Part II – Techniques and Equipment

Overview of Techniques and Equipment Used to Estimate Recreation Use

Several basic techniques are commonly used to gather recreation use data. Managers can directly count people and observe the activities in which people participate or managers can use indirect methods such as mechanical equipment and registers to count people. Some equipment can be used in combination to collect more detailed information such as duration of activity participation or group size. Other indirect methods of estimating use include using data from other agencies and using local knowledge and observation.

The sampling plan and area to be sampled will determine the appropriate measurement technique. Equipment found useful to count visitors includes traffic counters, voluntary registration, visitor surveys, mandatory permits, and remote sensing. Visual observation is also a useful technique when the information is recorded and analyzed. Each technique and type of equipment has strengths and weaknesses.

Techniques

Traffic counters record and tally the passing of objects. They may mechanically detect impact of tires, feet, or hooves using tubes or pads placed under a surface; or employ magnetic loops to detect vehicles; other counters detect motion, heat, sound, vibration, or light.

Counters are available for road, trail, and river use, and can count objects such as vehicles, hikers, horseback riders, bicyclists, cross-country skiers, snowmobilers, and boaters. Traffic counters can be used alone to count the number of visits or they can be combined with another measuring technique to calculate variables such as group size, activity participation, and length of stay. Techniques most effectively combined with traffic counters include visual observation (with camera or person), surveys, and registration.

Detailed information about the pros and cons of various traffic counters is summarized in: Trail Traffic Counters for Forest Service Trail Monitoring, a USDA Forest Service, Missoula Technology and Development Program publication (1994).

Voluntary registration depends on visitors signing a registration form sometime during their visit. Registration sites are usually unstaffed and located at or near trailheads, visitor centers, ranger stations, and undeveloped campgrounds. Voluntary registration means some visitors will choose not to fill out forms. Inaccurate use estimates can result unless you use another technique to determine the ratio of those that register versus those that don't. This ratio allows you to collect more defensible data. Traffic counters, cameras, and

personal observation can be used to develop this ratio.

Visitor surveys are not used solely to count visitor use. Rather, they are used to measure other visitor characteristics such as visitor satisfaction, length of participation, frequency of participation, preferences, types of activities engaged in, etc. Surveys involve directly contacting the visitor either in person or by mail and administering a questionnaire.

Mandatory permits require visitors to obtain written permission before using an area. Failing to obtain permission violates regulations, and there is a high incentive to obtain a permit. A ratio of those who obtained the permit to those who did not should still be developed. Permits are most often required in developed campgrounds, for boats, some wilderness areas, and ATV use.

Permits are often required for other management purposes such as limiting use, or user education. They may be useful to managers not only for number counts, but may contain information on group size, place of residence, length of stay, etc. Permits may be issued through the mail, over the phone, in person, or may be self-issued on-site (such as a trailhead).

Remote sensing is used to observe recreationists from a distance. This is accomplished by airplane, helicopter, and balloon over flights. When balloons are used, they are tethered and have cameras attached. The cameras are triggered either by remote control or a timer. Helicopters and airplanes require an observer who takes photographs or videos. Use of remote sensing satellites for monitoring may be feasible in the future. In all cases the photos are analyzed later. For most effective use of remote sensing, the ground level activity must be clearly visible. Special areas such as wilderness may have altitude restrictions and limit use of this method. The high cost and restrictions of this technique limit its usefulness for most managers.

Visual observation is systematically observing people as they enter an area or participate in an activity. The best use of this technique is to station a person at the location to observe the visitor and record the information on a form. Movie cameras, video recorders, or still cameras can be used in place of personnel. This equipment can be used in conjunction with traffic counters that trip the camera, roll the film, and record time and date. To ensure that all visitors are counted, cameras can be used only at sites where the visitor passes a specific location. It is important to protect visitor privacy by not using cameras in campsites or living areas, and to blur the lens enough to prevent facial feature identification. Visual observation is commonly used to validate or supplement other techniques.

Selecting Sampling Equipment and Techniques

Past research has shown that field managers consider several important factors before selecting and implementing a sampling technique. These factors include: (1) amount of time and effort required for them to implement the technique; (2) initial cost of purchasing sampling equipment and paying personnel to implement the technique; (3) future sampling and equipment maintenance costs; and (4) reliability of data collected. An additional factor called (5) “visitor burden” has been added that may assist in the decision process. Some sampling techniques do not involve any interaction or time with the visitor being counted, other techniques require visitors to sign a register or fill out a questionnaire.

In this section you will work through a decision key process based upon: time and effort required; initial equipment and implementation costs; future equipment and maintenance costs; and visitor burden. After making a series of guided decisions, one or more sampling techniques will be recommended. You can then read about these specific techniques and decide which one best fits your management situation.

It is assumed you have already followed the steps in Part I. The desired accuracy of your data has been determined by your sampling plan. The sampling plan also identified where and when you will sample, and which recreation use activities you will monitor.

Step 1 - Quick Technique Selection

Review this step to see if you can quickly select the appropriate technique for special situations.

In some situations, information required to estimate use is already being gathered for other purposes. If any of the following situations apply to your area, read the page referenced and determine if the technique applies to your situation. If these techniques do not apply, proceed to Step 2. If these techniques will work for you, go into the field and collect your data! Once collected, it must be analyzed and checked against your objectives. You will then analyze and report your data.

