

CANYONLANDS NATIONAL PARK
BACKCOUNTRY MONITORING PROGRAM

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OBJECTIVES:

1. Identify areas of concentrated backcountry use, and monitor continuing use levels and distribution. (through the use of permits and ranger patrol logs.).
2. To collect base line data on present state of selected backcountry campsites as representatives of the overall campsite situation in the Canyonlands backcountry. This initial description will provide a basis for monitoring changes in backcountry sites in the upcoming years. The description should include vegetation, topography, location, distance from water sources, and attraction sites, soils, and wildlife. The data will be collected with photographs and transects.
3. To identify and describe potential campsites as controls in monitoring, and as base line data in the establishment of new campsites in the future that may result from increased demand in the backcountry.
4. To identify primary problems and impacts of backcountry camping through monitoring vegetation, soils, and topographic features on a regular basis.
5. Correlate use levels and distribution with backcountry impacts.
6. Develop management strategies and alternatives to minimize impacts of backcountry use.
7. To develop an effective and strong working connection between the field people in the districts and the central resource management office in Moab headquarters. To integrate field and management activities.
8. To develop a user simplified system for field personnel to use with a minimal amount of training.

EQUIPMENT/SUPPLIES/

1. Photo Record

35 mm camera w/ standard 50 mm lens (wide angle also, 28mm)
ASA 64 print film
Photo log sheets
Photo information sheets for each campsite
compass (brunton)
star drill hammer
small hatchet (to mark trees)
rebar stakes (placed after second trip) & hammer
size scale (plastic measuring tape used in transects)

2. Data Collection/ General Use

site description forms
field notebook for photo log & forms
methods description
several writing utensils (pencils, colored pencils, pens, sharpener)
Needles map with key to all identified camping areas (sites coded)
knowledge and reference of major plant species
Canyonlands plant list
small plant press (when available)

3. Transects

100 foot tape (30 meters: all measurements should be metric)
Brunton compass
meter square
1/10 meter rectangle
data sheets
rebar, hatchet, or star drill for end point establishment

for % cover

EXPECTED OUTCOMES

1. A comprehensive understanding of the backcountry situation in Canyonlands. (Needles district first)
 - a. Of the overall use in the district
 - b. Related impacts in the heavy use zones (i.e. multiple trails, archaeological vandalism, etc.)
 - c. Use of individual sites and related impacts
2. An ongoing program monitoring changes in zones
 - a. Increase in number of campsites (establishment of new sites)
 - b. Narrative record of new trails, condition of trails, etc.
3. Individual monitoring program on selected sites
 - a. Identifying and monitoring changes.

All of this data will serve as an information base for management decisions that may lead to restricting use in specific areas, or establishing designated campsites.

FUTURE PLANS

There have been budget requests submitted for the funding of large scale aerial photographs of selected backcountry and river sites. These photos would be an extremely valuable tool for directly monitoring changes in vegetation, trails, and topography, and will assist in identifying problems not previously predicted.

MONITORING METHODS AND PROCEDURES

I. Identification of use zones:

Over a period of one to two months (1981 season) a map was compiled by the Needles District staff identifying major backcountry camping areas. This was the initial step in the inventory of backcountry campsites, and in selecting the locations for site specific monitoring.

A. A general (narrative) description of the concentrated use zones will be done. These zones will be delineated primarily by topography, relating to drainages and relative location to attraction areas. These zones should correlate to permit zones to facilitate analysis of use numbers and impact. The general description will include:

1. Approximate number of sites within zone
2. Their general location and concentration (clustered or scattered).
3. Water availability and specific location (seasonal?)
4. Location of trail(s) (note multiple trailing)
5. Overall impression of impact
 - a. litter/fecal matter and toilet tissue
 - b. Loss of vegetation
 - c. Fire rings
 - d. Trail conditions

This general description can be completed after a visit through the zone, assessing the overall condition.

II. Inventory and mapping of sites:

The next step in the inventory is the exact location of all sites on a topographic map, individual site description (on standard form), and photographic record of each site.

A. Locate and map each site on inventory map. Assign number for site, giving number and location on data sheet. Please try to be specific.

B. Fill out general description data sheet for each site as well as possible. (Impact rating key on separate sheet).

C. Photograph (prints) each site, attempting to include entire site. In order to identify the campsite boundaries, it is suggested that the photograph be taken from above the site, and at least five meters from the site edge.

1. Put something in site to give idea of scale.
2. List photo numbers on data sheet and photo log.
3. If more than one photo is necessary, overlap photos for panorama.
4. Describe point from which photo is taken. (i.e. from east side, looking west; approximately six meters from edge, on top of boulder by juniper tree.

