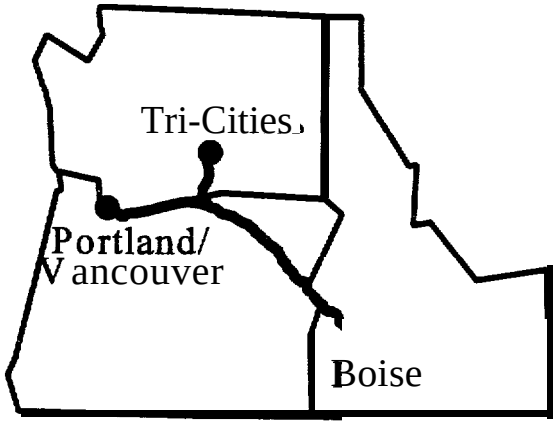
Transportation Needs Assessment
Technical Memo
April 1996

Portland/Vancouver to Boise ITS Corridor Study



Prepared for:
Idaho Transportation Department
Oregon Department of Transportation
Washington State Department of Transportation

In Cooperation with:
Federal Highway Administration

84ITS154.WPD

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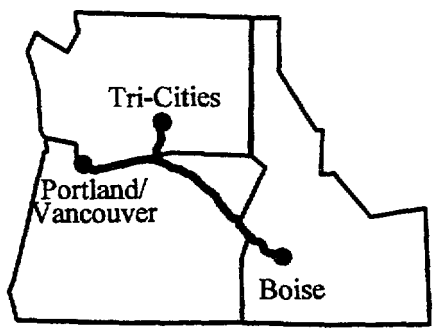
1.0 Project Overview

Intelligent Transportation Systems (ITS) (formerly Intelligent Vehicle Highway Systems [IVHS] is the application of advanced information processing, communications, vehicle sensing, and traffic control technologies to surface transportation systems. All highway and transit modes, as well as airport access, navigable waterway, and rail, can be included in ITS applications. The objective of ITS is to promote more efficient use of the existing highway and transportation network, increase safety and mobility, and decrease environmental impacts due to congestion.

The Portland/Vancouver, Washington to Boise, Idaho ITS Corridor Study consists of conducting an Intelligent Transportation System corridor study and developing recommendations for deployment of ITS and appropriate communications technologies along a multi-state, intercity corridor. The corridor limits are defined as follows:

- Interstate 84 from I-205 in Oregon to a point 20 kilometers east of Boise, a distance of 706 kilometers (439 miles).
- Interstate 82 from I-84 in Oregon to I- 182 in Tri-Cities, Washington, a distance of 66 kilometers (41 miles).
- State Route 14 from I-205 in Washington to I-82 in Washington, a distance of 282 kilometers (175 miles).



- Union Pacific and Burlington Northern & Santa Fe Railroads
- Columbia River Waterway

As mentioned, a primary purpose of this project is to develop recommendations for the implementation of appropriate ITS technology to address corridor transportation needs over the next 20 years. The study focuses on specific applications of Advanced Traffic Management Systems, Advanced Traveler Information Systems, Commercial Vehicle Operations, and Advanced Rural Transportation Systems technologies, with an emphasis on providing implementation guidelines that will facilitate the integration and expansion of future ITS components within the corridor.

The planning effort also investigates ways to provide traveler information for various modes. The information, including, but not limited to, current roadway congestion, weather conditions,

incident information, and construction information, will be used by travelers'to make informed choices regarding mode, route, and time of departure.

The study also investigates the surveillance and communications requirements of traffic management systems and traveler information dissemination. These requirements include incident detection, demand management techniques in urban areas of the corridor, and traffic flow monitoring.

A final purpose is to develop communication recommendations that take into account Idaho Transportation Department (ITD), Oregon Department of Transportation (ODOT), and Washington State Department of Transportation (WSDOT) communication requirements in the corridor. Communication requirements across state borders will receive particular attention.

The ITS implementation and communication plan will be developed for the following time frames:

- Short Term: The first period will encompass the interval from 1997 to 2002. The focus will be on the development of a detailed tactical plan that identifies specific projects and programs to be implemented.

- Medium Term: The second period will include 2003 to 2007. For this time frame, the study will address emerging trends and issues and will recommend steps that ITD, ODOT, and WSDOT should take to prepare for anticipated changes in the transportation operational environment.

- Long Term: The final period will be from 2008 to 2017. The plan will recommend a strategic approach to addressing long-term concerns.

The study is divided into seven major work elements:

Work Element 1– Assess Transportation Needs

This element generally consists of gathering data on transportation and traveller information needs and deficiencies in the corridor and identifying the magnitude of the problems.

Work Element 2 - Identify Corridor ITS Applications

Work Element 2 involves using the US DOT's user services categories to identify which ITS applications have the potential to address corridor needs.

Work Element 3 - Recommend ITS Strategies

This work element will identify ITS strategies that have a clear potential to meet corridor needs. Items associated with individual strategies such as benefits, costs, implementation barriers, technology requirements, and funding will be addressed.

Work Element 4 - Develop Corridor Plan

This element will identify specific projects and programs to be implemented. Short term projects will be developed in sufficient detail to allow them to be included in DOT and other funding and construction programs in the three states.

Work Element 5 - Assess ITS Communications Needs

Work Element 5 will identify the communication characteristics of various ITS field components and make recommendations for a communication system.

Work Element 6 - Conduct Outreach Effort

This work element contains the projects public involvement and outreach program, including stakeholder interviews, general media releases, targeted media kits, workshops, and. stakeholder presentations.

Work Element 7 - Prepare Final Report

Work Element 7 will consolidate the results of previous work into a final action plan.

Technical Memorandums will be prepared for each work element, except the outreach effort. Recommendations of the public outreach will be incorporated into the other technical memorandums.

2.0 Approach to Work Element 1

The purpose of this technical memorandum is to document the transportation needs in the study corridor. During this work element, information on transportation conditions in the corridor was gathered and an estimate was prepared of the magnitude of transportation problems. This assessment serves as a baseline against which ITS needs can be determined and the potential benefit of any recommended ITS applications can be estimated.

2.1 Steering Committee

The direction of the ITS study came from a project steering committee consisting of representatives from the following state and federal agencies:

- Idaho Transportation Department (ITD)
- Oregon Department of Transportation (ODOT)
- Washington State Department of Transportation (WSDOT)
- Federal Highway Administration (FHWA)

The committee met periodically throughout the study to review the study progress and findings of Work Element 1. It also worked together to develop the public presentations regarding the study.

2.2 Technical Advisory Committee

To assist in the development of the ITS study, a technical advisory committee was also formed. One technical advisory committee was for the west half of the project area (approximately the area between Portland and Hermiston); the other was for the east half of the project area (approximately the area between Hermiston and Boise). The technical advisory committees consisted of personnel from the following organizations:

West half (Portland to Hermiston)

- ODOT Headquarters
- ODOT Regions 1,4, and 5
- WSDOT Headquarters
- WSDOT Southwest and South Central Regions
- Regional MPO
- FHWA
- Oregon State Police
- Washington State Patrol

East half (Hermiston to Boise)

- ITD Headquarters
- ITD District 3
- ODOT Headquarters
- ODOT Region 5
- WSDOT Headquarters
- Regional MPO
- FHWA.
- Trucking Association
- Idaho State Police
- Oregon State Police

2.3 Kickoff Meeting --

On October 17, 1995, a kickoff meeting was held with the project Steering Committee and the consultants. The purpose of the meeting was to review the Scope of Work and discuss the objectives of individual work elements. Other discussion centered on project schedule, refining communication between the group, and working out the details of the project administration. Included in the meeting was lengthy discussion focusing on transportation needs on the corridor.

2.4 Project Field Survey

From October 18 to October 20, 1995, Steering Committee members and Kimley-Horn staff toured the corridor to identify existing transportation needs and potential ITS solutions. At various locations along the route, other individuals such as DOT staff and a representative of the Columbia Gorge Commission joined the committee to offer their insights to the issues. Information collected during the field survey included:

- congestion locations
- weather problems
- recreational needs
- rockfall areas
- existing electronic equipment
- automated weigh stations
- high accident locations
- Columbia River Gorge needs

The tour allowed the committee to see and discuss some of the corridor issues first hand, as well as identify additional data needed and people who should be contacted about the study. Results of the field survey are incorporated into later sections of this technical memorandum.

2.5 Stakeholder Interviews

A series of personal interviews with transportation officials and other stakeholders was conducted between mid December and January, 1996.

The survey was developed to help identify problems and potential ITS solutions in the areas of safety, operating efficiency, environmental quality and personal mobility. The Steering Committee worked closely with the consultants to design the survey and assemble a list of potential interviewees. This multi-agency effort assured the creation of an instrument that was sensitive to all modes and the multi-state nature of the study.

2.6 Contacts With DOT Staff

DOT staff in the three states were contacted directly to obtain information not readily available in existing studies, particularly related to weather conditions and existing electronic equipment along the corridor. District maintenance engineers were a valuable resource of information since they deal with the corridor's operation on a daily basis.

To assist them in relating the needed information for this work element, a series of maps and inventory forms were sent to all the district maintenance engineers. They were asked to color code the maps to indicate problem locations. DOT engineers also completed inventory sheets, that were used to construct a data base of field equipment with a potential ITS application. An example of the worksheet and complete inventory are located in **Appendix A.**

2.7 Review of Existing Reports

As part of Work Element 1, existing technical reports related to the corridor were reviewed to identify transportation needs, deficiencies, and problems. Reports were collected from ITD, ODOT, WSDOT, FHWA, and others. A listing of the reports is contained in **Appendix B.**

Information collected from existing sources and analyzed includes the following:

- forecasted person trips
- forecasted intercity person trip origins and destinations
- current and forecasted commercial trips
- current and forecasted vehicle volumes
- current and forecasted vehicle classification
- accidents
- roadside assistance calls
- number of freeway lanes (as an indicator of capacity)
- current and predicted levels of congestion
- weather conditions
- programmed and planned highway, rail, and river improvements
- intercity freight movement by rail, truck, and river barge
- planned intercity transit and passenger railroad improvements
- current and planned ITS programs and projects
- commercial vehicle operations
- Seattle to Portland ITS Corridor Plan

Results of the literature review are incorporated into later sections of this technical memorandum.

COWLITZ WA
1994 Population 87894
1994 Employment 35160
2015 Population 123161
2015 Employment 38078

SKAMANIA WA
1994 Population 9283
1994 Employment 3590
2015 Population 12131
2015 Employment 4192

KLICKITAT WA
1994 Population 17793
1994 Employment 7170
2015 Population 23571
2015 Employment 8714

BENTON WA
1994 Population 127085
1994 Employment 66800
2015 Population 172525
2015 Employment 139118

CLARK WA
1994 Population 279543
1994 Employment 132200
2015 Population 401071
2015 Employment 203234

MULTNOMAH OR
1994 Population 614331
1994 Employment 417597
2015 Population 744977
2015 Employment 497694

HOOD RIVER OR
1994 Population 17842
1994 Employment 8012
2015 Population 22342
2015 Employment 11040

SHERMAN OR
1994 Population 1956
1994 Employment 563
2015 Population 1673
2015 Employment 531

GILLIAM OR
1994 Population 1812
1994 Employment 528
2015 Population 1571
2015 Employment 500

MORROW OR
1994 Population 8510
1994 Employment 2592
2015 Population 11004
2015 Employment 3441

CLACKAMAS OR
1994 Population 306441
1994 Employment 99397
2015 Population 459727
2015 Employment 168650

WASCO OR
1994 Population 22109
1994 Employment 7894
2015 Population 22758
2015 Employment 9036

WHEELER OR
1994 Population 1521
1994 Employment 305
2015 Population 1753
2015 Employment 392

JEFFERSON OR
1994 Population 15638
1994 Employment 5554
2015 Population 20960

2015 Forecast Volumes
Map Layers
County
Highway

Figure 3-3

Highway Volume Flows (2015)

200000 100000 50000

0 10 20 30

Miles

ADAMS ID
1994 Population 3780
1994 Employment 968
2015 Population 4435
2015 Employment 1236

VALLEY ID
1994 Population 7602
1994 Employment 3474
2015 Population 12175
2015 Employment 6220

BAKER OR
1994 Population 16621
1994 Employment 5201
2015 Population 18961
2015 Employment 6215

WASHINGTON ID
1994 Population 9156
1994 Employment 2925
2015 Population 10638
2015 Employment 3814

GEM ID
1994 Population 13308
1994 Employment 3008
2015 Population 15580
2015 Employment 4010

PAYETTE ID
1994 Population 18674
1994 Employment 4712
2015 Population 27161
2015 Employment 6536

BOISE ID
1994 Population 4447
1994 Employment 1308
2015 Population 7120
2015 Employment 2347

CANYON ID
1994 Population 103886
1994 Employment 34682
2015 Population 150645
2015 Employment 54956

ADA ID
1994 Population 243882
1994 Employment 140044
2015 Population 364159
2015 Employment 231296

ELMORE ID
1994 Population 22586
1994 Employment 5365
2015 Population 25733
2015 Employment 7899

9400 9400 9200 8400 8400 8500 8900 8500 8600 8300 8300 8300 9000 24000 21878 22551 22383 22383 57897 76139 72750 69577 69577 27030

2015 Forecast Volumes
Map Layers

County
Highway

Figure 3-4

HighwayVo lume Flows(20 15

200000 100000 50000

0 10 20 30

Miles

BENTON WA
1994 Population 127085
1994 Employment 66800
2015 Population 172525
2015 Employment 139118

WALLA WALLA WA
1994 Population 51819
1994 Employment 2363
2015 Population 65197
2015 Employment 34285

COLUMBIA WA
1994 Population 4164
1994 Employment 140
2015 Population 4755
2015 Employment 1842

A
on 17793
ent 7170
on 23571
ent 8714

UMATILLA OR
1994 Population 64129
1994 Employment 22833
2015 Population 74656
2015 Employment 29250

RMAN OR
4 Population 1956
4 Employment 563
5 Population 1673
5 Employment 531

GILLIAM OR
1994 Population 1812
1994 Employment 528
2015 Population 1571
2015 Employment 500

MORROW OR
1994 Population 8510
1994 Employment 2592
2015 Population 11004
2015 Employment 3441

UNION OR
1994 Population 25631
1994 Employment 9869
2015 Population 29709
2015 Employment 12642

BAKER OR
1994 Population 16621
1994 Employment 5201

2015 Forecast Volumes
Map Layers

County
Highway

Figure 3-5

Highway Volume Flows (2015)

200000 100000 50000

0 10 20 30

Miles

2015 Population 753
521
305

3.3 General Road Conditions

Road condition information obtained from the district maintenance engineers, existing reports, and field visits was entered into a GIS database and mapped. The results show the general areas where specific types of road condition problems regularly occur. The mapping indicates the following problem areas:

- ice and snow
- fog
- high wind
- blowing dust
- steep grades
- rocks and slides

3.3.1 Ice and Snow

Snow and ice are a significant problem throughout much of the corridor, particularly in the Columbia Gorge and east of Pendleton through the Blue Mountains, Ladd Canyon, and into Idaho. Road closures are common in these locations during winter months, forcing motorists and truckers to seek alternate routes or delay travel plans. **Figure** 3-6 outlines the areas with snow and ice problems.

3.3.2 Fog

Although nearly every city experiences heavy fog a few times per year, it is not recognized as having the same significance as snow and ice. Locations that experience recurrent fog are identified on **Figure 3-7.**

3.3.3 High Wind

High wind (above 25 mph) occurs most frequently where the corridor follows the Columbia River. Many other locations also noted high wind problems throughout much of the corridor; however, the frequency of occurrences seems to be lower. Although the wind create some of the finest windsurfing conditions in the world, they pose significant problems for vehicles with trailers, particularly mobile homes. Several times during the year, parts of the corridor must be closed to the movement of mobile homes and trucks with triple trailers. **Figure** 3-8 illustrates the high wind locations.

3.3.4 Blowing Dust

Dust conditions were identified as being a problem in eastern Oregon and western Idaho. Although high winds are found in more areas of the corridor, it only becomes a general problem in the agricultural areas. Winds stir up recently plowed fields and carry the dust across the roadways, limiting visibility. In some of the worst areas, signs warn motorists of blowing dust. Locations that experience blowing dust **are** shown on **Figure 3-9.**

3.3.5 Steep Grades

In the Columbia River Gorge, steep grades between 4% to 6% exist only along SR 14. Further east, I-84 has steep grades near Pendleton, on Immigration Hill, west of La Grande, Ladd Canyon, near Baker City, and east Farewell Bend. No significant grades exist along the corridor in Idaho. The grades seem to create at least two major problems: vehicles unable to pass heavy trucks on upgrades and runaway trucks on long downgrades. SR 14 has the greatest problem with passing while 1-84 has a significant problem with runaway trucks. **See Figure 3-10** for locations with steep grades.

In an effort to educate truckers about the locations, FHWA prepared a brochure alerting truckers of the most serious truck accident locations. Three locations on I-84 are listed in the pamphlet: east Portland, the Blue Mountains, and between Caldwell and Boise. A copy of the Brochure is located in **Appendix E.**

3.3.6 Rocks and Slides

Rocks and slide areas were identified in a more limited number of locations, occurring at a number of places in the gorge, through the Blue Mountains, Ladd Canyon, and near Huntington. Most of the rock/slide areas have been contained through protective screening, retaining walls, and large rock cuts; however, many parts of SR 14 still experience frequent debris on the roadway. Some efforts are underway to control this problem but because of the scenic designation of the Columbia River Gorge, the use of retaining walls, steel mesh netting, etc. are strictly regulated by the Gorge Commission. Even I-84 in the Columbia gorge, which has been significantly protected from rocks and slides was completely inundated by a massive mud and debris flow in February 1996. Caused by a rapid snow melt that saturated the soil, the mud forced the closure of I-84 for several days. SR 14 was also closed due to blocked sections of the roadway, thus preventing any traffic movement east of Portland. **Figure 3.11** shows the areas that experience frequent rock falls and slides.

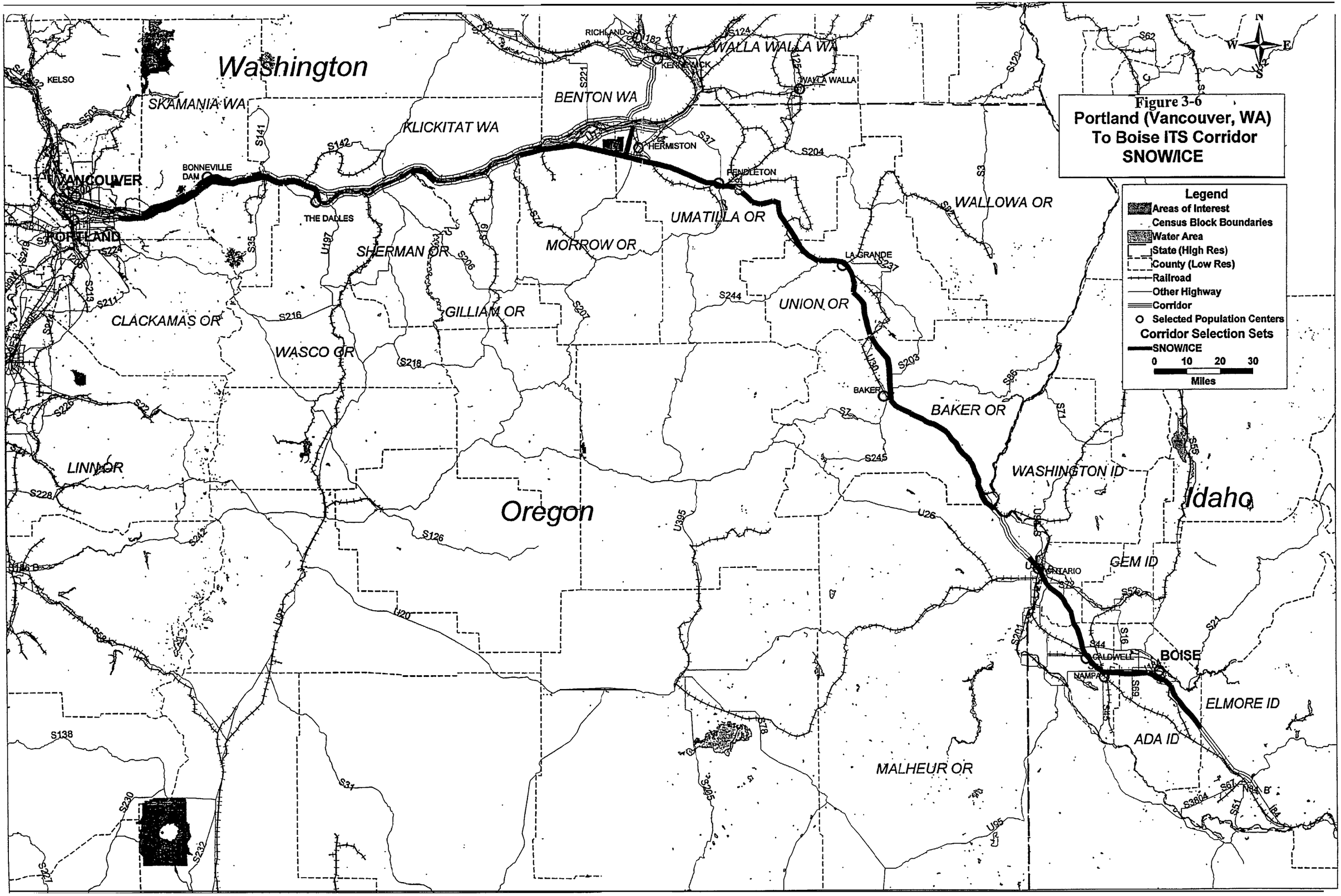


Figure 3-6
Portland (Vancouver, WA)
To Boise ITS Corridor
SNOW/ICE
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res)
Railroad
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
SNOW/ICE
0 10 20 30
Miles
Washington
Oregon
Idaho
KELSO
VANCOUVER
PORTLAND
BONNEVILLE DAM
THE DALLES
HERMISTON
PENDLETON
LA GRANDE
BAKER
ONTARIO
CALDWELL
NAMPA
BOISE
RICHLAND
KENNEWICK
WALLA WALLA
SKAMANIA WA
KLICKITAT WA
BENTON WA
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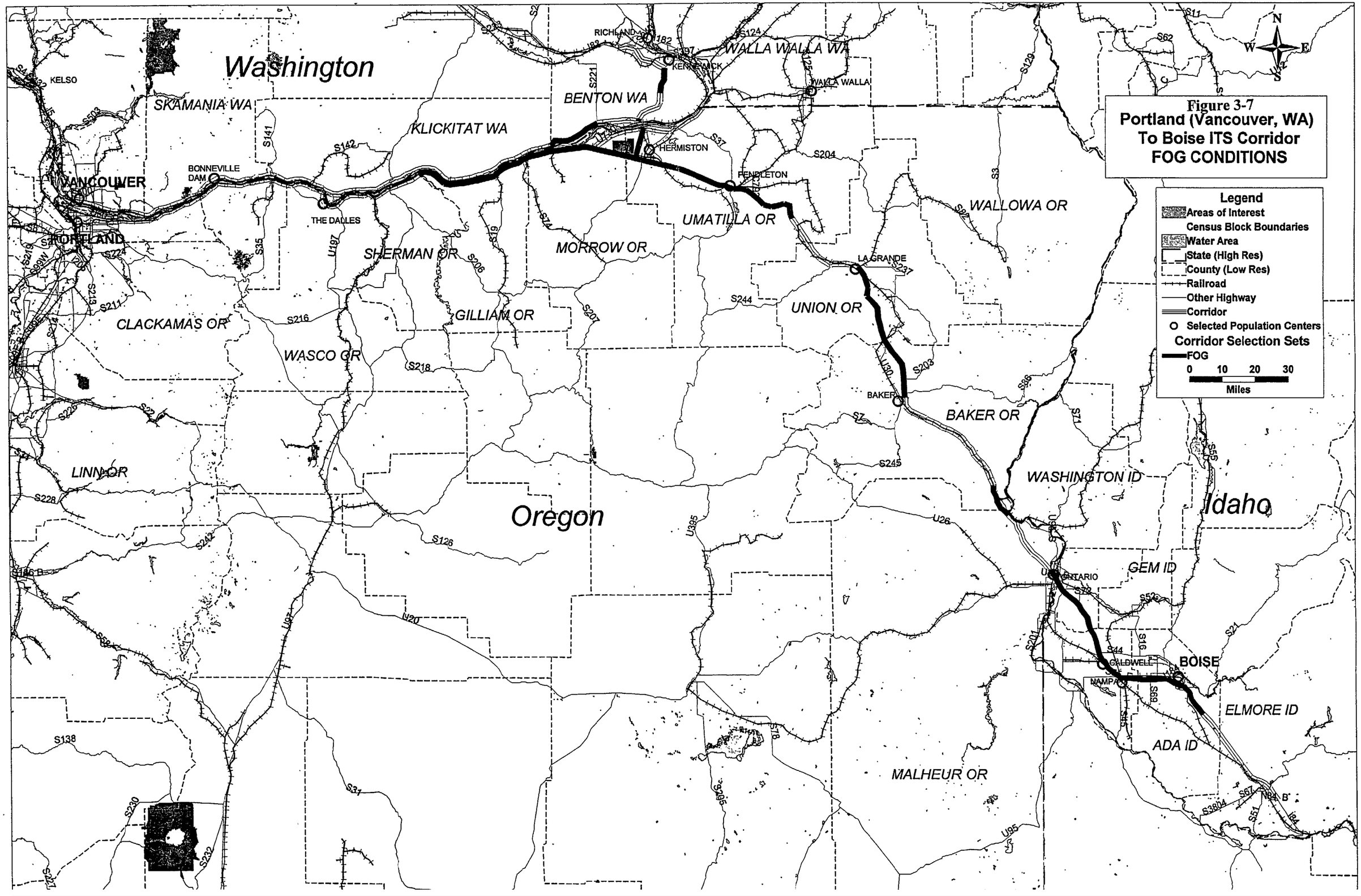
Figure 3-7
Portland (Vancouver, WA)
To Boise ITS Corridor
FOG CONDITIONS
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res)
Railroad
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
FOG
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Idaho
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PORTLAND
BONNEVILLE DAM
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WALLA WALLA
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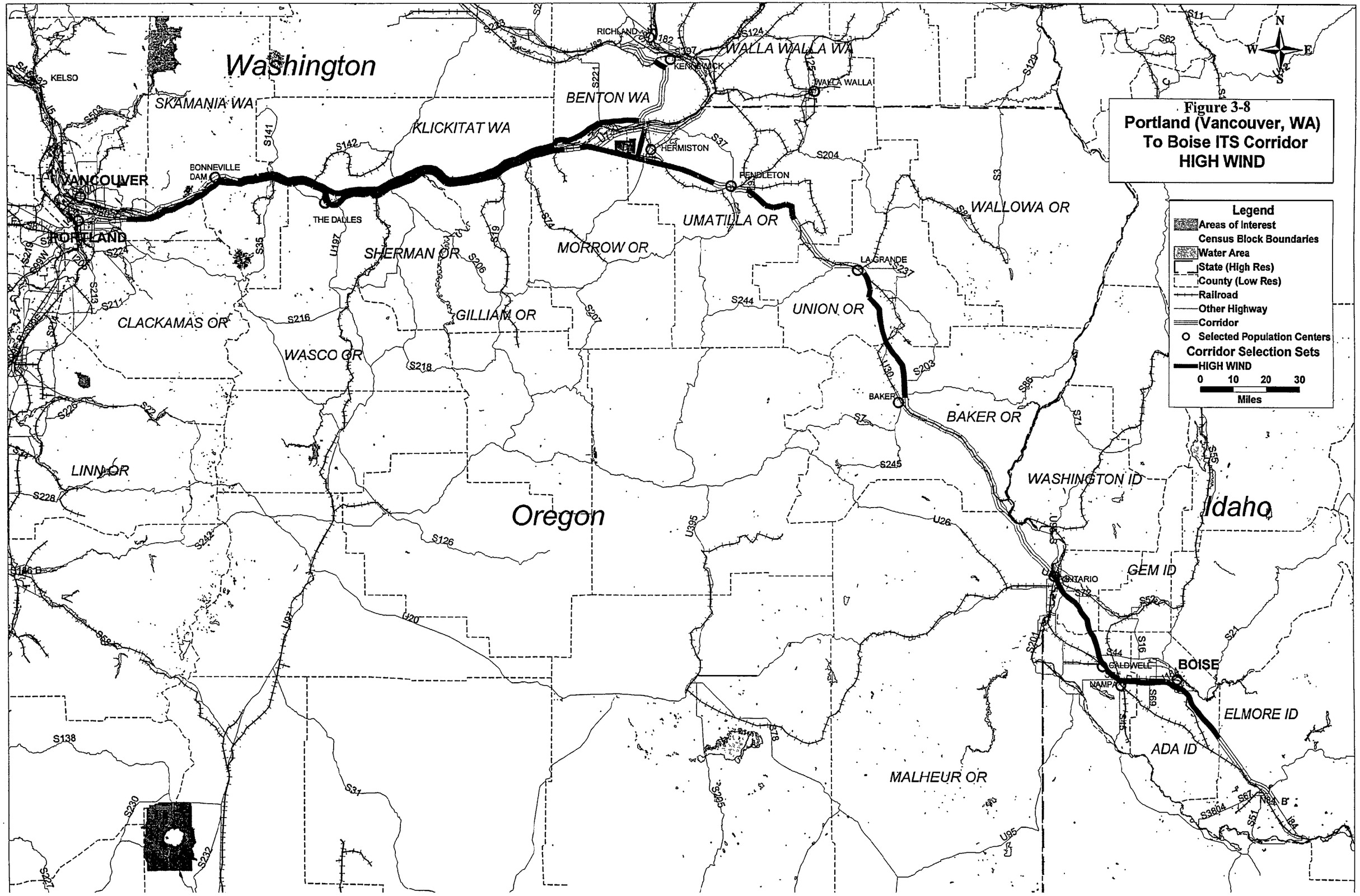
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Figure 3-8
Portland (Vancouver, WA)
To Boise ITS Corridor
HIGH WIND
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res)
Railroad
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
HIGH WIND
0 10 20 30
Miles

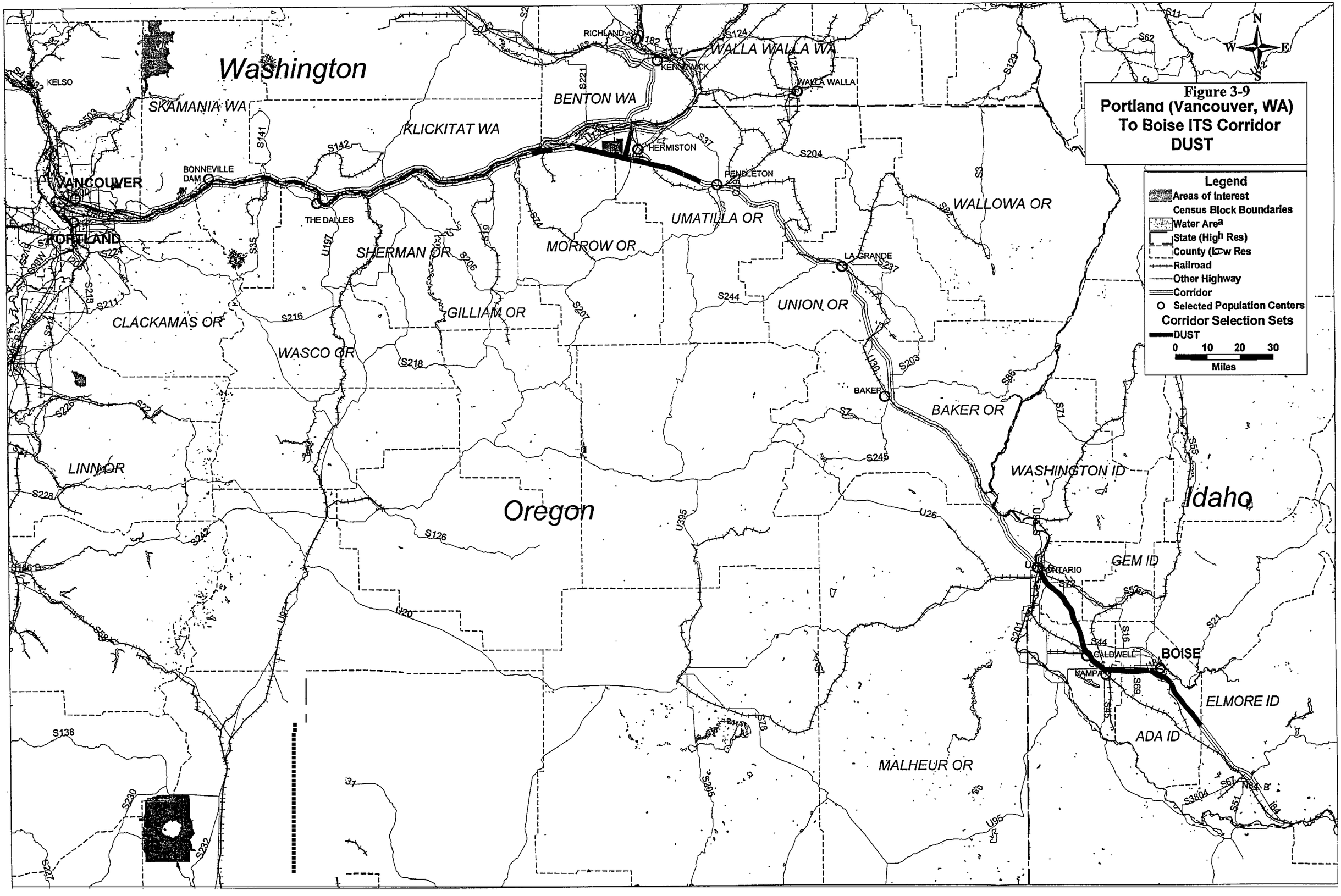
Figure 3-9
Portland (Vancouver, WA)
To Boise ITS Corridor
DUST
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res
Railroad
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
DUST
0 10 20 30
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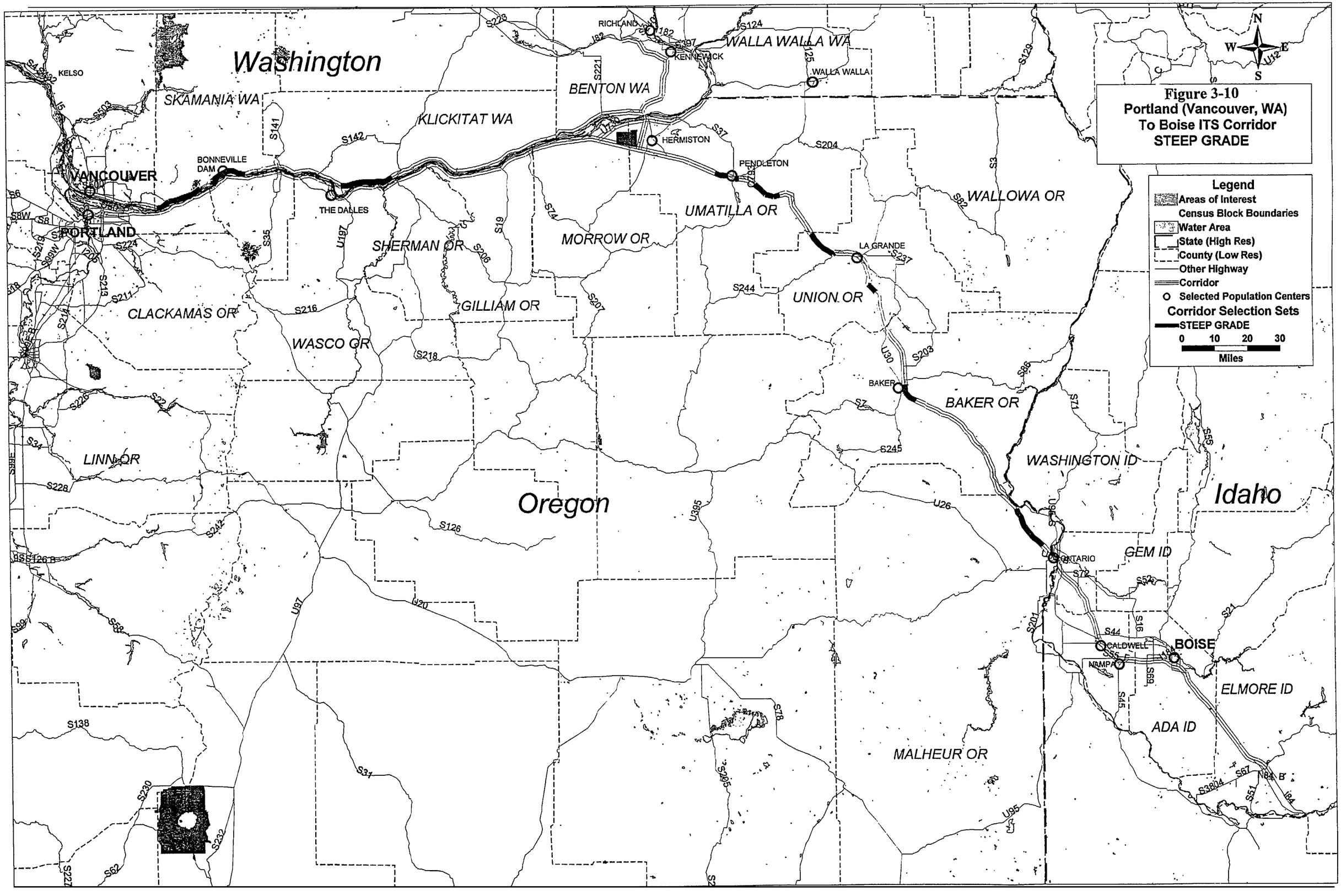
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GILLIAM OR
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UNION OR
BAKER OR
LINN OR
WASHINGTON ID
GEM ID
ELMORE ID
ADA ID
MALHEUR OR
Figure 3-10
Portland (Vancouver, WA)
To Boise ITS Corridor
STEEP GRADE
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res)
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
STEEP GRADE
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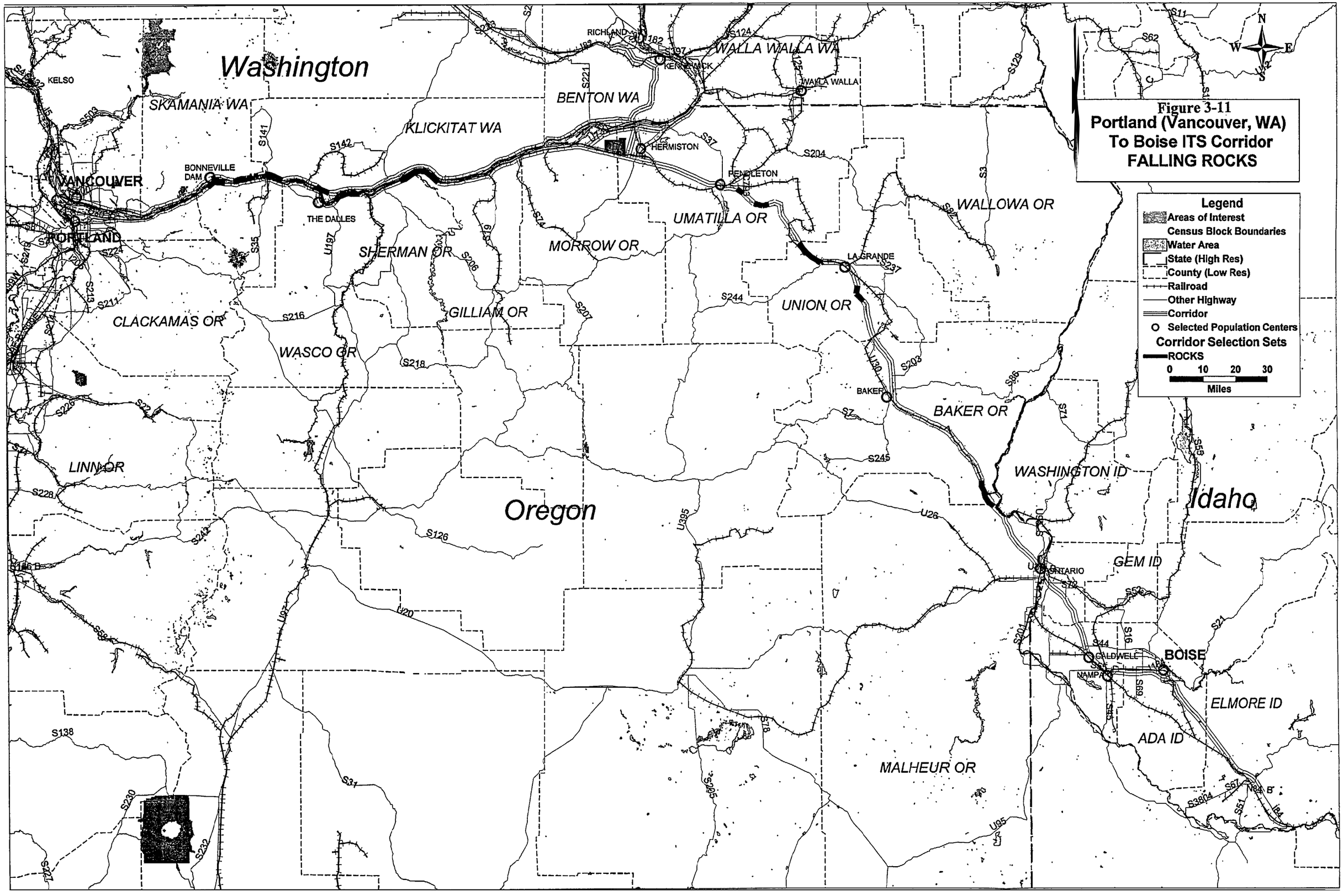
Figure 3-11
Portland (Vancouver, WA)
To Boise ITS Corridor
FALLING ROCKS
Legend
Areas of Interest
Census Block Boundaries
Water Area
State (High Res)
County (Low Res)
Railroad
Other Highway
Corridor
Selected Population Centers
Corridor Selection Sets
ROCKS
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Miles
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VANCOUVER
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BONNEVILLE DAM
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LINN OR

3.4 General Weather Conditions

Historical data on weather conditions were obtained for nine weather station locations along the corridors. Norma1 temperature and precipitation conditions for these locations are shown in **Table 3-2.**

The data shows that precipitation increases dramatically in the Cascades east of Portland with the Bonneville Dam area receiving more than twice as much rainfall as Portland. East of the Cascades precipitation declines rapidly with The Dalles receiving only 14 inches a year while Richland receives only 7 inches a year. Precipitation levels increase again through the Blue Mountains with La Grande receiving almost 17 inches annually. East of the Blue Mountains annual precipitation levels drop again to less than 10 inches at Ontario and then increases slightly to 12 inches at Boise.

