EPA Strategic Plan 2009 - 2014
Measuring Success of Sub-objective 4.3.9:
Restore and Protect the Columbia River Basin.

"GOAL: By 2014, prevent water pollution, and improve and protect water quality and ecosystems in the Columbia River Basin to reduce risks to human health and the environment.**"**

Strategic Targets:

- **"**By 2014, protect, enhance, or restore 19,000 acres of wetland and upland habitat in the Lower Columbia River watershed. (Cumulative starting in FY 2005) Baseline: 96,770 acres of wetland and upland habitat available for protection, enhancement, or restoration.
- "By 2014, clean up 85 acres of known highly contaminated sediments. (Cumulative starting in FY 2006) (Baseline: 400 acres of known highly contaminated sediments in the main-stem of the Columbia River and Lower Willamette River.)
- "By 2014, demonstrate a 10 percent reduction in mean concentration of certain contaminants of concern found in water and fish tissue. (Cumulative starting in FY 2006) (Chemical-specific baselines will be available in 2006 from the following sources: Pesticide Stewardship Partnership (PSP) Studies for Oregon as of 2006[i]; Total Maximum Daily Load (TMDL) studies for Washington[ii]; 2002 EPA Columbia River Basin Fish Contaminant Survey[iii]; Lower Columbia River Estuary Partnership 2006 Monitoring Study[iv]; and Washington Ecology's March 2005 Report: Concentrations of 303(d) Listed Pesticides, DDT, PAHs, Measured with Passive Samplers Deployed in the Lower Columbia River.[v])**"**

Determination of baselines for Columbia River Strategic Targets
A baseline is required for each element in EPA's Strategic Plan to serve as the method for tracking progress over the next five years. EPA Region 10 worked collaboratively with the States of OR, WA, ID, and the Lower Columbia River Estuary Partnership and Columbia River Tribes to develop a baseline that has broad support for each sub-objective.

Wetland and Upland Habitat
The baseline for protecting, enhancing and restoring 19,000 acres of wetland and upland habitat in the Lower Columbia River watershed was determined by the Lower Columbia River Estuary Partnership, whom identified 96,770 acres of wetland and upland habitat as "available" for protection, enhancement, or restoration.

Sediment
The baseline measurement for clean up of sediment was determined through an internal EPA database which found 400 acres of known highly contaminated sediments in the mainstem of the Columbia River and Lower Willamette River as of 2006. The majority of this acreage is a part of the Portland Harbor Superfund clean up work.

Certain Contaminants of Concern (pesticides/toxics)
Determining the baseline measurements for reduction in the mean concentration of contaminants of concern found in water and fish tissue required extensive chemical-specific data and monitoring. EPA Region 10, the States, and the Lower Columbia River Estuary Partnership used the following process to develop the baseline for contaminants of concern:

1. Review available data and knowledge of candidate contaminants of concern
2. Identify what the baseline document will look like

3. Choose contaminants of concern
4. Choose approach for measuring success in meeting the "10% reduction" target
5. Choose sampling matrix (i.e., water column, fish tissue, etc.)
6. Choose locations to be measured
7. Identify specific data sets to use to determine baseline combination
8. Identify quantitative concentrations for each baseline combination

Although many monitoring efforts have been conducted within the Columbia River Basin, few studies have addressed concentration of contaminants of concern in a consistent manner that can be applied to measuring reduction of concentration across this Basin. The size and variation of the land use and geography make this monitoring effort complex.

A small number of contaminants of concern were selected, and reduction in those contaminants will be reported and measured against the baseline data. EPA, the States, and the Lower Columbia River Estuary Partnership chose from existing data sets of the contaminants to be used for the baseline. Priority contaminants include DDT, and existing use pesticides such as Organophosphates.

The final baseline for this strategic target is in a table (below) that includes the selected contaminants for monitoring, the location for where baseline data was collected and where subsequent monitoring will occur, the baseline concentration and source of the baseline data as well as the type of sampling (fish tissue, water column, semi permeable membrane devices (SPMDs)) and the responsible party (see table below).

Choosing a contaminant location meant there must be historical data and the expectation of similar sampling data from the same location in the future (between now and 2014). Hence, if it is unlikely that a contaminant will be monitored at a given site, that contaminant/location should not be chosen as part of the baseline. The Columbia River Basin includes land that has a variety of uses. Many different pesticides may be used throughout the year. Spraying is more frequent during certain seasons and this may require intense monitoring and poses a challenge to consistently monitoring reduction of contaminant concentrations.

