Paul S. Sarbanes Transit in Parks Technical Assistance Center

Best Practice Manual

Defining the Need

Excerpted from the Transportation Planning Process for Transit in Federal Land Management Areas Volume 2: So You Think You Need Transit? by United States Department of Transportation, Federal Transit Administration, Office of Planning and Environment (http://www.triptac.org/Documents/Home%20Page/tran_pl_guide_vol2.pdf)

Prepared by Shapiro Transportation Consulting, Inc.

Source: National Park Service

May 2010

Disclaimer

1. Phase One: Identify Motivations for a Transportation Improvement Study

The primary purpose of Phase One of the planning process is to identify the motivation for conducting a transportation improvement study at a FLMA. Transportation improvement studies can be motivated in several ways. The traditional motivation used in urban transportation is the desire to provide mobility to the public or to address a perceived transportation-related issue, such as traffic congestion or poor air quality. While these are also valid for FLMAs, there are several motivations for FLMAs, including:

- Long-range management plans
- Legislative requirements
- Carrying capacities
- System plans and constrained long-range transportation plans

Phase One explores each of the reasons for a transportation improvement.

1.1. Long-Range Management Plans

As previously discussed the transportation planning process for FLMAs can be based on desired future conditions, i.e. what the agency wants the land management area to be in the future, based on protection of resources and providing for sustainable visitor use. Typically, the desired future conditions for each FLMA are defined by long-range management plans, which differ among the agencies: general management plans (NPS), comprehensive conservation plans (FWS), land management plans (FS), and resource management plans or management framework plans (BLM).

Table 1-1 provides a description of each plan and the information it includes. In summary, these plans identify the kinds of resource conditions and visitor experiences that will best fulfill the mission and purpose of the FLMA, and they identify areas or zones within the FLMA that are suitable for various uses. They examine the FLMA as a whole and consider stakeholder interests and concerns. These plans may include a discussion of transportation planning and how a transportation system could support the desired future conditions with respect to resource management and visitor use/experience. For example, the Grand Canyon National Park 1995 General Management Plan calls for a mandatory bus system around the North Rim for daily visitors, while camping permits would allow for personal vehicles to enter the area. Before developing the goals, needs, and objectives for a transportation system study, these long-range management plans must be reviewed and considered. The plans also

may include usable data or data sources for determining the impacts of the transportation system.

Table 1-1: Summary of FLMA Land Management Plans

Agency	Management Plan
National Park Service	General Management Plans (GMP) identify the long-term goals for a park based on its legislation, purpose, significance, fundamental resources and values, and themes. The plans 1) define the desired natural and cultural resource conditions to be achieved and maintained over time; 2) define the conditions necessary for visitors to understand, enjoy, and appreciate the unit's significant resources; 3) identify the kinds and levels of management activities, visitor use, and development that are appropriate for maintaining the desired conditions; and 4) identify indicators and standards for maintaining desired conditions.
Fish & Wildlife Service	Comprehensive Conservation Plans (CCP) provide long-term guidance for management decisions; set forth goals, objectives, and strategies needed to accomplish refuge purposes; and, identify the Fish and Wildlife Service's best estimate of future needs. These plans detail program planning levels that are sometimes substantially above current budget allocations and, as such, are primarily for Service strategic planning and program prioritization purposes. The plans do not constitute a commitment for staffing increases, operational and maintenance increases, or funding for future land acquisition.
Forest Service	Land Management Plans (LMP) include 1) desired conditions (describe the ecological, economic, and social attributes that characterize the desired outcome of land management.); 2) objectives (describe the focus of unit management during the next 15 years); 3) guidelines (provide guidance and information for implementing projects and activities to help achieve the objectives and desired conditions); 4) suitability of areas (identify areas of each National Forest System (NFS) unit as generally suitable for various uses); and 5) special areas (Land management plans may identify areas as special for various reasons without a formal designation).
Bureau of Land Management	Resource Management Plans (RMP) or Management Framework Plans (MFP) are used for completing land use plans. Land use plans ensure that the public lands are managed in accordance with the intent of Congress as stated in FLPMA (43 U.S.C. 1701 et seq.), under the principles of multiple use and sustained yield. As required by FLPMA and BLM policy, the public lands must be managed in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; that will provide for outdoor recreation and human occupancy and use; and that recognizes the

Nation's need for domestic sources of minerals, food, timber, and fiber from the public lands by encouraging collaboration and public participation throughout the planning process.

