DEPARTMENT OF ECOLOGY
State of Washington

Frequently Asked Questions

Toxics Cleanup Program **June 2011**

Source Control in the Lower Duwamish Waterway: Upriver Sediment Study

The Department of Ecology is working to understand and control sources of pollution in the Lower Duwamish Waterway and nearby areas. In 2008, as part of these efforts, the Department of Ecology conducted an upriver sediment study. This study involved a storm water outfall (drainage pipe) survey and sediment sampling. Below are a general background and questions and answers about this study and other source control work underway.

Background

The Lower Duwamish Waterway (LDW) cleanup site extends south from the southern tip of Harbor Island for about 5.5 miles. It includes the Duwamish River and many nearby state cleanup sites (Figure 1).

The sediments in the waterway are contaminated with pollution from industrial activity, combined sewer overflows, and run off from residential and commercial areas. A wide range of contaminants are present, including polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), dioxins, arsenic, and other metals.

Ecology and the U.S. Environmental Protection Agency (EPA) are working to clean up contaminated sediments and control sources of contamination in the LDW. Ecology and EPA have a joint legal agreement with the city of Seattle, the Boeing Company, the Port of Seattle, and King County to investigate the extent of contamination. They are also required to develop options for sediment cleanup. Cleanup is focused on three main efforts: cleaning up sediments, controlling sources of pollution, and cleaning up adjacent contaminated properties.

Q: What was the purpose of the sediment study?

A: The goal of the upriver sediment study was to better understand the distribution of contamination in surface sediments upriver (south) of river mile 4.9 (Figure 1). Ecology used the results of this study to help determine the level of contamination coming into the site from upriver sediments. This study also helped Ecology determine if there were identifiable contamination sources in this area.

Q: Where were samples taken?

A: Ecology analyzed approximately 70 sediment samples from locations south of the cleanup site (between river mile 4.9 to river mile 7.5) (Figure 1).

For More Information

Technical Questions:

Brad Helland
Site Manager
Northwest Regional Office
3190 160th Avenue NE
Bellevue, WA 98008
Phone: (425) 649-7138
Email:
Bradley.Helland@ecy.wa.gov

Dan Cargill
Source Control Project Manager
Phone: (425) 649-7023
Email: Dan.Cargill@ecy.wa.gov

Public Involvement:
Meg Bommarito
Public Involvement Coordinator
Phone: (425) 649-7256
Email:
Meg.Bommarito@ecy.wa.gov

For more information about Ecology's efforts to clean up the Lower Duwamish, visit

http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

For information about EPA's efforts to clean up the sediments, visit their web site at:

http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish

Special accommodations:

If you need this publication in an alternative format, call reception at 425-649-7070 Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877 -833-6341.

Q: What did the study find?

A: Within about two miles upriver of the LDW site, sediment concentrations of contaminants, such as arsenic, dioxins and PCBs, were low. The levels found were similar to background levels found throughout Puget Sound. However, PAHs were above Puget Sound background levels. See Table 1 below.

Ecology found that sediments at a location in the Norfolk Street stormwater drainage basin, at the Ryan Way outfall had 770 parts per billion (ppb) of polychlorinated biphenyls (PCBs). This was the highest level of PCBs found in the upriver study area. While there are many areas in the LDW site with similar concentrations of PCBs, the result was higher than expected for the southern reach of the river.

Table 1. Upriver contaminant levels compared to averages from Puget Sound and the Lower Duwamish Cleanup Area. The values in Table 1 may be revised based on new data and analysis. Final background values and cleanup standards will be determined during development of the Environmental Protection Agency's sediment cleanup plan (Record of Decision) next year.

Contaminant	Average for Area		
	Upriver[3]	Puget Sound Background[4]	Lower Duwamish Cleanup Site
Arsenic (parts per million or ppm)	**7**	7	16
PCBs (parts per billion)[1]	**3**	2	350
cPAHs (ppb)[2]	**43**	9	390
Dioxins-Furans (parts per trillion)[2]	**2**	2	26

[1]Dry weight values

[2]Concentrations measured in Toxicity Equivalent Factors.