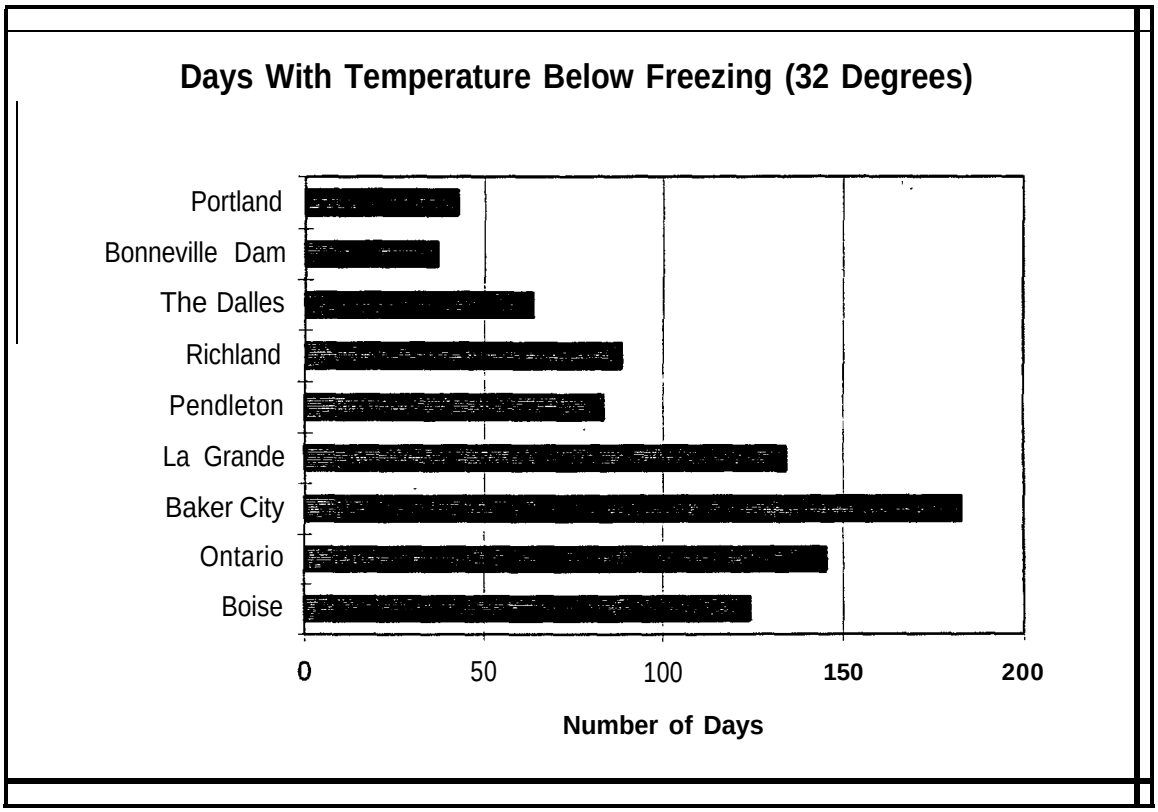
Temperatures along the corridor on the west side of the Cascades are moderate and do not vary significantly between Portland and the Gorge. The Bonneville Dam area reports 37 days with minimum temperatures falling below 32 degrees F. which is even less than Portland at 42 days. However, temperatures drop on the east side of the Cascades where The Dalles reports about half again as many days with minimum temperatures falling below 32 degrees F. as Portland. Normal temperatures continue to drop the farther east one goes through the Blue Mountains but then increase slightly again on the east side. The number of days with temperatures falling below 32 degrees F. in this region varies from **182** days in Baker to 124 days in Boise. **Figure 3-12** illustrates the number of days with temperatures below freezing.

Table 3-2
Normal Temperature and Precipitation Conditions

LOCATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
	High Temp. (oF)	45.4	51.0	56.0	60.6	67.1	74.0	79.9	80.3	74.6	64.0	52.6	45.6	62.6
	Low Temp. (oF)	33.7	36.1	38.6	41.3	47.0	52.9	56.5	56.9	52.0	44.9	39.5	34.8	44.5
Portland	# Days Min. Temp. <= 32oF	13.1	8.2	4.6	1.0	0.1	0.0	0.0	0.0	0.0	0.6	5.2	9.6	42.5
	Normal Percip. (In)	5.35	3.85	3.56	2.39	2.06	1.48	0.63	1.09	1.75	2.67	5.34	6.13	36.30
	# Days Precip. >=0.1"	12	10	10	8	6	4	2	3	4	7	13	12	91
	High Temp. (oF)	42.5	47.3	53.1	59.3	66.3	71.8	78.2	78.5	73.6	63.0	50.7	43.8	60.7
	Low Temp. (oF)	32.9	35.5	37.7	41.9	47.1	52.5	56.6	56.4	53.0	46.8	39.7	34.6	44.5
Bonneville Dam	# Days Precip. <=32oF	12.1	7.3	4.3	0.6	0.1	0.0	0.0	0.0	0.0	0.1	3.0	9.3	36.9
	Normal Precip (in)	11.68	8.75	8.03	5.71	3.62	2.72	0.92	1.53	2.96	6.09	11.0	12.41	75.40
	# Days Precip. >=0.1"	16	14	15	12	9	6	2	3	6	10	16	17	127
	High Temp. (oF)	42.3	49.2	57.5	65.8	73.8	80.4	87.9	87.5	81.4	68.5	51.8	43.4	65.8
	Low Temp. (oF)	29.7	32.7	36.5	42.4	49.0	55.5	60.1	59.1	51.7	42.8	35.6	31.3	43.9
The Dalles	# Days Precip. <=32oF	17.2	12.4	6.6	0.8	0.0	0.0	0.0	0.0	0.0	1.1	9.6	16.0	63.8
	Normal Precip (in)	2.60	1.81	1.30	0.78	0.57	0.45	0.17	0.36	0.44	1.02	1.98	2.66	14.13
	# Days Precip. >=0.1"	7	5	5	2	2	1	1	1	1	3	6	7	41
	High Temp. (oF)	40.9	48.9	58.1	66.8	75.6	83.0	90.5	89.2	80.5	67.5	51.1	41.9	66.2
	Low Temp. (oF)	26.4	30.8	35.0	41.1	48.3	55.0	59.6	58.7	50.7	40.9	33.7	28.4	42.4
Richland	# Days Precip. <=32oF	22.0	15.6	10.7	2.4	0.1	0.0	0.0	0.0	0.2	3.7	12.7	21.1	88.5
	Normal Precip (in)	1.01	0.70	0.60	0.48	0.58	0.44	0.18	0.29	0.28	0.48	0.97	1.03	7.06
	# Days Precip. >=0.1"	4	3	2	2	2	2	1	1	1	2	3	4	25

LOCATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
	High Temp. (oF)	39.7	46.9	54.2	61.3	70.0	79.5	87.8	86.2	76.3	63.7	48.9	40.5	62.9
	Low Temp. (oF)	27.2	31.6	35.4	39.4	45.8	52.9	58.0	57.7	49.9	41.0	34.1	27.9	41.7
Pendleton	# Days Min. Temp. <= 32oF	21.2	15.7	9.6	2.4	0.1	0.0	0.0	0.0	0.1	2.5	12.5	19.5	83.5
	Normal Percip. (In)	1.51	1.14	1.16	1.04	0.99	0.64	0.35	0.53	0.59	0.86	1.58	1.63	12.02
	# Days Precip. >=0.1"	5	4	4	3	3	2	1	1	2	3	5	5	38
	High Temp. (oF)	37.8	43.4	51.4	58.6	67.9	76.2	85.5	85.9	76.4	62.9	46.2	38.5	60.9
	Low Temp. (oF)	23.6	26.8	30.6	34.9	41.7	48.4	52.6	51.5	43.4	35.3	29.9	24.4	36.9
La Grande	# Days Precip. <=32oF	25.3	21.1	19.0	10.9	2.4	0.1	0.0	0.0	1.8	11.0	18.2	24.7	134.4
	Normal Precip (in)	1.86	1.43	1.51	1.49	1.73	1.56	0.65	0.90	0.87	1.22	1.94	1.81	16.98
	# Days Precip. >=0.1"	6	4	6	5	5	5	2	3	3	4	6	6	54
	High Temp. (oF)	33.8	40.7	49.3	58.6	67.1	74.8	84.6	83.8	75.1	62.2	45.0	35.5	59.2
	Low Temp. (oF)	16.8	21.6	26.2	31.0	38.2	44.4	47.9	46.3	38.5	30.1	24.1	17.9	31.9
Baker	# Days Precip. <=32oF	28.4	25.0	25.3	18.4	5.8	0.5	0.1	0.3	5.5	20.1	24.6	28.7	182.8
	Normal Precip (in)	0.93	0.67	0.82	0.82	1.43	1.38	0.59	0.82	0.63	0.63	0.90	0.97	10.57
	# Days Precip. >=0.1"	3	2	3	3	4	4	2	2	2	2	3	3	33
	High Temp. (oF)	35.8	44.6	56.2	66.4	76.2	85.3	95.3	92.9	82.3	67.3	48.8	37.5	65.7
	Low Temp. (oF)	19.8	24.8	30.4	36.4	44.3	51.3	57.3	54.3	44.4	34.5	27.2	21.2	37.2
Ontario	# Days Precip. <=32oF	27.9	23.6	19.6	9.0	1.7	0.1	0.0	0.0	1.5	12.5	21.9	27.8	145.5
	Normal Precip (in)	1.37	0.90	0.82	0.72	0.93	0.71	0.18	0.37	0.49	0.65	1.20	1.38	9.72
	# Days Precip. >=0.1"	4	3	3	3	3	2	1	1	1	2	4	4	33
	High Temp. (oF)	36.4	44.2	52.9	61.4	71.0	80.9	90.2	88.1	77.0	64.6	48.7	37.7	62.8
	Low Temp. (oF)	21.6	27.5	31.9	36.7	43.9	52.1	57.7	56.8	48.2	39.0	31.1	22.5	39.1
Boise	# Days Precip. <=32oF	26.3	20.8	17.5	8.0	1.7	0.0	0.0	0.0	0.5	5.6	18.1	25.6	124.4
	Normal Precip (in)	1.45	1.07	1.29	1.24	10.8	0.81	0.35	0.43	0.80	0.75	1.48	1.36	12.11
	# Days Precip. >=0.1"	5	4	5	4	3	2	1	1	2	3	6	5	41

Figure 3-12



Normal sky and visibility conditions were only available for Portland, Pendleton and Boise and are summarized in **Table 3-3.** Sky conditions vary from one end of the corridor to the other with Portland having the most cloudy conditions at 6 1 percent of all days per year and Boise the least at 42 percent of all days. The number of days with heavy fog (less than a quarter mile visibility) varies in a similar fashion with Portland having almost 33 days per year and Boise with 20 days.

Table 3-3
Normal Sky Cover and Visibility Conditions

LOCATION		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
	% Clear	9.4	10.4	10.3	11.7	15.8	20.7	41.0	36.8	34.3	17.7	9.3	6.8	18.7
Portland	% Partly Cloudy	11.6	13.6	15.8	19.3	23.2	25.7	27.7	31.0	27.0	24.2	14.3	10.6	20.4
	% Cloudy	79.0	77.1	73.9	69.0	61.3	53.7	31.6	32.6	38.7	58.1	76.3	82.3	61.0
	# Days with Heavy Fog	4.3	3.7	2.4	1.1	0.2	0.1	0.1	0.2	2.7	7.2	6.1	4.9	32.9
	% Clear	7.4	9.6	15.5	17.3	24.2	32.3	62.3	58.4	50.7	32.6	12.3	8.4	27.8
Pendleton	% Partly Cloudy	17.1	20.0	24.5	31.7	34.8	33.7	24.5	25.2	26.3	25.5	21.3	14.5	24.9
	% Cloudy	75.5	71.1	60.0	51.0	41.0	34.3	12.9	16.5	23.0	41.9	66.3	76.8	47.4
	# Days with Heavy Fog	7.4	4.9	1.9	0.3	0.2	0.1	0.0	0.0	0.2	1.0	5.9	8.6	30.6
	% Clear	14.2	16.1	19.7	21.7	27.4	38.3	65.5	60.0	56.7	38.7	20.3	15.8	33.0
Boise	% Partly Cloudy	15.8	22.9	23.5	29.0	31.9	34.0	23.5	25.5	23.3	26.8	21.0	18.1	24.6
	% Cloudy	69.7	62.1	56.8	49.3	40.3	27.7	10.6	14.8	20.0	34.5	59.0	66.1	42.4
	# Days with Heavy Fog	6.0	3.2	0.7	0.3	0.2	0.1	0.0	0.0	0.1	0.5	3.0	5.8	20.1

3.5 Commercial Vehicle-Operations

This section addresses commercial vehicle operations (CVO) issues and needs related to weigh stations and ports of entry in the Interstate 84 (I-84) corridor that links the Portland, Oregon / Vancouver, Washington metropolitan area with Boise, Idaho. The issues and needs analysis presented ensures that the I-84 ITS corridor study coordinates with the existing and planned CVO ITS infrastructure in Oregon, Idaho, and Washington along the I-84 corridor.

There are a range of intelligent transportation systems (ITS) applications related to CVO. They are generally categorized into the following "user services":

- commercial vehicle electronic clearance
- automated roadside safety inspections
- commercial vehicle administrative processes
- on-board safety monitoring
- commercial fleet management
- hazardous material incident notification

The ITS user services that improve the efficiency and effectiveness of weigh station and port-of-entry procedures include commercial vehicle electronic clearance, automated roadside safety inspections, and the commercial vehicle administrative processes.

For weigh station and port-of-entry facilities this section details:

- CVO institutional roles and responsibilities in the corridor
- current state policies and programs that are addressing ITS CVO needs in the corridor
- current ITS CVO deployment and needs in the corridor
- other CVO issues and needs identified through the analysis

3.5.1 CVO Institutional Roles and Responsibilities

The ODOT, ITD, and the WSDOT have been undertaking work to deploy ITS technologies at weigh stations and ports-of-entry for several years. These facilities are operated under state and federal guiding policies, which are implemented and enforced by several agencies in each state.

The following describes the institutional roles and responsibilities for the different CVO procedures undertaken at weigh stations and ports-of-entry in Oregon, Idaho, and Washington. Overall, CVO user services are delivered in a complex operating environment that must be understood when making recommendations that define ITS CVO needs and implementation plans for the corridor.

The institutional roles-and responsibiCities-for-weigh Study port-of-entry facilities in each state are described for the following activities affecting CVO in the corridor:

- driver licensing (
- vehicle licensing and registration
- operating authority and insurance
- permits
- tax collection
- weight and size regulation
- safety regulation

Oregon:

Commercial vehicle operations are regulated by several agencies in Oregon. Regulatory responsibilities, which are divided among the ODOT, the Oregon State Police, and the Oregon Public Utilities Commission. The following describes the institutional roles and responsibilities of each agency.

Oregon Department of Transportation

The ODOT License Control Service Division is responsible for issuing and regulating commercial drivers licenses and for managing vehicle titles.

The ODOT Motor Carrier Services Division is responsible for issuing special transportation oversize/overweight permits. This includes single trip and annual heavy haul permits for non-divisible loads over 98,000 pounds, annual extended weight permits for loads up to 105,000 pounds, and for issuing and regulating Western Regional Permits (a single trip permit valid in six states for vehicles with a moderately oversize or overweight load). This ODOT division is also responsible for weighmaster duties, which include weighing trucks at weigh stations, ports of entry, and at mobile weighing sites. When a commercial vehicle is found overweight at a weigh station, the ODOT reports the violation to the Oregon State Patrol, who handles enforcement. It also monitors vehicle movements for on-going Oregon Public Utilities Commission audits, enforces weight/distance taxes, and performs safety inspections.

Oregon State Police

The Oregon State Police are responsible for the enforcement. of several commercial vehicle operations regulations at weigh stations and along roadsides. These responsibilities include checking for proper credentials and enforcing safety, size, and weight compliance. The Oregon State Police work closely with the Oregon Public Utilities Commission with regard to commercial vehicle operations.

Oregon.Public Utilities Commission

The Oregon Public Utilities Commission is responsible for several operational and administrative issues relating to commercial vehicle operations. The Oregon Public Utilities Commission performs terminal inspections, grants intrastate certificates of authority to common and contract carriers, issues permit authority to interstate carriers, and administers and collects the weight/distance tax. In addition, it conducts safety inspections along-the roadside and at motor carrier terminals, registers and issues temporary registration permits for intrastate and apportioned (interstate) commercial vehicles, and issues oversize and overweight special transportation permits in conjunction with the ODOT.

To some it may appear that there is overlapping responsibilities between the OSP and the PUC; however, each has a different role in commercial vehicle operations. The Oregon State Police is the primary agency responsible for enforcement of safety rules and regulations applicable to commercial vehicles. However, the State Police and the Public Utilities Commission work in conjunction to perform limited safety inspections consistent with the Motor Carrier Safety Assistance Program. These inspections are performed by the Oregon State Police at the roadside and at weigh stations, and by the Oregon Public Utilities Commission at carrier terminals. In addition, the Oregon Public Utilities Commission coordinates with the Oregon State Patrol to perform roadside inspections. In general, the Oregon State Police enforce size, weight, and safety regulations and check credentials. The Oregon State Public Utilities Commission's mission is economic and safety regulation. This includes administration of the weight-distance tax, oversize and overweight permits, hazardous shipment permits, and it approves rates where they are governed by regulatory requirements.

The Oregon Public Utilities Commission also maintains the Safetynet database (a national database containing vehicle inspection data) and performs safety compliance audits. This agency also regulates hazardous waste and material, ensures compliance with insurance standards on regulated carriers, manages bond and insurance filings, and approves rates. The Oregon Public Utilities Commission's main focus is the economic and safety regulation of carriers, not roadway operations, though many Oregon Public Utilities Commission, Oregon State Patrol, and ODOT functions are integrally related.

Similar relationships exist between the DOT, PUC and Police in other states. This division of responsibilities is essentially the same in all states. Typically, departments of transportation are responsible for weighmaster duties and the State Patrol enforces regulations at the roadside and weigh stations. The Public Utilities Commission performs inspections at carrier terminals, but is generally a regulator agency. Departments of transportation and public utilities commissions (or their equivalent) work in conjunction to issue oversize and overweight permits.

Idaho;

The State of Idaho has an organizational structure that is similar to Oregon's in regard to commercial vehicle operations. The division of government regulatory responsibilities is split

between the ITD, the-Idaho Department-of Law-Enforcement the-Idaho Public Utilities Commission, and the Idaho Tax Commission.

Idaho Transportation Department

The ITD is responsible for issuing and monitoring commercial drivers licenses, licensing and registering vehicles, verifying operating authority, issuing temporary permits (96 hour trip permits, overlegal single trip permits, and Western Regional Permits - a single trip permit valid in six states for vehicles with a moderately oversize or overweight load) and annual permits (overlegal permits and special fuel licenses), collecting commercial vehicle operations related taxes, and enforcing size and weight restrictions on commercial vehicles. Commercial vehicle operations related taxes include the mileage tax, which is handled specifically by the ITD Motor Vehicle Accounting Division.

Idaho Department of Law Enforcement

The responsibilities of the Idaho Department of Law Enforcement are quite broad because it contains the enforcement powers of the Idaho State Police. The Idaho State Police have the authority to check credentials such as commercial driver's licenses, vehicle registration, insurance, and operating authority. Further, the Idaho State Police regulates safety compliance through inspections and reviews and assists the ITD in regulating weight and size compliance. Enforcement takes place at ports-of-entry, weigh stations, and during roadside stops.

Idaho Public Utilities Commission

The Idaho Public Utilities Commission grants and registers intrastate operating authority, approves rates, and publishes tariffs for intrastate operation. In addition, the agency has several enforcement responsibilities. These include verifying possession of credentials such as commercial driver's licenses, vehicle registration, and necessary permits. Other Idaho Public Utilities Commission enforcement duties include enforcing insurance standards on all regulated carriers, conducting safety inspections at truck terminals, and conducting safety reviews for intrastate carriers.

Idaho Tax Commission

The Idaho Tax Commission is responsible for collecting commercial vehicle related taxes, including fuel taxes. This regulatory responsibility is accomplished by registering and issuing fuel decals. The Idaho Tax Commission is also responsible for receipting all revenues, processing tax returns, and paying refunds to carriers.

Washington:

Washington's commercial vehicle operations regulatory structure is similar to that of Oregon and Idaho. The division of governmental responsibility is split between the WSDOT, the Washington State Patrol, the Washington Utilities and Transportation Commission, and the Washington Department of Licensing.

Washington State Department of Trasnportation

The WSDOT Motor Carrier Services Office issues permits for commercial vehicles. The permits offered include single trip permits, oversize and overweight permits, additional tonnage permits, log tolerance permits, special fuel permits, and Western Regional Permits. The WSDOT is also responsible for maintaining the safest and most efficient roadway environment possible. In pursuit of this goal, the agency provides permits to protect both the trucker and the motoring public from the hazards created by the movement of oversize and overweight loads on the highway. It also regulates the traffic flow around overweight and oversize loads in order to minimize inconveniences to other motorists. The number of overweight permits are issued to regulate the amount and type of commercial vehicle traffic and to generate revenue to defray some of the cost of maintaining the highway system.

Washington State Patrol

The Washington State Patrol is primarily responsible for enforcement of traffic and safety rules and regulations. The areas of enforcement related to commercial vehicle operations include checking for proper credentials {issued by the Washington Department of Licensing and similar agencies in other states), enforcing safety compliance, and enforcing size and weight compliance (these permits are issued by the WSDOT and similar agencies in other states). These enforcement activities are performed along the roadside and at weigh stations. The Washington State Patrol also issues trip permits and is responsible for gathering and maintaining vehicle inspection **and accident** data.

Washington Utilities and Transportation Commission

The Transportation Division of the Washington Utilities and Transportation Commission directs economic and safety regulation of common and contract carriers operating within Washington. The basic regulatory responsibilities of the Washington Utilities and Transportation Commission Transportation Division include granting interstate operating authority, registering interstate operating authority, approving rates and publishing tariffs, conducting safety inspections in terminals of intrastate and interstate carriers, and enforcing insurance standards on regulated carriers.

While primarily a regulatory agency, the Washington Utilities and Transportation Commission does perform random roadside checks for operating authority and conducts safety inspections,

However, the agency is primarily concerned with intrastae operating authority, insurance requirements, and the regulation of rates and tariffs.

Washington Department of Licensing

The Washington Department of Licensing handles vehicle licensing and registration, fuel taxation, and driver licensing. This agency is responsible for testing, issuing, and renewing commercial driver's licenses. It is also registers vehicles under the International Registration Plan and the International Fuel Tax Agreement. Both of these programs require the collection of fees from Washington-based interstate carriers and the apportioned disbursement of fees to various participating states. The Washington Department of Licensing also provides motor carriers with the proper credentials to operate as commercial vehicle operators.

3.5.2 Current State ITS CVO Plans and Programs Affecting the Corridor

There are a number of ITS CVO plans and programs that include the ports-of-entry and weigh stations in the I-84 study corridor. They are discussed below.

Multi-state:

The Western States Transparent Borders Project and now the Idaho, Oregon, Utah Project (I.O.U.) developed proposals for using ITS CVO applications to increase the efficiency of interstate CVO operations in the I-84 corridor. The I.O.U. study, now underway, is developing an agreement for establishing a system to issue longer combination vehicle permits to authorize commercial vehicle operation in more than one jurisdiction. The plan is to start with triple combinations and stage implementation of other commercial vehicle permits.

Oregon:

The ODOT's "Green Light" CVO Project is an undertaking to streamline commercial vehicle operations and improve safety by installing mainline bypass systems at 15 weigh stations and ports-of-entry, speed warning systems at two downgrades, distribution of 50,000 transponders, and two road weather advisory systems.

ODOT's "Green Light" CVO Project identified several corridors, such as Interstate 5, Interstate 84, and U.S. route 97, as corridors with significant commercial traffic. Each of these corridors are targeted for ITS application.

The Oregon Department of Transportation (ODOT) has prioritized the I-84 corridor as the most important for the deployment of ITS technologies. The reasons the Green Light Project has ranked the I-84 corridor as being the most important are:

(1) this corridor carries the second highest volume of traffic next to-I-5,
(2) it is the major linkage between the midwest manufacturing centers and the multi-modal Portland transportation centers,
(3) it is the least automated corridor, and
(4) there is potential corridor development between Idaho, Oregon and Utah (I.O.U.), i.e. transparent borders implementation as recommended in the Western States Transparent Borders Project reports.

Idaho:

The Idaho Transportation Department (ITD) is interested in applying intelligent transportation systems to corridors statewide. The ITD plans to establish a one-stop shopping arrangement for registration, fuel tax, permits, and operating authority. This will assist the ITD in providing the safest and most efficient roadway environment possible, while maintaining roadway structures to prevent premature deterioration. User services associated with ITS that may be of particular value to the I-84 corridor. include commercial vehicle electronic clearance, automated roadside safety inspections, and on-board safety monitoring.

Washingotn:

The Washington State Department of Transportation (WSDOT) is applying ITS technologies to its statewide transportation system. Interstate 5, Interstate 90, and other transportation corridors are the subject of continuous efforts to apply ITS. WSDOT's ITS goals are essentially the same as those for the ODOT and ITD: to reduce motor carrier and public agency costs, to improve motor carrier competitiveness, to eliminate unnecessary delays, and to improve motor carrier safety and compliance.

3.5.3 Assessment of Current ITS CVO Deployment and Corridor Needs

Ports-of-entry, weigh stations, and downhill speed information systems are located at key points along the Portland/Vancouver to Boise I-84 corridor. These facilities and the existing and planned ITS CVO deployments are listed in **Table** 3-4. These improvements at these facilities are discussed in more detail for each state. Total cost of the planned improvements are nearly $3.4 million dollars.

Table 3-4
Portland and Vancouver to Boise 1-84 Corridor CVO Facilities

Name	Mile Post Location	Direction	Existing and Planned CVO Facilities	Estimated Cost of Planned CVO Facilities
Idaho				
East Boise Port-of-Entry	54.5	EB		existing
Oregon				
Cascade Locks Port-of-entry	44.9	EB	Complete pre-clearance system	$397,300
Wyeth Weigh Station	54.3	WB	Complete pre-clearance System	$449,300
Emigrant Hill Weigh Station	226.9	EB	Downhill Speed Information System	$100,000
			Complete pre-clearance system	$411,300
La Grande Weigh Station	258.5	EB	Complete pre-clearance system	$377,300
Farewell Bend Port-of-entry	353.3	WB	Complete pre-clearance system	$362,300
			VISION Technology	$25,000
Olds Ferry Weigh Station	354.4	EB	Complete pre-clearance system	$363,300
Umatilla Port-of-entry (I-82)	0.5	SB	VISION technology (w/ existing pre-clearance)	$25,000
Columbia River Basin and Ladd Canyon			Road and Weather Information Systems	$400,000
Statewide			Database Management and Development	$354,000
			Electronic Data Interchange	$125,000

Oregon:

The ODOT manages two ports of entry, four weigh stations, and one downhill speed information system on the I-84 corridor, as shown in Table 3-4. In addition, the Umatilla Port-of-entry is located along Interstate 82 at the Washington border.

The ODOT is leading an effort to apply CVO technologies statewide to transportation corridors that are heavily traveled by commercial vehicles. These CVO technologies provide three primary commercial vehicle user services: commercial vehicle electronic clearance, automated roadside safety inspections, and commercial vehicle administrative process.

CVO needs along corridors heavily traveled by commercial vehicles were initially identified by the Western States Transparent Borders project and were further refined by a tri-state effort between Idaho, Oregon, and Utah: the I.O.U. project. These technologies are currently being implemented in Oregon under the "Green Light" CVO Project.

The statewide "Green Light" CVO Project involves the implementation of mainline pre-clearance systems, safety enhancements, deployment of VISION technology (which reads Public Utilities Commission license plates), database management and development, and the development of electronic data interchange capabilities. Efforts to implement CVO technologies at weigh stations and ports of entry along the I-84 corridor are expected to exceed $2.4 million, in addition to costs associated with other CVO technologies planned for the corridor. When completed statewide, it will include mainline bypass systems at 15 weigh stations and ports-of entry, speed warning systems at two downgrades, distribution of 50,000 transponders, and two road weather advisory systems.

- Mainline Pre-clearance Systems

ODOT's pre-clearance system is capable of weighing, classifying, identifying, verifying, and directing commercial vehicles at highway speeds. The capabilities of the system enable commercial vehicles, if they meet the necessary legal, safety, and tax requirements, to by-pass ports of entry and weigh stations entirely, thereby reducing congestion and improving carrier competitiveness.

The Oregon mainline pre-clearance system draws upon the several CVO technologies. These include weigh in motion scales and systems, automatic vehicle classifiers, overheight detectors, axle sensors and loops, automatic vehicle identification systems that use one or two way transponders to communicate, variable message signs, VISION technology, and a supervisory system computer that has registration, gross weight, tax status, and safety inspection records for nearly 250,000 vehicles. The supervisory system computer checks commercial vehicles for compliance and signals the vehicle to either bypass or enter the weigh station or port-of-entry for closer inspection.

The Umatilla port-of&entry,-which-is-located on I-82 at the Washington border, is currently equipped with a mainline pre-clearance system in the southbound direction. The Oregon "Green Light" CVO Project notes that several more sites are planned for the deployment of systems with similar capabilities.

- VISION Technology

VISION technology refers to the use of cameras to read Public Utilities Commission license plates. The "Green Light" CVO Project expects a continued development and deployment of these systems. In the future, VISION technology will be tied to weigh in motion systems to act as an automatic vehicle identification system. Further, once fully developed and implemented, VISION technology could be used to measure vehicle dimensions such as width and length, which are not currently measured due to technological limitations.

The ODOT plans to implement VISION technologies at two locations along the I-84 corridor: the Farewell Bend port-of-entry (westbound) and the Umatilla port-of-entry (I-82 southbound).

- Downhill Speed Information System

The Oregon "Green Light" CVO Project includes several planned safety enhancements oriented towards commercial vehicle operations.

A downhill speed information system is planned for the Emigrant Hill weigh station area. This system will measure the speed versus weight of passing westbound trucks and will provide a variable message sign to indicate safe operating speed under existing weather conditions.

- Road Weather Information System

In the Columbia River Basin (approximately between Arlington and Hermiston) and Ladd Canyon, the ODOT plans to equip the road with road weather information systems. These systems will allow maintenance units to more effectively mitigate snow and ice, and thereby increase highway safety.

- Improved Safety Inspections

Implementation of the "Green Light" CVO Project will also enhance Oregon's existing safety inspection program with an on-line real-time safety inspection database that will be accessible at all inspection sites. This enhancement will allow the selection of carriers/vehicles for inspection based upon current inspection and compliance status. In addition, the system will supply the date and time of the last inspection, a history of out-of-service defects and their status, the driver's hours-of-service information, and the status of the carrier's compliance and safety rating.

. Database Management and Development

An important element of the "Green Light" CVO Project is the development of an automatic vehicle identification system, the design and implementation of VISION technology, and the refinement and deployment of an operational central database for all commercial vehicle operations data.

- Electronic Data Interchange

An electronic data interchange system is proposed as part of the "Green Light" CVO Project - Phase III. This system will be developed by the Oregon Public Utility Commission to automate the filing of taxes through the use of automatic vehicle identification technologies and by on-board computers. This system will allow vehicles to automatically and electronically record, report, and audit road use taxes. A truck operator could file all necessary reports via the on-board computer and the automatic vehicle identification reader directly into the ODOT mainframe. This system is expected to improve cost effectiveness by reducing time spent on the administrative process.

Idaho-

As shown in **Table** 3-4, the ITD manages one port-of-entry on the Portland/Vancouver to Boise I-84 corridor. The East Boise Port-of-entry offers complete mainline pre-clearance and is the subject of a field operational test to demonstrate automated technologies that monitor commercial vehicles taken out of service and to aid in efficiently clearing violations. This port-of-entry is part of a vehicle out-of-service system that will be used at multiple ports, on a statewide or nationwide basis, that will be linked together to allow for tracking and monitoring of violators throughout the nation. This system assists in the enforcement of the Motor Carrier Safety Assistance Program, which seeks to ensure the safe operation of commercial vehicles on the nation's highways.

No additional CVO needs were identified for the East Boise Port-of-entry.

The ITD is working with the ODOT and the Utah Department of Transportation to Reduce Institutional Boundaries. This multi-state project, named the I.O.U. Project, is being led by the ODOT. The project will help to implement efforts identified by the Western States Transparent Borders Project.

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The WSDOT completed a statewide strategic intelligent vehicle highway system plan in 1993. This plan guides the state's intelligent transportation system program, Venture, Washington. WSDOT seeks to rapidly implement the most beneficial aspects of intelligent transportation systems, particularly along the Interstate 5 corridor between Seattle and Portland and on the Interstate 90 corridor. However, the WSDOT is currently developing and implementing several

ITS projects, including the-western States-Transparent Borders Project. Under this initiative the WSDOT is investigating administrative, institutional, organizational, and statutory barriers that limit the implementation of intelligent vehicle highway system technologies. The goal of this effort is to improve the efficiency and productivity of Washington state agencies and the motor carrier industry.

3.5.4 Other CVO Issues

Some general issues that are important to the continued deployment and implementation of CVO technologies along the I-84 corridor include the following:

- Weigh in Motion Accuracy

The ODOT notes that the accuracy of weigh in motion technologies is somewhat iimited. The accuracy of available equipment diminishes with the increased speed of the vehicle being weighed and, the closer a vehicle is loaded to its axle or gross weight legal limits, the more difficult it becomes to screen out. Although there are ways to improve the accuracy of existing technologies, such as improving the quality of the roadway surface over longer approach distances to the weigh in motion site, the solutions tend to be cost prohibitive. However, it is important to improve weigh in motion accuracy because its faults are greatest when weighing the vehicles that are most likely to be overweight.

- Oversize Vehicle Measurement

Although accurate systems exist and are in place to measure the height of commercial vehicles, no systems exist that measure their width or length. Systems that measure these dimensions at speed could help to reduce port-of-entry congestion and could improve roadway safety. Deployment of VISION technology may provide a basis for a future system that could perform these measurements.

A survey of commercial vehicle operators using the I-84 corridor was performed as part of the Portland/Vancouver to Boise ITS Corridor Study. The primary CVO issues identified through the interviews were the following:

- Continued Development and Application of CVO Technologies to the Portland/Vancouver to Boise corridor

Respondents were interested in the continued development of ITS and CVO capabilities. Existing technologies are seen as valuable and their continued development and deployment is considered crucial to the corridor. Many respondents desire technologies for the corridor that have not yet been developed. Respondents suggested that the ability to better communicate “real time” information electronically would improve operating conditions along the corridor. Some

respondents would also like to see more weather information on variable message signs so that commercial vehicle operators would know of emergency road closures in advance.

- Weather

Weather-related issues were commonly mentioned in the interviews. Carriers appear to be interested in improved technologies (and accessibility to them) that would provide weather condition information, early warning systems, and scheduling data that could improve intermodal connections and port operations. Respondents to the survey questionnaire suggested the installation of electronic reader boards at or before each major interchange and river crossing to alert drivers earlier of problems ahead. Highway advisory radio would also be useful in these areas.

- State Route 14

Local users of State Route (SR) 14 in Washington believe that some commercial traffic may be avoiding Oregon's Weight-Mile Tax by traveling SR-14 rather than I-84. Concerned respondents would like to consider a study to determine the percentage of trucks choosing SR-14 over I-84 and possibly limiting truck usage of SR- 14. This issue is currently being addressed by the SR- 14 Corridor Strategy and Action Plan for the Columbia River Gorge National Scenic Area. This plan seeks to "Encourage through-truck traffic to use alternate transportation corridors, such as Interstate 84." Some respondents to the survey questionnaire suggested that SR-14 should be closed immediately when I-84 is closed during inclement weather.

o Bridges and Tunnels

Respondents noted that some of the bridges that cross the Columbia River are too narrow for commercial vehicles to negotiate at the posted speed, and therefore backups and congestion occurs. Bridges crossing the Columbia river are located at Portland/Vancouver, Cascade Locks, Hood River, The Dalles, Biggs Junction, and Umatilla. Respondents noted the Bridge of the Gods in Cascade Locks, the Hood River bridge, and The Dalles bridges specifically. Similarly, there are overheight vehicle problems along SR-14, where many tunnels do not have adequate clearance or good sight distances. Because of the limitations, trucks drive in the center of the road through the tunnels, thus creating a significant safety risk. There is only one tunnel on I-84 (i.e. Tooth Rock tunnel at Cascade Locks), but it too has inadequate overhead clearance.

o Hazardous Materials Shipment Notification

Discussions with CVO interests in the I-84 corridor revealed concern over hazardous materials shipments, particularly in the Portland metropolitan area and between Hanford, Washington and Portland. Some hazardous material shipments are currently tracked by the Oregon Emergency Response System in Salem. They also track spills of hazardous materials and have records back nearly ten years. One of the most dangerous materials travelling in the corridor is cesium between Hanford Washington and Tennessee. Cesium shipments occur roughly once or twice a

between the ITD, the-Idaho Department-of Law Enforcement, the Idaho Public Utilities Commission, and the Idaho Tax Commission.

Idaho Transportation Department

The ITD is responsible for issuing and monitoring commercial drivers licenses, licensing and registering vehicles, verifying operating authority, issuing temporary permits (96 hour trip permits, overlegal single trip permits, and Western Regional Permits - a single trip permit valid in six states for vehicles with a moderately oversize or overweight load) and annual permits (overlegal permits and special fuel licenses), collecting commercial vehicle operations related taxes, and enforcing size and weight restrictions on commercial vehicles. Commercial vehicle operations related taxes include the mileage tax, which is handled specifically by the ITD Motor Vehicle Accounting Division.

Idaho Department of Law Enforcement

The responsibilities of the Idaho Department of Law Enforcement are quite broad because it contains the enforcement powers of the Idaho State Police. The Idaho State Police have the authority to check credentials such as commercial driver's licenses, vehicle registration, insurance, and operating authority. Further, the Idaho State Police regulates safety compliance through inspections and reviews and assists the ITD in regulating weight and size compliance. Enforcement takes place at ports-of-entry, weigh stations, and during roadside stops.

Idaho Public Utilities Commission

The Idaho Public Utilities Commission grants and registers intrastate operating authority, approves rates, and publishes tariffs for intrastate operation. In addition, the agency has several enforcement responsibilities. These include verifying possession of credentials such as commercial driver's licenses, vehicle registration, and necessary permits. Other Idaho Public Utilities Commission enforcement duties include enforcing insurance standards on all regulated carriers, conducting safety inspections at truck terminals, and conducting safety reviews for intrastate carriers.

Idaho Tax Commission

The Idaho Tax Commission is responsible for collecting commercial vehicle related taxes, including fuel taxes. This regulatory responsibility is accomplished by registering and issuing fuel decals. The Idaho Tax Commission is also responsible for receipting all revenues, processing tax returns, and paying refunds to carriers.

Washington:

Washington's commercial vehicle operations regulatory structure is similar to that of Oregon and Idaho. The division of governmental responsibility is split between the WSDOT, the Washington State Patrol, the Washington Utilities and Transportation Commission, and the Washington Department of Licensing.

Washington State Department of Transportation

The WSDOT Motor Carrier Services Office issues permits for commercial vehicles. The permits offered include single trip permits, oversize and overweight permits, additional tonnage permits, log tolerance permits, special fuel permits, and Western Regional Permits. The WSDOT is also responsible for maintaining the safest and most efficient roadway environment possible. In pursuit of this goal, the agency provides permits to protect both the trucker and the motoring public from the hazards created by the movement of oversize and overweight loads on the highway. It also regulates the traffic flow around overweight and oversize loads in order to minimize inconveniences to other motorists. The number of overweight permits are issued to regulate the amount and type of commercial vehicle traffic and to generate revenue to defray some of the cost of maintaining the highway system.