1. Is the activity you wish to sample already being counted by another agency or within another department in your own agency?

It is cost prohibitive and impractical to expect that all activity types can be measured using statistical methods. Indirect, nonstatistical methods of collecting data may be used if they meet your management objectives. Data collected by other agencies, special use permittees, or other departments in your own agency

can be used. For example, big game hunting use on National Forest System lands may be estimated indirectly from State sales of deer and elk hunting tags. The data are often recorded by county. You can then estimate use for the portion of that county on your District. Using local observation from fire patrols and other field workers may help you identify the areas of concentrated hunting use in the county.
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2. Is a fee required for each visit to the area?

If so, you can probably determine use estimates from this system. Ticket sales from ski areas or campground fee permits can easily be use to correlate use. **Go To Page 38**

3. Do you have a mandatory permit system in place?

If so, you can probably determine your use estimates from this system.
Go To Page 37

4. Are Campground hosts, entrance station attendants, or others measuring use at a campground?

If so, many techniques such as traffic counters and cameras are not appropriate. Visitors often enter and leave the campground several times during one day's visit, which causes the traffic counter to overestimate use. Techniques that are most appropriate are: Fee Receipts (Page 38), Registration With Personal Observation (Page 29), Personal Observation (Page 23), and Visitor Surveys (Page 35).

5. Does your area have a host whose primary duty is to greet visitors as they enter the area?

If so, they can probably estimate use to the area. Since the host is already there, techniques that utilize the host may be most appropriate. These include Personal Observation (Page 23), Registration With Personal Observation (Page 29), and Visitor Surveys (Page 35).

Step 2 - At what type of site are you estimating recreation use?

Selection of recreation sampling techniques and equipment will vary with the recreation setting. Primitive or semi-primitive areas present special challenges making accurate recreation use counts difficult. People are dispersed throughout the area, perhaps hunting and bushwhacking off developed roads and trails. Finding and counting these people is almost impossible! In roaded natural and urban recreation settings, people are concentrated in specific areas and use is easier to count.

To assist you in selecting techniques and equipment most appropriate for your sampling situation, the recreation setting has been categorized into four types. Decide which of the four categories best describes the site where you wish to estimate recreation use:

- *concentrated use with limited access*
- *concentrated use with multiple access*
- *dispersed use with limited access*
- *dispersed use with multiple access*

Once you have selected the category that best describes your sampling situation, turn to the appropriate decision key. Make the decision for time and effort, initial cost, future cost, and visitor burden. Read about each technique recommended for your situation. Select the technique that best meets your need and collect the data.

Definitions

Areas being sampled have either concentrated or dispersed recreation use.

Concentrated Use Areas–These areas relate to the urban, rural, and roaded natural end of the recreation opportunity spectrum. They are characterized by having designated sites within a larger area and are often designed for particular activities. This category defines most developed campgrounds, visitor centers, and interpretive sites. There are usually specific places for specific activities and visitors are easy to count.

Dispersed Use Areas–These areas are generally related to the roaded natural, semi-primitive, and primitive end of the recreation opportunity spectrum. Distribution of visitors is not controlled or funneled, and one large area often supports a wide variety of recreation activities. Examples of dispersed use areas may include lakes, rivers, trails, roads, and the general forest. On trails, for example, visitors may stray from the trail to hunt, camp, or explore nature. They may be difficult to find with many sampling techniques.

The basic approach to counting people in dispersed areas is to sample use at concentration or access points before dispersion takes place (trailheads, boat launches, major access roads, etc.). Care must be taken when reporting use at these staging areas. Remember, the activity itself occurs in the larger dispersed area, not the staging area. The use reported for the trailhead or staging area should include loading and unloading time only.

Limited Access–Areas with limited access have a small number (generally one or two) of well-defined entrance points. Examples of areas with limited access include most visitor centers, a fishing site with access only from a parking area, a lake with one boat launch, or a trail with one trailhead.

Multiple Access–Areas with multiple access routes have many well-defined and/or undefined entrance points (more than two).

Examples of areas with multiple access include a river with many launch sites, a general forest area with many logging roads providing multiple entry and exit routes, or a semi-primitive management area with motorized trails and trailheads.

Step 3 - How much time and effort can you spend to collect use data?

Estimating recreation use with any technique requires planning, skill, and knowledge. Effort is required to develop and adhere to a sampling plan, to purchase, install, and validate equipment, to maintain equipment, and to analyze the data collected.

The techniques are rated by categories assuming you have no prior knowledge of the technique. If you do know something about using a particular piece of equipment the technique will require less time and effort. Select the categories below based upon the time and effort you have available.

Time and Effort Categories

Minimal to Some - requires little time and planning, and the staff usually can easily learn the skills and knowledge needed. Maintenance costs on equipment are minimal.

Moderate to Extensive - requires considerable investment in planning, time, skill, and knowledge to implement the technique. At least 10 days are needed to properly design and administer the surveys, or purchase, calibrate and install the equipment, and/or more extended time is needed to collect and analyze the data.

Step 4 - How much money can you spend on initial equipment purchase, calibration, setup, and data collection?