1.2. Legislative Requirements

Some FLMAs may have a legislatively mandated transit system. These requirements may be based on resource protection and/or carrying capacity of a site, or to support federally mandated sustainable practices.

1.3. Carrying Capacities

The concept of carrying capacity can also provide a motivation for a transportation improvement study. Carrying capacity may influence the development of a long-range management plan, which in turn influences the development of a transportation system. Therefore, an understanding of carrying capacity is crucial to the transportation planning process in FLMAs.

For park and refuge management, carrying capacity takes into consideration both resource protection and visitor use and experience. The definition of carrying capacity provided by the NPS *Visitor Experience and Resource Protection (VERP) Framework: A Handbook for Planners and Managers* (1997) reflects this: "As it applies to parks, carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and social conditions that complement the purpose of a park unit and its management objectives."

Implementation of a transportation plan may help alleviate carrying capacity issues. For example, if an existing site is being used beyond the identified carrying capacity (i.e. the surrounding natural and cultural resources are showing obvious impacts), then implementing a transportation improvement such as a transit system may be one way to avoid or minimize the impacts to the resource. On the other hand, visitor experience may be diminished if too many visitors access a site at one time. This could be due to unacceptable impacts to resources or an unsatisfactory level of enjoyment or understanding of the site.

Denali National Park and Valley Forge National Historical Park provide two examples of carrying capacities in the national park system. In 1971, the George Parks Highway was completed between Anchorage and Fairbanks, making Denali National Park accessible to all motorists. Due to the increased access, park visitation quintupled within one year (from approximately 58,000 visitors in 1971 to 306,000 in 1972). With the increase in traffic, unacceptable impacts to wildlife and other natural resources became evident. In addition, visitor satisfaction decreased due to traffic congestion and pollution. The road structure also was incapable of supporting the high levels of vehicular traffic. Obviously,

the carrying capacity for acceptable visitor use within the area had been exceeded. In 1973, the NPS instituted a mandatory system of free shuttle buses along the park road. Objectives for the transit system considered the mission of Denali National Park, as well as the need for public safety. The system was designed to: 1) minimize disturbances to wildlife and scenery, 2) minimize road hazards, and 3) maximize wildlife and scenery viewing with the least resource impact and energy consumption.

At Valley Forge National Historical Park, the most recent General Management Plan (2007) identifies a social carrying capacity for their more heavily used recreational sites based on the number of times per year the parking lots are full during the mid-day period. To achieve the carrying capacity standard for these sites, visitors must be able to find a parking space on all but 10 days per year. Based on a parking lot capacity analysis, the parking lots for these recreation areas exceeded the social carrying capacity on a regular basis (at least once per week). This would force visitors to either park in inappropriate areas, impacting resources or creating safety hazards, or to leave the area, which would result in a frustrating experience. To help minimize impacts to resources and meet the social carrying capacity, the General Management Plan recommended a shuttle system. In addition to alleviating the issue at the recreation areas, such a system also would allow the park to 1) remove existing impacts from within the cultural landscape (underused parking lots), 2) provide a connection between the park's north and south sides, and 3) enhance interpretation and visitor experience of the park.

1.4. System Plans and Constrained Long-Range Transportation Plans

It is necessary to anticipate transportation needs for any area before they become an issue, be it a city a state or a FLMA. If transportation needs are not planned for in advance, transportation proposals can be reactions to a crisis rather than well thought out solutions to a mandate or identified need. System studies are performed to help foresee transportation needs long before a specific transportation project is needed.

System studies are long-range analyses that identify transportation and other needs for 10, 20, and/or 30 years in the future. They plan for the needs of individual FLMAs and for FLMAs in specific regions. They allow a systematic evaluation of transportation needs in response to all the factors and motivations that drive the need for transportation improvements throughout the area being studied. In some of the same ways that project planning helps to define a specific project, such as a transit service for a specific FLMA, the system study identifies all of the transportation needs to address goals and objective for a larger area. The system study defines the relationship between different transportation services, their relative importance, and how they are affected by what is happening around them.