Washington State Patrol

The Washington State Patrol is primarily responsible for enforcement of traffic and safety rules and regulations. The areas of enforcement related to commercial vehicle operations include checking for proper credentials {issued by the Washington Department of Licensing and similar agencies in other states), enforcing safety compliance, and enforcing size and weight compliance (these permits are issued by the WSDOT and similar agencies in other states). These enforcement activities are performed along the roadside and at weigh stations. The Washington State Patrol also issues trip permits and is responsible for gathering and maintaining vehicle inspection and accident data.

Washington Utilities and Transportation Commission

The Transportation Division of the Washington Utilities and Transportation Commission directs economic and safety regulation of common and contract carriers operating within Washington. The basic regulatory responsibilities of the Washington Utilities and Transportation Commission Transportation Division include granting interstate operating authority, registering interstate operating authority, approving rates and publishing tariffs, conducting safety inspections in terminals of intrastate and interstate carriers, and enforcing insurance standards on regulated carriers.

While primarily a regulatory agency, the Washington Utilities and Transportation Commission does perform random roadside checks for operating authority and conducts safety inspections,

However, the agency is primarily concerned with intrastate operating authority, insurance requirements, and the regulation of rates and tariffs.

Washington Department of Licensing

The Washington Department of Licensing handles vehicle licensing and registration, fuel taxation, and driver licensing. This agency is responsible for testing, issuing, and renewing commercial driver's licenses. It is also registers vehicles under the International Registration Plan and the International Fuel Tax Agreement. Both of these programs require the collection of fees from Washington-based interstate carriers and the apportioned disbursement of fees to various participating states. The Washington Department of Licensing also provides motor carriers with the proper credentials to operate as commercial vehicle operators.

3.5.2 Current State ITS CVO Plans and Programs Affecting the Corridor

There are a number of ITS CVO plans and programs that include the ports-of-entry and weigh stations in the I-84 study corridor. They are discussed below.

Multi-state:

The Western States Transparent Borders Project and now the Idaho, Oregon, Utah Project (I.O.U.) developed proposals for using ITS CVO applications to increase the efficiency of interstate CVO operations in the I-84 corridor. The I.O.U. study, now underway, is developing an agreement for establishing a system to issue longer combination vehicle permits to authorize commercial vehicle operation in more than one jurisdiction. The plan is to start with triple combinations and stage implementation of other commercial vehicle permits.

Oregon:

The ODOT's "Green Light" CVO Project is an undertaking to streamline commercial vehicle operations and improve safety by installing mainline bypass systems at 15 weigh stations and ports-of-entry, speed warning systems at two downgrades, distribution of 50,000 transponders, and two road weather advisory systems.

ODOT's "Green Light" CVO Project identified several corridors, such as Interstate 5, Interstate 84, and U.S. route 97, as corridors with significant commercial traffic. Each of these corridors are targeted for ITS application.

The Oregon Department of Transportation (ODOT) has prioritized the I-84 corridor as the most important for the deployment of ITS technologies. The reasons the Green Light Project has ranked the I-84 corridor as being the most important are:

(1) this corridor carries the second highest volume of traffic next to-I-5,
(2) it is the major linkage between the midwest manufacturing centers and the multi-modal Portland transportation centers,
(3) it is the least automated corridor, and
(4) there is potential corridor development between Idaho, Oregon and Utah (I.O.U.), i.e. transparent borders implementation as recommended in the Western States Transparent Borders Project reports.

Idaho:

The Idaho Transportation Department (ITD) is interested in applying intelligent transportation systems to corridors statewide. The ITD plans to establish a one-stop shopping arrangement for registration, fuel tax, permits, and operating authority. This will assist the ITD in providing the safest and most efficient roadway environment possible, while maintaining roadway structures to prevent premature deterioration. User services associated with ITS that may be of particular value to the I-84 corridor. include commercial vehicle electronic clearance, automated roadside safety inspections, and on-board safety monitoring.

Washington:

The Washington State Department of Transportation (WSDOT) is applying ITS technologies to its statewide transportation system. Interstate 5, Interstate 90, and other transportation corridors are the subject of continuous efforts to apply ITS. WSDOT's ITS goals are essentially the same as those for the ODOT and ITD: to reduce motor carrier and public agency costs, to improve motor carrier competitiveness, to eliminate unnecessary delays, and to improve motor carrier safety and compliance.

3.5.3 Assessment of Current ITS CVO Deployment and Corridor Needs

Ports-of-entry, weigh stations, and downhill speed information systems are located at key points along the Portland/Vancouver to Boise I-84 corridor. These facilities and the existing and planned ITS CVO deployments are listed in **Table** 3-4. These improvements at these facilities are discussed in more detail for each state. Total cost of the planned improvements are nearly $3.4 million dollars.

Table 3-4
Portland and Vancouver to Boise 1-84 Corridor CVO Facilities

Name	Mile Post Location	Direction	Existing and Planned CVO Facilities	Estimated Cost of Planned CVO Facilities
Idaho				
East Boise Port-of-Entry	54.5	EB		existing
Oregon				
Cascade Locks Port-of-entry	44.9	EB	Complete pre-clearance system	$397,300
Wyeth Weigh Station	54.3	WB	Complete pre-clearance System	$449,300
Emigrant Hill Weigh Station	226.9	EB	Downhill Speed Information System	$100,000
			Complete pre-clearance system	$411,300
La Grande Weigh Station	258.5	EB	Complete pre-clearance system	$377,300
Farewell Bend Port-of-entry	353.3	WB	Complete pre-clearance system	$362,300
			VISION Technology	$25,000
Olds Ferry Weigh Station	354.4	EB	Complete pre-clearance system	$363,300
Umatilla Port-of-entry (I-82)	0.5	SB	VISION technology (w/ existing pre-clearance)	$25,000
Columbia River Basin and Ladd Canyon			Road and Weather Information Systems	$400,000
Statewide			Database Management and Development	$354,000
			Electronic Data Interchange	$125,000

Oregon:

The ODOT manages two ports of entry, four weigh stations, and one downhill speed information system on the I-84 corridor, as shown in Table 3-4. In addition, the Umatilla Port-of-entry is located along Interstate 82 at the Washington border.

The ODOT is leading an effort to apply CVO technologies statewide to transportation corridors that are heavily traveled by commercial vehicles. These CVO technologies provide three primary commercial vehicle user services: commercial vehicle electronic clearance, automated roadside safety inspections, and commercial vehicle administrative process.

CVO needs along corridors heavily traveled by commercial vehicles were initially identified by the Western States Transparent Borders project and were further refined by a tri-state effort between Idaho, Oregon, and Utah: the I.O.U. project. These technologies are currently being implemented in Oregon under the "Green Light" CVO Project.

The statewide "Green Light" CVO Project involves the implementation of mainline pre-clearance systems, safety enhancements, deployment of VISION technology (which reads Public Utilities Commission license plates), database management and development, and the development of electronic data interchange capabilities. Efforts to implement CVO technologies at weigh stations and ports of entry along the I-84 corridor are expected to exceed $2.4 million, in addition to costs associated with other CVO technologies planned for the corridor. When completed statewide, it will include mainline bypass systems at 15 weigh stations and ports-of-entry, speed warning systems at two downgrades, distribution of 50,000 transponders, and two road weather advisory systems.

- Mainline Pre-clearance Systems

ODOT's pre-clearance system is capable of weighing, classifying, identifying, verifying, and directing commercial vehicles at highway speeds. The capabilities of the system enable commercial vehicles, if they meet the necessary legal, safety, and tax requirements, to by-pass ports of entry and weigh stations entirely, thereby reducing congestion and improving carrier competitiveness.

The Oregon mainline pre-clearance system draws upon the several CVO technologies. These include weigh in motion scales and systems, automatic vehicle classifiers, overheight detectors, axle sensors and loops, automatic vehicle identification systems that use one or two way transponders to communicate, variable message signs, VISION technology, and a supervisory system computer that has registration, gross weight, tax status, and safety inspection records for nearly 250,000 vehicles. The supervisory system computer checks commercial vehicles for compliance and signals the vehicle to either bypass or enter the weigh station or port-of-entry for closer inspection.

The Umatilla port-of&entry,-which-is-located on I-82 at the Washington border, is currently equipped with a mainline pre-clearance system in the southbound direction. The Oregon "Green Light" CVO Project notes that several more sites are planned for the deployment of systems with similar capabilities.

- VISION Technology

VISION technology refers to the use of cameras to read Public Utilities Commission license plates. The "Green Light" CVO Project expects a continued development and deployment of these systems. In the future, VISION technology will be tied to weigh in motion systems to act as an automatic vehicle identification system. Further, once fully developed and implemented, VISION technology could be used to measure vehicle dimensions such as width and length, which are not currently measured due to technological limitations.

The ODOT plans to implement VISION technologies at two locations along the I-84 corridor: the Farewell Bend port-of-entry (westbound) and the Umatilla port-of-entry (I-82 southbound).

- Downhill Speed Information System

The Oregon "Green Light" CVO Project includes several planned safety enhancements oriented towards commercial vehicle operations.

A downhill speed information system is planned for the Emigrant Hill weigh station area. This system will measure the speed versus weight of passing westbound trucks and will provide a variable message sign to indicate safe operating speed under existing weather conditions.

o Road Weather Information System

In the Columbia River Basin (approximately between Arlington and Hermiston) and Ladd Canyon, the ODOT plans to equip the road with road weather information systems. These systems will allow maintenance units to more effectively mitigate snow and ice, and thereby increase highway safety.

o Improved Safety Inspections

Implementation of the "Green Light" CVO Project will also enhance Oregon's existing safety inspection program with an on-line real-time safety inspection database that will be accessible at all inspection sites. This enhancement will allow the selection of carriers/vehicles for inspection based upon current inspection and compliance status. In addition, the system will supply the date and time of the last inspection, a history of out-of-service defects and their status, the driver's hours-of-service information, and the status of the carrier's compliance and safety rating.

- Database Management and Development

An important element of the "Green Light" CVO Project is the development of an automatic vehicle identification system, the design and implementation of VISION technology, and the refinement and deployment of an operational central database for all commercial vehicle operations data.

- Electronic Data Interchange

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3.5.4 Other CVO Issues

Some general issues that are important to the continued deployment and implementation of CVO technologies along the I-84 corridor include the following:

o Weigh in Motion Accuracy

The ODOT notes that the accuracy of weigh in motion technologies is somewhat iimited. The accuracy of available equipment diminishes with the increased speed of the vehicle being weighed and, the closer a vehicle is loaded to its axle or gross weight legal limits, the more difficult it becomes to screen out. Although there are ways to improve the accuracy of existing technologies, such as improving the quality of the roadway surface over longer approach distances to the weigh in motion site, the solutions tend to be cost prohibitive. However, it is important to improve weigh in motion accuracy because its faults are greatest when weighing the vehicles that are most likely to be overweight.

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respondents would also like to see more weather information on variable message signs so that commercial vehicle operators would know of emergency road closures in advance.

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o State Route 14

Local users of State Route (SR) 14 in Washington believe that some commercial traffic may be avoiding Oregon's Weight-Mile Tax by traveling SR-14 rather than I-84. Concerned respondents would like to consider a study to determine the percentage of trucks choosing SR-14 over I-84 and possibly limiting truck usage of SR- 14. This issue is currently being addressed by the SR- 14 Corridor Strategy and Action Plan for the Columbia River Gorge National Scenic Area. This plan seeks to "Encourage through-truck traffic to use alternate transportation corridors, such as Interstate 84." Some respondents to the survey questionnaire suggested that SR-14 should be closed immediately when I-84 is closed during inclement weather.

. Bridges and Tunnels

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. Hazardous Materials Shipment Notification

Discussions with CVO interests in the I-84 corridor revealed concern over hazardous materials shipments, particularly in the Portland metropolitan area and between Hanford, Washington and Portland. Some hazardous material shipments are currently tracked by the Oregon Emergency Response System in Salem. They also track spills of hazardous materials and have records back nearly ten years. One of the most dangerous materials travelling in the corridor is cesium between Hanford Washington and Tennessee. Cesium shipments occur roughly once or twice a

month. CVO interests desire a better- hazardous materials-shipment notification system to enhance communication and to improve safety along the I-84 corridor.

3.6 Traveler Information Needs

An area of significant need is to have accurate and timely traveller information. Much of the need is related to the unpredictable weather conditions that create traffic problems and road closures on a regular basis. Motorists have indicated the desire to easily obtain information related to traffic conditions, weather, accidents, road closures, detours, travel destinations, motorist services, and congestion. While most people believe that the information is available, it is not easily accessible and readily shared with the general public.

3.7 Emergency Services

In Washington, Oregon and Idaho States, an Emergency Management System processes the 911 calls around the state. Each county has one coordinator or PSAP (Primary Service Answering Point) and several secondary answering points who respond to 9 11 calls. These providers are listed in **Appendix F.** The role of each county PSAP is to direct emergency 911 calls to the appropriate and nearest emergency service-fire, ambulance, state patrol, etc. In general, ambulances are dispatched from fire stations. Each fire station has a geographical territory. The PSAPs are aware of these boundaries and send the call to the nearest emergency service (fire station). In congested urban areas, emergency vehicles are dispatched from the nearest interchanges in both directions toward the emergency. In rural areas the nearest emergency vehicle is sent.

3.7.1 Emergency Response Issues

The providers who were interviewed indicated that the major problem facing emergency response was weather related, particularly snow and ice. Other than weather related problems, the only other issue was the difficulty in crossing the freeway to reach an emergency on the other side. A goal of EMS is to provide a five minute response time to medical emergencies. At the present time, the acceptable response time is fifteen minutes. However, if the emergency is on the other side of a freeway, the vehicle must go to the nearest interchange and turn around. A cross over every five miles on a freeway adds up to 10 minutes (at 60 mph) to the response time.

The problem of freeway crossovers is not an issue along SR 14 since it is predominantly undivided. In the urban areas of I-84 and I-82, there are enough interchanges so that response time is not significantly affected. The rural areas along I-84 in Oregon state, however, do have some problem areas. In 1992, ODOT requested that the Oregon State Police indicate where freeway crossovers are needed. The specific mileposts on I-84 where crossovers were recommended are listed in **Table** 3-5. A recent change of policy now allows emergency vehicles to cross the median to turn around, helping the response time in many cases.

Table 3-5
Locations in Need of Freeway Crossovers

County	Milepost	Location
	92	East of the Dam
Sherman	100	3 miles west of Sherman Hwy (US97)
Gilliam	134	3 miles west of John Day Hwy (ORE19)
Gilliam		East of John Day Hwy
	154	County line
Morrow	174	West of Ordnance connection
Umatilla	186	East of Hermiston Highway, west of SR395
Umatilla	191	East of SR395
Umatilla		East of Pendleton, west of La Grande
Union	271,280	East of La Grande, West of Baker City
Baker	299,294	North of Baker City
Baker	310.25	East of S. Baker City Interchange
Baker	320.7	3 miles, 6.5 miles south of Pleasant Valley
Baker	349	3 miles east of North Huntington Interchange
Malheur		East of Huntington, west of Ontario

Another problem cited by the State Police is the difficulty in clearing multiple vehicle accidents. In the rural areas, a lack of towing equipment prevents quick repose to accidents. Sometimes vehicle removal can take hours when only one or two tow trucks are available.

4.0 Transportation Needs in the I-84 Corridor

4.1 Description of the Corridor

The Interstate 84 section of the ITS study extends from I-205 in Portland to 12 miles east of Boise near the port-of-entry, a distance of 439 miles. The interstate parallels the Columbia River and the historic Oregon Trail for much of its length as it journeys through the Columbia River Gorge, across the Deschutes Plateau, across the Blue Mountains, and over the Owhyee uplands of eastern Oregon. The roadway crosses the Snake River near Ontario and continues into the semi-arid plains and agricultural lands of Idaho where it ends east of Boise. Within the ITS study limits, I-84 passes through several counties: Multnomah, Hood River, Wasco, Sherman, Gilliam, Morrow, Umatilla, Union, Baker, Malheur, Payette, Canyon and Ada county.

I-84 links many of the isolated communities of northern and eastern Oregon to the major population areas of Portland, Boise, and the Tri-Cities in Washington. In Oregon the corridor provides access to the Columbia Rover Gorge scenic area, including camping, boating, fishing, and wind surfing. In eastern Oregon and Idaho it provides a gateway to major recreational areas such as national forest lands, Hell's Canyon wilderness, and Bogus Basin Ski area.

In addition to serving as an important route for vacationers, tourists and other travellers in the northwest, I-84 is important to the many communities and regional economies of Oregon, Idaho, and Washington. Commercial trucking operations use the corridor to transport goods such as timber and agricultural products, containerized freight, and manufactured homes.

4.2 Analysis of Corridor Data and Studies

42.1 Number of Lanes

I-84 consists of four eastbound and four westbound lanes from I-5 to 33rd Avenue where the westbound on ramp from 33rd Avenue becomes an add lane. The segment between 33rd Avenue and 39th Avenue consists of three lanes westbound and four lanes eastbound. One of the eastbound lanes becomes a drop lane at 39th Avenue. East of 39th Avenue I-84 continues as a six lane freeway until 18 1 st Avenue. The freeway is currently being widened to six lanes between 181 st Avenue and 223rd Avenue. From 223rd Avenue I-84 continues as a four lane freeway all the way to Boise. 1-84 widens to six lanes at the Meridian Interchange just east of Boise at approximately MP 44 and continues as a six lane freeway to the I- 184 Interchange at approximately MP 49 where it drops back to four lanes. The freeway is currently being widened to six lanes from the I- 184 Interchange to approximately MP 52.

4.2.2 Statistics

Congestion

The section of I-84 between I-5 and the east Portland Freeway is extremely congested under current conditions, with v/c ratios well over one. The level of service improves but is still quite congested between the east Portland Freeway and the N.E. Portland Hwy (Sandy Blvd, MP 16.5) where v/c ratios are close to one. East of the N.E. Portland Hwy, existing and future volumes are well under half of capacity and congestion is virtually eliminated. Between Portland and West Caldwell, Idaho, the most congested point is just west of the Hood River Bridge where the future v/c ratio is approaching 0.5. Between West Caldwell (MP 29) and Orchard Street in Boise (MP 52), the existing moderate congestion deteriorates to high congestion by 2015, with v/c ratios approaching one. Within Boise, congestion is more severe between the Orchard and Broadway exits (exits 52 and 54, MP 52 and 57). Here, v/c ratios decline from approximately **0.7** to 1.1. **Table 4-l** indicates existing and future traffic conditions for the three roadways.

Table 4-l
I-84 Volumes and LOS

Location	1994 Volumes	1994 V/C	1994 LOS	2015 Volumes	2015 V/C	2015 LOS
I-84: Portland to Hermiston						
East of N.E. Holladay St Portland ramp,	161,500	1.3	F	196,900	1.5	F
West end of Sandy River Bridge	26,800	0.4	B	32,800	**0.5**	**c**
West of The Dalles	16,800	0.3	A	21,000	0.3	A
West of Heppner Hwy	9,200	0.1	A	11,100	0.2	A

Location	1994 Volumes	1994 V/C	1994 LOS	2015 Volumes	2015 V/C	2015 LOS
I-84: Hermiston to Boise						
West of Pendleton	**11,400**	**0.2**	A	14,400	0.2	A
South of Union-Baker County line	**7,600**	0.1	A	9,300	0.1	A
South of Baker-Malheur County line	**7,100**	0.1	A	8,700	0.1	A
US95 Connection, 3 miles from Ontario	13,000	0.2	A	21,900	0.3	A
West Caldwell	23,000	0.4	B	36,500	0.6	C
Ada County line	38,000	0.6	C	60,300	0.9	E
Overland Road, Boise	55,600	0.6	C	87,900	0.9	E
Gowen Road, east city limit	21,000	0.3	A	35,500	0.6	C

Accidents

Data collected for the years 1992 through 1994 for I-84 indicate that there were a total of 1470 accidents from MP 0.00 to MP 179.00 (Portland to Hermiston). Of these, 795 accidents occurred within the Portland urban area between MP 0.00 and MP 17.75 while the remaining 675 accidents occurred in the largely rural area between Portland and Hermiston from MP 17.75 to MP 179.00 . The average number of accidents per mile for these urban and rural portions of this segment over the three year period are 45 and 4 respectively. For the Hermiston to Boise segment from MP 179.00 to MP 67.00 a total of 1767 accidents were reported. Of these, 687 accidents occurred in the urban Boise and Nampa-Caldwell areas between MP 26.00 and MP 58.00 while 1080 accidents occurred in the rural area between Hermiston and Boise. The average number of accidents per mile for the urban and rural portions of this segment over the three year period are 25 and 5 respectively. The average accident rates (per million vehicle miles) for I-84 are 0.374 for total accidents, 0.033 for accidents on wet roadway, and 0.164 for accidents on icy roadway conditions.

A breakdown of the I-84 accidents by urban or rural location, roadway condition and severity is shown in **Table** 4-2. The results show that while accidents involving wet roadways make up a substantial portion of the accidents occurring within the Portland area, accidents involving ice on the roadway makes up a much larger portion of the accidents outside the Portland area.

Table 4-2
I-84 Accident Summary

Location (MP)	Wet Roadway	Icy Roadway	Injury/ -Fatality	Hazard. Material	Const. Zone	Total
0.00 to 17.75 (Portland urban)	236 (29.7%)	56 7.0%	414 (52.1%)	NA	NA	795
17.75 to 179.00 (rural)	86 (20.7%)	250 (37.0%)	301 (44.6%)	NA	NA	675
179.00 to 67.00 (rural)*	75 (6.9%)	510 (47.2%)	473 (43.8%)	NA	NA	1080
25.99 to 38.52 & 43.00 to 57.75 (Idaho urban)* *	56 (8.2%)	207 (30.1%)	256 (37.3%)	NA	NA	687

*Excludes MP 25.99 to MP 38.52 and MP 43.00 to MP 57.75.

**Caldwell-Nampa and Boise urban areas.

Accident rates were also charted by milepost to determine the locations where the accident rate was above the average for **1-84** between Portland and Boise. **Figure 4-1,4-2,** and 4-3 illustrate accident rates correlated with roadway conditions discussed in **Section 3.3. As** can be seen, the accident rate for total accident is well above the average, particularly through the Blue Mountains (approximately MP 225 through MP 255) and between the Idaho/Oregon border and Boise (approximately MP 0 and MP 66). Wet weather related accident rates were highest in the Portland area but seemed to occur at many random locations, thus making it more difficult to identify problem locations. Accident rates for ice related accidents were predominantly an eastern Oregon and Idaho problem, with most of the problems located east of Pendleton.

Figure 4-1

Total Accidents
Above the Average Rate
Interstate 84
Correlated with Existing Roadway Conditions

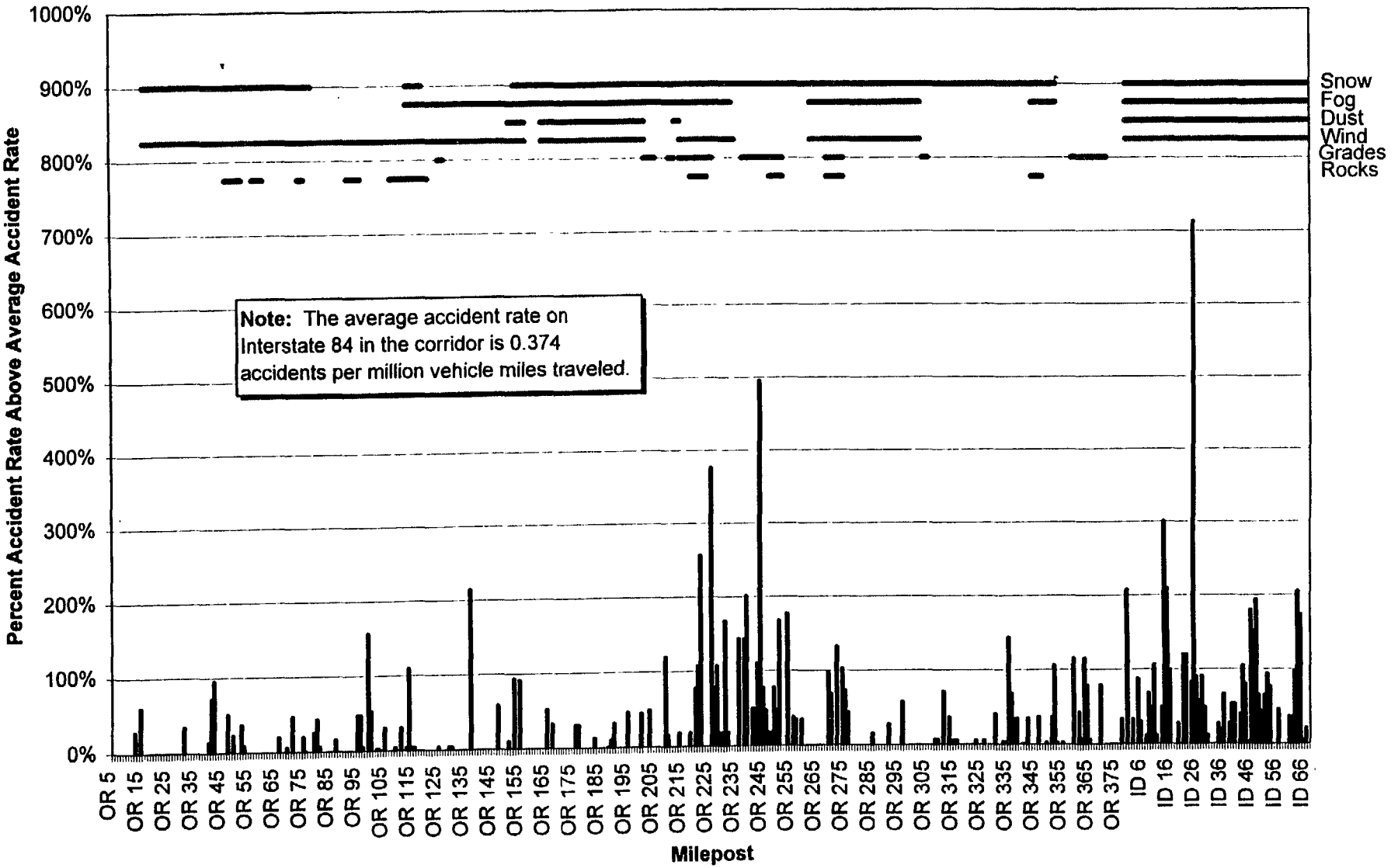


Figure 4-2

Accidents Involving Wet Roadway
Above the Average Rate
Interstate 84
Correlated with Existing Roadway Conditions

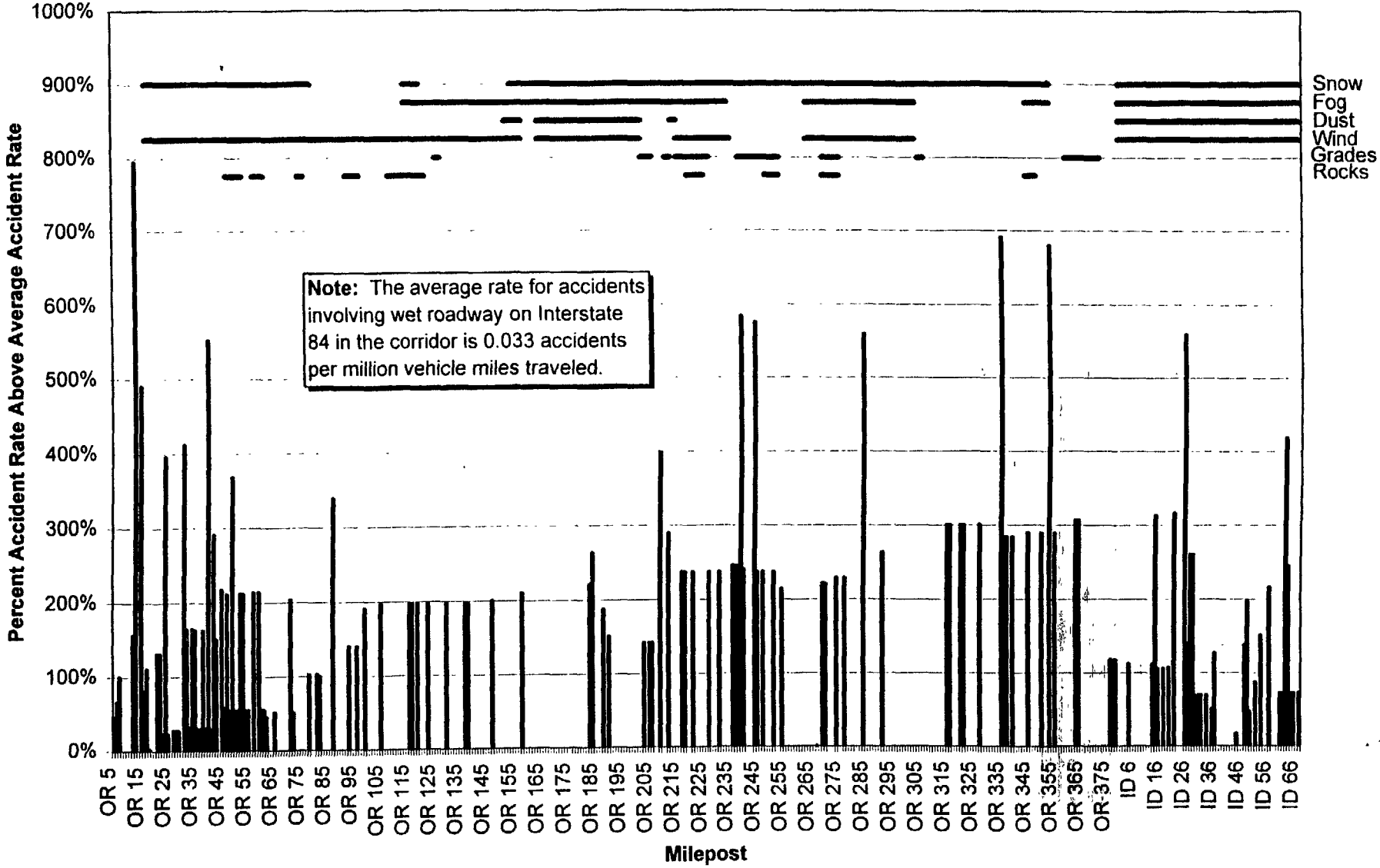
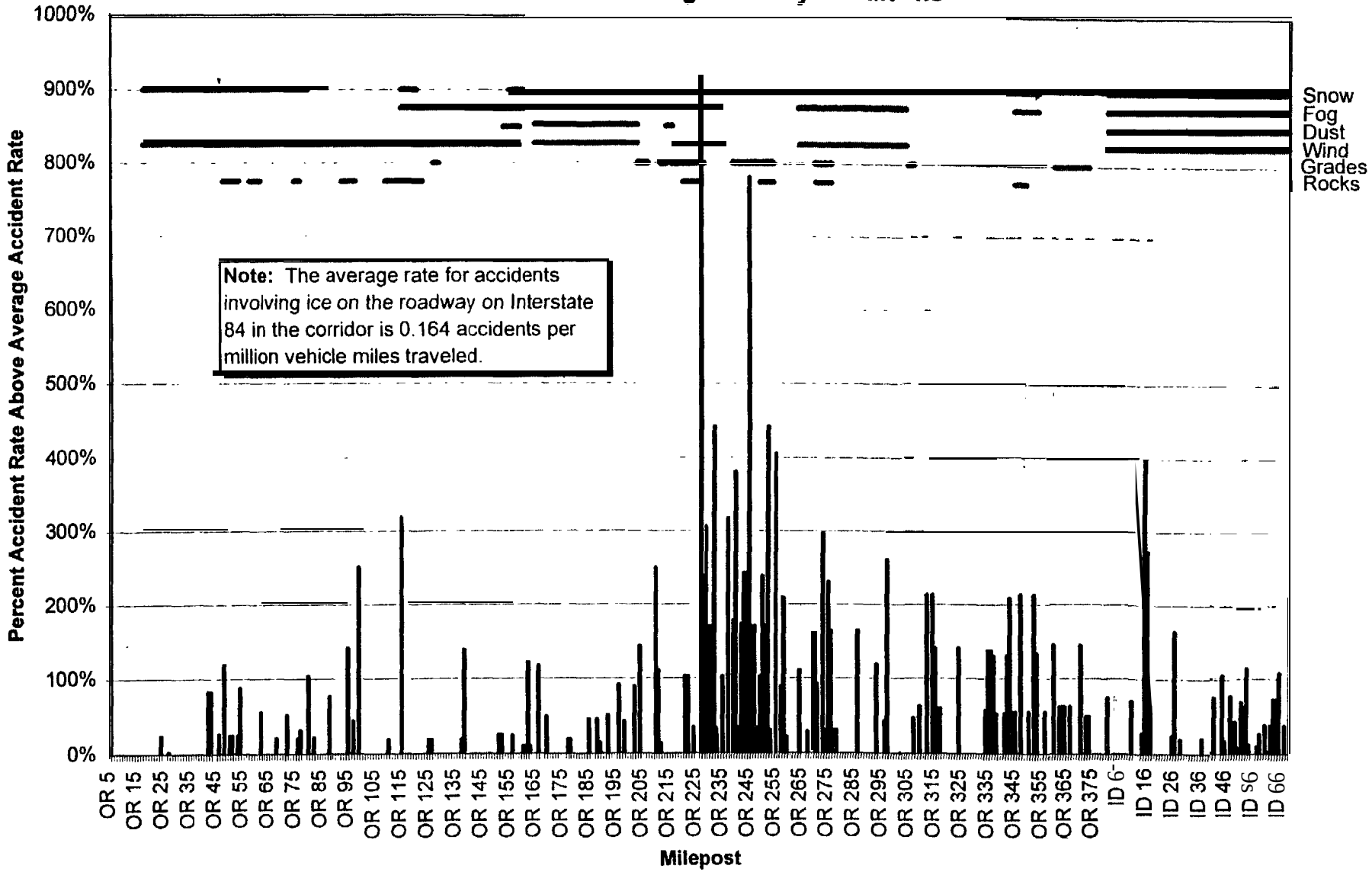


Figure 4

Accidents Involving Ice on Roadway
Above the Average Rate
Interstate 84
Correlated with Existing Roadway Conditions



Roadside Assistance Calls

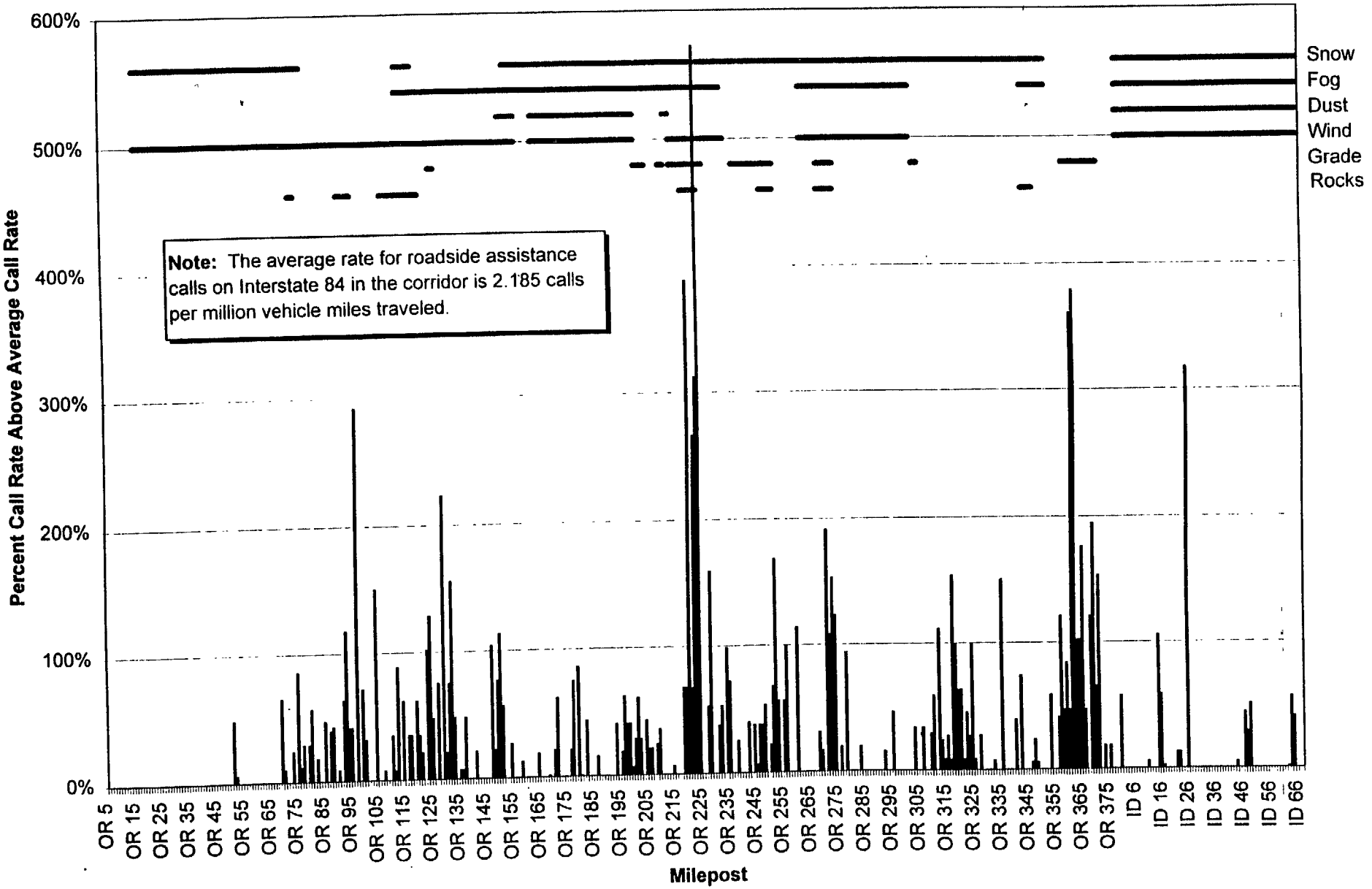
Records of roadside calls for assistance were obtained from the Oregon State Patrol for the I-84 corridor. No records were available from the Idaho State Patrol for I-84. The records obtained were limited to disabled vehicle calls.

Figure 4-4 shows the relative frequency of calls vs. milepost for I-84 for the period from November 1, 1994 to October 31, 1995. The number of calls per milepost was converted to a call rate per million vehicle miles using 1994 ADT volumes and percentages above or below the average rate for mileposts within the corridor were calculated. Only those locations with above average call rates are shown in the figures. In this one year period there were a total of 1,549 calls between Portland and Hermiston and 2,603 calls between Hermiston and the Idaho state line.

Areas with high call rates include MP 98 west of Biggs, MP 130 near Blalock, Cabbage Hill, Deadman Pass, Ladd Canyon, MP 363-37 1 west of Ontario, and MP 26 near Caldwell.