The purpose of specifying a cost category is to help identify techniques that may be too expensive for your budget. Costs associated with estimating visitor use include: equipment, labor, analyzing information, and maintenance. Estimate how much money you can spend on initial equipment purchase and project how much you can spend on future data collection for the next several years. Future budgets may affect the technique you choose now. For example, you may be willing to spend a little more now if the cost of using the technique in the future is low. Consider using volunteers, campground hosts, or borrowing equipment to save some costs. Select the initial and future cost categories that best meet your needs.

Initial and Future Cost Categories

0-$400
over $400

under $2,000
over $2,000

Step 5 - Visitor Burden

Visitor burden is the amount of time and effort visitors must expend to be counted. Visitor burden should not be viewed negatively. It may be an opportunity to involve and obtain first-hand information from the visitor. When you select the visitor burden category appropriate for your situation, do not assume that "No Visitor Burden" is always better than visitor burden. Base your decision on management objectives and the recreation setting. For example, people backpacking in a primitive ROS setting expect solitude and little sign of management. On-site visitor surveys may disturb their sense of solitude and may not be appropriate. On the other hand, campground visitors may welcome the interaction.

Visitor Burden Categories:

No Visitor Burden—the visitor is not actively involved in the process of being counted.

1 to 3 minutes Visitor Burden—requires up to 3 minutes of the visitor's time.

3 to 10 minute Visitor Burden—requires over 3 minutes and up to 10 minutes of the visitor's time.

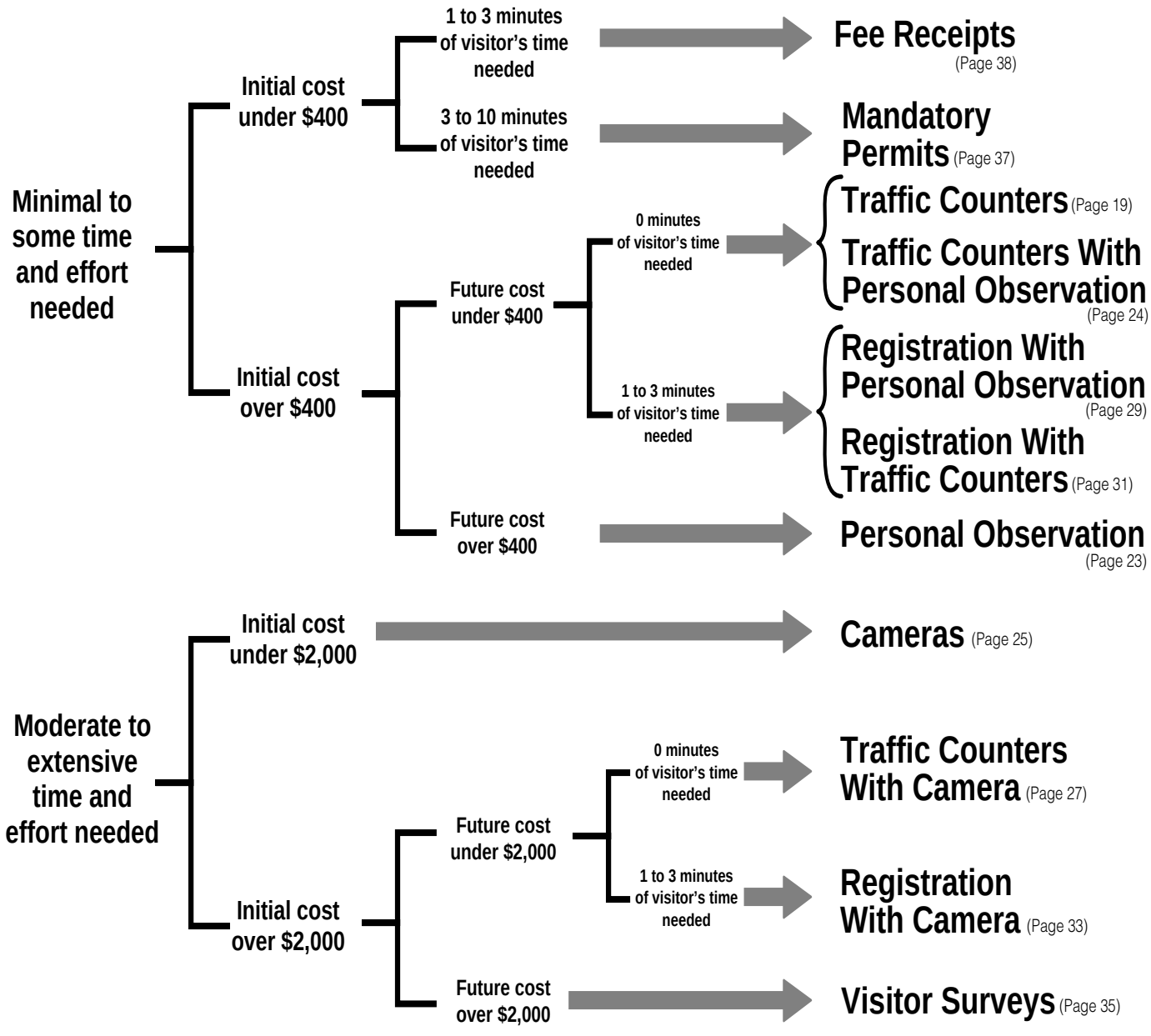
over 10 minute Visitor Burden—requires over 10 minutes of the visitor's time.

