



**Washington State
Department of Transportation**

Measures, Markers and Mileposts

The Gray Notebook for the quarter ending December 31, 2001

WSDOT's quarterly report to the
Washington State Transportation Commission
on transportation programs and department management

Douglas B. MacDonald
Secretary of Transportation



This periodic report is prepared by WSDOT staff to track a variety of performance and accountability measures for routine review by the Transportation Commission and others. The content and format of this report is expected to develop as time passes. Information is reported on a preliminary basis as appropriate and available for internal management use and is subject to correction and clarification.

Measures, Markers and Mileposts

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Measures, Markers and Mileposts

The Gray Notebook for the quarter ending December 31, 2001

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“What gets measured, gets managed.”

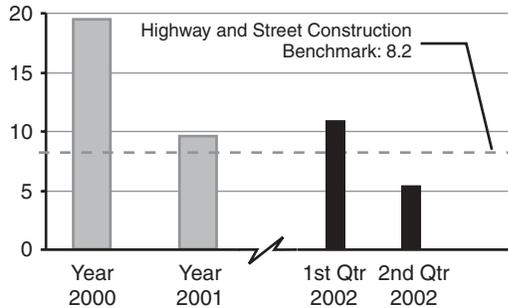
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Worker Safety: Quarterly Update

Continuing updates on *Gray Notebook* safety topics – data is shown on a calendar year basis for 2000 and 2001 and for fiscal year 2002 by quarter.

WSDOT Highway Maintenance Workers

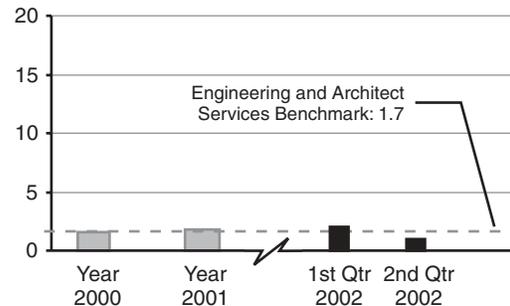
Recordable Injuries per 100 Workers per Year



During 2001, maintenance made a 50% reduction in the recordable injury rate from year 2000. In the 2nd quarter maintenance reduced the recordable injury rate by half from the 1st quarter of FY 2002. Forty-four percent of 2nd quarter injuries occurred in Highway and Shop work locations. The ankle and wrist were the leading injured part of body. Only one back injury occurred this quarter. Typically there are three or four.

WSDOT Highway Engineer Workers

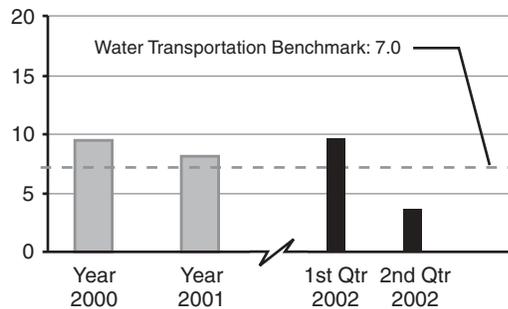
Recordable Injuries per 100 Workers per Year



The recordable accident rate decreased 53% in the 2nd quarter from the 1st quarter FY 2002. Eighty percent of the engineering reportable accidents occurred in the highway right of way. No clear trend was apparent because of the small number of recordable injuries. Forty percent of the injuries were sprains.

WSDOT Ferry Vessel Workers

Recordable Injuries per 100 Workers per Year



The recordable injury rate for WSF ferry vessel workers declined 17% in calendar year 2001 as compared to 2000. The reduction in the number of recordable injuries continues as the WSF reduced the recordable injury rate in the 2nd quarter of FY 2002 by 63%. WSF ferry vessel workers experienced 43 back injuries during 2001. This accounted for 37% of all injuries. Strains and sprains were the nature of injury in 68% of the recordable injuries.

Accident Prevention Activities

2nd Quarter Fiscal Year 2002

- WSF's new Safety Management System had a positive effect on accident prevention through increased safety awareness and attention to safety procedures.
- Regional accident prevention activities include continuation of awareness through staff and safety meetings and vehicle accident reduction activities in the Eastern, Southwest and Olympic regions.
- A department-wide maintenance safety training review was completed during the 2nd quarter to identify maintenance worker safety training needs and to plan strategies for training delivery.

Scheduled Activities

January through March 2002

- Revised accident reporting and review process focused toward better information for performance measurement.
- A WSF back injury prevention study to understand the high frequency of back injuries and develop a back injury accident prevention strategy.
- A focused effort to increase the percent of maintenance workers who have completed the required safety training courses.
- Supervisor Safety Awareness and Advocacy Training.

Noteworthy

The department received an 8.2% experience factor reduction from the Washington State Department of Labor and Industries beginning year 2002. This will decrease the size of industrial insurance premiums incurred by WSDOT.

Reading the Charts

"Recordable injuries and illnesses" is a standard measure that includes all work related deaths and work related illnesses and injuries, which result in loss of consciousness, restriction of work or motion, transfer to another job, or require medical treatment beyond first aid.

One worker equals 2,000 hours per year.

The U.S. Bureau of Labor Statistics provides the selected 2000 national average benchmarks. After consultation with the National Bureau of Labor Statistics, the following benchmarks were adjusted from previous

quarters to allow for a more comparable standard to WSDOT's specific worker classifications.

- Maintenance: *Highway and Street Construction* (rate 8.2), Standard Industry Classification (SIC) 161 (previously: *State Highway Department* rate 8.12).
- Engineering: *Engineering and Architect Services* (rate 1.7), SIC 871 (previously: *State Highway Department* rate 8.12).
- Ferry Vessel workers: same benchmark as previous quarters, *Water Transportation* SIC 44, with a rate adjustment for 2000 to 7.0 (up from 6.6).

Highway Construction Program: Quarterly Update

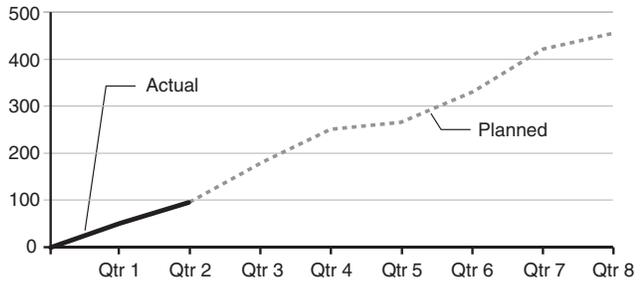
Meeting WSDOT's Scheduled Advertisement Dates

WSDOT's project delivery schedule, according to the Capital Improvement and Preservation Program (CIPP), is shown on the adjacent graphs for the quarter ending December 31, 2001. Of the 42 projects scheduled for bid this quarter, 29 were bid this quarter and 13 were deferred. These deferrals were caused by a variety of reasons, including insufficient time for design work and delayed scoping and preliminary engineering of projects.

However, owing to the inventory of critical highway construction projects, 12 others were advanced to take the place of 13 deferred projects.

Program Delivery: Number of Actual vs. Planned Advertising Highway Construction Projects

2001-2003 Biennium, Quarter 2 Ending December 31, 2001

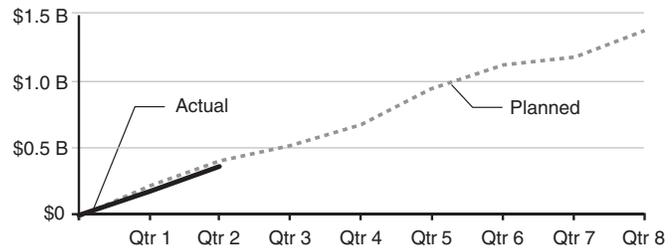


Highway Construction Program Cash Flow

Expenditures through the end of Quarter 2 (December 31, 2001) are running at the rate of approximately 90% of budgeted cash flow. The cash flow target for this program is 92% to 95%. Targeted expenditures should be within target at the end of the biennium. Further quarterly updates will be provided in future quarterly reports.

Program Delivery: Planned vs. Actual Expenditures

Dollars in Billions



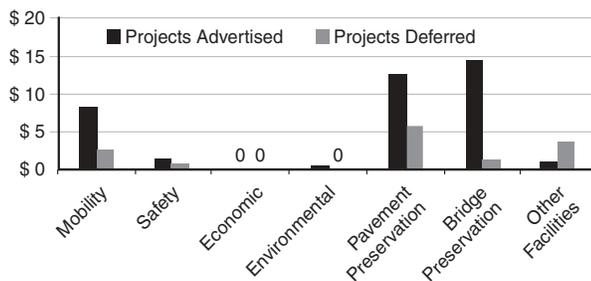
Dollar Value of Projects Advertised and Deferred

This chart shows the dollar value of advertised and deferred projects within the sub-programs of the CIPP during the second quarter. This information is a management indicator to insure that WSDOT is maximizing both its ability to deliver projects to advertisement and to deliver planned expenditures.

For more specific information about the highway construction program the CIPP is available at www.wsdot.wa.gov/ppsc/programmanagement/cipp/CIPP_web.htm. In addition, specific project information is available at www.wsdot.wa.gov/projects.

CIPP Value of Advertised and Deferred Projects by Subprogram

Dollars in Millions

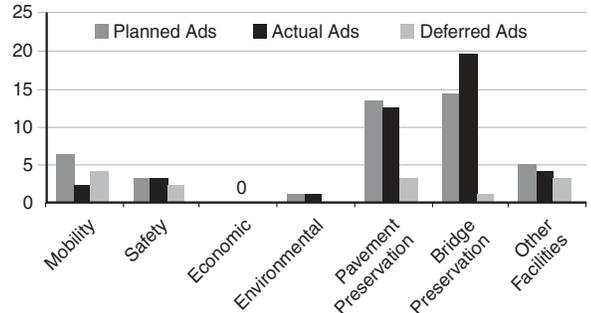


Project Shifting Between Subprograms

As shown in the adjacent graph WSDOT shifts projects between programs and subprograms to ensure a steady flow of projects to ad. It is important to keep the "pipeline" of projects full to complete construction on time and on budget.

Planned, Actual and Deferred Ads by Subprogram

2001-2003 Biennium, Quarter 2 Ending December 31, 2001

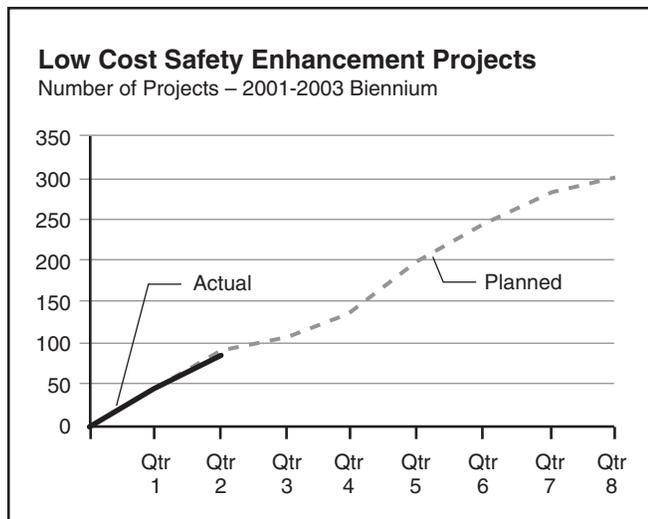


*Asphalt Concrete Pavement Delivery will be reported in the next quarterly report.

Highway Safety Quarterly Update

WSDOT has two major programs for the delivery of safety projects. The Safety Construction Program delivers the expensive and complex safety solutions (*Highway Construction Program* see page 2). The Low Cost Safety Enhancement Program delivers projects that provide immediate and sometimes interim improvements to the operational safety and efficiency of the highway system.

The chart below shows WSDOT's progress in meeting the target of 300 Low Cost Safety Enhancement projects for the biennium ending June 30, 2003.



High Accident Locations and High Accident Corridors

Standard criteria are reviewed every two years to identify High Accident Locations (HALs) and High Accident Corridors (HACs). Locations less than a mile in length are classified as HALs. Those greater than a mile are classified as HACs.

Last quarter *The Gray Notebook* (September 30, 2001) reported the top ten HALs and HACs statewide. This quarterly report lists the top two ranked HAC and HAL locations for each of WSDOT's six regions, in the following two tables. The third table describes two project locations for low-cost enhancements by region.

WSDOT's Six Regions



Top Two High Accident Locations (HAL) by WSDOT Region

Ranked by Societal Costs, 1999-2000 Data*

Region	Disabling Injury**	Fatal Injury	Total Accidents	Estimated Societal Cost \$M/Yr	Proposed Solutions
Eastern					
SR 27 at Sinto Rd. to I-90 between MP 86.3 and 86.6, Spokane area.	2	0	78	2.0	Solutions under development.
U.S. 2 at Nevada-Hamilton intersection, Chattaroy.	2	0	24	1.3	Add an acceleration lane at the intersection and continue to evaluate.
North Central					
U.S. 97, 12 miles north of Blewett Pass (Ruby Creek Canyon), MP 176.22 to 176.40	1	1	9	1.1	Repave and study need for anti-icing solutions.
SR 283/Adams Rd. Intersection, between George and Ephrata.	1	1	6	1.1	Solutions under development.
Northwest					
SR 522 from 61st Ave NE to west of the Park and ride, Kenmore.	11	0	259	8.5	Stripe transit lanes, add <i>Right Turn</i> signs, install multi-modal improvements, and widen road.
U.S. 2 west of Kelsey St to Ann St. vicinity, Monroe.	8	0	181	5.5	Construct Monroe Bypass, safety-access management, and upgrade left turn signals at intersection of Kelsey St. and SR 203.
Olympic					
I-5 northbound near the 38th St. pedestrian overcrossing north to near the Portland Ave. overcrossing, Tacoma.	10	1	611	11.5	Provide improvements to interchange ramps and portions of I-5, including some capacity improvements.
SR 7 from 122nd St. S. to 104th St. S., Parkland area.	5	1	330	7.0	Improve access control, sidewalks, illumination, and retaining walls.
South Central					
U.S. 12 in Clarkston from 7th St. to the beginning of the Snake River Bridge.	2	0	45	1.5	Address traffic safety issues.
I-90 at SR 906 (East Summit Rd. Interchange) Snoqualmie Pass	1	1	30	1.3	Bank the curve, install curve warning signs, and other signs.
Southwest					
SR 503/NE 71st St. vicinity to NE 79th St. vicinity, Vancouver area.	3	0	104	2.5	Install southbound right-turn lane at NE 76th St. and provide raised channelization to restrict movements between NE 76th St. and NE 79th St.
SR 500/NE 54th Ave. vicinity, Vancouver.	3	0	37	1.8	Remove at-grade intersection and construct interchange at NE 54th Ave. <i>Also included in the HAC list.</i>

The fact that a location is listed in the top two high accident locations or corridors does not imply that the location is unsafe or that accidents are related to the design or maintenance of the highway. Crashes are caused by many factors, including driver actions, vehicle condition, and weather. For each of these locations, discretion is exercised in the development and implementation of proposed solutions on the basis of many factors, including levels of authorized and expected funding.