Figure 4-4

Roadside Assistance Calls Above the Average Rate Interstate 84 Correlated with Existing Roadway Conditions



Planned Highway Improvements:

Table 4-3 shows a summary of planned highway improvements for I-84 within the study limits. These projects were taken from ODOT's Preliminary Statewide Transportation Improvement Program 1996-1998 andITD's National Highway System Program and Interstate Maintenance Development Program. Of a total of 27 projects in the TIP, the major projects are:

- Widening to six lanes from MP 15.2 to MP 16.9 (223rd Avenue-Troutdale)
- Reconstruction of the Multmomah Falls Interchange eliminating left turn ramps and median parking
- construction of the Port of the Dalles (Chenoweth) Interchange
- Construction of the Karcher Interchange in Nampa
- Construction of the Issac's Canyon Interchange at MP 59.0

Table 4-3
Future Projects Summary - I-84 Corridor

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modern.	Safety	Presrv.		
15.2	16.9	ODOT 1	223rd Ave - Troutdale	X			1996	Reconstruct highway, Rebuild interchanges & structures
59.0	64.8	ODOT 1	Cascade Locks - Mitchell Pt.			X	Future	Structural overlay
29.6	32.0	ODOT 1	Multnomah Falls Interchange	x			Future	Relocate eastbound freeway lanes & remove left turn ramps & median parking.
35.0	64.0	ODOT 1	I-84 Safety Rest Area		X		Future	Build rest area to accommodate east & westbound motorists
35.0	45.0	ODOT 1	Multnomah Falls - Cascade Locks (Bridges)	X			1996	Upgrade 15 bridges & adjacent roadway to current standards
59.0	64.8	ODOT 1	Mitchell Pt. - Hood River I/C			X	Future	Inlay travel lanes & overlay
NA	NA	ODOT 1	Moffett Cr. - Tanner Cr.	X			1997	Construct a bike path between Moffett Creek & Tanner Creek

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modem.	Safety	Presrv.		
69.7	69.7	ODOT 4	Mosier Overcrossing		X		1996	Install protective screening
76.6	104.6	ODOT 4	Rowena - US 97 I/C, Phase 2		X		1996	Widen existing structures & adjacent roadway
81.5	82.3	ODOT 4	Port of The Dalles (Chenoweth) Interchange	X			Future	Construct interchange
85.5	85.5	ODOT 4	Brewery Grade Interchange		X		1996	Install protective screening
87.0	87.1	ODOT 4	The Dalles/Calif. Highway		X		1996	Install protective screening
104.5	104.5	ODOT 4	Biggs Jct.		X		1996	Install protective screening
217.7	225.7	ODOT 5	Emigrant Hill - Poverty Flats			X	1997	Grind & overlay roadway, replace median barrier & guardrail & upgrade signs
269.9	270.0	ODOT 5	Ladd Creek Rockfall		X		1997	Rockfall correction
374.5	374.5	ODOT 5	North Ontario Interchange Bridge #8635	X			1996	Raise & widen structure, resurface deck, install walkways & protective screening
377.6	377.6	ODOT 5	Ontario Variable Message Sign (WB)				1998	Erect variable message sign

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modern.	Safety	Presrv.		
0.0	12.7	ITD 3	Oregon St Ln to Black Canyon Interchange			X	1999	Base/sub-base work and resurfacing
0.0		ITD 3	Dist 3 Pavement Striping			X	1996-2000	Install pavement markings
10.0	10.4	ITD 3	Blacks Cr. Rest Area	X			2000	Reconstruct rest area
17.6	26.3	ITD 3	Sand Hollow to Caldwell			X	1996	Provide seal coat
33.0	34.0	ITD 3	Karcher IC, Nampa, Stage 1	X			2000	Construct grade separation
35.8	38.5	ITD 3	Franklin Rd to Garrity I/C			X	1997	Provide seal coat
38.5	44.1	ITD 3	Garrity I/C to Meridian I/C			X	1997	Provide seal coat
49.7	50.7	ITD 3	Cole/Overland Interchange	X			1996	Staged obligations
59.0	59.0	ITD 3	Isaac's Canyon IC	X			1996	Construct interchange
60.0	82.0	ITD3	Issac's Canyon to Jack Rabbit Overpass			X	1996	Provide seal coat

Other ITS Programs

As discussed earlier, ODOT has begun implementation of a project known as the "Green Light" CVO project. The purpose of this $7.5 million project is to automate commercial vehicle operations in Oregon. The vision of the project is to make the I-84 corridor from Oregon to Utah a seamless transparent border for heavy vehicles by 1997. This will be accomplished by installing pre-clearance systems at specific sites. The pre-clearance system combines various ITS technologies into an integrated system which weighs, classifies, identifies, verifies and directs commercial vehicles at highway speeds. The system will enable commercial vehicles to completely bypass the ports-of-entry and weigh stations if they satisfy all legal, safety and tax requirements. One of the pre-clearance systems is already operational at the Umatilla port-of entry on I-82 southbound. Six pre-clearance sites are proposed on I-84 as follows:

- Cascade Locks POE (EB), MP 44.9
- Wyeth W.S. (WB), MP 54.3
- Emigrant Hill W.S. (EB), MP 226.95
- La Grande W.S. (EB), MP 258.5
- Farewell Bend POE (WB), MP 3 53.3
- Olds Ferry W.S. (EB), MP 354.4

Safety enhancements are also proposed which will include highway warning systems for weather related hazards, downhill truck informational systems and CVO roadside inspection information systems. Site specific highway warning systems will be installed at locations where weather/grade related hazards are common. The Downhill Speed Information System (DSIS) will measure the speed versus weight of passing trucks and provide a variable message sign to indicate safe operating speed under existing weather conditions. This system will be installed on I-84 westbound at Cabbage Hill. The Road and Weather Information Systems (RWIS) will also provide a dynamic warning system to assist maintenance in mitigating snow and ice. Proposed RWIS sites on I-84 include the Columbia River Gorge and Ladd Canyon.

Another project which will compliment the "Green Light" project is the I.O.U. project. This project is a continuation of funding for Idaho, Oregon and Utah CVO, ITS institutional studies. The intent of the project is to provide transparent borders for commercial vehicle operations.

ITD has implemented two ITS projects within the corridor. These projects are the Travel Demand Management/Emissions Detection Project and the Out-of-Service Project.

The Out-of-Service Verification Project will be tested at the East Boise POE. The intent of this operational test is to address the need for a cost effective method of tracking commercial vehicles and drivers that have been placed out of service for violating safety operating standards. The project will evaluate the use of video analysis of machine readable tags and automated license plate identifiers to find alternatives to law enforcement operations for verifying compliance with out of service orders.

The Travel Demand Management/Emissions Detection Project will evaluate the feasibility of using remote sensing technology to monitor vehicle emissions and perform origin-destination surveys. It will also determine the relative contributions of in-county and out-of-county vehicles to mobile-source emissions in Ada County.

Additional information regarding these projects and their relationship to commercial vehicle operations is discussed in Section 3.5.

4.3 Needs Summary

Results of the transportation needs investigation, including existing studies, stakeholder interview, and field data, are summarized in **Table 4-4.** The table lists the identified need or deficiency, as well as the source of information. In **Section 8.0** the needs are coupled with a frequency and magnitude assessment to determine an overall needs rating.

Table 4-4
Summary of Needs Matrix

	Source of Information				
Transportation Needs	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other
I-84	■		■	■	
1 Ice and Snow near Ladd canyon, Bue Mtns., Cabbage Hill, Gorge 3 Mile Hill.	■		■	■	
2 High Winds.		■	■	■	
3 Congestion near Portland and Boise.	■		■	■	
4 Rock Slides			■	■	
5 Isolated areas in southeast corridor hard to reach during incidents, detour problems.			■	■	
6 Water on road creates visibility/safety problems from spray and on-coming lights.			■		
7 Additional turnouts needed at scenic views.			■	■	
8 Overuse and high traffic at Gorge tourist attractions, e.g., Multnomah Falls.			■	■	
9 More safety rest areas needed. Can no longer use some parks due to day use fees			■		
10 Trucks drive too fast, more enforcement needed			■		
11 Height limits at tunnel near Casdade Locks and overpass near Woodvillage			■	■	
12 Shaded areas stay icy, esp. bridges.			■	■	
13 Wildlife crossings near Lime, Pleasant Valley, Gorge, near orchards			■		
14 Triple trailer conflicts w/ cars			■		
15 Inadequate parking for recreationalists. Park on shoulders and create safety problems.			■	■	
16 Need more tourist information, e.g. kiosks at pullouts.			■	■	
17 Signage is restricted in Gorge area.			■	■	

Table 4-4
Summary of Needs Matrix

	Source of Information				
Transportation Needs	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other
18 Significant commuter traffic near Portland and Boise.		■	■	■	
19 Need more road info. Motorists get caught in places and can't turn back.			■		
20 Bridges and tunnels too narrow for bikes and pedestrians.			■		
21 Dust storms.	■				
22 Steep Grades.	■			■	
23 Fog	■				■
24 High rate of wet weather related accidents in Portland area.		■			■
25 High rate of ice related accidents areas outside of Portland.		■			■
26 High rate of roadside assistance calls in eastern Oregon and near Caldwell.		■			■
27 Need improved CVO clearance at weigh stations.		■		■	
28 Need to track out of service vehicles		■		■	
29 some bridges have restricted load limits				■	
30 Tooth Rock tunnel near Casdade Locks needs better lighting.				■	
31 Roadway heavily rutted in Gorge and on eastbound Cabbage Hill				■	
32 Communication limitations in Ladd Cnyon				■	
33 Substandard curves in east of Baker City.				■	
34 Interagency coordination to develop policies and plans for incidents					■

5.0 Transportation Needs in the I-82 Corridor

5.1 Description of the Corridor

The Interstate-82 corridor extends from I-84 in Oregon to the junction with I- 182 in Washington, a distance of 41 miles. Compared to the other roadways, I-82 is the shortest link in the ITS study. Nine miles of the corridor is in Oregon where it is passes through Umatilla county. As it crosses into Washington, I-82 passes over rolling hills and through vast agricultural lands on its way to the Tri-Cities area of Pasco, Kennewick, and Richland. Most of the roadway is in Benton county.

I-82 also is located adjacent to the Umatilla Army Depot where roughly 3,000 tons of nerve gas is stored in concrete bunkers.

This route is an important truck route joining western Oregon and western Washington. Roughly l/4 of all the vehicles on this section are heavy trucks. There are no significant recreational opportunities located along I-82, although access between the mountains of central Washington and Oregon are provided by I-82.

5.2 Analysis of Corridor Data and Studies

5.2.1 Number of Lanes

I-82 is a four lane freeway throughout the entire limits of the study area. There are no plans to widen the roadway to provide additional lanes in the study area.

5.2.2 Statistics

Congestion

I-82 is uncongested within the entire study area and is projected to remain uncongested for the next 20 years. Table 5-l shows the operational levels for different sections of the roadway.

Table 5-l
I-82 Volumes and LOS

Location	1994 -Volumes	1994 -V/C-	1994 LOS	2015 Volumes	2015 V/C	2015 LOS
I-82: I-84 to SR-182						
South of Columbia River	5,000	0.1	A	**6,000**	0.1	A
Umatilla Bridge at Columbia River	**12,000**	**0.2**	A	**18,000**	**0.3**	A
South of SR-395	**9,800**	**0.2**	A	15,100	**0.2**	A
North of SR-395	5,500	0.1	A	**7,700**	0.1	A
North of SR-1 82	12,000	0.2	A	18,500	0.3	A

Accidents

Accident data for the I-82 corridor were collected from January, 1990 through May, 1995 for the Washington portion and from January, 1992 through December 31, 1994 for the Oregon portion. In order to make the two sets of data compatible, the number of accidents along the Washington portion was prorated to approximate a three year period, assuming a uniform rate of occurrence throughout the period. The resulting data indicate that approximately 186 accidents occurred within the study limits over the three year period. The average number of accidents per mile over this period is 5. The average accident rates (per million vehicle miles) for I-82 are 0.506 for total accidents, 0.047 for accidents on wet roadway, and 0.14 1 for accidents on icy roadway conditions.

A breakdown of the I-82 accidents by location, roadway condition, severity, hazardous materials involvement and proximity to construction zones is shown in **Table 5-2.** The results indicate that accidents involving ice on the roadway make up a significant portion of the total accidents.

Table 5-2
I-82 Accident Summary

Location (MP)	Wet Roadway	Icy Roadway	Injury/ Fatality	Hazard Material	Const. Zone	Estimated Total
102.56 to 132.60 (WA)	13 (8.0%)	48 (29.5%)	74 (45.4%)	0	3 (1.8%)	163
0.00 to 9.78 (OR)	3 (13.0%)	9 (39.1%)	12 (52.2%)	N/A	N/A	23

Accident rates were also charted by milepost to determine the locations where the accident rate was above the average for I-82 between I-84 and I-182. **Figure** 5-1,5-2 and 5-3 illustrate accident rates correlated with roadway conditions discussed in **Section 3.3.** As can be seen, the accident rate for total accidents is the greatest problem at MP 108 and MP 109 near Kennewick, Washington. Other locations do exist but they are generally no more than 50% above the corridor average. Wet weather related accident rates were also highest near Kennewick and near the interchange with I-82. Accident rates for ice related accidents were predominantly at MP 118 through MP 120 and at MP 1 where the interstate crosses over the Columbia River.

Figure 5-1

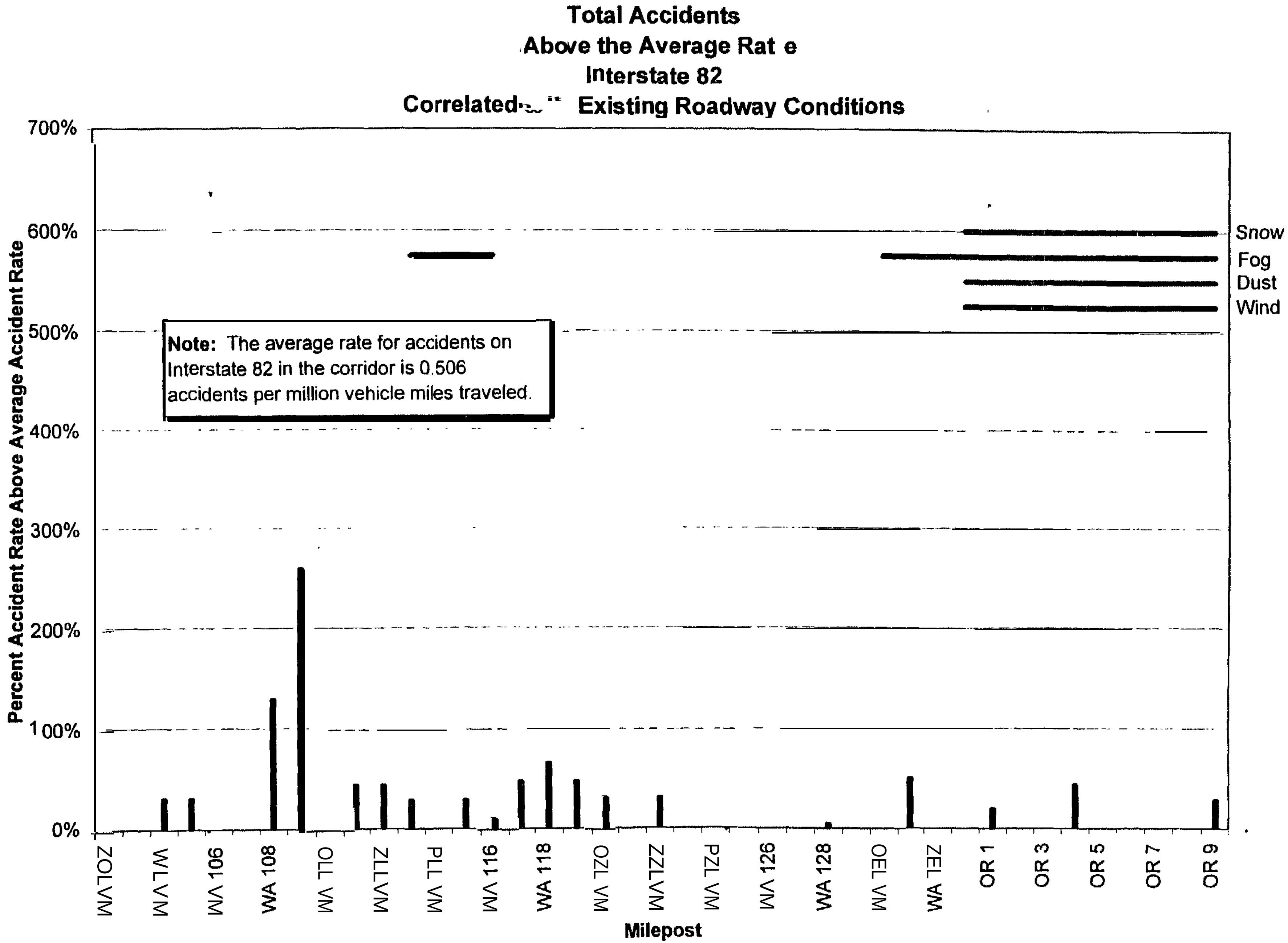

Total Accidents
Above the Average Rate
Interstate 82
Correlated with Existing Roadway Conditions
700%
600%
500%
400%
300%
200%
100%
0%
Percent Accident Rate Above Average Accident Rate
Note: The average rate for accidents on Interstate 82 in the corridor is 0.506 accidents per million vehicle miles traveled.
Snow
Fog
Dust
Wind
WA 102
WA 104
WA 106
WA 108
WA 110
WA 112
WA 114
WA 116
WA 118
WA 120
WA 122
WA 124
WA 126
WA 128
WA 130
WA 132
OR 1
OR 3
OR 5
OR 7
OR 9
Milepost

Figure 5-2

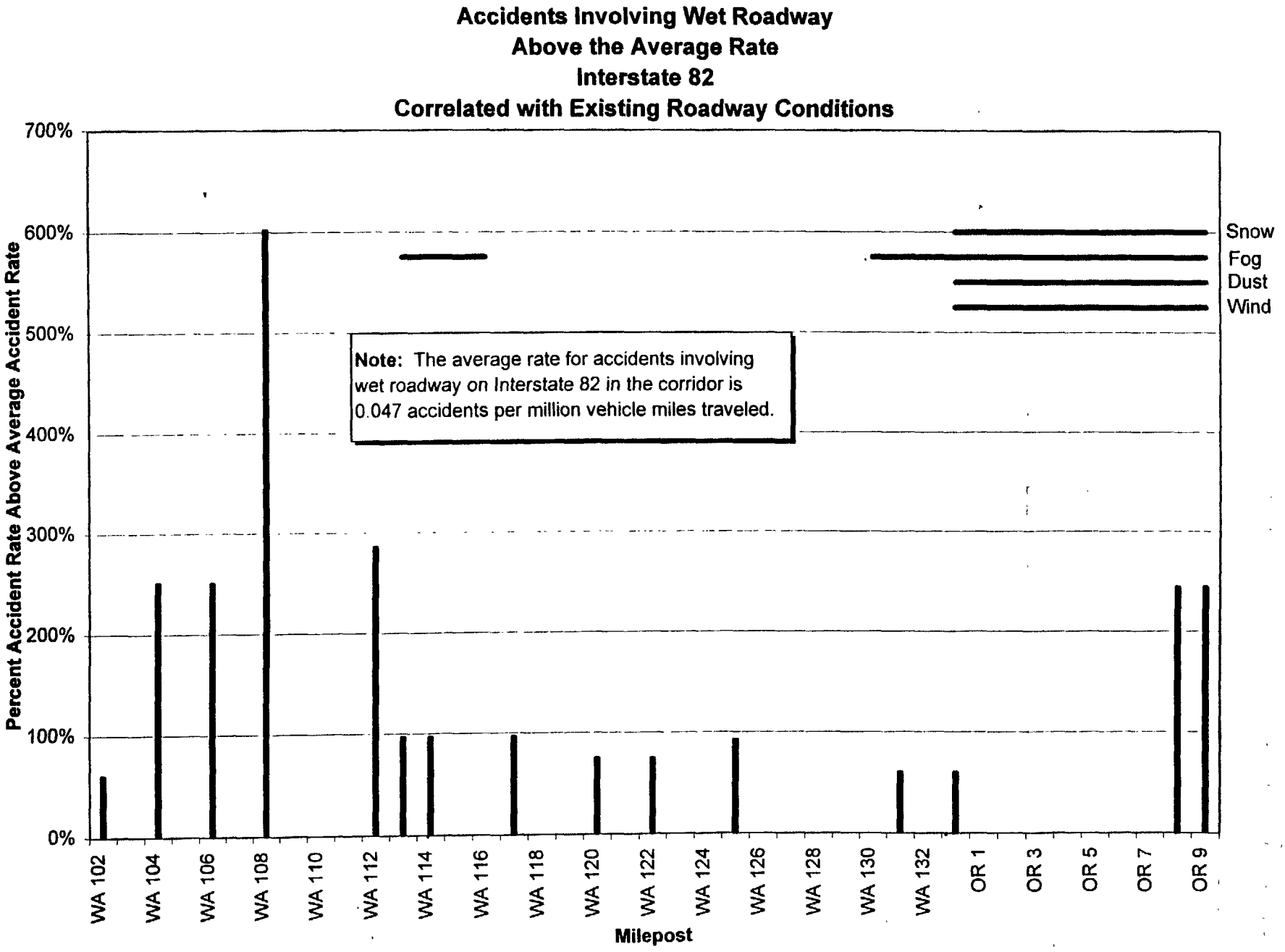
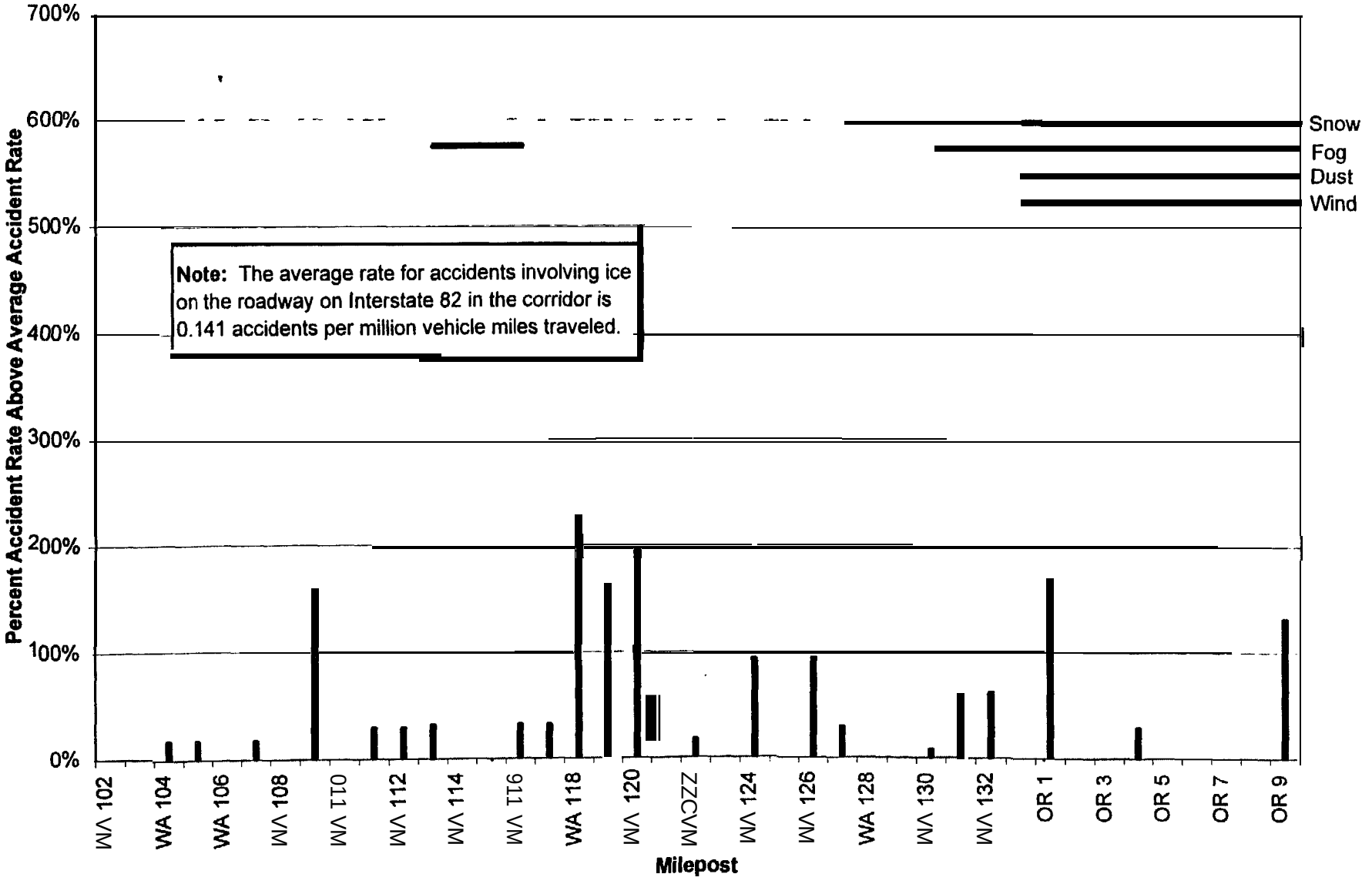

Accidents Involving Wet Roadway
Above the Average Rate
Interstate 82
Correlated with Existing Roadway Conditions
Percent Accident Rate Above Average Accident Rate
700%
600%
500%
400%
300%
200%
100%
0%
Note: The average rate for accidents involving wet roadway on Interstate 82 in the corridor is 0.047 accidents per million vehicle miles traveled.
Snow
Fog
Dust
Wind
WA 102
WA 104
WA 106
WA 108
WA 110
WA 112
WA 114
WA 116
WA 118
WA 120
WA 122
WA 124
WA 126
WA 128
WA 130
WA 132
OR 1
OR 3
OR 5
OR 7
OR 9
Milepost

Figure 5-3

Accidents Involving Ice on Roadway
Above the Average Rate
Interstate 82
Correlated with Existing Roadway Conditions



Roadside Assistance Calls

Records of roadside calls for assistance were obtained from the Oregon State Patrol and Washington State Patrol for the 1-82 corridor. The records obtained were limited to disabled vehicle calls.

The relative frequency of calls vs. milepost from January 1, 1995 to December 31, 1995 for the I-82 corridor is shown on **Figure** 5-4. 1994 ADT volumes were used to convert the number of calls per milepost to a call rate per million vehicle miles traveled. In the one year period there were a total of 430 calls on I-82 .

Locations with high call rates on I-82 include MP 109 near Badger Road and MP 114 near Locust Grove Road.

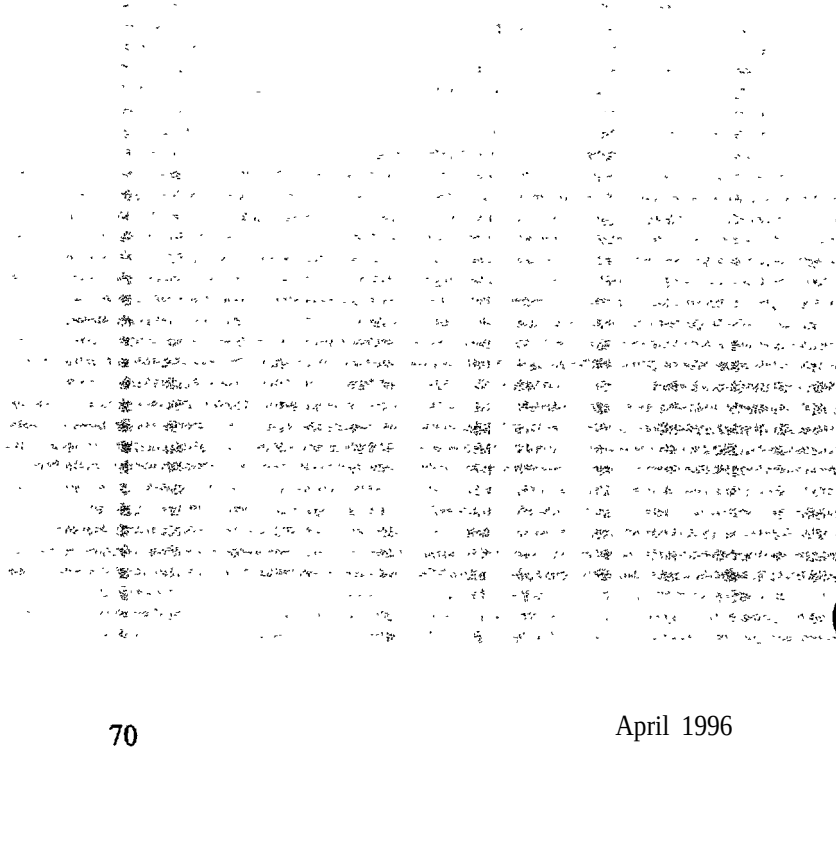
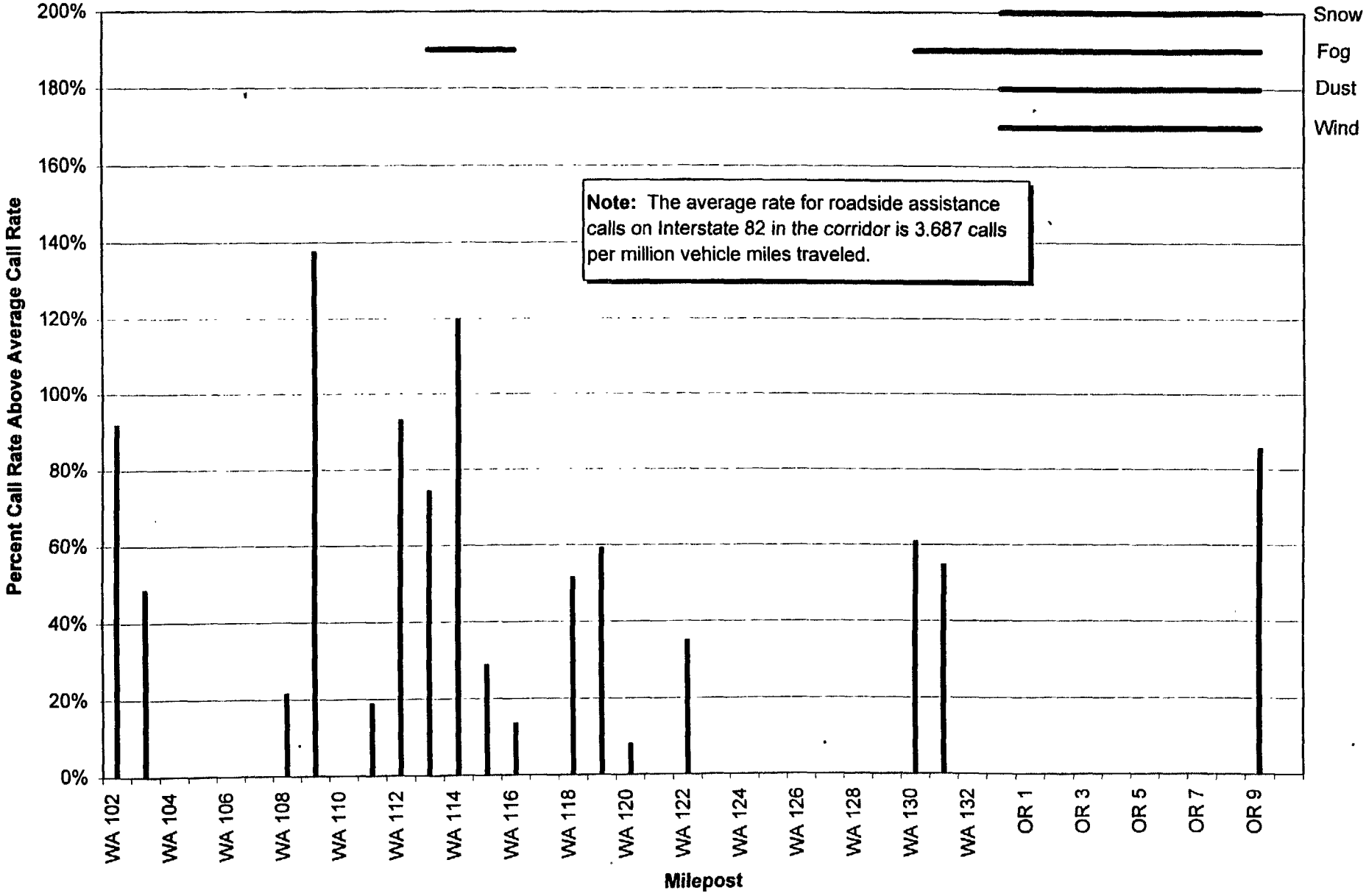


Figure 5-4

Roadside Assistance
Calls Above the Average Rate
Interstate 82
Correlated with Existing Roadway Conditions



Planned Highway Improvements

Table 5-3 shows a summary of planned highway improvements for I-82. Only two safety improvement projects are planned both of which were listed in WSDOTs State Highway System Plan dated January, 1995. No other major projects are planned.

Table 5-3
Future Projects Summary I-82 Corridor

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modern.	Safety	Presrv.		
0.0	132.6	WSDOT SC	I-82 Safety Improvement		X		Future	Improve I-82 corridor design standards
75.3	132.0	WSDOT SC	I-82 Safety Improvement		X		Future	Install rumble strips eastbound & westbound

ITS Programs

The only ITS program currently being implemented is at the Umatilla Port-of-entry as discussed in Section 3.5.

5.3 Needs Summary

Results of the transportation needs investigation, including existing studies, stakeholder interview, and field data, are summarized in **Table 5-4.** The table lists the identified need or deficiency, as well as the source of information. In Section 8.0 the needs are coupled with a frequency and magnitude assessment to determine an overall needs rating.

Table 5-4
Summary of Needs Matrix

	Source of Information				
Transportation Needs	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other
I-82			■	■	
1 Dust storms			■		
2 Water on road creates visibility problems from spray and on-coming lights.			■		
3 Trucks drive too fast.			■	■	
4 Icy brides.			■		
5 Wildlife crossings near Kenewick.			■		
6 significant commuter traffic near Tri-Cities.			■		
7 High Winds	■		■	■	
8 Fog	■		■	■	
9 High rate of ice related accidents.		■			■

6.0 Transportation Needs in the SR 14 Corridor

6.1 Description of the Corridor

Washington State Route 14 serves the Washington side of the Columbia River Gorge, connecting various communities and recreational areas. Located between Interstate 205 in Vancouver at its west end and Interstate 82 at its east end, the ITS corridor extends 175 miles along the scenic north side of the river. The corridor serves Clark, Skamania, Klickitat, Benton counties. Because of the routes winding alignment and occasional steep grades, most of the through trips in the Gorge avoid using SR 14 and instead are attracted to I-84.

The route is an important truck and recreational route. There are several logging operations/timber processing and gravel pit facilities in the corridor. Near Roosevelt there is a large land fill site that receives refuse and debris from other parts of the state. There are also several recreational facilities along SR 14. including state and county parks/lakes, which provide camping, fishing, boating, and wind surfing opportunities.

6.2 Analysis of Corridor Data and Studies

6.2.1 Number of Lanes

SR 14 is a four lane divided highway between I-5 and approximately MP 13 just west of Camas. At this point it becomes a two lane roadway which continues all the way to I-82 with turn lanes at various intersections and westbound climbing lanes near MP 28 and 47. Because of the congestion and steep grades along the SR 14 corridor, some minor widening is being considered between Vancouver and Bingen.

6.2.2 Statistics

Congestion

SR 14 is currently moderately congested between I-5 and 15th St in Washougal and will become highly congested by 20 15. The worst congestion occurs just east of I-5, where the existing v/c ratio is 0.6 and is projected to worsen to 1 .0. East of SR 140 congestion improves, and v/c ratios are under **0.5. Table 6-l** indicates the existing and future traffic conditions for SR 14.

Table 6-l
SR 14 Volumes and LOS

Location	1994 Volumes	1994 V/C	1994 -LOS	2015 Volumes	2015 V/C	2015 LOS
SR-14: Vancouver, WA to l-92						
East of l-5	38,000	0.6	C	61,600	1.0	F
East of l-205	40,000	0.6	C	65,000	1.0	F
East of SE 164th Ave	29,000	0.5	c	47,100	0.7	D
East of SR 500	16,000	0.5	c	26,000	0.8	D
East of 15th St in Washougal	9,900	0.3	B	16,100	0.5	c
Clark-Skamania County line	3,800	0.1	A	6,000	0.2	A
Hood River Bridge	7,500	0.2	A	12,000	0.4	B
East of Old Hwy 8	980	0.0	A	1,600	0.1	A
West of l-82	2,700	0.1	A	4,600	0.1	A

Accidents

Accident data for SR 14 collected from January, 1990 through May, 1995 was prorated similar to that for I-82 to approximate a three year period. The resulting data for the rural segment of **SR** 14 from MP 8.00 to MP 180.77 indicate that approximately 520 accidents occurred. The average number of accidents per mile for SR 14 over this three year period is 3.0. The average accident rates (per million vehicle miles) for SR 14 are 0.9 18 for total accidents, 0.171 for accidents on wet roadway, and 0.08 1 for accidents on icy roadway conditions.

A breakdown of the SR 14 accidents by location, roadway condition, severity, hazardous materials involvement and proximity to construction zones is shown in **Table** 6-2. The two accidents involving hazardous materials occurred at MP 34 and MP 58.

Table 6-2
SR 14 Accident Summary

Location (MP)	Wet Roadway	Icy Roadway	Injury/ Fatality	Hazard. Material	Const. Zone	Total
8.00 to 180.77 (rural)	107 (20.6%)	51 (9.8%)	198 (38.1%)	2 (0.4%)	6 (1.2%)	520

Accident rates were also charted by milepost to determine the locations where the accident rate was above the average for SR 14 between Vancouver and I-82. **Figure 6-1, 6-2,** and 6-3 illustrate accident rates correlated with roadway conditions discussed in **Section 3.3.** As can be seen, the accident rate for total accidents is well above the average, particularly between Washougal and US 97 (approximately MP 20 through MP 104). Wet weather related accident rates were highest in the Vancouver area but again extended to about US 97. Only a few locations in the eastern half of the corridor had high accident rate locations. Accident rates for ice related accidents were predominantly located from Vancouver to Bingen and again from the junctions of US 197 to US 97.

