Health and the Environment

Investing in our transportation systems can help align citizens' goals for a healthy environment. Environmental elements are considered part of every project's design, construction, operation and maintenance.

Highway construction projects are designed to:

- Treat stormwater by removing sediments and metals
- Protect the quality of groundwater
- Control erosion of banks and reduce surface run-off
- Provide fish passage and enhance habitat connections
- Build barriers to reduce noise on neighborhoods
- Replace and improve wetland functions
- Protect cultural and historic resources
- Minimize air pollution
- Allow habitat connectivity for animals
- Provide Bicycle/Pedestrian Facilities as needed.

WSDOT plans to continue investing in stand-alone environmental retrofit projects to fix problems along the existing highway system.

These projects are funded to:

- Remove culverts that keep fish from reaching upstream habitat
- Reduce highway noise in areas not addressed by past construction projects
- Treat stormwater
- Fix stretches of highway that suffer repeated flooding or streambank erosion
- Provide pedestrian crossings near schools, senior centers, and parks
- Provide bicycle connections near schools and in urban areas

Fish Passage Barrier Retrofit

What is the Problem?

Salmon and other fish need access to freshwater habitat for spawning and juvenile rearing. Under-sized road culverts act as barriers, blocking fish from habitat.

A state program identifies and fixes fish passage barriers on state highways (recent funding boosts this program). There is currently no statewide program to identify and fix barriers on non-state roads.

Vision for the Fish passage Barrier Removal Program

1. What is the problem and how do you find it? Highway culverts can act as barriers to fish passage that may keep salmon and trout populations from accessing their historic rearing and spawning grounds. Prior to WSDOT establishing its fish passage barrier removal program, there was no way to fund stand alone fish barrier correction projects. In 1991, WSDOT established a programming process to propose stand alone fish barrier removal projects to the Legislature.

We contracted with the Washington Department of Fish and Wildlife (WDFW) to inventory, identify, and prioritize state-owned culverts that are fish passage barriers. To date, WDFW has inspected 5,853 highway stream crossings and have identified 1,538 WSDOT-owned fish passage barriers where modifications to the culvert or other water crossing would result in significant fish habitat gain. We have removed 180 of these barriers and over 411 miles of stream habitat has been reclaimed for fish use.

2. What is our vision for the Fish Passage retrofit program and where do we want to be in 10 year, 20 years? (THIS SECTION IS STILL A WORK IN PROGRESS).

   WSDOT's long-term goal is to correct all fish passage barriers. Our strategy is to correct the highest priority fish passage barriers first. Some barrier corrections provide more habitat gain than others and projects to correct the barrier can vary widely in cost. The highest priority barriers are those that open up the greatest amount of high-quality fish habitat

at the lowest cost. The rate of barrier correction also depends on the amount of funding WSDOT has for the barrier removal program.

Existing funding:
TPA:

Our vision (or what we'd like to do if we had the money): In 20 years, we would complete 40% of the barriers to gain 80% of the highest quality habitat.

3. How do we prioritize the retrofit work?

WDFW evaluates and prioritizes WSDOT culverts identified as barriers to fish passage and establishes a Priority Index (PI) for each project. Projects are prioritized so that the first culvert barriers corrections are those that provide the greatest habitat benefits to fish. The PI takes into account the habitat gain, mobility and health status of the fish stocks that would benefit from the increased habitat, and the projected project cost. Barriers that rate the highest are those that benefit the most species and open up the most habitat.

5). How do we characterize the benefits? What are our performance measures? What are our links to current initiatives (executive order, governmental goals, policies, etc.

We characterize benefits as the square meters of habitat opened up for salmonid use as a result of barrier removal. WDFW inspects each corrected barrier the first year after construction. Each project is checked for fish passage use, and certain sites are selected for long term studies to see if fish use continues and whether the design of the structure is working as intended. As of May 2006, more than 1,752,387 square meters of salmonid habitat, or over 662 linear kilometers (411 miles) has been reclaimed.

Correction of WSDOT fish passage barriers directly supports statewide salmon recovery efforts. In addition, barrier correction may also help reduce repetitive maintenance activities.

6). Maps
GIS maps of identified WSDOT fish barrier removal projects have been created and are available as overlays.

2005 Legislative Action

$20 million for fish passage barriers on state highways.

WTP says "188 million to remove 900 barriers"

Ability to meet goal of fixing all barriers (nearly 900 sites require fixes on state highway system).

Description of Proposal

Assess whether projected funding over the next 12 years for the Fish Passage Barrier Retrofit program will adequately cover the need on state facilities.

Develop a strategy to address barriers on tribal, county and city roads.

Description of Benefits/Impacts of Implementing the Proposal

Correcting fish passage barriers like roadway culverts is one of the most effective ways to improve streams for fish habitat conditions.

WSDOT Fish Passage Barrier Removal Plan

WSDOT has been evaluating and correcting state highway fish passage barriers using a three-pronged approach. First, it designates dedicated (I-4) funding to correct the highest priority fish passage barriers within the Environmental Retrofit Program's Six Year Plan. Second, as road projects are constructed, additional fish passage barriers are removed whenever a Hydraulic Project Approval (HPA) is required. Combining fish passage restoration with road project construction decreases costs eliminating duplication in equipment and personnel mobilization. And third, some fish passage barriers are corrected as a result of routine maintenance on failing culverts.

Fish Passage Barrier Correction with Dedicated I-4 Funding

Each biennium dedicated funding within the WSDOT Environmental Retrofit Program (I-4) budget is set aside for correction of ranked, high priority fish passage barriers identified during the WSDOT inven-

tory. Projects are prioritized to provide the largest gains in habitat and the greatest production benefits for both migrating and resident fish species. Many factors determine a project's priority including: the degree of passage improvement, potential increase in production for specific species resulting from the gained habitat, amount of habitat gained, benefits or drawbacks from increased mobility to species present, stock status of species present (WDFW Salmonid Stock Inventory, SaSI), and cost of the project. All the factors are consolidated in a numeric Priority Index (PI) model, which provides an objective priority ranking for each project. These projects are contained within the Washington State Department of Fish and Wildlife (WDFW) Fish Passage and Diversion Screening Inventory Database.

