APPENDIX E

DOCUMENTATION OF ANALYSIS

CONTENTS

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1. Geospatial Analysis and Cartography

Plan alternatives maps and analyses were developed using the Midewin Geographic Information System (GIS). Calculations of areas and lengths for management areas, habitat types, roads, and trails were based upon the GIS data layers with the following data layers and controls:

A. NRCS soils— The Will County soil survey completed by the USDA Natural Resource Conservation Service was used as the basis for mapping projected (potential) native vegetation communities and development of the alternatives. The calculations of restored native habitat under each alternative are based upon the areas of each soil series that were allocated to management under native habitat restoration. The soil survey identifies hydric soils (where wetland restoration is projected), alfisols (where forests or woodlands are projected), transitional soils (savannah), and other mollisols (various types of prairie communities, e.g., dry, typic, bedrock dolomite). Typic soils with aquic regimes or inclusions of hydric soils, degraded sites, or sites of fill or excavation, were not included in the development of the alternatives but are known to affect potential wetland and other habitat restoration. Reported values for acres of habitat were rounded to the nearest multiple of ten.
B. Wetlands—an inventory of existing wetlands completed by Kevin Hamman of The Wetlands Initiative, following the U.S. Fish and Wildlife Service methodology (Cowardin, et. al.)
C. Trails are depicted with a width of approximately 10 feet. The mapped widths are for display purposes only. Actual trail widths may vary depending on type of use planned. Actual trail locations, when constructed, may appear different than depicted on the map. The intention is to construct the actual trails with approximately the same landscape considerations used in the development of the alternatives.

2. Cost-Benefit Analysis And Calculation of Present Net Value

The cost-benefit analysis was performed to determine annual expenses and revenues for anticipated activities of implementation of each alternative. Important activities with potential costs or revenues were identified, the years when those activities might occur were determined, and estimates of the unit costs or revenues were determined. Excel spreadsheet software was then used to project costs and revenues for each year for each alternative as functions of the unit expense or benefit, the year(s) of occurrence, and the number of likely units to occur under each alternative.

The Excel spreadsheet was then used to provide input to QuickSilver, an economic analysis software package maintained by the Forest Service Eastern Regional Office, to calculate present net value for each alternative. QuickSilver projects costs and benefits for each action in each year in each alternative, including annual depreciation functions. The output from QuickSilver allows a comparison of the present net value (monetary) of each alternative.

The anticipated expenses and revenues were based upon assumptions about the types and quantities of activities that would occur in each alternative as given in the descriptions of the alternatives. The narrative below explains important assumptions that were used concerning costs per unit and the recurrence of expenses for development of the spreadsheets.

Under all action alternatives, it was assumed that construction, restoration, and facilities removals would be completed within the first fifteen years of implementation of the plan. The cost/benefit analysis was extended to fifty years under the assumption that activities stabilized at a maintenance level after fifteen years. The alternatives differ in the amount construction, restoration, and maintenance required.

2.1. Facilities Removal

Bunkers: Remove 50 per year for six years (300 total) under any action alternative. Remove 10 in first year under alternative 1 (part of interim clean-up). $30,000 each (based on a contractor estimate).

Railroad grades Remove 5 miles per year for ten years, beginning in 2002, under any action alternative. The estimate assumes that extensive work is required on one half of the rail grades to restore the landscape. Estimate of $50,000 per mile reflects expense of fill or excavation of larger quantities of material than for road decommissioning.

Other buildings, facilities: $4.5 million in one year for removal under all alternatives (based on an inventory and estimate).

2.2. Roads

Decommissioning: 100 total miles are decommissioned under all alternatives at a rate of 10 miles per year. (This assumption neglects slight differences among alternatives in potential quantity of roads decommissioned. The unit cost estimate ($30,000 per mile) is based on an estimate by the staff engineer.

Construction: No road construction expenses except for tram or auto loop in alternatives that include that activity (see recreation facilities below).

Maintenance: Total miles vary by alternative, assuming annual miles maintained equal to total miles in permanent system. The unit cost estimate ($300 per mile) was based on an estimate by the staff engineer.