Step 6 - Selecting the Final Technique

Following this section are three decision keys. Select the appropriate key based on your decision in Step 2. Once you have selected the right key, use the decisions you made in Steps 3 through 5 to select the appropriate techniques(s) for your situation. It is not necessary to read the section in its entirety. Instead, read only about the techniques that you are considering using. Following is an index of the techniques discussed in the next section.

Decision Key No. 1 - Concentrated Use or Dispersed Use With Limited Access

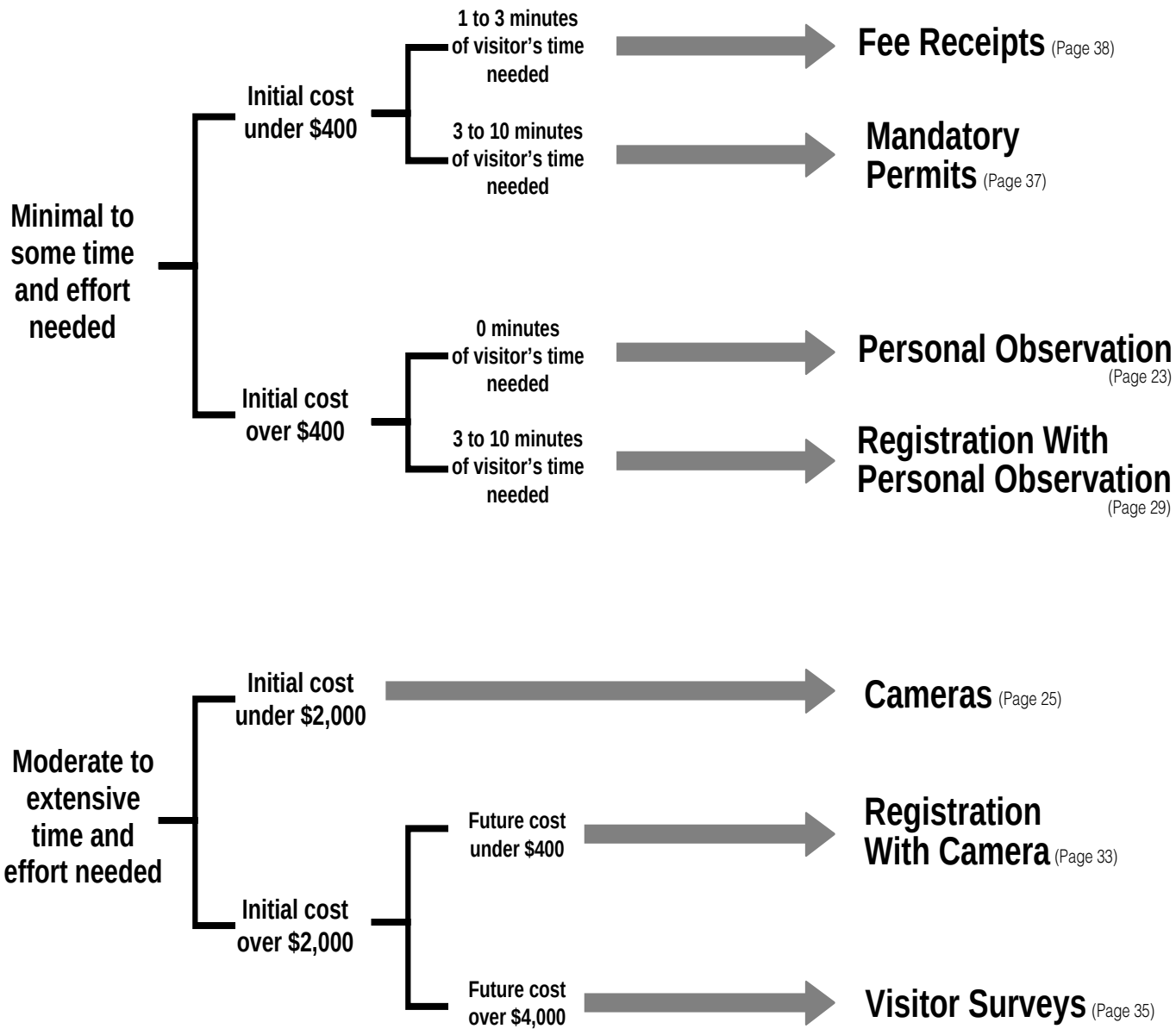
Concentrated Use or Dispersed Use With Limited Access