Six Year Planning Document

At WSDOT's request, WDFW has prepared a prioritized list of fish passage projects to be constructed and evaluated over the next three biennia. The Six Year Plan is the result of a process of project evaluation, scoping, development of conceptual designs, and budgeting. The Six Year Plan is regularly updated as projects are identified, prioritized, scoped, and refined. Project scoping is a multi-phased process that is carried out by WDFW biologists, environmental engineers, and WSDOT regional staff.

Fish Passage Inventory

Fixing Chronic Stream Bank Failures

What is the Problem?

At numerous locations along the state highway system, stream banks frequently flood or fail, damaging the roadway. Frequent and chronic maintenance and repairs to the state transportation infrastructure cause impacts to fish and/or fish habitat.

2005 Legislative Action

The Legislature provided $52 million to fund 10 retrofit projects.

WTP lists this as Medium Priority $98 Million

Stream bank failures additional needs.

(note: based on rate at which sites are currently identified and reach analyses completed, this is the low estimate. Aggressive retrofit would be $400 million)

Description of Proposal

Increase the funding level in order to continue identifying and fixing sites that are in need of long-term solutions to repetitive, high-cost maintenance.

Description of Benefits/Impacts of Implementing the Proposal

Expanding the program reduces maintenance costs for chronic repairs, reduces flooding risk, and improves habitat for important fish species.

Prioritization for Chronic Environmental Deficiencies (CED) Projects

Washington State Department of Transportation
Fish Passage Barrier Removal Data used in the Development of the 05-07 Program

								6 Year Plan				
								05-07	07-09	09-11	11-13	13-15
Stream/Project Name	Priority Index	Percent Passable	Hwy	MP	Region	Tributary Location	Site ID	Cost Est ($1,000's)	Cost Est ($1,000's)	Cost Est ($1,000's)	Cost Est ($1,000's)	Cost Est ($1,000's)
WDFW Inventory and Scoping	N/A	---	Statewide	N/A	All	---	N/A	$1,500.0	$1,600.0	$1,700.0	$1,800.0	$1,900.0
Mill Cr	19.1	0	US 2	70.21	NC	Nason Cr	990282	$1,009.0				
Little Boulder Cr	15.7	0	SR 20	181.34	NC	Methow R	990228	$498.0				
Beaver & Frazer Cr's (Twisp)	43.6/19.1	---	SR 20	205.84/206.85	NC	---	980114/24	$832.0				
Stevens Cr	22.0	0	SR 92	0.47	NW	Lake Stevens	991821	$280.0				
Toad Cr	13.4	0	SR 542	2.4	NW	Squalicum Cr	991803	$204.0				
High Cr	21.4	33	SR 542	24.9	NW	Kendall Cr	991621	$141.0				
Baptist Camp Cr	8.4	67	SR 542	28.74	NW	NF Nooksack R	990023	$140.0				
Hedrick Cr	16.6	0	SR 542	32	NW	Nooksack R	990187	$181.0				
Gribble Cr	21.9	33	SR 9	48	NW	WF Nookachamps Cr	991122	$208.0				
Catherine Cr	24.8	---	SR 92	1.93	NW	---	07.0148 1.3	$82.0	$126.0			
Swamp Cr	61.6	---	I 405	29.75	NW	---	08.0059 7.00	$92.0	$174.0			
Skobob Cr	20.0	67	SR 106	0.85	OLY	Skokomish R	990384	$947.0				
Unnamed to Physt R.	28.0	0	SR 112	24.91	OLY	Pysht R	990714	$243.0				
Chicken Coop Cr	30.9	0	US 101	271.98	OLY	Sequim Bay	990075	$32.0	$732.0			
Unnamed to Skokomish R	10.8	0	SR 106	2.95	OLY	Skokomish R	991244	$24.0	$288.0			
Bjorgen Cr	17.2	0	SR 305	9.88	OLY	Liberty Bay	991742	$71.0	$1,375.0			
Unnamed to Squamish Harbor	12.9	0	SR 104	12.7	OLY	Squamish Harbor	992196	$322.0				
Bear Cr	19.0	33	SR 112	54.35	OLY	Salt Cr	990713	$441.0				
Bowman Cr	32.4	---	SR 142	20.2	SW	---	30.0068 0.4	$896.0				
Snyder Canyon	23.2	33	SR 142	13.4	SW	Klickitat R	992223	$291.0				
							05-07 Total	$8,434.0				
Unnamed to Pilchuck Cr	31.6	33	SR 532	9.75	NW	Pilchuck Cr	990624		$143.0			
Swamp Cr	58.4	67	I 5	182.73	NW	Sammamish R	993090		$800.0			
Unnamed to Pacific Ocean	15.8	67	SR 109	36.4	OLY	Pacific Ocean	991270		$110.0			
Lees Cr	21.1	0	SR 101	250.5	OLY	Strait of Juan de Fuca	990240		$1,200.0			
Unnamed to Mayfield Lk	17.6	0	SR 122	4.99	SW	Mayfield Lk	992234		$260.0			
Mosquito Cr	20.4	67	US 101	76.48	OLY	North R	991908		$300.0			
Unnamed to Liberty Bay	24.2	0	SR 305	9.6	OLY	Liberty Bay	990709		$875.0			
Butte Cr	20.7	33	US 101	61.15	SW	Smith Cr	990053		$457.0			
Unnamed to Willapa Bay	25.9	0	SR 6	5.37	SW	Willapa R	990805		$423.0			
Foster Cr	20.6	33	I 5	58.63	SW	Cowlitz R	990152		$130.0			
Deadman Cr	11.5	0	US 395	247.7	E	Kettle R	990106		$1,002.0			
								07-09 Total	$9,995.0			

Methodology for 05-07 biennium

Prioritization for chronic environmental deficiencies projects was developed by comparing several key factors pertaining to the severity of each problem site including:

Likely recurrence interval of damage
Presence of fish
Presence of Endangered Species Act listed fish
Number of species impacted
Habitat type impacted
Size and severity of impact area

For the 05-07 Biennium this evaluation was largely qualitative. A more quantitative methodology has since been developed that uses the same criteria in a statistical format, which will reduce the subjectivity of the evaluation and prioritization process.

Stormwater

Transportation agencies have come a long way toward aligning citizen's goals for a clean and healthy environment with meeting their transportation needs.

Today's highway construction projects integrate environmental components into project design, budget, construction and operation. We are now making major investments in wetland avoidance or replacement, erosion control, cultural resource protection and stormwater treatment. This is in response to specific permit requirements as well as best practices that demonstrate our environmental commitment.

