



SCHOOL OF PUBLIC HEALTH
UNIVERSITY of WASHINGTON



**Health Impact Assessment
Proposed Cleanup Plan for the
Lower Duwamish Waterway Superfund Site**

Technical Report

September, 2013

(Final version)

Resources and methods

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Technical report

This technical report supports our HIA *Final Report*, published in September, 2013. This technical report is identical to the version that accompanied our *Public Comment HIA Report*, which was submitted to EPA on June 13, 2013.

Acknowledgment and disclaimer

We are indebted to the many agencies, organizations, and individuals who have contributed their time, information, and expertise to this project.

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The views expressed are those of the authors and do not necessarily reflect the views of the Health Impact Project, The Pew Charitable Trusts, the Robert Wood Johnson Foundation, or the Rohm & Haas Company.

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Resources and methods

We conducted this HIA in six steps, which is standard in HIA practice:

- Screening
- Scoping
- Assessment
- Recommendations
- Reporting
- Evaluation

We relied on guidance from a variety of sources throughout this HIA, including:
Stakeholder guidance—regular meetings and communication with our advisors:

- Resident Advisory Committee (RAC), with representatives from South Park; Georgetown; Nickelsville, a homeless encampment; a nonprofit organization, Puget Sound Sage; and a former state legislator representing the South Park and Georgetown area, and formerly affiliated with the nonprofit, Homesight
- Tribal Advisory Committee (TAC), with representatives from Suquamish and Duwamish Tribes. The Muckleshoot Tribe chose not to participate in the TAC
- Liaison Committee (LC), with representatives from EPA, other agencies, and potentially responsible parties
- Non-tribal fishing communities, via semi-structured interviews with individual community advisors and key informants
- Technical guidance from the Health Impact Project (Katherine Hirono, Aaron Wernham); Habitat Health Impact Consulting (Marla Orenstein); and Decision Research (Jamie Donatuto, Robin Gregory)

Methods (and findings) for the Assessment and Recommendation phases of this HIA are additionally described in the separate Technical Reports for each population of concern.



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Duwamish River Superfund Cleanup Health Impact Assessment Screening Summary February, 2012

1. Introduction

This Health Impact Assessment (HIA) will inform the Environmental Protection Agency (EPA) selection of a cleanup plan for the 5.5-mile long Lower Duwamish Waterway (LDW) Superfund site in Seattle, Washington. Assessment of possible cleanup plans has been conducted by EPA and a consortium of responsible parties called the Lower Duwamish Waterway Group – City of Seattle, King County, Port of Seattle, and The Boeing Company. The existing, completed assessments have a primary focus on contaminated river sediments and health risk associated with fish consumption and river and shoreline use, plus some assessment of nearby soil pollution and cleanup construction impacts, such as air pollution, traffic and noise.

Note: This Screening Summary repeats some information that is included in our recently submitted Stakeholder Engagement Plan, to ensure that both documents can be viewed independently of each other.

2. HIA and Decision-Making Timetable

Federal law requires public review and formal agency consideration of and response to public comments received on EPA's Proposed Superfund Cleanup Plans. Results of the Duwamish HIA will be presented to EPA for formal consideration and response during public comment on the agencies' Proposed LDW Cleanup Plan. EPA has delayed release of its Proposed Cleanup Plan from March 2012 until August or September 2012. As a result, we anticipate completing most of the Duwamish HIA assessment and recommendations prior to and during the public review of the EPA Proposed Plan. In addition, project partner Duwamish River Cleanup Coalition/Technical Advisory Group (DRCC/TAG) is EPA's designated Community Advisory Group (CAG) for the LDW site and will continue to work with EPA to understand and integrate recommendations of the Duwamish Superfund HIA following formal public review and comment.

3. HIA Governance: Project Team

The grant recipient and nominal project director is William Daniell (UW School of Public Health). However, the project is managed by consensus of the three key project partners: Linn Gould (Just Health Action), BJ Cummings (DRCC/TAG), and Daniell. DRCC/TAG has served as EPA's CAG for the LDW Superfund site since 2001, and has been engaged in all aspects of site investigation and evaluation of alternatives. DRCC/TAG and Just Health Action are also concurrently conducting a Cumulative Health Impacts Analysis of the site, and all three project partners are working together on another EPA-funded project to identify, prioritize and develop action plans to address local health impacts from other local environmental exposures and socioeconomic health influences. Information from these concurrent activities will inform and complement the Duwamish HIA.

4. HIA Governance: Advisory Groups

The Duwamish Superfund HIA is guided by two formally established advisory groups, community meetings, and focus groups. The HIA project team will meet with advisory groups every 4-8 weeks during the HIA, and will provide written updates every 1-4 weeks, as warranted. Findings and conclusions of the assessment will also be presented in a community meeting to receive comments, suggestions and recommendations. The two formal advisory groups are:

(a) Community Advisory Committee (CAC), representing affected community, tribal, fishing and organizational stakeholders. The CAC members will be selected based on invitations and recommendations of representatives from the affected communities, including Duwamish Valley residents, Tribal members, and fishing populations.

(b) Liaison Committee (LC), representing governmental (regulatory and non-regulatory) and responsible-party stakeholders. The LC members will be selected from individuals who indicated interest during the HIA Informational Workshop and Extended HIA Workshop conducted February 7 and 8. Selection will be augmented by direct invitations to individuals who would enhance representativeness of the group. A limited number of additional people can be accommodated at advisory group meetings.

5. Project Stakeholders

Key stakeholders for the Duwamish Superfund HIA include:

(a) Health-impacted populations: The HIA will focus on three populations whose health will be most directly impacted by cleanup activities and decisions:

- (i) Residents of two riverside neighborhoods, who are predominately low-income and ethnic minorities;
- (ii) Three Native American Tribes with historic and cultural rights to the river, including two federally recognized Tribes with treaty rights to fish, one of which has a commercial salmon fishery on the river;
- (iii) Non-tribal subsistence or cultural fishing communities, which are predominantly immigrant (especially Asian and Pacific Islander), low-income and/or homeless.

Non-resident (visiting) recreational river users: See Section 8.

(b) Regulatory agencies: EPA and the Washington State Department of Ecology are the regulatory agencies and decision-makers responsible for the river cleanup.

(c) Responsible parties: The City of Seattle, King County, Port of Seattle, and The Boeing Company (collectively known as the Lower Duwamish Waterway Group) and a large number of small businesses and municipalities are responsible for cleanup costs and activities.

(d) Other stakeholders: a variety of other interested parties include environmental organizations, public and private social and health service providers, labor and business organizations, cultural and ethnic associations (such as the Commission on Asian Pacific American Affairs), and others.

6. Resources and Responsibilities

DRCC/TAG will serve as the lead partner for Community and Stakeholder Engagement, in consultation with UW School of Public Health and Just Health Action. DRCC/TAG Project Manager (HIA Project Coordinator) BJ Cummings will be supported by DRCC/TAG Program Manager, Alberto Rodriguez and Community Outreach staff member Paulina Lopez (both Spanish/English bilingual). In addition, field interviewers will be contracted to conduct interviews and other engagement activities in a variety of languages prevalent in the affected communities, including Vietnamese, Chinese, Thai, and other languages as needed. Information for Community Health Profiles will be provided by Just Health Action, and results of community health concerns surveys will be provided by Antioch University, as part of their roles in related community health initiatives managed by DRCC/TAG and funded by EPA. UW School of Public Health graduate student, Amber Lenhart will serve as project assistant and liaison for Tribal engagement, and will coordinate a community based research project to collect information about Duwamish River fishing and fish consumption. Other UW and Antioch University students (to be named) may assist with HIA activities.

7. Stakeholder Engagement

The Duwamish Superfund HIA Stakeholder Engagement Plan was submitted to Pew/RWJ Health Impact Project on February 15. The first stakeholder engagement events were two HIA Informational Workshops and one Extended HIA Workshop conducted on February 7 and 8. These events were conducted with technical support from Marla Orenstein (Habitat Health Impact Consulting), and were observed by Katherine Houghton and Aaron Wernham (Pew/RWJ Health Impact Project). The events were attended by 56 stakeholder-participants.

8. Screening

Health is a key part of existing assessments and discussions about the LDW Superfund site cleanup, and in contrast to the subject of most HIAs, one specific and intentional aim of the cleanup is to reduce human health risk. However, as noted in Section 1, the existing completed assessments have a primary focus on contaminated river sediments and health risk associated with fish consumption and river and shoreline use, plus some assessment of cleanup construction impacts, such as air emissions, traffic and noise. However, the existing assessments do not substantially address impacts on health from unsafe post-cleanup levels of contamination, and particularly the use of "institutional controls" (social strategies) to

mitigate risks of fish consumption and river use after cleanup, which may last in perpetuity. In addition, the existing assessments generally do not address unintended/unplanned health impacts resulting from EPA's proposed cleanup plan. The HIA will independently assess potential health impacts that are under-addressed or not addressed by existing assessments, and will make recommendations to minimize health impacts and maximum health benefits resulting from the river cleanup.

(a) Initial project-team impressions

In our HIA funding application, we projected that key health issues would include:

- Consumption of contaminated seafood by subsistence and recreational fishers;
- Air and soil pollution;
- Construction noise;
- Traffic safety;
- Access to goods and services; and
- Community cohesion."

(b) Stakeholder comments

Stakeholders participating in the Extended HIA Workshop (Feb 7) identified the following list of possible areas for assessment. The list was displayed during the workshop, while each discussion group reported to the overall group, with opportunity to make modifications or add clarification. The following list preserves the original wording, with some additions (based on our recall), and rearranged to group similar items together:

- Construction impacts – risk, air quality impacts, exposure, disruptions to the waterway and surrounding communities
- Emissions and prioritization
- Time and duration of clean up
- Sequencing—as a way to mitigate some impacts of the various projects
- Disruption to community during clean up
- Recontamination [during or after cleanup]
- Air source control
- Ongoing water/sediment pollution source control
- Concern about dredging – impacts to people and fish
- Fish consumption – increased/decreased fish consumption impacts,
- Health impacts of institutional controls (nutritional, cultural)
- Relationship of fish consumption to lifestyle, diet, culture
- Tribal treaty rights and traditional activities
- Displacement and gentrification
- Business Impacts – cost, stimulus, redevelopment opportunities
- Increased activity/uses on river
- Habitat restoration/green space – ecological and mental health
- Bike paths, other amenities
- Decision making process – community voice, empowerment
- Job creation/opportunities

(c) Visiting (non-resident) recreational river users

At the Extended HIA Workshop (Feb 8), one discussion group asked about including recreational river users as an additional population in the HIA.

It is our preliminary opinion that visiting recreational users are not among the most health-impacted river users, and should not be a primary focus of this HIA. Duwamish pollutant concentrations are highest in sediments, fish and shellfish (and some nearby soil locations), and very low in water. Based on the Human Health Risk Assessment, all cleanup plans under consideration by EPA are expected to be adequate to protect the health of visiting recreational users. The visiting recreational-user population probably does not face any potential health impacts that are qualitatively different from the three populations that we chose for this HIA because of their relative vulnerability and potential for contaminant exposure (see Section 5a). The likelihood and magnitude of any one health impact is probably substantially less than in the three chosen vulnerable populations. We are not aware of any existing data about recreational users of the Duwamish (e.g., demographic, health, river usage, or fish consumption data). Collecting new data about this population would require a substantial field effort, in addition to currently planned data collection efforts, and would probably yield limited or no added value for making recommendations. We anticipate that any recommendations derived from assessing the three chosen populations will be applicable to visiting recreational users, or that recommendations could be tailored to the circumstances of visiting recreational users.

We will share this preliminary opinion with our advisory groups, and discuss whether to include separate or additional consideration of this population.

(d) Minimize duplication of effort

At the Extended HIA Workshop (Feb 8), it was suggested that the HIA not duplicate other past or ongoing assessment efforts. The project team generally agrees with this. Ongoing assessments to consider are:

- DRCC/TAG and JHA projects: DRCC/TAG is Project Manager for the EPA-funded Community for a Renewed Environment (CARE) "Duwamish Valley Healthy Communities" Project. JHA and DRCC/TAG are also conducting an EPA-funded "Cumulative Health Impact Analysis" of Duwamish communities. The HIA will have distinctly separate activities, and will benefit from the other projects' community partnerships and collected information.
- Duwamish air pollution study: A two-year project is assessing air pollution exposures in the Duwamish Valley. The project is a collaboration by UW School of Public Health researchers, South Seattle residents, and Puget Sound Sage, a local nonprofit organization. These collaborators are partners in the DRCC/TAG Healthy Communities project; this will facilitate the HIA project team being informed about study activities. We anticipate no duplication of effort, and it is conceivable that study results could be useful for the HIA, depending on when results are available.
- EPA EJ Analysis: The EPA Region 10 Environmental Justice Program is conducting an "EJ Analysis" of proposed cleanup options for the Duwamish Superfund site. The analysis began one year ago. There is no public information about what issues and

populations the Analysis is addressing. A report will probably be released with the EPA Proposed Cleanup Plan (Aug or Sept 2012), and a pre-release copy may be circulated for stakeholder review in June. We have repeatedly requested general information about scope. However, given the relative non-transparency of this EPA effort, it may be difficult to avoid some overlap of focus and effort.