[3]Ecology 2008 Sediment Study. This average does not include the highest (770 ppb) PCB data point.

[4]Data from the EPA 2008 OSV Bold Survey, which excluded urban bays.

Q: Where did the higher levels of PCBs and cPAHs come from?

Ecology has not yet determined the source of the higher levels of PCBs and cPAHs. More investigation is needed to find the source for this contamination.

While the level of cPAHs is lower than what has been measured in the LDW cleanup area, it is higher than the Puget Sound background levels. However, it is not surprising to find higher levels of cPAHs in urban areas where there are a lot of roads. Petroleum products (from cars), tires and asphalt can all be sources of cPAHs. The cPAHs can move from the roadway and into stormwater pipes and then into river sediments where we measured samples.

The source for the higher level of PCBs at the Ryan Way Outfall is also unknown. The Ryan Way storm water outfall drains water when a storm event exceeds the capacity other nearby drainage systems (Figure 2). The Ryan Way storm drain system drains storm water from about 100 acres of I-5 right-of-way and about 150 acres of residential and densely forested areas. It is difficult to track specific source(s) because there is so much water released during a storm event. An outfall pipe from the city of Tukwila is also contributing water from its storm drain system about 65 feet north of the Ryan Way outfall. Sampling data from this area, however, does not suggest this is a source of contamination.

Seattle Public Utilities (SPU) periodically conducts sediment sampling in this storm drain system. Ecology reviewed several years of data and found that generally, the levels of PAHs, metals, and PCBs were low.

Q: What are the next steps?

A: Ecology has already taken several steps to further investigate possible sources of PCBs and PAHs in this area. These efforts include evaluating GIS (Geographic Information System) files for this drainage basin to define the area for future efforts to trace pollution sources. Ecology is also:

- Requesting SPU to re-sample the Ryan outfall location as part of their regular storm drain sampling.
- Working with the cities of Seattle and Tukwila to identify potential sources within the drainage area.
- Working to summarize all known water and sediment data collected in the upriver area to get a better understanding about possible sources of pollution.

Q: What else is Ecology doing to control pollution entering the Lower Duwamish?

A: Ecology is leading the efforts to control sources of sediment pollution in the Lower Duwamish Waterway. The City of Seattle, the Port of Seattle, King County, the City of Tukwila, and EPA partner with Ecology in source control work.

Ecology and its partners use several different methods to reach source control goals. These include:

- Leading a Source Control Work Group to share information, discuss strategies, develop action plans, implement source control measures, and track progress.
- Upland contaminated site cleanups.
- Inspections and investigations.
- Sample collection to track sources of contamination.
- Technical assistance.
- Education and outreach to the Lower Duwamish community and stakeholders.

Ecology organized the Duwamish River basin into 24 source control areas. For each of these areas, Ecology developed a Source Control Action Plan to summarize:

- Potential sources of contamination.
- Source control actions (current and planned).
- Sampling and monitoring that is needed to look for more sources of pollution.

Ecology's most recent source control efforts include two surveys. One survey focused on building materials as a potential source of PCBs and another on examining outfalls. The building material survey involves the collection of paint and caulk samples from older buildings in the LDW drainage. Research from other cities has shown that paint and caulk from older buildings (1950s -70s) can contain PCBs and be a source of pollution. Ecology will analyze the materials to determine if they are a potential source of PCBs entering the waterway. During the second survey, Ecology will test sediments in some outfalls that have not been tested previously.