Public discussion of emerging issues, advances in scientific knowledge, and evolving practices also inform us of additional needs and priorities.

Improving our Performance: Stormwater Management

Today's focus is on inventorying drainage outlets and investigating the performance of stormwater best management practices (BMPs) in terms of their ability to remove pollutants from stormwater, and control runoff. We are learning alot about the performance of various practices used by WSDOT and state, tribal, and local jurisdictions. Monitoring helps transportation agencies and regulators evaluate the effectiveness of treatment facilities and helps match the right treatment to each unique situation. For example, WSDOT's research has shown that grass-lined swales can reduce most pollutants from runoff and are very economical to build and maintain. We are now working with the State Department of Ecology and other agencies on acceptable approaches to manage stormwater and flow control more broadly within a watershed.

Expanding the menu of available stormwater management techniques also helps to build connections between transportation investments and other community goals such as landscape design and watershed initiatives.

There are numerous strategies and policies that guide how stormwater is addressed on various projects. In all cases where new pavement or structures are constructed, all stormwater from the new surfaces is treated for quality and quantity. The solutions we use are spelled out in the Highway Runoff Manual. They can range from something as simple as dispersion and infiltration to engineered facilities. Treating stormwater outside the immediate project footprint is sometimes allowed.

, We have established specific provisions for treating stormwater coming from existing pavement in order to maintain the financing intent and capacity of our budget subprograms. In Mobility Projects (Program I1) treating runoff from existing pavement is always allowed. In Safety and Economic Initiatives projects (Programs I2 and I3) there is generally a limit of 20% of the cost to treat new pavement, although a variance can be requested. Environmental Retrofit projects (I4), except for Stormwater Retrofit, are not allowed to treat runoff from any pavement. Paving projects (P-1 subprogram) can only consider retrofitting existing impervious surfaces for projects involving the total replacement of existing concrete lanes.

These policies are reviewed periodically by the Strategic Planning and Programming Office to consider any changes that may be necessary due to changes in laws and other legislative directives.

Needs

Regulations requiring that highway runoff be treated to remove pollutants and control peek flows took effect in 1995. As most of Washington's highways predate such regulations, the water running off of these highways is not treated. This lack of treatment results in large amounts of dirty stormwater leaving the highway system in thousands of places called outfalls. The water from these outfalls potentially degrade local water used for drinking, recreation, fish habitat, and other beneficial uses. Because new

construction projects only affect limited portions of the highway system, WSDOT programming procedures allow for environmental improvements as part of the Environmental program. Although authorized, this program has been underfunded for some time despite a requirement of the Washington administrative Code (WAC 173-270) to retrofit deficient outfalls in the Puget Sound Region.

Strategies

While WSDOT is intent on addressing all stormwater deficiencies, this stormwater strategy priority will be given to growing urban fringe areas. There is a closing window of opportunity associated with preserving and protecting urban fringe areas compared to rural and intensely urbanized areas. As the area develops, land becomes much more expensive. Decreasing land availability and increasing real estate costs in such areas impose a level of urgency to provide stormwater treatment before currently available, cost-effective treatment options are forever lost. Development in urban fringe areas is transitioning to more intense land uses but the natural systems, while under stress, are still functioning properly and not beyond repair. Retrofitting stormwater here is more likely to make a measurable difference. At a minimum, the retrofits constructed in this environment will eliminate highways as a pollutant-contributing source as the area builds out. There will be a large array of treatment facilities to choose from and more of an opportunity to use low impact systems.

Stormwater Retrofit vision

1). What is the problem and how do you find it?

A stormwater outfall is the point where highway runoff leaves the right of way via a pipe or ditch, and flows into a stream or other water body, a storm sewer, or into the ground. Many outfalls carry untreated runoff from pavement, and the problem is how to 'retrofit' these outfalls, such as adding stormwater treatment facilities or using Best Management Practices (BMPs).

Prior to 1995 there were no design standards for managing and treating stormwater from roadways. Subsequent to 1995 the Highway Runoff Manual provided criteria for managing stormwater and recommendations for Best Management Practices to use. The problem is what to do with the stormwater outfalls constructed prior to 1995. To get a handle on the scope of the problem, first we must find and map all the outfalls; then to evaluate retrofit priorities, we must evaluate the discharge and where it flows, and then select the most appropriate BMP for the site conditions.

? Include in the vision the answer to "Where do we want to be in 10 yrs, 20 yrs?"

Our goal is to steadily improve the quality of water discharged from the state highway system. In 10 years we want to arrest the upward trend in pollutant loading and in 20 years to reduce the pollutants 20% below today's discharges.

3). How do we prioritize the retrofit work?

What is the likelihood of new construction doing it (before a crisis hits). Although new construction treats new surfaces for stormwater and retrofits existing surfaces within the project area, only a limited amount of highway miles can be treated in this fashion.

How do we prioritize in the near term and long term (this becomes our strategy for achieving the vision). Because WSDOT plans to retrofit areas where the best performance can be achieved for the resources committed, the first areas selected for retrofit will be in the developing urban fringe. WSDOT will first focus on the urban fringe because it 1) still contains high quality waters, 2) land is still available for building treatment facilities and 3) the window of opportunity to protect those waters is rapidly shrinking due to development. Retrofitting outfalls in rural area is less urgent because rural waters are less likely to become significantly affected in the near future and retrofit opportunities will not diminish as quickly. Retrofitting opportunities in urban areas are already greatly restricted due to a lack of space and real estate costs. Likewise, potential benefits are low in urban areas where extensive development in surrounding areas severely limits the potential for significantly restoring habitat and water quality.

Within these developing areas environmental specialists will apply a rating methodology that takes into account proximity to sensitive surface water bodies, drinking water supplies, and traffic density. We will use the data to identify areas in the developing urban landscape where retrofits are most likely to have a beneficial impact. Additional detailed inventory can then be scheduled to determine the highest priority outfalls in those areas and the best solutions.

5). How do we characterize benefit?

a) our performance: We can characterize benefit in terms of 1) acres of surface treated or 2) estimate reductions in annual load.
b) support other initiatives (Clean Puget Sound, Salmon recovery, etc.) Any program that relies on water. Controlling water flow benefits fish habitat, reduces bridge scour, and culvert maintenance. Managing pollutants benefits health of aquatic animals, drinking water supplies and human recreation activities.

