


Project Bulletin 4160-13B

Project 0-4160: Operating Freeways with Managed Lanes

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## *Identification of Traveler Information and Decision-Making Needs for Managed Lanes Users*



An implied goal of the managed lane concept is to offer additional choices to motorists on a section of freeway. These choices can vary by time of day or possibly in response to changing traffic conditions on either the managed lane or the other general-purpose lanes in the corridor or region. The extent to which travelers can and will accommodate such operational flexibility hinges on getting the right information to travelers, at the right time, and in the right format so that they can make effective decisions pertaining to their trip.

Some users of managed lanes will make decisions prior to the start of their trip. However, others may make such decisions en route to their destination. The information needed to support such decisions must be safely and effectively interwoven with that information required for motorists to safely control, guide, and navigate

their vehicles into and along the managed lanes. To further complicate matters, this information must often be presented next to adjacent general-purpose lanes. Obviously, in such a complex information environment the potential for information conflicts and overload exist.

### **What We Did . . .**

This bulletin provides a summary of research conducted addressing managed lanes traveler information and decision-making needs for managed lanes users. The research provides an overview of previous literature and available analysis tools relevant to traveler information overload, and positive guidance in a freeway and/or managed lane environment. It also contains the results of a series of focus groups to investigate motorist understanding of several managed lane operational issues and information

concepts. Finally, it contains a critical analysis to assess information needs that support key decisions by motorists attempting to use various types of managed lanes.

### **What We Found . . .**

Given the limits of human information processing, efforts to design facilities and information systems to be consistent with driver expectancies will minimize their overall driving workload, minimize errors, and maximize the consistency of the resulting driving behaviors.

By considering the information needs earlier in the design process (prior to exit ramp and managed lane entrance location selection, for example) the information needs of drivers can be more easily addressed

## The Researchers Recommend . . .

The researchers developed a conceptualized decision model shown in Figure 1. This model incorporates what information a driver needs to correctly answer each of the questions required in the process of deciding whether a managed lane facility is a better choice than the general-purpose lanes. It also takes into account not only the specifics of the managed lane facility and traffic conditions, but also the qualitative specifics of the individual driver. The assessment is alluded to as a benefit-cost analysis, but it is not performed with numbers and mathematics. Rather, this information is processed in the mind of the driver in real time or just prior to the trip, and may be thought more as a perceptual assessment rather than a precise computation.

One of the more important considerations for facility designers is that managed lane information needs are also highly dependent upon traveler experience and other individual factors. Certainly, not all of the information needed to make an informed decision must come from the highway agency in terms of information dissemination devices (overhead and shoulder-mounted static signs, overhead and shoulder-mounted dynamic message signs, pavement markings, etc.); some of the information required is internal to each individual driver, such as the perceived value of time, and the level of comfort with entering a barrier-separated facility. Other information, such as geometric features or specific sign locations and content, can be learned over time through repeated trips through a corridor. Drivers experienced with a particular roadway would also be likely to have some