The expansion of urban areas from the traditional urban area is resulting in conflicts between the needs of the urban populations and FLMAs. Therefore FLMAs are using

system studies to begin an evaluation of growth trends in surrounding areas to help anticipate encroachments of development on the FLMA and how the effects of that encroachment can be minimized using transportation and other measures.

Other system plans help determine the best use of limited resources available to provide transportation services in a large area, such as a region. Demands for improvements almost always outstrip the resources available to provide them. A system plan can evaluate the full set of transportation needs in a larger area so that the resources needed to satisfy needs can be quantified and individual components prioritized.

System plans often, but not always, result in a constrained long-range plan (CLRP) for the area studied. A CLRP provides a set of transportation improvements that may satisfy identified future transportation needs for the area being studied. This plan is financially constrained such that the components are can be funded using available resources in the timeframe of the plan. A CLRP cannot be used to define the details of a specific project, and most of the time, not even the specific mode or alignment. The CLRP sets the stage for more detailed project planning studies, using techniques provided in this Volume 2 and Volume 3, to define specific needs for the transportation improvement and options for addressing the needs.

1.5. Observed Transportation Issues and Impacts

One motivation for a transportation improvement study is to address transportation-related issues. While in many situations perceived issues may already exist, in other situations they may be looming on the horizon. Transportation-related issues can be identified in several ways. One method for identifying issues is through observation. FLMA staff may notice that check station queues are excessive or that the number of visitors that want to park their vehicle at a destination exceeds the number of parking spaces, forcing visitors to either damage resources by parking on the side of the road or limit their experience by avoiding the site altogether. Staff may observe increasing interest in a particular visitor-use area, which threatens to degrade the resource. A second method for identifying issues is by communicating with visitors. Visitors experience the resource differently than FLMA staff and may encounter or perceive issues that staff members do not. Communications with visitors can be conducted formally, through a visitor satisfaction survey or a comment box, or informally, by listening to visitor feedback (both positive and negative).

Motivation for Transportation Study at Anywhere Refuge

Within the last several years, two events have directly affected the ability of Anywhere Refuge to complete its missions. First, the Department of Transportation completed a new controlled access state highway within three miles of the refuge entrance. This has substantially improved access to the refuge. As one visitor recently noted, "We would have never come [to the refuge] if the new highway was not completed…it just makes it so much more convenient. My family is driving across the country and doesn't have too much time to stop. But we saw the refuge on the map and figured we would stop by for the night since we are passing so close."

Second, the Spotted Blue Grouse has developed a cult following ever since it was featured in both "Ornithologist Weekly" and "Birder's World" for its unique mating habits. The magazines rated the refuge under study as the "…most picturesque place to view the Spotted Blue Grouse in a mating ritual that pre-dates human beings…a sight every birder MUST see." Consequently, visitation has soared over the past few years, and it is predicted to continue.

While the additional visitation is welcomed, the sudden increase has left Anywhere Refuge unable to maintain its missions. First, delay throughout the refuge has increased substantially during peak periods, due to the limited capacity of staff to "process" vehicles at the entrance station, congestion, and parking shortages. Second, the parking lots at the pedestrian trailheads are consistently over used, creating safety concerns as well as inducing impromptu parking on the side of the road. This has resulted in damage to the Yellow Striped Lichen. Third, the nature of visitation has changed. The refuge used to be visited mainly by bird watchers who did not require many interpretive programs. Since the completion of the state highway, the number of visitors with little knowledge about birds has overtaken the number of bird watchers, increasing the need for interpretive programs. Finally, excessive noise generated by vehicular travel and parking along sensitive soils is destroying the lichen's habitat. This has resulted in fewer opportunities to view the mating behavior, as the grouse have retreated to the depths of the refuge to maintain their privacy. Overall, the refuge has found that it is rapidly losing its ability to provide a positive visitor experience while complimenting its mission of protecting the lichen and providing a natural feeding area for the Spotted Blue Grouse.