6). Maps

Location of existing/proposed retrofit projects; Overlays of features we intend to protect (like sole source aquifers). Available shortly.

What is the Problem?

Most highways were built prior to stormwater regulations and have no treatment facilities associated with them. All new projects address stormwater, however, only a small amount of funds are applied to retrofit old stormwater facilities where no new construction is planned. There is also a lack of information about the outfalls on the state system. At the current rate of construction it will take more than a century to fix all of the roads lacking adequate treatment facilities.

Prioritization

Outfalls that discharge the largest amount of pollutants to the most sensitive waters are given top priority for retrofit. The first strategic step is to identify potential stormwater problem areas based on available Geographical Information System (GIS) mapping methods and information. Available map information is used to screen the entire state based on predefined conditions that are known to present higher that average risks for highway stormwater impacts. Receiving water uses are a large factor in assessing stormwater retrofit priority. GIS mapping methods identify receiving water size, receiving water quality, and use as a drinking water supply as three factors for consideration. Map information is also used to broadly characterize the quality of runoff, identify the potential for fixing the problem in association with a project, and identify whether treatment options are likely to be eliminated in the future due to urbanization. Once the areas that present higher than average risks for highway stromwater impacts have been identified using GIS map tools, site-specific field information is gathered to further prioritize those areas and to develop retrofit recommendations with cost estimates. Site specific information includes size of stormwater generating area, the presence of erosion problems or polluted discharge, and cost effectiveness of available treatment options.

To date we have evaluated 900 stormwater outfalls and determined that 360 (40%) of them need to be retrofitted. The estimated cost to retrofit the 360 outfalls is $17M ($47,200 average per outfall). WSDOT has approximately 18,000-24,000 outfalls (very rough extimate). If we presume that:

1) WSDOT has 18,000 outfalls (Low end of estimated range because limited inventory work has occurred in eastern Washington where outfalls may be less numerous),
2) The same proportion of outfalls (40% or 7,200 outfalls) need to be retrofitted statewide and
3) the average cost for retrofitting those outfalls would be the same ($47,000) as we have estimated to date,

Then we can make a extremely rough estimate that the total retrofit costs would be $340M (7,200 deficient outfalls X $47,000 average/outfall + $340M).

If we can fund $6-10M for stormwater retrofits per biennium for the next ten years we may be able to fix the worst 10% of WSDOT's outfalls. Costs to collect data, prioritize outfalls, and gather pre-scoping information would be $250,000 per biennium.

2005 Legislative Action

The 2005 Legislature funded several stormwater retrofit projects ($7.6 million for 8 projects).

Description of Proposal

Increase the funding for the stormwater retrofit program to complete the outfall inventory and fund more retrofit projects.

Description of Benefits/Impacts of Implementing the Proposal

Improving the performance of highway drainage facilities will improve water quality and reduce damage to the highway system from stormwater.

A complete inventory of outfalls and treatment facilities will help WSDOT better plan, execute and maintain an effective stormwater program.

Complete the inventory of stormwater facilities on the state highway system to develop a strategic

implementation plan, and begin retrofit istallations at selected locations – $340 million

This dollar request is derived from the following: Stormwater retrofit (capital) and maintenance / operating unfunded priority needs include:

- funding projects on 5% of outfalls to install stormwater treatment statewide,
- completion of an inventory of stormwater facilities (to track and prioritize);
- stormwater facility maintenance and inspection to comply w/ new permits.

(note: First ten years = 100 million for projects and the inventory; 70 million for 20 year maintenance /operations to comply with NPDES. Actually the total amount needs to be $340 million, not 170. The 170 was for 10 years, but the current instruction we're getting is to make the dollars needed for 20 years. For the retrofit item, the $100 million/10 year amount was for only retrofitting 5% of outfalls statewide, which is a very low target to begin with.)

Benefit: Improving the performance of highway drainage facilities will improve water quality and reduce damage to the highway system from stormwater. A complete inventory of outfalls and treatment facilities will help WSDOT better plan, execute and maintain an effective stormwater program. (slide #16)

Related Investments proposed by Commission in WTP:

Roadside Maintenance - Retrofit of existing state highway shoulders and medians as part of the Integrated Vegetation Management program to improve filtration of stormwater runoff and establish desired grass stands.

(note: 2 million a year for first ten years, one million per year last ten.)

Result would be decrease in herbicide use, weeds and invasive species and maintenance costs. Grass shoulders filter contaminants - benefiting water quality. (Slide 19)

FUNDAMENTALS OF THE STORMWATER OUTFALL PRIORITIZATION PROCESS

Stormwater Outfall

The Department is currently inventorying its existing facilities to locate impervious surfaces, to identify the location of stormwater runoff drainage points or outfalls, to determine whether they have been retrofitted in accordance with WAC 173-270-060. During the inventory process the engineers and environmentalists collect information about the quantity and quality of the stormwater runoff and the quality of the stream or river affected. This information, along with cost data, will be used by the Department to prioritize locations needed for water quality improvements.

Some of the key data elements considered are:

- Type and size of receiving water body
- Beneficial uses of receiving water body
- Highway contribution to total runoff
- Percent highway drainage contributes to watershed
- Water quality of receiving water
- Court mandated water quality standards for watershed
- Best professional judgment

Stormwater Outfall Inventory

Noise Barrier Retrofit

What is the Noise Wall Retrofit Program?

Noise wall retrofit is a voluntary program established by WSDOT to improve livability at locations where traffic noise was not considered when highways and freeways were initially built. Retrofit locations are only identified if sensitive uses likes homes, schools, and parks were permitted for construction on or before May 14, 1976. The date is important because federal traffic noise regulations came into effect in 1976. Anything built prior to that date is not subject to the federal noise regulations.

A short summary of How, When and Why WSDOT builds noise walls...

Noise walls are free-standing barriers built parallel to a highway. They are usually made of concrete and are found near public areas (such as parks) and residential homes. The walls range in height from 6 to 20 feet, but are typically 12 to 15 feet tall. Around the Seattle area, examples of noise walls can be seen on Interstate 5 just north of the Ship Canal bridge, on Interstate 90 just west of the Mount Baker Ridge tunnel, and on Interstate 405 between Totem Lake and Bellevue. Most noise walls are installed as part of large construction projects that add new highway lanes, which increase vehicle capacity.