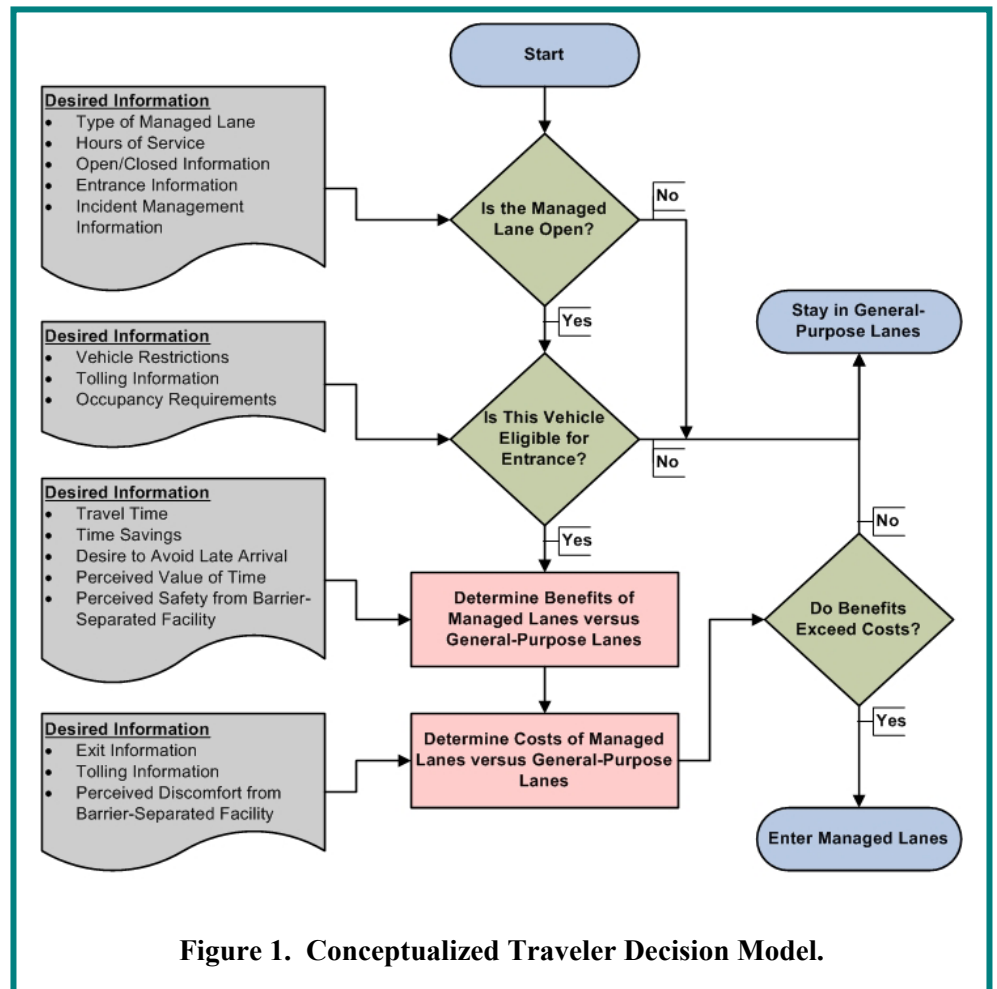


Figure 1. Conceptualized Traveler Decision Model.

expectations of typical traffic conditions during their trips, including speed and congestion at different times of day as well as areas where additional attentional demand is required such as at interchanges with weave areas. Drivers who have been through a specific corridor before could likely be considered to need to acquire less information and will rely more heavily on information stored in the driver's mind.

A general classification of drivers who might reasonably be confronted with the decision of whether or not to enter a managed lane includes the unfamiliar driver, the semi-familiar driver, and the very familiar driver. The entire driving population would fill the continuum between the extremes of a completely unfamiliar driver and a completely familiar driver. Figure 2

illustrates the concept that familiarity with managed lanes facilities reduces the amount of information needed by the driver during a trip.

## Other Information Sources

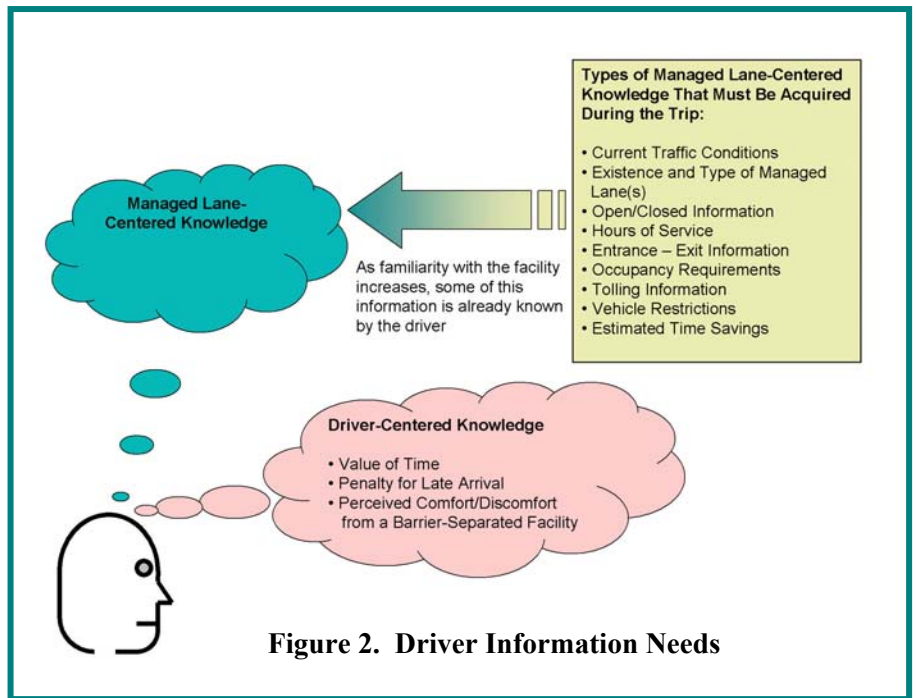
There are limits to human information processing. It is possible in some driving instances to provide so much information that some drivers are not able to process it all. Additionally, as many types of managed lane driver information are complicated and must come in addition to the general-purpose lanes, these drivers with lowered information processing capabilities will be hard-pressed to correctly read and process the information provided.

If general-purpose and managed lane information are presented on the same overhead guide sign or on separate sign structures but are still readable at a single point, conflicts in exit or distance information may occur. A review of the information may reveal that some of the information can safely be shifted upstream or downstream to spread the information load.

Determination of who the target audience really is (familiar, semi-familiar, or unfamiliar) can help determine how much information must be presented within the managed lane corridor regarding the managed lane. This step needs to happen early in the design process so the designers can make rational decisions about what levels of information need to be presented.

Additionally, if the target audience can be defined specifically, such as toll users who have electronic transponders, other options for information dissemination become available. The target audience is a process that should be explicitly determined in the design process, as it directly relates to the dissemination alternatives available for certain kinds of information.

Examples of possible information that could be removed from signs and put into mailings could include hours of service, toll structure, average time savings, and any planned uses for the managed lane facility. In this manner the information acquisition activity would move from during the trip to prior to the trip. Internet information pages can also serve a similar purpose for unfamiliar drivers who desire to learn more during pre-trip planning.



**Figure 2. Driver Information Needs**

## For More Details . . .

### Related Reports:

Report 4160-13, *Identification of Traveler Information and Decision-Making Needs for Managed Lanes Users.*

Report 4160-16: *Traffic Control Devices for Managed Lanes*

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