2	
SW	1	2	40			2				1					
SW	1	3	50	8	2	1	1	2							
SW	1	4	30	1											
SW	1	5	70	1			1								
SW	1	6	50	10				1						1	
SW	1	7	70			1									
SW	2	1	50	10	3	6	3		2						
SW	2	2	60	8	1	8	3		2				2		
SW	2	3	20	2	1	2	1								
SW	2	4	50	6		6	2		3						
SW	2	5	70	1		1									
SW	2	6	70	1	2	2	1		3						
SW	2	7	60	35	5	11	2	1	6						1
SW	3	1	50			3		3							1
SW	3	2	50				1		1						
SW	3	3	50	10		1									
SW	3	4	60		1	5	1	3							
SW	3	5	70	57											
SW	3	6	60												
SW	3	7	30		1	2	2	2	1						
SW	4	1	50	8	1	3				1				1	
SW	4	2	60	5		1		1							
SW	4	3	60	2		1								2	
SW	4	4	50	10	1	1								1	
SW	4	5	40	1											
SW	4	6	50	3	1	1									
SW	4	7	60	3		1									
SW	5	1	60	1	9					1					
SW	5	2	40						3						
SW	5	3	60	19		7				3					
SW	5	4	30			3									
SW	5	5	40	1		1	3								
SW	5	6	50	2			1		1	2					
SW	5	7	50	4		1			1						
SW	6	1	60	6			2		1						
SW	6	2	10	2		3									
SW	6	3	30												
SW	6	4	10	1			6	9	1	1					
SW	6	5	10				1								
SW	6	6	30	1			2		1				1		
SW	6	7	40	1			1		1	1					
SW	7	1	50			1									

		June 14 1999											
Block	Plot	Subpl	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4											
NE	7	5											
NE	7	6											
NE	7	7											1
NE	8	1											
NE	8	2											1
NE	8	3											
NE	8	4											
NE	8	5											
NE	8	6											
NE	8	7											
NE	9	1											1
NE	9	2											
NE	9	3											
NE	9	4											
NE	9	5											
NE	9	6								1			
NE	9	7										1	
NE	10	1				1							
NE	10	2											
NE	10	3											
NE	10	4											
NE	10	5											
NE	10	6											
NE	10	7											
NE	11	1											
NE	11	2											
NE	11	3											
NE	11	4				1	3						
NE	11	5											
NE	11	6											
NE	11	7											
NE	12	1											
NE	12	2											
NE	12	3					1						
NE	12	4											
NE	12	5		1									
NE	12	6						1					
NE	12	7											1

		June 14 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	7	4	60												
NE	7	5	50	2	1	5									
NE	7	6	40												
NE	7	7	60	3	1			1		1					
NE	8	1	60			2									
NE	8	2	50	1											
NE	8	3	50			1	2							1	
NE	8	4	60	2		1									
NE	8	5	60	1										1	
NE	8	6	40												
NE	8	7	20					2							
NE	9	1	30	10		1		1	1						
NE	9	2	70	5											
NE	9	3	50	6									1	1	
NE	9	4	50	3											
NE	9	5	60												
NE	9	6	70												
NE	9	7	50	4		1							1		
NE	10	1	50												
NE	10	2	60	1		1									
NE	10	3	50	1		2									
NE	10	4	50	3			1		1						
NE	10	5	50	3		1									
NE	10	6	40	6		3	1		1						
NE	10	7	50	1		1			1						1
NE	11	1	60	10											
NE	11	2	60	2											
NE	11	3	70												
NE	11	4	70	9		2							1		
NE	11	5	50												
NE	11	6	50	4									2	1	
NE	11	7	60												
NE	12	1	40												
NE	12	2	50					1	7						
NE	12	3	40			1	1	1		1					
NE	12	4	40					2							
NE	12	5	50												
NE	12	6	50	8	2	2	5		1					2	
NE	12	7	40	1		1									1