2.3. Agriculture Special Uses Revenues

Grazing: 1303 acres maintained in alternative 1 (for 50 years). All action alternatives start with 1303 acres and increase incrementally through the first 10 years to stabilize. Under all action alternatives, it is assumed that the final total acres under permit will be equal to the total allocations for non-native grasslands. (This assumption simplifies the situation. Under any action alternative, all lands may be within a grazing allotment, but annual grazing frequency and intensity may vary. Grazing will occur more intensively and regularly on non-native grasslands to achieve the grass height objectives for grassland birds. Some areas with native habitat will be grazed rarely or never, and the intensity of grazing on some non-native grassland areas may vary between years.) Estimates of per-unit revenues were based on present average bid for permits ($41 per acre).

Row Crops: In alternative 1, the existing 3831 acres under row crops are continued for fifty years (an assumption about the no-action alternative that does not satisfy the enabling legislation). Under all action alternatives, the existing 3831 acres are permitted in the first year with phase out of 500 acres per year until elimination. Estimates of per-unit revenues were based on present average bid for permits ($110 per acre).

2.4. Habitat Restoration and Maintenance

Costs are calculated per acre based on the following estimates of component costs. The acres subject to restoration are determined by the descriptions of the alternatives. Unit costs were based on a review of estimated average costs for restoration by different governmental, private, and non-profit agencies. The estimates differed widely, in part due to differences in the manner of accounting for labor, equipment and supplies, contracted services, and overhead. Also, Midewin will produce seed and plants on site, which will reduce purchase expenses but increase overhead, labor, and other expenses. The estimates shown below were the best available estimates of true expenses per unit.

Wet Prairie/Wetland—Higher unit costs reflect expenses for treatment of drain tiles or ditches, more intensive planting by hand, restrictions on equipment use and methods.

Mesic/Dry Prairie— Costs reflect more intensive management to achieve habitat conditions of desirable native species composition, grass height, and litter thickness.
Forest, Grassland, others-- Lower costs reflect the availability of non-native grass seed and lower maintenance needs. Costs reflect more intensive management to achieve habitat conditions of desirable grass height and litter thickness.

Restoration	***Wet Prairie Wetland***	***Mesic/Dry Prairie***	***Forest, Woodland, Savanna, Grassland***
Seed & plants	$ 1,200	$ 1,000	$ 400
Equip & Supplies	$ 200	$ 200	$ 100
Ground preparation	$ 750	$ 400	$ 300
Labor, Planning	$ 200	$ 100	$ 50
Other (Admin, overhead)	$ 10	$ 10	$ 10
Total, per acre	$ 2,360	$ 1,710	$ 860
Maintenance			
Mow & burn	$ 100	$ 100	$ 50
Weed control	$ 150	$ 50	$ 20
Equip & Supplies	$ 10	$ 10	$ 10
Labor, Planning	$ 10	$ 10	$ 10
Other (Admin, overhead)	$ 10	$ 10	$ 10
Total, per acre	$ 280	$ 180	$ 100

2.5. Recreational Facilities Construction and Maintenance

Construction costs were calculated per unit as shown below, with the number of units determined by alternative as described. Construction costs were divided across multiple years for construction in phases. Maintenance costs were calculated per unit, with the number of units under maintenance increasing annually to equal the total construction completed in previous years.

Hiking trails, multi-use trails, and auto loop or tram route— The total miles as described in each alternative were divided across ten years for incremental construction (years 2003 to 2012). Maintenance costs increase annually as each unit of construction adds to the maintenance layout for the following year.

Interim trails— Costs for construction of five miles in second to fourth year were included in each alternative (2002 – 2004). Maintenance costs were included for

five, ten, and fifteen miles in the third, fourth, and fifth years, respectively (2003 – 2005).

Dispersed Campsites—Construction costs were estimated as a one-time expense in sixth year (2007) for those alternatives that include dispersed camping. Costs were calculated as a one-unit expense, i.e. no variation in number of sites among those alternatives that include dispersed camping. Maintenance costs were calculated as a constant annual expense for the year of construction and all subsequent years.

Developed Campsites (Group Camping)—Construction costs were estimated as an expense per unit (per campground) with all construction occurring in the sixth year (2007); the number of units varies by alternative. Maintenance costs were estimated as an expense per unit (per campground) with maintenance occurring on all units in every year after construction (2008 and all subsequent years).