Local stakeholders have decided to find a solution to this issue. The Friends of the Blue Spotted Grouse has proposed starting a mandatory transit system to reduce motor vehicles in the refuge and expand the trail network. There would be exemptions for professional ornithologists and persons with disabilities. Since transit systems have long-term cost implications, the Refuge Manager wants to determine whether this solution will protect the resource and address the needs of visitors. The refuge has received an Alternative Transportation in Parks and Public Lands (ATPPL) grant to conduct a transportation study. She has hired a consultant to determine the extent of the need and to evaluate potential solutions.

2. Phase Two: Define the Need

As discussed previously in Phase One, there are several motivations for initiating a transportation improvement study in FLMAs. Some of the motivations, such as legislative requirements, may mandate the transportation improvement to be a transit service. For other motivations, transit may be one of many potential solutions. Whether the motivation mandates transit service or not, it is necessary to understand the unique situation of each FLMA.

The second phase of the planning process is to define the extent of a FLMA's transportation need. For FLMAs with a legislative mandate to implement a transit system, this phase will assist planners in determining the characteristics of the service. The need may be extensive, requiring buses to pick up visitors at the visitor center every 10 minutes, or it may be minimal, requiring service every 60 minutes or less. For FLMAs in which a transportation improvement study is initiated by a perceived existing or emerging issue, analysis may show that the challenge can best be addressed with a transportation solution or that the challenge is not substantial enough to warrant a response. This step of the planning process therefore seeks to first determine if a need exists. If so, the extent of the need is quantified.

Phase Two consists of the following three sections:

- Section 2.1: Develop goals, objectives, and performance measures
- Section 2.2: Data collection
- Section 2.3: Data analysis

2.1. Develop Goals, Objectives, and Performance Measures

The first step in Phase Two of the planning process is to develop goals, objectives, and performance measures. This step helps planners in several ways. It enables planners to define early in the planning process what they are trying to accomplish and to develop criteria to achieve that end. This step also establishes rules for comparing alternatives against a baseline situation. Crucially, it provides an opportunity for stakeholders to participate in developing a vision for the FLMA. Oftentimes, a workshop with stakeholders can be used to develop goals, objectives, and performance measures. One technique to facilitate this discussion is for the workshop facilitator to develop "straw men" goals, objectives, and performance measures to use as a starting point for discussion. "Straw men" are established because they can be easily challenged, which encourages debate among stakeholders.
This section, defines goals, objectives, and performance measures. It provides examples of effective and ineffective goals, objectives, and performance measures that are applicable to Anywhere Refuge. Volume 3, Section 2 provides additional resources for

developing goals, objectives, and performance measures, including a case study from Lyndon B. Johnson National Historical Park and other examples.

2.1.1. Developing Goals

The words 'goal' and 'objective' are often used interchangeably in colloquial speech, but they have distinct definitions in the context of project planning. Goals are broad statements of a desired state. Their purpose is to articulate a vision. An effective goal is general and brief and it describes a condition that can be improved upon, but not achieved.

Goals are most effective when they relate to the motivation for the transportation improvement study. Indeed many of these motivations, such as long-range management plans or carrying capacity studies, may have developed goals as part of their planning process that may be applicable to the transportation improvement study. For other motivations, such as a legislative mandate that requires a transit system or a transportation study motivated by safety concerns, goals may not yet exist.

Goals for Anywhere Refuge

The consultant team retained by Anywhere Refuge is leading a workshop with stakeholders to develop goals, objectives, and performance measures. Below are examples of effective and ineffective goals that the stakeholders have suggested.

- **Effective Goal**: Enhance the visitor experience – This is an effective goal because providing a positive visitor experience is part of the long-range management plan for Anywhere Refuge. While it is impossible to completely fulfill this goal – the visitor experience can always be improved – specific actions by Anywhere Refuge should be targeted toward advancing this goal.
- **Ineffective Goal**: Eliminate vehicles parking in areas not designated for parking on all but the 10 busiest days of the year – While this goal will reduce damage to the habitat of the Yellow Spotted Lichen and the Blue Spotted Grouse, it is an ineffective goal because it is measurable and achievable. It is more effective as an objective.

Workshop participants have settled on four goals for the study. Goal 1 and 3 were taken directly from the long-term management plan.