Figure 1. Upstream Sediment Study Location

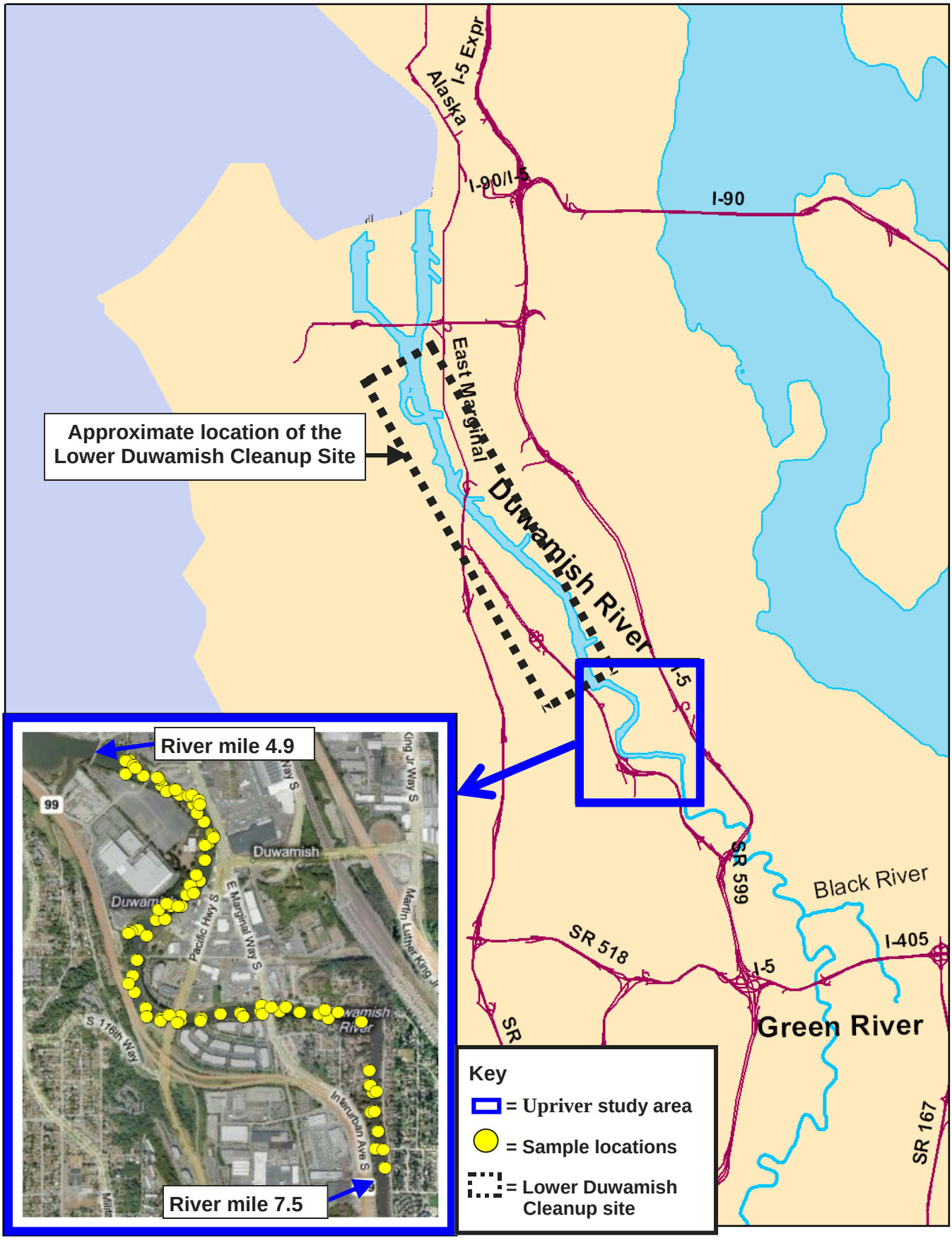
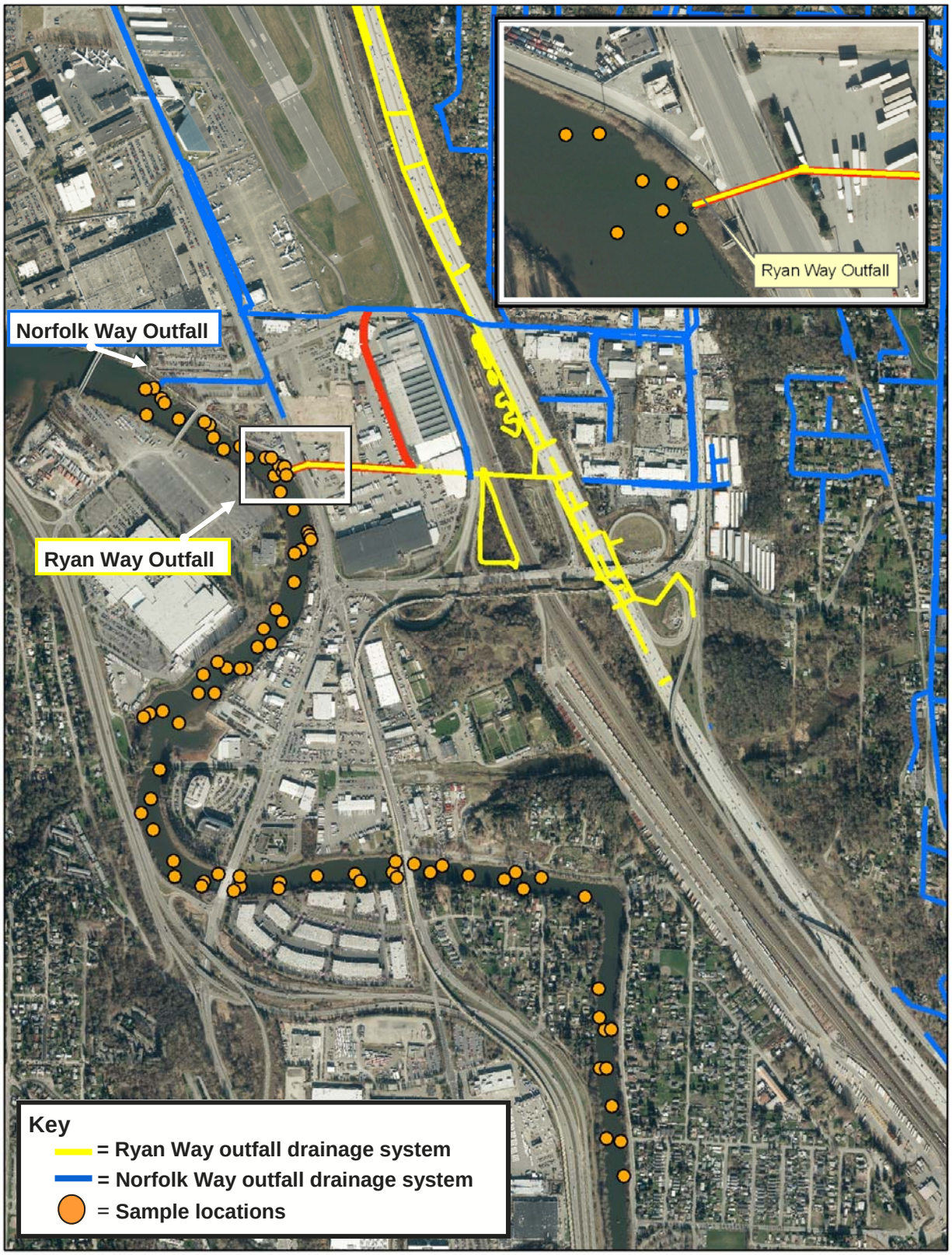