94-29

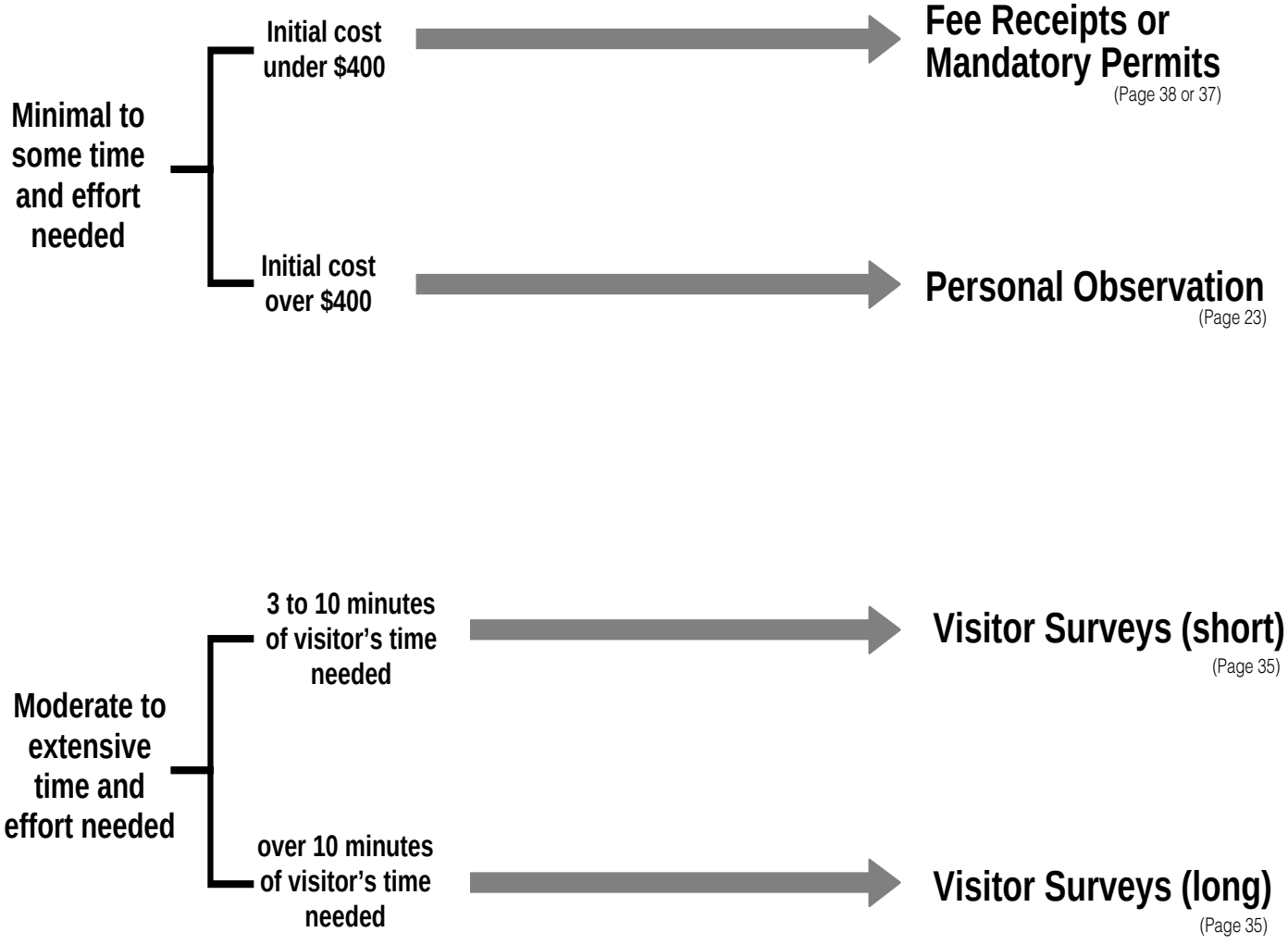
Decision Key No. 2 - Concentrated Use With Multiple Access

Concentrated Use With Multiple Access



**Decision Key No. 3-
Dispersed Use With
Multiple Access**

Dispersed Use With Multiple Access



Implementing Visitor Use Sampling Techniques and Equipment

This section provides a detailed description of each technique and tips about the equipment used including:

Advantages
Disadvantages
Approximate Costs
Steps in Implementation
General Description
Site Limitations
Equipment Needed
Installation and Setup
Collecting the Data
Factors Influencing Reliability
Maintenance Costs
Future Estimation Procedures

IndirectNon-statisticalMethods

Advantages

Low cost
Low time commitment

Disadvantages

Accuracy of data usually unknown

Approximate Costs

Range: $140 to $308

Specific Expenses
$28 to $84: 2 to 6 hours finding other agency data ($14/hour)
$112 to $224: 8 to 16 hours analyzing and applying estimates ($14/hour)

Steps in Implementation

1. Determine activities to be analyzed
2. Determine site locations
3. Find data sources
4. Analyze data received
5. Apply data to site locations

General Description

Indirect, nonstatistical methods of collecting data may be used if they meet your management objectives. Data collected by other agencies, special use permittees, and other departments within your own agency may provide the information you need. Engineers record road traffic use; Campground Hosts often observe types of recreation activities, types of people, group sizes, and even activity duration. Decreasing recreation budgets call for cooperative, creative work. Developing simple record forms that can be used by other field workers may help you collect more data in remote locations.

Do not overlook the value of recruiting volunteers to help collect your data. Other potential information sources include State Comprehensive Outdoor Recreation Plans, county and city surveys, State Park studies, Bureau of Land Management studies, local tourism offices, etc. Recreation use trends, especially for new high tech sports such as paragliding or wind surfing may be estimated through supplier market studies.

Site Limitations

Data collected through other sources may not match the specific area you need to analyze. For example, State Parks information may analyze the number of people fishing, hiking, and camping in state parks near your area, however they may offer very different services that attract a different visitor.