		June 14 1999											
Block	Plot	Subpl	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3											
NE	1	4											
NE	1	5											
NE	1	6											
NE	1	7									1		
NE	2	1											
NE	2	2				1		1					
NE	2	3		1									
NE	2	4				1				1			
NE	2	5											
NE	2	6											
NE	2	7											
NE	3	1											
NE	3	2											
NE	3	3											
NE	3	4											
NE	3	5											
NE	3	6											
NE	3	7											
NE	4	1											
NE	4	2											
NE	4	3		1									
NE	4	4											
NE	4	5											
NE	4	6				1							
NE	4	7											
NE	5	1					1						
NE	5	2				3							
NE	5	3				1			1				
NE	5	4											
NE	5	5											
NE	5	6											
NE	5	7					1						
NE	6	1											
NE	6	2											
NE	6	3											
NE	6	4											
NE	6	5											
NE	6	6											
NE	6	7											
NE	7	1											
NE	7	2											
NE	7	3											

		June 14 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
NE	1	3	40			2									
NE	1	4	50	1											
NE	1	5	50				2		1						
NE	1	6	60												
NE	1	7	30	2		1	1			1				1	
NE	2	1	50	2		2									
NE	2	2	50			2									
NE	2	3	50			2				1					
NE	2	4	40	5			1		1	3					
NE	2	5	30	1					1						
NE	2	6	50						1						
NE	2	7	50	5											
NE	3	1	50												
NE	3	2	50			1				1					
NE	3	3	60			1									
NE	3	4	70			1	1								
NE	3	5	60												
NE	3	6	50			1									
NE	3	7	50												
NE	4	1	50	14											
NE	4	2	30	5						1					
NE	4	3	70	5	1	2									
NE	4	4	50	4		1	1								
NE	4	5	60	2					1						
NE	4	6	60	7				1							
NE	4	7	50	3		1									
NE	5	1	20			1	1	1	1	1				1	
NE	5	2	30			5				4					
NE	5	3	40												
NE	5	4	30			7									
NE	5	5	10												
NE	5	6	10												
NE	5	7	30												
NE	6	1	40	11		4	1						2		
NE	6	2	70												
NE	6	3	60	5		4	1								
NE	6	4	60	4		2									
NE	6	5	70			2									
NE	6	6	40	1											
NE	6	7	40						1						
NE	7	1	30			1								1	
NE	7	2	50	2		7									
NE	7	3	60			1									

		June 14 1999											
Block	Plot	Subpl	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2											
SW	7	3											
SW	7	4											
SW	7	5											
SW	7	6											
SW	7	7		1									
SW	8	1											
SW	8	2											
SW	8	3											
SW	8	4											
SW	8	5											
SW	8	6											
SW	8	7											
SW	9	1											
SW	9	2											
SW	9	3										1	
SW	9	4		1				1					
SW	9	5											
SW	9	6											
SW	9	7				1							
SW	10	1											
SW	10	2											
SW	10	3											
SW	10	4											
SW	10	5											
SW	10	6				1							
SW	10	7											
SW	11	1											
SW	11	2		1									
SW	11	3											
SW	11	4											
SW	11	5				2							
SW	11	6				1							
SW	11	7											
SW	12	1											
SW	12	2											
SW	12	3											
SW	12	4											
SW	12	5											
SW	12	6											
SW	12	7											
NE	1	1											
NE	1	2											

