Measuring Progress

In Washington, statewide transportation performance is not uniformly measured across modes or jurisdictions. State, federal, tribal and local entities collect data about system condition and performance in a manner that meets their needs. Washington State lacks a coordinated and comprehensive transportation performance reporting process. On the heels of the recent transportation investment packages, accountability to the public has never been more important.

This section provides a series of examples taken from various editions of the Gray Notebook to illustrate how the State Department of Transportation measures system performance. The current reporting model is a strong platform on which to build an approach to statewide performance reporting. The Transportation Commission proposes to lead the effort to convene a study team to do just that. In addition, the Transportation Commission also recognizes the importance of the Governor's Priorities of Government and their relation to the long-range statewide transportation plan.

> As proposed by the Commission, it is recommended that statewide system performance measures are developed in addition to those already established, to create a comprehensive system for performance measurement and accountability.

The Transportation Commission recommends that consideration be given to how performance measures should be addressed with regard to all of the investment guidelines. Future discussion should focus on determining what data should be collected to determine how the following goals can be achieved:

- Transportation Access—Provide effective and affordable mobility options for those without access to an automobile or the ability to drive, especially in isolated areas.
- Bottlenecks and Chokepoints—Invest in new facilities and system assets that help address the most severely congested locations.
- Economic Vitality—Invest in new facilities and system assets that help strengthen the state's economic vitality and support family-wage jobs.
- Moving Freight— Invest in the specific needs of goods movement as part of the state's transportation system.
- Building Future Visions—Today's planning efforts should help shape visions of a transportation system for the future.

Performance and Accountability

The Washington Transportation Plan recognizes and connects to the Governor's Priorities of Government.

Priorities of Government is the statewide approach used by the Governor to identify results as the basis for budget decision-making. This approach facilitates strategic thinking and uses performance evidence to make investment choices that maximize results.

The Priorities of Government performance goals establish expectations that shape transportation investments, project design, and accountability at all jurisdictional levels.

The statewide transportation system contributes primarily to three Priorities of Government:

- **Improve economic vitality of business and individuals**
- **Improve statewide mobility of people, goods, information, and energy**
- **Improve safety of people and property**

Measuring the Performance of the State Owned Transportation System

Since March 2001, the Department of Transportation has been tracking a variety of performance and accountability measures for review by the public, Transportation Commission, the Legislature, the Governor, and others. These measures are reported in *Measures, Markers and Mileposts*, also called the Gray Notebook. It provides in-depth reviews of agency and transportation system performance.

The Gray Notebook is organized into two main sections. The Beige Pages report on the delivery of the projects funded by the 2003 Transportation Funding Package, 2005 Transportation Funding Package, and Pre-Existing Funds. The White Pages describe key agency functions and provide regularly updated system and program performance information.

The Gray Notebook is published quarterly in February, May, August, and November. The current edition as well as archived past editions are available on-line at: www.wsdot.wa.gov/accountability. For specific programs and issues an annual goal is established and then reported on periodically. For some the data is reported quarterly and for others there is an annual cycle.

The Gray Notebook is primarily focused on those parts of the state's transportation system owned and operated by Department Transportation. This plan recommends that this approach to performance measurement needs to be expanded to include other components of what is truly an integrated system.

The following pages highlight a few goals that support the vision of the WTP that are currently being measured on a periodic basis in the Gray Notebook.

Preservation—
Ensure that today's transportation systems will continue to serve us into the future

How do we know Washington's transportation systems are being preserved?

The investments made in our transportation system, both historically and in the future, are vital to the quality of life in our state as well as the efficiency of day to day business and operations of our society as a whole. The critical nature of this system and high expenses incurred through maintenance and operation require foresight and planning for the preservation of the system. Additionally, it is necessary to maintain the Lowest Life Cycle Cost in order to provide the most economical investments and protect taxpayer dollars. The most costly investments made in our statewide transportation system are in pavements and bridges, and therefore the preservation of these investments is most critical to the sustainability of the operation and expenses incurred by the system.