Equipment Needed

None.

Installation and Setup

None.

Collecting the Data

This step simply involved searching for and pursuing possible data sources.

Factors Influencing Reliability

Since you are estimating use based upon judgment instead of numbers, the reliability of your final estimate will be unknown. If someone else took the same data source and used their judgment, their use estimates may be very different than yours. To keep

some consistency, be sure to record your thought and estimate process.

Maintenance Costs

None.

Future Estimation Procedures

Revisiting your identified data sources may help you identify trends in various activities.

TrafficCounter s

Advantages

Reasonable cost
Easy to operate

Disadvantages

Equipment subject to vandalism
Provides limited information when used alone

Approximate Costs

Range: $205 to $1,000

Specific Expenses
$205 to $595: One counter and sensor system
$28 to $84: Installation and calibration (2 to 6 hours at $14/hour)
$200 to $250: Validation (20 to 25 hours at $10/hour) maintenance and batteries

Costs for Future Estimates
$20 to $84: Installation and calibration yearly
$200 to $250: Validation yearly

Steps in Implementation

1. Determine site location
2. Develop sampling plan
3. Determine equipment needs
4. Purchase equipment
5. Install and calibrate equipment
6. Validate counter
7. Read counter
8. Rotate counter to other sites (optional)
9. Analyze data

General Description

Traffic counters are devices that record the passing objects. They can be used on roads, trails, rivers, or any area where a visitor must pass a given point. Counters can record many types of activities including hiking, horseback riding, bicycling, skiing, snowmobiling, and boating.

Traffic counters have two basic parts: the counter box, and the sensor that detects the visitor and triggers the counter. Types of counters include active and passive infrared sensors, seismic sensors, electromagnetic inductive loops, and pneumatic tubes. Some counters have interchangeable sensors while others do not. Some counters allow the addition of cameras and date recording equipment.

The traffic counter, when used alone, is limited in the types of visitor use information it can record. For example, when visitors pass the counter in a vehicle, only the number of vehicles is recorded, not the total number of people using the area. Types of visitor use cannot always be distinguished. Unless you select certain types of counters (such as seismic counters) skiers, bikers, ATVers, horseback riders, and hikers would not be distinguished. You can separate use information by using two different types of counters on one trail or road. For example, snowmobilers and skiers could be separated by using both a seismic counter and an active infrared counter. The seismic counter's sensitivity can be set to record only the greater vibration of snowmobilers. Skiers can be determined by subtracting the seismic count from the infrared count.

Time and effort to use traffic counters is moderate. Initially you

must become familiar with the particular counter, install and calibrate it, and validate the count. After this initial effort, little further time or effort is required. The batteries must be changed every 2 to 6 months, and data must be read and recorded at set intervals.

Site Limitations

An area must have formal access (by road, trail, river, etc.) and contain a limited number of access points for traffic counters to work most efficiently. If there are many access points, more counters will be needed or one counter will have to be rotated. Counters should be concealed from vandals.

When counting vehicles on roads, the counter should be located at the entrance to the site. Do not locate it where vehicles will stop next to the counter or turn sharply. Traffic counters are not effective in areas such as campgrounds, where visitors enter and leave the area multiple times, because they cause over counting.

When counting trail users, the counter should be located far enough up the trail to avoid counting people who are "looking," but not hiking. The counter should be located on a narrow section of trail so visitors will be traveling single file. Do not locate the counter where people may stop, such as scenic stops or at the top of a steep grade.

Equipment Needed

The number of sensors and counters needed depends upon the number of entrances to the sample area. Ideally, a counter should be located at each entrance. Cost and effort may not allow this. An alternative may be to install the sensor portion of the counter at each entrance and rotate the counter itself among the sensors.

Traffic counters appropriate for sampling use on Forest Service trails were recently evaluated by the Missoula Technology and Development Center. Each type of traffic counter performs best in one or two situations, but not optimally in others. This publication will greatly assist you in choosing the appropriate equipment. The publication to order is: Trail Traffic Counters for Forest Service Trail Monitoring. USDA Forest Service, Missoula Technology and Development Program, publication no. 9423-2823 MTDC (1994).

Types of Counters

Active Infrared Counters emit a beam of light aimed at a reflector up to 100 feet away. When an object interrupts the beam, the sensor triggers the counter. One of its limitations is that it must be mounted at waist level, which means that a tree or post must be located on each side of the trail. These counters cannot be easily rotated among entrances.

Passive Infrared Counters operate by detecting moving objects that have a temperature different from their background. Animals, fog, or changes in temperature may trigger the counter. These systems are not recommended for most uses, unless connected with a camera. Photos of the object that triggered the counter would allow you to distinguish between visitors and phenomena that might trigger the counter.

Seismic Counters (Figure 4) operate by attaching the counter to a seismic sensor buried in the ground under the trail or road. When the sensor detects vibration above a given level, it triggers the counter. These counters can be difficult to calibrate correctly. Accuracy depends on sensor type, soil type, and the objects to be counted. An advantage of seismic counters is that the sensors can be buried and left in the ground for many years (in some cases 8 or more years). This facilitates rotating counters and using counters in future years. If the sensor is not connected to a counter, the end of the cable must be covered for protection.