D. This inventory procedure within each zone should be repeated every five to ten years. If new sites are observed, please note and map them upon observation (note date). The time periods for inventory are subject to change with management decisions and alternatives.

E. There are a number of qualities which determine backcountry campsite selection by the visitor. The sites possessing these characteristics invite concentrated use. These qualities are inventoried on the campsite data sheet.

1. Water availability: Probably one of the most important qualities of a site is its proximity to water. Places like Salt Creek, Elephant Canyon, and Big and Little Spring Canyons offer good water supplies, thus inviting camping.

2. Level/ fairly smooth areas: Overnight camping is considerably easier on flat areas without too many rocks. The size of a group determines the area needed for camping.

3. Proximity to Arches, scenic, & natural attractions & Archaeological sites

4. Distance from trailhead or point of departure : There are no specific statistics on this, but this factor should be observed to try determining the importance of this factor.

- Protection from the elements

5. Shade availability: trees, ledges, etc.

- Solitude

- Accessibility

F. Environmental characteristics which reduce site degradation will be inventoried and described on the campsite data sheet. These qualities include.

1. Soils/ substrate
2. Vegetation type and cover
3. Potential for expansion
4. Susceptibility to fire occurrence and expansion
5. slope

III. Specific site selection for monitoring

In each zone there should be at least two sites of each impact level (excellent, good, fair, poor) monitored. Two controls should also be identified, described, and monitored. This leads to a total of ten sites per zone. In backcountry situation in other parks and forests, it has been discovered that backcountry users will develop new sites when already existing sites do not meet the visitors' standards. (i.e. too dusty, trashy, eroded, etc.). This results in the establishment of more sites. This may at first appear to be a sign of increased numbers and concentration, when it is possibly an expansion of the same number of visitors.

Sites for monitoring will be selected by a random process that can be easily implemented.

There may be a need for further site selection if any of the sites resulting from this process lack quality photo points for monitoring. If the point can not be marked for relocation in the future, and/or does not provide an elevated overall view of the site, another site may be selected within its category by the same process listed above.

IV. Detailed monitoring of selected sites (including controls)

The detailed monitoring of selected sites will be a long term ongoing process to specifically measure changes in campsites over time. This monitoring should occur every year, once in the spring, and once in the fall. The data collected in spring serves as a record of the campsite before the heavy use season, while the fall data is a measure of change after a season of use. Repeated measurement over the years will express long term impacts. Throughout the years, the sites should be watched to identify vegetation and topographical types that are more susceptible to disturbance and less resilient.

Depending upon the total number of sites in the park, it may be decided to monitor one half of the sites one year, and the other half the next, in a cyclic two year program. Measureable change in the sites is unlikely to occur over a one year period, and the cyclic monitoring will compensate for the park's personnel and budget constraints. It is recommended that one site of each impact level be monitored in every zone each year; resulting in **five** sites per zone every season (two times a year). It is estimated that three of four sites can be reviewed in a day if the researchers are familiar with the procedures and plant species in the transects. The estimate is also influenced by the distance travelled between sites. Two researchers is an optimal number for executing the procedures: one observer/ one recorder.

A. Methods for site specific detailed monitoring will be composed of two major steps.

1. Photographic record
2. Relocateable transects across campsite observing vegetation, litter, garbage, fecal matter, fire rings, trails, sand, dirt, rocks, etc.
3. It is critical that methods be simple, easily repeated, and well documented in order to collect meaningful data.
4. Eventually some of these sites will be monitored by aerial photos when funding permits. All of the information collected by present methods will supplement findings through aerial photography. Transects will be particularly valuable to ground truth the photos.

B. General site description

1. Look over the site, its size, location, exposure, etc., completing data sheet to include
 - a. An idea of outstanding characteristics of the site
 - b. How it may change with increased use, relating to factors like 1. access and 2. good rocks to sit on 3. trees to camp under or hang equipment on. These characteristics will orient the use by campers.

C 1. Photographic monitoring; recording data

This aspect of the detailed study is the first priority, and it can easily be performed by the park staff in the field. The sooner these photos are taken, the better. Using photo log, record this information for each photograph. Also record this data, where appropriate, on the general data sheet.

1. Site being photographed: site number taken from campsite inventory map.
2. Date (date everything)
3. Direction of photo (approximate azimuth of center of photo)
4. Type of film and roll number

C 2 Selecting photo point

From a general perspective, identify a photo point from which the site can be photographed.