- Goal 1: Preserve and protect habitat of the Yellow Striped Lichen and the Blue Spotted Grouse
- Goal 2: Provide a safe means for visitors to access the resource
- Goal 3: Enhance the visitor experience
- Goal 4: Achieve a financially sustainable transportation system

2.1.2. Developing Objectives

Objectives are specific statements that describe the desired outcome. They are quantifiable measures of goals. Achieving an objective should lead to the advancement of the associated goal. Objectives should be quantifiable, time specific, and feasible to measure. They are often developed in response to specific issues or obstacles, but they can also be used to advance a vision or to define the characteristics of a transportation system. However, objectives should not prejudge one transportation improvement over another.

Often the strength of the verb used in the objective determines its effectiveness. For example:

- Strong Verbs: Shall, Will, Must
- Weak Verbs: Should, Encourage, Promote

Objectives for Anywhere Refuge

The consultant is leading workshop participants in developing objectives for the four goals of the study. Workshop participants have suggested several ineffective objectives for the goals of Anywhere Refuge (see Table 2-1). While the objective to "develop a transit system by 2020" has the potential to protect the habitat of the Yellow Striped Lichen and Blue Spotted Grouse, it will only do so if a sizable number of visitors decide to use it. In addition, this objective prejudges transit to be the appropriate transportation improvement, even though there may be other means of achieving this end. A more meaningful objective might be to:

- Reduce the percent of visitors that access visitor-use areas by private vehicle by 20 percent, between 2015 and 2020.

Stakeholders are also concerned that an increase in visitation by private vehicle at Anywhere Refuge has led to an increase in vehicular collisions. While crashes have only resulted in vehicular damage and minor injuries to date, there is a concern that more severe injuries could occur. In addition, when crashes occur, traffic congestion can become an issue, requiring staff to coordinate with emergency responders and to direct traffic. This is a drain on Anywhere Refuge's limited resources.

Objectives for Anywhere Refuge (continued)

In response, Objective 2.1 in Table 2-1 was established to reduce the number of automobile crashes by 40 percent at Anywhere Refuge. While this objective is motivated by good intentions, there are two main faults that may make measurement of the objective meaningless. First, since the objective must be measured over time, a target year for achieving the objective is needed. Second, the objective should be standardized to account for changes in annual visitation. For example, if the number of crashes falls by 40 percent due to a transportation improvement, but the number of visitors falls by 50 percent in the same year, visitor safety would actually decrease. If the objective is not standardized to account for changes in annual visitation, it would appear that safety has improved, even though the number of crashes per visitor increased. A more effective objective would be:

- By 2020, reduce the ratio of automobile crashes per 100,000 visitors by 40 percent.

An increase in visitation by private vehicle has also increased the delay at the entrance during peak periods. Objective 3.1 in Table 2-1, which is to reduce delay, was established to address this concern. Unfortunately, it is ineffective because it does not specify a target year when the objective will be met and it does not specify the reduction in delay. A more effective objective would be:

- By 2015, reduce average delay at FLMA by 15 percent per visitor compared to the baseline

After discussing why the objectives in Table 2-1 are ineffective, the workshop participants developed several effective objectives (see Table 2-2). For example, the workshop participants understand that a transportation improvement may require additional physical improvements but wish to minimize these improvements. Therefore, Objective 1.1 states that "The footprint of the transportation system will not increase by more than 5 percent compared to the baseline." This objective is effective because it is quantifiable, it can be used to compare alternative transportation improvements with a baseline situation, and its achievement indicates progress in achieving the goals.

Objectives for Anywhere Refuge (continued)

Table 2-1: Examples of Ineffective Objectives for Anywhere Refuge

Goals		Objectives	
1	Protect the natural environment	1.1	Develop a transit system by 2020
2	Provide a safe means for visitors to experience the resource	2.1	Reduce crashes by 40 percent
3	Enhance the visitor experience	3.1	Reduce delay