*The accident locations listed above are based on a statewide list organized by societal cost. Estimated societal cost per year is calculated as a function of crash frequency and severity. This data is used for project considerations for the 2003-2005 biennium. The list was sorted by region for the top two HALs.

**Disabling injuries include permanent disabilities only, i.e., temporary disabilities are not included.

Top Two High Accident Corridors (HAC) by WSDOT Region

Ranked by Societal Costs, 1999-2000 Data*

Region	Disabling Injury**	Fatal Injury	Total Accidents	Estimated Societal Cost \$M/Yr	Proposed Solutions
Eastern					
I-90 from Pines Rd. Interchange to Evergreen Rd. Interchange, Opportunity area.	4	2	51	1.6	Solutions under development.
I-90 in the vicinity of Geiger Rd. Interchange, Spokane	4	2	51	1.4	Evaluate solutions, including median barrier.
North Central					
U.S. 2 near Cashmere	9	3	95	1.1	Complete safety study for this corridor.
I-90 at Hilltop Interchange between George and Vantage	4	0	35	0.9	Evaluate data from the location's recently-installed Roadway Weather Information System (RWIS) to track winter road conditions.
Northwest					
SR 515 from SE 232nd vicinity to SE 211th vicinity Kent area.	12	2	330	2.2	Improve signalization for SR 515 at the intersections of 222nd Place and SE 217th St.
SR 9 from S 146th St. vicinity to north of S 130th Lake Stevens area.	11	1	189	2.1	Evaluate 1999 signal and left turn improvements.
Olympic					
SR 167 from Puyallup River Bridge to SR 410, Puyallup area.	7	2	173	2.6	Evaluate southbound direction. Solutions under development.
SR 512 from west of the SR 161 off-ramp to SR 167, Puyallup area.	16	3	407	1.9	Lengthen the deceleration and acceleration lanes at several interchanges in this corridor.
South Central					
I-82 at I-182 Interchange, Richland area.	5	2	49	1.6	Evaluate 1999-2001 safety improvements. Solutions under development.
U.S. 395 at I-182 Interchange, MP 23 to 24, Pasco area.	4	2	45	1.4	Construct interchange.
Southwest					
SR 500 from I-5 to NE 54th Avenue, Vancouver area.	10	0	273	3.4	Remove at-grade intersections at St. Johns Blvd., NE 42nd Ave., and NE 54th Ave., construct new interchanges at St. Johns Blvd. and NE 54th Ave., and construct an overcrossing of SR 500 at NE 42nd Ave.
SR 502 from NE 179th St. to NE 199th St. vicinity, Vancouver area.	8	0	56	1.9	Provide turn channelization, acceleration and deceleration lanes, and signal improvements.

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**Disabling injuries include permanent disabilities only, i.e., temporary disabilities are not included.

Low Cost Safety Enhancement Program

Two Sample Project Locations by WSDOT Regions*

2001-2003 Biennium

Region	High Accident Location (HAL)	Proposed Solutions
Eastern	U.S. 395 Deer Park to Monroe Rd., Deer Park vicinity.	Replace substandard recessed pavement markers and install a continuous centerline rumble strip.
	U.S. 2 Eloika Lake Rd., Bridges and Elk Intersection, near Elk (Spokane County).	Improve signing, relocate advance-warning signs, add recessed pavement markers, and convert the truck climbing lane into a two-way left turn lane at Eloika Lake Rd. to Oregon Rd.
North Central	Intersection U.S. 2 and U.S. 97, near Leavenworth.	Install rumble strips, right turn arrows and "turn only" pavement markings on U.S. 97 approaching the intersection with U.S. 2.
	SR 171 and intersections of Ash, Alder and 3rd St. in Moses Lake.	Coordinate the timing of the signals at these three intersections.
Northwest	SR 525 Northbound on-ramp from Manor Way, Lynnwood.	Install a left turn only signal for northbound traffic, <i>Signal Ahead</i> signs, control signs at the intersection of Alderwood Mall Blvd. and Manor Way, and a <i>Do Not Enter</i> sign at the end of the off-ramp. Adjust signal timing and re-evaluate pavement marking location.
	I-5 Northbound off-ramp to S. Dearborn St., Seattle.	Adjust signal timing, and install a speed advisory sign and pavement arrows at mid-ramp. Improve signal lighting.
Olympic	SR 3 at Agate Rd. Wye, near Shelton.	Widen and restripe to channel left turn traffic away from the main flow.
	I-5 at Bridgeport Way Southbound off-ramp, Lakewood.	Coordinate highway ramp signals with the adjacent city street signal.
South Central	I-90 Eastbound, near Snoqualmie Pass.	Install overhead <i>Curve</i> warning signs and extend the jersey barrier.
	I-90 Westbound, near Snoqualmie Pass.	Install overhead <i>Curve</i> warning signs.
Southwest	Near SR 14 and Marble Rd., Cape Horn vicinity.	Monitor the effectiveness of the improved traffic signs that were installed at this location in 2001.
	Intersection of SR 432 and SR 433, City of Longview.	Install advanced vehicle detection loops (improves traffic signal timing) and advance warning signs.

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*The list above illustrates the variety of low-cost safety enhancement solutions implemented by WSDOT regions. These projects are scheduled to be completed during the 2001-2003 biennium (see the Low Cost Safety Enhancement Project Delivery graph on page 3).

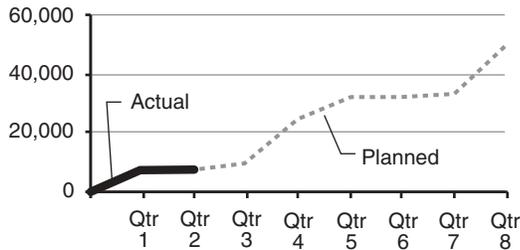
Highway Maintenance Program: Quarterly Update

Selected Maintenance Activity Measures

The line charts show planned production (dotted line) and actual production (solid line) related to select maintenance activities for the 2001-2003 biennium to date.

Pavement Striping

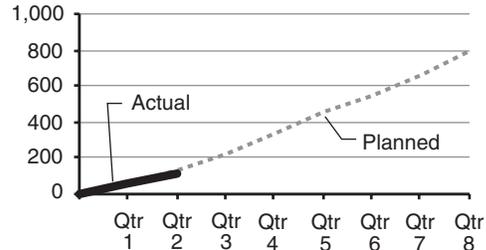
Miles of Roadstripe Painted
Actual vs. Planned



Pavement striping repaints the yellow and white lines on the highway. Striping must be repainted each year as traffic wears it out. Note: Over 255 miles of painted striping will not require annual re-painting because they were painted with durable markings in 2001.

Repairs of Sign Bridges

Number of Sign Bridges Repaired
Actual vs. Planned



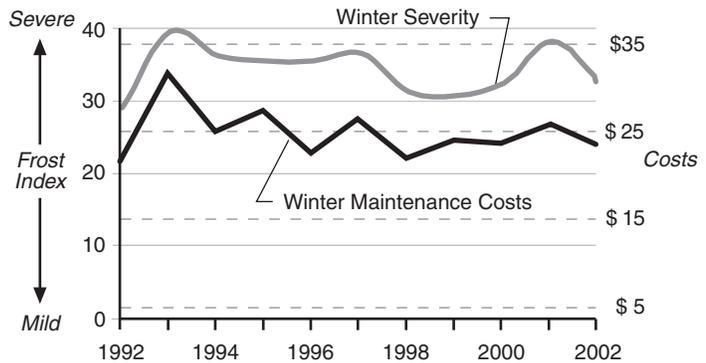
Sign bridges are structures used to mount large signs over or near highways. These structures periodically need repairs of loose or rusted bolts, bracing, and foundations.

Snow and Ice Control Operations

During winter months, the primary focus of the Maintenance program is to provide safe and reliable driving conditions by plowing and/or sanding the roadway when snow and/or ice has accumulated. The severity of winter weather is a major factor in snow and ice control costs incurred by WSDOT. The Frost Index is a numerical value that scientifically identifies the overall severity of statewide winter weather. The chart on the right shows, unsurprisingly, that the colder the winter, the higher the winter maintenance costs.

Fiscal Year Winter Severity and Maintenance Costs

Costs in millions (2002 dollars)



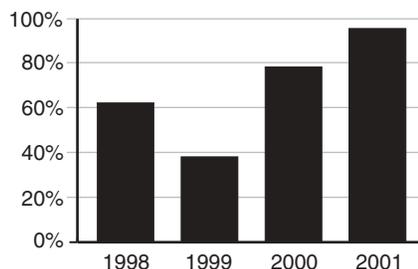
Let it snow, let it snow, let it snow! And we'll plow. Snapshot of a winter maintenance day: U.S. 2 at Stevens Pass received 26 inches of snow one early morning this winter. WSDOT advised travelers about the closure by contacting television media, radio stations, and the Washington State Patrol. WSDOT also broadcast advisories using Internet web sites, highway advisory radio, and variable message signs. Once the pass was closed around 4 am, maintenance crews began avalanche control. Using dynamite, snow was blasted off the hillsides, blocking all four lanes of the highway in 10-40 feet of snow. Meanwhile it continued to snow, and the rest of Stevens Pass required clearing as well. Help was needed. Maintenance crews were called in early while Wenatchee crews shifted to Leavenworth, and Leavenworth crews shifted to Stevens Pass. All lanes were open to traffic by 7 am. Crews continued to keep the traffic flowing as an additional 12 inches of snow fell. In a three-day period, Stevens Pass received a total of 63 inches of new snow while traffic kept moving.

Biennial Maintenance Targets

The Maintenance Accountability Process (MAP) measures and communicates the outcomes of 34 distinct highway maintenance activities. Maintenance results are measured via field condition surveys and reported as Level of Service (LOS) ratings. LOS targets are defined in terms of the condition of various highway features (i.e. percent of guardrail on highway system that is damaged) and are set commensurate with the level of funding provided for the highway maintenance program. The following table shows 2001-2003 LOS targets for highway maintenance activities (in prioritized order), those targets which were achieved (*Pass*), and those activities whose targets were not achieved (*Fail*) during Calendar Year (CY) 2001. From CY 2000 to CY 2001, six maintenance activities changed from “fail” status to “pass” status (see table, bold print.)

Maintenance Activity	Did WSDOT Achieve the Target Level for Highway Conditions Funded by the Legislature?	
	Pass	Fail
Pavement Patching & Repair	✓	
Snow & Ice Control Operations	✓	
Traffic Signal System Operations		✓
Movable & Floating Bridge Operations	✓	
Urban Tunnel Systems Operations	✓	
Keller Ferry Operations	✓	
Guardrail Maintenance	✓	
Noxious Weed Control	✓	
Structural Bridge Repair		✓
Intelligent Traffic System Operations	✓	
Control of Vegetation Obstructions	✓	
Permits/Franchises	✓	
Maintain Culverts	✓	
Regulatory Sign Maintenance	✓	
Slope Repairs	✓	
Crack Sealing	✓	
Bridge Deck Repair	✓	
Safety Patrol	✓	
Rest Area Operations	✓	
Highway Lighting Systems Operations	✓	
Pavement Striping Maintenance	✓	
Maintain Catch Basins & Inlets	✓	
Raised/Depressed Pavement Markers	✓	
Sweeping and Cleaning	✓	
Nuisance Vegetation Control	✓	
Maintain Ditches	✓	
Shoulder Maintenance	✓	
Detention/Retention Basins	✓	
Litter Pickup	✓	
Guide Sign Maintenance	✓	
Landscape Maintenance	✓	
Guidepost Maintenance	✓	
Bridge Cleaning	✓	
Pavement Marking Maintenance	✓	

Percentage of Legislatively Funded Targets Achieved for 1998-2001



Analysis of “Failed” Maintenance Activity Targets for 2001

Structural Bridge Repair

Improving the Level of Service delivered for Structural Bridge Repairs is a continuing objective. Failure to complete the majority of *priority one* repairs as identified in the Bridge Management System (BMS) is disappointing. Advances in the bridge inspection program increased the inventory of *priority one* needs. (See page 12 - *Bridge Assessment Program*.) Maintenance crews did address the most critical needs first and deferred those that are less critical within the *priority one* category. Other reasons for not meeting the target include the lack of a maintenance crew especially equipped for and assigned to bridge maintenance in one region; increasingly stringent environmental permits required for some bridge repairs; and a backlog of *priority one* repairs that has developed over time.

In no case is the safety of the traveling public at risk because of deferred repairs. However, accumulation of needed repairs would accelerate the overall deterioration of bridge conditions over time.

The corrective actions to meet target in 2002 are as follows:

- Assignment of dedicated bridge maintenance crews in each region.
- Continued development of environmental Best Management Practices.
- Enhanced coordination between bridge inspection engineers and maintenance engineers and calibration of the bridge repair list with field maintenance data.

Traffic Signal Systems

The Level of Service target for this activity is a statewide average of no more than one repair per year per signal. Factors contributing to the failure to meet this target include complications related to the application of new technology (camera operated signals with technical glitches that consume crew time), increased interruptions in power supplies that essentially render a signal useless until a maintenance person resets the signal, and an increase in the number of signals on the highway system.

The corrective actions to meet target in 2002 are as follows:

- Headquarters Maintenance staff will work with regional signals personnel to assess the projected duration of referenced complications and determine needed actions and/or improvements.

Freeway Operational Efficiency Strategies – Incident Response Teams and Service Patrols: Quarterly Update



A WSDOT Incident Response Team renders assistance.