Figure 6-1

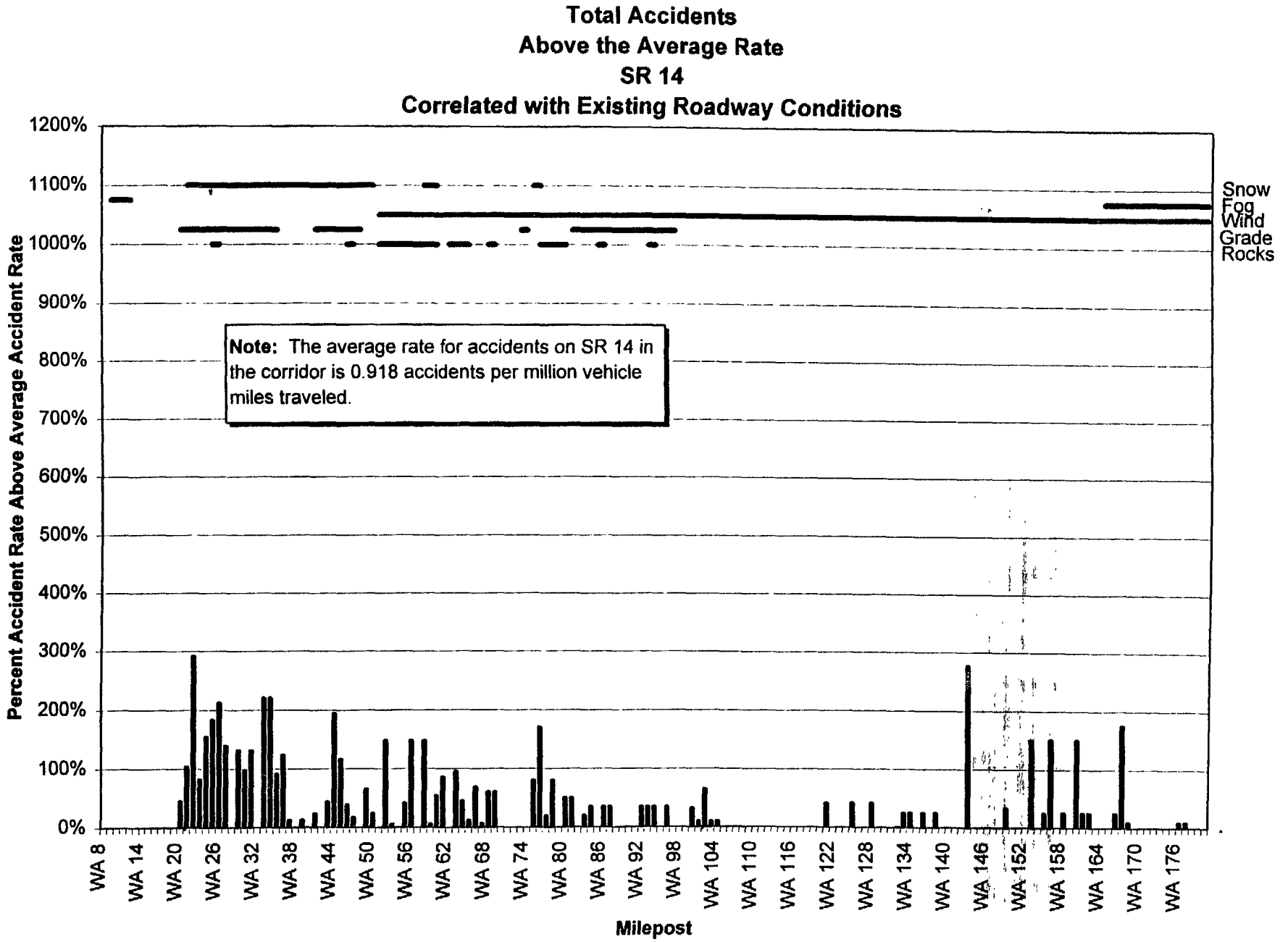

Total Accidents
Above the Average Rate
SR 14
Correlated with Existing Roadway Conditions
Percent Accident Rate Above Average Accident Rate
1200%
1100%
1000%
900%
800%
700%
600%
500%
400%
300%
200%
100%
0%
Note: The average rate for accidents on SR 14 in the corridor is 0.918 accidents per million vehicle miles traveled.
Snow
Fog
Wind
Grade
Rocks
WA 8
WA 14
WA 20
WA 26
WA 32
WA 38
WA 44
WA 50
WA 56
WA 62
WA 68
WA 74
WA 80
WA 86
WA 92
WA 98
WA 104
WA 110
WA 116
WA 122
WA 128
WA 134
WA 140
WA 146
WA 152
WA 158
WA 164
WA 170
WA 176
Milepost

Figure 6-2

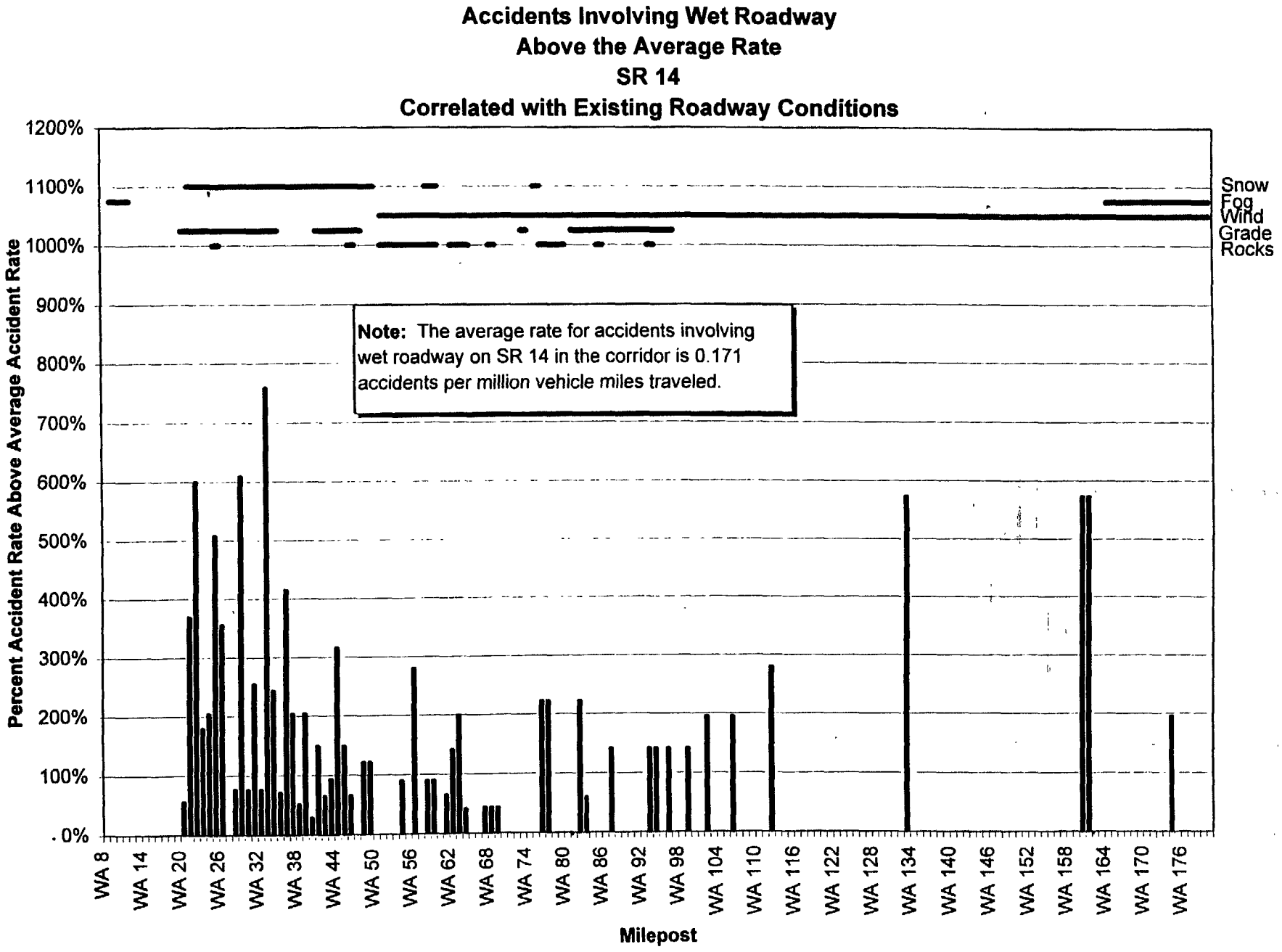
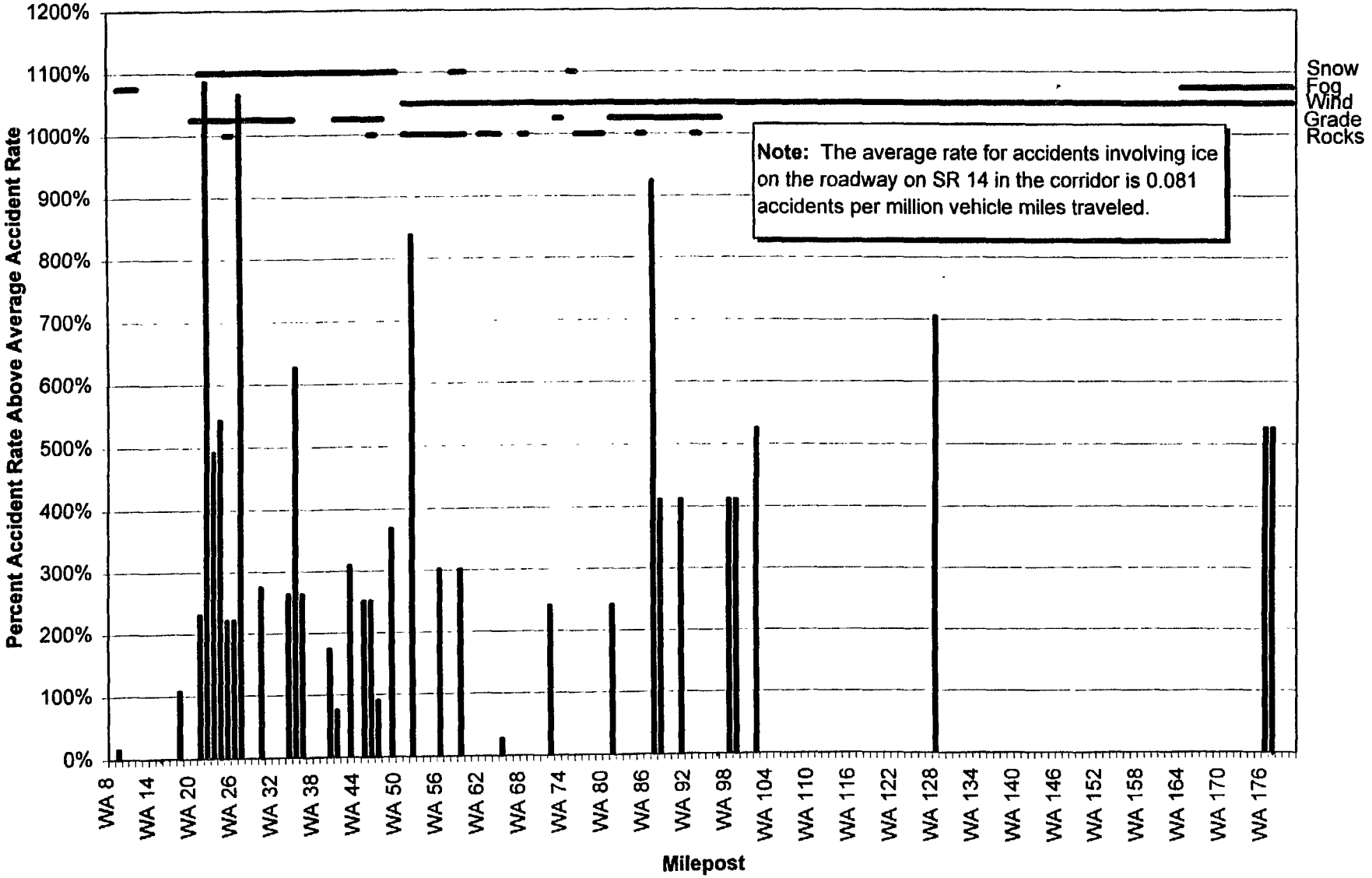

Accidents Involving Wet Roadway
Above the Average Rate
SR 14
Correlated with Existing Roadway Conditions
Percent Accident Rate Above Average Accident Rate
1200%
1100%
1000%
900%
800%
700%
600%
500%
400%
300%
200%
100%
. 0%
Note: The average rate for accidents involving wet roadway on SR 14 in the corridor is 0.171 accidents per million vehicle miles traveled.
Snow
Fog
Wind
Grade
Rocks
WA 8
WA 14
WA 20
WA 26
WA 32
WA 38
WA 44
WA 50
WA 56
WA 62
WA 68
WA 74
WA 80
WA 86
WA 92
WA 98
WA 104
WA 110
WA 116
WA 122
WA 128
WA 134
WA 140
WA 146
WA 152
WA 158
WA 164
WA 170
WA 176
Milepost

Figure 6-3

Accidents Involving Ice on Roadway
Above the Average Rate
SR 14
Correlated with Existing Roadway Conditions



Roadside Assistance Calls

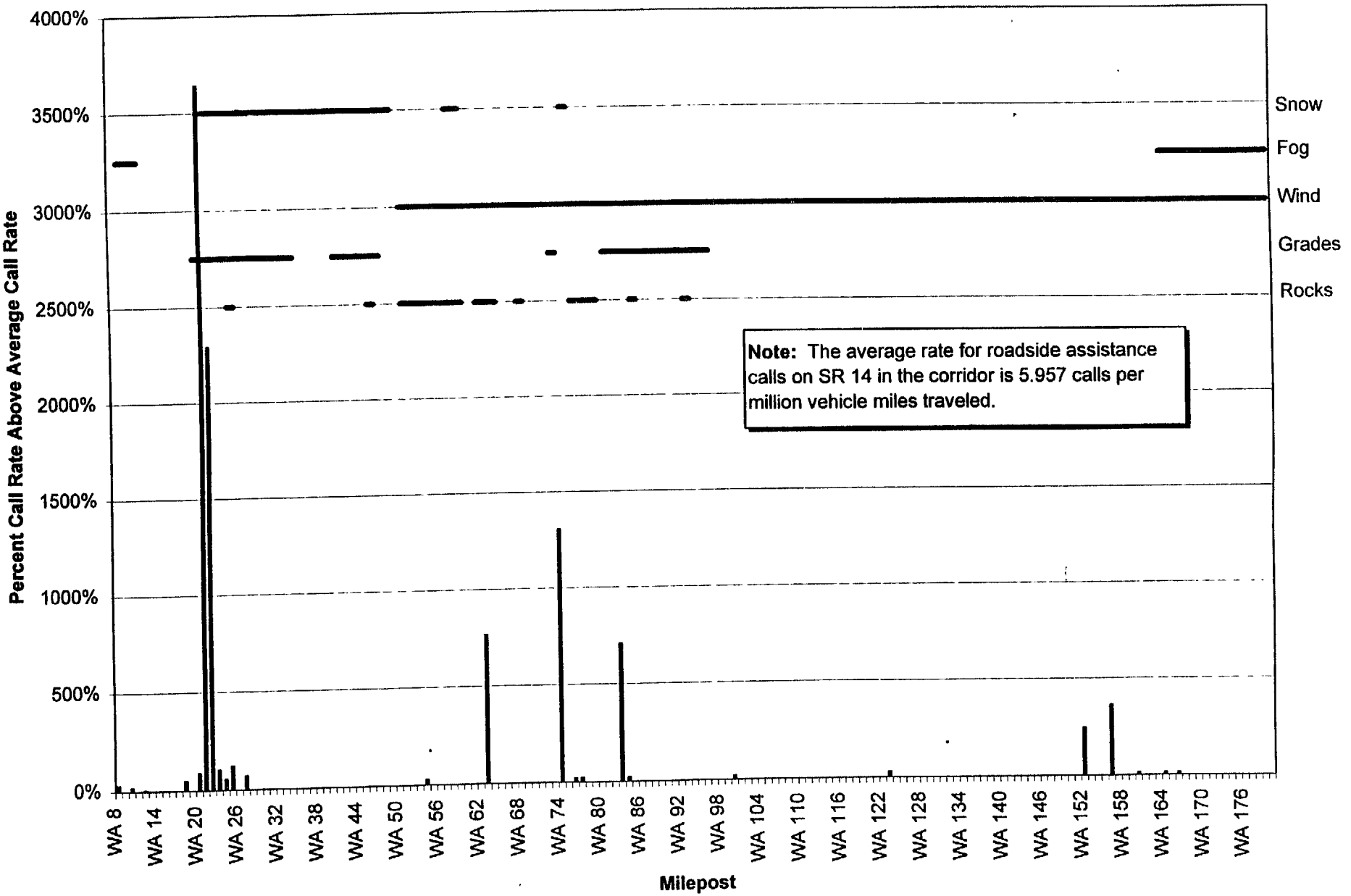
Records of roadside calls for assistance were obtained from the Washington State Patrol for the SR 14 corridor. The records obtained were limited to disabled vehicle calls.

The relative frequency of calls at each milepost from January 1, 1995 to December 31, 1995 for the SR 14 corridor is shown on **Figure 6-4.** **1994** ADT volumes were used to convert the number of calls per milepost to a call rate per million vehicle miles traveled. In the one year period there were a total of 1639 calls on SR 14.

SR 14 MP 21-23 east of Washougal had by far the greatest number of calls. Other locations with high call rates include MP 63 near Underwood, MP 74 west of Lyle, and MP 83 near the junction with Highway 197.

Figure 6-4

Roadside Assistance
Calls Above the Average Rate
SR 14
Correlated with Existing Roadway Conditions



Planned Highway Improvements:

Table 6-3 shows a summary of planned highway improvements for SR 14. The projects listed were taken from WSDOT's State Highway System Plan, WSDOT Southwest Region's six year program and WSDOT South Central Region's six year program. Only projects listed in the State Highway System Plan and also included in the financially constrained plan (1.e. funding available) are shown. Of the 23 programmed projects, major projects include:

- Construction of a future interchange at Blandford Drive
- Future widening to six lanes with interchange reconstruction and installation of ramp metering and traffic surveillance equipment from MP 2.10 to MP 8.56
- Future construction of an interchange at 164th Avenue
- Construction of interchange at SR 500
- Future widening to four lanes between MP 14.60 and 15.40
- Construction of a two-way couplet through Stevenson

Table 6-3
Future Projects Summary - SR 14 Corridor

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End.			Modern	Safety	Presrv.		
2.10	8.56	WSDOT SW	Tran. Plan Mobility Strategy	X			Future	Reconstruct interchange, install ramp metering, traffic surveillance & widen to 6 lanes
2.17	12.09	WSDOT SW	Blandford Dr. to West Camas Interchange			X	1996 1998	PCCP rehabilitation
2.17	12.09	WSDOT SW	Blandford Dr. to West Camas Interchange		X		1996	Safety Improvements
8.54	8.56	WSDOT SW	SR 14 & SE 164th Ave.	X			1996	Construct interchange and park-n-ride lots.
10.18	10.27	WSDOT SW	Tran. Plan Mobility Strategy	X			Future	Construct interchange
12.16	16.10	WSDOT SW	Tran. Plan Mobility Strategy	X			Future	Widen to 4 lanes & construct interchanges at SR 500, 15th, 27th, & 32nd

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modern	Safety	Presrv.		
14.60	15.40	WSDOT SW	SR 14/SR 500 interchange	X			1997	Build interchange & frontage roads
21.72	27.47	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Realignment
25.10	93.50	WSDOT SW	Columbia River Gorge Vista Enhancement	X			1996	Construct scenic vistas
27.83	29.18	WSDOT SW	Prindle Road to Smith-Cripe Road		X		1997	Overlay & Safety .
27.85	37.05	WSDOT SW	Tran. Plan Mobility Strategy	X			Future	Add passing lanes, widen shoulders, replace bridges at Duncan Cr. & Woodard Cr.
30.15	30.67	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Realignment
32.88	33.14	WSDOT SW	Woodward Creek Intersection	X			1997	Construct left turn channelization
33.73	34.96	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Realignment
41.55	42.15	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Widen shoulder

Mile Post		Jurisd. (Dist./ Region)	Project Description	Project Category			Const. Date	Work Description
Beg.	End			Modern	Safety	Presrv.		
42.71	45.42	WSDOT SW	Tran. Plan Mobility Strategy	X			Future	Widen roadway & shoulders & widen bridge at Rock Cr.
43.93	44.75	WSDOT SW	Stevenson Two Way Couplet	X			1996	Construct two way couplet
44.00	45.00	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Signalization & rockfall protection
44.89	48.09	WSDOT SW	Tran. Plan Safety Improvement Strategy		X		Future	Widen shoulder

ITS Proarams

WSDOTs ITS program, known as VENTURE Washington, is guided by a statewide ITS strategic plan completed in 1993. The plan produced recommendations on programs to implement ITS projects for all areas of the state including inter-city and rural. Recommended ITS project areas for inter-city/rural regions included:

Incident Detection and Management
Trip Guidance-En-Route
Regulatory Support-Borders
Trip Planning-Pre-Trip
Mayday
Transit Vehicle Management

Although WSDOT has an ITS implementation program, no projects have been specifically identified for the SR 14 corridor.

6.3 Needs Summary

Results of the transportation needs investigation, including existing studies, stakeholder interview, and field data, are summarized in **Table 6-4.** The table lists the identified need or deficiency, as well as the source of information. In **Section 8.0** the needs are coupled with a frequency and magnitude assessment to determine an overall needs rating.

Table 6-4
Summary of Needs Matrix

Transportation Needs	Source of Information				
	Maint. Engineers	Exist. Studies	Phone Surveys	Field Visit	Other
SR 14					
1 Ice and snow near Cape Horn.	■	■	■	■	
2 Congestion near Vancouver.		■	■	■	
3 Narrow roadway and tunnels.		■	■	■	
4 Rock Slides.	■	■	■	■	
5 Additional turnouts needed at scenic views.		■	■	■	
6 Water on road creates visibility problems from spray and on-coming lights.			■		
7 More rest areas needed.			■	▒	
8 Trucks drive too fast.			■	▒	
9 More truck climbing lanes needed in steep areas.		■	■	■	
10 Difficult for trucks on narrow and steep areas west of Bingen. Many switch to I-84.			■		
11 Height limits at tunnels		■	■	■	
12 Blind curves and left hand turns at intersections and driveways create safety problems.		■	■	■	
13 High winds.			■	■	
14 Icy bridges.			■	■	
15 Inadequate parking for recreationalists. Park on shoulders and create safety problems.			■	■	
16 Need increased tourist information to capture more traffic from I-84.			■	▒	
17 Signage is restricted in Gorge area.			■	■	

Table 5-4
Summary of Needs Matrix

	Source of Information				
Transportation Needs	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other
18 Truck using road to avoid Oregon weight-mile tax, esp. east of Bingen.			■	■	
19 Auto/rail conflicts at grade crossings			■		
20 Turn onto Hood River Bridge too tight. Causes trucks to blow tires			■		
21 Bridges too narrow for bikes and pedestrians			■		
22 High rate of wet weather related accidents		■			■
23 Need for more view corridors in Gorge				■	■
24 some bridges have restricted load limits.		■		■	
25 Conflicts with bikes in narrow tunnels				■	
26 Some tunnels are not lined. Freezing water causes rocks to fall from ceiling.				■	

7.0 Issues and Needs Affecting Other Transportation Modes

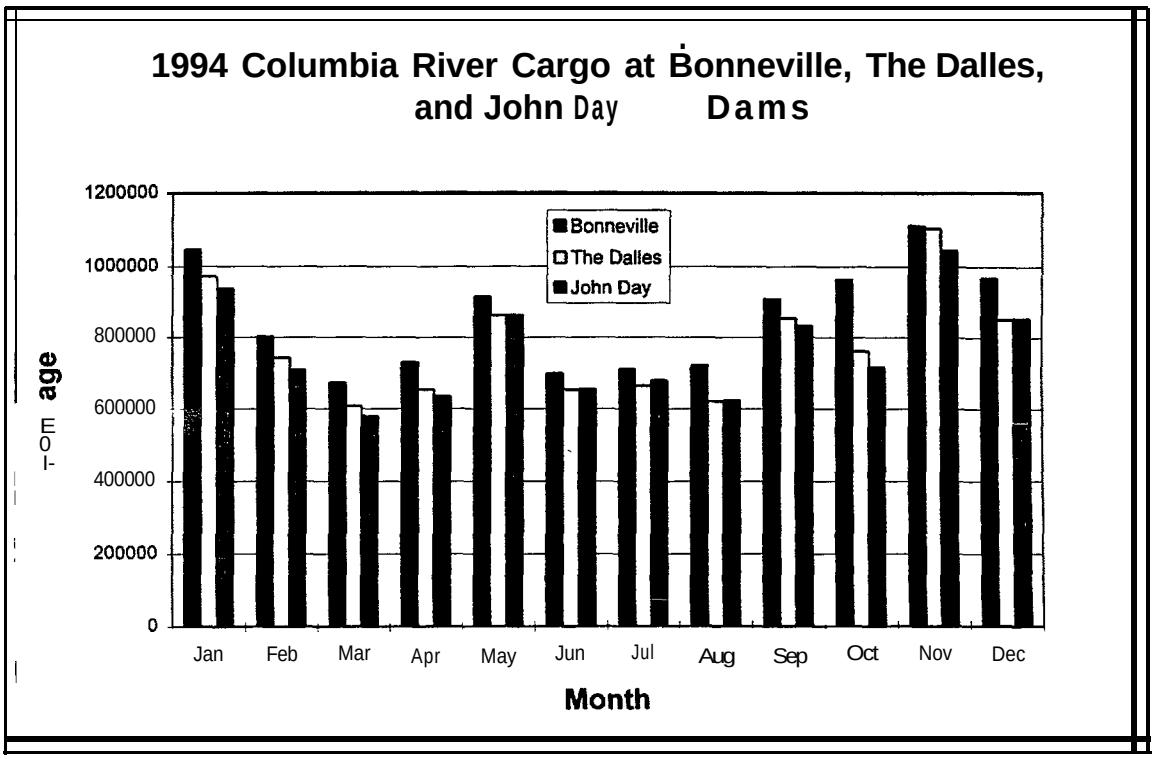
7.1 Barge

The Columbia River navigation system provides a barge channel upriver of Portland and Vancouver as an alternative to rail and truck freight movement. Within the study area between Portland and the Tri-Cities there are four dams and navigational locks located in the Bonneville, The Dalles, John Day and McNary pools.

The Port of Portland and Port of Vancouver are major deep draft ports located to the west of the corridor terminus. Shallow draft ports are located along the Columbia River at Cascade Locks, Hood River, The Dalles, Biggs, Arlington, Roosevelt, Morrow, Umatilla, and the Tri-Cities. Of the shallow draft facilities, only Morrow, Umatilla, and the Tri-Cities handle significant amounts of cargo.

According to the 1995 Marine Cargo Forecast Technical Report published by the Washington Public Ports Association and WSDOT, the Columbia River waterway barge traffic exceeds 10 million tons per year. The Bonneville lock handles between 9 and 11 million tons of cargo. The Dalles and John Day locks handle between 7 and 9 million tons. McNary lock handles 6 to 8 million tons. Cargo varies depending on the time of year as indicated in Figure 7-l.

Figure 7-l



Detailed information provided by the Corps of Engineers indicates that petroleum products are the predominant cargo shipped upstream as shown in **Figure 7-2. Figure** 7-3 shows that downstream cargo far exceeds upstream shipments, with grain being the largest commodity moving on the river system.

The last major improvement to the navigation system was the replacement of the Bonneville lock in 1993 giving it a capacity compatible with the other upstream locks. No further improvements to the navigational system are planned by the Army Corps of Engineers at this time.

Figure 7-2

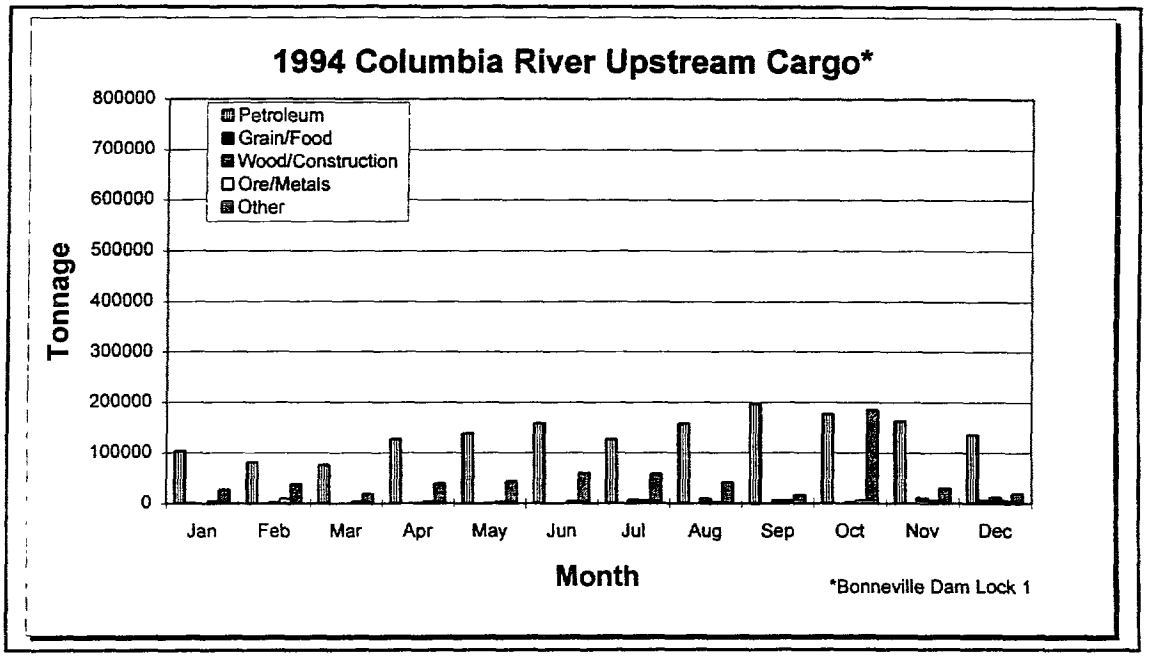
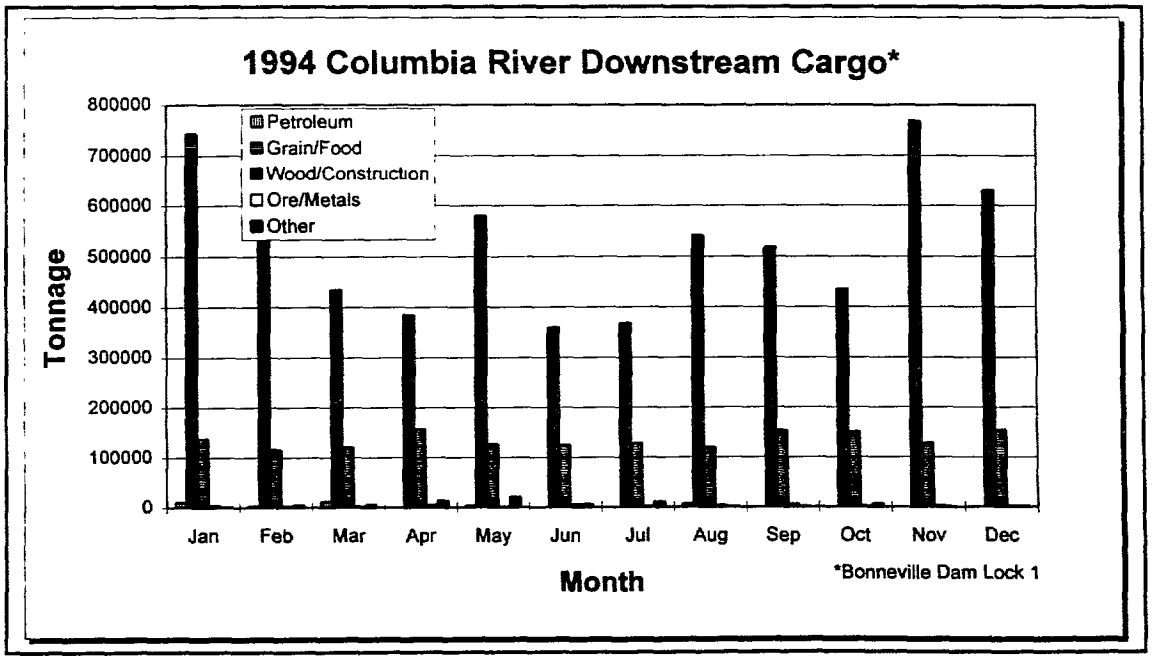


Figure 7-3



7.2 Rail

A Union Pacific (UP) main line runs the entire corridor in Oregon. A Burlington Northern & Santa Fe main line runs on the Washington side of the Columbia River to the Tri-Cities area and from there to Spokane and destinations east. The UP rail line and I-84 are located next to or near each other along the Columbia River and between Baker City and Huntington.

7.2.1 Freight

Rail freight data was provided by the ITD, taken from the Union Pacific - Southern Pacific merger application. **Table 7-l** shows a summary of this data taken in 1994 for Union Pacific and 1993 for Burlington Northern.

Table 7-l
Rail Freight Movement

Railroad	Location	Tonnage tons/year	
		Eastbound	Westbound
Union Pacific	Portland to Hinkle	17.8	26.03
	Hinkle to Boise	24.04	30.77
	Hinkle to Wallula	4.57	7.53
Burlington Northern & Santa Fe	Portland to wishram	19.2	32.8
	Wishram to Pasco	18.8	33.33

Major rail improvements planned include Union Pacific's proposed plan to double track through the Blue Mountains over the next five years at a cost of approximately $ 1 OO,OOO,OOO. The proposed improvement will involve 25 projects.

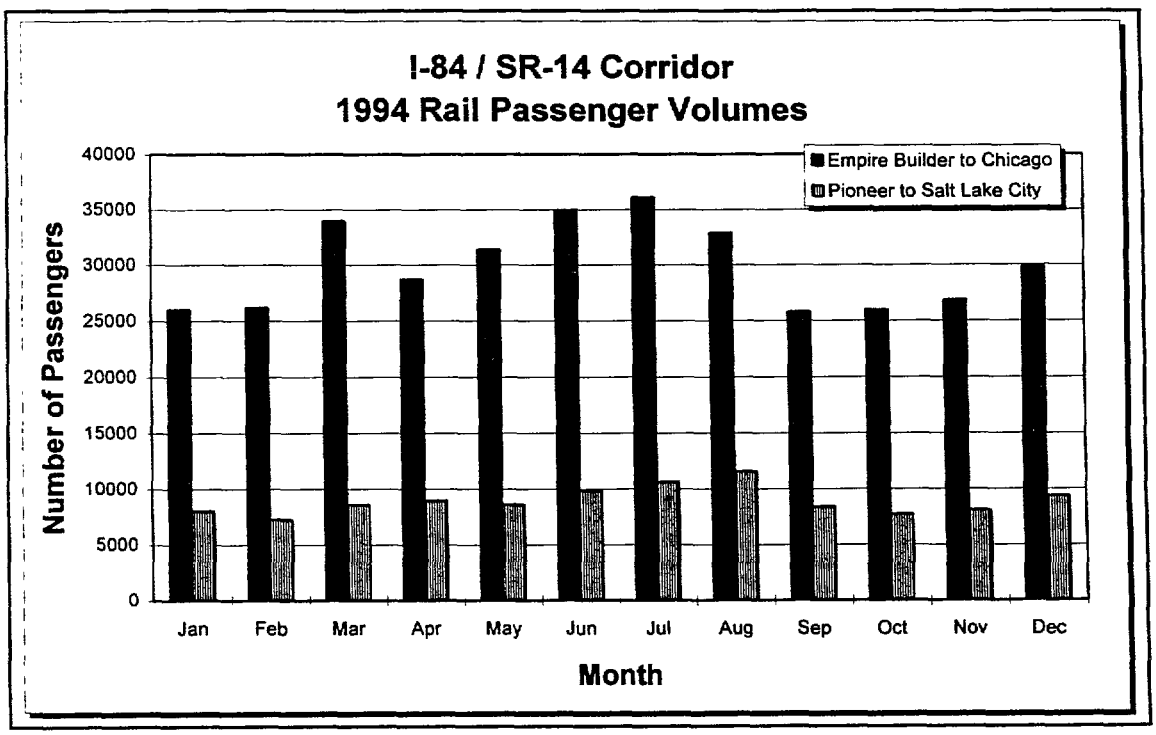
Although not finalized as of this date, the Port of Seattle, the Port of Tacoma, and Burlington Northern & Santa Fe are nearing a deal to reopen Stampede Pass through central Washington. If

the arrangement is completed, it would significantly reduce rail congestion in the Columbia River Gorge.

7.2.2 Passenger Rail

Intercity rail passenger service is provided by Amtrak between Portland and Boise on the Pioneer and between Vancouver and Pasco on the Empire Builder. The Pioneer runs three times per week on the UP line and makes stops in Hood River, The Dalles, Hermiston, Pendleton, La Grande, Baker City, Ontario, Nampa, and Boise. The Empire Builder runs four times per week on the BN&SF line with stops in Bingen/White Salmon, Wishram and the Tri-Cities area. Ridership from 1994 shows that the Empire Builder carries between 25,000 and 35,000 passengers per month. The Pioneer carries between 8,000 and 12,000 passengers per month as shown on **Figure 7-4.**

Figure 7-4



No improvements are proposed for the Empire Builder service. However, Oregon's Rail Passenger Policy and Plan dated 1992 has identified the addition of a second train to the route between Portland and Boise as a potential long range improvement.

7.3 Intercity Transit

Greyhound provides intercity bus service along the length of the ITS corridor. Four eastbound and four westbound buses run daily between Portland and Hermiston. At Hermiston, two daily northbound and southbound bus runs are made to the Tri-Cities and the other two daily eastbound and westbound bus runs continue on to Boise. Greyhound makes stops at the bus stations in Portland, The Dalles, Pendleton, La Grande, Baker City, Ontario, Boise and many other cities along their route. No intercity transit improvements are known to be planned at this time.

7.4 Needs Summary

Results of the transportation needs investigation, including existing studies, stakeholder interview, and field data, are summarized in **Table** 7-2. The table lists the identified need or deficiency, as well as the source of information. In **Section** 8.0 the needs are coupled with a frequency and magnitude assessment to determine an overall needs rating.

Table 7-2
Summary of Needs Matrix

Transportation Needs	Source of Information				
	Maint. Engineers	Exist. Studies	Phone Surveys	Field Visit	Other
Columbia River					
1 Draw down below the minimus operating pool mav restrict river traffic.			■	■	
z Better coordination w/ railroads.			■		
3 Wind surfers and fishermen get in the way of barges.			■		
4 Road access into port facilities is difficult.			■		
5 Need upgraded facilities at the Port of Morrow.			■		
Railroad					
1 Lack of passenger services. Frequency too low.		■	■		
2 Rail corridors at or above capacity.			■		
3 Restrictions in scenic areas prevent capacity expansion.			■	■	
4 Yard constraints in Portland and Vancouver, Gorge sidings used for storage.			■		
5 Expensive to transfer freight across the river.			■		
6 Better coordination w/ barge operators.			■		
7 Rock slides.			■	■	
8 People crossing tracks to get access to river.			■	■	
9 Auto/rail conflicts at grade crossings.			■		
10 Some of SR 14 in BN/SF right of way, limits road expansion					

8.0 Rating of Needs

8.1 Frequency of Problems

The needs and deficiencies identified along I-84, I-82, and SR 14 were evaluated to determine the frequency of occurrence and the number of times identified during the needs investigation. If studies, data, or interviews mentioned the need as occurring frequently, then it was rated high. If the need was mentioned only once, it received a lower rating. The rating indicators are shown below.

Low 

Medium 

High 

8.2 Magnitude of Problems

The magnitude of the need was also determined based upon the studies, data, or interviews . Needs that were identified as being a significant problem when they occur, were rated high. Needs that were not judged to be a significant problem, even if they occur frequently, were rated lower.

8.3 Overall Rating

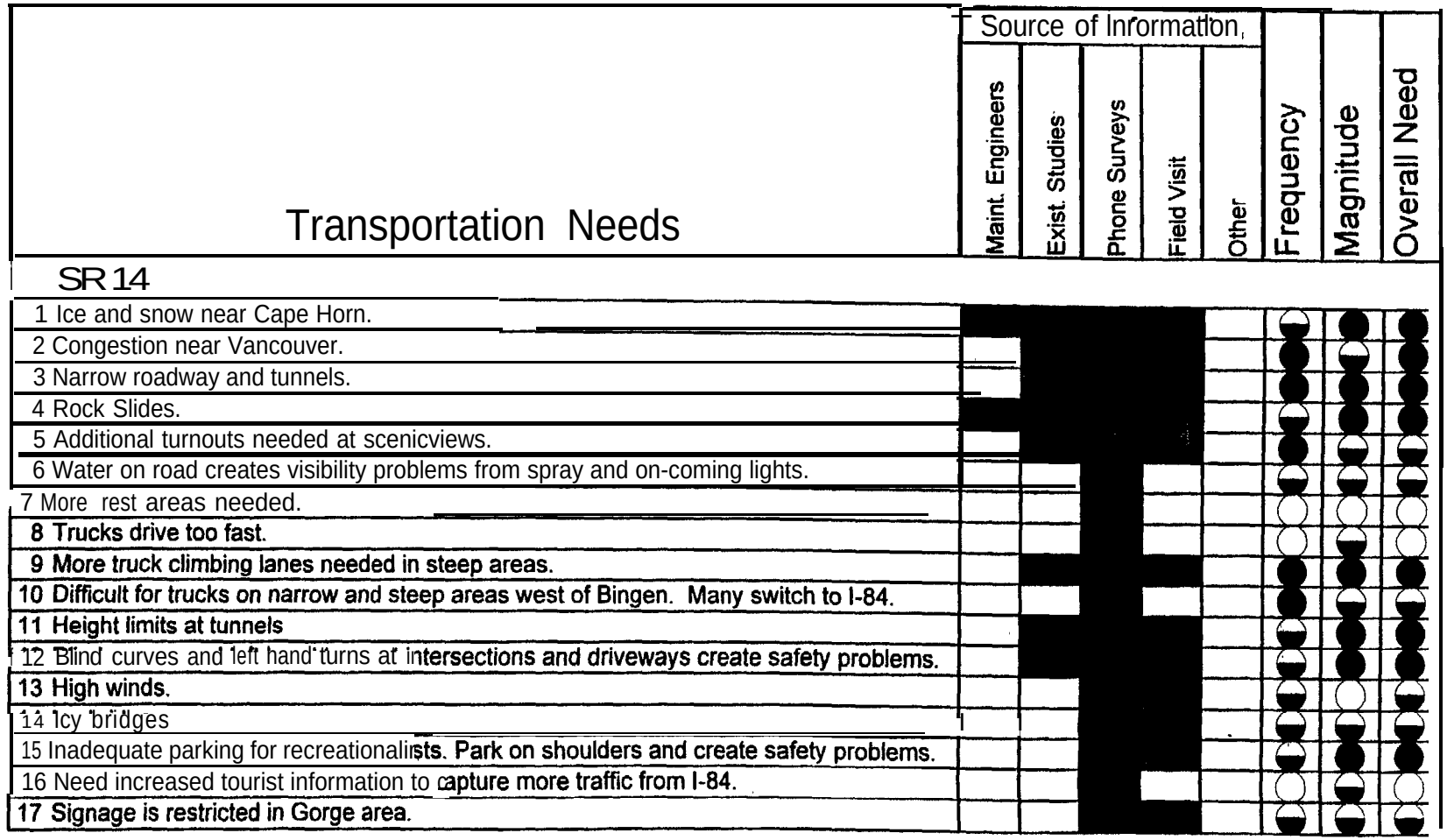
The needs were then rated on an overall scale using a composite of the frequency of occurrence and the magnitude . **Table 8-1** contains the ratings for the individual roadway needs.

Table 8-1
Rating of Needs

	Source of Information							
Transportation Needs	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other	Frequency	Magnitude	Overall Need
I-84								
1 Ice and Snow near Add canyon, Blue Mtns., Cabbage Hill, Gorge, 3 Mile Hill	■		■	■		◐	●	●
2 High Winds	■		■	■		◐	◐	◐
3 Congestion near Portland and Boise		■	■	■		●	●	●
4 Rock Slides	■		■	■		○	●	◐
5 Isolated areas in southeast corridor hard to reach during incidents, detour problems			■	■		◐	●	●
6 Water on road creates visibility/safety problems from spray and on-coming lights.			■			○	◐	◐
7 Additional turnouts needed at scenic views			■	■		○	○	○
8 Overuse and high traffic at Gorge tourist attractions, e.g., Multnomah Falls			■	■		◐	◐	◐
9 More safety rest areas needed. Can no longer use some parks due to day use fees			■			●	◐	●
10 Trucks drive too fast, more enforcement needed.			■			◐	●	●
11 Height limits at tunnel near Cascade Locks and overpass near Woodvillage.			■	■		○	○	○
12 Shaded areas stay icy, esp. bridges.			■	■		◐	●	●
13 Wildlife crossings near Lime, Pleasant Valley, Gorge, near orchards.			■			○	◐	○
14 Triple trailer conflicts w/ cars			■			○	◐	○
15 Inadequate parking for recreationalists. Park on shoulders and create safety problems			■	■		○	◐	○
16 Need more tourist information, e.g., kiosks at pullouts.			■	■		○	◐	◐
17 Signage is restricted in Gorge area.			■	■		◐	◐	◐

Transportation Needs	Source of Information					Frequency	Magnitude	Overall Need
	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other			
18 Significant Commuter traffic near Portland and Boise.		■	■	■		◐	◐	◐
19 Need more road info. Motorists get caught in places and can't turn back.			■			●	●	●
20 Bridges and tunnels too narrow for bikes and pedestrians.			■			○	◐	◐
21 Dust storms.	■					○	◐	◐
22 Steep Grades.	■			■		◐	◐	◐
23 Fog.	■				■	○	◐	◐
24 High rate of wet weather related accidents in Portland area.		■			■	●	◐	●
25 High rate of ice related accidents areas outside of Portland.		■			■	●	◐	●
26 High rate of roadside assistance calls in eastern Oregon and near Caldwell.		■			■	●	○	◐
27 Need improved CVO clearance at weigh stations.		■		■		◐	○	◐
28 Need to track out of service vehicles.		■		■		○	◐	◐
29 Some bridges have restricted load limits.				■		◐	●	●
30 Tooth Rock tunnel near Casdade Locks needs better lighting.				■		◐	○	○
31 Roadway heavily rutted in Gorge and on eastbound Cabbage Hill				■		●	◐	●
32 Communication limitations in Ladd Canyon.				■		◐	◐	◐
33 Substandard curves in east of Baker City.				■		●	◐	◐
34 Interagency coordination to develop policies and plans for incidents.					■	●	●	●

Transportation Needs	Source of Information					Frequency	Magnitude	Overall Need
	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other			
I-82								
1 Dust storms.			■	■		○	◉	◉
2 Water on road creates visibility problems from spray and on-coming lights.			■			○	◉	○
3 Trucks drive too fast.			■			◉	○	○
4 Icy bridges.			■	■		○	◉	◉
5 Wildlife crossings near Kenewick.			■			○	◉	○
6 Significant commuter traffic near Tri-Cities.			■			○	○	○
7 High Winds	■		■	■		◉	◉	◉
8 Fog.	■		■	■		○	◉	○
9 High rate of ice related accidents		■			■	◉	◉	◉


Transportation Needs
Source of Information
Maint. Engineers
Exist. Studies
Phone Surveys
Field Visit
Other
Frequency
Magnitude
Overall Need
SR 14
1 Ice and snow near Cape Horn.
2 Congestion near Vancouver.
3 Narrow roadway and tunnels.
4 Rock Slides.
5 Additional turnouts needed at scenicviews.
6 Water on road creates visibility problems from spray and on-coming lights.
7 More rest areas needed.
8 Trucks drive too fast.
9 More truck climbing lanes needed in steep areas.
10 Difficult for trucks on narrow and steep areas west of Bingen. Many switch to I-84.
11 Height limits at tunnels
12 Blind curves and left hand turns at intersections and driveways create safety problems.
13 High winds.
14 Icy bridges
15 Inadequate parking for recreationalists. Park on shoulders and create safety problems.
16 Need increased tourist information to capture more traffic from I-84.
17 Signage is restricted in Gorge area.