Picnic Areas-- Construction costs were estimated as an expense per unit (per picnic area) with all construction occurring in the second year (2003); alternatives have either one unit or none. Maintenance costs were estimated as an expense per unit (one or none) with maintenance in every year after construction (2004 and all subsequent years).

Parking and Services-- Construction costs estimated as an expense per unit (per parking area) with all construction occurring in the second year (2003); units vary by alternative. An additional one-unit, one-time construction expense was added for each alternative that includes equestrian use to provide additional facilities. Maintenance costs estimated as an expense per unit with maintenance occurring on all units in every year after construction (2004 and all subsequent years).

Construction	***Measure***	***Cost***
Hiking only trail	per mile	*50,000*
Bike/horse/multi trail	per mile	*150,000*
Tram and/or auto loop	per mile	*200,000*
Interim Trails	per mile	*10,000*
Dispersed Camping	all	*150,000*
Visitor Center	each	*6,000,000*
Group Camping	each	*1,500,000*
Picnic area	each	*200,000*
Parking / Services	50 cars	*75,000*
Parking/services w/trailers	30 cars, 20 trailers	*100,000*

Maintenance	*Measure*	*Cost*
Hiking only trail	per mile	*2,500*
Bike/horse/multi trail	per mile	*3,000*
Tram and/or auto loop	per mile	*5,000*
Interim Trails	per mile	*200*
Dispersed Camping	all	*10,000*
Visitor Center	each	*500,000*
Group Camping	each	*50,000*
Picnic area	each	*10,000*
Parking / Services	50 cars	*10,000*
Parking/services w/trailers	30 cars, 20 trailers	*10,000*

3. Streamflow Analysis

Projected changes in streamflow were based upon the study by Dimissie and Khan (1993). In their study, baseflow (Q99) was defined as the flow at 99 percent probability of exceedance. The peak flows produced by the watersheds were analyzed as ratios between average storm precipitation and peak stream discharge measured in cubic feet per second per acre of watershed. (The Q95 and other measures of peak flows were also analyzed in the study and results were similar, but those other measures for streamflow were not used to support this analysis). The authors presented summary information from regression models relating streamflow characteristics to precipitation and the percent of wetlands in the study watersheds for different seasons and regions of Illinois. The study reported the following relationships that were used in this analysis:

> Influence of Wetlands on Peakflow as Measured by the Percent Change in the Ratio of Peakflow to Average Precipitation Ratio (Qp/Pa) for a One Percent Change in Wetland Area:
>
> North Illinois: -7.9
>
> Seasonal Variability of Influence of Wetlands on Low Flow by Region in Illinois as Measured by the Percent Change in Q95 and Q99:
>
> Northern Illinois: Summer: Q99: +20.0

For this analysis, the existing percent wetlands in each watershed were determined from data in the state GIS layer for the total area and different wetland types in each watershed. Some error was introduced to this

determination by correction of the watersheds boundaries in the GIS layer to reflect drainage conditions on Midewin.

The projected percent wetlands in each watershed were determined by (1) calculating the amount of restored wetlands in each watershed in each alternative, (2) adding the restored acres to the existing acres, (3) calculating the percent. Additional errors were introduced through this method because (1) the state GIS layer and the Midewin planning layers, based on soils, are not strictly equal in detail and resolution, (2) there is some overlap or "double-counting" of existing wetlands within restored wetlands.

The results of the analysis were rounded to two significant figures. In addition to the sources of error described above, substantial errors of prediction are present in the regression models of Dimissie and Khan due to the large variability in watershed conditions, water uses, and dynamics. The results of the analysis presented in Chapter 3 should provide reliable estimates of the direction (positive or negative) and order of magnitude (e.g. ten times, 100 times) of the projected changes in streamflow.

3.1. Soil Conditions Indicators

Estimates of the acres of roads, trails, and railbeds are based on an assumed road and rail width of 15 feet and trail width of 6 feet. The acres were calculated as the product of total length and the assumed width.

Estimates of site disturbance for restoration were based on the assumptions of disturbance of 9 miles of road per square mile (15 feet wide) in unfragmented habitat, 2 miles of fencerow per square mile (30 feet wide) in unfragmented habitat, and one mile of drainage work per square mile (50 feet wide) in areas of restoration to native habitat. Areas were calculated as the products of length and width per 640 acres (1 square mile) and the product of the total sum or acres in restoration or unfragmented habitat.