1. This point should be outstanding in some way, to facilitate identification and relocation for future photographic records.

2. This point should also be at least five meters back from the edge of the central area of impact. This will allow for photographing to record vegetation loss or impact boundary expansion. It is often very difficult to clearly define the edge of impact in the desert environment because of natural spacing of vegetation. The clearest evidence is in the lack of ground cover (grasses & cryptogams), and soil compaction due to trampling. Other signs are broken limbs and fire rings. The five meters is not a hard and fast rule, but a suggestion that will also give an idea of vegetation type. Don't get too far back so that detail is lost from the photo.

3. Photographing the site from an elevated location wherever possible is highly recommended. (i.e. from a rock shelf, embankment, or boulder.) This kind of shot gives a much better perspective of the entire site.

4. Make sure to consider obstruction of view by trees, rocks, etc. Taking time to select a good photo point can save a good deal of work in the future.

5. In some cases, finding a good photo point with outstanding features may be difficult. In this case, the point can be identified by cross-referencing azimuth and distance from two identifiable points (i.e. trees, rocks, etc.). In order to do this, first identify and mark the reference points. Then measure distance and azimuth (with Brunton compass) to the central point where the lines intersect. If possible, mark this point by any of methods given below. This method may also be used to reference any photo point that may be difficult to relocate.

This will give an idea of basic photo direction. It is best to do this immediately before or after taking each photo so that this step is not forgotten or direction misrepresented.

4. If there are specific signs of impact that can not be seen in detail in the campsite panorama, it is recommended that photos be taken. For example: broken tree limbs, graffiti, fire pits, uprooted shrubs, etc.

5. When vegetation transects are run, these will be photographed for reference point location and general reference. This is described under vegetation transect methods.

D. Transect methods

The transects and corresponding meter plots will monitor short and long term changes along the boundaries of use and vegetation. Expansion of the site can be measured in terms of vegetation composition or density changes. Increase in exotic and weedy species is indicative of disturbance, and will be monitored by this method.

The vegetation transect for each selected site will originate from the established and marked photo point and run across the middle of the campsite to the other side of the site. The transect should extend at least five meters into the undisturbed perimeter of the site on both sides to allow for recording data on the surrounding vegetation. The length of the transect will vary according to campsite size. The endpoint opposite from the photo point should be well marked in order to be relocated. This should be done by any of the same methods described in the photo section. If there is a good endpoint that is less or greater than five meters from the campsite edge, or if it is not on center, it is acceptable to use the endpoint. It is critical that the two ends of the transects be easily relocated, or all work is lost. Photograph all endpoints as well as the transect every five meters while the tape is in place.

In running the tape between the two endpoints, every effort should be made to place the tape along the ground, rather than through trees and shrubs. It is not to be held taut, but run along the ground, over rocks and under plants wherever encountered.

The tape should be as close as possible to a straight line between the

two points. If the tape is forced off the straight line to circumvent a tree or bush, photograph and note exact measurement.

Along the transect, the intercept of everything encountered in a vertical plane from ground level to the top of canopy is recorded. This includes plants, (annuals & perennials), litter, rocks, dirt, sand, garbage, lichens, mosses, remnants of fires, trails.

After recording everything along the line to gather data on species composition and frequency. At five meter intervals along each transect, (0-1, 5-6, 10-11, etc.), a meter square plot is placed on the left side of the transect line. All plants within the vertical plane of this plot are tallied by species, and a canopy coverage class (1-6) is estimated for each species. Rocks, soil, moss/lichen/cryptogam, plant litter, garbage, etc. are also estimated for coverage class. These classes are as follows. (also listed on data sheet) Class 1: 0-5%; Class 2: 5-25%; Class 3: 25-50%; Class 4: 50-70%; Class 5: 70-95%; Class 6: 96-100%. It is helpful to bring original data sheets along for relocation of transect.

Precise relocation of the transect is not absolutely imperative, although every attempt should be made for precision. These transects measure percentages and trends in vegetation composition and cover. Over the years, when these are repeated, the variation from one reading to the next will balance out.