Table 2-2: Effective Objectives for Anywhere Refuge

Goals		Objectives	
1	Preserve and protect habitat of the Yellow Striped Lichen and the Blue Spotted Grouse	1.1	The footprint of the transportation system will not increase by more than 5 percent compared to the baseline
		1.2	Eliminate vehicles parking in areas not designated for parking on all but the 10 busiest days of the year
2	Provide a safe means for visitors to access the resource	2.1	By 2020, reduce the number of automobile crashes per 100,000 visitors by 40 percent compared to the baseline
3	Enhance the visitor experience	3.1	By 2015, reduce average delay at the refuge by 15 percent per visitor compared to the baseline
		3.2	Provide access to interpretive programs for all visitors
4	Achieve a financially sustainable transportation system	4.1	Provide a financially sustainable transportation system in which life - cycle revenue exceeds (or is equal to) life-cycle costs.
		4.2	Cost-effectively accommodate low demand periods

2.1.3. Developing Performance Measures

Performance measures are used to quantify objectives. Their purpose is to understand and define the transportation need in a FLMA by measuring the extent to which the corresponding objective is achieved. They also serve as a baseline for evaluating the effectiveness of alternative improvements, such as those formulated in Section 3, and for the implemented alternative.

Developing performance measures is necessary before data collection can begin, as the performance measures dictate the data that is required to evaluate alternative transportation improvements. Therefore, it is necessary to develop performance measures that effectively measure the objective and for which data can be collected. In addition, use of performance measures requires a long-term commitment to data collection, as the performance measures must continuously be monitored after implementation of the transportation improvement.

Performance Measures for Anywhere Refuge

After developing goals and objectives the workshop participants were eager to develop performance measures. Table 2-3 provides an example of an ineffective performance measure that was suggested by one stakeholder. While Performance Measure 3.4.1, which measures the total number of standing passengers per day, can be used to determine whether there are sufficient seats for all passengers except on the 20 busiest days of the year, it requires excessive data collection. A less data intensive method of collecting data is to determine whether any passengers were observed standing as the bus leaves each bus stop. This way, the data collector does not have to tally the number of standing passengers and can concentrate on other tasks.

Table 2-4 provides examples of effective performance measures for Anywhere Refuge. As an example, Performance Measure 2.1.1 can effectively measure whether Objective 2.1 is achieved by determining the number of crashes per 100,000 during the designated time period. Objective 1.2, which is to eliminate vehicles parked in areas not designated for parking except on the 10 busiest days of the year, can be measured with Performance Measure 1.2.1. This metric compares the relationship of the number of parking spaces to the demand for those spaces. If vehicles are observed parking in areas not designated for parking on more than 10 days per year, the objective has not been achieved.

Performance Measures for Anywhere Refuge (continued)

Table 2-3: Ineffective Performance Measures for Anywhere Refuge

Goals	Objectives	Performance Measures
3 Enhance the visitor experience	3.4 If alternative transportation is provided, there will be sufficient seats for all passengers except on the 20 busiest days of the year	3.4.1 Total number of standing passengers per day

Table 2-4: Effective Performance Measures for Anywhere Refuge

Goals	Objectives	Performance Measures
1 Preserve and protect habitat of the Yellow Striped Lichen and the Blue Spotted Grouse	1.1 The footprint of the transportation system will not increase by more than 5 percent compared to the baseline	1.1.1 Footprint of additional transportation infrastructure (area)
	1.2 Eliminate vehicles parking in areas not designated for parking on all but the 10 busiest days of the year	1.2.1 Number of days per year vehicles park in areas not designated for parking
2 Provide a safe means for visitors to access the resource	2.1 By 2020, reduce the number of automobile crashes per 100,000 visitors by 40 percent compared to the baseline	2.1.1 Number of automobile crashes per 100,000 visitors in the baseline and Alternative
3 Enhance the visitor experience	3.1 By 2015, reduce average delay at the refuge by 15 percent per visitor compared to the baseline	3.1.1 % change in the average delay at the refuge per visitor
	3.2 Provide access to interpretive programs for all visitors	3.2.1 % of visitors that have access to interpretive programs
4 Achieve a financially sustainable transportation system	4.1 Provide a financially sustainable transportation system in which life -cycle revenue exceeds (or is equal to) life-cycle costs	4.1.1 Ratio of life cycle revenue to life cycle costs
		4.2.1 Cost to FLMA per visitor during low demand periods
	4.2 Cost-effectively accommodate low demand periods	