State Highway Pavement

The Department of Transportation has been rating pavement condition since 1969, using Lowest Life Cycle Cost (LLCC) analysis to manage pavements for preservation. The principles behind LLCC are that if rehabilitation is done too early, pavement life is wasted; if rehabilitation is done too late, additional costly repair work may be required, especially if the underlying structure is compromised. The Department continually looks for ways to best strike the balance between these two basic principles.

State Bridges

The state benchmark law established a goal for no bridges to be structurally deficient, and for safety retrofits to be performed on those state bridges at the highest seismic risk levels. The Department of Transportation tracks bridge condition using the Bridge Management System's (BMS's) to achieve optimum service life. The structural deficiency rating is based on inspection findings. At the same time, some bridges are simply more important and expensive than others. BMS considers the cost-effectiveness of several feasible corrective actions for any given bridge deficiency and provides cost-effective indices for each potential action in various time periods.

Goal

- Maintain interstate and state highways so that none are in "poor" condition—(0%)
- No bridges in the state are to be structurally deficient—(95% of bridges are in the structural condition of at least fair)

Performance Measure

- % of miles in "poor" condition
- % of bridges in the structural condition of at least "fair"

Highlights of Gray Notebook Preservation Measures

Bridge Structural Conditions Ratings

Category	Description	2000	2001	2002	2003	2004	2005
Good	A range from no problems to some minor deterioration of structural elements	84%	85%	87%	86%	87%	89%
Fair	All primary structural elements are sound but may have deficiencies such as minor section loss, deterioration, cracking, spalling or scour.	11%	11%	10%	11%	10%	9%
Poor	Advanced deficiencies such as section loss, deterioration, cracking, spalling, scour or seriously affected primary structural components. Bridges rated in poor condition may be posted with truck weight restritions.	5%	4%	3%	3%	3%	2%

The condition rating shown above is based on the structural sufficiency standards established in the Federal Highway Administration "Recording and Coding Guide for the Structural Inventory and Appraisal of the Nation's Bridges." This structural rating relates to the evaluation of bridge superstructure, deck, substructure, structural adequacy, and waterway adequacy.

Bridges rated as "poor" may have structural deficiencies that restrict the weight and type of truck traffic allowed. No bridge currently rated as "poor" is unsafe for public travel. Any bridge determined to be unsafe is simply closed to traffic. In 2004 and 2005, The Department of Transportation did not close any bridges due to unsafe conditions.

The Department of Transportation policy is to maintain 95% of its bridges at a structural condition of at least fair, meaning all primary structural elements are sound. Since 2000, there has been a slow but steady increase of bridges into the "good" category. In 2004, 3% of bridges showed a condition rating of "poor," and in 2005, only 2% were rated as "poor." The Department credits this improvement to preventative measures such as structural or scour repair, painting, or bridge deck overlays that are keeping some of the "fair" bridges from crossing over into the "poor" category, and the building of new bridges that fall in the "good" category.

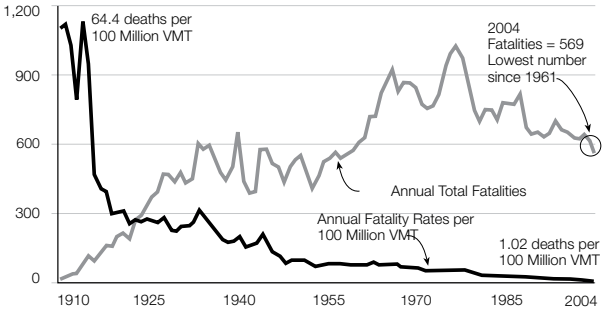
Safety—
Make transportation infrastructure and facilities throughout the state safer and more secure for their users.

How do we know things are safer?

"The region's top priorities remain safety, efficiency and preservation of the existing transportation system."

Thurston Regional Planning Council
2025 Regional Transportation Plan

Figure II-6
Washington Motor Vehicle Total Fatalities and Fatality Rates
1910-2004



Source: WSDOT Transportation Data Office

The benchmark law established a goal to improve safety. While many criteria and measures are used to track safety on the state transportation system, the Transportation Commission and The Department of Transportation uses the state motor vehicle fatality rate to determine progress. The 2004 fatality rate was 1.02 deaths per 100 million vehicle miles traveled (VMT) on all Washington roadways, while the total fatality count shows 567 people killed in motor vehicle collisions and two people killed in pedalcyclist/pedestrian fatalities where a moving motor vehicle was not involved.