(e) Summary

Based on stakeholder comments and our preliminary consideration of areas not yet addressed by other analyses to date, the project team envisions including the following topics in the HIA. We will iteratively refine this list during Scoping, with guidance from our advisory groups. At this time, we believe these represent the greatest potential for substantial impacts on health:

- Impacts on health from unsafe levels of sediment and fish contamination, during and after active cleanup, and particularly the "institutional controls" (social strategies) needed to mitigate risks of fish consumption and river use;
- Impacts on health and potential reductions in health risk from source-control efforts directed at water, soil and air pollution sources outside the Superfund site but within the Duwamish watershed and airshed.
- Population/behavior impacts, including changes in tribal and subsistence fish consumption, disruption of tribal treaty rights and traditional activities, and disruption of traditional activities of other subsistence or cultural fishing populations;
- Duwamish community impacts, including gentrification and displacement in surrounding residential neighborhoods, and losses of social cohesion, as well as potential displacement of businesses;
- Potential for exacerbating existing health disparities and opportunities for reducing inequities;
- Potential cleanup-related improvements and benefits, including natural habitat restoration and creation of greenspace and other amenities that might increase opportunities for recreational activity and outdoor enjoyment;
- Opportunities for economic revitalization.

The HIA will also examine and make recommendations to the following topics but may reduce their relative priority if it appears that they will or can be adequately addressed in other assessment or planning activities, separate from the HIA:

- Short-term impacts of cleanup construction activities: air pollutant emissions, noise, traffic safety;
- Sequence and duration of cleanup activities.

The ultimate goal of the HIA will be to examine as yet under-assessed impacts and make recommendations that focus on opportunities to minimize health impacts, maximize health benefits, and reduce existing health disparities. In the next "scoping" phase in the HIA, we will develop the logical framework and characterize potential causal pathways related to these identified impact areas, in order to guide further prioritization and data collection.



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Duwamish River Superfund Cleanup Health Impact Assessment; Pew #2277

Scoping Summary July, 2012 (version 1.2)

1. Introduction

This Health Impact Assessment (HIA) will inform the Environmental Protection Agency (EPA) selection of a cleanup plan for the 5.5-mile long Lower Duwamish Waterway (LDW) Superfund Site in Seattle, Washington. Assessment of possible cleanup plans has been conducted by EPA and a consortium of principal responsible parties called the Lower Duwamish Waterway Group – City of Seattle, King County, Port of Seattle, and The Boeing Company. The existing, completed assessments have a primary focus on contaminated river sediments and health risk associated with fish consumption and river and shoreline use, plus some assessment of nearby soil pollution and cleanup construction impacts, such as air pollution, traffic and noise.

This HIA is conducted as a partnership between three organizations. The grant recipient and nominal project director is William Daniell (UW School of Public Health). The other key project partners are Linn Gould (Just Health Action) and BJ Cummings (Duwamish River Cleanup Coalition/Technical Advisory Group). DRCC/TAG has served as EPA's Community Advisory group for the LDW Superfund site since 2001, and has been engaged in all aspects of site investigation and evaluation of alternatives.

2. Status report

This HIA began in January 2012. We submitted a Screening Report and Stakeholder Engagement Plan in February.

The EPA originally planned to announce its favored LDW cleanup plan in March 2012, but delayed this until August or September. We proposed in March that our Pew deliverable deadlines be revised accordingly; the proposed revision was approved by our Pew project officer (Katherine Houghton) but is still under review by Pew administration. The EPA is now considering a further delay for their announcement, possibly until January 2013. Regardless of these uncertainties, we are kept aware of EPA's cleanup considerations through their representation on our HIA Liaison Committee and through the ongoing formal relationship between EPA and DRCC/TAG. However, depending on the selected EPA

announcement date, it may become necessary to request an additional revision of deliverable deadlines, to ensure that our HIA recommendations and final report are appropriate for the ultimate EPA cleanup proposal.

As suggested by Katherine Houghton, we view this Scoping Summary as a “living document” and not a final report, summarizing our Scoping activities at this point in time. At this juncture, we welcome feedback from our Pew/RWJ Health Impact Project partners and our technical advisor, Marla Orenstein (Habitat Health Impact Consulting).

We have concluded most but not all Scoping activities, but we are nearly ready to begin our Assessment. We will soon share our major draft Scoping materials—logic model, research questions and potential evidence sources—with our Resident and Tribal Community Advisory Committees, and our Liaison Committee; we consider our draft Scoping materials provisional until we have their feedback and support. We are also finalizing connections with Community Advisors to serve as voices for non-tribal subsistence fisher populations; their input may necessitate small but important additions to our Scoping materials and Assessment plans.

Our major activities to date include:

- **Community Advisory Committees (CACs).** We originally envisioned that a single CAC would represent affected community, tribal, fishing and organizational stakeholders. However, based on logistic practicality and differing concerns, we divided our CAC into three separate committees, each representing one of the vulnerable populations that our HIA primarily focuses on:
 - **Resident CAC.** This committee includes: 6 residents of the South Park and Georgetown neighborhoods (SP/GT); 1 resident of Nickelsville, a local self-managed Eco Village for up to 1000 homeless people; and 1 representative of Puget Sound Sage, a local organization conducting a community-based participatory research study of local diesel emissions in SP/GT (other organizational members are anticipated to join this group as the assessment progresses). Members are native English, Spanish and Vietnamese speakers, representing the ethnic diversity of the affected residential neighborhoods. We met once with this group, on April 23, and will meet next on June 25. Membership is adaptive; for example, a local small business owner joined the first meeting, held at a South Park pizza restaurant.
 - **Tribal CAC.** This committee includes: 2 members of the Duwamish Tribe; and 2 professional staff employees of the Suquamish Tribe. The Muckelshoot Tribe has chosen not to participate. We met once with this group, on May 29, and will meet next on June 13. That meeting will be joined by our new, additional technical advisors from Decision Research (see below).
 - **Subsistence (non-tribal) Fisher CAC.** This informal group consists of individual Community Advisors and will not meet as a committee, for logistic practicality. We will conduct individual semi-structured interviews with these Advisors. They will help initiate “snowball” contacts with people who fish, and help identify potential focus group facilitators. Advisors include the Director of the Washington State Commission on Asian American Affairs and Executive

Director of the Vietnamese Friendship Association. We have made and are pursuing other contacts in the Filipino, Chinese, Cambodian and urban Indian communities (the latter encompasses many tribes other than those with treaty or historic connections to the Duwamish River).

- **Liaison Committee.** This committee includes about 20 members, plus alternate members, representing: EPA; State agencies (Departments of Ecology, Health, and Natural Resources); local public entities (City of Seattle,* King County,* Port of Seattle,* and Puget Sound Clean Air Authority); The Boeing Company;* and two environmental consulting groups. The asterisks denote the four principal responsible parties for the LDW cleanup. We have met twice with this group, on March 28 and May 9.
- **UW graduate students.** Two UW graduate students have joined the HIA team:

Amber **Lenhart** (Environmental & Occupational Health...EOH MPH program) shares primary responsibility for: engaging non-Tribal fisher Community Advisors; overall HIA assessment of impacts on non-Tribal fishers; and a UW-funded CBPR **research** study focusing on non-Tribal subsistence fishing.

Jonathan **Childers** (EOH MPH and Built Environment PhD programs) shares primary responsibility for: the ongoing evaluation of HIA process; (probably) overall HIA assessment of gentrification impacts; and a UW-funded **research** project evaluating HIA impacts on decision-makers and other stakeholders.
- **UW HIA Class.** Dr. Andrew Dannenberg instructs an HIA class at UW. This year, the LDW cleanup was the subject of the class project. About 20 enrolled students worked in four groups addressing construction, fish, economic, and social and cultural impacts. The HIA team served as course advisors. The class presentation (May 30) was attended by the HIA team, DRCC/TAG director and staff, Communications staff from UW School of Public Health, and press representatives. A final report was delivered on June 5, and will serve as a resource for our HIA.
- **Decision Research.** Pending final Pew approval of a submitted work plan, two representatives of Decision Research—Drs. Jamie **Donatuto** and Robin **Gregory**—will serve as Technical Advisors for our Scoping, Assessment and Recommendations related to Tribal health impacts. Decision Research is a non-profit research organization that investigates human judgment, decision-making, and risk.

Drs. Donatuto and Gregory have conducted research on Tribal environmental public health indicators (EPHIs), with a particular focus on fish contamination and shortcomings in conventional risk assessment approaches. Their work to date has focused on the Swinomish Tribe, a Puget Sound area tribe. This tribe traditionally fishes on the Salish Sea (Puget Sound) and not specifically the Duwamish River, but has cultural and historic similarities to the tribes focused on by this HIA.

In collaboration with the HIA team, Drs. Gregory and Donatuto will prepare an application for National Science Foundation (NSF) or other possible quick-turnaround funds for a **research** study utilizing focus groups/ interviews with Suquamish and Duwamish Tribal representatives, to: identify health-related

concerns, framed by the tribal EPHIs; identify similarities and differences between Tribal and non-Tribal considerations; improve understanding of how HIA methods relating to Tribal concerns could be incorporated by EPA and other agencies as part of the Duwamish Superfund clean-up; and

- **DRCC/TAG and JHA projects.** Work continues on two EPA-funded projects: the Cumulative Health Impacts Analysis (CHIA) of the LDW site, and the Duwamish Valley Healthy Communities Project to identify, prioritize and develop action plans to address local health impacts from other local environmental exposures and socioeconomic health influences. Information from these concurrent activities will inform and complement the Duwamish HIA. DRCC/TAG recently co-sponsored youth group activities as part of Seattle’s International District “WILD” (Wilderness Inner-city Leadership Development) Youth Program, including surveys of Vietnamese residents in Duwamish communities and riverside surveys of fishing people. Those experiences will inform HIA Assessment activities.
- **Press activities.** Environmental journalists from InvestigateWest, an independent non-profit news service, KUOW (public radio), and KCTS (public television) are collaborating on a project prompted by the upcoming 40th anniversary of the Clean Water Act. The project includes a major focus on the Duwamish River and the HIA.

The following sections of this Scoping Summary use a structure defined by Scoping guidelines in the *Minimum Elements and Practice Standards for HIA*, prepared by the North American HIA Practice Standards Working Group (November 2010, v2). In general, we provide skeletal details for sections that are not substantially changed since our Screening Summary, and provide details mostly regarding our major Scoping activities and products—logic model, research questions, and potential evidence sources.

3. Decision and decision alternatives

- A. Primary decision: LDW sediment cleanup and institutional controls
- B. Decision alternatives
 - 1) LDW Group’s Feasibility study: five removal alternatives (2R-6R), and four combined technologies alternatives (3C-6C).
 - 2) LDW Group’s “Key Elements” proposal.
 - 3) Theoretical cleanup alternative(s) with lower post-cleanup concentrations of hazardous chemical in LDW sediment, closer to preliminary remediation goals (PRGs, desired endpoint concentrations that are believed to provide adequate protection of human health and the environment) and “natural” background.
- C. Related actions and decisions
 - 1) LDW early action and upland cleanup areas
 - a) Boeing Plant 2
 - b) Jorgensen Forge
 - c) Terminal 117
 - d) Completed: Slip 4, Duwamish Diagonal, Norfolk Combined Sewer Overflow
 - 2) LDW habitat restoration
 - 3) Duwamish River ongoing pollution source controls

4. Potential significant health impacts and their pathways (e.g., a logic model)

The accompanying logic model and tables of health impacts summarize our conception of potential pathways that could reasonably link cleanup and related decisions to direct, indirect or cumulative health impacts. The overall logic model is illustrated in detail in Figure 1, and Figure 2 shows the key sections of the model. The major areas of potential significant health impact are:

- Seafood consumption: Duwamish River contamination and fish-related impacts
- Tribal impacts
- Construction impacts: impacts of construction for cleanup and related actions
- Community revitalization and gentrification
- Industry revitalization and gentrification

Tables 1 to 5 list health impacts associated with each major section of the logic model. The yellow section in Figures 1 and 2 includes cleanup and related decisions/actions. The green section includes direct, expected consequences of cleanup actions. The blue sections identify impact domains of greatest potential importance, including direct and indirect impacts that have received substantial but variably incomplete formal attention to date (construction impacts, and Duwamish River contamination and fish-related impacts), and indirect impacts that have received no formal attention (Tribal impacts, beyond disease risk from fish consumption; community revitalization and gentrification; and industry revitalization and gentrification).