Figure 2. Ryan Way Outfall Location. During large storms, the Ryan Way outfall gets untreated runoff from I-5, treated runoff from I-5 and untreated runoff from the South Norfolk / MLK subbasin. The area in red indicates where the water from the Norfolk system (blue) enters the Ryan Way system (yellow).



DEPARTMENT OF
ECOLOGY
State of Washington
3190 160th Avenue SE
Bellevue, WA 98008

Lower Duwamish Waterway Upriver Investigation Seattle, WA

Ecology investigates sediments upriver from the Lower Duwamish Waterway cleanup site

If you need this publication in an alternative format, call reception at 425-649-7000. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Want to get more involved with efforts to clean up the Duwamish River?

Contact the Duwamish River Cleanup Coalition at james@duwamishcleanup.org, (206) 954-0218 or visit http://www.duwamishcleanup.org/index.html

DEPARTMENT OF ECOLOGY State of Washington

Ecology and the U.S. Environmental Protection Agency (EPA) are working to clean up contaminated sediments and control sources of recontamination in the Lower Duwamish Waterway (LDW). Cleanup is focused on three main efforts: cleaning up sediments, controlling sources of pollution, and cleaning up adjacent contaminated properties. In 2008, as part of efforts to better understand and control sources of pollution in the Lower Duwamish Waterway, the Department of Ecology conducted a sediment study. This study involved a storm water outfall (drainage pipe) survey and sediment sampling.

Ecology found that within about two miles upriver of the LDW site, sediment concentrations of contaminants, such as arsenic, dioxins and PCBs, were low. The levels found were similar to background levels found throughout Puget Sound, however PAHs were above Puget Sound background levels.

In addition, Ecology found that sediments at a location in the Norfolk Street stormwater drainage basin, at the Ryan Way outfall had 0.77 ppt of polychlorinated biphenyls (PCBs). This was the highest level of PCBs found in the study area. While there are many areas in the LDW site with similar concentrations of PCBs, the result was higher than expected for the southern reach of the river. Ecology is now working to address this area of higher contamination.

For a copy of this Frequently Asked Questions document in another language, please contact Meg Bommarito at Meg.Bommarito@ecy.wa.gov or (425) 649-7256. For more information about Ecology's efforts in the Lower Duwamish Waterway, visit http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

Publication No. 11-09-215

El Departamento de Ecología (Ecología) del Estado de Washington y la Agencia de Protección Ambiental (EPA, por sus siglas en inglés) están trabajando para limpiar los sedimentos contaminados y también para controlar las fuentes de re-contaminación en la Vía Fluvial Baja del Duwamish (LDW, por sus siglas en inglés). La limpieza está enfocada en tres principales esfuerzos: limpieza de los sedimentos, control de las fuentes de contaminación, y limpieza de las propiedades contaminadas aledañas al río. En 2008, como parte de los esfuerzos para entender y controlar mejor las fuentes de contaminación en la LDW, Ecología llevó a cabo un estudio de los sedimentos. Este estudio incluyó un reconocimiento de los puntos de descarga de las aguas pluviales y muestreo de los sedimentos.

Ecología descubrió bajas concentraciones en los sedimentos de algunos contaminantes (arsénico, dioxina y PCBs) dentro de un límite de aproximadamente dos millas río arriba del sitio LDW. Los niveles encontrados fueron similares a los niveles que existen naturalmente en el área de Puget Sound. Sin embargo, los hidrocarburos aromáticos policíclicos (PAHs, por sus siglas en inglés) sobrepasaron los niveles naturales de Puget Sound.

Adicionalmente, Ecología encontró que los sedimentos en una porción de la cuenca hidrológica de la Calle Norfolk, específicamente cerca del punto de descarga en Ryan Way, contenían 0.77 ppt de bifenilos policlorados (PCBs, por sus siglas en inglés). Esto fue el nivel más alto de PCBs encontrado en toda el área de estudio. Aunque hay muchas áreas dentro del sitio LDW con concentraciones similares de PCBs, tal resultado fue más alto de lo que se esperaba para el curso sur del río. Ecología está trabajando en estos momentos para limpiar ésta área de contaminación más alta.