Finally, quantitative concentrations for each baseline were chosen. Success in meeting the 10% reduction target will be measured in the average reduction for each contaminant at each location.

How will toxic reductions be achieved?
Reduction in the mean concentration of contaminants of concern will be achieved through a variety of activities implemented by EPA and the States, specifically:

- Washington will be contributing to the target reduction by the implementation of two Water Quality Improvement Projects/Total Maximum Daily Loads (TMDLs), specifically the Yakima River TMDL and Walla Walla TMDL. To find out more about Washington's Water Quality Improvement Projects (TMDLs), please visit the following site: http://www.ecy.wa.gov/programs/wq/links/wq_assessments.html.

- Oregon will be contributing to the target reduction by the implementation of the Pesticide Stewardship Partnership (PSP) for the Walla Walla Basin and Clackamas Sub-basin. More on Oregon PSPs can be found at http://www.deq.state.or.us/wq/pubs/factsheets/community/pesticide.pdf or contact Kevin Masterson at (503) 229-5983 ext 260.

- Idaho is committed to toxics reduction and sees value in the regional Columbia River Toxics Reduction effort. Idaho has been participating in the work efforts on the Columbia River baseline and as a part of that did an inventory of data for the Snake River Basin. With the exception of ongoing Superfund work effort in Blackbird mine and Coeur d'Alene, there is a lack of widespread toxics data in Idaho sufficient to establish a suitable project baseline for the present five-year plan. Current information about Idaho toxics contamination either shows: 1) low levels, 2) is old data (>10 years), 3) or data not well coupled with current or planned cleanup efforts. (Attachment A is a summary table of toxics data for Idaho.) Elevated mercury levels in fish is getting a lot of attention, and there are known problem areas in Idaho, but there is hesitancy to use fish tissue as a yardstick as it is unlikely to show near term improvement. The absence of an Idaho project in the table below is hopefully temporary and may be corrected through additional monitoring efforts to better establish Idaho baselines, identify toxics hotspots, and develop cleanup plans.

- Washington, Oregon, and Idaho are also reducing toxics and exposure to toxics in the Columbia River Basin by holding collection events and/or establishing collection sites to give the public a safe alternative for properly disposing of toxic material including but not limited to pesticides, mercury waste, household hazardous waste, electronic waste, and school lab clean-ups. These pollution prevention actions are a creative and innovative way of reducing toxic contamination in the environment. Although these work efforts are not included in the strategic measures for the Columbia River Basin, they are increasingly important due to the significant amounts of toxics that have been and will continue to be removed and properly disposed through voluntary programs.

Tribal Involvement

For the 2009-2014 Strategic Plan, a conference call was held with tribal government in August 2008. During this call, EPA presented the new proposed targets and relayed information regarding the upcoming release of the Columbia River Basin State of the River Report for Toxics. Tribes provided EPA with their comments and additional water quality concerns in the Columbia River.

Columbia River: Baseline for Pesticide/Toxics Strategic Target

Contaminant Name	Location	Sampling Matrix	Mean Baseline Concentration	Year & Source(s) of Baseline Data	Responsible Party*
Chlorpyrifos	Oregon: West Prong, Little Walla Walla River, South of Stateline Road	Water column	**0.21 µg/l** [1] Detection frequency: **0.43**	Pesticide Stewardship Partnership documentation	OR DEQ
Azinphos methyl			**0. 0199 µg/l (2006 average)** Detection frequency: **0.29**		
Chlorpyrifos	Oregon: North Fork Deep Creek (Clackamas Sub-basin)	Water column	**0.087 ug/l (3- year average [2005-2007])**	Pesticide Stewardship Partnership documentation	OR DEQ
DDT	Washington: Walla Walla River, RM 14.3	Water Column (measured with SPMD)	**1.3 ppt** [2]	2002-2003 Walla Walla TMDL Evaluation, Dept. of Ecology publication 04-03-032	WA Ecology
	Washington: Yakima River, RM 18-30	Fish Tissue	**92 µg/Kg, wet** [3]	2006 Yakima River Fish Tissue Study (preliminary data for TMDL report)	WA Ecology

* All work is dependent on continued availability of funds.

[i] Hood River Watershed, DEQ 2006, Mill Creek Watershed, DEQ 2006, Walla Walla Watershed, DEQ 2006 (pending), Pudding River Watershed, DEQ 2006 (pending), and Clackamas River, Watershed DEQ 2006 (pending).