		June 14 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	7	2	40	1			3								
SW	7	3	50												
SW	7	4	60						4						
SW	7	5	50			2									
SW	7	6	60			1									
SW	7	7	40			3									
SW	8	1	40	1		1				1					
SW	8	2	50												
SW	8	3	60	1		2	10								
SW	8	4	50												
SW	8	5	50	8					1						
SW	8	6	50	7		2	1								
SW	8	7	50												
SW	9	1	60												
SW	9	2	80												
SW	9	3	50	4	1	3	1		1					1	
SW	9	4	50	6		2									
SW	9	5	60	2		1									
SW	9	6	40	1		3									
SW	9	7	40	1											
SW	10	1	30				1								
SW	10	2	60	1		1									
SW	10	3	60	2											
SW	10	4	50			5			2	1					
SW	10	5	50	5											
SW	10	6	40			12				1					
SW	10	7	50												
SW	11	1	70	4		2									
SW	11	2	60	10		1									
SW	11	3	60	1		2		1							
SW	11	4	60	15		2									
SW	11	5	60	5		4		2	1						
SW	11	6	30	9		1	1		2						
SW	11	7	70	18				1	1						
SW	12	1	40	4											
SW	12	2	50	1											
SW	12	3	60												
SW	12	4	60					1	1						
SW	12	5	60	4					1						
SW	12	6	60	1											
SW	12	7	40	1											
NE	1	1	30							1					
NE	1	2	40							1					

		June 14 1999											
Block	Plot	Subpl	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1											
SW	1	2											
SW	1	3											
SW	1	4											
SW	1	5											
SW	1	6											
SW	1	7											
SW	2	1		1									
SW	2	2				2						1	
SW	2	3											
SW	2	4					1						
SW	2	5											
SW	2	6		1									
SW	2	7		1		1	1					1	
SW	3	1											
SW	3	2		1									
SW	3	3						1					
SW	3	4											
SW	3	5											
SW	3	6											
SW	3	7		1					6				
SW	4	1							1			1	
SW	4	2											
SW	4	3											
SW	4	4											
SW	4	5											
SW	4	6											
SW	4	7											
SW	5	1											
SW	5	2											
SW	5	3											
SW	5	4											
SW	5	5											
SW	5	6											
SW	5	7				1							
SW	6	1											
SW	6	2											
SW	6	3											
SW	6	4											
SW	6	5											
SW	6	6											
SW	6	7											
SW	7	1											

		June 14 1999													
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	ancy
SW	1	1	60			8		2						1	
SW	1	2	30			4									
SW	1	3	50	7	2	2		2							
SW	1	4	20												
SW	1	5	70	1											
SW	1	6	40	10										1	
SW	1	7	60			1									
SW	2	1	50	7	2	7			1						
SW	2	2	60	4	1	7			2				1		
SW	2	3	40	2	3	2			1						
SW	2	4	50	5	1	6	2		3						
SW	2	5	60			1									
SW	2	6	60	2	1	3	1		2						
SW	2	7	50	31	4	11	1	1	5						1
SW	3	1	50			5		4							1
SW	3	2	40			1	1								
SW	3	3	40	6		1									
SW	3	4	60		1	7	1	3							
SW	3	5	60	65						1					
SW	3	6	50	1											
SW	3	7	30		2	1		3		1					
SW	4	1	50	2		4								1	
SW	4	2	60	4										2	
SW	4	3	50	1		2		1							
SW	4	4	50	4										1	
SW	4	5	40												
SW	4	6	50	2											
SW	4	7	60	2		1									
SW	5	1	70	1	5	2									
SW	5	2	40	1				3							
SW	5	3	50	14		7									
SW	5	4	50			1				2					
SW	5	5	50	1						1					
SW	5	6	60						1						
SW	5	7	40	5					2						
SW	6	1	50	9											
SW	6	2	20			2									
SW	6	3	40												
SW	6	4	20			1		11		1					
SW	6	5	10			1									
SW	6	6	40										1		
SW	6	7	50						1	1					
SW	7	1	50			1									