Para obtener una copia de este documento de Preguntas Frecuentemente Preguntadas en otro idioma, favor de comunicarse con Meg Bommarito a meg.bommarito@ecy.wa.gov ó al tel. (425) 649-7256. Para

obtener más información sobre los esfuerzos de Ecología en la Vía Fluvial Baja del Duwamish, visite el siguiente sitio Web: http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

Publication No. 11-09-215ES

華盛頓州生態署（生態署）与美國環境保護署（EPA）正在清理Duwamish下游水道(LDW)受污染的底泥,並控制污染源以防止河里的底泥再次污染。清理工作有三個主要重點：清理底泥，控制污染源，清理附近有污染的地產。2008年，生管署為了更好地了解和控制污染源Duwamish下游航道，對河里的系沉積物進行了研究。這項研究涉及雨水排放口（排水管）調查和沉積物采樣。

生態署發現，大約在LDW兩英里的上游，泥沙中的污染物,如砷，戴奧辛(Dioxin)和多氯聯苯（PCBs)，濃度較低, 類似整個普吉特海灣的背景水平，但環芳烴含量高于普吉特海灣 背景水平.

此外，生態署發現，沉積物在諾福克街(Norfolk Street)雨水流域, 在瑞安路(Ryan Way) 的排污口，有0.77百分點濃度的多氯聯苯 污染化學物品。這是在研究地區中發現的 最高濃度的多氯聯苯。雖然在LDW的許多地方有与類似的多氯聯苯濃度，但是多氯聯苯濃度在LDW河的南部高于生管署的預期。生管署現在正在努力解決這一地區的比較高度的污染。

有如需更多信息，請聯系林昊（425）649-7187。或上網 http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

Publication No. 11-09-215ZH

Bộ Môi Sinh đang cộng tác với Cơ quan Bảo vệ Môi Trường Hoa Kỳ (EPA) trong một công trình dọn sạch bùn ô nhiễm và xử lý các nguồn gây tái nhiễm ở hạ nguồn thủy lộ sông Duwamish (LDW). Sự dọn sạch nhắm vào ba nỗ lực: dọn sạch bùn, xử lý các nguồn nhiễm và dọn sạch các khu vực ô nhiễm kề cạnh. Một trong những nỗ lực trong năm 2008 là để tìm hiểu thêm và xử lý nguồn nhiễm nơi LDW nầy, Bộ Môi Sinh đã tiến hành một nghiên cứu về bùn ở đáy sông tại đây. Cuộc nghiên cứu nầy liên hệ đến việc khảo sát ống xả nước mưa (ống cống thoát nước) cùng việc thâu lấy mẫu bùn.

Khi đi khoảng hai dặm ngược dòng trên thủy lộ LDW, Bộ phát hiện rằng các chất ô nhiễm như thạch tín, dioxin và PCBs có nồng độ thấp tương tự với nồng độ được ghi nhận trong khắp vùng Puget Sound, chỉ có PAHs là cao hơn so với tầm mức sẵn có trong thiên nhiên trong vùng Puget Sound.

Ngoài ra Bộ còn phát hiện chất PCBs trong chất bùn đáy sông tại lưu vực chứa nước mưa trên đường Norfolk có nồng độ đến 0,77 ppt (part per trillion - một đơn vị PCB trong ngàn tỷ đơn vị nước), cao nhất trong vùng đang được nghiên cứu.

Nếu quí vị muốn nhận bản tin với những câu hỏi phổ thông bằng ngôn ngữ khác, xin liên lạc Meg Bommarito tại địa chỉ email Meg.Bommarito@ecy.wa.gov hoặc ở số (425) 649-7256. Muốn biết thêm các nỗ lực của Bộ liên quan hệ đến Hạ nguồn thủy lộ sông Duwamish, xin vào http://www.ecy.wa.gov/programs/tcp/sites_brochure/lower_duwamish/lower_duwamish_hp.html

Publication No. 11-09-215VI