[ii] Water Cleanup Plans (TMDLs) by Watershed/Ecology Region, http://www.ecy.wa.gov/programs/wq/tmdl/watershed/index.html (updated April 2005); Yakima River Pesticide TMDL, Okanogan River DDT and PCB TMDL, Wenatchee River, Mission Creek, and Lake Chelan PCB and Pesticide TMDL, Walla Walla Pesticide and PCB TMDL, and Palouse River Pesticide and PCB TMDL.

[1] Baseline data is from 2006 monitoring results associated with DEQ's Walla Walla Basin Pesticide Stewardship Partnership. The baseline concentrations are median concentrations found from Spring 2006 monitoring in the Basin. The detection frequency baseline is the fraction of sampling events where detections were observed.

[2] Baseline data is from the Walla Walla TMDL Evaluation (Technical Report) 04-03-032 (page 47). The sampling location is the lower Walla Walla River Site (RM 14.3) above Columbia River influences. Sampling was done with Semipermeable Membrane Devices (SPMDs). Measurements are in ng/L (ppt) dissolved. The concentration is an annual average (data is from May and June 2002, August and September 2002, November and December 2002, and February and March 2003). DDT is measured as total DDT, the sum of 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD.

[3] This preliminary data is from the Dept. of Ecology's Yakima River Fish Tissue study (as of 1/03/07). This study will be part of the Yakima River TMDL report. Samples were collected on 10/11/06 between Benton City (about RM 30) and Horn Rapids Dam (RM 18) in the Lower Yakima River. Each sample is a composite of skin-on fillets from five individual Largescale Suckers. Three samples were averaged to determine the baseline concentration. DDT is measured as total DDT, the sum of 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD.

[iii] U.S. Environmental Protection Agency. 2002. *Columbia River Basin Fish Contaminant Survey:1996-1998* (EPA, 910-R-02-006). Seattle, Washington: Region 10, Risk Evaluation Unit: http://yosemite.epa.gov/R10/OEA.NSF/af6d4571f3e2b1698825650f0071180a/c3a9164ed269353788256c09005d36b7?OpenDocument.

[iv] Fixed Station and Seasonal Monitoring of Conventional and Toxic Contaminants on the Lower Columbia River Estuary Partnership (LCREP) Internet site: http://www.lcrep.org/eco_water_qual.htm#fixed.

[v] Johnson, A. and D. Norton. March 2005. *Concentrations of 303(d) Listed Pesticides, PCBs, and PAHs Measured with Passive Samplers Deployed in the Lower Columbia River*, Ecology Publication No. 05-03-006. Olympia WA., Washington State Department of Ecology: http://www.ecy.wa.gov/pubs/0503006.pdf.

Attachment A - Idaho Summary Table of Studies and Reports Related to Idaho Toxins in Surface Water

Contaminant Name (Number of Detections)	Location	Sampling Matrix	Median Baseline Concentration	Year & Source(s) of Baseline Data	Responsible Party*
Metribuzin (11), Diuron (7), Dicamba (6), Atrazine (5), Picloram (4), Dimethoate (3), Hexazinone (3), Bromacil (2), Methomyl (2), Linuron (1), Simazine (1), Tralkoxydim (1), 2,4-D (1)	Tributaries to Clearwater River	Water Column	Lower ppb concentrations	2004 Campbell, 2005 ISDA	ISDA
Mercury	Jordan Creek	Water Sediment Fish Tissue Water Sediment	38.5 ng/l 1.98 mg/Kg 0.56 mg/Kg 1.8 ng/l 0.010 mg/Kg	2005, Ingham, 2007, DEQ	DEQ, Draft Jordan Creek TMDL
	Background Tribs				
Mercury	Statewide Salmon River – Whitebird	Fish Tissue	0.09 mg/kg (median) 0.09-0.42 mg/kg 0.33 mg/kg	2004-2005	DEQ/USGS Statewide Monitoring Coop
Ammonia Dioxins 1,2,3,4,5,6,7,8-HpCCD 1,2,3,4,5,6,7,8,9-OCCD Selenium other metals Liuron other pesticides Polynuclear Aromatic Hydrocarbons (PAHs)	Lower Snake and Clearwater Rivers	Sediment	42-76 ppm 2.03-4.95 ppt 10.99-36.38 ppt TEQ an order of magnitude < screening criteria 2.45 ppm < levels of concern 28-77 ppb < limits of detection << Puget Sound disposal criteria	2003, Heaton, Juul, Fishella, ACOE June 2003	Walla Walla District of Army Corps of Engineers for Dredging issues