Inductive Loop Counters (Figure 5) are attached to a loop of copper wire buried under a trail or road. When a metal object passes through the loop's electrical field, the counter is triggered. Because only metal objects will trigger these counters, inductive loops are not suitable to count pedestrians or horses.

Model	Cost	Power Source	Best Uses
Diamond Traffic Products	$320	Batteries	Counting Bicycles
Diamond Traffic Products	$300	6 D-Cell Batteries	Counting Bicycles
K-Hill Signal Co.	$290	Two 6 Volt Batteries	Counting Bicycles

Figure 5.–Inductive Loop Counters.

Inductive loop counters work well on paved and unpaved roads and trails. The vehicle does not need to be moving at a minimum speed to register. However, the loop should not be located where traffic will stop over it. Since the sensor is buried, the counter is less subject to vandalism than conventional road (or pneumatic) tubes.

Road Tube Counters (Figure 6) are attached to a rubber tube that stretches across a roadway. When a wheeled vehicle crosses the tube, a burst of air triggers the

Model	Cost	Power Source	Best Uses
Diamond Traffic Products *Traffic Tally 77*	$275	Batteries	Counting Vehicles Measures 2-Speed Ranges (3-30 mph & 7-90mph

Figure 6.–Road Tube Counters.

Model	Cost	Weight lb (kg)	Size in (cm)	Power	Installation	Construction	Accuracy	Vandal Resistance
Active Infrared								
Cuesta Systems **RS-501**	$595	6.6 (3.0)	11.5 x 7 x 6.5 (29 x 18 x 16.5)	4-C-Cells	Average	Very Good	Good	Average
Ivan Technology **Trail Traffic Counter**	$1,000	6.7 (3.0) each unit	6.25 x 6.25 x 4 (16 x 16 x 10) Each Emitter & Receiver	8-D-Cells 2-N-Cells	Average	Very Good	Very Good	Good
Diamond Traffic **TCS-120**	$420	19.5 (8.8)	10 x 3 x 7 (25 x 7.5 x 18) Counter 10 x 12 x 7 (25 x 30.5 x 18) Battery Box	2-12 V and 1-6 V Carbon Zinc	Average	Poor	Good	Average
Passive Infrared								
Compu-Tech **PIR-70 Sensor**	$330	4.5 (2.0)	12 x 4 dia. (30 x 10 dia.)	4-D-Cells	Easy	Good	Poor	Good
TR-41 Counter	$178	1.1 (0.5)	48 x 1.5 dia. (122 x 4 dia.)					
Diamond Traffic **TT-3 Counter**	$189	1.8 (0.8)	3 x 3.5 x 5.5 (7.5 x 9 x 14)	2-3.5 V lith	Easy	Poor	Very Poor	Good
TT-IR Sensor	$159	1.6 (0.7)	8 x 1.75 dia. (20 x 4.5 dia.)	2-3.5 V lith				
Seismic								
Compu-Tech **TR-41 Counter**	$330	4.5 (2.0)	12 x 4 dia. (30 x 10 dia.)	4-D-Cells	Average	Poor	Poor	Very Good
PR-40 Sensor	$49	2.1 (0.7)	3 x 3 x 5.5 (7.5 x 7.5 x 14)					
Compu-Tech **TR-41 Counter**	$330	4.5 (2.0)	12 x 4 dia. (30 x 10 dia.)	4-D-Cells	Difficult	Good	Average	Very Good
TSS-32 Sensor	$66		36 x 48 (91 x 122)					
Diamond Traffic **TT-3 Counter**	$189	1.8 (0.8)	3 x 3.5 x 5.5 (7.5 x 9 x 14)	2-3.5 V lith	Easy	Poor	Poor	Very Good
TT-SS Sensor	$109	1.0 (0.7)	3 x 1.5 x 5 (7 x 4 x 13)					

Figure 4.–Infrared and Seismic Counters.

counter. These counters can be adjusted to count either individual axles or every second axle (to represent a vehicle). In areas where there are many logging trucks, trailers, or other vehicles with more than two axles, the counter reading will have to be adjusted.

Road tube counters are commonly used because they are simple to install and operate. However, when used on dirt roads, a solid surface such as a 2 by 4 inch board must be installed flush with the road surface and the tube must be attached to it. This prevents vehicles from pushing the tube into the dirt which can cause a malfunction. These tubes also deteriorate over time or can be cut. Since they are visible, they are subject to vandalism.

Indoor/Outdoor Pedestrian Counters (Figure 7) use a floor mat with sensors (known as a threadlike), which, when stepped on, sends a signal to the counter. This type of counter is commonly used at entrance ways to buildings. The sensor is available in a variety of styles including waterproof, single door, or two door style.

Model	Cost	Power Source	Best Uses
K-Hill Signal Co.	$210 - $240	110 volts ac or batteries	Entryway/ waterproof sensor available
K-Hill Signal Co.	$330 - $380	110 volts ac or batteries	Entryway/ waterproof sensor available
Diamond Traffic Products	$210	7 year lithium battery	Indoors

Figure 7.–Pedestrian Counters.

List of Manufacturers.