Transportation Needs	Source of Information					Frequency	Magnitude	Overall Need
	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other			
18 Trucks using road to avoid Oregon weight-mile tax, esp., east of Bingen.			■	■		◎	●	●
19 Auto/rail conflicts at grade crossings.			■			○	◎	○
20 Turn onto Hood River Bridge too tight. Causes trucks to blow tires.			■			○	○	○
21 Bridges to narrow for bikes and pedestrians.			■			○	◎	○
22 High rate of wet weather related accidents.		■			■	●	◎	●
23 Need for more view corridors in Gorge.				■	■	◎	◎	◎
24 Some bridges have restricted load limits.		■		■		○	◎	○
25 Conflicts with bikes in narrow tunnels				■		○	◎	◎
26 Some tunnels are not lined. Freezing water causes rocks to fall from ceiling.				■		○	◎	◎

Transportation Needs	Source of Information					Frequency	Magnitude	Overall Need
	Maint. Engineers	Exist. Studies	Phone Surveys	Field visit	Other			
Columbia River								
1 Draw down below the minimus operation pool may restrict river traffic.			■	■		○	●	◎
2 Better coordination w/ railroads.			■			○	◎	◎
3 Wind surfers and fishermen get in the way of barges.			■			○	○	○
4 Road access into port facilities is difficult.			■			○	◎	◎
5 Need upgraded facilities at the Port of Morrow.			■			○	◎	○
Railroad								
1 Lack of passenger services. Frequency too low.		■	■			◎	○	○
2 Rail corridors at or above capacity.			■			●	●	●
3 Restrictions in scenic areas prevent capacity expansion.			■	■		●	●	●
4 Yard constraints in Portland and Vancouver, Gorge sidings used for storage.			■			◎	◎	◎
5 Expensive to transfer freight across the river.			■			○	◎	○
6 Better coordination w/ barge operators.			■			○	◎	○
7 Rock slides.			■	■		◎	◎	◎
8 People crossing tracks to get access to river.			■	■		◎	○	○
9 Auto/rail conflicts at grade crossings.			■			○	◎	○
10 Some of SR 14 BN/SF right of way, limits road expansion						●	◎	●

9.0 Summary and Conclusions

Because implementation of ITS improvements is expected to occur incrementally over a long period of time, the transportation problems identified along I-84, I-82 and SR 14 were stratified into short, medium, and long term needs.

9.1 Short Term Needs

This period encompasses needs that should be addressed during the time from 1997 to 2002. Later in the ITS Corridor Study, the short term needs will be formulated into a detailed tactical plan that identifies specific projects and programs to be implemented. The following needs should be addressed in the short term:

9.1.1 Lack of Interagency Incident Policies and Procedures

Currently only loose policies and procedures exist between the three states in dealing with incidents in the corridor. The greatest need for incident policies is between Oregon and Washington, where SR 14 provides a parallel route to I-84. In the past, there has been considerable confusion on how certain types of incidents' are to be handled; when traffic should be diverted to the opposite side of the river; and who should pay the bridge tolls during a traffic detour. Detailed agreements between the states would significantly improve existing incident management procedures.

9.1.2 Lack of Corridor ITS Implementation and Communications Master Plan

This study will identify the ITS implementation and communication solutions for the corridor; however, it will be essential that each state adopt the same master plan for the corridor. Although it may take years to implement all the ITS improvements, the master plan will allow states to select future ITS technologies and communications that will be compatible with each other, thus reducing retrofit costs.

9.1.3 Insufficient Police Enforcement

Police staffing along the corridor is too low to address the safety and enforcement needs in the corridor. Motorists frequently request increased speed enforcement, rest area safety, and response times to accidents and roadside assistance calls. Given the roadway and weather conditions, there is a general need for additional police staffing. Increased funding will be necessary.

9.1.4 Poor SR 14 capacity and-safety

Western parts of SR 14 (MP 20 to 37) are especially prone to congestion and accident problems because of the steep grades and the lack of frequent passing lanes and vehicle turnouts. Although little can be done to change the grades, efforts should be made to provide additional passing lanes and vehicle turnouts.

9.1.5 SR 14 Ice Problems Near Cape Horn

Ice and snow conditions between MP 20 to MP 37 also contribute to the accident problems on SR 14. The is a need to find solutions to closely monitor hazardous driving conditions and alert drivers.

9.1.6 Weather and Recreation Information Needs in the Gorge

Motorists in the Columbia River Gorge need timely information regarding weather/roadway conditions and recreational destinations. Coordination of existing signs as well as new ITS solutions would significantly help motorists.

9.1.7 High volumes, Weather and Congestion Problems in Idaho

High traffic volumes, poor weather conditions, and congestion between Caldwell and Boise need to be addressed. This stretch of roadway consistently has some of the highest accident rates along I-84. ITS solutions could inform motorists of hazardous roadway conditions and alert them of incidents.

9.1.8 General Corridor Information at State Borders

Motorists and truckers travelling along the corridor are in need of general roadway information. The real-time information must be provided at locations well in advance of where problems may occur in order for them to adjust their travel plans if needed. A logical place for information is near the state borders.

9.1.9 Road Weather Information Systems

ODOT plans to implement two road weather information systems along I-84. One location will be in Ladd Canyon and the other approximately between Arlington and Hermiston. The system will collect road and weather information to be used primarily for maintenance purposes. This information could be helpful to motorists when making travel decisions.

9.1.10 Commercial Vehicle Operations

Additional CVO improvements are needed in the corridor, including full deployment of "green light projects" in Oregon and compatible projects in Washington and Idaho.

9.2 Medium Term Needs

Medium term needs include the period between 2003 and 2007. The following needs should be addressed in the medium term:

9.2.1 More and Safer Rest Areas

Travellers consistently want more frequent rest areas along the corridor. Personal safety while at the rest area is also a concern. Increased funding will be necessary.

9.2.2 Access Management along SR 14

SR 14 has numerous access points and intersections that decrease its capacity and safety . Efforts should be considered to manage existing and future access to preserve its operation.

9.2.3 Weather Information in the Blue Mountains

Another location with weather related traffic problems is along l-84 through the Blue Mountains. Accident rates are high through this area caused by snow, ice, fog, wind and steep grades. More roadway information is needed.

9.2.4 Incident Management and General Traveller Information

In the Gorge it is common practice to detour traffic to the opposite side of the river during freeway closures. Strategically placed ITS equipment could significantly aid in this process. Regular traveller information in other parts of the corridor should also be implemented.

9.2.5 Coordination With Existing and Future ITS Systems

Many potential ITS devices already exist along the corridor. Efforts should be made to tie them together into a common communication system and to other nearby systems such as the Portland ATMS.

9.2.6 Multnomah Falls Parking Lot

The Multnomah Falls parking lot has a number of existing design and operational problems. Accidents have been an ongoing issue, as well as the limited size of the lot. Corrections are needed.

9.2.7 Oregon Weigh-Mile Tax

As long as there is a significant difference in how Oregon and Washington collect truck taxes, trucks will likely continue to use SR 14 to avoid paying Oregon's weigh-mile tax. Efforts should be made to eliminate the disparity.

9.2 Long Term Needs

The long term needs occur during 2008 to 2017. ITS solutions for this time period will be less specific than the previous time periods and will be prepared as a strategic approach to address the long term concerns.

9.3.1 Freeway Overcrossings / Median Openings

There is a need to decrease the response time to incidents, particularly along the rural sections of I-84. More crossings should be implemented over time; however, much of the freeway is divided by concrete barrier or guardrail, which makes it difficult to provide locations for crossing locations.

9.3.2 Tunnels along SR 14

All the tunnels along SR 14 have height problems. Solutions should be investigated.

9.3.3 Bridges With Truck Restrictions

Bridges at Cascade Locks, Hood River and at The Dalles were not designed for some of the large trucks on the road today. Solutions should be investigated.

9.3.4 Rail Capacity

Rail capacity in the corridor is limited. BN&SF and UP are operating at capacity now. The railroads should continue to investigate ways to increase rail capacity, thus reducing the pressure for additional trucks in the corridor.

Appendix A

Existing Equipment Inventory

Portland/Vancouver Washington to Boise Idaho
ITS Corridor Study

Existing Equipment Inventory

Check One:

- O I-84 (Oregon I-205 Junction-to Idaho Border)
- O I-84 (Oregon Border to Port of Entry East of Boise)
- O SR 14 (Washington I-205 Junction to I-82 Junction)
- O I-82 (Oregon I-84 Junction to Washington Border)
- O I-82 (Oregon Border to I-182 Junction)

Mile Post: _____

Direction: [] E I 3 [ ] W B [] NB [] SB

Description:

(Include info on equipment type, manufacturer, communication and power requirements, manual or auto operation, other system features.)

Kimley-Horn and Associates, Inc.

Portland-Boise ITS
Inventory of Equipment

Interstate 84

Equlpment Type	Mile Port	State	Direction(s)	Capabilities	Manufacturer	Communlcatlon	Power	Notes
Weigh Station Only	one							
Weigh-In-Motion	44.90	OR	EB,WB	WIM, AVI, height sensor, preclearance.station	WlM. International Road Dynamic. AVI: Mark IV.	Not specified	Notspecified	Cascade Locks
	54 30	OR	WB	WIM, preclearance, AVI. station	Not specified	Not specified	Notspecified	Wyeth
	109.00	OR	EB, WB	WIM, AVI	WIM: International Road Dynamic. AVI: Mark IV.	Phone (modem?)	Notspecified	Rufus. No axle sensors.
	256.52	OR	EB	WM, AVI, height sensor, station	WIM: International Road Dynamic. AVI. Mark IV.	Not specified	Notspecified	La Grande
	353.30	OR	WB	WIM. AVI. VISION. station	International Road Dynamic	Not specified	Not specified	Farewell Bend
	354 40	OR	EB	WIM, AVI, height sensor, preclearance	WIM: International Road Dynamic. AVI: Mark IV.	Not specified	Notspecified	Olds Ferry
	15.10	ID	EB. WB	WIM. axles	Not specified	Phone	Solar	
	66.00	ID	EB. WB	WIM	International Road Dynamic	Data to Port of Entry	AC power	
Downhill Speed Information System	226.00	OR	WB	WIM AVI. communication with VMS	Not specified	Localcommunitcatiion lo VMS	Notspecified	
Variable Message Sign	11? ?							
	65.43	OR	WB	3 line/l 6 character	Skyline, Model 170 Controller	Modem	120/240 V from Koberg Rest Area.	
	163.60	OR	EB	Not specified	Sylvia	Modem	Not specified	Oregon Emergency Management
	190.70	OR	WB	Not specified	Sylvia	Modem	Umalilla Electric	Oregon Emergency Management.
	203.60	OR	WB	Not specified	Sylvia	Modem	Umalilla Electric	Oregon Emergency Management.
	214.00	OR	EB	Not specified	Sylvia	Modem	Umatilla Electric	

Portland-Boise ITS
Inventory of Equipment

Interstate 84

Equipment Type	Mile Post	State	Direction	Capabilities	Manufacturer	Communication	Power	Notes
	226.60	OR	WB	Not specified	Sylvia	Modem	Umatilla Electric	
	263.57	OR	EB	Not specified	Fiberoptic Display Systems	Modem	Oregon Trail Electric	
	266.63	OR	WB	Not specified	Fiberoptic Display Systems	Modem	Oregon Trail Electric	
Counter and Classification	17.71	OR	EB. WB	Volume, vehicle classification	Sheeter-Amet counter	Modem	120	Permanent traffic recorder 26-001.
	76.00	OR	EB. WB	Volume, vehicle classification	Streeter-Amet counter	Modem	120 v	Permanent traffic recorder 33-001.
	146.16	OR	EB, WB	Volume, vehicle classification	Atreeter-Amet counter	Modem	120v	Permanent traffic recorder 1 I-006.
	203.30	OR	EB. WB	Volume, vehicle classification	Streeter-Amet counter	Modem	Solar	Permanent traffic recorder 30-004.
	266.70	OR	EB, WB	Volume, vehicle classification	Streeter-Amet counter	Modem	Solar	Permanent traffic recorder 01-001.
	353.50	OR	EB. WB	Volume, vehide classification	Streeter-Amet counter	Modem	Solar	Permanent traffic recorder 23-016:
	377.20	OR	EB, WB	Volume, vehicle classification	Streeter-Amet counter	Modem	Solar	Permanent traffic recorder 23-014.
	19.10	ID	EB, WB	Volume, length. speed	Diamond	Phone	Solar	
	32.40	ID	EB, WB	Volume, length speed	Diamond	Phone	Solar	
	47.90	ID	EB. WB	Volume, length, speed	Diamond	Phone	Solar	
	51.00	ID	EB. WB	Volume, length, speed	Diamond	Phone	Solar	
	53.06	ID	EB, WB	Volume	Diambnd	Phone	AC power	
	53.90	ID	EB, WB	Volume, length, speed	Diamond	Phone	AC power	
	56.70	ID	EB. WB	Volume, length, speed	Diamond	Phone	AC power	
Detecter Loops Only	11.40	OR	EB. WB	WB volume only, EB volume and speed.	Not specified	Local only	Portable	Requires attachment of portable counter.
	171.13	OR	EB	Volume, classification, speed	Not specified	Local only	Portable	Requires attachment of Streeter-Amet portable Trafficomp counter.
	215.56	OR	EB. WB	Volume. classltication	Not specified	Local only	Portable	Requires attachment of Streeter-Amet portable Trafficomp counter.

Portland-Boise ITS
Inventory of Equipment

Interstate 84

Equipment Type	Mile Port	State	Direction(s)	Capabilities	Manufacturer	Communication	Power	Notes
	342.00	OR	EB, WB	Volume,classification	Not specified	Local only	Portable	Requires attachment of Streeter-Amet portable Trafficomp counter.
	371.00	OR	EB, WB	Volume,classification, speed	Not specified	Local only	Portable	Requires attachment of Streeter-Amet portable Trafficomp counter.
Strategic Highway Research Program	263 50	OR	WB	PAT remote data collection	Not specified	2 pair phone line cable	AC	2 piezo * 1 loop
	265 77	OR	EB	PAT remote data collection	Not specified	Cellular phone	Solar	2 piezo + 1 loop
Sign	215.20	OR	EB	Mobile Home	Oregon Sign Corp	Phone actuated or manual.	PP & L	
	215 60	OR	EB	SnowZone	State of Oregon	Manual only	PP & L	
	216 00	OR	NB HWY 331	Snow Zone	Slate of Oregon	Manual only	PP & L	
	254 60	OR	WB	SnowZone	State of Oregon	Manual only	Solar	
	265 59	OR	WB	MobileHome	Oregon Sign Corp	Phone actuated or manual.	Oregon Trail Electric	
	266.35	OR	EB	SnowZone	State of Oregon	Manual only	Oregon Trail Electric	
	273 34	OR	WB	Watch for Ice	State of Oregon	Manual only	Oregon Trail Electric	Wind gauge?
	276.55	OR	WB	SnowZone	State of Oregon	Manual only	Oregon Trail Electric	
	305.10	OR	WB	FreewayClosure	Not specified	Manual only	12 V Battery	
	332.00	OR	EB	Sharp Turn	Earth-Wind-Flre	None	Solar	
Weather Station	223.50	OR	WB	Not specified	Texas Weather Instruments	Modem	Umatilla Electric	
	1700	ID	NA	Weather conditions, pavement temp, moisture,chemicals	Not specified	Not specified	Not specified	
	27.60	ID	NA	Weather conditions, pavement temp. moisture, chemicals	Not specified	Not specified	Not specified	

Portland-Boise ITS
Inventory of Equipment

Interstate 84

Equipment Type	Mile Port	State	Direction(s)	Capabilities	Manufacturer	Communication	Power	Notes
	44.00	ID	NA	Weather conditions, pavement temp, moisture.chemicals	Not specified	Not specified	Not specified	
	49.50	ID	NA	Weather conditions, pavement temp, moisture, chemicals	Not specified	Not specified	Not specified	
	54.50	ID	NA	Weather conditions, pavement temp, moisture, chemicals	Not specified	Not specified	Not specified	
	59.50	ID	NA	Weather conditions, pavement temp. moisture, chemicals	Not specified	Not specified	Not specified	

Portland-Bolse ITS
Inventory of Equipment

Interstate 82

Equipment Type	Mile Post	State	direction(s)	Capabilities	Manufacturer	Communlcatlon	Power	Notes
Weigh Station Only	None							
Weigh-In-Motion	121.20	WA	EB, WB	WIM, classification	International Road Dynamics	Transmitted7	Notspecified	
	0.50	OR	EB, WB	WIM. AVI, VISION. station	International Road Dynamics	Not specified	Notspecified	Umatilla
Downhill Speed Information System	None							
Variable Message Slgn	112 00	WA	SB	Not specified	Notspecified	Not specified	Notspecified	
	132.20	WA	NB	Notspecified	Notspecified	Not specified	Not specified	
	10.06	OR	NB	Not specified	Sylvia	Modem	Umatilla Electric	Oregon Emergency Management
Counter and Classlflcatlon	132.03	WA	NB, SB	Volume, length classifier	Golden River	Transmitted7	Not specified	
	0.56	OR	NB, SB	Volume, classification	Streeter-Amet counter	Modem	Solar	Permanent traffic recorder 30-025.
Detecter Loops Only	None							
Strategic Highway Research Program	115.00	WA	SB	Notspecified	Notspecified	Not specified	Not specified	
	6.93	OR	SB	PAT remote data collection	Notspecified	Phone	AC	2 piezo t 1 loop
Slgn	None							
Weather Statlon	None							

Portland-Boise ITS
Inventory of Equipment

SR 14

Equipment Type	Mile Post	State	Direction(s)	Capabilities	Manufacturer	Communication	Power	Notes
Weigh Station Only	50.45	WA	Not specified	Not specified	Not spedfied	Not specified	Not specified	
Weigh-in-Motion	None							
downhill Speed Information System	None							
Variable Message Sign	167.25	WA	EB	Not specified	Not specified	Not specified	Not specified	
	107.25	WA	SB SR 221	Not specified	Not specified	Not specified	Not spedfied	
	160.30	WA	EB	Not spedfied	Not specified	Not specified	Not specified	
Counter and Classification	11.90	WA	Not specified	Volume, weight and vehicle classification	Not specified	Not specified	Not specified	
	17.70	WA	Not spedfied	Volume, weight and vehicle classification	Not specified	Not specified	Not specified	
	100.64	WA	Not specified	Traffic recorder	Not specified	Not specified	Not specified	
	102.37	WA	Not specified	Traffic recorder	Not specified	Not specified	Not specified	
Detector Loops Only	None							
Strategic Highway Research Program	11.90	WA	Not specified	Pavement Deflection	Not specified	Not specified	Not spedfied	
	17.70	WA	Not specified	Pavement Deflection	Not specified	Not specified	Not specified	
Sign	12.14	WA	EB	Right lane ends	Not specified	Not specified	Not specified	
	12.40	WA	EB	Divided highway ends	Not specified	Not specified	Not spedfied	
	12.60	WA	WB	Divided highway	Not specified	Not specified	Not specified	
	56.01	WA	EB	Bicycle In tunnel	Not specified	Not specified	Solar	
	56.17	WA	WB	Bicycle In tunnel	Not specified	Not specified	Solar	
	56.36	WA	EB	Bicycle in tunnel	Not specified	Not specified	Solar	
	56.60	WA	WE	Bicycle in tunnel	Not specified	Not specified	Solar	
	58.85	WA	EB	Bicycle In tunnel	Not specified	Not specified	Solar	
	59.09	WA	WB	Bicycle in tunnel	Not specified	Not specified	Solar	
	59.53	WA	EB	Bicycle In tunnel	Not specified	Not spedfied	Solar	
	59.73	WA	WB	Bicycle In tunnel	Not specified	Not specified	Solar	
	60.16	WA	EB	Bicycle In tunnel	Not specified	Not specified	Solar	
	60.36	WA	WB	Bicycle In tunnel	Not specified	Not specified	Solar	
	76.70	WA	EB	Bicycle In tunnel	Not specified	Not specified	Solar	
	77.06	WA	WB	Bicycle In tunnel	Not specified	Not specified	Solar	

Portland-Boise ITS
inventory of Equipment

SR 14

Equipment Type	Mile Post	State	Direction(s)	Capabilities	Manufacturer	Communication	Power	Notes
	100.81	WA	WB	Stop ahead	Not spedfied	Not specified	Not specified	
	134.15	WA	EB	Truck crossing	Not specified	Not specified	Not specified	
	134.59	WA	WB	Truck crossing	Not specified	Not spedfied	Not specified	
Weather Station	None							

Appendix B

Reports Reviewed

January 24,1996
Updated: February 29,1996

I-84
Reports Reviewed

1. Seattle To Portland Inter-City ITS Corridor Study and Communication Plan, Technical Memorandum Number 1, Transportation Needs, August 31,1994.

2. Seattle To Portland Inter-City ITS Corridor Study and Communication Plan, Technical Memorandum Number 2, Communications Survey and Transmission Alternatives, October 1994.

3. "Seattle To Portland Inter-City ITS Corridor Study and Communication Plan, Technical Memorandum Number 3, Intelligent Transportation System (ITS) Needs", David Evans and Associates, Inc. for the Washington State Department of Transportation, November 1994.

4. Seattle To Portland Inter-City ITS Corridor Study and Communication Plan, Technical Memorandum Number 4, Draft Seattle to Portland ITS Corridor Plan, prepared for WSDOT, prepared by David Evans & Associates, Inc., May 1995.

5. Seattle To Portland Inter-City ITS Corridor Study and Communication Plan, Technical Memorandum Number 5, Recommended Corridor Communication Alternatives, June 1995.

6. 1991 Washington Ports and Transportation Systems Study, Technical Report.

7. 1991 Washington Ports and Transportation Systems Study, Final Report.

8. 1995 Marine Cargo Forecast Technical Report, January 31, 1995, prepared by BST.

9. 1995 Private Port and Pipeline Forecast Final Report, prepared for WSDOT, prepared by BST, July 31, 1995.

10. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 1, February 1994 Linking Transportation System Improvements to New Business Development in Eastern Washington.

11. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 2, February 1994 Lessons from Eastern Washington: State Route Mainstreets, Bypass Routes and Economic Development in Small Towns.

12. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 3, December 1994 Washington State Freight Truck Origin and Destination Study: Methods, Procedures, and Data Dictionary.

13. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 4, January 1995 Major Generators of Traffic on U.S. 395 North of Spokane: Including Freight Trucks and Passenger Vehicles Crossing the International Border.

14. Eastern Washington Inter-modal Transportation Study (EWITS) Research Report Number 5, March 1995 Transportation Characteristics of Wheat and Barley Shipments on Haul Roads To and From Elevators in Eastern Washington.

15. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 6, March 1995 A Quantitative Estimate of Eastern Washington Annual Haul Road Needs for Wheat and Barley Movements.

16. Eastern Washington Intermodal Transportation Study (EWITS) Research Report Number 7, March 1995 Transportation Needs of Eastern Washington Fruit, Vegetable and Hay Industries.

17. Eastern Washington Inter-modal Transportation Study (EWITS) Research Report Number 8, April 1995 Importance of U.S. 395 Corridor for Local and Regional Commerce in South Central Washington.

18. South Central Region Six Year Transportation Improvement Program (printed 7/6/95).

19. Transportation Policy Plan for Washington State, 1995 Report to the Legislature.

20. Southwest Region Six Year Transportation Improvement Program (printed 9/29/95).

21. 1994 Estimated Commercial Vehicle Rural Traffic Flow Map, State of Idaho.

22. District Three, 1994 Rural Traffic Flow Map, State of Idaho.

23. Monthly Average Daily Traffic compared to Average Daily Truck Traffic from Automatic Traffic Recorders on I-84 (printed October 1 8, 1995) (2 copies).

24. 1992 Classification File: Vehicle Types from I-84 Milepost 0 to 67.0 (printed October 18, 1995).

25. 1994 Classification File: Vehicle Types from I-84 Milepost 0 to 67.0 (printed October 18, 1995).

26. 1993 Classification File: Vehicle Types from I-84 Milepost 0 to 67.0 (printed October 18, 1995).

27. WSDOT Washington Official State Highway Map 1994 (two copies).

28. WSDOT High Speed Ground Transportation Study, Final Report and Executive Summary, October 1992.

29. WSDOT State Highway System Plan, Improvement Program Maps, January 1995..

30. WSDOT Preliminary Statewide Multimodal Transportation Plan 1994.

31. WSDOT Key Facts, A Summary of Useful Transportation Data, August 1995.

32. WSDOT State Highway System Plan, January 1995.

33. WSDOT 1994 Annual Traffic Report.

34. WSDOT 1991 Washington Ports and Transportation Systems Study, Final Report.

35. WSDOT State Highway System Plan, lmprovement Program Maps, January 1995 (3 copies).

36. WSDOT Southwest Region Six Year Transportation Improvement Program (printed 9/25/95) (2 copies).

37. WSDOT South Central Region Six Year Transportation Improvement Program (printed 7/6/95) (2 copies).

38. WSDOT State Highway System Plan, January 1995.

39. WSDOT Preliminary Statewide Multimodal Transportation Plan, 1994.

40. WSDOT 1991 Washington Ports and Transportation Systems Study.

41. WSDOT Venture Washington Newsletter, August 1995.

42. WSDOT Venture Washington Status Report of Active Projects, September 1995.

43. WSDOT Venture Washington Status Report of ITS projects, September 1995.

44. WSDOT Venture Washington, IVHS Strategic Plan for Washington State.

45. WSDOT Venture Washington, IVHS Strategic Plan for Washington State, Executive Summary, November 1993.

46. WSDOT Venture Washington, IVHS Strategic Plan for Washington State, brochure.

47. WSDOT Venture Washington Newsletters: February 1994, May 1994, July 1994, March, 1995, May 1995, and August 1995.

48. WSDOT "SR-14 Corridor Strategy and Action Plan for SR-14 in the Columbia River Gorge National Scenic Area" (Draft Review), Southwest Region of the Washington State Department of Transportation, November 1995.

49. ODOT "Mainline Screening for Enforcement", Milan Krukar and Ken Evert, October 1992.

50. ODOT Construction Projects Status Report, as of September 25, 1995 (2 copies).

51. ODOT 1994 Oregon Rail Freight Plan.

52. ODOT Preliminary Statewide Transportation Improvement Program, 1996-1998.

53. ODOT Oregon Rail Passenger Policy and Plan, 1992.

54. ODOT State of Oregon Traffic Congestion Management System, CMS Perspective, June 1995 (2 copies).

55. ODOT 1994 Traffic Volume Tables (published August 1995).

56. ODOT High Speed Rail Passenger Demand/Ridership Forecasts, Final Report, prepared by Parsons Brinckerhoff, June 1995.

57. ODOT Amended Report to the 1994 Traffic Volume Tables (Amendment to: Summary of Traffic Trends at Permanent Station Locations (published September 1995).

58. ODOT Draft: The "Green Light" CVO Project, Phase I, Work Plan for FHWA, prepared by Research and New Technologies Unit and Automation and Weighing Facilities Unit, May 25, 1995 (Final Version) (2 copies).

59. ODOT 1994 State Highway System Accident Rate Tables, September 1995.

60. ODOT Strategic Plan, IVHS/CVO in Oregon, July 1993 (2 copies).

61. ODOT Highway Division, 199 1 Oregon Highway Plan, June 1991.

62. ODOT Oregon Transportation Plan, The New Oregon Trail Leading into the 21st Century, September 15, 1992.

63. ODOT Oregon Transportation Plan, Annual Report 1994, November 1994.

64. ODOT Crew Listing, June 1995.

65. ODOT Transportation System Planning Guidelines, August 1995.

66. ODOT Oregon Transportation Safety Action Plan, April 1995 Draft.

67. ODOT 1994 Oregon Bicycle and Pedestrian Plan, Review Draft, August 22,1994.

68. ODOT Oregon Scenic Byways Program, March 1995.

69. Oregon State Highway Division, Accident Summary Database Investigative Report; based on 1991, 1992, 1993 Accident Date (printed 10/l 6/95) (2 copies).

70. Oregon State Highway Division, Accident Summary Database Investigative Report; based on 1992,1993,1994 Accident Date (printed 10/l6/95) (2 copies).

71. Safety Priority Index System (2 copies).

72. 1995 Private Port and Pipeline Forecast Final Report, prepared by BST Associates, July 3 1, 1995.

73. Portland to Boise IVHS Corridor Study, July 1994 funding proposal to the FHWA.

74. Portland to Boise IVHS Corridor Study, submitted by ID Transportation Department, ODOT, and WSDOT, prepared for FHWA, July 1994 (2 copies).

75. SR 14 MP 0000.00 to 180.77, l/1/90 to 5/3l/95, Rural Accidents per Half-Mile Segments (printed 9/22/95).

76. SR 82 MP 102.56 to 132.60, l/1/90 to 5/3l/95, Rural Accidents Involving Wet Roadway (printed 9/22/95).

77. Seattle to Portland Inter-City IVHS Corridor Study and Communications Plan, Technical Memorandum Number 1: Seattle to Portland Corridor Transportation Needs, prepared for WSDOT, prepared by David Evans and Associates, Inc., August 3 1, 1994.

78. Seattle to Portland Inter-City IVHS Corridor Study and Communication Plan, Technical Memorandum Number 2: Seattle to Portland Corridor Communications Survey and Transmission Alternatives, prepared for WSDOT, prepared by David Evans and Associates, Inc., October 1994.

79. Seattle to Portland Inter-City IVHS Corridor Study and Communication Plan, Technical Memorandum Number 3 : Intelligent Transportation System (ITS) Needs, prepared for WSDOT, prepared by David Evans and Associates, Inc., November 23,1994.

80. S.R. 14/Columbia River Gorge Needs Study, October 1990, prepared by JRH.

81. Rural Applications of Advanced Traveler Information Systems (ATIS), prepared for FHWA, prepared by JHK, August 30,1995.

82. Orange County Intelligent Vehicle/Highway Systems Study, Final Report, prepared for OCTA, prepared by JHK, November 1993.

83. Early Deployment of ATMS/ATIS for Metropolitan Detroit, Final Report, prepared for Michigan DOT, prepared by Rockwell-Intematianal, September 26, 1994.

84. Federal Highway Administration Seminar, Intelligent Vehicle Highway System (IVHS), "What, Why, & How", April 1, 1993.

85. FHWA ITS Architecture, Evolutionary Deployment Strategy, prepared by Loral Federal Systems/Rockwell International, June 1995.

86. "Portland, OR/Vancouver, WA to Boise, ID I.T.S. Corridor Study Telephone Interviews" (Draft), Pacific Rim Resources, January 1996.

87. "Out-Of-Service Vehicle Field Operational Test at the East Boise, Idaho, Port of Entry", Idaho Transportation Department, January 1996.

Appendix C

Media Kit

U.S. Department
of Transportation
Federal **Highway**
Administration

Washington State
Department of Transportation

IDAHO TRANSPORTATION DEPARTMENT

Oregon
DEPARTMENT
TRANSPORTATION

FOR IMMEDIATE RELEASE

Contact: Jim West
(503)977-2588

Tri-State Study To Examine Intelligent Transportation System Options

The states of Oregon, Washington, and Idaho — in cooperation with the Federal Highway Administration — have initiated a study to examine transportation needs in the corridor extending from Portland, Ore. and Vancouver, Wash. to Boise, Idaho. Results of the study will include recommendations on how those needs can be met through the application of Intelligent Transportation Systems' (ITS). ITS refers to solutions involving the integrated application of high-technology and communications solutions to transportation problems in the areas of safety, personal mobility, operating efficiency, and environmental quality. (see ***enclosed materials for specific examples)***

The areas under study include: I,-84 from Portland, Oregon to Boise Idaho; and SR-14 in Washington from Vancouver to I-82, and I-82 from I-84 to the Tri-Cities area. The Columbia River waterway, and the Union Pacific and Burlington Northern rail lines also are included in the study.

Recommendations coming out of the study will be based in large measure on what travelers in these transportation corridors say is needed. A concentrated effort is underway to

get input from the area's residents, businesses, industries, and local and regional governments. An extensive public involvement and public information program is planned including interviews, public meetings and presentations that will be announced as the study progresses.

The study is expected to be complete in late 1996 and will recommend a 20-year plan to implement ITS technology in the corridor to address present and future needs.

-end-

Transportation Futures

PORTLAND, OR ' VANCOUVER, WA

TO BOISE, IDAHO

ITS

CORRIDOR

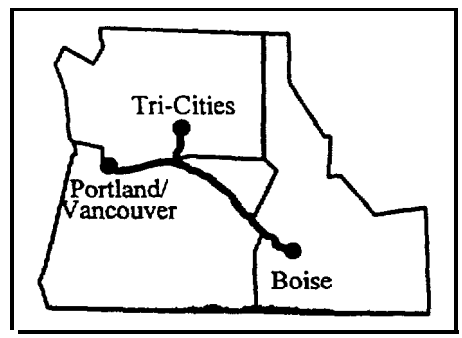
STUDY

What is the ITS Corridor Study?

The ITS Corridor Study is a tri-state effort to identify the transportation needs in the corridor than can be addressed through application of Intelligent Transportation Systems [ITS) in the area between Portland and Vancouver, WA to Boise, Idaho. ITS refers to systems that involve integrated applications of a variety of high-tech solutions to transportation problems in the areas of safety, operating efficiency, environmental quality and personal mobility. The purpose of ITS is to promote more efficient use of existing highway and transportation networks, increase safety and mobility, and decrease environmental costs of travel. The term integrated applications means that these systems also facilitate the sharing of information, hardware, and/or staff so that the transportation network – freeways, expressways, highways, railroads, rivers and transit routes that pass through multlple jurisdictions – can operate as a single, seamless entity.

This study is being co-sponsored by the transportation departments of the states of Idaho, Oregon, and Washington in cooperation with the Federal Highway Administration. The corridor is defined as a multi-state, and intercity area stretching 440 miles from Portland, Oregon and Vancouver, Washington to just east of Boise, Idaho. The major roadways in the study area are I-84, SR 14, and I-82. The I-82 corridor extends 30 miles from the I-84 interchange to I-82 near the Tri-Cities area in Washington. The Columbia River waterway and the Union Pacific and Burlington Northern rail lines also are included in the study.

Through this study process, consultants working with the states and other jurisdictions will identify needs and develop a 20-year plan to implement ITS technology in the corridor. The first period of the plan will cover from 1997 to 2002; and will focus on the development of a detailed plan that identifies specific projects and programs to identify current problems. For 2003 to 2007 the study will address emerging trends and issues and will recommend steps that should be taken to prepare for these anticipated situations. The final period of the plan addresses the years 2008 to 2017 and will recommend strategic approaches to addressing long-term concerns.



ITS Glossary

Intelligent Transportation Systems to be addressed in this study are categorized into the following areas:

Traffic Management Systems technologies that monitor, control, and manage traffic on streets and highways including: coordinated signal systems, video surveillance, ramp metering, automated toll collection, and variable message signs

Traveler Information Systems Designed to help traveler with planning, perception, analysis. and decision-making to Improve the convenience and efficiency of travel Technologies allow communicaton with motorists about traffic conditions, road safety, locations, and alternate routes. as well as services.

Commercial Vehicle Operations ITS technologies applied to commercial roadway vehicles, including trucks, commercial fleets, and inter-city buses, to expedite deliveries, Improve operational efficiency, improve incident response, and increase safety.

Rural Transportation Systems Applications of ITS technologies to rural needs, including vehicle location. signaling, and traveler information, Rural conditions, such as lower population densities and limited road congestion levels require technologies and techniques different from those used in urban and suburban areas.

Emergency Management ITS technologies- which can help avoid or minimize the risk of catastrophic accidents occurring inconjunction with the movement of hazardous cargoes frequently carried on the corridor.

What are some of the problems?

Weather
Travelers often contend with high winds, dust storms, fog. ice, heavy rain and snow. Weather conditions are a particular problem in the Columbia River Gorge and Ladd Canyon. Highway closures of several hours to several days may occur a dozen times each year, putting a strain on the area's ability to feed and house stranded motorists. The study will look at ways all travelers can learn about weather conditions and related problems that could affect their trips in the corridor, and how to update that information rapidly as conditions change.

Tourism
Tourism is an important component of the local economy, Ranking third behind forest products and agriculture. Growth in tourism activities, and an expansion of tourist facilities has helped offset a recent decline in the timber industry. Part of the ITS plan will be to provide all tourists with information concerning recreational and sightseeing opportunities and to make motorists aware of nearby services and attractions.

Accidents and Incidents
Accidents are a problem on any main corridor. In some cases, an accident on a railroad can impact the movement of vehicles on an adjacent highway, or vice versa. There is limited access to alternative routes within the Columbia Gorge portion. The study of the corridor will determine the need for roadside services related to incident evaluation and clearance, and will identify detour routes.

Commercial Vehicle Operations
Technological improvements at highway ports of entry that can improve the movement of goods and services are desirable for everyone. The ITS plan will evaluate seven ports of entry- four in Oregon, one in Idaho, and two in Washington.

Emergency Management
Hazardous cargoes are frequently carried in the corridor by truck and rail and occasionally by river barge. Though the dally risk of an accident is low, the catastriphic effects to people and the environment cannot be Ignored. The corridor study area serves two major hazardous materials locations: the Umatilla Army Depot just south of I-84 in Umatilla County, OR., and the Hanford Site operated by the US Department of Energy north of Richland, WA. The Army Depot has one of the largest stockpiles of chemical and biolobicaal weapons in the United States. A waste disposal site at Arlington, Oregon also receives hazardous materials from the Portland metropolitan area shipped daily by truck on I-84. The ITS plan will examine use of signage, emergency vehicle management, and emergency notification and personal security in these areas.

How can you get involved?

A critical part of the study is a coordinated effort along the corridor to identify transportation needs, stimulate interest, deepen understanding and strengthen support for ITS projects. To insure that the study addresses the concerns of the area' s residents, businesses. industries. local and regional municipalities. and extensive public involvement and public information program is planned. Citizens and users of the corridor will have opportunities through surveys, public meetings and presentations to express their concerns and offer suggestions over the duration of the study — expected to be complete by the end of 1996.

Kimley-Horn and Associates is coordinating the technical aspects of the study. Pacific Rim Resources is coordinating the public information and outreach efforts. We welcome your ideas. suggestions, or concerns. Please mail or fax your comments to:

(Technical)
Kimley-Horn and Associates, Inc.
9320 SW Barbur Blvd., Suite 130
Portland, OR 97219
FAX: (503)977-2688

(Public Involvement)
Pacific Rim Resources
1220 SW Morrison, #500
Portland, OR 97205
FAX: (503)241-7195

PORTLAND, OR VANCOUVER, WA

TO BOISE. IDAHO

ITS

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ITS Glossary

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Technologies that monitor, control, and manage traffic on streets and highways including: coordinated signal systems, video surveillance ramp metering, automated toll collection, and variable message signs

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ITS technologies applied to commercial roadway vehicles, including Trucks, commercial fleets, and inter-city buses, to expedite deliveries, improve operational efficiency, improve incident response, and increase safety.

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Applications of ITS technologies to rural needs, including vehicle location, signaling, and traveler information. Rural conditions, such as lower population densities and limited road congestion levels require technologies and techniques different from those used in urban and suburban areas.