Long before construction begins, acoustical engineers evaluate sources and patterns of noise in neighborhoods near the project limits. The findings are used to determine if noise walls would be appropriate and cost-effective. This evaluation takes into account many factors, only one of which is actual highway noise. Among other things, acoustical engineers

Washington State Department of Transportation
Stormwater Outfall Locations used in the Development of the 05-07 Program Showing Projects Programmed

Project Number	SR	Begin	End	Sub. Pgm	Project Title	Location	Phase	Start Start Date	End Date
100231B	2	18.91	24.90	I4	US2/Fern Bluff Road Vicinity to Sultan Startup Road Vicinity	E. of Monroe	PE	9/22/05	5/1/07
100231B	2	18.91	24.90	I4	US2/Fern Bluff Road Vicinity to Sultan Startup Road Vicinity	E. of Monroe	CN	4/2/07	9/10/08
100231B	2	18.91	24.90	I4	US2/Fern Bluff Road Vicinity to Sultan Startup Road Vicinity	E. of Monroe	RW	7/3/06	4/2/07
100232C	2	22.92	22.92	I4	US2/10th St I/S Vicinity	Sultan	PE	11/1/05	12/15/06
100232C	2	22.92	22.92	I4	US2/10th St I/S Vicinity	Sultan	CN	3/5/07	12/17/08
100559S	5	219.15	219.45	I4	I-5/Fischer Creek Vicinity	Mt Vernon S.	PE	7/2/07	2/2/09
100559S	5	219.15	219.45	I4	I-5/Fischer Creek Vicinity	Mt Vernon S.	CN	12/22/08	11/2/09
100583S	5	247.00	250.00	I4	I-5/Chuckanut Creek Vicinity	Bellingham	PE	8/6/07	6/1/09
100583S	5	247.00	250.00	I4	I-5/Chuckanut Creek Vicinity	Bellingham	CN	4/20/09	11/5/10
100583W	5	250.30	250.60	I4	I-5/Padden Creek Vicinity	Bellingham	CN	4/20/09	11/5/10
100583W	5	250.30	250.60	I4	I-5/Padden Creek Vicinity	Bellingham	PE	8/6/07	6/1/09
100591G	5	255.05	255.42	I4	I-5/Squalicum Creek Vicinity	Bellingham	PE	8/6/07	6/1/09
100591G	5	255.05	255.42	I4	I-5/Squalicum Creek Vicinity	Bellingham	CN	4/20/09	11/5/10
100598D	5	273.93	274.15	I4	I-5/Dakota Creek Vicinity	Blaine	CN	2/9/09	5/4/10
100598D	5	273.93	274.15	I4	I-5/Dakota Creek Vicinity	Blaine	PE	8/1/07	3/23/09
300507B	5	114.35	114.43	I4	I-5/Mcallister Creek - Stormwater	Nisqually	PE	12/14/01	2/21/06
300507B	5	114.35	114.43	I4	I-5/Mcallister Creek - Stormwater	Nisqually	CN	1/17/06	10/18/06
300507B	5	114.35	114.43	I4	I-5/Mcallister Creek - Stormwater	Nisqually	CN	1/17/06	10/18/06

PE - Preliminary Engineering
R/W - Right of Way
CN - Construction

look at area topography, population density, cost, and expected levels of noise reduction a wall would provide. If, for example, homes near a project are widely-spaced or built high on a hill, we often will not build noise walls because the cost to reduce noise for each resident is usually quite high and the wall does not noticeably decrease noise.

On occasion, we may build noise walls in high-noise neighborhoods that existed before the freeway. These walls, known as “retrofit” walls, are rare because their project funding must compete with other important programs like safety improvements and pedestrian accommodations. To be fair to everyone, retrofit noise walls are ranked and built according to a neighborhood priority list. We build on average one retrofit wall every two years. That means even if your neighborhood qualifies for a noise wall, it may be several years before it is actually built.

Our agency gets many requests from citizens to build noise walls, but not everyone wants them. Sometimes finished walls obscure scenic views from residents’ homes. And, in almost every case, we must remove trees and shrubs within our right-of-way to make room for a wall.

During the design phase of a project, we hold open houses to solicit public comments. We invite you to get involved by watching for notices of these open houses in your local newspaper. We want to hear your ideas and suggestions, especially if a project is planned near your neighborhood.

Health

Noise levels at 67 decibels (db) are based on annoyance curves from previous studies and has no relationship with health. Noise and health is an extremely complex issue because it affects many people differently. Annoyance leads to health concerns/stress in some people and not in others. Some people have a high tolerance for loud things and can not stand quiet. Others say that they can only function where it is quiet. Some people like to look at cars (e.g., NASCAR races) and others do not because the vehicle sounds bother them. Some people will put up with traffic if there is a scenic view at stake – but not without one. Other people are upset because they cannot control their noise environment, yet that lack of control is not an issue.

Property Values

We provide noise mitigation when it is reasonable and feasible to do so (including a cost/benefit analysis). Our determinations are not related to property values in any way, If we took property values into account, we would not be in compliance with environmental justice and non-discrimination values. The effects of noise mitigation on property values (like health), is so subjective that we can not make specific determinations. At 67+ db – if we place a noise wall that blocks a scenic view – property values may go up or down depending on the values of the property owner. For some locations, property values may temporarily dip during construction phases (because people do not generally like construction delays), but then come back up again once the project is complete. In some cases, properties values may increase more without

a barrier because of better access to transportation facilities. When we place barriers, the property value may go down because to some people the wall is too imposing, but others may value it more because of the noise reduction.

What is the Problem?

The impact of traffic noise on neighborhoods throughout the state was not considered before May 1976, when noise regulations were put in place. WSDOT has developed a prioritized retrofit program to construct noise barriers in these locations, but it has been under-funded.

2005 Legislative Action

The legislature provided about $38 million to address several of the highest priority locations.

Description of Proposal

Dedicate consistent funding for the noise retrofit program. The retrofit priority list consists of 61 locations in 20 different counties.

Description of Benefits/Impacts of Implementing the Proposal

Addressing the continued backlog of noise projects will benefit established neighborhoods and help to meet noise reduction goals.