Goal

- Reduce the annual number of fatalities statewide
- To reduce the severity of collisions statewide
- Reduction of collisions (fatal and disabling) caused by driver behaviors including seatbelt use and driving under the influence (DUI)

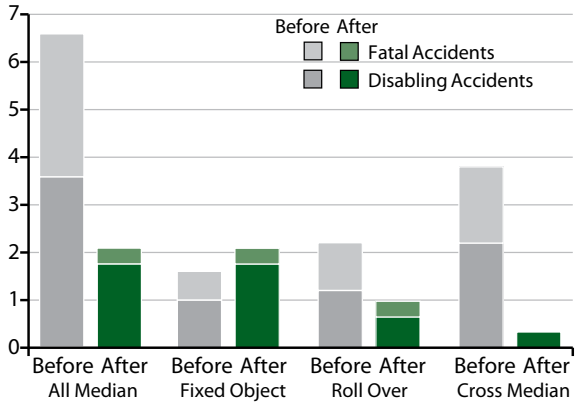
Measure

- Annual number of fatal collisions
- Frequency and severity of disabling collisions in areas where cable median barriers have been installed (Before and after)
- Number of collisions related to driver behavior

Highlights of Gray Notebook Safety Measures

Figure II-

Severe Collisions
Before and After Cable Median Barrier Installation
Annual Fatal and Disabling Collisions and Median Collision Type



Source: WSDOT Engineering and Regional Operations Division; as taken from the WSDOT *Gray Notebook* Published Decemeber 2003

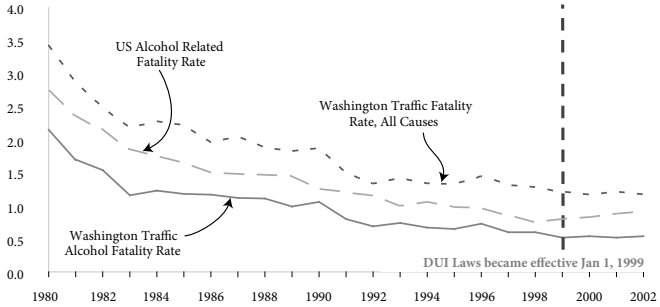
Before and After Reductions in Severe Collisions

While total collisions in the study areas, I-5 in Everett, Vancouver and Fife, nearly doubled (from 45 to 100, including collisions with property damage only), the number of severe collisions (fatal and disabling) decreased significantly. This resulted in a societal benefit of cable median barriers calculated to be $420,000 per mile annually. A breakout of the types of severe collisions are shown in the graph to the left (graph does not include "property damage only" collisions.)

The data on the left was normalized and represents 12 months before and 12 months after the project.

Figure II-8

Alcohol-Related Traffic Fatalities
Comparison of Washington's Public Roadway Fatality Rate And Alcohol-Related Fatalities Per Million VMT
1980 - 2002



Source: WSDOT Transportation Data Office

Alcohol-Related Fatalities on Public Roadways

From 1998 to 2002, alcohol-related deaths per 100 million miles driven dropped 11% overall from 0.60 to 0.54 per 100 million miles driven in Washington. A package of anti-drunk-driving laws, enacted in 1998, lowered the blood alcohol intoxications threshold from 0.10 to 0.08 percent, and provided for automatic loss of license for drunk driving. These legislative steps together with increased State Patrol emphasis on stopping drunk drivers are credited with the decrease. Other measures in Washington include increased use of ignition interlock devices (a device attached to the car's ignition system that requires the driver to blow into the device before starting the car - if alcohol is detected the car won't start), and a crackdown on deferred prosecutions.

Mobility—System Efficiencies
Optimize the efficient operation of our current transportation facilities and those we develop in the future

How do we know Washington's transportation systems are being operated most efficiently?