Stakeholder input: Model construction was informed by concerns and perspectives communicated by members of the Resident and Tribal CACs, and the Liaison Committee (LC). We used a “Good things, bad things” group exercise (Figure 3) as our primary approach to obtain information from CAC members. Figures 4-8 illustrate how sections of the logic model align with CAC concerns and perspectives.

We anticipate that our upcoming Tribal CAC meeting will lead to further optimization of our model. Our Decision Research technical advisors will attend that meeting, and discussion will include consideration of the Swinomish Tribal environmental public health indicators (Figures 9-11).

For LC members, we used a less structured group discussion at our first meeting to identify potential impacts of the LDW cleanup (Figure 12). At our second meeting, the LC members engaged in a “pathway” exercise, where we provided skeletal pathway examples, LC members self-divided into three groups, and each group produced a pathway related to cleanup construction, fish consumption, or “accelerated” gentrification (Figures 13-15). Participants were asked to generate pathway-related research questions and to suggest possible sources of information, but generally found these tasks difficult or confusing. Although this second-meeting exercise was arguably less productive than the CAC meeting exercise, one major goal was to ensure that LC members understand the HIA process, and are optimally prepared to understand the HIA team’s logic model and research questions, so LC members can provide informed suggestions or substantive assistance for identifying and obtaining evidence for the HIA Assessment.

Prioritization: Our prioritizations are guided mostly by the potential for disproportionate impacts on the three most vulnerable populations (see section #8) that are a primary focus of this HIA; but balanced against our desire not to duplicate efforts by EPA, other public agencies, and responsible parties.

In view of the latter, we will probably minimize (but still include) HIA Assessment of direct impacts that will probably receive substantial attention during cleanup and/or implementation planning; e.g., cleanup construction disturbance of the river environment, and associated traffic, pollution or spillage; and estimated disease risk from residual LDW sediment and fish/shellfish contamination.

We will, however, prioritize Assessment of indirect effects in the construction and seafood-related impact domains, as well as Assessment of potential impacts related to community revitalization and gentrification.

However, we have not yet decided how much to prioritize our Assessment of industry impacts in this HIA, and particularly the breadth of any such assessment. We will discuss this further with CAC and LC members, and we may solicit input from stakeholders in Duwamish Valley industry sectors.

Industry revitalization and gentrification impacts are potentially closely intertwined with community impacts, particularly in terms of ensuring survival or growth of community businesses, and promoting or preserving blue collar and entry level employment opportunities in Seattle. The Greater Duwamish Industrial District, which surrounds the LDW Superfund Site, is home to 85,000 jobs. Furthermore, the Port of Seattle has proposed its *Century Agenda* which, “over the next 25 years...will add 100,000 jobs through economic growth led by the Port of Seattle, for a total of 300,000 port-related jobs in the region.”

5. Research questions for impact analysis

Our research questions for impact analysis are outlined in Tables 1 through 5. These tables are still under construction, especially the research questions and evidence sources. We anticipate that these will undergo revisions after we share these with CAC and LC members (and our Pew partners and technical advisors).

6. Demographic, geographical and temporal boundaries for impact analysis

See #8, vulnerable subgroups.

7. Evidence sources and research methods expected for each research question

The primary evidence sources for our impact analysis are outlined in Tables 1 through 5. As noted, these tables are still under construction, especially the research questions and evidence sources. We anticipate that these will undergo revisions, particularly additions, after we share these with CAC and LC members (and our Pew partners and technical advisors).

The evidence sources include: existing databases; community and other stakeholder voices, collected in CAC meetings, individual interviews, focus groups (non-Tribal subsistence fishers and, depending on ability to obtain additional funds, Tribal representatives); and

input from our Decision Research technical advisors. We will also consider the content and evidence sources in the UW HIA class report.

Existing databases will, as appropriate, be analyzed with descriptive and comparative statistical methods. Community and stakeholder voices that are collected in unstructured meeting or discussion venues will be compiled in summary descriptive manner, with pertinent anecdotal quotes. Key-informant interviews or focus groups will be conducted in semi-structured manner, and where appropriate, will be analyzed with systematic qualitative methods.

Research questions that are addressed primarily by review of existing published information will use a categorical rating system to assess the likelihood, severity, magnitude, and distribution of possible impact or health effect (Figure 16); and also will characterize the degree of uncertainty or gaps in available information.

8. Vulnerable subgroups of the affected population

- A. Residents of two riverside neighborhoods (Georgetown and South Park), who are predominately low-income and ethnic minorities; plus residents of Nickelsville, a self-managed Eco Village with up to 1000 homeless people.
- B. Three Native American Tribes with historic and cultural rights to the river, including two federally recognized Tribes with treaty rights to fish (Suquamish and Muckelshoot Tribes), one of which has a commercial salmon fishery on the river. The Duwamish Tribe historically resides along the Duwamish River, and its Tribal Longhouse is situated near the River.
- C. Non-Tribal subsistence or cultural fishing communities, which are predominantly immigrant (especially Asian and Pacific Islander), low-income and/or homeless.

9. Approach to evaluation of the distribution of impacts

The HIA scoping process is formative and adaptive, and will continue throughout the Assessment phase, facilitated by regular engagement between the HIA team, our CAC and LC members, and our technical advisors.

10. Roles for experts and key informants

Already described in other sections of this Scoping Summary.

11. Standards or process for determining the significance of health impacts

As mentioned above, we will use a categorical rating system to assess the likelihood, severity, magnitude, and distribution of possible impact or health effect (Figure 16); and also will characterize the degree of uncertainty or gaps in available information.

12. Plan for external and public review

See our previously completed Stakeholder Engagement Plan.

13. Plan for dissemination of findings and recommendations

See our previously completed Stakeholder Engagement Plan.

14. HIA team (and roles). Team members include:

- A. UW School of Public Health
 - 1) William Daniell
 - 2) Amber Lenhart, graduate student
 - 3) Jonathan Childers, graduate student
- B. Just Health Action
 - 1) Linn Gould
- C. Duwamish River Cleanup Coalition (DRCC/TAG)
 - 1) BJ Cummings
 - 2) Paulina Lopez
 - 3) Alberto Rodríguez
- D. Consultants
 - 1) Habitat Health Impact Consulting: Marla Orenstein
 - 2) Decision Research: Robin Gregory; Jamie Donatuto

This HIA is conducted as a partnership between three organizations. The grant recipient and nominal project director is William Daniell (UW). The other key project partners are Linn Gould (Just Health Action) and BJ Cummings (DRCC/TAG). DRCC/TAG serves as the lead partner for Community and Stakeholder Engagement, in consultation with UW and Just Health Action. DRCC/TAG Project Manager (HIA Project Coordinator) BJ Cummings is supported by DRCC/TAG Program Manager, Alberto Rodríguez, and Community Outreach staff member, Paulina Lopez (both Spanish/English bilingual). In addition, field interviewers will be contracted to conduct interviews and other engagement activities in a variety of languages prevalent in the affected communities, including Vietnamese, Chinese, Khmer, Spanish and other languages as needed. Information for residential Community Health Profiles (Georgetown and South Park) will be provided by Just Health Action, and results of community health concerns surveys will be provided by Antioch University, as part of their roles in related community health initiatives managed by DRCC/TAG and funded by EPA. Daniell and Gould have shared primary responsibility for Assessment activities. Lenhart's and Childers' activities are described above (Status report). Other UW and Antioch University students (to be named) may assist with HIA activities.

15. Version notes:

- A. Version 1 – Original version prepared for Pew Health Impact Project, but replaced same day by Version 1.1
- B. Version 1.1 – Revised version prepared for Pew Health Impact Project, to replace Version 1. Made some wording additions/clarifications in the text (first 8 pages), and rearranged the sequence of Tables 1-5. No change in the content of the tables, or in the figures
- C. Version 1.2 – Updated version prepared for Duwamish Superfund HIA Advisors. Tables 1-5 were updated on July 9, in response to helpful suggestions from Dr. Aaron Wernham (Pew Health Impact Project). No other changes.

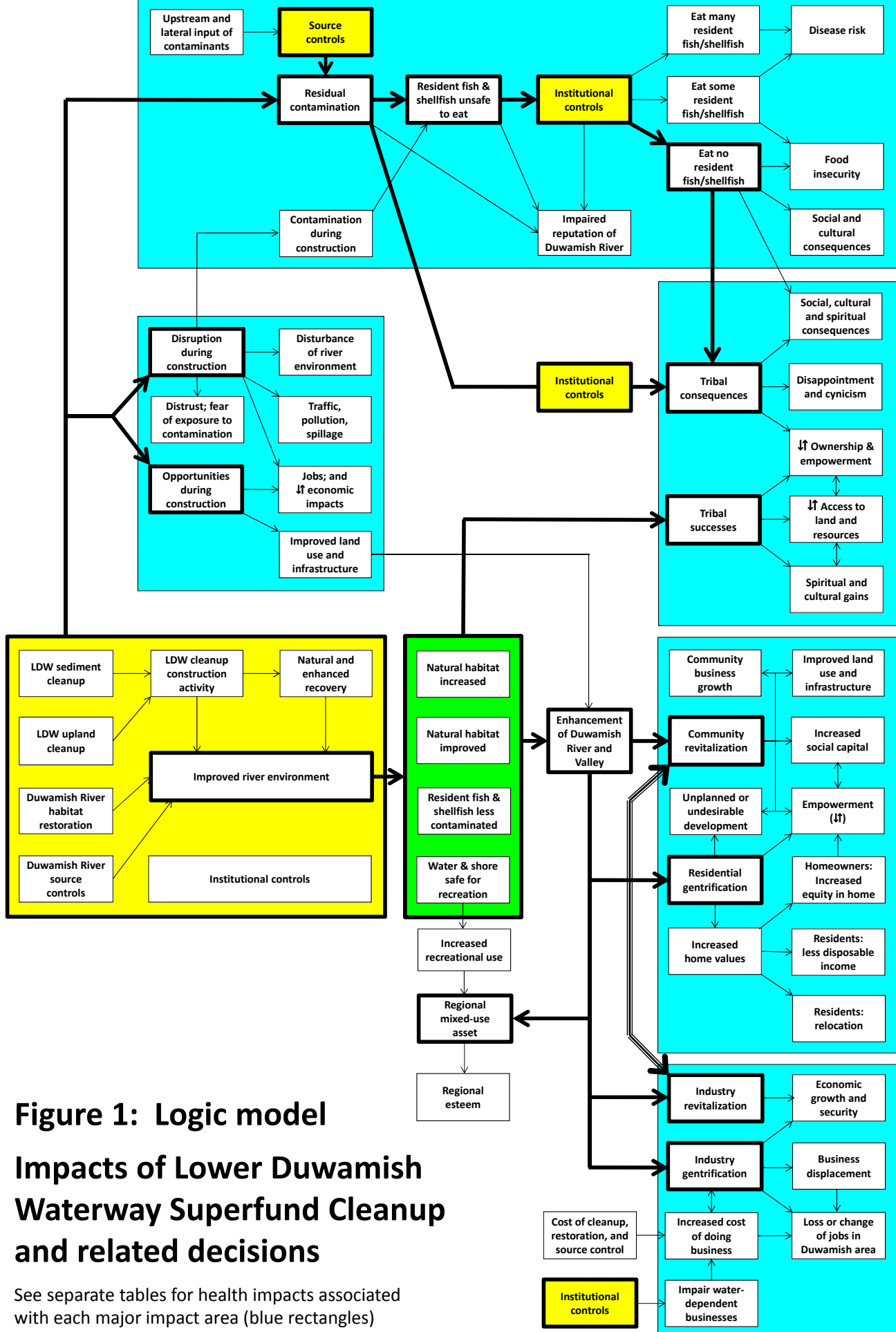


Figure 1: Logic model
Impacts of Lower Duwamish Waterway Superfund Cleanup and related decisions

See separate tables for health impacts associated with each major impact area (blue rectangles)