Compu-Tech Systems, LLC
P.O. Box 6615
Bend, OR 97708-6615
(503) 389-9132
FAX (503) 382-4878

Cuesta Systems Corporation
5556 Ridge Park Dr.
Loomis, CA 95650
(916) 797-1282
FAX (916) 797-1282

Diamond Traffic Products
P.O. Box 1455
Oakridge, OR 97463
(503) 782-3903
FAX (503) 782-2053

Ivan Technologies, Inc.
27 Saddle Ridge Dr.
P.O. Box 550
West Simsbury, CT 06092
(203) 651-3118
FAX (203) 658-4828

K-Hill Signal Co., Inc.
P.O. Box 432
Uhrichsville, OH 44683
(614) 922-0421
FAX (614) 922-0421

Trail Master
Goodson & Associates, Inc.
10614 Widmer
Lenexa, KS 66215
(913) 345-8555
FAX (913) 345-8272

Installation and Setup

Instructions for installing the counter will be provided by the manufacturer. Installation may take from 2 to 6 hours. This will include examining the sample site to find the best location, installing the sensor and counting mechan-ism, setting the sensitivity and time delay, and testing the func-tion of the counter. Counters mounted on trees or posts should be checked after a few days to correct any shifting. A newly in-stalled counter should be checked frequently until you feel it is oper-ating and calibrating correctly. En-sure that the agency's name and address is attached to the counter to deter vandalism and theft.

Validating the Counter
To ensure accurate estimates, the traffic counter must be validated. Validation compares the number of tallies the counter is registering with the actual number of visitors (or cars, etc.) passing the counter. Differences between the tallies and the actual number observed can occur due to false triggers by animals, blowing leaves, non-recreational visitors (log trucks, etc.), improper installation, or equipment failure.

The best method to validate counter readings is by personal observation. Using a sample process, personnel can count recreation visitors and compare this count with the reading from the counter. Any difference is accounted for by adjusting the tally. For example, if during the validation period the counter records 100 visitors on a trail, and the observation determines that only 90 visitors passed the counter, future readings can be adjusted using a correction factor. In this case, the counter readings are multiplied by 0.9 (derived by dividing 90 by 100).

Collecting the Data

Observations to validate counter data should be recorded on a standard form and filed. Minimum data needs are shown on the sample form in Appendix A.

Reading the Counter
Counter readings must be recorded on a consistent basis. It is best to record information from each counter separately, keeping track of date and time the reading was taken. A common reading schedule that allows weekend traffic to be separated from weekday traffic includes recording traffic readings by Friday noon, and on Monday morning. By subtracting Friday traffic reading from Monday, weekend use is known. To calculate weekday use you must subtract the previous Monday's reading from the following Friday's reading. Counters that automatically read and record data can also be purchased. At a minimum the counter should be checked every 2 weeks for malfunction, battery failure, or vandalism.

Rotating Counters
If one traffic counter is used to cover multiple entrances or areas, a sampling plan must be designed to determine when to rotate the counter. It is important that the sampling plan be adhered to, as deviations will reduce the accuracy of use estimates.

Factors Influencing Reliability

The primary factors influencing reliability of traffic counter data are proper setup and validation. A traffic counter hastily installed and not validated will produce unreliable data. Maintenance and monitoring of equipment will reduce equipment malfunction.

Maintenance Costs

Traffic counters are relatively inexpensive to maintain. Regular maintenance includes replacing batteries every 2 to 6 months. The most likely cause of major repair or replacement may be vandalism.

Future Estimation Procedures

Most traffic counter sensors can be left in place from year to hear. Prior to each year's sampling, recalibrate and validate the counter readings. Correction factors need only be calculated every few years unless you observe a significant change in use patterns.

Personal Observation

Advantages

Can be used in areas where many other systems will not work
Can provide additional visitor information

Disadvantages

Counts will be inaccurate if observations are not systematic
Requires considerable personnel time
No cost reduction for counts in future years

Approximate Costs

Range: $680 to $1,400

Specific Expenses
$680 to $1,400: Observation (68 to 140 hours at $10/hour)

Costs for Future Estimates
$680 to $1,400: Observation (68 to 140 hours at $10/hour)

Steps in Implementation

1. Determine site limitations
2. Determine visitor information to sample
3. Develop sampling plan
4. Observe visitors and record information
5. Analyze information to determine total use estimate for area

General Description

Personal observation is a technique that uses personnel to count recreation visitors. Because a person does not have to stay at one specific place, personal observation can be very effective in areas where there are multiple or uncontrolled entrances. Although this technique is often used, it is usually done incorrectly because observations are not systematic. Visitor use numbers are usually collected by counting visitors when and where it is convenient, rather than by using a formal sampling plan. This results in costly, unreliable use estimates.

Depending on the area's characteristics, additional visitor information can often be obtained. Informa-tion can include individual visits, group visits, group size, activity participation, and some observable socio-demographic characteristics.
The only effort required for this technique is in designing and adhering to the sampling schedule. There is no visitor burden, as visitors do not actively participate in being counted.

Site Limitations

Personal observation is often the most appropriate technique at campgrounds and dispersed areas. In undeveloped campgrounds where no fees are collected, no registration board installed, and no host is present, personal observation can be quickly and inexpensively used to obtain use estimates. In many dispersed roaded areas, rivers, and reservoirs, personal observation is the easiest and cheapest method available to determine use.

Equipment Needed

None.