	June 02 1999													
Block	Plot	Subpl	ancy	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	7	4												
NE	7	5												
NE	7	6												
NE	7	7			1									1
NE	8	1												
NE	8	2												
NE	8	3												
NE	8	4												
NE	8	5												
NE	8	6												
NE	8	7												
NE	9	1			1									1
NE	9	2												
NE	9	3												
NE	9	4									1			
NE	9	5												
NE	9	6									1			
NE	9	7												
NE	10	1					1							
NE	10	2												
NE	10	3												
NE	10	4												
NE	10	5												
NE	10	6								1				
NE	10	7												
NE	11	1												
NE	11	2												
NE	11	3												
NE	11	4			2		1	2						
NE	11	5												
NE	11	6												
NE	11	7												
NE	12	1												
NE	12	2												
NE	12	3												
NE	12	4												
NE	12	5												
NE	12	6						1						
NE	12	7												1

	June 02 1999														
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	
NE	7	4	60	0		0									
NE	7	5	40	3		2									
NE	7	6	50	0		0									
NE	7	7	70	1	1	0		1							
NE	8	1	60	0		1									
NE	8	2	40	1		0	1								
NE	8	3	40	0		0								1	
NE	8	4	80	2		1									
NE	8	5	70	1		0								1	
NE	8	6	50	0		0									
NE	8	7	30	0		0		2							
NE	9	1	20	10		1		1							
NE	9	2	70	3											
NE	9	3	50	2				1						1	
NE	9	4	50	2											
NE	9	5	80	0											
NE	9	6	70	1											
NE	9	7	60	4											
NE	10	1	60	1		2									
NE	10	2	60	1		1									
NE	10	3	40	1		0									
NE	10	4	30	2		1									
NE	10	5	60	3		2									
NE	10	6	50	7		2				1			1		
NE	10	7	50	0		0	1								
NE	11	1	50	6					2						
NE	11	2	60	1											
NE	11	3	60	0									1		
NE	11	4	60	9		1		2							
NE	11	5	50	0											
NE	11	6	60	1									1	1	
NE	11	7	70	0											
NE	12	1	20	0		0									
NE	12	2	30	0		0		1	4						
NE	12	3	50	0		1		1							
NE	12	4	50	0		0	1								
NE	12	5	50	1		0		1							
NE	12	6	40	5	1	2	3		1						
NE	12	7	40	0		1									

	June 02 1999													
Block	Plot	Subpl	ancy	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
NE	1	3												
NE	1	4												
NE	1	5			2									
NE	1	6												
NE	1	7												
NE	2	1												
NE	2	2							1					
NE	2	3												
NE	2	4					1							
NE	2	5												
NE	2	6			1									
NE	2	7												
NE	3	1												
NE	3	2												
NE	3	3												
NE	3	4												
NE	3	5												
NE	3	6												
NE	3	7												
NE	4	1												
NE	4	2												
NE	4	3			1									
NE	4	4												
NE	4	5												
NE	4	6												
NE	4	7												
NE	5	1			1									
NE	5	2					3							
NE	5	3					1							
NE	5	4												
NE	5	5												
NE	5	6												
NE	5	7												
NE	6	1												
NE	6	2												
NE	6	3												
NE	6	4												
NE	6	5												
NE	6	6												
NE	6	7												
NE	7	1			1									
NE	7	2												
NE	7	3												

	June 02 1999														
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	
NE	1	3	40	0		1									
NE	1	4	50	1		0									
NE	1	5	50	0		0									
NE	1	6	50	0		0									
NE	1	7	30	2		1								1	
NE	2	1	40	0		2									
NE	2	2	50	0		3									
NE	2	3	50	0		2							1		
NE	2	4	30	2		0			1						
NE	2	5	20	0		0									
NE	2	6	50	0		0									
NE	2	7	50	4		0									
NE	3	1	50	0		0									
NE	3	2	60	4		1									
NE	3	3	30	1		0									
NE	3	4	50	2		2									
NE	3	5	70	0		0									
NE	3	6	50	2		1									
NE	3	7	50	0		0									
NE	4	1	50	7		0									
NE	4	2	50	5		0									
NE	4	3	70	6		2									
NE	4	4	50	2		1									
NE	4	5	60	1		0			1						
NE	4	6	60	1		0									
NE	4	7	50	2		0									
NE	5	1	30			2		1						1	
NE	5	2	40			3									
NE	5	3	50			0									
NE	5	4	30			6									
NE	5	5	20			0									
NE	5	6	10			0									
NE	5	7	30			0									
NE	6	1	40	8		2									
NE	6	2	70	1		0									
NE	6	3	70	4	1	3									
NE	6	4	60	4		0									
NE	6	5	70	0		2									
NE	6	6	40	1		1									
NE	6	7	30	0		0			1						
NE	7	1	50	0		3								1	
NE	7	2	60	1		5	1								
NE	7	3	80	0		1									