Estimates of the total area of facilities, etc. were based upon the following assumptions about the total hardened or impervious area in each of the following facilities (acres): developed camping (3), visitor center (2), picnic area (2), access point (0.1), parking area (0.5), administrative site (2).

4. Scenery Analysis

4.1. Existing Scenic Integrity

Scenic integrity as described in "*Landscape Aesthetics, A Handbook for Scenery Management"* is a measure of the degree to which a landscape is visually perceived to be "complete." The highest scenic integrity ratings are given to those landscapes which have little or no deviation from the character valued by constituents for its aesthetic appeal. Human alterations can sometimes raise or maintain integrity. More often it is lowered depending on the degree of deviation from the character valued for its aesthetic appeal.

When analyzing the scenic integrity it becomes evident that it is not whether the land is impacted by human alteration, but to what degree the land is impacted by human alteration. The existing scenic integrity was classified into very high, high, moderate, low, very low, and unacceptably low. These classifications are relative to Midewin.

Unacceptably Low Approximately 300 acres were classified as "unacceptably low". Land within this classification included areas of intense impact with dense structures, roads and railroad beds, primarily in extensive warehouse groups.

Very Low - Approximately 3200 acres were classified as "very low". Similar to land within in the "unacceptably low" classification. These include warehouse groups and land surrounding Army property such as the Load, Assemble Package facilities.

Low - Approximately 3700 acres of two types of land. 1) that land impacted by bunker field construction, 2) land significantly impacted by adjacent industry Bunkers have less impact on the scenic integrity of the land because they are earthen, grass covered, and blend with the surrounding landscape when viewed from the sides and rear.

Moderate - Approximately 9000 acres. The land has significant human impacts evident, but with much lower density and visual impact. Impacts typically come from roads and railroad beds, and occasional, but scattered buildings and parking lots. Impacts also stem from agricultural crops, fences and plowing fields.

High – A small portion (800 acres) of Midewin is classified within high existing scenic integrity. These areas appear to be whole and in a natural state. Included are two native woodlands. The remainder is vegetated by non-native grasses, which has a strong resemblance to the waving grasses and expansive vistas that people associate with prairie.

Very High – No area was designated within the Very High Existing Scenic Integrity level.

4.2. Existing Ecological Integrity

Ecological integrity is much the same as scenic integrity, except it describes the wholeness and completeness of the ecological system. The highest rating is given to those landscapes that have little or no deviation from the natural ecological system. It may be possible that an area with high scenic integrity may have low ecological integrity, or visa versa.

Unacceptably Low - Areas with invasive species such as Amur honeysuckle, Garlic Mustard, Cut-leaved Teasel and Autumn Olive. These are less than one acre in size.

Very Low –Areas planted in row crops and small grains.

Low –Shrub thickets, fencerows, and successional woodlands.

Moderate – Pastures or hay fields make up the moderate classification of Existing Ecological Integrity.

High –Existing native vegetation.
Long-term scenery objectives include a large scale naturally appearing landscape. The landscape will be free from the patchwork of arsenal development and agricultural fields divided by roads, railroad beds and fence and hedgerows. Structures including most bunkers will be removed. Roads and railbeds will be removed and re-graded to blend with the surrounding landscape. It will be a continuous landscape dominated by native or native appearing grasses and forbs, with patches of savanna and woodland. Small remnants of the culturally altered landscapes may remain.

Due to the extensive human impacts on the land over the past 150 years, it is not expected that these objectives will be fully achieved within this planning period. Short-term objectives were established that would transition Midewin toward the long-term objectives. These objectives give highest priority to the viewsheds of State Route 53, Hoff and River Roads and the visitor center (if included in the alternative); the Proposed Scenic Integrity Objectives would remain the same as the long-term objectives. Outside of these viewsheds, any Proposed Scenic Integrity objective of “high” would be dropped to “moderate”, proposed Scenic Integrity objectives of “low” would remain the same. These variations move the scenic integrity toward the proposed long-term objectives but allow some aspects of the landscape to appear slightly altered.

Landscape Visibility and Concern Level - Landscape visibility is a function of duration of view, degree of discernible detail, seasonal variations, and number of viewers.