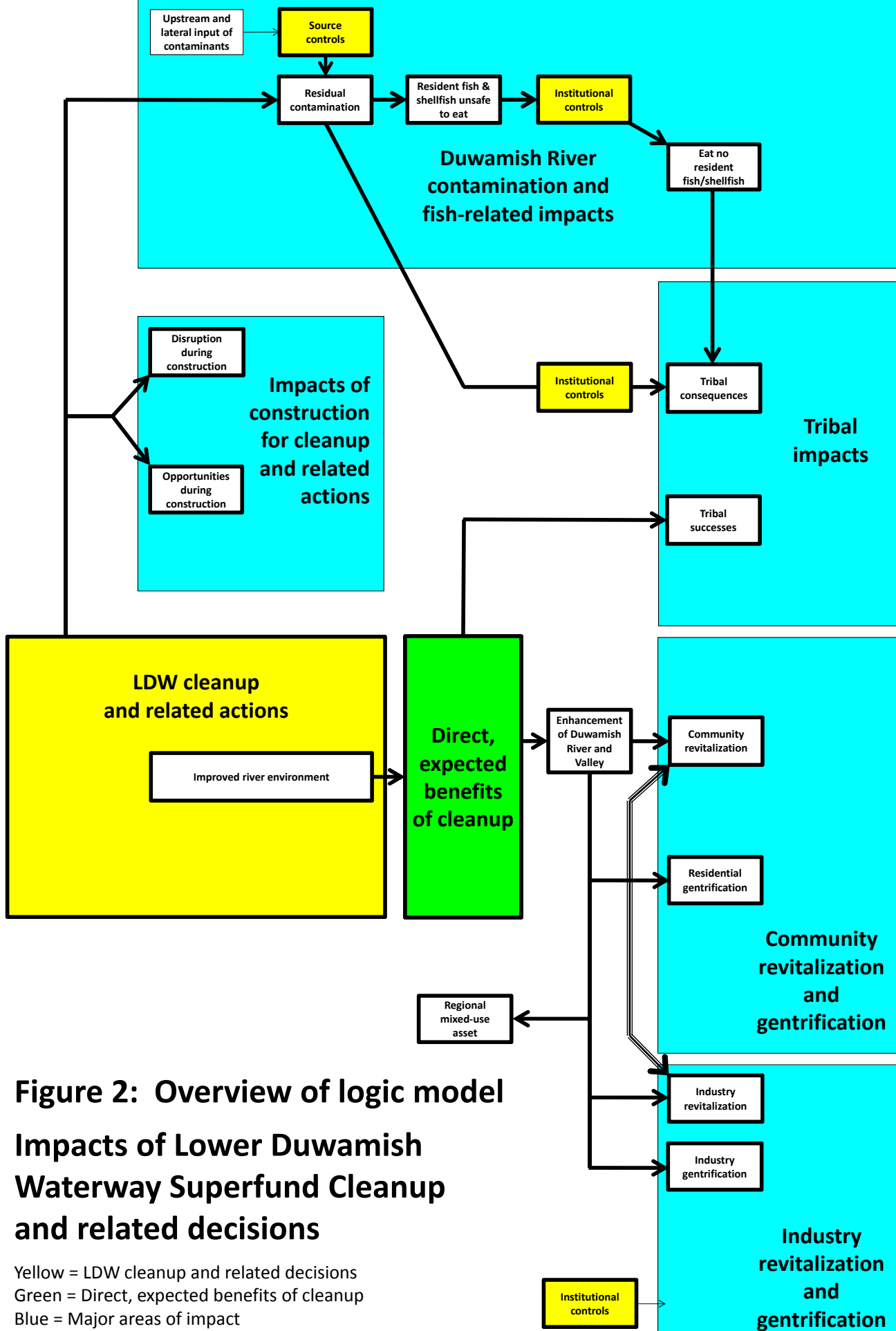


Figure 2: Overview of logic model
Impacts of Lower Duwamish Waterway Superfund Cleanup and related decisions

Yellow = LDW cleanup and related decisions
 Green = Direct, expected benefits of cleanup
 Blue = Major areas of impact

Tables 1a-b Duwamish Superfund HIA Scoping – Health impacts, Research Questions, Evidence: Residual contamination and seafood consumption

1a. Health impacts: Residual contamination & seafood consumption – Tribal and non-tribal subsistence fishers	
<i>Impact</i>	<i>Health impact</i>
Eat no fish/shellfish – Food insecurity	<ul style="list-style-type: none"> • Reduced income – Eat cheap processed/fast foods – Obesity, diabetes (Seligman et al, 2010; Goetz 2012; Cook et al, 2004; Whitaker, 2006). • Malnourishment – increased vulnerability to disease • Reduced intake of omega fatty acids, vitamins (Simopolous 1991; Roos et al. 2007). • Stress/anxiety - increased vulnerability to disease
Eat no fish/shellfish – Less exercise	<ul style="list-style-type: none"> • Obesity, diabetes, heart health
Eat no fish/shellfish – Change in culture	Loss of cultural practices (Cartledge 1999; Bengston et al. 2008; Reis and Hibbeln 2006; Wheatley and Wheatley 2000) and treaty rights? <ul style="list-style-type: none"> • Decrease social cohesion • Change in family recreation
Fishing increases – Cleaner fish – Increased fish/shellfish consumption	<ul style="list-style-type: none"> • Cancer, noncancer, developmental effects • Increase in omega fatty acids, vitamins, etc
Fishing increases – Cleaner fish – More fishing	<ul style="list-style-type: none"> • Increased exercise • Cultural practices maintained • Family recreation
Eat some fish/shellfish – cleaner fish	<ul style="list-style-type: none"> • Cancer, noncancer, developmental effects but less than before • Some food security • Some nutrition

1b. Research questions: Residual contam. & seafood consumption – Tribal and non-tribal subsistence fishers	
<i>Research Questions</i>	<i>Evidence</i>
<ul style="list-style-type: none"> • What institutional control seafood advisories are currently in place? • Do institutional control seafood advisories currently in place work? • What is known about institutional control seafood advisory effectiveness, in general? What is known about the relationship between seafood advisories and food insecurity and health? • What are the proposed changes, if any, in institutional control seafood advisories? • What is the evidence for their effectiveness? What is known about the relationship between proposed changes in seafood advisories and health? 	<ul style="list-style-type: none"> • White/gray literature • Tribal info • Tribal health indicators (see below) • Interviews
<ul style="list-style-type: none"> • What factors influence where people fish now? • What factors will influence where people fish during cleanup, and after the cleanup? 	<ul style="list-style-type: none"> • Tribal info • Interviews • Focus groups
<ul style="list-style-type: none"> • What alternatives are there to fishing the Duwamish River? • Are there chemical or other hazards associated with likely alternative fishing locations? 	<ul style="list-style-type: none"> • Interviews • Focus groups

<p>What alternatives are available, and culturally appropriate, to reduce consumption of Duwamish resident seafood?</p>	<ul style="list-style-type: none"> • Surveys • Focus groups • Key informant interviews
<p>How will source control efforts affect amount of residual sediment contamination?</p>	<ul style="list-style-type: none"> • FS? • KC/Seattle/Ecology source control documents

Note: Tables 1-5 were updated on July 9, in response to helpful suggestions from Dr. Aaron Wernham (Health Impact Project, Pew Charitable Trusts/Robert Wood Johnson Foundation).

Tables 2a-b Duwamish Superfund HIA Scoping – Health impacts, Research Questions, Evidence: Tribal health impacts

2a. Health impacts: Tribal health (based on Donatuto/Gregory model, 5/29/2012)	
<i>Impact</i>	<i>Health impact</i>
<i>Higher priority impacts</i> (based on Tribal CAC discussion, 6/13/2012)	
<ul style="list-style-type: none"> Natural resources security 	<ul style="list-style-type: none"> Availability Access Sharing
<ul style="list-style-type: none"> Self determination 	<ul style="list-style-type: none"> Healing Development Restoration (environmental/habitat restoration)
<ul style="list-style-type: none"> Well-being 	<ul style="list-style-type: none"> Connection to nature Confidence Resilience
<i>Lower priority impacts</i> (based on Tribal CAC discussion, 6/13/2012)	
<ul style="list-style-type: none"> Community cohesion 	<ul style="list-style-type: none"> Participation and cooperation Roles Familiarity
<ul style="list-style-type: none"> Ceremonial use 	<ul style="list-style-type: none"> Gatherings and ceremonies Giving thanks Feeding the spirit
<ul style="list-style-type: none"> Knowledge transfer 	<ul style="list-style-type: none"> The teachings Elders Youth

2b. Research questions: Tribal health	
<i>Research Questions</i>	<i>Evidence</i>
<p>How does the current state of the Duwamish River affect the Tribes with respect to:</p> <ul style="list-style-type: none"> Natural resources security? Self determination? Well-being? Community cohesion? Ceremonial use? Knowledge transfer? <p>How will river cleanup (increased and improved natural habitat) affect health and well being of the Tribes?</p> <ul style="list-style-type: none"> Natural resources security? Self determination? Well-being? Community cohesion? Ceremonial use? Knowledge transfer? 	<ul style="list-style-type: none"> Tribal Community Advisory Committee meetings Existing research with Swinomish Tribe Qualitative focus groups and key informant interviews (possible but not certain if feasible) Tribal internal discussions (eg, Ken Workman and Duwamish Tribal Council)
<p>How does contaminated seafood currently affect the Tribes with respect to:</p> <ul style="list-style-type: none"> Natural resources security? Self determination? Well being? Community cohesion? 	<ul style="list-style-type: none"> Same as above

<ul style="list-style-type: none"> • Ceremonial use? • Knowledge transfer? 	
<p>How will <i>residual</i> contamination (during and after cleanup) of seafood affect the Tribes with respect to:</p> <ul style="list-style-type: none"> • Natural resources security? • Self determination? • Well-being? • Community cohesion? • Ceremonial use? • Knowledge transfer? 	<ul style="list-style-type: none"> • Same as above
<p>How does incomplete adherence to treaty rights affect Tribal health?</p>	<ul style="list-style-type: none"> • Same as above

Tables 3a-b Duwamish Superfund HIA Scoping – Health impacts, Research Questions, Evidence: Construction impacts *

3a. Health impacts: Construction	
<i>Impact</i>	<i>Health impact</i>
Dredging – Increased seafood concentrations (spikes)	<ul style="list-style-type: none"> • Cancer effects of consuming contaminated seafood • Non-cancer effects of consuming contaminated seafood • Developmental effects of consuming contaminated seafood
Dredging – Increased sediment and water quality concentrations	<ul style="list-style-type: none"> • Cancer and non-cancer effects of swimming and beach play
Increased traffic in GT/SP/DV	<ul style="list-style-type: none"> • Reduced pedestrian mobility – reduced exercise – health • Deaths/injuries
Decreased/delayed transportation routes through GT/SP/DV	<ul style="list-style-type: none"> • Late to work – anxiety, stress, lose job – income – health • Late home – anxiety, social cohesion – not with kids – kids get into trouble
Increased air pollution in GT/SP/DV	<ul style="list-style-type: none"> • Worsen asthma symptoms and potential causing new cases of asthma • Lowering immune system’s ability to fight off infections • Increased risk of lung cancer and possibly other cancers • Peters et al 2004; Castranova et al, 2001; Yang et al, 2001; Harrod et al., 2003; Guo et al, 2004; Harriet Ammann and Matthew Kadlec, 2008.
Increased noise in GT/SP/DV	<ul style="list-style-type: none"> • Hearing impairment • Interference with spoken communication • Sleep disturbances • Cardiovascular disturbances • Disturbances in mental health • Impaired task performance • Negative social behavior and annoyance reactions
Increase jobs	<ul style="list-style-type: none"> • Income - health
Partial source control	<ul style="list-style-type: none"> • Reduce recontamination

3b. Research questions: Construction	
<i>Research Questions</i>	<i>Evidence</i>
<ul style="list-style-type: none"> • How has current or recent dredging affected the River environment and specifically seafood conditions? • What is known about the effects of different dredging techniques? • How will dredging during cleanup affect seafood concentrations? 	<ul style="list-style-type: none"> • FS • EPA monitoring
<ul style="list-style-type: none"> • How does the current state of river contamination affect access to beaches? • How will cleanup affect access to beaches? 	<ul style="list-style-type: none"> • EPA proposed plans, monitoring • Resident CAC
<ul style="list-style-type: none"> • How does the current state of river contamination affect the safety of water and beach use for animals and humans? • How will cleanup affect safety of water and beach use on the beaches for animals and humans? 	<ul style="list-style-type: none"> • EPA proposed plans, monitoring • Resident CAC
<ul style="list-style-type: none"> • What is the current state of GT/SP/DV traffic patterns? • How will cleanup affect GT/SP/DV traffic patterns? 	<ul style="list-style-type: none"> • DOT? • EPA proposed plans, T-117 only?
<ul style="list-style-type: none"> • What is the current state of air quality in GT/SP/DV? • How will cleanup affect GT/SP/DV air quality? 	<ul style="list-style-type: none"> • DOH study, PSCAA, SAGE study • Riverwide? , T-117/BP2/Jorgensen Forge?
<ul style="list-style-type: none"> • What is the current state of noise pollution in GT/SP/DV? 	<ul style="list-style-type: none"> • DOT