Emergency Management
ITS technologies that can help avoid or minimize the risk of catastrophic accidents occurring in conjunction with the movement of hazardous cargoes frequently carried in the corridor.

ITS Benefits

Better Travel Information

Information centers provide up-to-date, real-time information on travel and road conditions, details on bus, transit and train arrivals and other travel information through cable television in the home, kiosks in the workplace electronic messages at bus stops, and variable message signs on the roadway.

Quicker Emergency Response

Electronic incident detection allows trained operators to locate and judge the nature of an accident so they can quickly dispatch and guide the right emergency personnel and equipment to the site.

Easier Safer Travel

Navigation systems in cars and trucks tell drivers exactly how to get to their destination. Intelligent cruise control will automatically adjust a vehicle's speed when in traffic, reducing rear end collisions and lowering vehicle emissions. "Mayday" systems in vehicles that automatically alert police, fire and other emergency personnel of accidents will become widely available.

Fewer Traffic Jams

Traffic management centers reduce traffic jams and speed travel by continuously monitoring current conditions and adjusting speed limits, traffic signals and roadway ramp access.

Improved Fleet Management

Bus, freight and emergency vehicle tracking systems allow supervisors to track vehicles and to communicate directly with drivers.

Faster Freight Deliveries

ITS provides for electronic weighing and inspection of commercial vehicles while in motion, electronic issuing and monitoring of transportation permits and automatic tracking of cargo containers.

Improved Safety

Innovations both inside and outside vehicles will improve safety by checking a driver's vision and motor skills, providing on-board road signing and vision enhancements, warning of vehicles and other obstacles in a blind spot, and preventing vehicles from hitting other objects on the road through vehicle control and warning systems. ITS technologies warn drivers that they are too close to a car in the next lane, or that they are in danger of running off the edge of the road. New traffic control systems can reduce the number of vehicle stops, minimize changes. in vehicle speeds and improve traffic flow – all of which reduce accidents.

Improved Traffic Flow

Drivers with a toll debit card attached to their vehicle can travel though toll plazas without stopping. Toll charges are deducted automatically from a prepaid account. Other travel fare collection systems, such as smart cards, allow bus fares, transfers and other fees to be charged to one card.

Source: ITS America

Transportation Future

PORTLAND, OR , VANCOUVER, WA

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CORRIDOR

STUDY

I-84
ITS Corridor Statistics

- Average Daily Traffic ADT (1992 data)

Portland - Cascade Locks:	47,000	7 accidents/mile
Baker City - Ontario	7,000	.8 accidents/mile
Caldwell - Boise	33,000	4.5 accidents/mile

- As a result of summer recreational uses and winter weather, seasonal variations of traffic differ by as much as 100% between the lowest and highest months of the year.

- Weather conditions in the Columbia River Gorge and Ladd Canyon result in highway closures of several hours to several days about a dozen times each year.

- Commercial vehicles account for more than 40% of total volumes in rural areas.

Oregon - Idaho Border	12,000 ADT (33% commercial)
Boise Area	57,000 ADT (13% commercial)
East of Boise	16,000 ADT (31% commercial)

ITS At Work
Examples from Around the United States

ADVANCED TRAFFIC MANAGEMENT SYSTEMS-

FAST-TRAC/ Oakland County, Michigan – FAST-TRAC is one of the largest ITS projects in the United States. It is a public/private partnership and encompasses:

- Computer Controlled Adaptive Signal Control System for the control of traffic signals at intersections based on real-time traffic densities.
- Automated Traffic Monitoring System using video detection devices to provide data on traffic density.
- Beacon-based dynamic route guidance system providing real-time information to motorists on the best route to use and how to get there, based on current traffic conditions.
- A Comprehensive Intermodal Transportation Information Management system for processing transportation data into information to users over a variety of media.

Results:

- 89% decrease in left-turn accidents at intersections
- 6% decrease in injury accidents
- 27% decrease in total injuries
- 19 % increase in vehicle speeds during peak hours

Minneapolis, Minnesota – The Minnesota Department of Transportation Traffic Management Center is a real-time adaptive freeway control system that meters traffic onto the freeways based on the density and speed of traffic.

Results:

- Accident rates decreased by 25%, from 42 1 to 208 a year.
- 20-minute reduction in response-time to incidents
- Average speeds increased by 35% during rush hours.
- Capacity of freeway increased by 22%

Abilene, Texas -As part of the Texas Department of Transportation program, computerized traffic signals were installed in Abilene to time traffic signals based on traffic density.

Results:

- 14% reduction in travel time
- 37% reduction in delays
- 22% increase in travel speed
* 10% reduction in carbon monoxide and hydrocarbon emissions

ADVANCED PUBLIC TRANSIT SYSTEMS

Automatic Vehicle Location (AVL) / Computer-Aided Dispatch (CAD)

Twenty-one cities in the United States have, or are in the process of installing, AVL/CAD which provides precise position of a transit vehicle along its route to a central computer at dispatch headquarters. This data is used to determine the on-time performance and provides a visual indication of where the vehicle is and of schedule adherence. The systems also provide a covert "mayday" message capability. AVL also is the basic ingredient for providing real-time schedule information to the public to make transit easier to use and more reliable.

Baltimore MTA, Maryland – Baltimore installed a system on 50 buses in 1991 and conducted **a** schedule performance test of those vehicles versus their non-equipped buses.

Results:

- Achieved a 23% improvement in on-time performance by the AVL-equipped buses.

Kansas City Area Transportation Authority, Kansas – installed a system in 199 1 on 200 buses. Improved-schedule adherence and accurate run times allowed them to use seven fewer buses to operate routes.

Results:

- Saved $400,000 in operating expenses in one year.
- Saved $1,575,000 in capital outlay for buses
- Amortized investment in less than three years.
- Reduced incident response by being able to pinpoint locations.

ELECTRONIC TOLL AND TRAFFIC MANAGEMENT

PIKE-PASS, Oklahoma Turnpike Authority – Electronic toll collection systems have been operational for several years and are currently being installed in 20 states. Electronic toll technology uses a special radio frequency tag that talks to the toll gate as the vehicle approaches. The tag identifies the drivers and the toll system then debits the driver's account for the amount of the toll. The vehicle does not need to slow down at all, and proceeds through the toll plaza at regular freeway speeds, eliminating the slowdown and deceleration at toll booths.

Results:

- Reduced accidents in PIKE-PASS lane to zero in first year of operation while there were 71 accidents in the regular toll lane.
- Reduced time lost to toll congestion by 1 million hours a year.
- Reduced annual cost of operation of toll lane from $176,000 to $15,800.
- Reduced air pollutants, including hydrocarbons by 6 to 1, carbon monoxide by 4 to 1, and nitrous oxide by 2 to 1.

Appendix D

Stakeholder Interviews

I-84 **INTELLIGENT TRANSPORTATION SYSTEMS CORRIDOR STUDY**
STAKEHOLDER INTERVIEW REPORT

EXECUTIVE SUMMARY

Background

This survey was developed to help identify problems and potential high-tech solutions within the 1-84 corridor between Portland/Vancouver and Boise. The survey covered the areas of safety, operating efficiency, environmental quality and personal mobility. The Departments of Transportation in Oregon, Washington and Idaho and the Federal Highway Administration worked closely with Pacific Rim Resources (PRR) to design the survey and assemble a list of potential interviewees. This multi-agency effort assured the creation of an instrument which was sensitive to intermodal and multi-state nature of the study.

The interviews were conducted between Mid December, 1995, and early January, 1996.

Pacific Rim Resources contacted more than 45 individuals and organizations and conducted 40 interviews to gather information about transportation problems and ITS opportunities in the Portland/Vancouver to Boise Corridor. The interviewees included local government officials, transportation specialists, state transportation departments, tourism advocates, state police, port officials, rail companies, trucking firms, barging companies and others with an interest in the corridor.

The Questionnaire

The five-page survey was sent or faxed to most survey participants prior to their telephone interviews along with a letter of explanation and a ***Transportation Futures*** fact sheet. The questionnaire included 17 basic questions and a number of follow-up inquiries within many of the questions. PRR interviewers contacted the potential participants initially to schedule the interview and answer any questions about it. Interviews usually took between 20 and 40 minutes with some lasting as long as one hour. The interviewers encouraged participants to consider the questions with a 20-year horizon in mind. Each question carried a prompt to inquire whether information-based or technological applications could have a role in solving the problem at hand.

The interviews inquired about issues in the corridor including:

- weather
- safety
- information sharing

- possible cooperative efforts
- tourism conflicts
- tourist-areas
- tourism information
- conflicts between auto and truck traffic
- conflicts between local and regional traffic
- information-related issues for commercial vehicles
- bridge problems
- other issues that affect transportation

An initial group of selected interviewees was asked for additional contacts of individuals, companies or groups that might have interests about the corridor and the ITS study. These names were used to expand the database of potential interviewees. In selecting survey participants, PRR attempted to represent not only users of road, rail and river transportation, but also those who might have an affect on issues within the corridor, such as scenic area managers. Interviewees also were selected with consideration to location so as to achieve a broad geographical representation.

Results

Most respondents offered expanded versions of existing technology to improve corridor transportation problems. Notably, most of the information obtained through the surveys was gathered in the first several questions, in particular, question number two, which is general in nature. While this caused some repetition in later responses, it allowed for the opportunity to focus discussions on the areas of most concern to the interviewee. A few respondents offered solutions that require a leap into the future with technology not readily available. Despite prompts about information-related technologies, some respondents offered only physical solutions--more lanes, better enforcement, increased access, bigger facilities--to the issues they identified.

By far, the most frequently mentioned issue was weather. Weather-related issues found their way into answers to nearly every question in the interview. Weather problems ranged from ice and snow to winds and dust storms. In light of this, it is not surprising that many of the information technologies suggestions involved getting better, more advanced weather condition information.

Most respondents agreed that while most of the needed information was available, it is not easily accessible and not readily shared. This included not only weather information, but also scheduling data that could improve inter-modal connections and port operations. The most likely area of information sharing, according to respondents, was in the area of safety and emergency response, where most people have a vested interest. Information sharing in many other areas, however, often is limited because of competitive pressures, according to several respondents.

Respondents generally agreed that the communications within the various modes is pretty good, but it tends to break down between the different modes. Respondents mentioned Global Positioning Systems (GPS), shared radio communications, intemet connections and broadcast fax systems as possible areas where improvements could be made.

Beyond weather, most respondents echoed concerns related to the various modes of transportation. On roads, congestion was the most frequent origin of potential conflicts within the corridor. The causes included:

- Peak traffic periods in and around urban areas,
- slow moving vehicles over steep terrain,
- over capacity at tourist attractions (particularly Multnomah Falls),
- poor road maintenance (often mentioned on SR 14 in the Gorge), and
- narrow tunnels.

On the river, the most frequent concern was uncertainty caused by public decisions relating to drawdowns in the river level. As this is a public policy issue, interviewees had few solutions short of educating policy makers as to the ramifications of drawdowns. Conflicts with windsurfers and fishing boats also were mentioned frequently

Rail interests cited lack of capacity as the largest problem. The reopening of Stampede Pass and better coordination at exchange points were offered most often as solutions to alleviate some of this problem

In the area of tourism, the primary issues were getting tourists to areas where they would not disrupt the flow of traffic or cause safety hazards. Some of the reasons cited for the problems with tourists included narrow road areas and lack of adequate parking and turn-out areas. Information systems could inform tourist when various attractions have reached capacity and perhaps steer them to less utilized areas, according to respondents. Information systems could also provide publicity and background for areas without which tourists might not otherwise be aware. Some suggested ways to get this information to tourists included interactive kiosks, in-car computers, or radio and cellular systems that allow drivers to select information about which they would like to know.

The last two questions asked interviewees if they would like to be kept informed and offered the opportunity to suggest other stakeholders who might provide helpful information. Many interviewees suggested names for the latter, and all said they would like to stay informed as the study progresses.

QUESTION #1
WHAT PORTIONS OF THE PORTLAND/VANCOUVER, WA TO BOISE CORRIDOR DO YOU OR THOSE YOU REPRESENT USE MOST FREQUENTLY OR ARE YOU MOST FAMILAR WITH?

Interview selection achieved varied geographical representation as well as representation from various interests within the corridor. Familiarity within the corridor of interviewees leaned toward the western end in part because those on the eastern end traveled to the Portland/Vancouver region more frequently than those in the western end traveled to Boise.

QUESTION #2
WHAT DO YOU SEE AS THE BIGGEST TRANSPORTATION PROBLEMS IN THE CORRIDOR?

By far, the most frequently mentioned problem in the corridor was weather. Respondents mentioned early warnings systems and coordination to get the latest information to corridor travelers as solutions that would help most in severe weather conditions. Congested areas also are a concern. The causes mentioned are varied, ranging from narrow scenic areas in the gorge to rush hour traffic to accidents. On the rivers, respondents mentioned that water draw downs and uncertainty about long-term regulations are major hurdles to expanding barge traffic and easing the capacity problems of the railroads.

QUESTION #3
ARE YOU **AWARE OF ANY REGULARLY OCCURRING WEATHER RELATED PROBLEMS: e.g., HIGH WINDS, FOG, SNOW OR ICED BRIDGES?**

As mentioned in responses to question two, weather was the most frequently mentioned problem in the corridor. High winds, ice and snow, dust, and water spray (impacting visibility), were the primary problems identified.

Respondents reiterated the concerns they identified in question number two and mentioned early warnings systems and coordination to get the latest information to corridor travelers as solutions that would help most in severe weather conditions.

For additional weather-related information, see responses to Question two.

QUESTION #4.
ARE YOU AWARE OF OTHER SAFETY PROBLEMS IN THE CORRIDOR/ROADWAY?

Respondents identified some specific areas of frequent wildlife crossing and rockslides. Weather was again mentioned as were some conflicts between windsurfers and river traffic.

For additional weather information, see responses to questions two and three.

See questions seven and eight for additional information about tourism and recreation effects on the corridor.

QUESTION# 5
DO THE OPERATORS OF THE RAILROAD, HIGHWAY AND RIVER SYSTEM SHARE INFORMATION ABOUT TRAFFIC AND/OR WEATHER OR OTHER ISSUES IN THE CORRIDOR?

Question number five was a four-part question designed to identify existing and potential intermodal communication and facility opportunities. According to respondents, communications between modes is very limited, but within modes appears to be fairly good. Suggested solutions to improve communications between modes included a web site on the intemet, a broadcast fax system for important information, the use of Global Positioning Systems (GPS), and shared radio communications between existing users/providers.

Some intermodal connections currently exist within the corridor, especially between-barge and rail facilities for commercial traffic. Some respondents noted that the different modes are natural competitors and are not likely to cooperate. For passenger service, connectivity is limited. Improved passenger bus and rail service and inter-modal connections were noted as desirable by some of those interviewed.

QUESTION #6
CAN YOU IMAGINE ANY OPPORTUNITIES FOR COOPERATIVE VENTURES BETWEEN THESE CORRIDOR TRANSI'ORTATION MODES, ESPECIALLY WITH INFORMATION BASED AND TECHNOLOGY APPLICATIONS?

Most of the responses and suggestions received focused on cooperation to reduce congestion and/or allow quicker and more efficient exchanges between modes at connection points. Cooperative efforts for emergency responses, safety and alternative transportation also were discussed. Most of the suggested solutions included better electronic communication systems to transmit and receive “real time" information.

QUESTION # 7

ARE YOU AWARE OF PROBLEMS IN THE TRANSPORTATION CORRIDOR POSED BY PEOPLE STOPPING ON THE HIGHWAY TO TAKE PICTURES, WIND SURFING, FISHING ETC.?

People stopping in the corridor to take pictures, windsurf or fish is primarily a problem in the Columbia River Gorge where narrow roadways, lack of sufficient shoulder or designated parking areas combine to create a serious hazard. In addition, people often cross the road and railroad tracks on foot to access the river or get a better view. High winds in the Gorge sometimes make it difficult to hear an approaching train or car.

QUESTION #8

ARE THERE PROBLEMS AT TOURIST ATTRACTIONS WITHIN THE CORRIDOR SUCH AS MULTMOMAH FALLS?

Tourist attractions can cause real traffic congestion problems. Topping the list is one of Oregon's premier attractions, Multnomah Falls. Problems at that location include the access and capacity problems for the parking lot location in the median of I-84, and people stopping on the road to take pictures or attempting to cross the highway on foot. Suggestions for managing this and other tourist locations include improved parking or parking shuttles, vista management, clear signage and encouraging the use of under-utilized facilities within the Gorge.

QUESTION # 9

IS THERE A NEED FOR ADDITIONAL INFORMATION FOR TOURISTS WITHIN THE CORRIDOR?

Interviewees identified a need for additional information on weather conditions and tourism opportunities. Methods to convey this information included the intemet, Visitors Centers, electronic kiosks or information bulletin boards at rest stops and train stations, and radio stations which would provide weather, traffic and cultural information for the region.

QUESTION #10

WHAT CONFLICTS EXIST (IF ANY) BETWEEN TRUCK AND AUTOMOBILE TRAFFIC IN THE CORRIDOR?

Some traffic conflicts exist between cars and trucks using I-84. High/peak hour congestion in metropolitan areas, narrow roadways through the Gorge, speed difference between users, and visibility impacts caused by truck spray and wet weather conditions were the most frequently mentioned concerns on I-84. Interviewees suggested alternative routes be designated for trucks, observation and enforcement of the speed limit, and improved maintenance of the road surface.

QUESTION #10 (CONTINUED)

On SR 14 in Washington State, local users expressed concerns that they may be experiencing a disproportionate share of trucks due to perceived truck driver avoidance of Oregon's Weight-Mile Tax. Concerned respondents would like to consider a study to determine the percentageof trucks choosing SR I4 over I-84 and possibly limiting truck usage of SR 14.

QUESTION # 11
ARE THERE INFORMATION-RELATED/OPERATIONAL-ISSUES FOR COMMERCIAL VEHICLES OPERATING IN THE CORRIDOR?

This question serves as a summary to earlier questions about creating greater efficiency in communications both within and between modes.

For additional information on information-related/operational issues for commercial vehicles see responses to questions five, six and ten.

QUESTION #12
ARE THERE CONFLICTS BETWEEN LOCAL AND REGIONAL TRAFFIC ALONG THE CORRIDOR?

Conflicts in the corridor occur primarily between local commuter traffic **and trucks** and to a lesser extent between local and tourist traffic on I-84. SR 14, which serves as both a regional arterial through towns along the corridor and as a major highway, experiences conflicts between local and regional users. Interviewees also mentioned conflicts on the Columbia River between commercial and recreational users of the waterway. For additional information on conflicts between local and regional traffic see responses to question 10.

QUESTION # 13
ARE YOU AWARE OF PROBLEMS ON THE BRIDGES IN THE CORRIDOR?

Problems identified on the bridges in the I-84 Corridor include congestion and icing. Congestion could be alleviated with additional crossing points, congestion control measures and/or commuter bus service. Problems resulting from icing could be controlled with improved signage and heating coils in the bridges.

Another problem identified by a few respondents was general safety for both motorized and non -motorized users of the bridges. Trucks sometimes have trouble completing narrow turns on and off the bridges and blow out tires. The narrowness and lack of proper facilities is also a problem for bicycle and pedestrian users of some of the bridges in the corridor.

One respondent said he would like to see the toll eliminated from the Hood River Bridge.

Responses to questions # 14 and # 15 are combined below.

QUESTION #14
CAN YOU THINK OF OTHER ISSUES THAT EFFECT TRANSPORTATION IN THE CORRIDOR?

and

QUESTION #15
ANY FINAL IDEAS OR THOUGHTS ABOUT HOWTECHNOLOGYORINFORMATIONBASED TRANSPORTATIONSYSTEMSCOULDBEUSEDTOENHANCETHESAFETYANDEFFICIENCY OF THE CORRIDOR FROM PORTLAND/VANCOUVER TO BOISE?

Both questions provided interviewees a chance to elaborate on other issues that they had not discussed during the course of the interview Respondents offered a pot pourri of topics, which varied greatly from the internet to identification of additional studies. However, most responses were general in nature and were covered during previous responses.

QUESTION #1 .
WHAT PART OF THE PORTLAND/VANCOUVER, WA TO BOISE CORRIDOR DO YOU OR THOSE YOU REPRESENT USE MOST FREQUENTLY OR ARE MOST FAMILIAR WITH?

The survey attempts to get varied geographical representation as well as representation with various interests within the corridor. The familiarity within the corridor of respondents leaned toward the western end of the corridor in part because those on the eastern end traveled to the Portland/Vancouver region more frequently than those in the western end traveling to Boise.

- Both SR 14 and I-84
- Columbia Gorge from Troutdale to Deschutes & Washington side-- includes interstate, Columbia River Hwy., and I-84
- Familiar with the entire corridor*
- I-5 to Metro Portland boundary (Sandy River)
- I-82 from Umatilla to Tri Cities
- I-82, I-84,395, Columbia River.
- I-82--Hanford site to I-84; I-84 to Boise and beyond
- I-84 Portland to Hood River
- I-34 Boise to Ontario and Boise to Portland
- I-84 Boise to Oregon line
- I-84 from Boardman/Hermiston to Portland and I-82 to the Tri-Cities Also familiar with River traffic.
- I-84 from Portland to Boise
- I-84 from the Idaho state line to Boise - mostly controlled access highway
- I-84 MP 0 to I-84 MP 130
- I-84 Cascade Locks or Hood River to Portland
- I-84 to Tri-Cities
- Lewiston to Portland--represents 18 ports
- Lewiston to Vancouver
- Portion within Ada County
- Portland to Boardman, where I-84 leaves the river. Also Snake River to Lewiston, Idaho
- Portland to Hood River
- Portland to McNary
- Portland to Ontario
- Portland to Pendleton

- Portland to The Dalles*
- Portland to Multnomah Falls.
- Rail line - UP line from Portland to Boise
- Rail lines from Portland to Pasco, WA
- Sandy River to the Deschutes River.
- Sherman County to Portland and west of Baker City to a lesser extent.
- SR 14 - from Klickitat to SR 82
- SR14-from mile posts 1-147
- SR 14 - Stevenson to Vancouver
- SR 14 - Stevenson/Carson to White Salmon
- SR 14 - Vancouver area and generally the Washington side
- Troutdale./Vancouver to Biggs' Junction
- Vancouver area to the Tri-cities and to Boise.

Indicates multiple response

QUESTION #2

WHAT DO YOU SEE AS THE BIGGEST TRANSPORTATION PROBLEMS IN THE CORRIDOR?

By far, the most frequently mentioned problem in the corridor was weather. Respondents mentioned early warnings systems and coordination to get the latest information to corridor travelers as solutions-that would help most in severe weather conditions. Congested areas are also a concern. The causes mentioned are varied, ranging from narrow scenic areas in the gorge to rush hour traffic to accidents. On the rivers, respondents mentioned that water draw downs and uncertainty about long-term regulations are major hurdles to expanding barge traffic and easing capacity problems with the railroads.

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Weather Problems Freezing rain and snow-Ladd Canyon, the Blue Mountains, Cabbage Hill, the Columbia Gorge*, Cape Horn, Troutdale to Cascade Locks Dust storms*-- Horse Heaven between Tri-Cities & Umatilla) during wheat production block areas on 82. Mostly during plowing operations. Also between Mile posts 3- 17 High winds, problems with things blowing off vehicles (east of Rufus to Pendleton)	Timely information and coordination between the DOTS of the three states. Electronic reader boards* to alert drivers earlier on of problems ahead. More reader boards should be put in at or before each major interchange to allow people time to find an alternative or go back if the road conditions are bad. Cell phone improvements and new technologies are needed to allow better communication. Aggressive signing. Coordinate to close traffic immediately on SR 14 when they close l-84 Internet home page as a travel advisory service and CD ROM maps. Low frequency radio - for tourist info and traffic updates Only the RR can handle the inclement weather problems. Auto Pilot that would space vehicle w/ distance sensors.

**Indicates multiple response*

QUESTION #2 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• congestion*	Alternative routes can be signalized to provide better traffic flow during incidents
Inadequate number of traffic lanes between Caldwell & East of Boise between L-84 MP 29 - MP 44 and I-84 MP 52 - MP 60	Moving to a-two-hour peak periodrecognizing that they are unable to build out of congestion
Increased congestion in Portland, Vancouver area*	Improving alternative modes such as air conditioned MAX cars, station area planning
Substandard interchanges at mile points: 17,22, 28.29,30,31,37,40,41,42,55,56,58,62,60, 64. Designed at lower standard for lower volume.	Better bicycle routes along the l-84 corridor
Congestion and safety hazards on Washington side* caused by: • Narrow road in poor condition • Narrow tunnels • Grooved highway • Few passing lanes eastbound • No slow-vehicle turn-out	Capacity expansion*, wider shoulders from points where four lanes change to two Widen interstate. More lanes for greater capacity in heavily traveled areas* Lightrail within urban areas.
I-84 east of Troutdale where lane reduction causes congestion	Columbia River Bridge from Troutdale to or ferry system short term: boat cars in the long-term Use of performance measurements to resolve "non-recurring congestion" Continued emphasis and education on moving more goods by rail. For long hauls, the use of the of the highway instead of rail is a waste of our transportation resources.
	Could improve car pool and van pool expansion and commuter bus use with highway advisory radio. Truck climbing lanes in steep areas Develop advanced notification to drivers of congested areas and areas that have reached maximum capacity and advise of alternatives Divert recreational traffic to recreational routes. Implementation of staggered work hours (government should lead the way and provide incentives for employers to do the same) Increase speed limit east of the Cascades.

**Indicates multiple response*

QUESTIONS #2 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Accidents and Safety High volume of truck traffic creates serious visibility problems with water spray. The 1-5/I-84 interchange does not work either direction Rock slides, especially during rainy season Incidents & related detour routes in Southeast corridor are complicated because it's such a rural area. Communications is a concern, but they get good cooperation from radio stations Rain collects on the highway instead of draining off and creates a large visibility problem from both the spray and the reflection from on-coming lights.* Speed limit reduction to match the conditions Additional turnouts Emergency response time to some areas, especially eastern Oregon	Incident response with portable signage and radio communications telling drivers about alternative routes. Aggressive signing/Variable Message Signs* New technology can provide better coordination: Could transmit more info for variable message signs to motorists at grade crossings The weather in the gorge is often thought to be worse than it actually is. People are often over cautious when not recommending travel in the gorge. To reduce glare could extend the height of the median barriers with louvers. May limit visibility, but not by much. Redesign the freeway so water disperses more quickly. Continued efforts and training with hazardous materials response teams
• Tourism and Scenic Areas Multnomah Falls*: high volumes of traffic, the interchange, and limited parking. Overuse of some tourist attractions and under use of others: examples at Multnomah Falls (overuse) and SR 14 (under use) Traffic in narrow the Gorge where road is narrow. Scenic attractions are often distraction. Inadequate pullovers at scenic areas where people stop to take pictures. The rest areas situation is a problem. There are very few real rest areas. People once stopped at state parks, but now many of them have day use fees even just to pull in for a few minutes.	Heightened marketing and availability of information is needed to notify people of alternative (to Multnomah Falls) recreational opportunities available in the gorge. Radio for tourism Informational signage (such as those marking crops along I-5 corridor) Tie into cell phones for info if it is into mapped data - base, video screen GIS system to get you there De-emphasize some areas - don't advertise peak locations, focus on under used areas

**Indicates multiple response*

QUESTION #2 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• TruckTraffic Increased truck traffic and the conflict it creates with other traffic in the scenic gorge area * Truck going too fast* and the lack of traffic enforcement on the highway Biggest problem is Highway 14 at The Dalles and Bingen. There is a point that is difficult for trucks so many go over to I-84 via 205 or 5. Overheight trucks in the tunnels on SR 14, the tunnels at Cascade Locks and the I-84 Wood Village overpass.	Most respondents did not suggest specific solutions. Some suggestions from other categories, such as safety, are applicable. Decrease truck traffic by encouraging intermodal opportunities such as rail piggy-backing through the gorge. Ship garbage to Arlington via rail (or piggy-back on rail) rather than truck.
• Rail Traffic Lack of passenger rail services* Heavy rail traffic and the lack of capacity expansion in rail services.* Capacity problems for rail due to the Scenic Act, which restrains rail capacity Yard constraints in Portland and Vancouver Inner city rail coordination Rail transfers are also a problem as it is expensive to move rail freight from one side of the river to the other.	The train currently runs passenger service 3 days each week, that should be expanded to 7 days each week. Highway funds need to be released to address intermodal opportunities, we can't continue to rely as a country on cars and trucks alone. High speed frequent rail service between Portland and Ontario. Open rail at Stampede Pass (give 20 percent increase in capacity Make network operations more efficient for rail with on-board computer systems for satellite tracking and global positioning system. Better track-side communications. Video and image detection could be aboard trains for earlier warnings of possible hazards
• River Traffic Draw down past the Minimus Operating Pool (MOP) in the river.* • Increased truck transport into the Gorge on I-84 if river is used less	Get some stabilization on waterway concerns, * (the need for drawdowns. for instance) Fish transport, Fish-friendly turbines, fish reroutes. Ports and companies have entered into joint ventures to provide Electronic Data Interchange (EDI) system to track container movement on the Columbia River. The EDI system will track containers at each of the locks, where they are, what is in them, etc. Companies also considering installing a GPS for barges that will provide real time information for barges and tugs

**Indicates multiple resonse*

QUESTION #2 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Intermodal Need a better route between Canada and Boise, this will help alleviate congestion on I-84 and put more traffic on the rivers	Maintain current system with all forms of transportation to keep price-competition Improve funding for roads Improve signalization to help with bottlenecks east of Spokane and at Portland Terminal upgrades for Portland Make use of the river to alleviate some of the commercial traffic on the highway and railways* Infrastructure improvements at the Port of Morrow reload facility and to highways and rail facilities. Coordinate intermodal movement with more advanced technology Coordinate and improve loading spots for trains & barges to get more stuff through a finite system
• Maintenance and Design I-84 maintenance issues- snow/ice/standing water on roadway, freezing weather and trucks can create a lot of damage to pavement SR-14 blind curves & left hand turns: Particularly at Skamania landing Visibility/maintenance problems with painted stripes and fog lines	Limit or restrict trucks during freezing weather -or-step up maintenance activities. Sensors can create maintenance help; SSI and visibility detection. Get maintenance early, provide early warning

Current ODOT Activities

There are a lot of ideas being studied or proposed at ODOT for the corridor Following is some of what is being considered:

- Revised standard diamond interchange at Beacon State Park with a south side frontage road off I-84.
- Entry/parking fees at popular sites, or some type of a permit system like a snow park permit (which would require an act of the legislature).
- Greely/North Banfield where I-5 meets I-84 working on improvements to the short on/off problem.
- Edgefield Station is in the early phases of discussion. It would be a major gateway to the area and a multimodal development north of Edgefield Manor. It is on the Union Pacific rail line and they would like to have an Amtrak stop, a park and ride, to Mt. Hood and the Gorge, a scenic RR tour, etc. It could also be used to disseminate information on tourist opportunities.
- ODOT is working on a marketing proposal aimed at limiting the numbers of people coming into the major attractions and dispersing some of that traffic.

Indicates multiple response

QUESTION #3.

ARE YOU AWARE OF ANY REGULARLY OCCURRING WEATHER RELATED PROBLEMS: e.g. HIGH WINDS, FORG, SNOW OR ICED BRIDGES?

As mentioned in responses to question #2, weather was the most frequently mentioned problem in the corridor. High winds, ice and snow, and water spray (impacting visibility), were the primary problems identified.

Respondents mentioned early warnings systems and coordination to get the latest information to corridor travelers as solutions that would help most in severe weather conditions. Congested areas are also a concern. The causes mentioned are varied; ranging from narrow scenic areas in the gorge to rush hour traffic to accidents. On the rivers, respondents mentioned that water draw downs and uncertainty about long-term regulations are major hurdles to expanding barge traffic and easing capacity problems with the railroads.

For additional weather-related information, see responses to Question #2

IDENTIFIED PROBELMS	SUGGESTED SOLUTIONS
• Ice and snow In Ladd Canyon and the Blue Mountains* Ice and snow in the Gorge * The west bound left lane of I-84 stays slick and icy all winter because it is always shaded Some ice problems with changes in road surfaces and shadowing - milepost #13 SR-14 at Sweeny's Corner - roadway design can cause cars to slide in icy weather	Advance warning systems* for all users Electronic reader boards* Heaters in the roads, especially on bridges and overpasses Reliable forecasting Improved radio communications The Port of Morrow could be promoted as an intermodal hub opportunity. In bad weather river traffc is often easier than truck Education of drivers Change from existing reflector system to upgraded version
• High winds in the Gorge For trucks, buses and automobiles * At Beacon Rock -(high winds can tip trucks/campers) Tri-Cities to 84*	Advance warning systems for high winds* Electronic reader boards* Info signs at Columbia River Bridges Get weather info to truckers as early as possible More tourist information

***Indicates multiple response**

QUESTION #3 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Bridges Iced bridges at freezing or slightly below Viaduct at Eagle Creek (longest bridge) people don't recognize that as bridge Snake River Bridge has some ice damming	Anything over 100 feet can have sensors to alert l/4 mile ahead that "ice bridge ahead" Could change from existing delinier reflector system to upgraded version, but this is not a budget item Education of drivers
• River Traffic High winds in the Gorge for barges and other river users Fog is a concern in loading and keeping on schedule	Port of Morrow or Umatilla have services that load containers to Far East. Can load into computer system all info: IDs positions on barge The GPS might help navigation in foggy conditions but there is only so much you can do and safety is a big concern
• General Weather Problems Obscured vision due to water spray from Trucks* Fog* - Canyon County area. I-84 MP 27 - MP 42 Freezing rain at Cape Horn Standing high water on I-84 in spots between Multnomah. Falls & Randy River (Hydra-planing)	Advance warning Improve painted stripes and fog lines

*Indicates multiple response

QUESTION #4

ARE YOU AWARE OF OTHER SAFETY PROBLEMS IN THE CORRIDOR/ROADWAY?

Respondents identified some specific areas of frequent wildlife crossing and rockslides. Weather was again mentioned as were some conflicts between windsurfers and river traffic.

For additional weather information, see responses to questions #2 and #3.

See questions #7 and #8 for additional information about tourism and recreation effects on the corridor.

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Windsurfers and fishermen in path of Barge traffic*	The intemet may be a good way to reach out to windsurfers, providing information on their homepages, etc. Get information to public to make aware of the danger of getting in front of a barge. Also, the channel that barges operate in is very narrow and the barge cannot swerve to avoid collisions.
• Wildlife crossings*: Lime and in Pleasant Valley. Milepost 100 -Kennewick Scenic areas of Columbia Gorge Beacon Rock State Park SR 14 at MP 29, 32 Near apple orchards	Deer reflectors--reflect light back in to woods and scare deer Electronic sensors or beams to keep wildlife off of road Wider angle headlights
• Rockslides:* Around Bridal Veil (undermining of the Historic Highway) White Salmon to Home Valley West end on Columbia River Hwy. On Railways SR 14 - problem is how do you quickly re route traffic - mixed feelings on electronic signs	No technological solutions. Keep an eye on it and do regular maintenance. There are some restrictions and concerns on signage and mitigation due to the historic designation.* Use Cape Horn solution (screen and slurry mix works well) Good example is I-84 at Shell Rock Mtn. - good maintenance, for ongoing problem Use flashing mile markers (instead of flares) Sensors*, or perhaps laser beam system to keep the from being unsightly Electronic signs*

*Indicates multiple response

QUESTION #4 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SLUTIONS
• Design Problems Entrance and exit ramps are too short, especially on bridges. Ladd Canyon and Cabbage Hill grade problems	Add acceleration lanes. Extend ramps on Hood River bridge.
• Weather problems* (Ice, wind): Cabbage Hill The Dalles to Troutdale Pavement type alternates between Boise and Ontario, i.e., concrete, asphalt, concrete, asphalt. People forget concrete roadways are slower to melt off than asphalt when it snows.	Signage early would help Lighting . Radio advisories Rumble strips, cat eyes, and better guard rails and lighting are needed. Use blue star ice warning signs
• Incidents (safety, traffic)* Passing on SR 14*--People out of the area are especially likely to try and pass when it is not appropriate. Cape Horn is especially problematic. There are some truck turnouts but the truckers do not always use them.	. Delineators or highway advisory radio to alert motorists. Trucks should be limited or separated from cars. Rail roads should be used for long hauls: "trucks deliver, rail roads haul". (B) Random safety checks should be conducted on trucks and regulations should be toughened and enforced. The general public needs to be shown the different options available for transportation. ICC bar code scanners could be used to monitor trucks more effectively. You could keep track of sleep hours, mileage, illegal use of roads etc. by installing scanners.
• Eco-tourism (Bald Eagle nesting, for example) can cause back-ups in places	Communications is critical, but system in place works well
• Night driving	Higher dividers to block on coming headlights
• Triple Trailers	

*Indicates multiple response

QUESTION # 5

DO THE OPERATORS OF THE RAILROAD, HIGHWAY AND RIVER SYSTEM SHARE INFORMATION ABOUT TRAFFIC AND/OR WEATHER OR OTHER ISSUES IN THE CORRIDOR?

Question number five was a four-part question designed to identify existing and potential intermodal communication and facility opportunities. According to interviewees, communications between modes is limited, but within modes appears to be fairly good. Suggested solutions to improve communications between modes included a web site on the intemet, a broadcast fax system for important information, the use of Global Positioning Systems (GPS) and shared radio communications between existing users/providers.

Some intermodal connections currently exist within the corridor, especially between barge and rail facilities for commercial traffic. Some respondents noted that the different modes are natural competitors and are not likely to cooperate. For passenger service, connectivity is limited. Improved passenger bus and rail service and intermodal connections were noted as desirable by some of those interviewed.

HOW IS INFORMATION SHARED BETWEEN MODES NOW?

- The links are informal because the differing modes are competitors. Trucks and rail operators are aware of barge and visa versa.
- Burlington Northern tends to say "this is how it will be" and they are not open to discussion. They are not very willing to work with others.
- Railroads have good tracking system; sophisticated software
- Monitoring CB frequencies used by truck drivers.
- Not shared tremendously
- Information sharing only if someone is pushing for it
- Information is not shared between operators.
- Barging does not with exception of potential TradeTrek
- Communications is generally from hub to hub, not mode to mode
- Consolidated Freightway LTL carriers have system
- Systems are often proprietary, rough time sharing
- We track hazardous materials shipments the way UPS does.
- Freight people seem to talk to each other all of the time.
- For example, if a truck breaks down on its way to a barge the word comes through the terminal that there will be a delay. For larger incidents such as the road out or a lock being repaired the informal network will spread the word or it will be in the media.
- 'Can be improved through an intermodal management system which ODOT and the Port of Portland have done some work on it
- There are no local media outlets, but the DOT does a pretty good job of informing people about problems
- Trucking association provides a bulletin board service for weather advisories for its members.

indicates multiple response

QUESTION# 5 CONTINUED

HOW COULD INFORMATION SHARING BE IMPROVED?

- The Internet.*
  - An I-84 Corridor Home page on the Internet.
  - The Journal of Commerce is widely read. Perhaps a regional transportation bulletin board or a Commerce home page
  - A web page and keep it updated
- Metro is trying to start a database but they are unsure of what information they need and whether or not they can get it due to competition and the proprietary nature of the information.
- coordination of info
  - Truckers--hope that TradeTrek will one day extend to truckers
  - Separate scheduling programs could be coordinated and put into easily usable format
- Windsurfers have on-line systems about wind conditions
- Barges have wind condition meters - maybe they could share information
- Found improvement with better cooperation between to or boats and busses
- more sharing locally (city-county-school districts) about conditions
- ODOT is working on setting up a traffic control system for the Portland Metro area. Could expand and extend services.
- A system of information sharing would have to be driven by congestion and what is best for the customer. Cooperating could lessen the turn around time for the customer. If we could show a truck driver that he does not lose money by dropping off a load at Morrow because he saves enough time in congestion into Portland that he can actually go back and get another load in the same amount of time, then we would be able to cooperate.
- GPS - Global Positioning Systems
- Better park and ride and commuting
- Better communications in boat traffic
- Railways have trip wires to send signals
- Improve information to and from ports
- lmproving emergency management system. This should include more reader boards for public info and a phone tree so all the right people get calls.
- Currently Amtrak maintains a communications system that tracks weather and emergency situations. It is heavily subsidized by the federal govt. And could be opened to use by other modes of transportation if they man&ted it.
- Currently NTSB channels for emergency systems are not standardized. This could gain some real efficiency in providing emergency services.
- Getting the railroad (BN) to share information would be a big improvement.
- The airport at The Dalles will soon have an automate weather station (they currently have a staffed weather station) and pilots will be able to get updated information every 10 or 15 minutes. There might be room to expand this to other users of the corridor on a call in basis. People would be able to call ahead to weather stations throughout the gorge to get the latest weather reports. There may also be a way to monitor the water on the road and inform people about more specific road conditions. The airport station will be on line in 6 or 12 mos.
- Better emergency communications network to get info in a quicker, more efficient manner
- Semi-monthly meeting meetings
- Create better links, clearinghouse
- Computerized access to shipping documents
- Improvements in cellular phone access and satellite tracking access

*Indicates multiple response

QUESTION # 5 CONTINUED

WHAT INTERMODAL CONNECTIONS ARE AVAILABLE NOW?