Non-recurring traffic incidents, not just traffic volumes, are a significant factor in urban area congestion. WSDOT's strategy to address congestion is to quickly clear incidents when they occur. Quicker Incident Response Teams and the new Service Patrol program are reducing non-recurring congestion and travel times for the public. We are currently developing performance measures.

Incident Response Teams*

There are currently 13 Incident Response Teams statewide. These well-trained teams, with specially equipped vehicles, are able to respond 24 hours a day to accidents and other types of incidents that require on-the-spot traffic control and coordination with the Washington State Patrol (WSP) and other emergency services. Incident Response Teams do not respond to all accidents but only to those when the WSP calls for their assistance. WSP calls when they believe an incident is going to last longer than one hour.

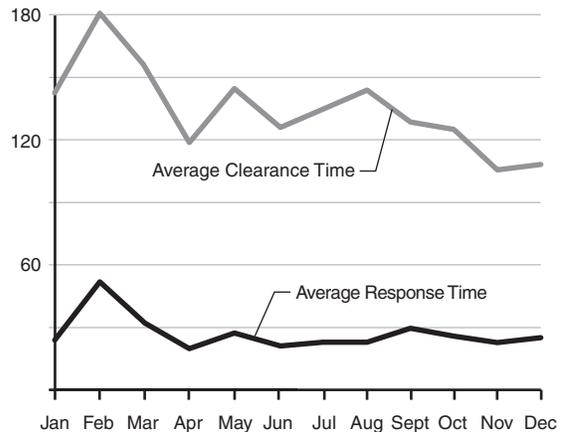
Service Patrols*

There are currently four Service Patrols in the Puget Sound area. Most encounters by the roving Service Patrols are minor incidents involving debris, disabled vehicles or non-crash related incidents. These types of encounters make Service Patrols the best fit for removing incidents from the roadway without needing to block traffic while waiting for a tow vehicle. The chart indicates the number of Service Patrol contacts made thus far in FY 2002, compared to FY 2001.

*See the *Gray Notebook* for September 30, 2001.

Response Time and Clearance Time for the WSDOT Incident Response Teams

In minutes, 2001*



Average response time is the monthly average time from when an Incident Response Team received a call to when that team arrived on the scene.

Average clearance time is the monthly average time from when the Incident Response Team gets a call to when the incident is cleared from the roadway and all lanes are again free for traffic flow.

*Benchmark levels have not yet been developed for this critical performance indicator.



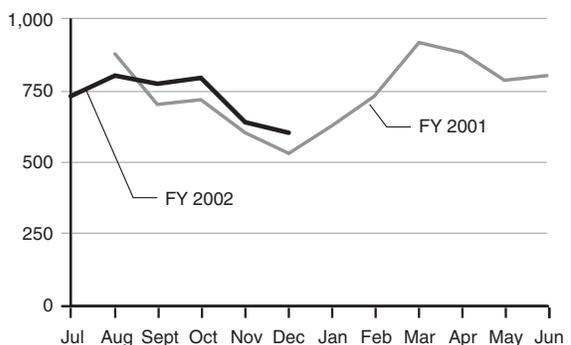
WSDOT's staff and Incident Response truck on patrol in the Salt Lake City area.

WSDOT Incident Response Teams Go to the Olympics

Two teams are assisting with traffic interruptions in the Salt Lake City area during the three-week international event. Washington is one of only three states invited to send incident management experts and equipment. We will provide an update about our experience and what we learned in the next *Gray Notebook*.

Service Patrol Contacts

Number of Contacts



Pavement Conditions on State Highways*

WSDOT has been rating pavement condition since 1969. Pavement rated in *good* condition is smooth and free of defects. Pavement in *poor* condition is characterized by cracking, patching, roughness, and rutting. From 1969 to 1998, trained teams rated pavement by driving every state highway and noting pavement distress from the vehicle.

To improve efficiency and accuracy, WSDOT purchased a new van in 1999 that provides for automated data collection. The new van collects video images of the roadway, as well as measurements of pavement conditions. The pavement images are reviewed, analyzed, and rated by pavement technicians at computer workstations. Pavements are rated on pavement structural condition (PSC), rutting, and roughness (see below).

Determining Pavements “Due” for Rehabilitation



Pavement Structural Condition (PSC)

A pavement will develop structural deficiencies (for example, cracking) for two reasons: truck traffic and cold weather. The PSC is a measure based on distresses, such as cracking and patching, which are related to the pavement’s ability to carry loads. PSC ranges from 100 (best condition) to 0 (worst condition). A roadway should be considered for rehabilitation when it falls within the PSC range of 40 to 60.



Rutting

Rutting is caused by heavy truck traffic or studded tire wear. Ruts deeper than 1/2 inch have the potential to hold water, increasing the risk of hydroplaning for high-speed traffic. A roadway should be rehabilitated when the rut depth is greater than 1/3 inch.



Roughness

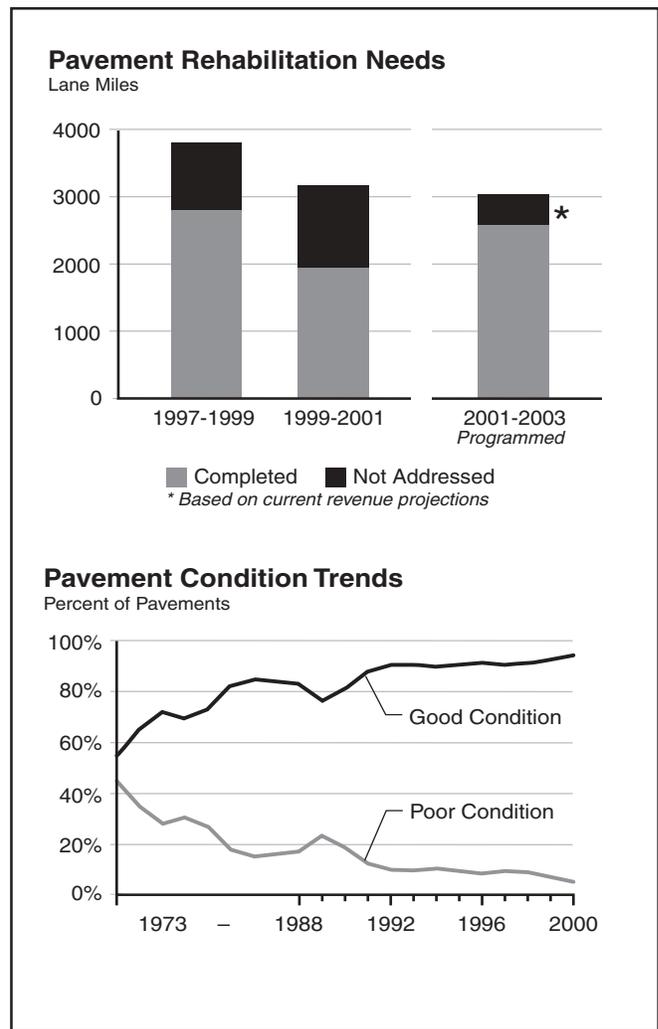
The International Roughness Index (IRI) is a procedure to measure pavement ride. A full-sized van, with a laser-measuring device mounted on the front bumper, measures the roughness of the pavement. A roadway should be rehabilitated when the IRI value is greater than 220 inches per mile. The benchmark for FHWA’s report is 170 inches per mile (WSDOT is currently re-evaluating its “220 inches” standard. An alignment with FHWA’s reporting standard is now under review).

WSDOT uses a combination of pavement ratings to determine when pavement is due for rehabilitation. Points are subtracted as the pavement begins to age and show distress such as cracking, patching, etc. In 1993, the Legislature required WSDOT to rehabilitate pavements at the Lowest Life Cycle Cost (LLCC). WSDOT determined that LLCC occurs at a PSC range between 40 and 60 or when triggers for “rutting” or “roughness” are met. Ideally, when a portion of state highway pavement falls within this range, the department completes its procedures for design and construction bidding. If rehabilitation is done too early, pavement life is wasted. If rehabilitation is done too late, additional – and possibly very costly – repair work may be required if the underlying surface structure is compromised.

* This updates the *Gray Notebook* for June 30, 2001, *Pavement Conditions on State Highways*.

Pavement Rehabilitation Needs

Using pavement condition measures, WSDOT is able to determine the number of lane miles of pavement due to be rehabilitated each year. Often times, the funding level is not sufficient to address all of the pavements that are currently due for rehabilitation. The graph illustrates, by biennium, the number of miles rehabilitated and the number of miles due for rehabilitation that were not addressed due to funding constraints or other program impediments. One thousand miles fell into the “not addressed” category in 1997-1999, and 1,181 miles in 1999-2001. During 2001-2003, 446 miles are not programmed. Miles that are due for rehabilitation, but not addressed, will be completed in future biennia as funding permits.



Pavement Performance

WSDOT’s goal is to achieve a pavement system in which no pavements are in *poor* condition. WSDOT manages close to 18,000 lane miles of pavement surface and as of the year 2000 pavement rating, about 6 percent of the pavements are in poor condition. (Since the June 30, 2001 *Gray Notebook*, WSDOT has changed pavement condition categories to better implement the LLCC approach. This adjustment resulted in revising the percentage of pavements in “poor” condition from 9 percent to 6 percent.) The trend over the last five years has shown slight decreases in the percent of pavements in poor condition, complemented by increases in the percent of pavements in good condition.

How Do Washington’s Pavements Compare Nationally?

The Federal Highway Administration (FHWA) publishes an annual report entitled *Highway Statistics*. Included in this report is information concerning pavement smoothness in each of the 50 states and the District of Columbia. All states are required to provide FHWA with smoothness data for a sampling of their public roads. To the right is a snapshot of the ranked table that shows the number of miles, by state, in poor condition according to smoothness. The total miles reported includes the interstate system and principal arterials owned by the state, cities, and counties, and a sampling of other functional classes. Washington state is ranked 10th in smooth roads.

This publication can be viewed at www.fhwa.dot.gov/ohim/hs00/index.htm

*This rating is based only on the International Roughness Index (IRI). In contrast, WSDOT measures pavement performance using all three ratings: pavement structural condition, rutting, and roughness.

Roadway Smoothness by State*

Source: FHWA, *Highway Statistics 2000*

Ranking	State	Centerline Miles Reported	Miles in Poor Condition	Percent in Poor Condition
1	Georgia	11,554	7	0.1
2	Alabama	7,721	34	0.4
3	Kansas	8,655	102	1.2
4	Minnesota	11,582	150	1.3
5	North Dakota	6,179	95	1.5
6	Florida	10,398	176	1.7
7	Wyoming	4,413	78	1.8
8	Utah	3,752	80	2.1
9	Arizona	3,861	83	2.1
10	Washington	5,368	131	2.4
11	Kentucky	5,156	130	2.5
12	Idaho	3,839	114	3.0
13	Nevada	2,924	89	3.0
14	Montana	6,968	219	3.1
15	Tennessee	7,250	269	3.7
24	Oregon	6,249	407	6.5
48	California	20,317	5,263	25.9
50	New Jersey	2,883	925	32.1

Bridge Assessment Program

WSDOT Bridge Inventory

December 30, 2001

Bridge Type	Quantity	Area (sq ft)
Pedestrian Bridges	61	251,790
Railroad Bridges	11	65,746
Buildings or plazas	1	na
Structures < 20 feet in length	200	39,770
Culverts > 20 feet in length	69	37,840
Tunnels	34	566,999
Vehicular Bridges > 20 feet	2,991	45,475,040
Total WSDOT Bridges	3,367	46,437,185

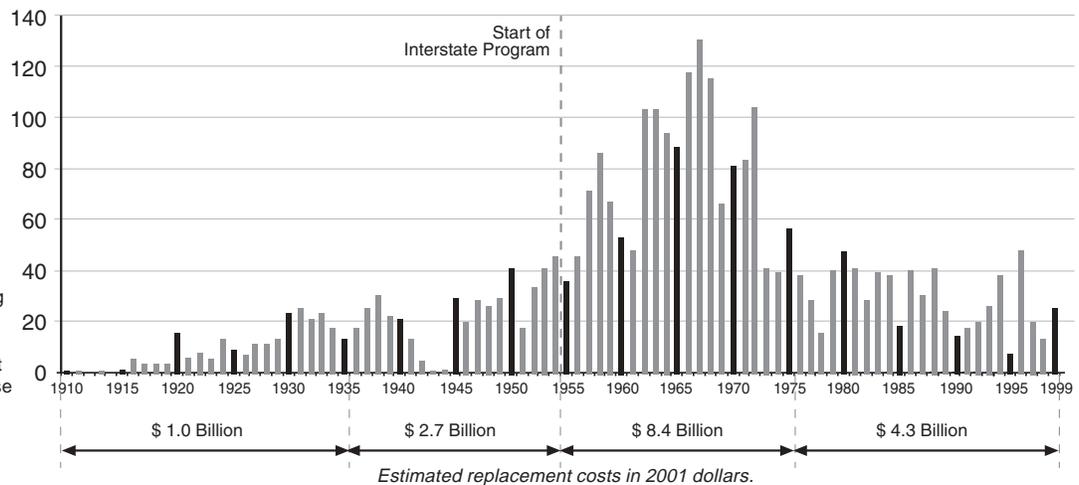
Bridge specialists at WSDOT are also involved in tunnels, sign bridges, and other ancillary highway structures. These matters will be covered in future Gray Notebook reports.

The WSDOT Bridge Assessment Program consists of four main program areas:

- **Inspection.** Inspect one-half of all WSDOT bridges every year.
- **Repair, Rehabilitation, and Replacement.** Remedy for deterioration and traffic impacts. Rehabilitation of mechanical and electrical operating systems on movable bridges.
- **Preservation.** Extend bridge service life such as painting of steel structures, overlays of bridge decks, replacement of floating bridge anchor cables.
- **Risk Reduction.** Special efforts directed to seismic and flood risk.