<ul style="list-style-type: none"> • How will cleanup affect noise in GT/SP/DV? 	<ul style="list-style-type: none"> • T-117? BP2, Jorgensen Forge, Riverwide
<ul style="list-style-type: none"> • What is the current rate of employment for GT/SP/DV residents? • How will cleanup improve job opportunities for GT/SP/DV community? 	<ul style="list-style-type: none"> • WA Employment Security?
<ul style="list-style-type: none"> • What is the current infrastructure (parks, roads, etc) in GT/SP/DV? • How will cleanup improve infrastructure of community? 	<ul style="list-style-type: none"> • T-117? • Resident CAC • Mapping
<ul style="list-style-type: none"> • How would different lengths of cleanup impact residents? 	<ul style="list-style-type: none"> • EPA proposed plans (T-117 vs bigger cleanup)
<ul style="list-style-type: none"> • What is the current status of GT/SP commercial operations? • How will cleanup affect GT/SP commercial business operations? 	<ul style="list-style-type: none"> • ??? • Resident CAC • Mapping

Tables 4a-b Duwamish Superfund HIA Scoping – Health impacts, Research Questions, Evidence: Community revitalization and gentrification (Georgetown and South Park)

4a. Health impacts: Community revitalization and gentrification	
<i>Impact</i>	<i>Health</i>
Gentrification – Increased property values – taxes	<ul style="list-style-type: none"> • Reduced disposable income for other goods – stress • Displacement – loss of community/social cohesion, inc. travel times/cost/stress • Kennedy (Policylink)
Gentrification – Increased rents, crowded housing to reduce costs	<ul style="list-style-type: none"> • Increased infections • Increased stress
Revitalization Recreation - Increased access to river, parks, habitat, fishing	<ul style="list-style-type: none"> • Exercise – reduce blood pressure, reduction diabetes/obesity • Providing opportunity for increased physical activity and therefore reducing stress and increasing mental wellbeing (Sallis, Millstein & Carlson, 2011) • Increasing a sense of community (Sullivan, Kuo & DePooter, 2004) • Strengthening neighborhood social ties (Coley, Kuo & Sullivan, 1997) • Decreasing crime and fear (Kuo & Sullivan 2001b) • Increasing sensory stimulation, creativity and excitement about daily living (Louv, 2005) • Assisting in mental fatigue recovery (Kuo & Sullivan, 2001a) • Increasing the ability to cope with life adversity (Kuo, 2001) • Over one hundred studies confirm that one of the main benefits of spending time in nature and greenspace is stress reduction (Kahn, 1999). Studies have also shown that greenspace promotes healthy child development (Taylor & Kuo, 2006) and may reduce symptoms of Attention Deficit Hyperactivity Disorder (ADHD) (Faber & Kuo, 2009; Kuo & Taylor, 2004).
Cleaner river/beaches	<ul style="list-style-type: none"> • Reduced anxiety about contamination for humans, children and pets
Revitalization – equitable development	<ul style="list-style-type: none"> • Increased social capital • Increased political capital – empowerment • Increased economic capital

4b. Research questions: Community revitalization and gentrification	
<i>Research Questions</i>	<i>Evidence</i>
<ul style="list-style-type: none"> • Is community gentrification currently happening in Georgetown, South Park and the Duwamish Valley, and how is it manifesting? (Note, we include community-based and community-serving commercial businesses in our definition of “community”) • What factors are currently driving community gentrification in SP/GT/DV? • How will river cleanup affect gentrification in SP/GT/DV? • What is known about the impacts of gentrification on health? • How can gentrification be managed to maximize benefits and minimize impacts for the community (aka, community revitalization or equitable development)? 	<ul style="list-style-type: none"> • Real estate records • US census • Rental vs ownership (neighborhood data) • Kennedy (policylink) • CDC • Other HIAs • Search for other gentrified communities • Green impact zones • Tax policies • Housing policies
<ul style="list-style-type: none"> • How is the GT/SP/DV community currently revitalizing or developing, and is it equitable? • What is known about the relationship between community revitalization and health? • How can cleanup activities facilitate or impair community revitalization efforts? 	<ul style="list-style-type: none"> • Change in commerce • Improved infrastructure • Community initiatives • CDC • Policylink • White/grey literature

Tables 5a-b Duwamish Superfund HIA Scoping – Health impacts, Research Questions, Evidence: Duwamish Valley industry revitalization and gentrification

5a. Health impacts: Duwamish Valley industry revitalization and gentrification	
<i>Impact</i>	<i>Health impact</i>
Business displacement	<ul style="list-style-type: none"> • Lose job/income individual/city
Business revitalization	<ul style="list-style-type: none"> • Income goes up for individual/city • Decrease poverty, increase health if done equitably

5b. Research questions: Duwamish Valley industry revitalization and gentrification	
<i>Research Questions</i>	<i>Evidence</i>
<ul style="list-style-type: none"> • What industry (business) revitalization efforts are currently happening in the Duwamish Valley? • How will the cleanup impair or facilitate business revitalization efforts in the DV? 	<ul style="list-style-type: none"> • Manufacturing Industrial Council (MIC) of Seattle • Port of Seattle • ECOSS?
<ul style="list-style-type: none"> • Is industry (business) gentrification currently happening in the DV, and how is it manifesting? • What factors are currently driving gentrification? • How will the cleanup impair or facilitate business gentrification in the DV? 	<ul style="list-style-type: none"> • Stats for greater DV industrial district • MIC • Port of Seattle • WA Employment Security stats • Labor unions – Patrick Neville?
<ul style="list-style-type: none"> • What types (class) of jobs are currently being lost or gained in the DV business community? • What types (class) of jobs may be lost or gained during the cleanup? • What types (class) of jobs may be lost or gained in the longer term, as a consequence of the cleanup? 	<ul style="list-style-type: none"> • Same as above
<ul style="list-style-type: none"> • What is known about industry/business gentrification or revitalization near other cleanup efforts? 	<ul style="list-style-type: none"> • Revitalization/gentrification efforts in other industrial areas
<ul style="list-style-type: none"> • How will cleanup costs facilitate or impair business revitalization/gentrification efforts? 	<ul style="list-style-type: none"> • Dave Templeton (Liaison Committee)? • ECOSS? • MIC?
<ul style="list-style-type: none"> • How does business revitalization/gentrification affect health? 	<ul style="list-style-type: none"> • White/grey literature – income leads to better health.

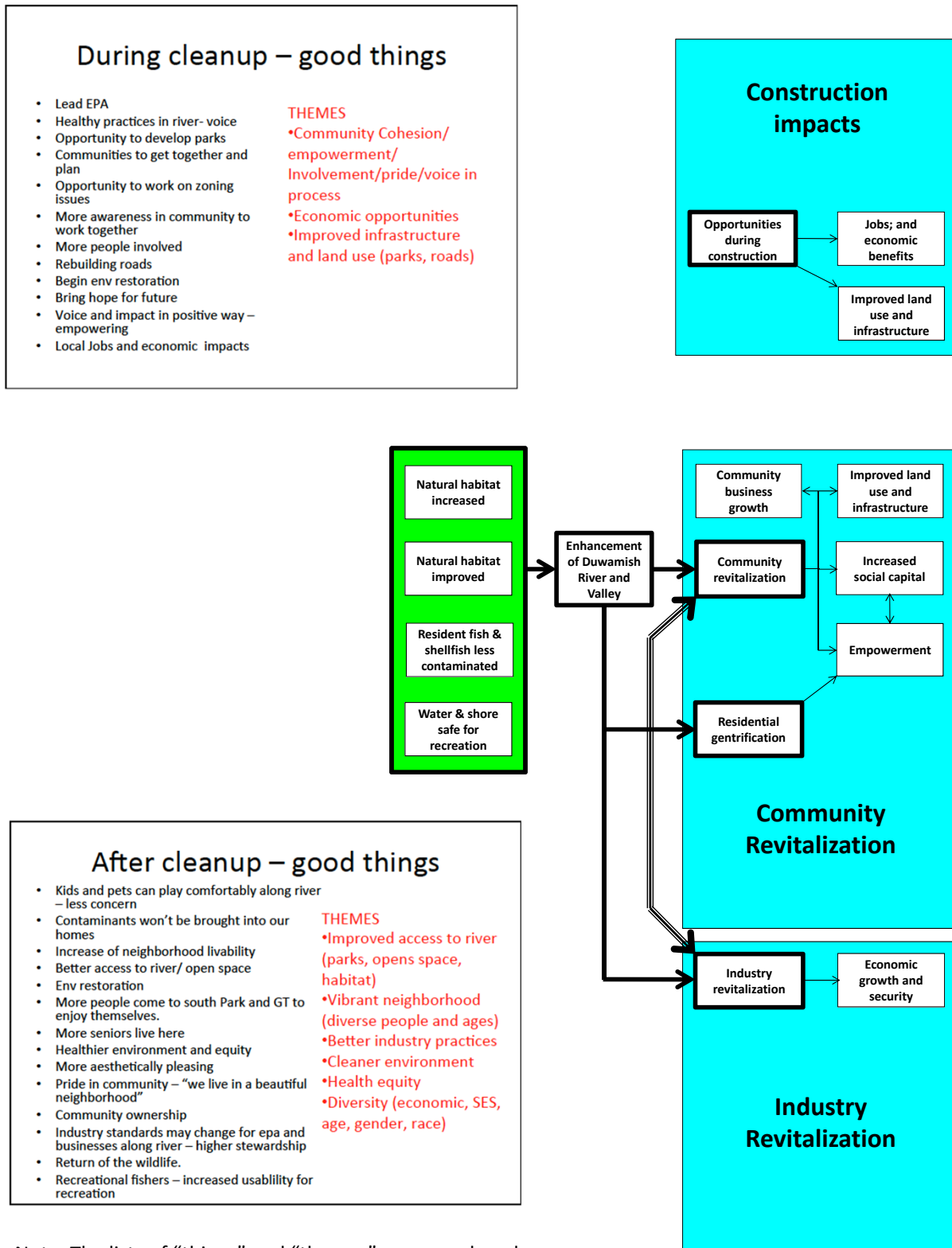
Figure 3: “Good thing, bad thing” exercise

Exercise 1: How could the river cleanup impact or change our community?

Good things	Bad things
During cleanup:	During cleanup:
After cleanup:	After cleanup:

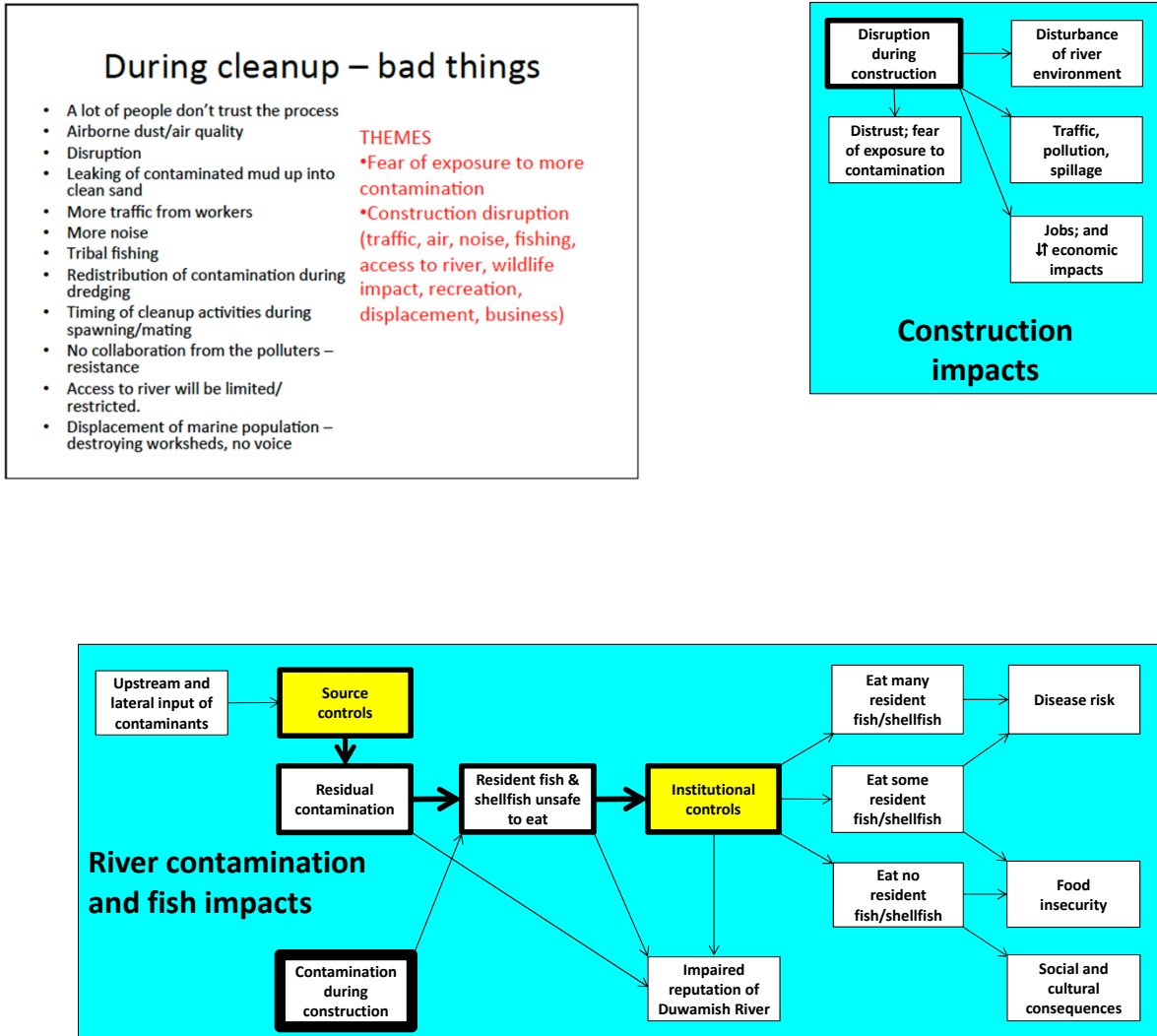
Figure 4: Stakeholder concerns reflected in logic model