- River connections
- Ports of Portland and Vancouver, Port of Nampa, etc.
- An example might be container from Portland to Boardman and then truck from Boardman to Boise or rail from Boardman to Lewiston. Also rail from Boardman to Seattle or Oakland, depends where the ship is leaving from.
- The more freight forwarders are educated about intermodaling, the more money can be saved
- Anyplace where grain moves onto barges: Pasco, Burbank (Walla Walia) Whitman City, Lewiston, etc.
- Issue for Western Washington farmers is inadequate rail connection, making rail non-competitive
- The Port of Morrow tries to increase connections. Port of Morrow currently move more than one million tons of cargo.
- Bratters Mill still has lumber loading to train
- The Dalles has a transportation center where Amtrak, Greyhound and local taxis all connect.* The local motels also have some pick-up services for people arriving by train or bus. The Dalles also has a large port area that has the potential for expanded inter modal activities. Currently river and highway access, with a new interchange being built, and the possibility for a rail spur.

How COULD INTERMODAL CONNECTIONS BE IMPROVED?

- Freeway monitoring with cameras.
- Capital improvements that address rail crossing conflicts
- At Hood River and White Salmon there are Amtrak stops, but no bus service to speak of. Need more public transit in the corridor.
- Need a bus stop at Stevenson or Cascade locks.
- Intermodal connections between trucks, ports and/or railroads could improve if the state took a more active role in promoting the options and improving the infrastructure, (improvements to the rail spur to facility, road access, dock, etc.)
- Privately operated bus between counties for commuters
- Treasure Valley Alternative Transportation Study looking at Canyon and Ada Counties
- Cybertrain or light rail
- Stevenson wants/needs passenger service to Portland/Vancouver, train offers no local benefit, just goes through community
- More intermodal connection between railroad and Klickitat & Arlington to handle garbage
- Improve communications, esp. with railroad
- Provide cities with good information on how to get to the train stations
- Hood River is currently collaborating on a similar facility for boats, Amtrak, Greyhound and T.D.
- There is also talk of a park and ride facility on the Washington side of the river to take some of the pressure off the bridge and the arterial streets on the Oregon side.
- Provide more certainty to river/environmental issues
- Subsidize intermodal stations for jurisdictions. Currently in this corridor, only Portland and The Dalles have intermodal stations. Bus stations should be economically encouraged to move into train stations.
- Centralize information point for all modes.*
- New ways of identifying commodities in trucks: Bar coding, on-vehicle radio transmissions.

OTHER ISSUES

- Pasco had piggyback operation, now closed
- Moreeconomical for east/west line over Stampede Pass - if this opens, it will have impact of moving trucks off highway w/ east/west rail link

**Indicates multiple response*

QUESTION #6

CAN YOU IMAGINE ANY OPPORTUNITIES FOR COOPERATIVE VENTURES BETWEEN THESE CORRIDOR TRANSPORTATION MODES, ESPECIALLY WITH INFORMATION-BASED AND TECHNOLOGY APPLICATIONS?

Most of the responses and suggestions received focused on-cooperation to reduce congestion and/or allow quicker and more efficient exchanges between modes at connection points. Cooperative efforts for emergency responses, safety and alternative transportation was also discussed. Most of the suggested solutions included better electronic communication systems to transmit and receive "real time" information.

QUESTION #6 RESPONSES

- Better tracking systems, equipment and inventory maintenance.
- Monitoring. ODOT is looking at doing a project called Advanced Traffic Management System (ATMS).
- Telecommunications opportunities - Internet.
- Better communication between modes.
- TradeTrek program--still working out bugs with Port of Morrow. Allows reduction of redundancy.
- Better rail coordination to eliminate or decrease bottlenecks*.
- Cooperate to move closer to "just on-time" delivery. Develop better location information for all elements of intermodal transport
- A partnership of warehousing/distribution facilities involving all three modes of commercial traffic with or without public sector support
- More coordination between ports/trains/river*
- Cooperate for funding for pedestrian , bike & transit improvements.
- Cooperate on efforts to inform tourist about bridges and their plusses and minuses: for example, tell bicyclist, that it's narrow and scary.
- Additional cooperatives like Union Pacific and Burlington Northern on Positive Train Separation efforts.
- Joint tourist excursion opportunities between the Stemwheeler and the scenic tour trains.
- Customize signal systems for rail yards for more efficiency
- Look at how intercity bus and trains interact with each other. Involve businesses in generating intermodal opportunities.
- Provide for better access of information among train operators and suppliers to allow for more shuttle trains and unit trains.
- Intermodal facilities, including airport shuttles.
- Master schedule where people could call in to get information about connecting times for all transportation within the corridor.
- Special tour trains, weekly or daily, that left from Portland and toured the gorge stopping in towns and scenic areas. May even have sleeping accommodations on the train.
- Sharing of weather information
- Emergency management*
- Variabie message signs
- Charter bus services as a feeder line to handle areas where Amtrak does not stop.
- Commercial air service to The Dalles
- Channel deepening below PDX and Vancouver
- Broad-based proactive spread of information such as road and rail conditions, weather information and lock closures. These will allow for better planning and improve overall safety.
- Reopening of Stampede Pass

***indicates multiple response**

QUESTION # 7

ARE YOU AWARE! OF PROBLEMS IN THE TRANSPORTATION CORRIDOR POSED BY PEOPLE STOPPING ON THE HIGHWAY TO TAKE PICTURES. WIND SURFING, FISHING ETC.?

People stopping in the corridor to take pictures, windsurf or fish is primarily a problem in the Columbia River Gorge where narrow roadways, lack of sufficient shoulder or designated parking combine to create a serious hazard. In addition, people often cross the road and railroad tracks on foot to access the river or get a better view. High winds in the Gorge sometimes make it difficult to hear an approaching train or car.

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Columbia Gorge Problems exist in the Columbia Gorge where people pull off. Parking problems exist at Wyeth, Vent and Ainsworth state Parks. Along I-84 people pull off at Moffett Creek, Crates Point - whenever there is a wide spot in the road and it is close to the water. Congestion and parking problems exist around The Dalles near Rowena and Crates Point. RR track crossings - informal pedestrian crossings can be unsafe because truck traffic and high winds make it difficult to hear train whistle Parking is a problem because it is not always available where windsurfers want to surf. * They often park illegally and cause safety concerns when crossing the roads or railroad tracks Scenic Highway restrictions present a problem for signage* Swell City* - 1 mile west of hatchery - Best place for jumping and high performance boards - best watching - causes problems on highway Problem in the Hood River area Hydroplane races in Tri-Cities impacts 10-20 miles in all direction	Fisherman and other attractions need to be restricted, maybe with signs, but not too many in scenic corridor. Maybe need additional parking* areas or warning citations Safety information about crossing trains, notice about tickets for illegal parking Improve parking or park areas for wind surfers Better signage - especially around Cascade Locks. More turn outs, better signage for turn outs, trains, etc. and in multiple languages During rock slide - provide extra staff Use technology to free up people - get our people behind desk and on site Improve access to recreation areas We can go so far with touch boards and high tech, but people <u>really really</u> want to be with people Seminars for tourism industry to develop better, more coordinated promotions

**Indicates multiple response*

QUESTION#7 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Multnomah Falls - People stop to take pictures from the freeway pictures or walk out of parking lot to take pictures*	Redo parking lot with ODOT On site people management Need volunteers on site (give the Nordstroms experience) Direct people to alternate location w/ more adequate parking capacity Better information to people about capacity intemet pages (AAA, TICO)
• SR 14 in Washington State There is a problem with people trespassing onto the railroad tracks to take pictures or get to the river. Between Stevenson and White Salmon Between Cape Horn and north of Hood River There are parking problems at Spring Creek Hatchery, Doug's Beach* and Beacon Rock,* Cape Horn. Franz Lake, Broughton Hill Problems with parking capacity (narrow roadway)	Maybe need warning citations Safety information about crossing tram tracks, notice about tickets for illegal parking* Notification of alternatives
• Milepost 60 near Underwood also about two miles east of Lyle	
• The Dalles area East of The Dalles: people park in the service lane to go fishing and they stop to take pictures Sesquallie point, west of the Dalles used to be a big problem because windsurfers like the area and there is no access. The biggest beach in the gorge is also located here and people have to park on the freeway and cross rail tracks where the trains are traveling at 60 mph around a bend. People who stop at Mosier to go fishing are parking on the freeway.	The Discovery Center, which will open in The Dalles in April of 1997. will serve as point of distribution for information about the gorge. There will be a system that shows what is in the gorge and how to get there
US 395 bridge over Snake , junction between 240 & 395	Variable message signs to re-route 11 miles of 82 and 12 miles of 182

***Indicates multiple response**

QUESTION #8.
ARE THERE PROBLEMS AT TOURIST ATTRACTIONS WITHIN THE CORRIDOR SUCH AS MULTNOMAH FALLS?

Tourist attractions can-cause real traffic congestion problems. Topping the list is one of Oregon's premier attractions, Multnomah Falls. Problems at that location include the access and capacity problems for the parking lot location in the median of P-84, people stopping on the road to take pictures or attempting to cross the highway on foot. Suggestions for managing this and other tourist locations include improved parking or parking shuttles, vista management, clear signage and encouraging the use of under-utilized facilities within the Gorge.

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
. Mulmomah Fails*: Access:* Left hand approach is confusing and dangerous* Rural residential area loop when you exit I-84 is a long drive to return to the highway, and probably annoying to local residents Parking*: overflow can cause hazard on I-84 Overuse*: high concenuation of visitors. People trying to get out or come in the wrong way in the Multnomah Falls parking lot. People wandering onto the highway from the Mulmomah Falls parking lot. The quantity of traffic at Mulmomah Falls.	Encourage use of other sites like Bridal Veil. Promote rest of Gorge* Provide direct access (rather than left side parking entrance). Better signage* Flashing lights, lots of notice for the merge problems Make the parking lot at Multnomah Falls become a one way grid.. If possible it would be nice to have the parking lot closer to the falls for the elderly who visit. Move Mulmomah Falls parking lot to the side rather than in the median.
• Vegetation/Vista Managemenr The glimpses you get are almost an accident hazard with people slowing to try and see them	Cut back trees somewhat to allow other falls to be seen from the highway. Better visibility would encourage visitors to other sites (in addition to Mulmomah Falls).
• Train/people incidents High number of incident in wind surfing areas. 4th of July fireworks events at Vancouver	Areas already posted. Cooperation with law enforcement--Trooper on train program, for example.

***Indicates multiple response**

• Potential traffic snarls. Windsurfing at MP 50 MP60 MP95 Drano Lake*, White Salmon River*, Cape Horn MP 24, Carson Hot Springs Bingen Winery At The Dalles the second exit from the east off Hwy. 30 is a hard road to get onto. It is a short exit. Maryhill Museum & Stonehenge MP 95	Better Parking and signs for parking. Maybe shuttles.
• Monotony is sometimes hazardous. In portions of Oregon east of about Baker City, lack of scenery is almost as hazardous as scenery	On road communication through ITS could fill some of the boredom
• Tourist events can cause scheduling problems and delays	More advance notice so parties can schedule more efficiently and plan around delays

**Indicates multiple response*

QUESTION # 9

IS THERE A NEED FOR ADDITIONAL INFORMATION FOR TOURISTS WITHIN THE CORRIDOR?

Interviewees identified a need for additional information on weather conditions and tourism opportunities.' Methods -to-convey this information included the internet, Visitors Centers, electronic kiosks or information bulletin boards at rest stops and train stations and radio stations which would provide weather, traffic and cultural information for the region.

INFORMATION	WAYS OF COMMUNICATING WITH TOURISTS?
• Tourist Opportunities	WEB pages*
Multnomah Falls and along highway in Gorge.	Informational kiosks**
Gorge Discovery Center just west of Dalles*	Better signs* (Currently the Columbia River Historic Highway Advisory Committee is putting up 40 new signs.)
Columbia Gorge Interpretive Center	
Under utilized areas: Maryhill, The Dalles, Stevenson	Radio info such as "Tune to 1620 for area cultural information" or short-wave informational radio, perhaps - highlighting local attractions at targeted audiences*
At ports that are looking at developing their areas as interesting stopping points	
Eastern Oregon*	ISTEA/USFS signage should help for recreation information
Public lands east of the Cascades so people realize it is open for their use.	Scenic area signage
Between The Dalles and Baker City more tourist information and opportunities are needed.	Interactive television about tourist attractions put together in an interesting way so people can use it
Sites that have rainy day activity opportunities	Kiosks in train stations for transit info to make connections easier
At Viento Park and other places.	Audio/video on passenger trains offering optional information about sights and locations
	Visitor center downtown
	Ports at Hoodsport and The Dalles, for example
	Canyon County west of Boise give Boise art and cultural info about Boise

Indicates multiple, response

INFORMATION	WAYS OF COMMUNICATING WlTH TOURISTS?
• Signage regarding hazards,* weather and access In the gorge*	Radio frequency that broadcasts traffic conditions: "For info tune to...."* Electronic reader boards* for poor weather conditions and accidents ahead Info systems to help overcome access problems Snoqualmie Pass has a project called Travel Aid
• Educational Information* Information on trade-offs involved with limitations on different modes of transportation safety issues Weather	Expand AAA Oregon program **Smart** cars with info systems on board Weather radio channels to provide specific info Cell phone #s to call with specific information
• waterways fias to be an ongoing thing. Great deal of barge traffic combined with boaters, fishermen, jet skiers, windsurfers	Shops, signs on beaches WEB pages* Provide more turnouts so tourists are out of the way of Port traftic

*Indicates multiple response

QUESTION #10

WHAT CONFLICTS EXIST (IF ANY) BETWEEN TRUCK AND AUTOMOBILE TRAFFIC IN THE CORRIDOR?

Some traffic conflicts exist between cars and trucks using I-84. High/peak hour congestion in metropolitan areas, narrow roadways through the Gorge, speed difference between users and visibility impacts caused by truck spray and wet weather conditions were the most frequently mentioned concerns on I-84. Interviewees suggested alternative routes be designated for trucks, observation and enforcement of the speed limit and improved maintenance to the road surface.

On SR 14 in Washington State, local users expressed concerns that they may be experiencing a disproportionate share of trucks due to perceived truck driver avoidance of Oregon's Weight-Mile Tax. Concerned respondents would like to consider a study to determine the percentage of trucks choosing SR 14 over I-84 and possibly limiting truck usage of SR 14.

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• Local and through traffic conflicts* on I-84:	Now that I-84 is built and adequate Metro wants as much truck traffic on it as they can get.
Regional truck traffic on Marine Drive from Troutdale to Portland (not a truck route)	Regulate movement of truck traffic to certain hour, especially in urban areas. (Rationing system)
Conflicts ma& worse by additional development in the towns throughout the gorge	Provide alternate route (fully access controlled)
In Portland, commuting pattern is causing congestion both ways	Triple trailers should not be allowed in the gorge.
Conflicts exist on I-84 and become greater the closer you to Portland	Trucks should stay in the right lane and observe the posted truck speed of 55 MPH.
MP 40 over Cape Horn* causes some truck/car conflicts because of no turnouts	Truckers have learned to avoid commuter traffic through Boise and Ontario during rush hour.
I-84 carries significant commuter traffic throughout the Boise to Ontario stretch	Variable traffic lights in places
At Troutdale truck stop traffic backs up onto I-84	More creative road design

*Indicates multiple response

QUESTION #10 CONTINUED

IDENTIFIED PROBLEMS	SUGGESTED SOLUTIONS
• SR14 Some truck drivers using SR 14 to avoid Oregon's Weight Mile Tax* SR 14 is so survy and narrow that unless it is improved, it really can't be used to alleviate traffic on I-84. Beaon Rock traffic	Conduct a study to determine truck use on SR 14 Washington State would need to change legislation in order to equalize fees on both sides of the river.* Could use electronic fee-metering systems. Could restrict truck traffic on SR 14.
• Truck Traffic Congestion restricts Port access Triple trailors:* cause grief to commuters during windy and rainy periods Large trucks cause safety concerns and more damage to the road and bridges that are not designed to withstand this weight Trucks cause water spray, which limits visibility* Truck entry and exit on SR 14 Waste hauling between Portland and Arlington	Variable speed limits for truck might help or might be a problem because of consistency - must make sure they imposed for long stretch. Better drainage on Highway 82 would help some with water spray problem. Shouldn't limit truck traffic on I-82, but we could alleviate the problem by moving more trucks to barge. Variable or synchronized traffic lights in places* More creative road design Limits on truck passing in some areas
• speed Slow truck traffic: East bound between Washougal and East Bonneville. Problem is worse during commuter periods. Trucks do not know where they canpulltotheside Trucks driving too fast Speed enforcement is lax in the Gorge.	Signs and enforcement of speed laws
• Rail auto problems at grade crossings*	
• Metro hauling their garbage to the landfills in the gorge	Should use barges. Traffic on the river is more fuel efficient and reduces congestion.

*Indicates multiple response

QUESTION # 11

ARE THERE INPORMATION-RELATED/OPERATIONAL ISSUES FOR COMMERCIAL VEHICLES OPERATING IN THE CORRIDOR?

This question serves as a summary to earlier questions about creating greater efficiency in communications both within and between modes.

For additional information on information-related/operational issues for commercial vehicles see responses to questions five, six and ten.

WHAT AND WHERE	IDEAS FOR ADDRESSING ISSUES?
• Truck traffic When trucker pulls up to gate, most paperwork is already done. Truckers picking up or delivering empty may not have proper information. Presently goes to trouble desk. Processors check. Emergency road closures throughout need to bc communicated to the commercial vehicle operator rapidly so they don't get caught in a place they can't mm back from Trucking Triple trailers* cause grief to commuters during windy and rainy periods	Need system that's shared with trucker or shipper (TradeTrek might do this) Regulate weight more higher weights degrade the road Provide more weather information on variable message signs Continue to develop reel-time reporting systems
• Truck traffic on SR 14 Truck traffic seeking to avoid Oregon's Weight-Mile Tax*	On SR 14 a study is needed to look at the (perceived) increase in truck traffic. Open point of entry in Washington Washington State would need to change legislation in order to equalize fees on both sides of the river* Could use electronic fee-metering systems* Could restrict truck traffic on SR 14*

**Indicates multiple response*

QUESTION #11 CONTINUED

WHAT AND WHERE	IDEAS FOR ADDRESSING ISSUES?
• Port Issues that might close the Port (longshore closure or death on the dock) Port access points can be a problem getting in and out. This is the case at all Port areas Lack of properly trained inspectors at points of entry, specifically those qualified to perform the safety inspection of commercial highway vehicles as recommended by the Commercial Vehicle Safety Alliance (CVSA)	New systems in which all info on containers is already given to them (SSA system) Get that info into info network (signs, radio) Barge Co. has excellent communications with all of their barges through cellular phones, radio, and other means
• enhanced with school buses	
. Traffic and road construction problems	Reader boards well in advance always help
• Commuter traffic in Portland	Highway advisory radio
General Comments:	There is a cellular phone system for the Coast Guard, Fii, and Marine people implemented through a federal grant which allows users from Portland to Astoria to make a call at local price Cabbage Hill is handled very well

*Indicates multiple response

QUESTION #12
ARE THERE CONFLICTS BETWEEN LOCAL AND REGIONAL TRAFFIC ALONG THE CORRIDOR?

Conflicts in the corridor primarily occur between local commuter traffic and trucks and to a lesser extent between local and tourist traffic on I-84. SR 14, which serves as both a regional arterial through towns along the corridor and as a major highway, experiences conflicts between local and regional users. Interviewees also mentioned conflicts on the Columbia River between commercial and recreational users of the waterway.

For additional information on conflicts between local and regional traffic see responses to question 10.

PROBLEM	SOLUTION
• Commuter Traffic Conflict between through traffic and commuter traffic commuting pattern is running congestion both way. In Portland, west end is a little worse than the east end of I-84 East bound traffic between Washougal and East Bonneville, especially with impatient commuters in the evening. Trucks do not know where they can pull to the side Commuter traffic is disrupting original purposes of highway system which is interstate commerce & national safety	Might consider restricting some access on the 16th and 33rd ramps. Congestion pricing Provide business loops Provide better traffic info (there is already pretty good info out there, but it doesn't help) Weather and accident information could be posted before each river crossing opportunity.
• SR 14 Conflicts SR 14*: Left turn movements that regional traffic may be unaware of SR-14 serves dual role - local access - regional through route which creates conflicts* Conflicts between wind surfers and fisherman for parking and-access	New highway project going through Stevenson should help local problem The Gorge Commission needs to look at how to improve access, maybe provide a shuttle service, encourage people to drive and park less along the gorge corridor

IIndicates multiple response

QUESTION #12 CONTINUED

PROBLEM	SOLUTION
• River Traffic Wind surfers* cause traffic difficulties for locals Wind surfers* cause safety problems for trucking crossing the roads and parking too close to the highway Fishers and barges Wind surfers & barge traffic	
• TruckTraffic MP 40 over Cape Horn causes some truck/car conflicts because of no turnouts Through trucks using SR 14 because of weight taxes conflict with local and tourist traffic US 395 truck stop would cause additional traffic. Stanfield to Umatilla will increase 400 semi-trucks a day to Willamette District Facility	Regulate movement of truck traffic to certain hour, especially in urban areas. Perhaps a rationing system
• Tourist Traffic People slowing down or stopping in the scenic areas The Columbia Crest Highway (I-84 near Mulmomah Falls, rural residential area) Portland Metro area* Corbett through Vista House - conflict between tourist, bicycle and local traffic At the Marina exit in Hood River, traffic gets backed up onto the freeway on Fridays and holidays	Better return to highway at Multnomah Falls Provide info on where to park, stop, etc. Low frequency radio Since the highway will never be widened -provide info and work with bicyclist, sign warnings.

**Indicates multiple response*

QUESTION #12 CONTINUED

PROBLEM	SOLUTION
• Exit Ramps City Center exit #84 in The Dalles: There is no stop at the bottom and people are going 60 mph into town Exit 83 in The Dalles: Local traffic on Hwy. 6, on the freeway is causing traffic to back up	Solutions include stop signs at the bottom of the ramps and signalization at the intersections by the ramps to control traffic ..
• other Lack of local infrastructure sometimes forces slow-moving farm equipment onto the interstate	
• congestion I-84 at 197 is becoming congested Traffic congestion at I-84 and US 395	Signalization may help

*Indicates multiple response

QUESTION# 13
ARE YOU AWARE OF PROBLEMS ON THE BRIDGES IN THE CORRIDOR?

The primary problems identified on the bridges in the I-84 Corridor include congestion and capacity concerns as well as safety and icing. Congestion could be alleviated with additional crossing points, congestion control measures such as encouraging the use of other bridges or demand management, and/or commuter bus service. Some of the bridges are too narrow for some vehicles. Trucks sometimes have trouble completing narrow turns on and off the bridges and blow out tires

A few respondents expressed concern about general safety for both motorized and non -motorized users of the bridges. The narrowness of some bridges and lack of proper facilities is a problem for bicycle and pedestrian. Facilities need to be provided to accommodate them or they need to be prohibit from using the bridges.

Problems resulting from icing could be controlled with improved signage and heating coils in the bridges.

One respondent expressed concerns about delays caused by draw bridges and one said they would like to see the toll eliminated from the Hood River Bridge.

PROBLEM	SOLUTION
• Icing:* Maryhill grade horrid because of freezing rain, snow and truck traffic. Big White Salmon Bridge at MP 64	Heaters in the road Signage* Larger (temperature sensitive) reflectors which indicate freezing temperatures on the bridges
• Draw Bridges Delays caused by draw bridges	Better and more advanced information to trains and auto about when river traffic will cause draw bridge &lays Sensors along river to provide more accurate river traffic arrivals for more efficient draw bridge lifting and lowering
• Tolls:	Would like to see toll eliminated on Hood River Bridge.

*Indicates multiple response

QUESTION # 13 CONTINUED

PROBLEM	SOLUTION
• Congestion/Capacity The Hoo dRiver Bridge is too narrow * and operating beyond its capacity. There is a problem-- with the arterial street capacity at the Oregon terminus. Bottlenecks form on SR 14 and I-34, backing traffic up onto the access lanes on the highways.* Problem with RR bridge west of I-5 bridge, trains switching in Vancouver back up on RR bridge and limit RR opening I-5 bridge opening back up traffic on SR 14 Cascade Lacks and The Dalles bridges have load restrictions and are very narrow	Hood River Bridge needs to be redesigned* or an additional bridge added. The Dalles bridge is-underutilized, maybe some Hood River traffic could be diverted Cascade Locks and The Dalles bridges need to be updated to improve access for trucks and motor homes.
• safety Trucks can't make turn on Hood River Bridge and blow tires* Westbound suspended stretch of I-84 (by Bonneville) Narrow bridges for Bike and Pedestrian use. Bridge at Hood River and Bridge of the Gods have problems with inadequate turning lanes and cars crowding the center	Provide better Hood River side information Close truck traffic to SR 14 when I-84 closes Sign the curves. Seems to always cause problems. Provide for bikes and pedestrians

**Indicates multiple response*

QUESTION # 14

CAN YOU THINK OF OTHER ISSUES THAT EFFECT TRANSPORTATION IN THE CORRIDOR?

Highway

- Weight mile tax repeal (to be replaced with a registration fee); impacts on length and weight of commercial vehicles
- Road maintenance
- Single-vehicle commuters
- Declining service ability of the highway system in general. Our roads are falling apart faster than we can fix them
- Commuter traffic from The Dalles and Hood River to Portland could be accommodated with a van service
- Access in Portland metro area is being limited by over capacity arterial system.
- Studded tires. Should impose a surcharge.
- Highway construction, narrow lanes.

River

- Salmon Recovery plan could impact river traffic: A draw down on the Snake river could impact barge traffic bringing more trucks and rail use to the I-84 Corridor.
- Draw down of the river. Railroads are operating at 110% of capacity through the gorge. There are a whole host of issues that effect travel through the gorge: gas prices, weight restrictions, speed limits.
- Inability to expand river transportation system
- Breakdowns in river system that isolate and halt transportation of goods (Lock repair at ice bridge)
- Deepening of navigation channel

Rail

- How will big Railroad mergers impact rail traffic in the corridor? The Sante Fe and Burlington Northern lines have merged and Northern Pacific and Southern Pacific have filed papers to merge.
- Railroad conflicts are growing problem
- Special events can cause capacity problems on rail. Handled now through pricing strategies. Internet and similar info on busy rail periods would aid travelers.

General/Overall

- Information flow and communication between agencies* Continue to improve by tying in various types of electronics, radar, GPS, converging vehicle systems, etc.
- Overall traffic is increasing in the corridor. How will that increase be accommodated? The options for highway traffic are limited, alternative modes for moving goods need to be promoted. Encourage cooperation rather than competition between modes.
- Ten years ago - major cutbacks. then growth, now dropping back
- Hanford concerns
- People in Portland have the perception that The Dalles is hours away when it only takes an hour to get to from Portland. Mulmomah Falls seems to be the limit that people will travel from Portland. The Discovery Center may change this.
- National scenic area makes it tough to mitigate transportation problems with traditional solutions.

**Indicates multiple response*

QUESTION #15

ANY FINAL IDEAS OR THOUGHTS ABOUT HOW TECHNOLOGY OR INFORMATION BASED TRANSPORTATION SYSTEMS COULD BE USED TO ENHANCE THE SAFETY AND EFFICIENCY OF THE CORRIDOR FROM PORTLAND/VANCOUVER TO BOISE?

- More reader boards (variable message signs) for weather conditions and opportunities ahead.*
- Add a variable message sign at Ladd Canyon for warnings
- Variable message signs updated regularly at the Sandy River and The Dalles with weather, road surface, construction schedules.
- Internet usage and other methods of sharing information between organizations..
- Provide some centralizedsource of information such as an internet site
- Perhaps some kind of Metering systems that give Port traffic priority at certain times,
- Traffic control in Bingen and Hood River, possibly stop light at Hood River bridge.
- **Avis commercial**: location tracking
- GPS on certain locations so driver would know more info.
- Ada County is working on 3 phases for ITS using RSD
    1) Determine the use of RSD
    2) Instead of using traditional means of stopping vehicle
    3) Determine whether Outside Ada County vehicles are dirtier than Ada county vehicles--used RSD
    4) Determine whether RSD is reliable for CO emission--compare RSD to reading of stationary testing on same vehicle
- More informational signs.
- Better coordination.*
- Need to provide timely updates of road condition information, must be faster than local grapevine.*
- Commercial rail tracking information could be shared. Would improve overall interface with truck hauling and help ease delays and congestion on passenger rail lines.
- Improve information and signage for small towns utilizing existing businesses.
- Railroads should be penalized for removing infrastructure rather than receiving tax credits.
- Highlight the fact that there are other options of modes travel for people.
- Both ODOT and WSDOT are working with the communities in the corridor to resolve transportation issues.
- Become more effective at redirecting traffic where appropriate rather than adding capacity.
- Increase the use of high-occupancy vehicles in the corridor.
- Second or Third generation of traffic report. Staggering of traffic. A traffic meeting would be useful.
- More futuristic control of the external environment such as weather control, road conditions, traffic spacing and eventually automatic control of vehicle or rail engine.
- Enhanced accident avoidance devices*

*Indicates multiple response

PORTLAND,OR/VANCOUVER,WA.TO BOISE,ID
I.T.S. CORRIDOR STUDY
TELEPHONE INTERVIEW INSTRUMENT

NAME _____

POSITION _____

AFFILIATION _____

ADDRESS _____

PHONE _____ FAX _____

DATE _____ INTERVIEWER _____

1. WHAT PART OF THE PORTLAND/VANCOUVER WA TO BOISE CORRIDOR DO YOU OR THOSE YOU REPRESENT USE MOST FREQUENTLY OR ARE MOST FAMILAR WILL?

2. WHAT DO YOU SEE AS THE BIGGEST TRANSPORTATION PROBLEMS IN THE CORRIDOR? WHERE?(BY MILEPOST, IF POSSIBLE)

(A) YOU HAVE ANY IDEAS FOR SOLUTIONS OR WAYS TO ADDRESS THESE PROBLRMS, ESPECIALLY INFORMATION BASED AND TEHCNOLOGICAL APPLICATIONS?

3. ARE YOU AWARE OF ANY REGULARLY OCCURRING WEATHER RELATED PROBLEMS e.g. HIGH WINDS, FOG, SNOW OR ICED BRIDGES? YES _____ No _____

(A) WHAT AND WHERE? (MILEFOST, IF POSSIBLE)

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS OR WAYS TO ADDRESS THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

4. ARE YOU AWARE OF OTHER SAFETY PROBLEMS IN THE CORRIDOR/ROADWAY?

WILDLIFE CROSSINGS _____

ROCK SLIDES _____

_____

(A) WHERE? (MILEPOST, IF POSSIBLE)

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS TO THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

5. DO THE OPERATORS OF THE RAILROAD, HIGHWAY AND RIVER SYSTEM SHARE INFORMATION ABOUT TRAFFIC AND/OR WEATHER OR OTHER ISSUES IN THE CORRIDOR?

YES _____ NO _____ _____

(A) HOW COULD INFORMATION SHARING BETWEEN MODES BE IMPROVED?

(B) ARE YOU AWARE OF INTER-MODAL CONNECTIONS BETWEEN TRUCKS, PORTS AND/OR RAILROADS? BETWEEN PASSENGER TRAINS AND BUSES? OTHER?
YES _____ NO _____ NOT SURE _____
PLEASE DESCRIBE:

IS IT ADEQUATE? CAN IT BE IMPROVED?
YES _____ NO _____ NOT SURE _____
COMMENT:

(C) IN CASE OF ACCIDENTS/INCIDENTS (E.G. ROCK SLIDES, HAZARDOUS MATERIAL SPILLS) IS INFORMATION SHARED BETWEEN MODES OF TRANSPORTATION IN A TIMELY FASHION? YES _____ NO _____ NOT SURE _____

(D) DO YOU HAVE ANY IDEAS FOR SOLUTIONS TO THESE INTERMODAL PROBLEMS, ESPECIALLY RELATED TO THE USE OF INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?
COMMENT:

6. CAN You IMAGINE ANY OPPORTUNITIES FOR COOPERATIVE VENTURES BETWEEN THESE CORRIDOR TRANSPORTATION MODES, ESPECIALLY WITH INFORMATION BASED AND TECHNOLOGY APPLICATIONS?

7. ARE YOU AWARE OF PROBLEMS IN THE TRANSPORTATION CORRIDOR POSED BY PEOPLE STOPPING ON THE HIGHWAY TO TAKE PICTURES WIND SURFING, FISHING ETC.?

(A)WHERE?(MILEPOST, IF POSSIBLE)

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS TO THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

8. ARE THERE PROBLEMS AT MULTNOMAH FALLS OR OTHER TOURIST ATTRACTIONS WITHIN THE CORRIDOR? YES_____ NO_____

(A) WHAT AND WHERE?

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS To THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

9. IS THERE A NEED FOR ADDITIONAL INFORMATION FOR TOURISTS WITHIN THE CORRIDOR?
YES _____ NO_____ DON'T KNOW_____

(A) WHAT KINDS OF INFORMATION?

(B) WHERE?

(C)DO YOU HAVE ANY IDEAS FOR IMPROVING COMMUNICATIONS WITH TOURISTS, ESPECIALLY USING INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

10. DO CONFLICTS BETWEEN TRUCK AND AUTOMOBILE TRAFFIC IN THE CORRIDOR CAUSE SIGNIFICANT PROBLEMS? YES _____ NO _____

(A) WHAT AND WHERE?

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS TO THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

11. ARE THERE INFORMATION-RELATED/OPERATIONAL ISSUES FOR COMMERCIAL VEHICLES OPERATING IN THE CORRIDOR?

YES _____ NO _____ DON'T KNOW _____

(A) WHAT AND WHERE?

(B) DO YOU HAVE ANY IDEAS FOR ADDRESSING THESE ISSUES ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

12. ARE THERE CONFLICTS BETWEEN LOCAL AND REGIONAL TRAFFIC ALONG THE CORRIDOR?

YES _____ NO _____

(A) WHAT AND WHERE/

(B) DO YOU HAVE ANY IDEAS FOR SOLUTIONS TO THESE PROBLEMS, ESPECIALLY INFORMATION BASED AND TECHNOLOGICAL APPLICATIONS?

13. ARE YOU AWARE OF PROBLEMS ON THE BRIDGES THAT CROSS THE COLUMBIA RIVER IN THE CORRIDOR? YES _____ NO _____

(A) WHAT AND WHERE?

(B). CAN YOU THINK OF WAYS TO INCREASE THE EFFICIENCY OF THE BRIDGES USING TECHNOLOGICAL AND/OR INFORMATION BASED SOLUTIONS YOU CAN IMAGINE TO IMPROVE THESE NORTH-SOUTH CONNECTIONS?

14. **CAN YOU THINK OF OTHER ISSUES THAT EFFECT TRANSPORTATION IN THE CORRIDOR?**
YES _____ **NO** _____

15. ANY FINAL IDEAS OR THOUGHTS ABOUT HOW TECHNOLOGY OR IN-FORMATION BASED TRANSPORTATION SYSTEMS COULD BE USED TO ENHANCE THE SAFETY AND EFFICIENCY OF THE CORRIDOR FROM PORTLAND/VANCOUVER TO BOISE?

16. **WOULD YOU LIKE TO BE KEPT INFORMED AS THE STUDY PROGRESSES? WE WOULD LIKE TO ADD YOUR NAME TO OUR MAILING LIST. YES** _____ **No** _____

(Make sure the name and address are on the front page)

17. **ARE THERE OTHER PEOPLE YOU THINK IT WOULD BE HELPFUL FOR US TO INTERVIEW OR KEEPINFORMED?**

NAME _____
TITLE _____
ORGANIZATION _____
ADDRESS _____
_____
PHONE/FAX _____

NAME _____
TITLE _____
ORGANIZATION _____
ADDRESS _____
_____
PHONE/FAX _____

THANK YOU FOR YOUR TIME.

INTVW.DOC

LIST OF INTERVIEWEES

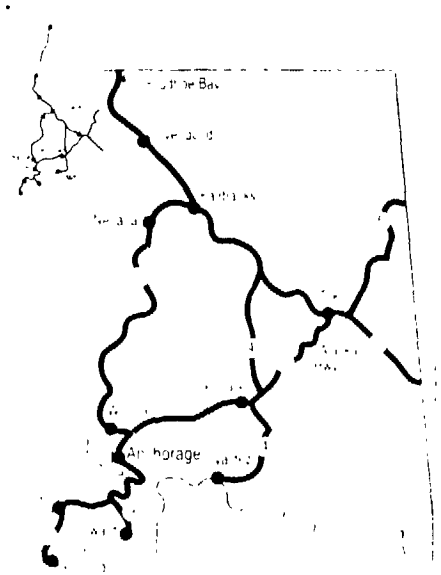
Name	Agency
Ron Kerr	ITD Headquarters
skip Hart	Tidewater Barge Lines, Inc.
Michael Hoglund	Metro (Portland area MPO)
Lewis L. McArthur	Historic Columbia River Highway Working Group
Arlene Johnson	Columbia River Gorge Visitors Assoc.
Scott Taylor	WA Public Ports
Gary Neal	Port of Morrow
Bob Lentz	Washington State Police
Ali Bonakdar	Ada
Dave Madill	Port of Portland
Eric Berger	Washington State County Road Administration
Mary Ann Duncan-Cole	City of Stevenson
Art Carroll	U.S. Forest Service
George Hilsinger	WSDOT South Central Region
Gary Moles	ITD District 3
Ralph Powell	Idaho State Police
Jeff Schultz	Blue Mountain Railroad
Dan Burns	Burlington Railroad
Mike Meridith	Oregon Trucking Association
Jean Palmateer	RTAP Eastern Oregon Head Quarters
John Mitchum	Wilhelm Trucking
johnothan Schleuer	PWW Grain & Feed
Elmer Stacey	Port of Klickitat County
Janet Kloose	ODOT
Dan Darrow	The Dalles Airport

LIST OF lNTERVIEWEl3 (continued)

Sharon Schalk	White Salmon School District
Robert Locket	Idaho State Police
Lee Coulthart	James River
Dennis Mitchell	ODOT Region 1
Anne O'Ryan	Oregon AAA
Dean Warton	Greyline Tours
Jack Hamill	Bonneville Power Administration
Kim Puzey	Port of Umatilla
Ken Niles	Oregon Department of Energy
Peggy Lalor	Columbia Gorge Windsurfing Assn.
Melissa Carlson-Price	Skamania County
Bernie Bills	Port of Vancouver
Mike Kania	USFS National Scenic Area
John Burkeland	Westinghouse Hanford

Appendix E

Most Serious Truck Accident Locations for the states in the Pacific Northwest



ALASKA

5 - Taylor Hwy, [illegible] to Canadian

1 - Glenn Hwy, [illegible] to Glennallen
[illegible] Roads

1 and Hwy 9 - Seward Hwy, Anchorage south to
[illegible] Steep Roads

3 - Parks Hwy, [illegible] to south of Fairbanks

n Hwy - Haul Road, *Fairbanks to Prudhoe Bay*
[illegible] Extreme Cold, Flooding, and

WLEDGMENTS
DATA

GENERAL INFORMATION TELEPHONE NUMBERS

ALASKA

Alaska State Troopers	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

IDAHO

Idaho State Police HQ	(208) 884-7200
Idaho State Police [illegible]	(208) 884-7220
Idaho Public Utilities Commission	(208) 334-0320
Office of Motor Carriers	208 334 3542
Road Conditions	208 336 6600

OREGON

Oregon State Police	503 378 3723
Oregon Public Utility Commission	(503) 378-6659
Office of Motor Carriers	503 399-5775
Road Conditions	503 365 4154

WASHINGTON

Washington State Patrol	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

Trucker, Be Alert!

Most Serious Truck Accident Locations

for the states in the Pacific Northwest

(Alaska, Idaho, Oregon, Washington)

U.S. Department of Transportation
Federal Highway Administration

Emergency Services Providers

county	PSAP Agency	Contact Person	Phone
Clark, WA	Clark Regional Communications Agency	Thera Bradshaw	(360) 694-l954
Skamania, WA	Skamania County Sheriffs Office	Deputy Ed Powell	(509) 427-9490
Klickitat, WA	Klickitat County Adminiatrator	Ed Hoyle	(509) 773-4616
Benton, WA	Southeast Communications Center	Lorlee Mizell	(509) 582-0187
Multnomah, OR	City of Portland-Bureau of Emergency Communications	Sherill Whittemore	(503) 823-0911
Hood River, OR	Hood River county Sheriffs Office	Lt. Carl L. Casey	(541) 386-2711
Wasco, Sherman, Gillam	wasco county Communications (The Dalles)	Bill Lennox	(541) 298-5771
Morrow, OR	Morrow County Sheriff's Office	Sheriff Roy Drago	(541) 676-5317
Umatilla, OR	Umatilla County Sheriffs Office	Sheriff Gordon Campbell	(541) 276-7111
Union, OR	Union County Communications	Ramona Goins	(541) 963-5 112
Baker, OR	Baker County Sheriffs Office	Sheriff Terry Speelman	(541) 523-6415
Payette, Canyon, Ada, Idaho	Bureau of Disaster Services	Darrel Waller	(208) 334-3461

application ITS Corridor