Assessing the efficient operation of Washington's transportation system is measurable by the reduction of the greatest contributors of congestion. In Washington State, the greatest source of congestion is accidents. Reduction in the number of accidents which occur and average clearance time for accidents provide the best measurements of our progress in improving the efficiency of the system.

Goal

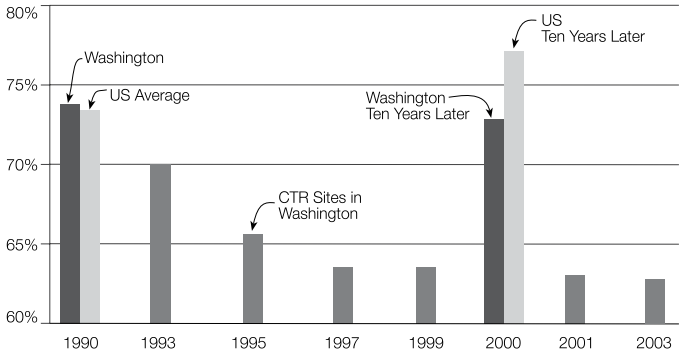
- Reduce delay time caused by incidents on state highways through Incident Response Teams
- Reduce congestion by reducing the number of single passenger commute trips through the Commute Trip Reduction program

Measure

- Actual overall clearance times
- Rate of drive alone trips

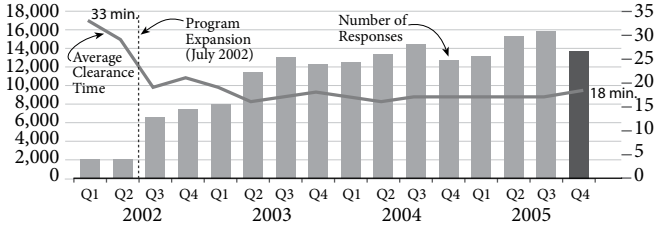
What We Measure Today

Figure II-
Comparing Drive-Alone Rates: CTR Sites, Washington and U.S.



This graph compares reductions in the drive-alone commuting rates within the eight counties that began participating in CTR in 1993. The 2000 Census data is for residents of the eight counties. The CTR data applies to the 525 worksites that have participated continuously since 1993.
Source: Transportation Demand Management Office

Figure II-
Number of Responses and Overall Average Clearance Time
January 2002 - December 2005



Source: WSDOT Incident Response Tracking System
Note: Program-wide data is available since January 2002. Prior to Q3 of 2003, number of responses by IRT are shown. From Q3-2003, responses by Registered Tow Truck Operators and WSP Cadets have been reported in the total.

Commute Trip Reduction Program

In Washington State, in the decade from 1990 to 2000, the percentage of drive-alone commute trips decreased slightly from 73.9 percent to 73.3 percent. Washington and Oregon were the only states where the percentage of people driving alone to work decreased during the decade. Nationally, drive-alone commuting increased 3.4 percent during the same period.

In comparison, the drive-alone rate at worksites in the CTR Program since 1993 decreased even more than the state average. The drive-alone rate at these sites dropped from 69.7 percent in 1993 to 62.8 percent in 2003, a decrease of nearly ten percent.

Overall Clearance Time

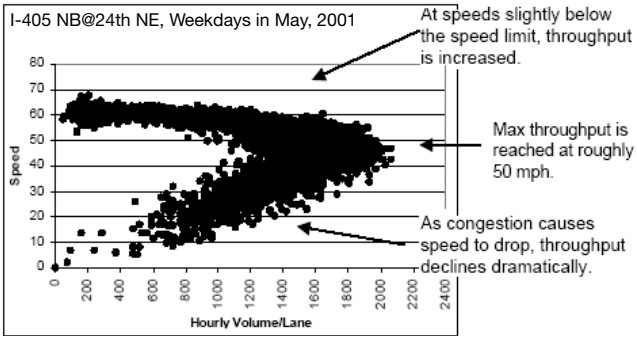
During the fourth quarter of 2005 (October – December), WSDOT Incident Response team members responded to 13,705 incidents. This was down 14% from last quarter's summertime peak of 15,881 responses. However, when compared with the same period in 2004, the number of incidents continues to increase consistent with a steady upward trend since program expansion in 2002 (as shown in the bar chart below). The average clearance time for all responses to incidents was 18 minutes. An incident also tends to invite rubbernecking/gawking which could suddenly slow traffic down, and may result in a secondary incident.