1. Site type: 1. River 2. 4WD 3. Horse/pack stock 4. Backpack 5. Other
2. Recorder(s): _____ 3. Date: _____ 4. District: _____
5. Survey Area: _____ 6. Location: _____
7. Elevation: _____ 8. Slope: _____ 9. Aspect: _____ 10. Estimated capacity: _____
11. Main trail/route: _____ 12. Distance: _____
13. Side trails (# and direction): _____
14. Water source or water course: _____ 14a. Distance: _____
15. Other sites(distance,direction,visible?,audible?): _____
16. Sites of interest(archeological,natural. Distance?) _____
17. Dimensions: a.Max. L: _____ b.Max.W: _____ c.Area: _____
18. Pests/insects (type and #): _____
19. Vegetation type: _____ 20. Soil conditions: _____
21. Number and direction of photos: _____ 22. Impact rating: _____
23. Expansion potential/topographic constraints: _____
24. Potential for fire spreading: _____
25. Number of landing/mooring sites (river): _____

Cover classes: 1=0-5%; 2=5-25%; 3=25-50%; 4=50-75%; 5=75-95%; 6=95-100%(apply to soil & vegetati

Ground cover: class

Soils: class

Human impact: Yes/No

26. Vegetation: a. canopy:
b. basal :

30. Bare rock:
31. Gravel(.2cm-7.5cm) : :

35. Fire pit :
36. Veg. damage :

27. Bare ground:

32. Stones(7.5 cm) : :

37. Trash :

28. Rock :

33. Sand (.05mm-2mm) :

38. Other :

29. Litter :

34. Silt or Clay(.05mm):

COMMENTS/DISCUSSION:

DIAGRAM:

Explanation Sheet for Applying the Impact Rating Keys

Following is several explanations for using the impact rating keys in assessing campsites in the back country. The impact rating keys have been designed to be easy to use and hopefully these explanation will clear up any confusion.

It is important that the user using the keys be aware of naturally occurring events that would have impacts to a site. The impacts rated at each site should only be human induced impacts. An example would be a fire that burned through an area 20 years ago. There may still be dead trees standing or charcoal in the soil from the fire and human impacts could be confused. The user needs to be aware of natur ally occurring events and look for them when rating an area.

1. Estimating the capacity of a site. The carrying capacity (number of people) for each site is important. The best approach to use is the square footage of a tent. Visually estimate where tents could be placed and what size of a tent could be used. Following is a list of the average square footage of tents.

one person tent	16.5 sq. feet
two person tent	27.2 sq. feet
three person tent	45.0 sq. feet

2. % of Tree & Shrub damage. This is based on the number of trees in the site. If one tree out of 10 shows some type of damage it is 10% of the trees. One out of 2 trees is damaged 50%. You should look at the trees adjacent to the campsite. Many times people will break limbs off of trees from the surrounding area. Count the total number of trees, count damaged trees,

$$\text{Divide } \frac{\text{Damage Trees}}{\text{Total number of Trees}} \times 100 = \% \text{ damaged trees}$$

3. Standard for estimating % cover of vegetation. Estimating % cover is probably the hardest to do when inventorying a site. The percent in the site should be compared to the percent cover outside the site. The best procedure is to take the total disturbed area figure the square footage or square meters and compare to similar habitat which is undisturbed. If the disturbed site has 10% less of the same type of vegetation it could be considered a reduction of 10% of the cover. This may not work all the time so you have to look at height and structure of the vegetation making sure you are comparing like areas.
4. Cryptogamic Crust. When looking at a site for Cryptogamic Crust make sure there is Cryptogamic Crust on the soil in the nearby undisturbed areas. Some soil types may natu rally not have much Cryptogamic Species and one may misjudge the amount. Compare percentage of Cryptogamic Crust with nearby soils to determine percent reduction. When there is no Cryptogamic Crust present give the site a rating of one.
5. What to do when no trees are present. When no trees are present the site is given a rating of 1.

6. "Islands" of vegetation. Often times in disturbed sites bare ground is found with clumps of vegetation in it. Many times it is because of a shrub or cactus plant with some grasses interspersed. Vegetation in the site that is isolated from other vegetation by an obvious amount of bare ground would be considered islands. Many of these islands are a little higher than the bar ground around it because of the roots holding soil in place.
7. Access trails. Access trails are trails that lead into a campsite from either a main hiking trail, four-wheel drive road or from a put in spot on the river.
8. Satellite sites. Satellite sites are usually a small site connected to a main area by a well defined path. They are usually sleeping areas used by people in a group who have a main cooking or congregating area. These satellite sites are common in sites along the river.