Pharmaceuticals 1,4 dichlorobenzene 4-nonylphenol 6 other organics Cholesterol Coprostanol 5 other hormones	Lower Boise River - 2 sites	Water	10 compounds, all < limits of detection 0.22,0.26 µg/l estimated 3, 4 µg/l < limits of detection 0.57,0.83 µg/l 0.043, 0.046 µg/l < limits of detection	2002, Barnes and others	USGS, OFR 02-94
p,p'-DDD p,p'-DDE p,p'-DDT	Snake River - Pittsburgh Landing	Fish Tissue	14 µg/kg 170 µg/kg 7.1 µg/kg	1992-1997, Clark& Maret (1998) USGS	IDEQ and ISDA
p,p'-DDE p,p'-DDT	Salmon River - Whitebird	Fish Tissue	33 µg/kg 5.9 µg/kg	1992-1997, Clark & Maret (1998) USGS	IDEQ and ISDA
Cadmium Copper Zinc	Salmon River - Whitebird	Fish Tissue - Liver	1.9 µg/kg 100 µg/kg 190 µg/kg	1992-1997, Clark & Maret (1998) USGS	IDEQ
p,p'-DDD p,p'-DDE p,p'-DDT trans Nonachlordane Total Chlordane Dieldrin Total PCBs TCDD-EQ	Snake River - Lewiston	Fish Tissue	0.09 µg/g 0.59 µg/g 0.69 µg/g 0.10 µg/g 0.13 µg/g 0.03 µg/g 0.64 µg/g 2.00 pg/g	2004, Hinck, Jo Ellen, USGS	IDEQ and ISDA
Polynuclear Aromatic Hydrocarbons (PAHs)	Lewiston: Corps East Pond	Sediment	Low Mol. Weight PAHs 300 ppb High Mol. Weight PAHs 492 ppb	1998-1999 CH2MHILL, 1999	Idaho DEQ Walla Walla District of Army Corps of Engineers for Dredging issues
Polynuclear Aromatic Hydrocarbons (PAHs)	Lewiston: L. Snake & Clearwater Pool	Sediment	Low Mol. Weight PAHs <10 ppb High Mol. Weight PAHs <50 ppb	1998-1999 CH2MHILL, 1999	Idaho DEQ Walla Walla District of Army Corps of Engineers for Dredging issues
Oil and Grease	L. Snake near Clarkston	Sediment	62-222 ppm	1985, Crecelius and Gurtisen, 1985	WDOE

4,4-DDT 4,4-DDD 4,4-DDE	Lewiston: L. Snake & Clearwater Pool	Sediment Sediment Sediment	0.6-1.8 ppb 0.4-4.8 ppb 0.6-16 ppb	1992, Pinza et al., Walla Walla District of Army Corps of Engineers	Idaho DEQ Walla Walla District of Army Corps of Engineers for Dredging issues
4,4-DDT 4,4-DDD 4,4-DDE	Lewiston: L. Snake & Clearwater Pool	Sediment Sediment Sediment	3-6 ppb 2-4 ppb 3-11 ppb	1996, Walla Walla District of Army Corps of Engineers	Idaho DEQ Walla Walla District of Army Corps of Engineers
Manganese	Lewiston: L. Snake & Clearwater Pool	Sediment	370-1,000 ppm	Clark and Maret, 1998, USGS	Idaho DEQ
Manganese Cadmium	Lewiston: L. Snake & Clearwater Pool	Sediment	0.122 – 1.058 ppm 10.97-4,009 ppm	June, 2000 Walla Walla District of Army Corps of Engineers	Idaho DEQ Walla Walla District of Army Corps of Engineers for Dredging issues

* All work is dependent on continued availability of funds.

Sources:

http://www.cerc.usgs.gov/pubs/center/pdfDocs/BEST-Columbia_River.pdf

http://www.agri.idaho.gov/Categories/Environment/water/waterPDF/swreports/clearwater.pdf

http://www.nww.usace.army.mil/dmmp/sea/final/attach-e.pdf

http://id.water.usgs.gov/PDF/wri984103/ORGANOSX.PDF

http://toxics.usgs.gov/pubs/OFR-02-94/index.html