WSDOT Bridge Inventory Distributed by Age 1910-1999

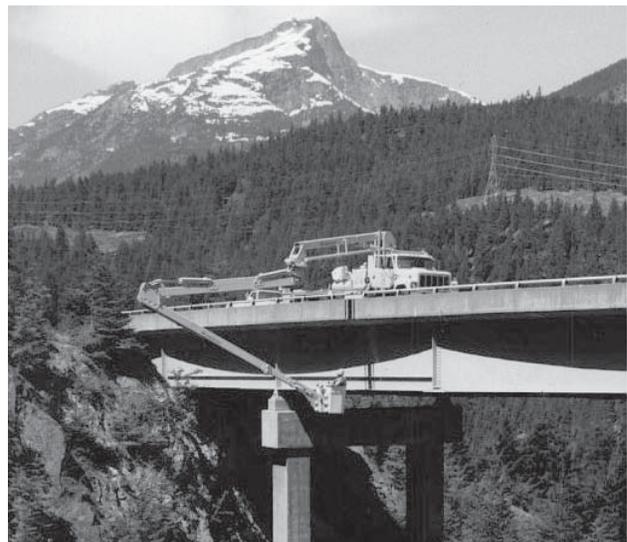
Over half of the bridge structures were built from 1956-1976, during the peak years of the interstate highway program. The total cost of bridge repairs will rise sharply in the next decade as large numbers of bridges reach age of 50.



Inspection

WSDOT follows federal regulations requiring that highway bridges be inspected once every two years. Approximately one-half of WSDOT's bridges are inspected each year. Underwater diving inspections are performed every year on each of the floating bridges; one third of the underwater cables on floating bridges are inspected every year. Movable spans on bridges receive a special in-depth inspection at least once every five years.

The Bridge Preservation Office performs inspections and identifies needed repairs. Implementation is split between Capital Construction and Highway Maintenance. Maintenance conducts routine bridge repairs managed through the Maintenance Accountability Program (MAP). (See page 7 for Maintenance Program.) Major repair, rehabilitation, and replacement needs are programmed in the Bridge Management System (BMS) and implemented through the Capital Improvement and Preservation Program (CIPP).



Bridge inspection on State Route 20 in the North Cascades.



The State Route 290 (East Trent Street) bridge over the Spokane River is under contract for replacement.

Awarded Replacement Contracts:	Actual 2001-2003 Expenditures	Total Award Quarter	Total Estimated Construction Cost
SR 20 Methow River	\$ 4.6 M	*	\$ 4.6 M
SR 20 Damnation Creek	\$ 1.7 M	*	\$ 1.8 M
U.S. 97 Toppenish Creek	\$ 2.8 M	1	\$ 2.8 M
SR 290 Spokane River	\$ 10.9 M	1	\$ 10.9 M

*awarded in '99-'01 Biennium

Rehabilitation and Replacement

In some cases, major rehabilitations, or total bridge replacements are required.

Bridge replacement/major rehabilitation projects scheduled in the 2001-2003 biennium are as follows (dollars in millions):

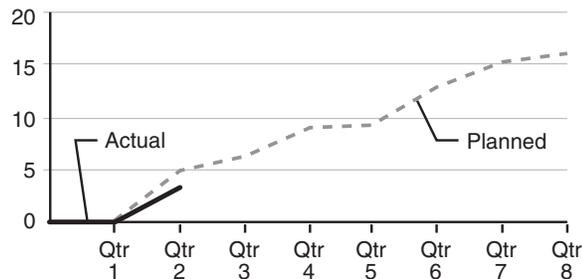
Project to be Awarded:	2001-2003 Expenditures	Planned Award Quarter	Total Estimated Projected Costs
SR 107 Slough Bridges	\$ 8.0 M	3	\$ 8.3 M
SR 542 Boulder Creek	\$ 1.5 M	3	\$ 2.6 M
U.S. 2 Barclay Creek	\$ 4.3 M	3	\$ 4.5 M
U.S. 101 McCalla Creek	\$ 1.1 M	4	\$ 1.9 M
SR 240 Yakima River	\$ 1.3 M	6	\$ 20.1 M
U.S. 12 Dry Creek	\$ 0.2 M	7	\$ 0.5 M
SR 433 Columbia River	\$ 6.8 M	7	\$ 32.1 M
SR 104 Hood Canal	\$ 5.1 M	8	\$ 196.5 M

Preservation: Bridge Deck Protection

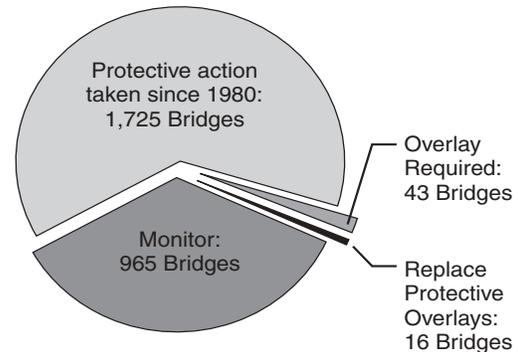
Concrete bridge deck deterioration has been the largest single problem in the country for years. WSDOT has been working since the early 1980s on a systematic program to repair bridge deck damage and provide durable protective concrete overlays.

2001-2003 Deck Protection Projects

Number of Bridges



Deck Program Overview



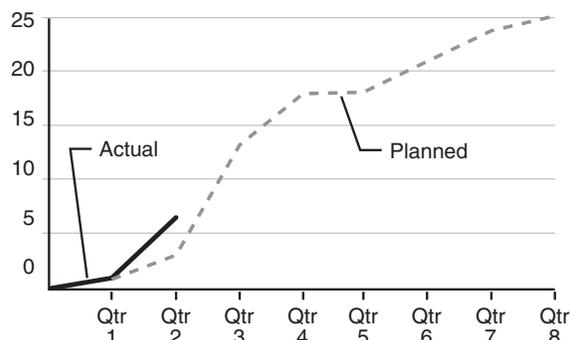
Preservation: Steel Bridge Painting

On steel bridge elements, maintenance of protective coatings is essential to prevent corrosion and loss of structure capacity. Bridge painting can be a major project because of the length of the structures and the complexity of safety, environmental (lead paint removal) and other program management requirements.

The cumulative award of approximately 25 steel painting projects scheduled for the 2001-2003 biennium is shown in the accompanying graph.

2001-2003 Bridge Painting Projects

Number of Bridges



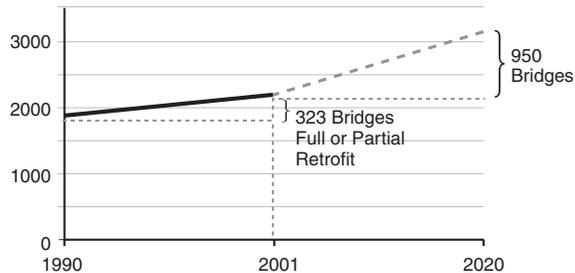
Risk Reduction: Seismic

Scheduled for award in each quarter of the 2001-2003 biennium.

From 1990 to the end of December 2001, WSDOT has completed 323 full or partial seismic retrofits to meet current AASHTO standards. An additional 950 bridges await retrofit programming. Retrofit priorities are based on seismic risk of a site, structural detail deficiencies, and route importance.

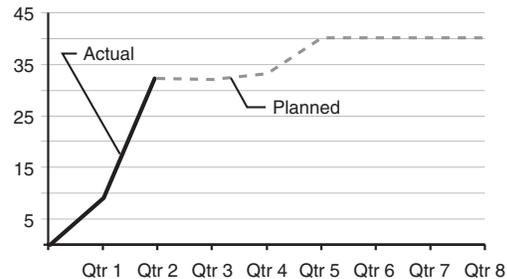
1990-2020 Bridge Seismic Retrofit Plan

Number of Bridges



2001-2003 Bridge Seismic Retrofit Program

Number of Scheduled Bridges



Top Ten Priority Bridges for Seismic Retrofit

2001-2003

No.	City	Highway	Bridge Name or River	Planned Award Quarter
1	Longview	SR 433	Lewis & Clark Bridge over Columbia River	5
2	Seattle	I-5	Eastbound 6 th Ave. Ramp at Spokane St. Viaduct	4*
3	Seattle	I-5	Westbound 6 th Ave. Ramp at Spokane St. Viaduct	4*
4	Seattle	SR 99	Spokane St. Overcrossing	7*
5	Seattle	SR 99	Aurora Ave. over Lake Union	4
6	Aberdeen	U.S. 12	Heron St. over Wishkah River	5
7	Aberdeen	U.S. 101	Chehalis River	5
8	Hoquiam	U.S. 101	Riverside Ave. over Hoquiam River	5
9	Hoquiam	U.S. 101	Simpson Ave. over Hoquiam River	5
10	Elma	U.S. 12	Satsop River	5

* Dependent on availability of funds from "new law" revenues.

A Federal Emergency Management Agency (FEMA) sponsored assessment of King and Pierce County bridges between the Ports of Tacoma and Seattle revealed that 214 bridges could be damaged during a major earthquake on the Seattle fault. Of those, 40 could be damaged by a magnitude of 7.0, and 20 bridges could be damaged by a magnitude of 6.5. This could lead to extended transportation breakdowns and very large economic losses. This problem illustrates the importance of continuing the seismic retrofit program.

Risk Reduction: Scour

Scour mitigation has been completed on 29 bridges since June 1999, at costs per bridge from as little as \$2,570 (I-90 Kachess River Bridge near Easton) to as high as \$967,000 (U.S. 12 Sylvia Creek Bridge near Montesano). An additional dozen projects are funded for the current 2001-2003 biennium. However, it now proves very difficult to obtain environmental permits for bridge scour projects and as a result, only three scour remediation projects have been awarded during this biennium. Furthermore, several projects that included scour remedial work as part of larger contracts have seen the scour work deleted to avoid delay of other work. This is a matter of significant concern and is now being addressed as a matter of urgency with the permitting agencies.



Scour repair on State Route 410.

FHWA Bridge Ratings: Structurally Deficient and Functionally Obsolete

USDOT's Federal Highway Administration (FHWA) requires all state transportation agencies to report state, city, and county Structurally Deficient (SD) and Functionally Obsolete (FO) bridge ratings each year. SD and FO ratings are used to help determine federal bridge replacement and rehabilitation funding levels to the states. According to *Better Roads* magazine, WSDOT ranks 28th nationally with 22% of our bridges Structurally Deficient (SD) or Functionally Obsolete (FO). WSDOT has determined, based on deck area, 3.5% of state-owned bridges are SD.

The SD rating refers to bridge superstructure, deck, substructure, structural adequacy, and waterway adequacy. The FO rating refers to approach roadway alignment, deck geometry, under-clearances, structural adequacy, and waterway adequacy. The WSDOT Bridge Program prioritizes SD bridges with public safety concerns before addressing FO bridges that require solutions such as wider lane widths or higher vertical clearances. Aside from tracking SD and FO, WSDOT's Bridge Program emphasizes the importance of cost effective preservation programs, such as bridge replacement and rehabilitation, seismic retrofit, bridge painting, bridge deck rehabilitation, and bridge foundation scour mitigation.

The SD Rating

is applied if a bridge meets one of the following condition codes: super structure, deck, and/or substructure rates at "4" (poor condition) or less; or one of the two appraisal codes for structural adequacy and waterway adequacy is coded at "2" (very substandard).

Condition Categories:

Superstructure



Deck



Substructure



Appraisal Categories:

Structural Adequacy



Waterway Adequacy – Is the bridge high and wide enough?

The FO Rating

is applied if a bridge with an approach roadway alignment, deck geometry, underclearance, structural adequacy, or waterway adequacy appraisal code is rated at "3" or less (substandard).

Appraisal Categories:

Approach Roadway Alignment



Deck Geometry



Underclearances



Structural Adequacy



Waterway Adequacy – Is the bridge high and wide enough?

Commute Trip Reduction: Quarterly Update

Vanpools in the Puget Sound Region

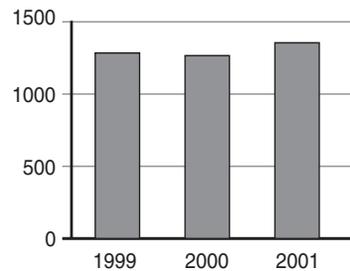
During 2001, the number of vanpools on the road in the Puget Sound region increased 5.9 percent to 1,353 vans. Last fall, the number of vanpools was expected to decrease as a result of the economic downturn. However, these decreases did not materialize. In fact, vanpool ridership increased nearly 3 percent during the last quarter. One factor is the successful and continuing strong collaboration between the vanpool operators and the Boeing Company. The regional *RideshareOnline.com* web site is also increasingly used by vanpools to recruit their own riders. During 2001, 278 new vanpool groups started and 229 groups folded. WSDOT will investigate the turnover rate of vanpool groups in 2002.



Quarterly Regional Vanpool Highlights

- Due to heightened security after September 11th, the Navy placed restrictions on single-occupancy vehicle entry to the Puget Sound Naval Shipyard. This has resulted in significant growth in use of vanpools. During this quarter the number of Kitsap Transit vans on the road increased 20 percent. Kitsap Transit is currently renting eight vans from WSDOT to help meet this growth in demand.
- Mason County recently purchased eight vans from King County Metro in order to provide vanpool service in 2002. Initially, these vans will support commuters traveling to Bremerton.
- King County is exploring new ways to expand vanpooling. The county has recently assigned 20 *VanShare* vans to Sounder stations. These vans take riders from the station to their employment sites.

Number of Operating Vanpools in the Puget Sound Region



Commute Trip Reduction

Washington law requires employers located in nine Washington counties who have more than 100 employees to participate in a program to decrease energy consumption, improve air quality and reduce traffic congestion by reducing commute vehicle trips.

WSDOT supports this program with direct and indirect assistance to the employers to encourage voluntarily participation in the program. A tax credit was available in the years 1994-1999 which acted as an incentive for non-obligatory participation. Many employers involved in the program report economic benefits from the program, for example, reduced costs of providing parking for commute vehicles.

CTR Program Biennial Results

The CTR program measures its effectiveness by surveying commuters every two years.

The program is most effective in areas where congestion is high and more alternatives for commuting to work are available. WSDOT is providing CTR funding to jurisdictions based on performance. This should increase the program's impacts in areas where commute trip reduction is most cost effective.

- Nearly 75 percent of the original worksites that entered the program in 1993 reduced their drive alone commute rate.
- On average, employees at CTR sites reduced their drive alone commuting 9 percent between 1993 and 2001.
- The CTR program removed nearly 20,000 vehicles from Washington's roadways each morning.