ITEM RATED	EXCELLENT	GOOD	FAIR	POOR
VEGETATION COVER				
a. % cover	<20% reduction in contrast to adjacent areas.	1-5 20-40% reduction	3 40-80% reduction	4.5 >80% reduction 6
b. Composition	<5% exotic or disturbance species present	1 5-20% of vegetation composed of exotics and disturbance spp.	2 20-50% exotics &/or disturbance species	3 >50% exotics &/or disturbance species 4
c. Distribution	vegetation evenly distributed throughout site.	1.5 <20% of veg. in site is accumulated or appearing in distinct isolated "islands" around shrubs or other stable objects.	1 20-50% of veg. built up in "islands"	1.5 >50% of veg. appearing in "islands" 2
SOIL DISTURBANCE				
a. Cryptogamic crusts	>80% still in appropriate habitat. 20% reduction in contrast to adjacent undisturbed area.	1 20-50% reduction in contrast to adjacent undisturbed area.	2 50-70% reduction in contrast to.....	3 >70% reduction in contrast..... 4
b. Compaction/loosening/erosion	<10% show compaction (fine soils) loosening (coarse soils) or erosion. Soils evenly distributed.	1 10-30% of soil shows compaction (fine soils) loosening (coarse), erosion or gullyng in <2 locations. Soils evenly distributed.	2 30-60% of soil shows compaction (fine soils) loosening (coarse soils). erosion or gullyng in 2-4 locations.	3 >60% of soil shows compaction (fine soils) loosening (coarse soils) erosion or gullyng in >4 locations. 4
c. Excavations and trenches	none present	1 1-2 excavations or trenches present	2 3-4 excavations or trenches present	3 >4 excavations or trenches present. 4
LITTER				
a. % cover	<20% reduction in contrast to adjacent undisturbed areas of similar habitat.	1 20-40% reduction in contrast to adjacent undisturbed areas of similar habitat.	2 40-60% reduction in contrast to adjacent undisturbed areas of similar habitat.	3 >60% reduction in contrast to adjacent undisturbed areas of similar habitat. 4
b. Distribution	evenly distributed	1 <50% of litter concentrated around base of stable objects and edge of site	2 50-80% of litter around base of stable objects and edge of site.	3 >80% of litter around base of stable objects and edge of site. 4
c. Condition	no obvious signs of broken or crushed litter	1 <40% of litter appears crushed or broken.	2 40-80% of litter appears crushed or broken.	3 >80% of litter appears crushed or broken 4
SIDE TRAILS				
a. Number	<2 side trails no spur trails, and only a few isolated footprints appear off trail	1 2-4 side trails present. few isolated footprints. no spur trails apparent. >1 trail leading to the same spot in 1 location	2 4-6 side trails >1 trail leading to the same spot in 2 locations. footprints off trails apparent.	3 >6 side trails >1 trail leading to same spot in >2 locations. footprints off trails apparent. 4
b. Width	average width of trails <12" wide	1 avg. width of 1 trail >12" wide	2 avg. width of 2-3 trails >12" wide. trails merging in 1 location.	3 all trails 12" wide trails merging in >1 location. 4
c. Depth	trails at same level as adjacent area.	1 1-trail worn below ground surface of adjacent area.	2 2-3 trails worn below ground surface of adjacent area.	3 all trails worn below ground surface of adjacent area. 4
ACCESS TRAILS				
a. Number	only 1 access trail to site from 1 landing mooring site	.5 2 access trails to site from 1 landing/mooring site.	1 3 access trails to site from 1 landing/mooring site.	1.5 3 access trails to site from 1 landing/mooring site 2
b. Width	trail(s) avg. width <12".	.5 avg. width of trail(s) 12-18 inches	1 avg. width >18" trail merging in one location.	1.5 avg. width >18" trails merging in >one location. 2
c. Depth	trail(s) even with ground level when viewed in cross-section	.5 one trail eroded below ground level when viewed in cross-section	1 2-3 trails eroded below ground level when viewed in cross-section.	1.5 all trails eroded below ground level when viewed in cross-section. 2
d. Profile	trail(s) show no erosion along profile from river to site.	.5 one trail shows erosion downward toward river. still no problem in ascent.	1.5 trail(s) show erosion downward. sand and debris beginning to accumulate in bottom.	2 trail(s) almost unclimbable slide away or erode under every footstep. high accumulation at base 4
SATELLITE SITES				
a. Number	none present	1 1 present	2 2 present	3 2 present 4
b. Condition	small mostly still vegetated. no exotic or disturbance species present.	1 <30% vegetation reduction in contrast to surrounding undisturbed area. <20% of vegetation composed of exotics.	2 30-60% veg. reduction in contrast to surrounding undisturbed area. 20-40% of veg. composed of exotics	3 >60% of veg. reduction in contrast to surrounding undisturbed area >40% of veg. composed of exotics. 4