Resident CAC: “Good” impacts of cleanup



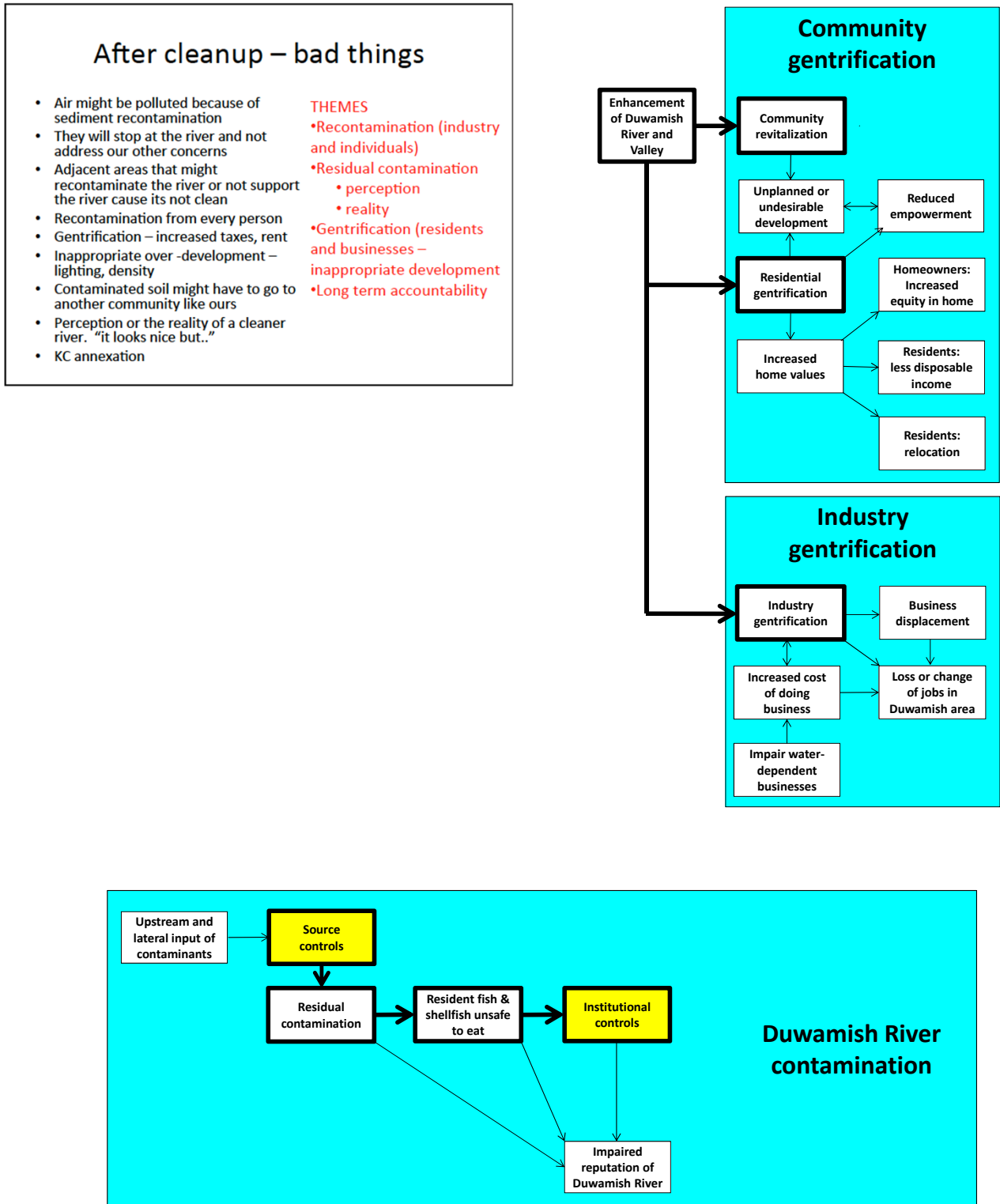
Note: The lists of “things” and “themes” were produced by CAC members, and were recorded in their own words.

Figure 5: Stakeholder concerns reflected in logic model Resident CAC: “Bad” impacts during cleanup



Note: The lists of “things” and “themes” were produced by CAC members, and were recorded in their own words.

Figure 6: Stakeholder concerns reflected in logic model
Resident CAC: “Bad” impacts *after* cleanup



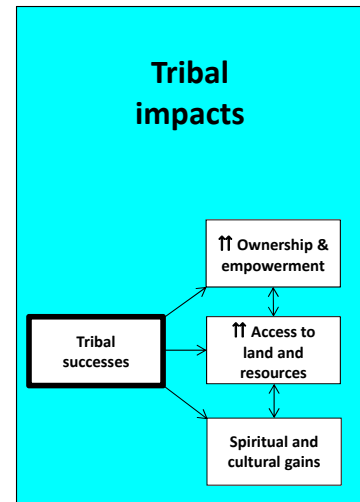
Note: The lists of “things” and “themes” were produced by CAC members, and were recorded in their own words.

Figure 7: Stakeholder concerns reflected in logic model

Tribal CAC: “Good” impacts of cleanup

Good things
<p><i>During cleanup:</i></p> <ul style="list-style-type: none"> •Community sense of empowerment •Development of integrated holistic approaches •We got here! •Visual cues – Raising awareness <p>THEMES</p> <ul style="list-style-type: none"> •Empowerment in decision making process •Ownership

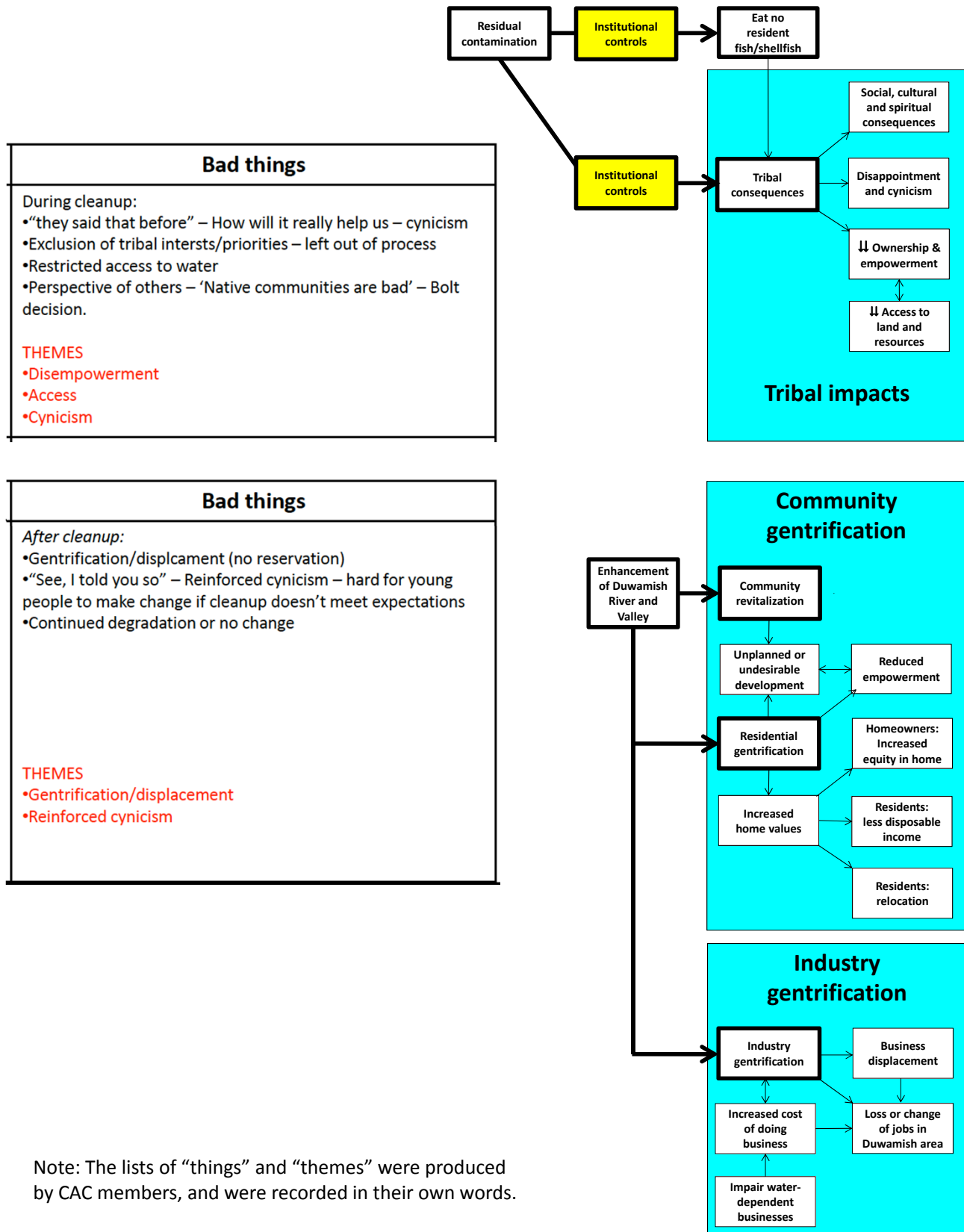
Good things
<p><i>After cleanup:</i></p> <ul style="list-style-type: none"> •Increased ability to express tribal rights and connections •Sense of ownership •Opportunity to push farther – higher expectations- this place will be more comfortable for my “family” •Can swim, walk on beach, fish •Accomplishment – coordinated actions together = empowered community •Everyone succeeds – balanced industry – does not have to be winners and losers <p>THEMES</p> <ul style="list-style-type: none"> •Sense of ownership •Accomplishment •Access to land/resources •Spiritual aspect of place itself



Note: The lists of “things” and “themes” were produced by CAC members, and were recorded in their own words.

Figure 8: Stakeholder concerns reflected in logic model

Tribal CAC: “Bad” impacts of cleanup



Note: The lists of “things” and “themes” were produced by CAC members, and were recorded in their own words.

Figure 9: Swinomish Indian Tribe indicators of health

Community Health in Native Communities

In many Native American communities, Swinomish included, health is defined on a community level, consisting of inseparable strands of human health, ecological health, and cultural health woven together, all equally important. Within this definition, many of the dimensions of good health as defined by the Swinomish are difficult to quantify, such as participation in spiritual ceremonies, intergenerational education opportunities, and traditional harvesting practices, yet they may be negatively impacted or even destroyed when resources are scarce or disappear. (Arquette et al. 2002, Harris and Harper 1997, 2000, 2001, Wolfley 1998)

Table 4-1. Suggested Top 5 Tribal Health Factors and Associated Health Indicators
(Salish Sea natural resources, including seafood, seaweeds, shells, etc.)