	June 02 1999												
Block	Plot	Subpl	ancy	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	7	2												1
SW	7	3												
SW	7	4												
SW	7	5							1					
SW	7	6												
SW	7	7			1									
SW	8	1												
SW	8	2												
SW	8	3												
SW	8	4		1										
SW	8	5												
SW	8	6												
SW	8	7												
SW	9	1												
SW	9	2												
SW	9	3											1	
SW	9	4												
SW	9	5												
SW	9	6												
SW	9	7												
SW	10	1												
SW	10	2												
SW	10	3												
SW	10	4												
SW	10	5												
SW	10	6					1							
SW	10	7												
SW	11	1												
SW	11	2			1			1						
SW	11	3												
SW	11	4												
SW	11	5					2							
SW	11	6					1							
SW	11	7												
SW	12	1												
SW	12	2												
SW	12	3												
SW	12	4	1											
SW	12	5												
SW	12	6												
SW	12	7												
NE	1	1												
NE	1	2												

	June 02 1999														
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	
SW	7	2	40	1		0									
SW	7	3	50	1		0								1	
SW	7	4	70	0		0			4						
SW	7	5	60	0		2									
SW	7	6	70	0		0		1							
SW	7	7	40	0		2									
SW	8	1	50	1		1									
SW	8	2	70	0		1	4	1							
SW	8	3	70	0		0									
SW	8	4	60	0		0									
SW	8	5	60	7		0			1						
SW	8	6	50	4		2	2								
SW	8	7	70	0		0									
SW	9	1	60	0		0				1					
SW	9	2	80	0		0									
SW	9	3	40	6		3			1						
SW	9	4	60	9		3									
SW	9	5	60	3		2									
SW	9	6	50	0		5									
SW	9	7	50	2		1									
SW	10	1	50	0		0									
SW	10	2	60	3		1	1	1					1		
SW	10	3	60	6		1									
SW	10	4	70	0		5			4						
SW	10	5	50	5		0									
SW	10	6	40	0		12		1							
SW	10	7	60	0		0									
SW	11	1	80	4		1									
SW	11	2	70	9		0								1	
SW	11	3	60	5		2									
SW	11	4	70	9		2									
SW	11	5	60	7		2								1	
SW	11	6	40	8		3			2						
SW	11	7	80	10		0		1						1	
SW	12	1	30	3											
SW	12	2	50	1											
SW	12	3	50	0											
SW	12	4	60	0											
SW	12	5	80	6					1						
SW	12	6	60	1											
SW	12	7	50	1											
NE	1	1	20	0		0									
NE	1	2	40	0		1									

	June 02 1999													
Block	Plot	Subpl	ancy	ziau	hehe	lipy	ecpa	astu	evco	copa	deca	anca	sila	deil
SW	1	1												
SW	1	2												
SW	1	3												
SW	1	4												
SW	1	5												
SW	1	6												
SW	1	7												
SW	2	1			1									
SW	2	2					2						1	
SW	2	3												
SW	2	4						1						
SW	2	5												
SW	2	6			1									
SW	2	7						1					1	
SW	3	1				1								
SW	3	2												
SW	3	3												
SW	3	4												
SW	3	5												
SW	3	6												
SW	3	7								7				
SW	4	1								1			1	
SW	4	2												
SW	4	3												
SW	4	4												
SW	4	5												
SW	4	6												
SW	4	7												
SW	5	1												
SW	5	2												
SW	5	3												
SW	5	4												
SW	5	5												
SW	5	6												
SW	5	7					1							
SW	6	1												
SW	6	2												
SW	6	3												
SW	6	4												
SW	6	5												
SW	6	6												
SW	6	7												
SW	7	1												