ITEM RATED	EXCELLENT		GOOD		FAIR		POOR	
7. SHRUB DAMAGE								
a. % damaged reduced vigor	no damage apparent	1.5	<20% of total shrubs present show damage (broken limbs, crushed)	3	20-40% of present shrubs show damage	4.5	>40% of shrubs show damage	6
b. root exposure	no roots exposed	1.5	exposed roots on 2 shrubs	3	exposed roots on 3 shrubs	4.5	exposed roots on 4 shrubs	6
8. TREE DAMAGE								
a. Broken limbs, gashes, damage	no damage	1	20% trees show damage	2	20-50% of trees show damage	3	>50% of trees show damage	4
b. Root exposure	no roots exposed	1	6-2 roots exposed	2	3-4 roots exposed	3	>4 roots exposed in site	4
9. HUMAN WASTE								
a. Toilet paper	none present	1	1-2 pieces of toilet paper present.	2	2-4 pieces of toilet paper	3	4 pieces of toilet paper	4
b. Fecal matter	none present	1	1 pile	2	2 piles	3	>2 piles	4
c. odor:	no odor of urine present	1	no odor	1	urine odor present	2	urine odor present	2
10. FIRE PITS								
a. Number	none present	1	sign of one small fire ring (<2' dia.)	2	1 fire ring >2' dia.	3	>1 fire ring	4
b. Scars & other damage	none	.5	rocks show no fire scarring.	1	<25% of rocks show scarring	1.5	>25% of rocks show scarring	2
c. Charcoal & ash	none	.5	charcoal and ash in site can be easily be returned to natural or undisturbed state	1	charcoal and ash concentrated in a pile	1.5	charcoal & ash scatter throughout site mixing with soil in some cases trash in fire.	2
11. ROCK DISPLACEMENT	none	1	5-10 small rocks (<12" dia.) moved no tables or seats constructed	2	>10 rocks moved no tables or seats constructed	3	>10 rocks moved tables seats and other items constructed	4
12. PESTS and INSECTS (ants, flies, rodents)	none present in site, within 50' of site.	1	1 ant colony in site, found crawling in <50% of site. no signs of rodents. no obvious flies within 50' of site	2	1-2 ant colonies in site found crawling in <50% of site. 1 rodent hole or burrow within 50' of site. a few flies apparent	3	2 ant colonies, found in >50% of site. >1 rodent hole or burrow within 50' of site numerous flies present	4
13. TRASH	none present	1	1-5 pieces of non-biodegradable or biodegradable trash present	2	6-10 pieces of non-biodegradable or biodegradable trash present	3	>10 pieces of trash present	4

Record the values in each column of the summary sheet. Then add values to obtain total score for site rating. Excellent (E)=28-42; Good (G)=43-71; Fair (F)=72-98; Poor (P)=73-98

DATE:	ASSESSOR(S):						
IMPACT FACTOR	SITES SURVEYED						
SITE NUMBER							
AREA FT. ²							
1. GROUND COVER							
a. % cover							
b. composition							
c. distribution							
2. SOIL DISTURBANCE							
a. cryptogams							
b. excavations							
compaction, loosening							
c. erosion							
3. LITTER							
a. % cover							
b. distribution							
c. condition							
4. SIDE TRAILS							
a. number							
b. width							
c. depth							
5. ACCESS TRAILS							
a. number							
b. size							
6. SATELLITE SITES							
a. number							
b. condition							
7. TREE DAMAGE							
a. broken limbs							
b. root exposure							
8. SHRUB DAMAGE							
a. % damaged							
b. root exposure							
9. HUMAN WASTES							
FIRE PITS							
10. a. number							
b. scars, etc.							
11. ROCK DISPLACEMENT							
PESTS & INSECTS							
13. TRASH							
TOTAL							
IMPROVED RATING							