WPT Priority Page 78 of WTP: Medium Priority $205 Million

Complete the remaining pre-1977 locations statewide. Fund 60 noise retrofit projects on state highways – $205 million

Benefit = Addressing the continued backlog of noise projects will benefit established neighborhoods and help to meet noise reduction goals.

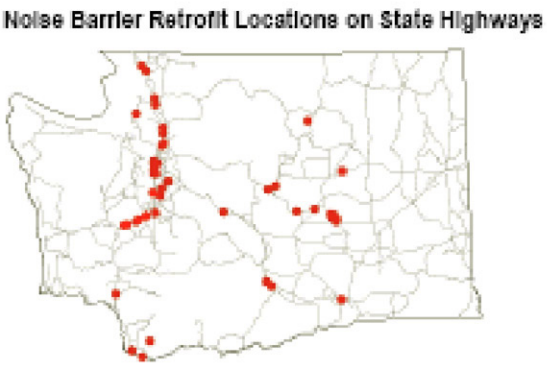
*No policy recommendations are made in the final WTP for addressing noise issues other than the specific retrofit of sixty locations.

Source WSDOT WTP Presentation-6/15/05

Washington State Department of Transportation
Chronic Environmental Deficiencies used in the Development of the 05-07 Program

Location	County	SR/River	Project summary
Vic. W of Yakima	Yakima	SR 12, Naches River	Project will construct a bioengineered bank, side channel reconnection and in stream engineered log jam structures to address repetitive bank erosion and toe slope failures affecting SR 12 and the Lower Naches River
Vic. S of Forks	Jefferson	SR 101, Hoh River (site #2)	Project will construct a series of 9 engineered log jam structures to deflect/diffuse erosive flows threatening SR 101 and improve habitat conditions in the Hoh River
Vic. N of Darrington	Skagit, Snohomish	SR 530, Sauk River (site #1)	Project will relocate approx ½ mile of highway along the Sauk River, protecting the highway while allowing channel migration to occur
Vic. W. of Hamilton	Skagit	SR 20, Red Cabin Creek	Project will replace existing culvert with a bridge and modify the channel to address bed aggradation and repetitive maintenance problems.
Vic. N of Hoquiam	Grays Harbor	SR 109 Moclips	Project will replace bridge that traps debris thus eliminating need for repetitive channel excavation
At Mt. Rainier Nat'l. Park	Pierce	SR 410, White River	Project will address severe bed aggradation problems that are forcing the White River on to and down SR 410, resulting in repetitive maintenance activities and the potential catastrophic loss of the highway
Vic. NW of Yakima	Yakima	SR 410 Rattlesnake Creek	Project will construct bank stabilization elements to address repetitive toe slope failures at the confluence with the Naches River
Vic. E of Arlington	Skagit, Snohomish	SR 530, Sauk River (site #2)	Project will construct bioengineered bank stabilization structures to address repetitive toe slope failure
Vic. E of Burlington	Skagit	SR 20, Skagit River	Project will construct engineered log jams and bioengineered revetment to address repetitive bank erosion and toe slope failures along the Skagit River
Vic. W of Port Angeles	Clallam	SR 112, Hoko/Pysht Rivers	Project will construct several bioengineered LWD structures for repetitive erosion sites
Vic. N of Deming	Whatcom	SR 542, Nooksack (site #2)	
			Total cost

[1] Cost estimates should include the following costs: Preliminary Engineering (20%), Right of Way, Construction, Construction Engineering/Inspectio (9%), traffic control (10%), mobilization, and inflation (15%)



Noise Barrier Inventory

Source Prioritization Process

How are noise retrofit locations prioritized on the list?

Washington State Department of Transportation Directive D22-22 outlines the procedures for placing locations on the ranked retrofit list and provides a detailed methodology on how to prioritize locations. Locations on the list are prioritized in an order reflecting traffic noise levels, number of homes benefiting, planning level cost, and achievable reductions.

Habitat Connectivity

Why is this an issue for WSDOT?

There is a growing understanding of the impacts of roads on wildlife and habitat. This is important from a natural resource conservation perspective as well as a matter of public safety. The 2005 publication by the National Academies of Sciences "Assessing and Managing the Ecological Impacts of Paved Roads" identifies how roads can constitute barriers to animal movement, lead to habitat loss, and in some cases can contribute to the decline of imperiled wildlife populations. Animal-vehicle collisions pose a serious hazard for motorists as well as a significant source of wildlife mortality. WSDOT annually records about 3,000 collisions with deer and elk on state highways.

Washington is biologically diverse state with over 650 vertebrate species. More than 63 of these are currently designated under the federal Endangered Species Act, including 38 terrestrial species. A list of these species can be found at: The state highway system occurs in the majority of the habitat types of the state. There is strong public support for transportation solutions that include ecological considerations as part of meeting transportation objectives.

Measures such as enlarged stream crossing structures, wildlife crossing structures, animal detection and warning systems, and fencing have proven useful in reducing some of the problems, but these need to be applied an a strategic manner to get the best gain. Significant effort has been made in a few areas of the State, such as the I-90 Hyak to Easton corridor, but in Washington, the attention has largely been opportunistic, and project by project. To provide the best benefit for habitat connectivity as well as helping reduce the potential for animal-vehicle collisions, a system for identifying and prioritizing key areas statewide is needed. This can then be used to develop location specific solutions in a strategic manner.

How can we contribute to a solution?

While there is a growing body of knowledge about how to better address wildlife habitat connectivity Research is needed to help identify high priority focus areas in the state for addressing wildlife connectivity statewide and to make preliminary recommendations for addressing connectivity. Working with existing GIS data, and other existing information including local expert knowledge, it would be possible to develop a habitat connectivity plan for the highway system. This would include where notable habitat linkage areas exist for large terrestrial animals such as deer, elk and cougar, as well as for other species that are of special conservation management concern. This prioritization should also note localities that have management for protecting nearby habitat and where significant records for animal vehicle collisions occur.

Potential Benefits of addressing this issue

This effort would provide a basis for determining the locations of key focus areas for connectivity. This could be used in project planning and scoping to identify where the best opportunities for improving connectivity and reducing animal vehicle collisions are and allow these to more be easily included in project planning. With a well developed system for prioritization, WSDOT will gain a better understanding of the scope and scale of the issue and will develop proactive strategies for improvements. This would also help with demonstrating compliance with SAFTEA LU section 6001 that directs states to incorporate natural resource information into transportation planning.