Landscape visibility distance zones are mapped based on distance from all viewing areas. These include roads, trails and roadways, recreation areas, vistas, and any place that a person could view the landscape. For Midewin, these distance zones were calculated based on the flat landscape model in Landscape Aesthetics Handbook for Scenery Management.

Scenic attractiveness - Scenic attractiveness is the scenic importance of the landscape based on human perceptions of the intrinsic beauty of the landscape. It reflects varying visual perception attributes of: variety, unity, vivid, coherence, history, uniqueness, harmony, balance, and pattern.
It is classified as; A - distinctive, B -typical or common, or C - undistinguished.

Scenic Classes - Overlaying the landscape visibility and concern level map, the scenic attractiveness map forms the scenic classes map. New polygons are formed showing the scenic attractiveness combined with the visibility and concern level. The new polygons were classified according to the scenic class matrix below.

		Distance Zone & Concern Level											
		fg1	mg1	bg1	fg2	mg2	bg2	fg3	mg3	bg3	ss1	ss2	ss3
Scenic Attractiveness	A	1	1	1	2	2	2	2	3	3	1	2	3
	B	1	2	2	2	3	4	3	5	5	2	3	5
	C	1	2	3	2	4	5	5	6	7	3	5	7

Desired Scenic Integrity Levels - The new classifications from the scenic classes map were ranked in a manner similar to the existing scenic integrity map. All polygons with a scenic class of 1 were rated as high. All polygons with a scenic class of two or three, were rated as moderate. Polygons with a scenic class of four were rated as low.

Desired Ecological Integrity Levels - The ecological integrity objectives are a measure of the proposed management. These include grassland habitat, dry/mesic prairie restoration, wet prairie/sedge meadow restoration, savanna restoration and forest/woodland restoration. The ecological integrity objectives are a portrayal of the ecological wholeness.

Proposed Scenic Integrity Objectives - The desired scenic integrity levels are the objectives if there were no other aspects to consider. In reality, there are also other aspects that should be integrated. In comparing the proposed ecological integrity objectives and the desired ecological integrity objectives, it was determined that both the ecological and scenic integrity levels can both be met at Midewin.

5. Summary of Cumulative Effects of Recreation

The recreational opportunities proposed in the action alternatives will complement and supplement what is currently available and proposed in the area surrounding Midewin. Coordination with local, county, and state agencies will be needed to further insure that plans harmonize and offer unique experiences. A market analysis will be utilized to ensure that plans meet the needs of the area and the public, and that planning is also coordinated with activities in the private sector.

5.1. RECREATION DEMAND ANALYSIS

Since no pre-existing public recreational use has been allowed on site, no site-specific data is available on current recreational use to assist in projecting future needs. Midewin will conduct a market analysis prior to developing major facilities. The market analysis will provide additional local data to assist with site-specific planning.

Because of the restricted use of Midewin during the past 50 years, little to no site-specific data exists to predict future recreation demand. Therefore, we used national, state, and local surveys and public comments to project the need that Midewin may fulfill.

5.1.1. Trends and Projections

Public lands management and planning depend upon accurate information from a variety of sources. “Snap shot” information isn’t as useful as trend information that charts changes over time and is comparable in methodology, context and content. To look at trends in recreation, the 1996 Survey of Fishing, Hunting and Wildlife-Associated Recreation sponsored by the USFWS, and the 1994-95 National Survey of Recreation and Environment (NSRE) offer the two best sources of national trend information.

The following are highlights that apply to the issues, activities, and resources most closely associated with Midewin.

5.1.2. General Trends

- The most significant trends affecting recreation are age structure of the population, population growth, differences in participation by race and ethnicity, changes in family structure, available leisure time, economic trends, participation in specific recreation activities, increased concern about preserving natural resources, and migration of people to amenity areas.
- People come to natural sites looking for a range of experiences from solitude and nature study to activities requiring physical challenge. The values most often cited include relationship with nature, social bonding, healing and experience. Some people develop strong personal attachments to specific places

- Recreational opportunities are widely available, but their type and quantity are unevenly distributed.
- Social imbalances exist in recreation opportunities. In general, the elderly, less educated, racial minorities, economically disadvantaged, disabled, or people living in cities have fewer opportunities to participate in resource-based recreation.
- Tourism is the largest and one of the fastest growing social and economic activities in the world. The importance of recreation and tourism to the overall economy of most states will increase.
- Tourism will be more “destination” oriented in the future. Pleasure trips of shorter distance and duration will continue to grow at a greater rate than longer, more extended trips.