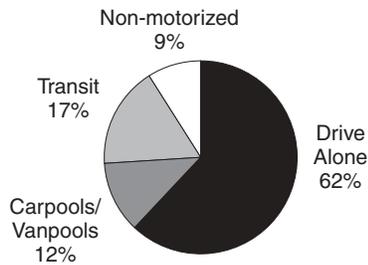
Comparing Commuting Trends at CTR Work Sites with Work Sites in General

The effectiveness of the CTR program can be gauged by the number of employees that use CTR alternatives to drive alone commuting. Apples-to-apples data comparisons are not easy to develop. However, information about CTR sites in Seattle viewed in the years 1990 and 2000 can be compared to information about work sites generally in Seattle viewed in the years 1993 and 2001 to provide strong suggestions about the trends.

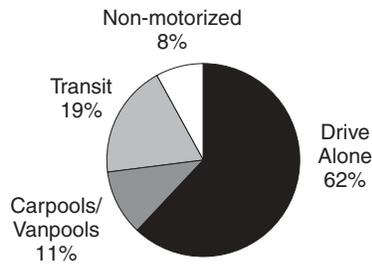
All Employees in the City of Seattle

Percentage Change by Modes, 1990 and 2000

1990



2000

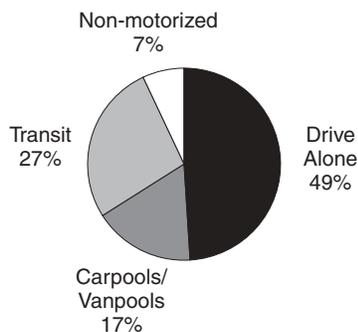


During the decade, employees in the City of Seattle did not reduce the "Drive Alone" percentage (62 percent of commute trips). The small increase in transit share has not resulted in decreased use of drive-alone commuting.

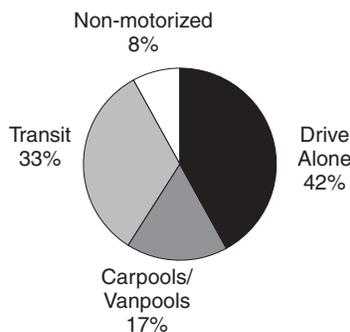
Employees at CTR Sites in the City of Seattle

Percentage Change by Modes, 1993 and 2001

1993



2001



At these CTR sites, the "Drive Alone" rate was reduced from 49 percent in 1993 to 42 percent in 2001.

Ridesharing (carpool and vanpool) use remained constant. In the CTR program, this is unusual because in most areas of the state, ridesharing has increased 14.9 percent at CTR sites statewide.

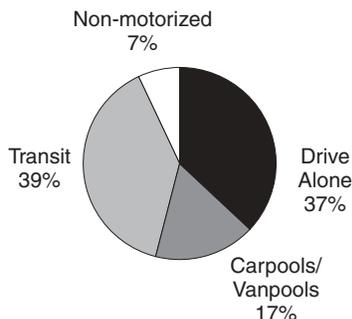
Even with high use of transit in 1993, CTR employees increased their use of transit by almost a quarter. This is an important finding as it suggests transit use can increase, even when use is already high.

Sources: 1990 U.S. Census statistics, 2000 U.S. Census supplemental survey, and CTR employee surveys. Note: This data has been adjusted to create comparable mode information.

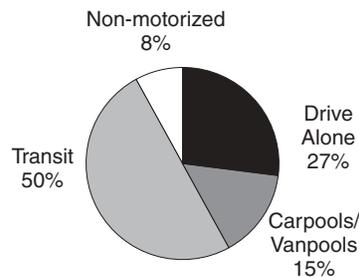
Changes in CTR Employee Commuting Seattle Central Business District

Percentage Change by Modes, 1993 and 2001

1993



2001



The change in drive alone rate observed at CTR sites is even more pronounced for Seattle's central business district (CBD) than it is for the city as a whole.

In the Seattle CBD, where the drive alone rate was already low, the drive alone rate for the 143 CTR participating sites decreased by almost a third.

Over half of the commute trips at CTR sites in the Seattle CBD are employees taking transit, a considerable increase in transit use. Growth in transit use can be attributed to:

- additional Sound Transit Service
- improvements in King County Metro Service, including Flex Pass
- increase in transit subsidies by CTR employers

Sources: CTR employee surveys. Note: This data has been adjusted to create comparable mode information.

WSDOT Park & Ride Lot Occupancy Rates in the Puget Sound Region

Park & Ride lots enhance the convenience of transit, vanpools and carpools. The lack of capacity at Park & Ride lots limits the growth of these programs.

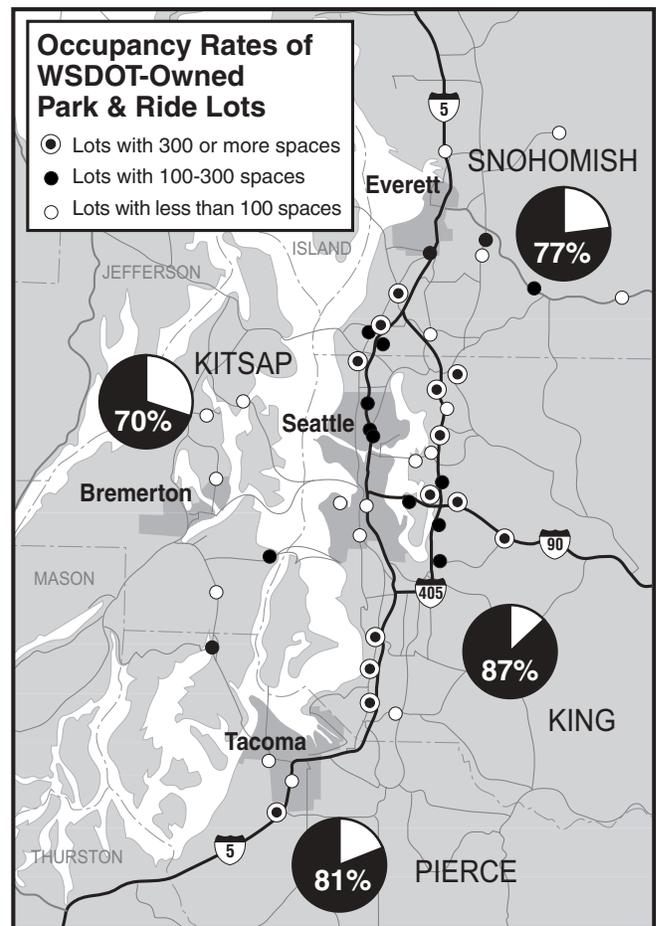
This map shows the occupancy rates of the 62 WSDOT-owned lots in the Puget Sound region. The 12,048 WSDOT-owned spaces have an average occupancy of 84 percent. Almost three-quarters of the lots exceed the full use standard of 70 percent. Occupancy information is not available for all lots in Snohomish County.

See the September 2001 *Gray Notebook* for WSDOT Park & Ride occupancy rates in King County.

Park & Ride Lot Security

To date, no coordinated reporting and tracking system for incidents at or around Park & Ride lots exists. WSDOT recognizes the need to better assess security issues and guide appropriate action strategies in coordination with responsible law enforcement agencies. For this *Gray Notebook*, the Commute Trip Reduction Office conducted an informal survey of police agencies on the frequency and type of incidents and accidents at selected Park & Ride lots. Police departments reported that incidents range from non-criminal information calls to car thefts, parking lot traffic accidents, and sexual offenses.

Review of the available information indicates that the data is not consistently reported or categorized. WSDOT will work with Park & Ride lot partners, local police, and the Washington State Patrol to improve incident reporting by developing a system for data collection and tracking. Findings will be published in the next quarterly report. This information will be used to create action strategies that address incidents and accidents at Park & Ride lots.



Environmental Programs

Many WSDOT programs have implications for and connections with the environment. Performance measurements for some of these efforts are now under development and will be reported on and tracked in this section.

Fish Passage Barriers

Salmon and other fish need access to freshwater habitat for spawning and juvenile rearing. *The Statewide Strategy to Recover Salmon: Extinction is not an Option* (www.governor.wa.gov/esa/index.htm) identifies barriers to habitat as an impediment to salmon recovery. Since 1991, WSDOT has managed a program to inventory and correct highway culverts that block fish passage. Once corrected, the benefits to fish habitat are real and immediate – in many cases fish have been observed upstream of improved culverts within weeks of restoring access. Below are photographs of a typical fish passage barrier removal project performed by WSDOT.

Unnamed Tributary to Stillwater Creek Under State Route 506 near Vader in Lewis County



Before: Older culvert was too high and too steep.



After: New arch culvert was installed in 2001 at a cost of \$103,000.

Pictures of the fish themselves are hard to see when printed in black and white. At www.wsdot.wa.gov/eesc/environmental/programs/biology/fishpass/fishpass.htm you will find fish pictures, and much more technical information about this program, including a discussion of state laws that recognize the importance and requirements of unobstructed fish passage.

Identification and Inventory

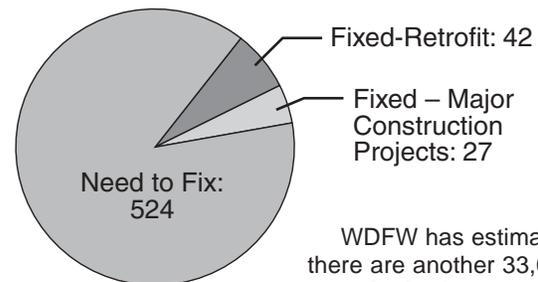
Fish barriers on WSDOT highways were first surveyed and inventoried beginning in 1991 under a cooperative program with the Washington State Department of Fish and Wildlife (WDFW). Just under 600 barriers have been identified for correction. Two stream criteria changes were adopted by WDFW in 1995 and 1998. The more stringent criteria have led to additional survey and evaluation work that has not yet been completed, but which is expected to add approximately 300 to 400 more barriers to the WSDOT inventory. WSDOT/WDFW jointly manage a statewide database for this inventory.

Corrective Efforts

WSDOT culvert barriers are corrected in the course of highway projects, as stand-alone projects; during routine maintenance, or through a special retrofit program funded expressly by the legislature. Projects are prioritized so that the culvert barriers corrected first are those that promise to yield the greatest habitat benefits.

Already Identified WSDOT Fish Barriers

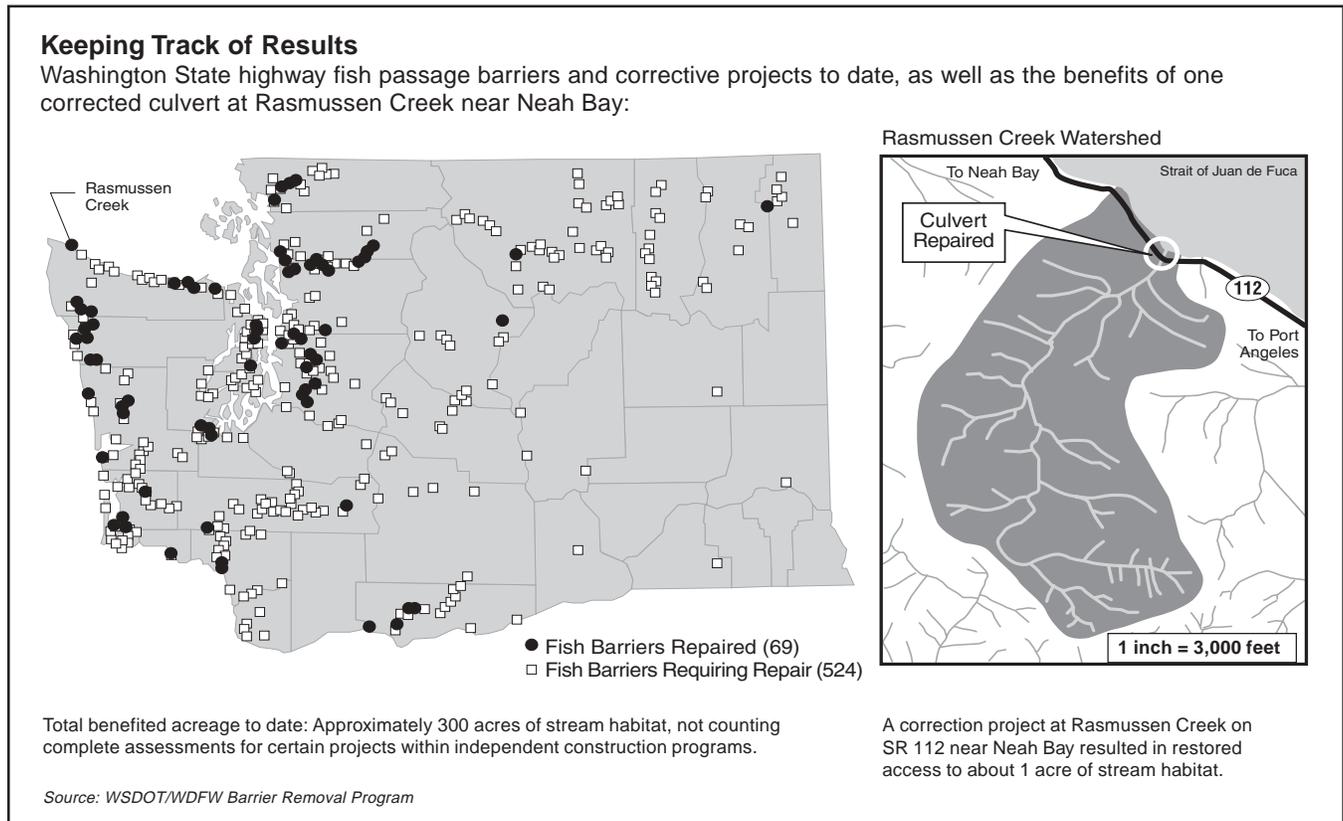
December 31, 2001



Source: WSDOT/WDFW Barrier Removal Program

WDFW has estimated there are another 33,000 non-WSDOT fish passage barriers located on city, county, federal, private and tribal roads.

Since 1991, 27 barriers have been corrected in the course of highway projects, and another 42 barriers have been corrected through the special retrofit program. WSDOT maintenance personnel also correct or at least improve some fish barriers during routine culvert maintenance.



Goals for 2001-2003 and Beyond

Inventory

WSDOT has approximately 7,000 miles in the state highway system. So far 2,000 highway miles have been inventoried by WDFW for fish barriers using recently revised criteria. The goal is to inventory an additional 400 miles by June 30, 2003.