Five Health Factors	Fifteen Health Indicators with Definitions for each
Community Cohesion	<i>Participation & cooperation</i> – the community depends on each other; strong support network (e.g., everyone supports the maintenance, harvest and distribution of resources)
	<i>Roles</i> (e.g., harvest, prepare, preserve natural resources) – each member of the community has a role that is respected
	<i>Familiarity</i> – food roles are known and trusted; therefore, it is assumed food is “safe”
Food Security	<i>Availability</i> – natural resources are abundant and healthy
	<i>Access</i> – all resource use areas (i.e., Usual and Accustomed areas) are allowed to be harvested with an emphasis on local resources for subsistence consumers.
	<i>Sharing</i> – ensuring that everyone in the community receives natural resources from the Salish Sea, esp. Elders
Ceremonial Use	<i>Gatherings & ceremonies</i> – particular community assemblies that require natural resources from the Salish Sea
	<i>Giving thanks</i> – thanking Nature/ the Spirit for providing the natural resources when harvesting and preparing them; done with prayers and thoughtful intentions
	<i>Feeding the Spirit</i> – using natural resources from the Salish Sea to satisfy a spiritual “hunger” (e.g., consuming traditional foods)
Knowledge Transmission	<i>The Teachings</i> – knowledge, values and beliefs about tribal health in connection with the Salish Sea
	<i>Elders</i> – the knowledge keepers; they have and are able to pass on the knowledge
	<i>Youth</i> – the future; they receive and respect the knowledge
Self Determination	<i>Healing</i> — ability to choose life-style desired for what is considered “good health” (e.g., traditional medicines, language programs)
	<i>Development</i> —community enrichment opportunities directed by and for the community
	<i>Restoration</i> — environmental or habitat restoration projects that are community driven

Notes:

- The Swinomish Tribe is a Puget Sound area tribe, but is not one of the tribal populations directly affected by the Duwamish Superfund cleanup.
- **From:** Office of Planning and Community Development; Swinomish Indian Tribal Community. *Swinomish Climate Change Initiative Climate Adaptation Action Plan*. La Conner, WA; Oct 2010.

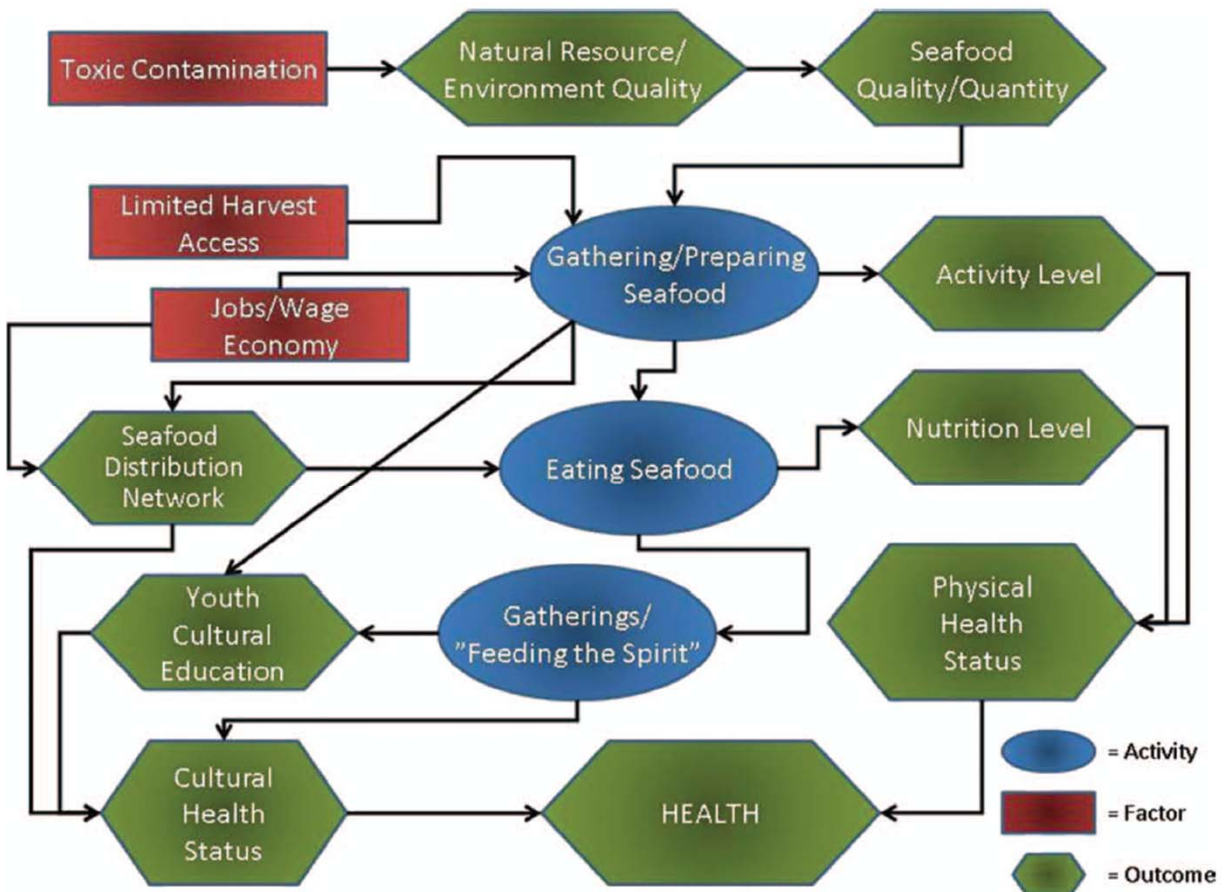
Figure 10:**Swinomish Indian Tribe meanings of health in reference to seafood and contamination of aquatic natural resources**

Figure 1. Flow chart depicting mental models information.

Notes:

- The Swinomish Tribe is a Puget Sound area tribe, but is not one of the tribal populations directly affected by the Duwamish Superfund cleanup.
- From: Donatuto JL, Satterfeld TA, Gregory R. Poisoning the body to nourish the soul: Prioritising health risks and impacts in a Native American community. *Health, Risk & Society* 2011;13:103-27.

Figure 11:

Swinomish Indian Tribe meanings of health in reference to seafood and contamination of aquatic natural resources

Table 6. The four main non-physical aspects of Swinomish health, key components of the aspects, and impacts, if any, from contaminated shellfish.

Health factor	Health indicator, definition and ranked impact from contaminated shellfish	Averaged ranking of impacts of contaminated shellfish on health factor
Community cohesion	<p>Participation & cooperation: the community depends on each other; strong support network. Not at all.</p> <p>Roles (harvest, prepare, preserve food): each member has a role that is respected. Not at all.</p> <p>Familiarity: food roles are known and trusted; therefore, it is assumed that the food is 'safe'. A lot.</p>	<p>A little.</p> <p>At times, contaminated shellfish restrict / close harvest sites to members that still harvest, forcing people to purchase seafood, which is not considered a 'safe' alternative. Overall, other factors affect this factor much more than contaminated shellfish.</p>
Food security	<p>Availability: seafood is abundant and the stocks are healthy. A lot.</p> <p>Access: all traditional areas allowed to be harvested. A lot.</p> <p>Sharing: ensuring that everyone in the community receives traditional foods, esp. Elders. Somewhat.</p>	<p>A lot.</p> <p>Pollution depletes shellfish populations and closes beaches. With shellfish more difficult to acquire, there is less to distribute in the community.</p>
Ceremonial use	<p>Gatherings & ceremonies: particular community assemblies that require seafood A lot.</p> <p>Give thanks: thanking the Spirit for providing the food when harvesting and preparing it; done with prayers and thoughtful intentions. A little.</p> <p>Feed the Spirit: consuming seafood to satisfy a spiritual 'hunger'. A lot.</p>	<p>Somewhat.</p> <p>Contaminated shellfish impact all categories of ceremonial use due to lower availability and access; yet people continue to eat seafood, even if it's contaminated, because it 'feeds the spirit'.</p>
Knowledge transmission	<p>The Teachings: knowledge, values and beliefs about seafood and its importance for the community. A lot.</p> <p>Elders: the knowledge keepers who pass on the knowledge. Not at all.</p> <p>Youth: the future; they receive and respect the knowledge. Somewhat.</p>	<p>Somewhat.</p> <p>Lower shellfish populations and restricted access exacerbates intergenerational knowledge transfer loss, as youth do not have the opportunity to learn about the importance of shellfish, harvest practices, etc. Overall, other factors more strongly affect loss of cultural education.</p>
Self determination (noted in Refs 2 and 3)		

Notes:

- The Swinomish Tribe is a Puget Sound area tribe, but is not one of the tribal populations directly affected by the Duwamish Superfund cleanup.
- Ref 1 (source of table): Donatuto JL, Satterfeld TA, Gregory R. Poisoning the body to nourish the soul: Prioritising health risks and impacts in a Native American community. *Health, Risk & Society* 2011;13:103-27.
- Ref 2: Donatuto J. *White Paper: Key Indicators of Tribal Human Health in Relation to the Salish Sea*. July 2010.
- Ref 3: Office of Planning and Community Development; Swinomish Indian Tribal Community. *Swinomish Climate Change Initiative Climate Adaptation Action Plan*. La Conner, WA; Oct 2010

Figure 12: Liaison Committee: Potential impacts of cleanup

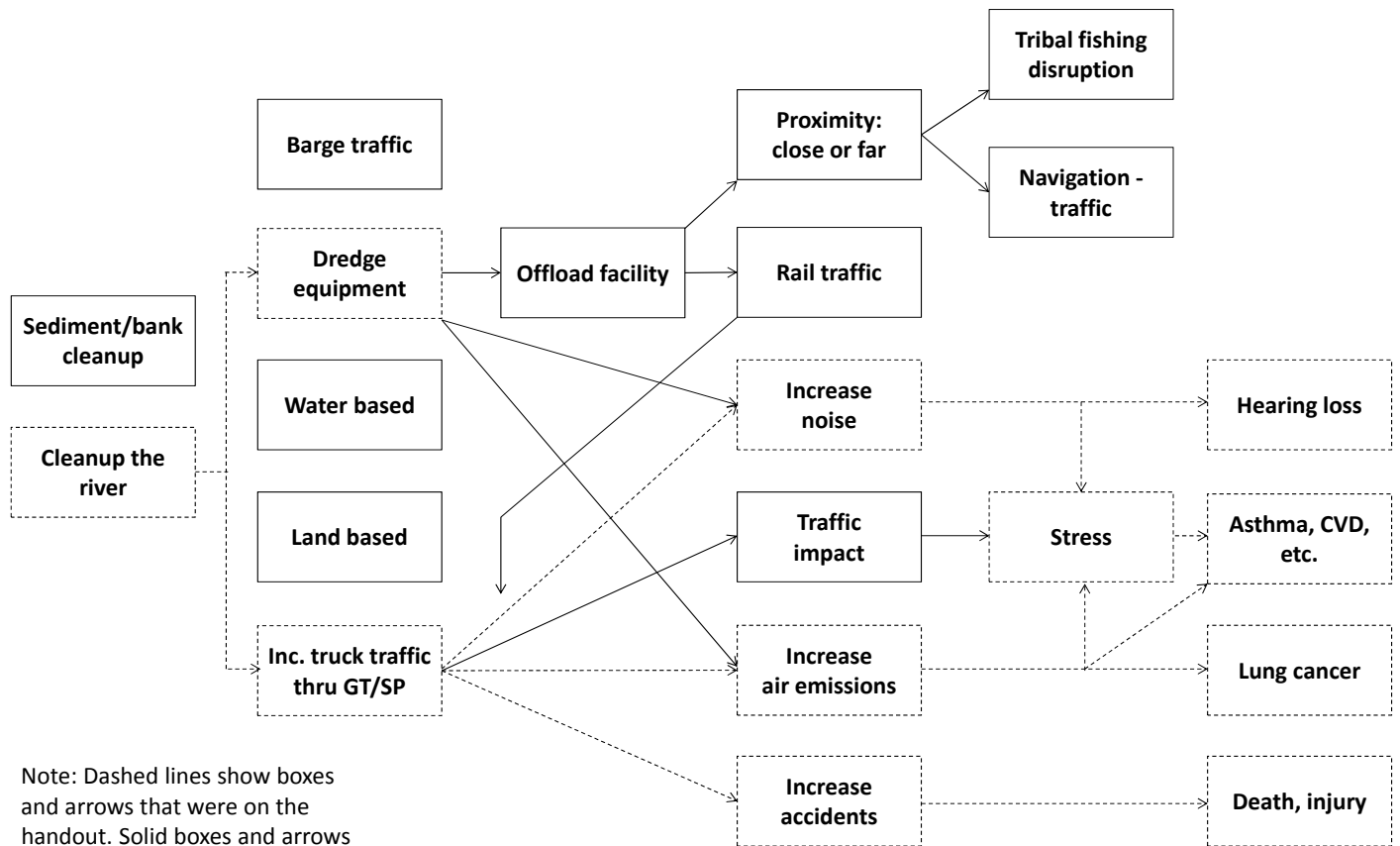
Actions	Associated Benefits& Burdens Long term consequences	Health
<p>Construction</p> <ul style="list-style-type: none"> • Air quality • Time • Sequencing • Disruption of community • Fish tissue spikes <p>Institutional Controls</p> <ul style="list-style-type: none"> • Outreach • Advisories <p>Source control</p> <ul style="list-style-type: none"> Air Recontamination Water <p>Restoration</p> <p>Public Involvement</p>	<p>SHORT/INTERIM</p> <ul style="list-style-type: none"> • Property values • Public costs • Fish tissue concentrations • Duwamish business • Job creation • Fish consumption • Recreation 	<p>Gentrification</p> <p>Treaty rights</p> <p>Economic Revitalization</p> <p>Cultural traditions</p> <p>Food security</p> <p>Habitat for people</p> <p>VOICE = HEALTH</p> <p>Nutrition Obesity</p>

POTENTIAL IMPACTS for assessment in HIA

- Gentrification/displacement
- Erosion of treaty rights
- Economic revitalization
- Reduce/increase/change cultural traditions
- Food security
- Habitat for people (mental, social, physical)

Figure 13:

Liaison Committee: Construction impacts of cleanup



Note: Dashed lines show boxes and arrows that were on the handout. Solid boxes and arrows were added by LC members.