	June 02 1999														
Block	Plot	Subpl	cover	ruhi	asno	rapi	sori	dapu	mofi	rusu	amca	troh	lias	leca	
SW	1	1	60	0		8	1	1						2	
SW	1	2	20	0		2									
SW	1	3	40	8		1									
SW	1	4	40	0		0									
SW	1	5	60	1		0									
SW	1	6	50	5		0		1						1	
SW	1	7	60	0		1									
SW	2	1	50	2		2									
SW	2	2	60	4		5			2				1		
SW	2	3	50	2		3							1		
SW	2	4	60	5		4			1						
SW	2	5	60	0		1									
SW	2	6	70	2		2			2						
SW	2	7	50	23		7		2	4						
SW	3	1	50	0		4		5							
SW	3	2	40	0		0	1		1						
SW	3	3	50	8		1									
SW	3	4	60	0	1	5	1	2							
SW	3	5	50	53		0									
SW	3	6	60	1	1	0									
SW	3	7	40	0		1		2	1						
SW	4	1	60	5		5								1	
SW	4	2	60	4		2		1							
SW	4	3	70	1		0								2	
SW	4	4	50	3		0								1	
SW	4	5	60	0		0									
SW	4	6	40	1		1									
SW	4	7	60	1		1									
SW	5	1	60	2	1	1									
SW	5	2	40	0		0		2							
SW	5	3	50	11		6		2							
SW	5	4	60	1		1									
SW	5	5	30	1		1									
SW	5	6	70	0		0									
SW	5	7	30	3		0			2						
SW	6	1	50	7		0									
SW	6	2	20	0		3									
SW	6	3	30	0		0									
SW	6	4	20	1		2		11							
SW	6	5	10	0		1									
SW	6	6	40	1		1									
SW	6	7	30	0		2			1						
SW	7	1	60	0		1									

APPENDIX 5

DESTRUCTIVE SAMPLING (1999) RAW DATA

	Forbs destructive sampled in September 1999					
trtmt	species	top height(cm)	# leaves	root length(cm)	shoot(g)	root(g)
mow-1	Mofi	10	16	6	0.1016	0.0175
mow-1	Mofi	8	20	5	0.0295	0.0127
mow-1	Mofi	8	16	9	0.0879	0.0251
mow-1	Mofi	10	18	13	0.1421	0.0369
mow-1	Mofi	10	10	4	0.0735	0.0206
mow-1	Mofi	9	32	9	0.1746	0.0301
mow-1	Mofi	8	12	7	0.075	0.0318
mow-1	Mofi	12	14	8	0.1313	0.0217
mow-1	Mofi	9	16	5	0.0464	0.0094
mow-1	Mofi	10	20	10	0.1051	0.0285
mow-1	Rapi	9	4	9	0.1537	0.0294
mow-1	Rapi	8	4	7	0.0946	0.0137
mow-1	Rapi	11	4	11	0.1816	0.0414
mow-1	Rapi	9	6	8	0.1995	0.0341
mow-1	Rapi	7	4	6	0.0847	0.0101
mow-1	Rapi	12	6	9	0.2073	0.0331
mow-1	Rapi	10	3	9	0.0994	0.0236
mow-1	Rapi	11	3	5	0.0793	0.0086
mow-1	Rapi	12	5	11	0.2634	0.0315
mow-1	Rapi	11	7	10	0.2101	0.0346
mow-1	Ecpa	6	3	10	0.0728	0.0387
mow-1	Ecpa	11	5	11	0.3165	0.135
mow-1	Ecpa	8	5	12	0.2015	0.1591
mow-1	Ecpa	8	5	11	0.178	0.1153
mow-1	Ecpa	10	6	13	0.1935	0.0739
mow-1	Ecpa	10	4	11	0.169	0.1276
mow-1	Ecpa	10	5	14	0.3008	0.1062
mow-1	Ecpa	11	4	12	0.2959	0.1059
mow-1	Ecpa	7	5	10	0.1012	0.055
mow-1	Ecpa	9	7	13	0.2585	0.1097
mow-1	Sori	5	5	5	0.0344	0.0047
mow-1	Sori	10	8	8	0.3377	0.056
mow-1	Sori	8	6	7	0.1721	0.0261
mow-1	Sori	10	5	7	0.2738	0.0453
mow-1	Sori	7	2	6	0.0607	0.0175
mow-1	Sori	11	5	6	0.2674	0.0612
mow-1	Sori	6	5	5	0.0894	0.023
mow-1	Sori	7	6	5	0.1235	0.0296
mow-1	Sori	8	7	7	0.1014	0.018
mow-1	Sori	8	9	11	0.2219	0.0676