5.1.3. Demand

- Demand for recreation opportunities will change due to the increasing age of the population, more ethnic diversity and the increase in people in urban areas. Currently, demand is for shorter, more frequent trips, closer to home, with a broad range of activities.
- A shrinking American middle class coupled with an aging population can be expected to lead to increased demand for more moderate forms of recreation, such as walking for pleasure, sightseeing, and bird watching.
- The fastest growth in outdoor recreation participation is projected for activities that are popular with older adults.
- Nationally, the fasted growing activities are bird watching, hiking, backpacking, primitive area camping, and off-road driving.
- Studies have shown that people want more trails (especially for biking or walking). The number of people using trails has increased dramatically, and when compared to all outdoor activities, trail-related participation is quite high. From 1982 to 1994-1995, walking experienced a 41 million person increase; bird watching, a 38 million person increase; hiking, a 28 million person increase; and bicycling, an 18 million person increase.
- Mountain biking is also increasing in the U.S.

5.1.4. State and Local Surveys, Data and Trends

Previously known as the Statewide Comprehensive Outdoor Recreation Plan (SCORP), the current Illinois “Statewide Outdoor Recreation Partnership Plan” focuses primarily on needs and assistance to local communities. The Plan helps guide development and acquisition of outdoor recreation resources provided by federal, state, and local governments. The following state priorities illustrate that recreation development at Midewin is consistent with state goals.

Statewide Outdoor Recreation Partnership Plan - Priorities

1. Water resources
2. Significant ecological areas
3. Greenways and trails
4. Conservation education
5. Planning
6. Community needs

The Illinois Department of Natural Resources (IDNR) conducts periodic surveys to determine user needs and preferences. The 1997 *Illinois Outdoor Recreation Activities for the Illinois Department of Natural Resources*, identifies the need for more open space in Illinois.

This survey, as well as surveys conducted by three county forest preserve districts, indicate the popularity of passive recreational activities and a high level of public interest in outdoor activities that are associated with the natural environment. The tables below display Visitor Preferences and Visitor Activities, respectively. Public support of open space and recreation was demonstrated the passage of a 1998 successful bond referendum for the Forest Preserve District of Will County to purchase land and develop recreational facilities.

The Illinois Statewide Trail User Study (Gobster 1990) and the Illinois Outdoor Recreation Activities for the IDNR (O'Rourke, 1997) found that people value a natural environment when choosing a trail. When asked why they use the trail, the response was 87% pleasure/recreation, 76% health and physical training, and 61% scenery and natural environment.

Visitor Preferences Survey

What respondents would like to see the Forest Preserve District(s) emphasize in the future	1997 Will County (% Agree)*	1993 Lake County (% Agree)*
Provide close up opportunity to observe wildlife	78%	N/A
Continued open space development for outdoor recreation.	74%	N/A
Preserve natural areas	N/A	74%
Increase # hiking trails	74%	75%
Increase # bicycle trails	67%	70%
Increase # equestrian trails	43%	N/A
Offer more fishing opportunities	59%	N/A
Add more large reservable picnic areas	48%	N/A
Expand picnic areas	N/A	60%
Develop facilities that generate income to supplement tax money	65%	N/A

Source: Management Learning Laboratories (1997), and Becker Assoc., Inc. (1993)
N/A = result of no data due to the different questions asked in each survey

Visitor Activities Survey

Selections of activities applicable to Midewin. Percentage of respondents engage in:	1993 Lake County*	1992 DuPage County*	1996 State Survey*
hiking/walking	55%	51.1%	21.3%/76%
observing nature/wildlife/bird-watching	51%	15.1%	40.4%
sitting and relaxing	46%	N/A	N/A
attending a group picnic	46%	N/A	N/A
pleasure driving/sightseeing	N/A	N/A	66%
general picnicking	38%	39.4 %	49.2%
bicycling	23%	30.5%	44.2%
visiting a nature center	24%	22.2%	N/A
cross country skiing	14%	13.6%	3.5%
horseback riding	5%	1.8 %	9.8%
fishing	19%	N/A	27.1%
hunting	N/A	N/A	6.9%

Source: Becker Assoc., Inc. (1993), Pruehs and Associates (1992), and O'Rourke (1997)
N/A = result of no data due to the different questions asked in each survey.