Mobility—Bottlenecks and Chokepoints
Invest in new facilities and system assets that help address the most severely congested corridors

Goal	Measure
Reduce peak travel times	Peak travel times
Reduce number of slow traffic days	Number of slow traffic days
Reduce amount of lost throughput efficiency	Amount of lost throughput efficiency

Highlights of Gray Notebook Mobility Measures

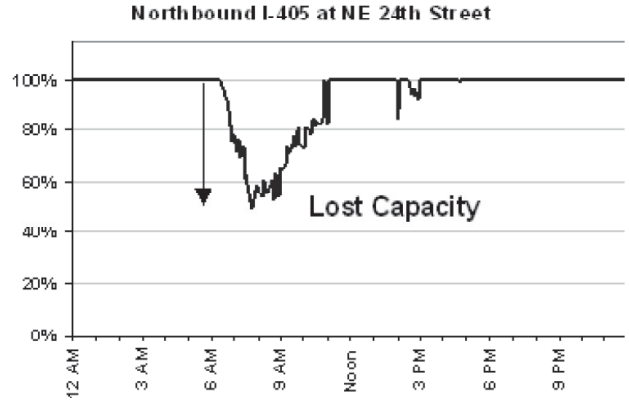
Figure II-17
Minimal congestion maximizes throughput



For most roadways, basic day to day maintenance activities such as snow plowing, picking up debris, controlling vegetation, and patching potholes are the activities needed to keep the road available for optimal use. Each roadway has an optimal capacity where throughput is maximized. The scatter graph to the left, where each dot represents a specific moment's observation of speed and throughput, is typical for a freeway and represents real data from I-405. It shows maximum throughput at about 2000 vehicles per lane per hour.

Maximum freeway throughput should typically be achieved when freeway traffic is flowing at about 45 mph. System throughput drops dramatically when traffic volume forces speeds to drop below 40 mph, as also shown by the scatter graph.

Percent of Lane Capacity Lost Due to Delay



Source: WSDOT Urban Corridors Office

Figure II-18

The Productivity Lost Due to Delay graph (left) shows that during the peak period on I-405 at NE 24th Street, congestion reduces the throughput of the two general purpose lanes in Renton to the capacity of one free-flowing lane.

WSDOT's goal is to stay on top of the curve, working toward improving productivity of the system by investing in opportunities that provide optimal throughput. WSDOT currently has about twenty projects scheduled for construction in the 05-07 biennium that are designed to improve productivity of the system.

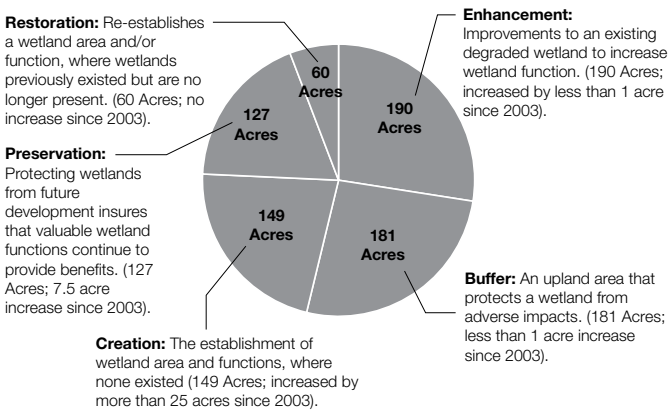
Environmental Quality
Develop, implement, and use transportation investments in ways that promote energy conservation, enhance healthy communities, and protect the environment

How do we know health and the environment in Washington are protected and cared for?