	Forbs destructive sampled in September 1999					
trtmt	species	top height(cm)	# leaves	root length(cm)	shoot(g)	root(g)
no-mow	Mofi	4	14	10	0.0134	0.0071
no-mow	Mofi	8	18	8	0.0271	0.018
no-mow	Mofi	7	12	11	0.0131	0.0062
no-mow	Mofi	12	12	9	0.0276	0.0108
no-mow	Mofi	6	16	8	0.011	0.0065
no-mow	Mofi	10	14	9	0.0187	0.0123
no-mow	Mofi	8	12	6	0.0178	0.0073
no-mow	Mofi	5	14	7	0.009	0.0082
no-mow	Mofi	3	10	3	0.0031	0.001
no-mow	Mofi	6	12	7	0.0057	0.004
no-mow	Rapi	5	3	5	0.0351	0.0055
no-mow	Rapi	6	2	5	0.036	0.0072
no-mow	Rapi	5	3	5	0.0237	0.0067
no-mow	Rapi	11	5	7	0.0893	0.0163
no-mow	Rapi	7	4	6	0.041	0.0069
no-mow	Rapi	4	2	7	0.0141	0.0076
no-mow	Rapi	4	2	5	0.0158	0.0052
no-mow	Rapi	7	2	6	0.0252	0.0045
no-mow	Rapi	6	2	5	0.0164	0.0029
no-mow	Rapi	4	3	5	0.0125	0.0039
no-mow	Ecpa	6	2	12	0.0656	0.0698
no-mow	Ecpa	9	1	10	0.0367	0.0471
no-mow	Ecpa	10	2	10	0.0699	0.0684
no-mow	Ecpa	11	2	8	0.0618	0.0519
no-mow	Ecpa	10	1	14	0.0394	0.0437
no-mow	Ecpa	12	2	11	0.0835	0.08
no-mow	Ecpa	6	1	9	0.0221	0.0333
no-mow	Ecpa	8	1	7	0.0194	0.0199
no-mow	Ecpa	11	1	11	0.0202	0.0193
no-mow	Ecpa	9	1	6	0.0215	0.0158
no-mow	Sori	2	4	7	0.0191	0.0049
no-mow	Sori	4	3	4	0.0121	0.0028
no-mow	Sori	3	2	4	0.0074	0.0023
no-mow	Sori	3	5	3	0.0133	0.0025
no-mow	Sori	2	4	4	0.0092	0.0024
no-mow	Sori	3	5	6	0.0226	0.0062
no-mow	Sori	3	5	4	0.0151	0.0051
no-mow	Sori	2	4	4	0.0097	0.0029
no-mow	Sori	2	2	3	0.0038	0.0016
no-mow	Sori	3	4	3	0.0117	0.0051