5.2. Assumptions of Analysis

In order to compare the potential effects of the alternatives on different resources, it is useful to make some assumptions about the magnitude or extent of some actions. The discussion below clarifies assumptions about different activities that are used to allow meaningful analyses of effects. These assumptions provide a basis for numerical or other comparisons of the alternatives. These assumptions conform with the Standards and Guidelines and do not constitute objectives or prescriptions.

5.2.1. Grazing

Grazing is prescribed for most lands in Management Area 1 under all alternatives in restored native prairie as well as non-native grasslands. Grazing will occur more intensively or regularly in non-native grassland areas because those areas will be managed specifically for certain habitat structures for grassland birds. Areas of restored native habitat may be grazed to achieve habitat objectives, but grazing intensity and frequency will most likely be lower. Grazing will generally not occur in Management Area 2 or in some habitats such as woodlands, forests, seeps, marshes, and riparian areas.

For the purposes of comparing alternatives, it may be assumed that the extent (acres) of non-native grasslands in each alternative provides a good indicator of the amount of grazing that will occur each year under each alternative. The cost-benefit analysis uses this assumption to estimate revenues from grazing permits.

5.2.2. Prescribed fire

Prescribed fire will be prescribed for most lands of Management Area 1 under all action alternatives. Prescribed fire may be used in the Management Area 2 under more restrictive conditions under all action alternatives.

In contrast to grazing, prescribed fire will be used more frequently in restored native habitat to promote native species and improve community composition. However, non-native grasslands may also be burned with prescribed fire to manage grass structure for ground-nesting birds, control invasive species, or promote the occurrence of native species within the grassland community. As rough estimates for comparison of alternatives, it will be assumed that 25 to 33 percent of restored native habitat and 10 to 30 percent of non-native grassland habitat will be burned in a typical year. It is recognized that prescribed fire may be undesirable or unsuccessful in some wetlands and forests, but these areas are not excluded here for comparison of the alternatives.

5.2.3. Haying

Haying for the maintenance of mid-stature grassland bird habitat will focus on the removal of late season biomass. For comparison of the alternatives, it is useful to assume that the number of acres where haying occurs is equal the number of acres of mid-stature grassland bird habitat. Haying may be used in combination with grazing to maintain this desired habitat.

5.2.4. Integrated Pest Management

In this analysis, it is assumed that Integrated Pest Management will be used on all lands (both Management Areas) under all action alternatives to control invasive species. To some extent, the alternatives may differ in site-specific applications due to different arrangements of non-native grasslands, restored native habitat, visitor uses, and the Developed Uses Management Area. Site-specific IPM prescriptions will vary in the types, intensities, and schedules of different treatments (including grazing and prescribed fire). No assumptions are made about the locations or relative amounts of hand removal, pesticide application, mowing, control of livestock or human activity, planting, tilling, and enhancement planting.

5.2.5. Trail Types and Locations

Analyses in the Final EIS do not assume that the future trail system will exactly reproduce the layouts that are displayed on the maps of the alternatives. The alternatives present approximate trail lengths and ratios of trail types, and the maps of the alternatives present conceptual locations and types. The exact locations and details of trails will be identified during site specific planning.

5.2.6. Facilities Impacts

Some alternatives include a visitor center, an environmental education center, and camping opportunities. The exact location and details of these developed areas will be defined during site specific planning. Given the lack of accurate

information, it is useful to assume that different types of visitor facilities will have certain dimensions in all alternatives so that the potential effects may be more easily gauged and compared.

Assumed Measures for Comparison of Alternatives; Facilities

	Assumed Size
Campground	Five acres hardened surfaces, vegetation impacts on 60 acres.
Visitor Center	One acre of impervious area, vegetation impacts on twenty acres.
Education Center	One-half acre of impervious area, vegetation impacts on ten acres.
Parking lot	One-half acre impervious area, vegetation impacts on one acre.
Dispersed Campground	Vegetation impacts on one-half acre, no impervious area.
Administrative Site	One acre of impervious area, vegetation impacts on twelve acres.