WILDLIFE KILL MAP

Washington State Department of Transportation
Noise Reduction Locations used in the Development of the 05-07 Program Showing Projects Programmed

									Numbers Provided in Residential Equivalencies									
Funded?	Project Number	2004 Ranking	WSDOT Region	SR	Est. Mile Post 1	Est. Mile Post 2	Location	County	Houses	Apartments / Mobile Homes	Schools	Day Care / Year Round Schools	Hospitals / Nursing Homes	Churches	Recreation Areas&Parks	Avg Wall Height	Wall Length	Total Wall Dollars **
Programmed but Un-funded	100524Z						I-5 / Ship Canal Bridge - Study to Develop Noise Mitigation						Partial noise analysis completed by con					$150,000 est.
Programmed but Un-funded	100525P	1	Northwest	005	171.40	171.90	85th St., southbound, east side	King	99							20	1260	$1,269,867
Programmed but Un-funded	100569N	2	Northwest	005	230.60	230.80	Westview School	Skagit			631					14	558	$400,241
Programmed but Un-funded	100524H	3	Northwest	005	168.06	168.40	Roanoke to Shelby, west side, southbound	King	11	100						22	1300	$1,441,198
Programmed but Un-funded	100524H	4	Northwest	005	167.78	168.06	Boston to Roanoke, west side, southbound	King	11	72	250					24	1716	$2,058,031
Programmed but Un-funded	100524H	5	Northwest	005	168.06	168.40	Roanoke to Shelby, east side, northbound	King	29	14				112		18	748	$695,434
Programmed but Un-funded	100525P	6	Northwest	005	171.50	171.90	85th St., northbound, west side	King	30							11	1667	$924,030
Programmed but Un-funded	100524H	7	Northwest	005	167.78	168.06	Boston to Roanoke, east side, northbound	King	53	4						12	1367	$826,623
Programmed but Un-funded	100567A	8	Northwest	005	225.80	226.40	South end of SR536 Interchange	Whatcom	66	8						14	2650	$1,840,469
		9	South Central	395	15.56	15.60	W. 19th Avenue, Benton County	Benton		50						12	1900	$1,141,503
		10	Olympic	005	110.10	111.00	14th Avenue, Thompson Place	Thurston	126			14				12	3800	$2,269,503
Not Programmed		11	Northwest	020	32.32	32.75	60th NW St.	Island	39							12	1176	$724,194
Not Programmed		12	Northwest	005	194.00	194.60	25th St. (southbound, west side)	Snohomis	20							14	1290	$910,807
		13	Southwest	005	49.16	49.84	Castle Rock, between Powell Road and Huntington Avenue	Cowlitz	32							10	2783	$1,388,803
		14	South Central	395	19.07	19.33	Flamingo Mobile Home Community, Pasco	Franklin		36						12	1315	$790,040
Programmed but Un-funded	100552N	15	Northwest	005	202.18	202.61	116th Street NE	Snohomish		30						12	838	$519,825
Programmed but Un-funded	100528N	16	Northwest	005	175.14	175.41	NE 155 th St.	King	28							12	1426	$862,300
		17	South Central	012	338.49	338.72	Crawford Dr. to Fraizier Dr., Walla Walla north side	Walla Wal	40							12	1400	$841,107
		18	Olympic	005	112.30	112.69	Queets Dr., East Tanglewild	Thurston	23							12	1911	$1,148,112
Programmed but Un-funded	100545C	19	Northwest	005	194.00	194.60	North of SR 2 Interchange (northbound, east side)	Snohomis	31					171		18	1330	$1,207,348
		20	South Central	240	38.14	38.58	Nevada Avenue to Short Avenue, Richland	Franklin	21							12	1000	$615,811
		21	South Central	012	338.50	338.72	Wellington Ave., Walla Walla south side	Walla Wal	30							12	1275	$766,009
		22	Southwest	014	11.49	12.00	West of 6th Avenue	Clark	30							12	2360	$1,416,714
Programmed but Un-funded	100525P	23	Northwest	005	171.00	171.20	NE 80th St. on west side of highway	King	36							16	1400	$1,128,771
		24	Olympic	512	11.55	11.99	Southwest of SR 167 I/C near Milepost 11.55	Pierce	15							10	2129	$1,070,236
Not Programmed		25	Northwest	005	170.10	170.30	Ravenna	King	23							18	1296	$1,175,534
		26	Olympic	005	121.52	122.05	Fort Lewis, 41st Division Drive to Berkley Jackson Avenue	Pierce	42							12	2611	$1,561,917
Not Programmed		27	Northwest	515	1.50	2.00	S 228th Street	King	32							14	1000	$723,119
Programmed but Un-funded	116928F	28	Northwest	169	24.10	24.30	Fifth Ave SE, Monroe Avenue to SE 5th Street	King	20							12	1145	$709,689
		29	North Central	017	51.73	52.19	Chief Moses Jr. High School	Grant			224					10	1200	$614,809
Funded Ad Date 10/04	100528Z	30	Northwest	005	176.56	176.70	NE 175th to 185th both (right and left sides)	King	16							12	2200	$1,330,337
		31	South Central	097	67.85	68.54	Wapato High School	Yakima			750					12	2175	$1,302,471
		32	Southwest	014	3.20	3.66	Evergreen Blvd., Vancouver	Clark	23							16	2450	$1,944,647
		33	North Central	002	115.18	115.63	County Park, Monitor	Chelan							380	10	2132	$1,067,405
		34	South Central	090	71.56	71.75	Easton, E. Easton Road to east of Trailer Park	Kittitas		25						10	1090	$557,997
		35	North Central	017	52.62	52.83	Dahlia Drive to Fairbanks Drive, School/Park, Moses Lake	Grant			135				430	10	1100	$563,575
		36	Olympic	512	1.11	2.21	South side of SR 512, Parkland	Pierce	49					30		12	3785	$2,264,211
		37	North Central	017	52.41	52.62	Evergreen Drive, Moses Lake	Grant	20							10	1150	$589,192
		38	South Central	090	71.28	71.56	Easton School	Kittitas	5	25	154					10	1190	$609,190
Not Programmed		39	Northwest	005	175.14	175.31	N. 145th St.	King	16							20	991	$998,761
Not Programmed		40	Northwest	522	5.96	6.24	Lake Forest Park	King	24							14	1476	$1,041,291
		41	North Central	017	52.83	53.20	Grand Drive, Moses Lake	Grant	39							12	3071	$1,826,679
		42	South Central	097	68.50	69.08	Hoffer Road to 1st Street, Wapato	Yakima	43							12	3050	$1,811,233
Not Programmed		43	Northwest	005	206.40	206.70	Smokey Point	Snohomis	13							14	1315	$928,458
		44	Olympic	512	1.11	2.21	North side of SR 512, Parkland	Pierce	55							12	3715	$2,222,337
Not Programmed		45	Northwest	005	191.97	192.63	47th Street SE to 41st Street SE	Snohomis	66							18	2916	$2,647,088
Not Programmed		46	Northwest	005	175.52	176.16	N 171st	King	31						50	16	1553	$1,252,129
		47	South Central	097	64.20	64.42	Mobile Home Park	Yakima		30						12	1150	$705,879
Not Programmed		48	Northwest	005	256.40	257.00	McLeod Rd., Bellingham	Whatcom	32							14	2600	$1,805,744
Not Programmed		49	Northwest	509	25.38	25.60	NE Ramp SR 518 Interchange	King	22							12	1215	$753,077
Not Programmed		50	Northwest	908	4.69	5.09	138th Ave NE	King	6							18	720	$669,401
		51	North Central	017	57.10	57.92	Offut Drive, Moses Lake	Grant	50							14	4330	$2,979,560
		52	South Central	395	17.24	17.59	SW Columbia Riv. Br., Kennewick	Benton	12	24			72			12	1485	$892,175
		53	North Central	017	56.90	57.13	Trailer Park	Grant		17						14	1200	$839,740
Not Programmed		54	Northwest	090	12.60	13.04	NW 41.5, 169th Avenue SE to 171st Avenue SE	King	22							16	1700	$1,370,650
Not Programmed		55	Northwest	526	2.93	3.32	Glenn Drive	Snohomis	7							16	700	$578,962
Not Programmed		56	Northwest	522	6.24	6.54	Uplake Terrace	King	30							12	1612	$974,774
		57	North Central	028	44.57	45.05	Oasis Park	Grant								10	2550	$1,274,605
		58	North Central	002	190.81	191.60	City Park, Coulee City	Grant							250	8	1430	$586,118
Not Programmed		59	Northwest	520	1.20	1.73	Foster Island/Arboretum, beg. Union Bay Br. to beg. Lake WA Br. (eastbound, south side)	King							520	16	2745	$2,194,754
		60	North Central	028	30.61	30.84	Quincy Park	Grant								8	800	$333,230
		61	North Central	097	260.85	261.13	Okanogan County	Okanogar	18							10	1400	$716,110
Not Programmed		62	Northwest	104	28.23	28.92	Wallingford Ave	King	19							18	1086	$1,009,680
Not Programmed		63	Northwest	005	262.80	263.00	Cedar Street	Whatcom	5							14	553	$396,978
		64	North Central	017	58.30	58.60	Castle Drive, Moses Lake	Grant	15							12	2180	$1,307,595
		65	North Central	002	119.10	119.26	Wenatchee	Chelan	11							12	1830	$1,099,448
		66	Olympic	005	120.00	120.50	North of Fort Lewis entrance	Pierce	24							14	2715	$1,894,819
		67	North Central	002	120.63	127.86	East Wenatchee, Douglas County	Douglas		6						12	590	$369,236
		68	North Central	017	55.70	55.90	Grape Drive, Moses Lake	Grant	11							14	1200	$841,107
		69	South Central	395	20.19	20.28	Wernet Road	Franklin		6						12	2045	$1,226,620
Not Programmed		70	Northwest	520	1.20	1.73	Arboretum, beg. Union Bay Br. to beg. Lake WA Br. (westbound, north side)	King							520	14	2710	$1,895,923
		71	South Central	395	19.51	19.80	Riviera Trailer Park Village, Pasco, Franklin County	Franklin		54	13					10	1350	$692,787
Programmed but Un-funded	100506N	2	Northwest	005	145.30	145.80	S 292nd St.	King		120						14	2300	$1,609,086