ITEM RATED	EXCELLENT	GOOD	FAIR	POOR
1. VEGETATION COVER				
a. % cover	10% reduction when compared with adjacent undisturbed area	1.5 10-30% reduction	3 30-60% reduction	4.5 60% reduction
b. Composition	No exotic or disturbance species present	1 10-20% of vegetation composed of exotic/disturbance species	2 20-50% exotics and/or disturbance species	3 50% exotics and disturbance species
c. Distribution	Vegetation evenly distributed throughout site	3 faint appearance of isolated "islands" of vegetation	1 up to 30% of veg. built up around shrubs and "islands" of vegetation	1.5 30% of vegetation built up around shrubs and "islands" of vegetation
2. SOIL DISTURBANCE				
a. Erosion/cracks	No disturbance still intact in appropriate habitat	1 30% reduction of crust when compared to adjacent/undisturbed area	2 30-60% reduction of crust	3 60% reduction of crust
b. Compaction/leaching/cracks	None apparent	1 30% of soil in site shows compaction (fine soils) or leaching (coarse soils)	2 30-60% of soil shows compaction or leaching. Signs of erosion or gully in 2 locations	3 60% of soil shows compaction or leaching signs of erosion in 2 locations
c. Deposition and trenches	None apparent	1 1 or 2 small trenches or excavations	2 2-4 excavations or trenches. A few may show slight erosion	3 4 excavations or trenches. None show erosion and gully
3. LITTER				
a. % cover	10% disturbed	1 35% reduction in contrast to adjacent/undisturbed areas	2 35-70% reduction compared to adjacent/undisturbed areas	3 70% reduction compared to adjacent undisturbed areas
b. Distribution	Evenly distributed	1 30% of litter around edge of site and stable objects	2 30-60% around edge and stable objects	3 60% of litter around edges and stable objects
c. Condition	No obvious signs of broken or crushed litter	1 Slight appearance of crushed and broken litter	2 60% appears crushed or broken	3 60% appears crushed or broken
4. FIRE TRAILS				
a. Number	Only 1 present; not very obvious from main trail to or through site. No spurs, trails, and only a few isolated footprints present	1 2 distinct trails from main trail to site or between attraction sites (such as site or spring). No spurs. Few isolated footprints	2 3 distinct trails from main trail to site or between attraction sites. 3 side trails or spurs developing. Footprints apparent	3 3 distinct trails from trail to site. 3 side or spur trails developing. Trails have begun to merge, numerous footprints in and around trail and site
b. Width	Average width 12"	1 Avg. width of 1 trail 12"	2 1 or 2 trails wider than 12"	3 Avg. trail width 12" Trails merging
c. Depth	Trail at same level as adjacent area	1 1 trail wearing below level of adjacent area	2 At least 2 trails deeper than adjacent ground level	3 All trails deeper than adjacent ground level
5. SHRUB DAMAGE				
a. % damaged (broken limbs, crushed, etc.)	None show any damage	1.5 10% of shrubs show damage (i.e., broken limbs, crushed appearance)	3 10-30% of shrubs show damage 1 or 2 show reduced vigor as a result of damage	4.5 30% of shrubs show damage. 2 show reduced vigor. Dead or dying shrubs present
b. Root exposure	No roots exposed	1.5 Exposed roots on 1 shrub	3 Exposed roots on 2 shrubs	4.5 Exposed roots on 3 shrubs
6. TREE DAMAGE				
a. Broken limbs, gashes, etc.	No damage; or no trees present	1 10% of trees have broken limbs, gashes, or other damage	2 10-35% of trees have broken limbs, gashes or other damage	3 35% of trees have broken limbs, gashes, or other damage
b. Root exposure	No roots exposed; or no trees present	1 1 root exposed in site	2 2 roots exposed in site	3 3 or more roots exposed in site
7. HUMAN WASTE				
a. Toilet paper	None present	1 1-2 pieces of toilet paper present	2 3-4 pieces of toilet paper	3 4 pieces of toilet paper
b. Fecal matter	None present	1 One pile of feces unencountered	2 Two piles of feces	3 Greater than two piles of feces encountered
8. FIRE PITS				
a. Smokes	None present	1 Sign of 1 small fire ring (2' diam.)	2 1 fire ring 2' diam	3 1 fire ring
b. Rock scarring	None	1 Less than 15% of rocks show fire scars	2 10-50% of rocks show fire scars	3 Greater than 50% show fire scars
c. Charcoal and ash	None present	1 Small trace of charcoal and ash concentrated in one pile. Site can be easily returned to natural or undisturbed condition	2 Concentrated pile of charcoal and ash in obvious pile	3 Charcoal and ash concentrated throughout site, mixing into soil
9. ROCK DISPLACEMENT				
	None	1 1-5 small rocks (6" diam.) moved. No tables or seats constructed	2 5 rocks moved. No tables or seats constructed	3 5 rocks moved. Tables, seats, and other items constructed
10. TRASH				
	None present	1 Under 4 pieces of trash, biodegradable or non-biodegradable	2 4-6 pieces of trash	3 Over 6 pieces of trash
11. PETS AND INSECTS				
	None	1 1 small ant colony in or at edge of site	2 1 ant colony. Ants in less than 30% of site. Few captured signs of rodents within 30' of site	3 Greater than 1 ant colony. Ants throughout site. Numerous signs of rodents: tracks, burrows, nests within 30' of site

Record the values in each column of the summary sheet. Then add values to obtain total score for site rating.
 Excellent (E)=25-37; Good (G)=38-62; Fair (F)=63-87; Poor (P)=88-100.