APPENDIX 6

DESTRUCTIVE SAMPLING (2000) RAW DATA

	Forbs destructive sampled in September 2000					
trtmt	species	top height(cm)	leaves	root length(cm)	top weight(g)	root weight(g)
mow-1	rapi	39	10	15	2.846	0.3747
mow-1	rapi	25	4	15	0.5743	0.1435
mow-1	rapi	28	4	14	0.8125	0.159
mow-1	rapi	27	2	13	0.526	0.0848
mow-1	rapi	30	9	15	1.8551	0.403
mow-1	rapi	26	4	13	0.4862	0.1314
mow-1	rapi	33	7	15	2.3477	0.4903
mow-1	rapi	27	7	13	1.4021	0.3216
mow-1	rapi	28	5	15	1.2526	0.1945
mow-1	rapi	38	6	15	2.284	0.4301
mow-1	rapi	38	5	15	1.7995	0.3151
mow-1	rapi	32	4	14	1.0434	0.2208
mow-1	rapi	34	6	15	1.8819	0.3828
mow-1	rapi	35	7	15	3.6219	0.8247
mow-1	rapi	30	21	15	3.2265	0.7214
mow-1	rapi	29	3	14	0.5399	0.1148
mow-1	rapi	31	5	15	1.2554	0.195
mow-1	rapi	21	2	12	0.2893	0.0852
mow-1	rapi	37	10	15	3.5772	0.6981
mow-1	rapi	29	8	15	1.4987	0.2528
no-mow	rapi	12	2	6	0.031	0.0091
no-mow	rapi	14	2	8	0.0451	0.0194
no-mow	rapi	23	3	11	0.2569	0.0493
no-mow	rapi	20	4	9	0.2161	0.0344
no-mow	rapi	14	2	12	0.0348	0.0206
no-mow	rapi	10	2	11	0.0379	0.0259
no-mow	rapi	7	3	10	0.0175	0.0068
no-mow	rapi	16	2	8	0.0486	0.019
no-mow	rapi	13	3	11	0.0704	0.0211
no-mow	rapi	12	1	15	0.0456	0.0459
no-mow	rapi	13	3	10	0.088	0.0274
no-mow	rapi	14	4	7	0.0694	0.0165
no-mow	rapi	18	5	15	0.2018	0.0463
no-mow	rapi	13	4	15	0.1155	0.0537
no-mow	rapi	14	3	9	0.0955	0.0201
no-mow	rapi	12	2	7	0.0685	0.0167
no-mow	rapi	8	3	9	0.042	0.0058
no-mow	rapi	19	3	9	0.1715	0.0394
no-mow	rapi	19	3	12	0.217	0.0402
no-mow	rapi	15	4	10	0.1	0.014

APPENDIX 7

FLOWERING PLANT COUNTS RAW DATA

	Number of flowering plants sampled 6/29/00, 8/1/00, and 9/20/00.									
block/plot	trtment	ruhi	rapi	mofi	hehe	sori	deca	asno	dapu	leca	total
SW/2	no-mow	2	0	0	0	0	0	0	0	0	2
SW/3	no-mow	2	0	0	0	0	0	0	0	0	2
SW/6	no-mow	4	0	0	0	0	0	0	1	0	5
NE/1	no-mow	1	0	0	0	0	0	0	0	0	1
NE/2	no-mow	2	0	0	0	0	0	0	0	0	2
NE/5	no-mow	3	0	0	2	0	0	0	0	0	5
SW/5	mow-1	44	0	0	10	0	2	18	0	1	75
SW/8	mow-1	57	0	0	27	2	0	24	0	0	110
SW/10	mow-1	43	0	0	10	3	1	0	0	0	57
NE/3	mow-1	68	2	1	6	3	0	6	0	0	86
NE/7	mow-1	97	2	0	28	31	0	68	0	1	227
NE/8	mow-1	135	0	0	33	4	0	48	0	0	220