Corrective Projects

Sixteen projects have been funded for retrofit and/or replacement for the 2001-2003 biennium. Additional projects will be completed as an element of larger transportation projects. These additional projects are now not fully and adequately tracked. WSDOT is developing a system to more accurately track and report on these projects.

Future Projects

Twelve projects have been funded for the 2001-2003 biennium for design and for development of right-of-way access. These projects are scheduled to be constructed during the 2003-2005 biennium.

The *Washington State Highway System Plan* update (proposed for adoption in February 2002) sets a twenty-year goal for correction of all state highway culvert barriers. Expenditures for barrier removal in the current biennium are approximately \$7 million. Estimates show that this spending level would have to approximately double to complete the correction of all culvert barriers in the state highway system within twenty years. This does not include the costs of addressing tens of thousands of barriers not in the state highway system, an unknown number of which may require corrective action.

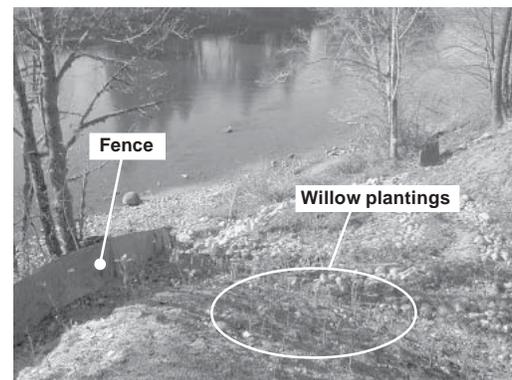
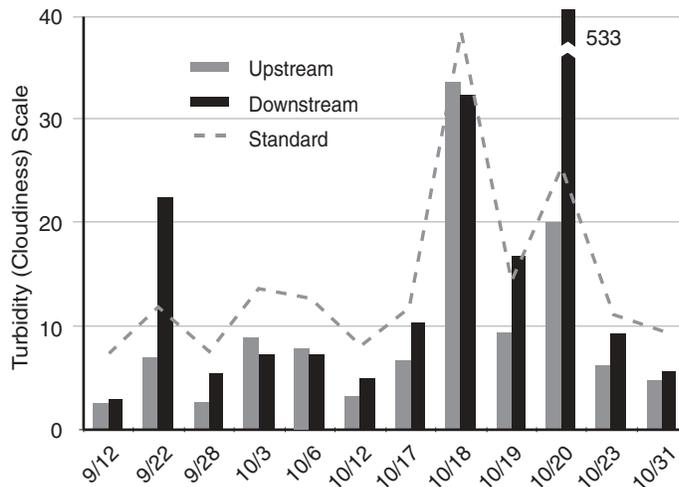
Construction Site Runoff Water Quality Protection and Monitoring

Plastic fences and straw bales on roadway construction sites are familiar to motorists. They are examples of “best management practices” required by state and federal agencies to prevent muddy construction site runoff from degrading water quality. Environmental regulations require these precautions on construction projects to prevent noticeable increases in the cloudiness (turbidity) of streams. The standard varies with the natural clarity of a stream and is especially strict in clean streams where small increases are visible.

WSDOT holds contractors to these standards. In some areas, notably King County, regulators are requiring that stream quality samples be taken and analyzed to track runoff impacts during storm events. Monitoring is more intensive during wet periods (more than 1/2 inch storms) when erosion problems are most likely. Currently six projects contain these requirements. With current resources, WSDOT is performing voluntary analysis on five additional projects. The following charts report the results at two project sites.

State Route 20: Removal of Debris Jam from Skagit River Tributaries at Mile Post 20

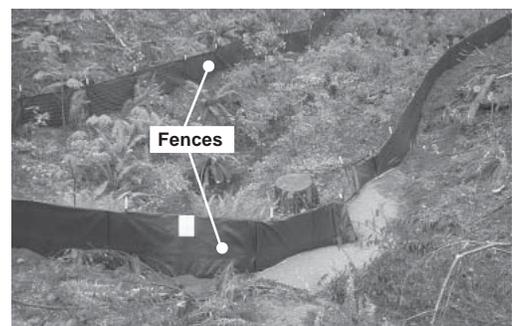
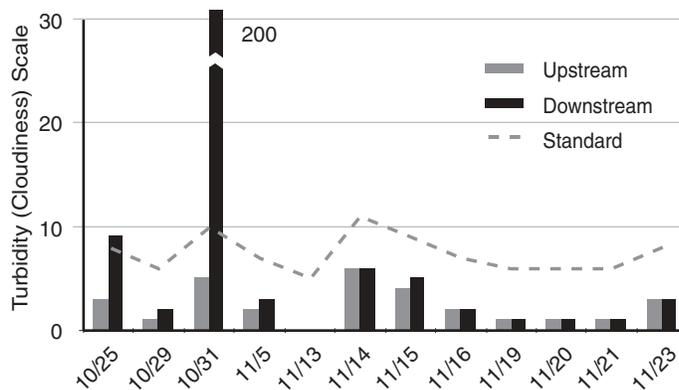
Downstream readings consistently met water quality standards. Two events (September 22 and October 20) were notable exceptions, but in both cases the increased turbidity (cloudiness) resulted from mudslides further up the mountain that drained through the project and into the river between monitoring points.



Stream bank slopes stabilized using fences, willow plantings, erosion blankets, and mulch.

State Route 18: Cedar River – Highway Widening for 180th Avenue SE to Maple Valley Interchange

Consistently met standards except for October 25 and 31 when storms overwhelmed the best management practices. The violations were reported and problems were promptly corrected (e.g., modified pond design, redirected surface flows, and covered soils).



Fences keeps the stream clean during storm events and construction.

Next Steps

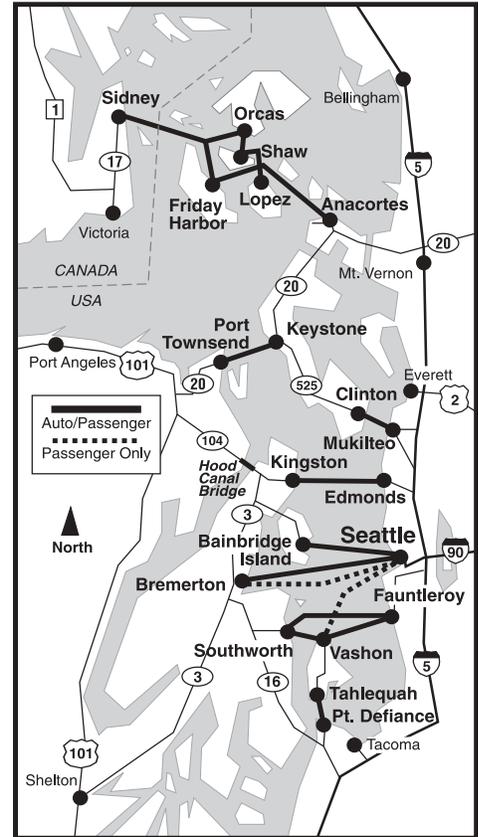
WSDOT is developing standard monitoring protocols to increase the quality of data gathered and efficiency in compiling and reporting monitoring information. Toward this effort, WSDOT is monitoring five sites for water quality that are not required by permit. These five “test” sites will be case studies for the development of monitoring, tracking and reporting practices.

Washington State Ferries: Quarterly Update

Washington State Ferries (WSF) operates the largest ferry system in North America. WSF serves eight counties within Washington as well as Vancouver Island, B.C.



Colman Dock in Seattle is the busiest WSF terminal.



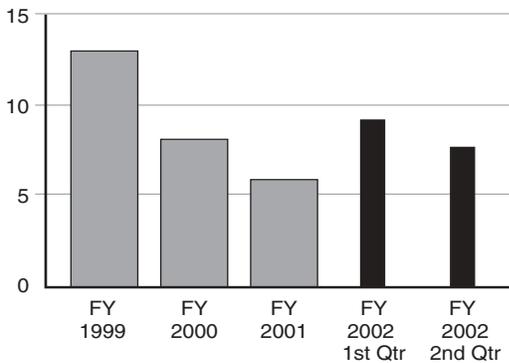
Customer Feedback

WSF collects customer complaints, compliments, comments, and suggestions. This information is recorded in the Automated Operating Support System (AOSS) database for measurement and action, based on date base cross tabulation and analysis.

The charts show trends in the data for the last three fiscal years and through the second quarter of fiscal year 2002 (July 1, 2001 through December 31, 2001).

Total Customer Complaints

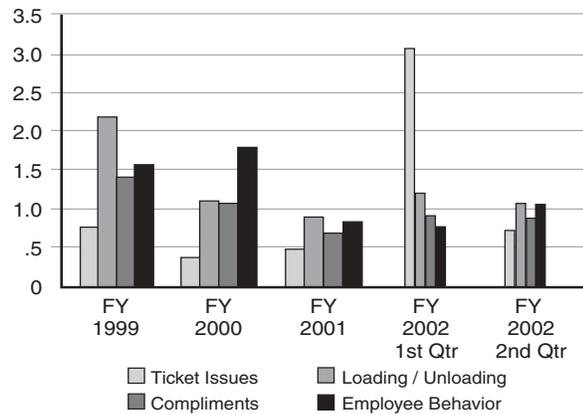
Complaints per 100,000 Customers*



*Does not include compliments or suggestions.

Most Frequent Customer Comments

Top Four Comment Types per 100,000 Customers



Complaints were down 17% in the 2nd quarter. This is attributable to the dramatic drop in ticket issue complaints. It should be noted that WSF received 46 ticketing complaints in the 2nd quarter as compared to 239 ticketing complaints in the 1st quarter.

On-Time Performance

WSF has been collecting on-time performance data since June 2001. The table below depicts on-time performance across the system for the first two quarters of this fiscal year. Overall, on-time performance improved in the second quarter. Summer peak traffic volumes impacted service delivery in the first quarter. The September 11th terrorist attacks in New York had a negative impact to the International Route on-time performance for the second quarter. Border security and Customs screening have intensified, causing delays in trip delivery. A trip is considered to be on-time if it departs within ten minutes of the published scheduled sailing time. Not all scheduled trips (about 5%) are recorded due to bad weather and related Global Positioning System (GPS) tracking difficulties.

On-time Performance Delivery

For period July 1, 2001 through December 31, 2001

Route	First Quarter Fiscal Year 2002			Second Quarter Fiscal Year 2002		
	Number of Trips Recorded	Percent of Trips Within 10 Minutes of Schedule	All Trips Average Delay From the Scheduled Sailing Time	Number of Trips	Percent of Trips Within 10 Minutes of Schedule	All Trips Average Delay From the Scheduled Sailing Time
San Juan Domestic	7,172	71%	8.5 minutes	6,493	88%	3.5 minutes
International Route	337	87%	4.4 minutes	180	79%	6.4 minutes
Edmonds/Kingston	4,453	85%	5.3 minutes	4,452	96%	2.8 minutes
Passenger-Only: Seattle/Bremerton	1,584	98%	3.1 minutes	1,660	95%	2.8 minutes
Passenger-Only: Seattle/Vashon	992	97%	3.0 minutes	1,026	98%	2.1 minutes
Fauntleroy/Vashon/Southworth	10,331	88%	4.3 minutes	10,489	93%	3.3 minutes
Keystone/Port Townsend	2,479	85%	4.8 minutes	1,688	95%	2.8 minutes
Mukilteo/Clinton	6,756	96%	2.6 minutes	6,487	99%	1.6 minutes
Point Defiance/Tahlequah	3,062	92%	3.7 minutes	3,060	91%	3.3 minutes
Seattle/Bainbridge island	4,133	85%	5.5 minutes	4,025	89%	4.6 minutes
Seattle/Bremerton	2,522	97%	3.0 minutes	2,469	98%	2.4 minutes
Total	43,821	87%	4.8 minutes	42,029	93%	3.0 minutes

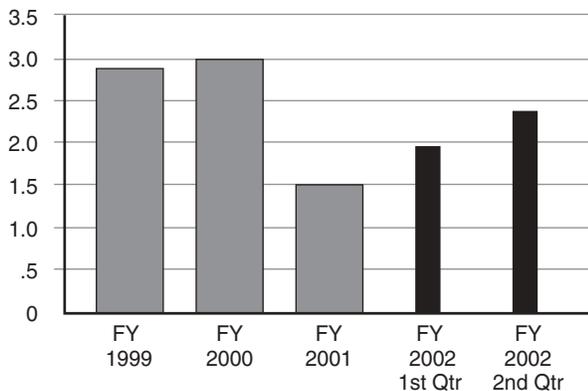
Note: Missed trips are not reported in this measure. They are included in the following measure (Trip Reliability).

Trip Reliability

WSF scheduled 44,295 trips during the 2nd quarter of fiscal year 2002. Of these trips, 261 were cancelled. The chart below shows a system-wide average reliability index. Assuming that a commuter worked 200 days per year and made 400 trips on WSF, the statistical likelihood is that 2.4 ferry trips would be cancelled. This rating represents a decline in reliability from the preceding quarter. This decline is attributable to an annual pattern associated with increased weather and tide cancellations. In fact, weather related cancellations increased 473% and tide cancellations increased 70% over the preceding quarter and were a major factor in the apparent decline in reliability. Vessel related cancellations actually decreased 46% from the preceding quarter.

Trip Reliability Index

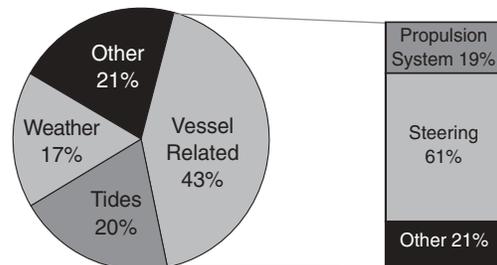
Missed Trips per 400 Sailings



$$\text{Trip Reliability Index Number} = \frac{\text{Cancelled Trips}}{\text{Total Scheduled Trips}} \times 400 \quad (\text{Average Annual Number of Commute Trips})$$

Most Common Trip Cancellation Causes

Second Quarter, Fiscal Year 2002



Vessel related trip cancellations decreased 46% during the 2nd quarter. The leading causes of vessel cancellations were steering and propulsion system related. Steering problems on vessels serving commuter routes were the main contributor to missed trips this quarter.