DATE		ASSESSOR(S)					
IMPACT FACTOR		SITES SURVEYED					
SITE NUMBER							
AREA FT.							
1. VEGETATION COVER							
a. % cover							
b. composition							
c. disturbance							
2. SOIL DISTURBANCE							
a. cryptogamic crust							
b. compaction, loosening, erosion							
c. excavations trenches							
3. LITTER							
a. % cover							
b. distribution							
c. condition							
4. SIDE TRAILS							
a. number							
b. width							
c. depth							
5. SHRUB DAMAGE							
a. % damaged							
b. root exposure							
6. TREE DAMAGE							
a. broken limbs, gashes, damage							
b. root exposure							
7. HUMAN WASTE							
a. toilet paper							
b. fecal matter							
8. FIRE PITS							
a. number							
b. rock scarring							
c. charcoal and ash							
9. ROCK DISPLACEMENT							
10. TRASH							
11. PESTS & INSECTS							
TOTAL							
IMPROVED RATING							

RECREATIONAL IMPACT ASSESSMENT AND MONITORING PLAN

I. PURPOSE - Mandate

- A. Management concerns, responsibilities, influences on management
Regulations
Other related documents (Backcountry Mgmt. Plan, Archeological Mgmt. Plan,
Resource Mgmt. Plan, Baseline Data Coll. & Monitoring)
- B. Discussion of sociological & biophysical impacts (literature review)
 - 1. Summary of observations and data collected to date.
 - 2. Biophysical changes - i.e., veg., soils, fauna, H₂O, human wastes.
 - 3. Sociological
 - a. Visitor Expectations
 - b. Perception of biophysical change
 - c. Crowding
 - d. Conflict of use types
 - e. Site selection criteria

II. OBJECTIVES

III. INTRODUCTION & BACKGROUND OF PARKS

- A. General orientation to Arches, Canyonlands, Natural Bridges
 - 1. Location, size, access, trails and roads
 - 2. Unique and special features of the Colorado Plateau
(fragile characteristics, arid environments)
- B. Visitor use of each park
 - 1. General discussion - Kinds of uses (4WD, river, horse, hiking,
Under each kind of use discuss characteristics, expectations of
each user group and potential impacts of each type of use.
 - 2. Arches
 - a. Visitation - Numbers, length of stay, distribution
 - b. Backcountry zones

c. Use Zones

1. Road (points of interest)
2. 4 WD
3. Hiking (day and night)
4. River
5. Horses
6. Large groups, i.e. Outward Bound

3. Canyonlands

- a. Visitation: Numbers, length of stay, distribution
- b. Backcountry zone
- c. Use zones

4. Natural Bridges

- a. Visitation
- b. Use zones?

IV. METHODS FOR ASSESSING AND MONITORING SOCIOLOGICAL & BIOPHYSICAL IMPACTS

(for each type of use: 4 WD, river, hiking, horse)

- A. General discussion - need easily applied methods to obtain consistent and reliable results.
- B. Equipment needed.
- C. Inventory & initial impact assessment: step by step instructions
 1. Location procedures
 2. Data sheets: mapping, general description, photos
 3. Impact rating key (for each use because standards and expectations differ)
 4. Scheduling
- D. In-depth monitoring on selected sites
 1. Selection of sites
 2. In-depth monitoring procedures
 - a. Vegetation transects
 - b. Measurements
 - c. Profiles
 - d. Soils
 - e. Fauna?
 - f. Site recovery
Studies (cryptogams)
 3. Scheduling

E. Long-term monitoring

1. Re-inventory and re-assessment of sites
2. Scheduling

F. Data analysis and storage

1. Computer
2. Files: HQ and in districts
3. Correlate impact data with visitation data
4. Use of other data/overlap with other plans
 - a. Water resources
 - b. Baseline monitoring: control data for contrast with impacted sites.

V. ROLES AND RESPONSIBILITIES

- A. Cooperation with field
- B. Resource Management staff

VI. EXPECTED OUTCOMES

- A. Use in management - site designation, restrict numbers, ID critical habitats, etc.
- B. Rehabilitation/Site restoration (plan)
- C. Minimum impact audio-visual program for Colorado Plateau
 1. To diverse audience (all types of use)
 2. To include safety and regulations info.
 3. Ecological education emphasis.
- C. Publication and presentation of methods at research symposium.

VII. RECOMMENDATIONS FOR FURTHER RESEARCH.