Source: WTP Presentation 6/15/05-Page 17

Health and the Environment

Habitat Connections

What is the Problem?

Transportation systems have the potential to impact habitat in ways that include:

- Direct effects such as noise disturbance or wetland fill
- Habitat fragmentation
- Barrier effects that impede the movement of fish and wildlife.
- Vehicle-wildlife collisions.

WSDOT recognizes the importance of habitat connections at the policy level. Funding for program support is needed to more consistently consider habitat connection as part of transportation planning, design, and construction.

Strategy to address the need:

WSDOT will develop a habitat connectivity plan, which will identify areas where habitat connectivity must be maintained. These will include priority areas where highways intersect important wildlife linkage zones, wildlife migration routes, and lands under special management for the protection and enhancement of wildlife (like wildlife refuges). These areas will be prioritized as low, medium and high priority for retrofit. Prioritization will consider many factors including, but not limited to, permeability needs of ESA listed species, areas of high animal vehicle collisions, management of adjoining landscaped (i.e. wildlife refuges, national forest etc.), and highway areas that are wider than normal.

Performance Outcomes:

Effectiveness of the program will be measured by the methods that relate to the solutions implemented. Typical measures may include reductions in the numbers of animal vehicle collisions, a measure of the number of connectivity structures installed per mile, frequency of use of connectivity structures, miles of habitat corridors connected etc.

2005 Legislative Action

None

Description of Proposal

Funding identification and prioritization of problem areas, development of design guidance, and coordination with agencies for connectivity planning.

Description of Benefits/Impacts of Implementing the Proposal

Careful analysis will help WSDOT determine the highest priority locations where investments should be made. This proposal would create dual benefits: protect wildlife and improve the safety of the traveling public.

Increase habitat connectivity by providing safe connections across the highway for wildlife migration – $50 m

Benefits = Improve streams for fish habitat, increase potential for salmon recovery, and improve wildlife habitat and connectivity.

(note: establish program in 07/09 to set priorities; plan for gradual start to program through 2027)

Habitat Connectivity - the ability to reduce animal/vehicle collisions by providing safe connections across the highway for animal migration: Careful analysis will help WSDOT determine the highest priority locations where investments should be made. This proposal would create dual benefits: protect wildlife and improve the safety of the traveling public.