Heightened security following the terrorist attacks in New York resulted in 34 trip cancellations between September 11 and December 31, 2001.

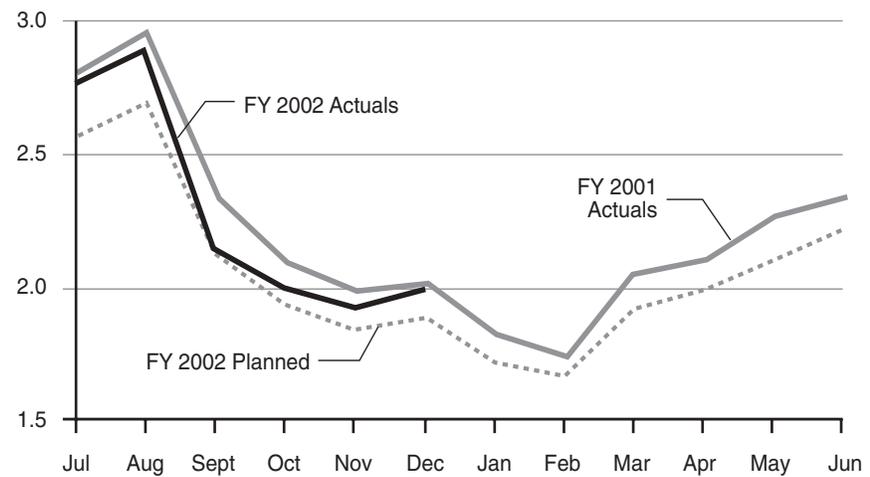
Ridership and Revenues

The Legislature's Joint Task Force on Ferries (JTFF), comprised of legislators, citizens, ferry management, and ferry workers was formed in 2000. The Task Force recommended incremental tariff increases to raise the farebox recovery rate to 80 percent of operating costs over six years. The Transportation Commission instituted this recommendation and WSF implemented the first tariff increase on June 3, 2001.

New tariffs were designed to recover higher total revenues even though the number of riders would be expected to fall slightly when the price of the trip went up. As shown below, WSF predicted that ridership would fall from the previous year because of the fare increase and that the amount of total fares would increase. In fact, judging from the results after two quarters, ridership has fallen somewhat less than expected and farebox revenues have run slightly ahead of the June 2001 forecast.

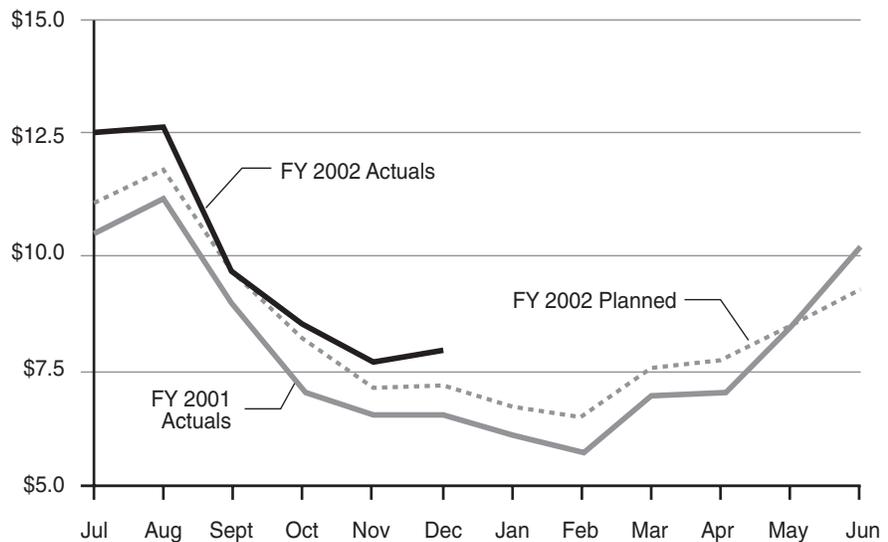
Ridership by Month

In Millions



Farebox Revenues by Month

In \$ Millions



Fiscal year to date, ridership has exceeded the plan by 5% or 645,000 riders. Revenues have exceeded the plan by 7% or \$3.6 million. (Plan based on June, 2001 forecast.)

Construction Program Delivery

WSDOT makes capital investments in the Ferry System through the WSF Construction Program. The program preserves existing structures and terminals, and builds new vessels.

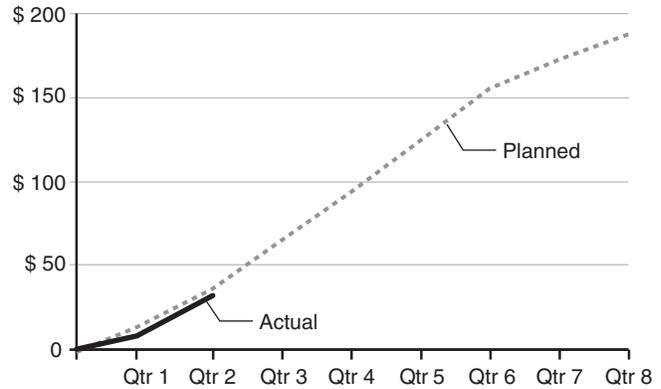
At the end of the second quarter of the 2001-2003 Biennium the program spent \$31.7 million compared to its plan of \$32.3 million.

Program expenditures are grouped into three categories. Biennial spending to date:

- Terminal construction – \$11.7 million.
- Vessel construction – \$16.6 million.
- Emergency repairs of terminals and vessels – \$3.4 million.

WSF Construction Program Expenditures

2001-2003 Biennium, Quarter 2 Ending December 31, 2001
Actual vs. Planned

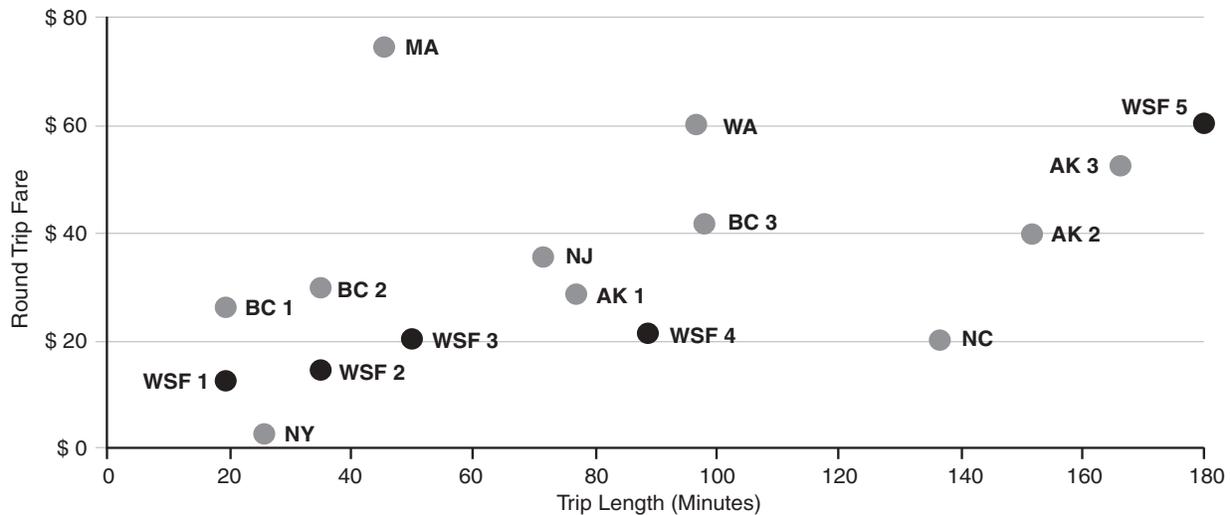


Vehicle Ferry Fare Comparisons

The chart below compares vehicle and driver fares nationwide*.

Ferry Fare Comparisons

Roundtrip – Vehicle and Driver



AK 1 – Alaska Marine Hwy, AK: Ketchikan/Metlakatla
 AK 2 – Alaska Marine Hwy, AK: Angoon/Tenakee
 AK 3 – Alaska Marine Hwy, AK: Ketchikan/Hollis
 BC 1 – B.C. Ferries, Canada: Horseshoe Bay/Bowen
 BC 2 – B.C. Ferries, Canada: Swartz Bay/Fulford
 BC 3 – B.C. Ferries, Canada: Mainland/Vancouver Island
 MA – Steamship Authority, MA: Woods Hole/ Vineyard Haven
 NC – North Carolina DOT: Cedar Island/Ocracoke

NJ – Cape May/Lewes Ferry, NJ: Cape May DE/Lewes NJ
 NY – Staten Island Ferry, NY: St. George/Whitehall
 WA – Blackball, WA: Port Angeles/Victoria on the *Coho*
 WSF 1: Mukilteo/Clinton
 WSF 2: Seattle/Bainbridge Island
 WSF 3: San Juan Inter-Island
 WSF 4: Anacortes/Friday Harbor
 WSF 5: Anacortes/Sidney, BC

* Passenger-Only Ferry Fares: The 2000 Joint Task Force on Ferry Fares compared nationwide passenger-only ferry fares with those charged by WSF. The national average round trip tariff was \$15. Currently, WSF charges \$11 for a round-trip passenger fare on the Seattle/Vashon and Seattle/Bremerton routes.

State-Supported Amtrak Cascades Service: Update

Quarterly Ridership

Ridership on state-supported Amtrak *Cascades* trains was 85,107 for the second quarter of the 2001-2003 biennium. This represents a 4.4 percent decrease over the same period in 2000. The primary reason for this decline has been the slowing state economy and the reduction in demand for intercity travel since September 11th. Ridership on state-supported trains declined 10 percent in October 2001 compared to October 2000. Ridership in November and December was 2.2 percent and 2.1 percent lower, respectively, over the same period in 2000, indicating some closing of the gap.

Annual Ridership

The ridership total for state-supported Amtrak *Cascades* trains was 359,327 for 2001. This is 1.2 percent less than the total for 2000 and 6.6 percent less than the 2001 goal set by WSDOT. Total Amtrak *Cascades* ridership for the entire Pacific Northwest Rail Corridor – including service sponsored by Amtrak and the Oregon Department of Transportation – was 560,381. This is a 5.6 percent increase over 2000. The primary reason for this increase is the popularity of new midday service between Portland and Eugene, which was introduced in October 2000. This overall ridership gain occurred despite the fact that periodic track repairs south of Portland disrupted service during the final 15 weeks of the year.

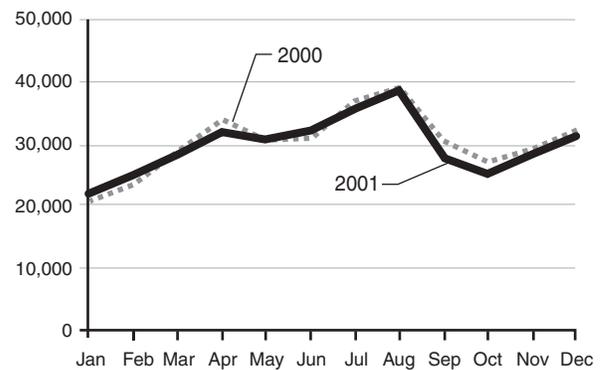
WSDOT Actions: 2nd Quarter

WSDOT and Amtrak continue to reach out to public and private sector organizations to increase ridership. 120 organizations are partnering with the Amtrak *Cascades* in various cooperative promotions through 2002. The total value of cooperative promotions has increased 20 percent over last year, and will likely continue to grow as new partners are added throughout 2002. Current partners include AAA, Jiffy Lube, the Victoria Clipper, King County Metro, the Washington State History Museum, Destination Centralia, Star 101.5 radio, Seattle/King County Convention and Visitors Bureau, Bellingham Convention and Visitors Bureau, Grayline Tours, KWJZ Smooth Jazz, and the Seattle Seahawks.



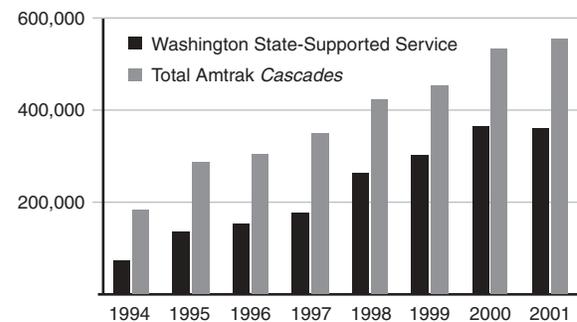
Monthly Ridership Chart

State-Supported Amtrak *Cascades* Service
Number of Passengers



Long-Term Trends in Annual Ridership: Amtrak Cascades Total Passengers

2001 State-Supported Amtrak *Cascades*: 359,327
2001 Total Amtrak *Cascades*, including Oregon-supported service: 560,381



WSDOT contracts with Amtrak to operate eight daily trains in Washington. Four additional daily trains are operated by Amtrak and the Oregon Department of Transportation.

WSDOT is also expanding its popular ‘Schools on Trains’ program during 2001-2002, with an established goal of 100 schools for the academic year. To date, 74 schools have reserved trips, already doubling the total of 36 schools that participated last year.

Quarterly On-Time Performance

The on-time performance goal for the Amtrak *Cascades* is 80 percent. A train is considered on-time if it arrives at its final destination within 10 minutes or less of the scheduled arrival time.

On-time performance for state-supported Amtrak *Cascades* trains averaged 73.2 percent in October, 74.9 percent in November, and 73.7 percent in December 2001. These averages were lowered by the cancellation of U.S. Customs rolling inspections for train 763 after September 11th. If the performance of train 763 were taken out of the monthly averages, on-time performance would have averaged 79 percent for the last three months of 2001. WSDOT continues to work with U.S. Customs and Washington’s congressional delegation to increase border staff levels and to develop new procedures so that Amtrak *Cascades* international service meets its on-time performance goals and continues to be attractive to the traveling public.

Customer Satisfaction

Amtrak’s Customer Satisfaction Index (CSI) is based on surveys of riders using the service. The scores are three-month rolling averages. The CSI goal for the Amtrak *Cascades* is a score of 92 or better. For trains north of Seattle, the overall satisfaction score was 95, which is equal to the same period last year and up three points from the preceding quarter. For trains south of Seattle, the overall satisfaction score was 94, compared to the previous year score of 91, and up one point from the preceding quarter. Cleanliness of the train’s exterior windows was a recurring complaint by *Cascades* passengers. However, WSDOT and Amtrak corrected this problem by having all the trains hand-washed in December 2001. A new automated train washer will be operational in spring 2002, and it is anticipated that customer comments on this issue will be significantly reduced.