Vegetation management for the Department of Transportation's 100,000 acres of roadside must meet operational, safety, environmental and aesthetic objectives. Management techniques include soils amendment, planting, hand weeding, mowing, tree maintenance and herbicide application. Herbicide use is a sensitive issue for many citizens, drawing special attention to the importance of Integrated Vegetation Management (IVM).

Goal	Performance Measure
Improve streams for fish habitat conditions by removing fish passage barriers	Number of fish passage barriers removed
Manage roadside to achieve better operation and environmental outcomes through Integrated Vegetation Management	% reduction in the use of herbicides Control of noxious weeds Achievement of greater slope stability Preservation of sight distance
Mitigating for unavoidable wetlands loss with replacement wetlands to achieve zero net loss of wetlands	Percentage of successful replacement wetlands % net loss of wetlands

WSDOT Replacement Wetlands, 1988-2004
Total Acreage of Wetland Projects
120 Sites, 708 Acres



Types of Wetland Mitigation
When transportation projects create unavoidable wetland impacts, wetlands are enhanced, restored, created or preserved to achieve the no net loss policy. the Department of Transportation has a total of 120 (708 acres) replacement wetland sites. Monitoring was initiated on four new sites in 2004. Two of these sites were created wetlands, one involved both creation and enhancement of wetlands, and one solely involved wetland enhancement. These sites add more than 25 acres to the state's inventory of replaced wetland acreage.

Highlights of Gray Notebook Environmental Measures

Fish Passage Barrier Removal Projects on Highways
Moose Creek under SR 530 at milepost 44 near Darrington in Snohomish County

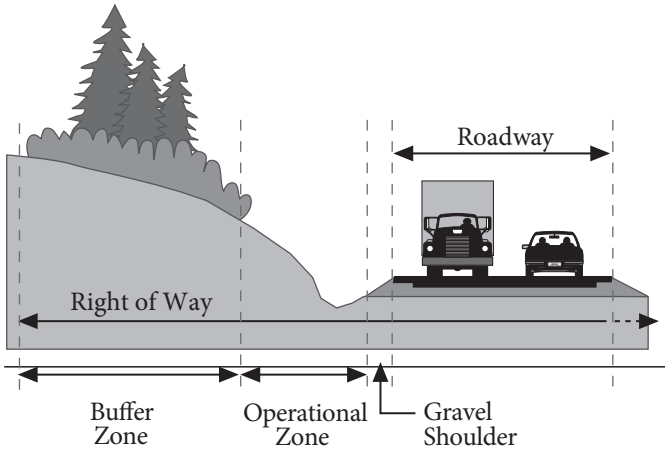
Before
Two corrugated steel culverts are too high and too steep to provide adequate passage

After
New Bottomless culvert replaces the two round steel culverts, eliminating the barrier

2001-2003 Goals Accomplished

The goals for the program during the 2001-03 biennium were to inventory 400 miles of highway and construct 16 fish passage retrofit/replacement projects. These goals were met above the established targets. An additional 441 miles have been inventoried as of June 30, 2003 and all 16 fish passage projects were successfully constructed. The inventory work is a huge effort and at present staffing levels will take a number of years to complete for the WSDOT's 7,000 plus miles of highway. The inventory goal for 2003-05 was an additional 700 miles, which was met and surpassed by 500 miles. As of March of 2005, the inventory had been completed on 3,405 miles of state routes or 48% of the total highway system. The number of fish passage barrier projects completed in the 2003-05 biennium was 14.

Integrated Vegetative Management of Highway Roadsides



Gravel Shoulder – Vegetation Free Area
Maintained with herbicides where necessary to allow surface water drainage off the pavement into the ditch.

Operational Zone – Grass or Small Trees and Shrubs
Maintained through mowing to allow for visibility of signs and traffic at interchanges and curves. Large trees are also removed for safety in case vehicles accidentally leave the road. Herbicides are used very selectively for control of noxious weeds, and sometimes for brush control.

Buffer Zone – Natural/Native Vegetation
Wherever possible the roadside is designed and maintained as native and/or low maintenance vegetation. The IVM approach encourages stable self-sustaining vegetation with limited use of mowing, herbicides, tree removal and other methods as necessary.