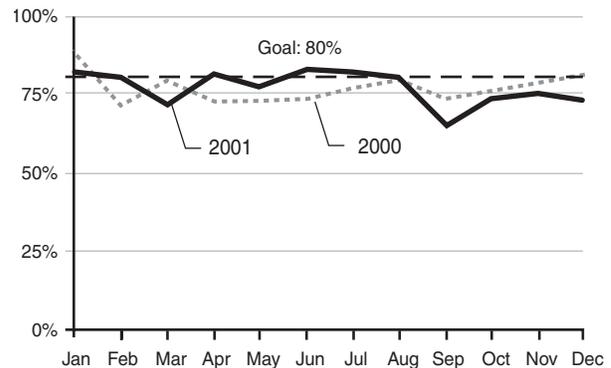
Amtrak’s National Ridership and the Impacts of September 11th

Amtrak reported immediately after September 11th that total ridership across the nation rose by 17 percent compared to September 2000. Subsequent data on actual tickets sold revealed that ridership on all Amtrak trains across the nation actually declined by 6 percent in September. The difference in these figures is attributable to the projection methodology used by Amtrak and the fact that many travelers canceled their travel plans and returned their tickets.

For October 2001, Amtrak experienced a total ridership decline of 1 percent. This compared to an estimated 23 percent drop for the nation’s airlines for the same period.

Washington State-Supported Amtrak *Cascades* On-Time Performance

2001 vs. 2000
Percent On-Time
2000 Average: 76.64%, 2001 Average: 76.29%



Background: WSDOT supports the development of Amtrak *Cascades* intercity passenger rail service. WSDOT’s strategy is to increase ridership, reduce travel times, and increase the number of trains operating between Seattle and Portland and Seattle and Vancouver, BC. These changes will be realized through the completion of various capital projects along the Pacific Northwest Rail Corridor, the purchase of new train equipment, and aggressive marketing. WSDOT partners with Amtrak, the Burlington Northern Santa Fe Railway, the Union Pacific Railroad, the Oregon Department of Transportation, and local jurisdictions to provide Amtrak *Cascades* service. Currently, there are 12 daily trains in operation, eight of which are financially supported by WSDOT.

Since 1994, ridership has nearly tripled on the Amtrak *Cascades*. The program’s ultimate goals are 13 daily roundtrips between Seattle and Portland, with a travel time of 2:30 hours, and 3 to 4 daily roundtrips between Seattle and Vancouver, BC, with a travel time of 2:57 hours. WSDOT anticipates that the Amtrak *Cascades* will carry 2.2 million riders per year at program build-out.

Other WSDOT Activities: 2nd Quarter 2001

In October, WSDOT staff went to Amtrak's major call center in Riverside, California to help train telephone reservation agents. The training sessions were designed to help Amtrak's front-line staff gain a better understanding of unique Amtrak *Cascades* services and destinations, and ultimately help improve customer service and customer satisfaction. Over 200 agents attended the sessions.

WSDOT also increased the number of automated ticket machines at staffed and unstaffed stations along the corridor. Quik Trak machines, which are similar to automated teller machines, allow the public to use debit or credit cards to purchase tickets without the aid of a ticket agent. These are particularly important in stations with long lines at the counter and those without an agent. New machines were added in Everett, Edmonds, and Vancouver, WA. Machines were installed in Bellingham, Seattle, Tacoma, Olympia-Lacey, and Kelso-Longview in 2000.

State-Supported Amtrak *Cascades* Operating Costs and Farebox Recovery

The farebox recovery rate per train measures the percentage of total annual operating costs generated through ticket fares. The average farebox recovery rate for eight Amtrak *Cascades* trains in Washington rose from 38.5 percent in federal fiscal year 2000 to 41.65 percent in federal fiscal year 2001. These results are attributed to aggressive revenue and cost management strategies implemented by Amtrak and WSDOT. Both of these figures would be approximately seven percentage points higher if Seattle-Bellingham daily service – trains 761 and 762 – extended through to Vancouver, BC.

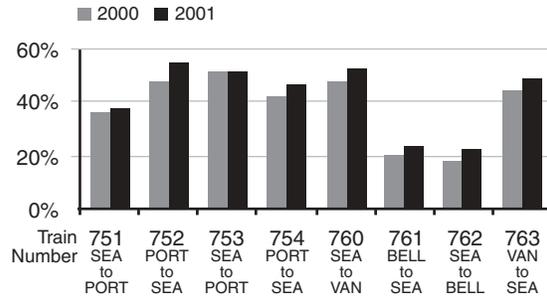
Under WSDOT's contract with Amtrak to operate eight daily intercity trains in Washington, WSDOT pays a percentage of the total operating costs not covered by ticket-buying passengers. Pursuant to the contract, the percentage of total operating costs paid by WSDOT has increased year by year, while Amtrak's portion has decreased. At the same time, the total operating cost borne by the traveling public, both in absolute and proportional terms, has steadily increased.

Several other states, including California, New York, and Wisconsin, have partnered with Amtrak to develop and operate intercity rail passenger service. When comparing the farebox recovery rates of the Amtrak *Cascades* to other intercity routes across the country, the *Cascades* rank in the top third nationally. A full discussion of this national comparison will be included in the next *Gray Notebook*.

State-Supported Amtrak *Cascades* Operating Costs: Percentage of Farebox Recovery by Train

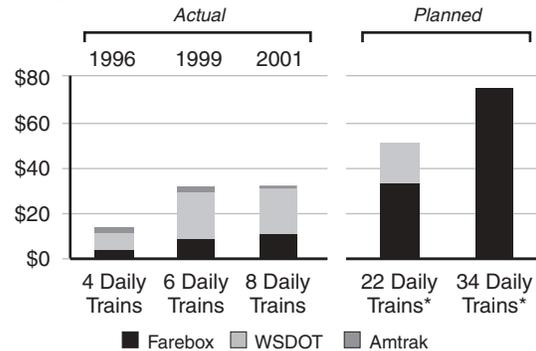
Federal Fiscal Year 2000 and 2001

Percentage of operating costs covered by farebox revenues



Amtrak *Cascades* Long-Term Annual Operating Costs: Projections per Frequency

In millions



* At full program build-out, the goal is full farebox recovery according to WSDOT's Pacific Northwest Rail Corridor Operating Plan, 1997. Long-term operating cost projections are for illustrative purposes only. Additional service will be added when funding is available.

Farebox Recovery: National Comparisons

Chart to come in the next *Gray Notebook*

Highlights of Program Activities

October 2001

- WSDOT reopened Tacoma's 38th Street Bridge over Interstate 5 on time and on budget with an October 29th ribbon cutting celebration.
- Safety, traffic flow, freight mobility, and access were improved after the on-time, on-budget completion of the interchange/bridge replacement project on Interstate 90 at Moses Lake.
- Washington's first HOV lane outside of the Puget Sound opened in Vancouver, running four miles on Interstate 5 southbound from 99th Street to Mill Plain Boulevard.
- Installation of a new automatic anti-icing system marked the completion of a major safety effort on State Route (SR) 17 and SR 26 east of Othello.
- WSDOT contractors reconfigured the exit from southbound Interstate 405 to SR 167 as part of a project to improve the interchange of both freeways in Renton.
- WSDOT unveiled new mountain pass highway signs that spell out the actual legal regulations in effect for current pass conditions.
- Greyhound Lines Inc. and WSDOT partnered to begin providing roundtrip, scheduled bus service from Yakima to Portland.
- In an effort to recoup revenues lost with the passage of Initiative 695, Washington State Ferries (WSF) began pursuing advertising on vessels and terminals.
- WSF began accepting credit cards at most of its tollbooths after a successful pilot program.
- WSDOT began a new, multi-year study of a Strategic Freight Transportation Analysis (SFTA) that will end with a review of freight movement in and out of Washington to better understand freight patterns.
- WSDOT held a public open house in Vancouver to present information about the SR 500 and Thurston Way Design-Build Project and gather comments. The project will improve safety and ease congestion.

November 2001

- WSDOT was one of the winners of the 2001 National Highway Safety Awards for the Intersection Safety Improvement Priority Program that enables WSDOT to analyze the need for turn lanes at intersections.
- Incident response efforts on Interstate 90 in the Spokane area were increased during peak commute hours to help eliminate extensive back-ups.

- Growers, shippers, railroads, the state and other partners gathered in Wenatchee to celebrate the new *Washington Fruit Express* service, supported by WSDOT.
- Phase two of the Clinton ferry terminal construction to increase the size of the dock began and is expected to take two-and-a-half years to complete.
- Crews working for WSDOT completed a slope stabilization project in Leavenworth that involved moving 300 cubic yards of rock.
- A ribbon cutting marked the opening of a new 10-foot wide bicycle/pedestrian walkway on U.S. 2/U.S. 97 Odabashian Bridge over the Columbia River north of Wenatchee.
- An open house for media and the public was hosted by WSDOT and the City of Seattle to seek input on the SR 99 Alaskan Way Viaduct project in Seattle.

December 2001

- Deschutes Parkway, between Interstate 5 and Lakeridge Drive in Olympia, reopened to traffic.
- In response to the state's declining revenue and the agency's desire to be accountable, WSDOT reviewed its overall out of state travel budget and undertook a reduction of 18 percent.
- Crews working for WSDOT began permanent earthquake repairs on Interstate 90 and Interstate 5 resulting in temporary closures of lanes and ramps for a month.
- WSDOT unveiled its new home page in an effort to create a new customer-oriented, friendly face of government on the web.
- New self-service Amtrak ticket machines were introduced at stations in Edmonds, Everett, Vancouver, and Eugene, Oregon, in time to reduce long holiday ticket lines.
- A new 643-foot pedestrian bridge linking downtown Wenatchee with Riverfront Park and trail system opened to the public.
- An open house and access hearing was held regarding a new high-occupancy vehicle direct-access interchange from Interstate 5 to the city of Federal Way.
- Cayuse Pass (SR 123) and Chinook Pass (SR 410) were officially closed for the season.

Special Features

Annual Reporting on Highway Driving Speeds

Each year WSDOT gathers data on drivers' typical speed on state highways. This data is collected at 49 sites across the state on a sample basis. Many factors presumably influence year-to-year trends including driver attitudes, enforcement patterns and traffic volumes. Year 2001 information is given below.

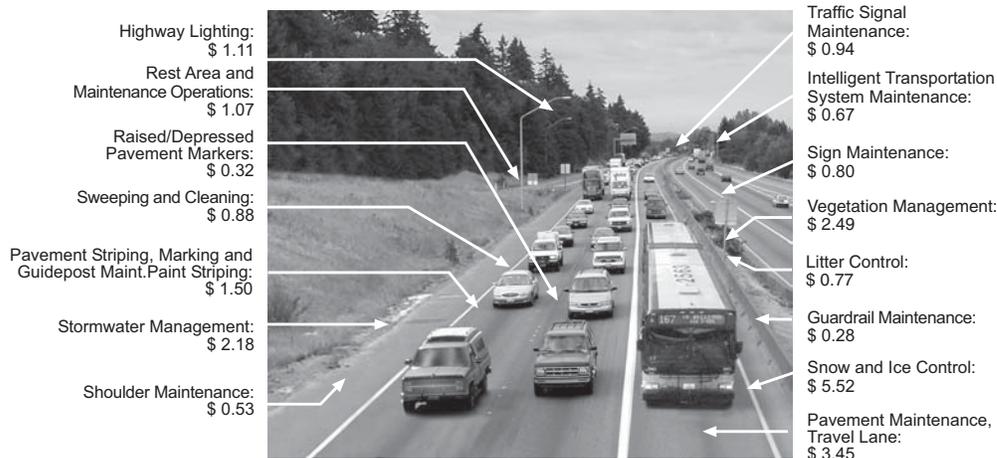
	Average Speed in MPH	Change from 2000 in MPH	85th Percentile Driver in MPH*	Change from 2000 in MPH	Vehicles Exceeding Speed Limit
70 mph zones					
Interstate	68.1	0.7	75.2	-0.2	41.0%
Non interstate	67.1	-1.2	74.2	-1.5	46.1%
65 mph zones					
Non interstate	59.2	-2.4	67.3	-2.1	54.3%
60 mph zones					
Interstate	59.5	-0.7	66.8	-0.8	55.9%
Non interstate	59.2	0.2	67.7	0.4	57.6%

*The 85th percentile driver is driving faster than 84 out of a hundred drivers on the road and slower than the other 15 drivers. Traffic engineers generally believe that this indicator of on-road driver behavior is important because setting speed

limits dramatically below the rate traveled by 85th percentile drivers tends to lead to much greater disparities in travel speeds on the highways, a situation that can have the effect of increasing the overall frequency of traffic accidents.

Typical Costs of State Highway Maintenance

Seeing the Picture "Per Year, Per Car"



Maintenance Activity/ Highway Feature	Annual Cost/Motor Vehicle Registered in Washington	Maintenance Activity/ Highway Feature	Annual Cost/Motor Vehicle Registered in Washington
Highway Lighting	\$ 1.11	Rest Area Maintenance & Operations	\$ 1.07
Raised/Depressed Pavement Markers	\$ 0.32	Traffic Signal Maintenance	\$ 0.94
Sweeping & Cleaning	\$ 0.88	Intelligent Transportation System Maintenance	\$ 0.67
Pavement Striping, Marking and Guidepost Maint.	\$ 1.50	Sign Maintenance	\$ 0.80
Stormwater Management	\$ 2.18	Vegetation Management	\$ 2.49
Shoulder Maintenance	\$ 0.53	Litter Control	\$ 0.77
Pavement Maintenance (Travel Lane)	\$ 3.45	Guardrail Maintenance	\$ 0.28
Sign Maintenance	\$ 0.80	Snow and Ice Control	\$ 5.52
Vegetation Management	\$ 2.49	Pavement Maintenance, Travel Lane	\$ 3.45
Litter Control	\$ 0.77		
Guardrail Maintenance	\$ 0.28		
Snow and Ice Control	\$ 5.52		
		Totals	\$ 27.48

Cost includes approximately 6% for training, administration and field supervision.