Figure 14:
Liaison Committee: Fish consumption impacts of cleanup

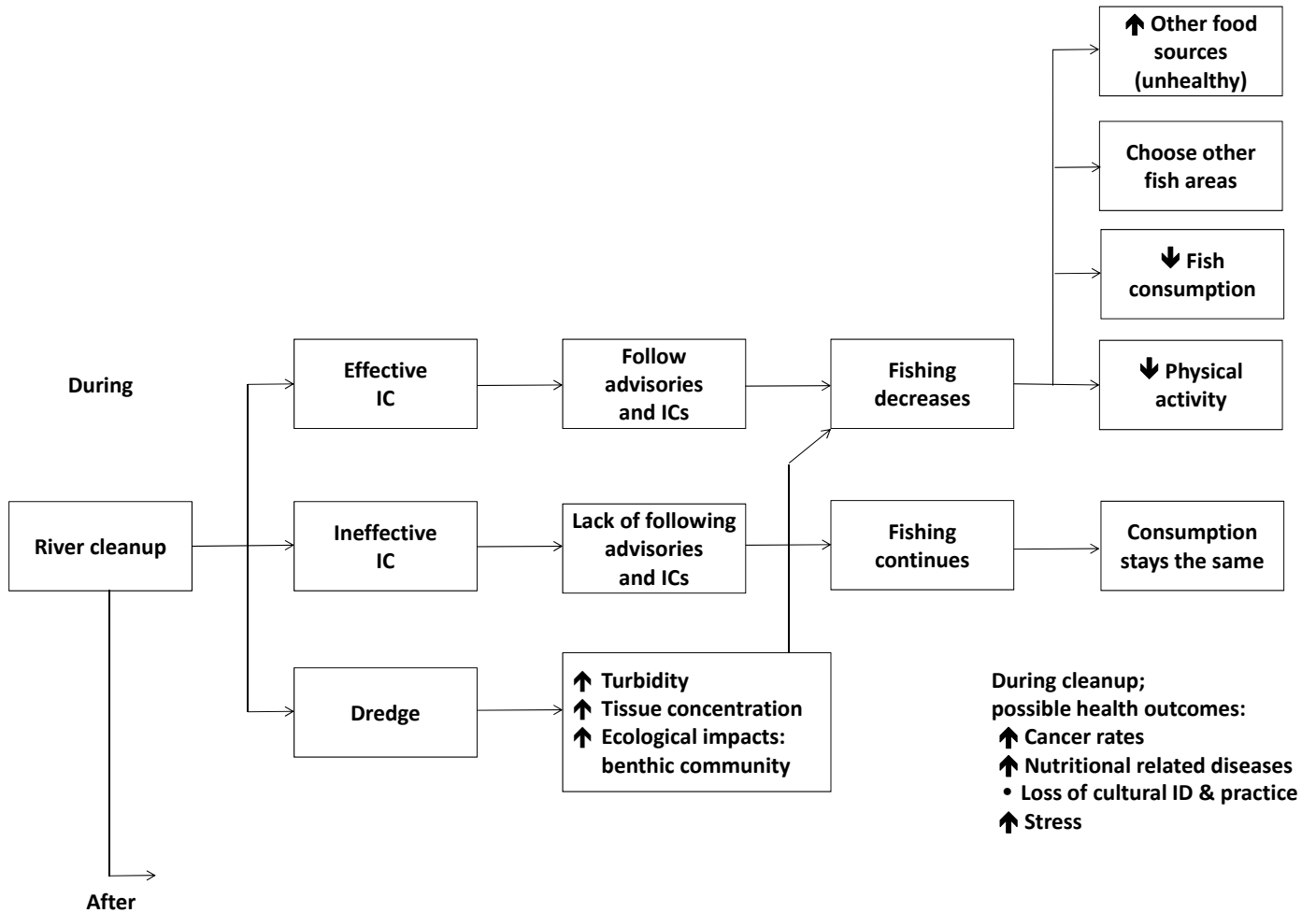


Figure 15:

Liaison Committee: “Accelerated” gentrification impacts of cleanup

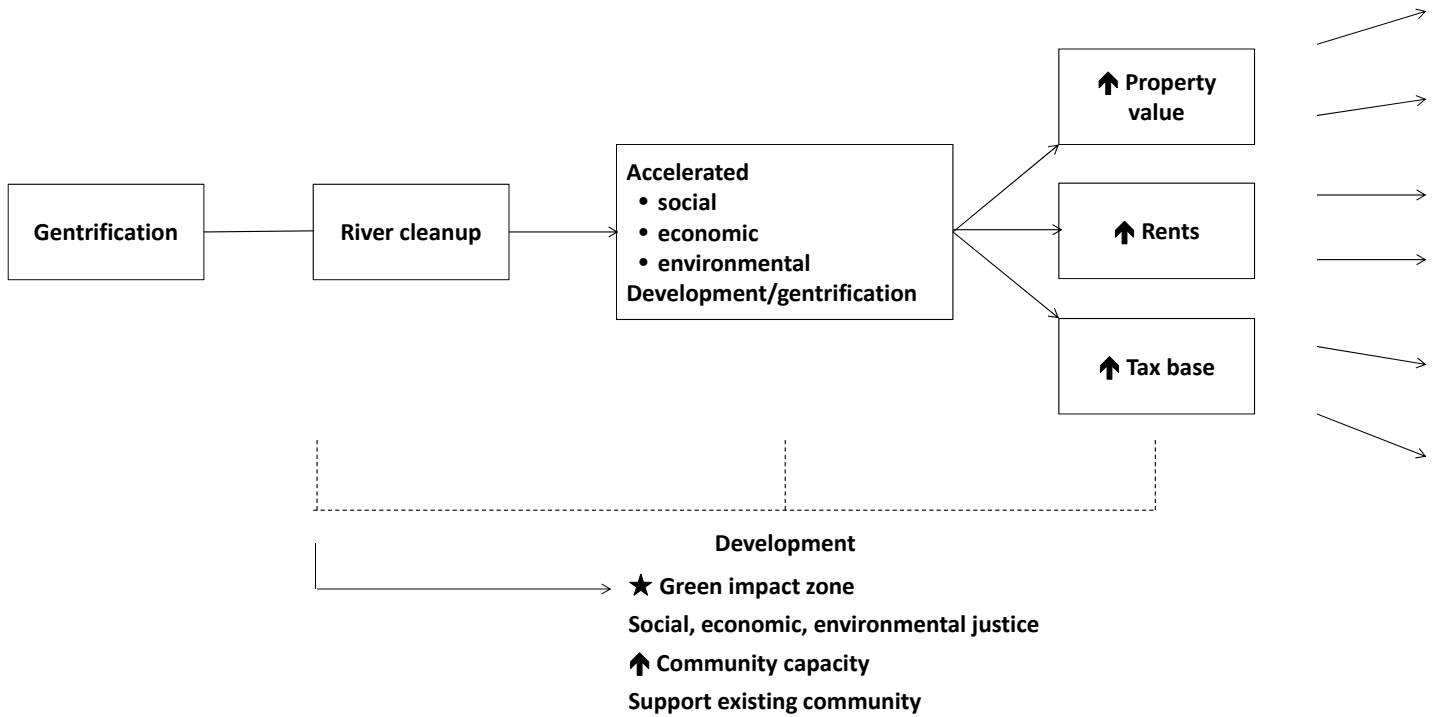


Figure 16: Criteria for assessing evidence of a possible effect

TABLE 4. HEALTH EFFECT CHARACTERISTICS AND THEIR INTERPRETATION

Likelihood	How certain is it that the decision will effect health determinants or outcomes irrespective of the frequency, severity, or magnitude?
Unlikely/ Implausible	Logically implausible effect; substantial evidence against mechanism of effect
Possible	Logically plausible effect with limited or uncertain supporting evidence
Likely	Logically plausible effect with substantial and consistent supporting evidence and substantial uncertainties
Very Likely / Certain	Adequate evidence for a causal and generalizable effect
Insufficient Evidence / Not Evaluated	—
Severity	How important is the effect with regards to human function, well-being, or longevity, considering the affected community's current ability to manage the health effects?
Low	Acute, short-term effects with limited and reversible effects on function, well-being, or livelihood that are tolerable or entirely manageable within the capacity of the community health system
Medium	Acute, chronic, or permanent effects that substantially affect function, well-being, or livelihood but are largely manageable within the capacity of the community health system; OR Acute, short-term effects on function, well-being, or livelihood that are not manageable within the capacity of the community health system
High	Acute, chronic, or permanent effects that are potentially disabling or life-threatening, regardless of community health system manageability; OR Effects that impair the development of children or harm future generations
Insufficient Evidence / Not Evaluated	—
Magnitude	How much will health outcomes change as a result of the decision (i.e., what is the expected change in the population frequency of the symptoms, disease, illness, injury, disability, or mortality)?
Limited	A change of less than one-tenth of 1% in the population frequency of a health endpoint
Moderate	A change of between 0.1% and 1% in the population frequency of a health endpoint
Substantial	A change of greater than 1% in the population frequency of a health endpoint
Insufficient Evidence / Not Evaluated	—
Distribution	Will the effects, whether adverse or beneficial, be distributed equitably across populations. Will the decision reverse or undo baseline or historical inequities?
Disproportionate harms	The decision will result in disproportionate adverse effects to populations defined by demographics, culture, or geography
Disproportionate benefits	The decision will result in disproportionate beneficial effects to populations defined by demographics, culture, or geography
Restorative equity effects	The decision will reverse or undo existing or historical inequitable health-relevant conditions or health disparities
Insufficient Evidence / Not Evaluated	—



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Health Impact Assessment Proposed Cleanup Plan for the Lower Duwamish Waterway Superfund Site

May 2013

Assessment and Recommendations

In this brief chapter of our draft “Resources and Methods” Technical Report, we describe general resources and methods, logic models, and criteria used to characterize the likelihood, magnitude, severity and distribution of possible Plan-related health impacts.

Methods (and findings) for the Assessment and Recommendation phases of this HIA are additionally described in the separate Technical Reports for each population of concern.

As of May 2013—in support of the *Advance HIA Report*—we have completed near-final draft Technical Reports for:

1. Effects of the proposed cleanup plan on local residents
2. Effects of the proposed cleanup plan on Tribes
3. Effects of the proposed cleanup plan on subsistence fishing populations

Assessment is still in progress for a fourth population of concern. That Technical Report will be available in late May or June 2013. Findings and recommendations will be summarized in the *Final HIA Report*.

4. Effects of the proposed cleanup plan on workers and employment in local industry

Resources and methods

We used a wide assortment of information sources for the Assessment stage of the HIA, including:

- Peer-reviewed literature, published reports, and credible internet-based materials
- Data obtained from public databases or provided by individual organizations (e.g., Urban Indian Health Institute)
- Semi-structured interviews with selected community advisors and key informants
- Focus groups: one with members of the Duwamish Tribe; and multiple with non-tribal subsistence fishers

The University of Washington Human Subjects Division approved our interview and focus group procedures. The Duwamish Tribal Council approved procedures and use of information for the Tribal focus group.

We developed our recommendations in collaboration with many stakeholders. Our community advisors and focus groups guided and informed selection, prioritization and wording of recommendations. Our Liaison Committee provided advice about wording, feasibility, and best decision-makers to receive individual recommendations.

Figure 1: Potential health impacts of the proposed cleanup plan *

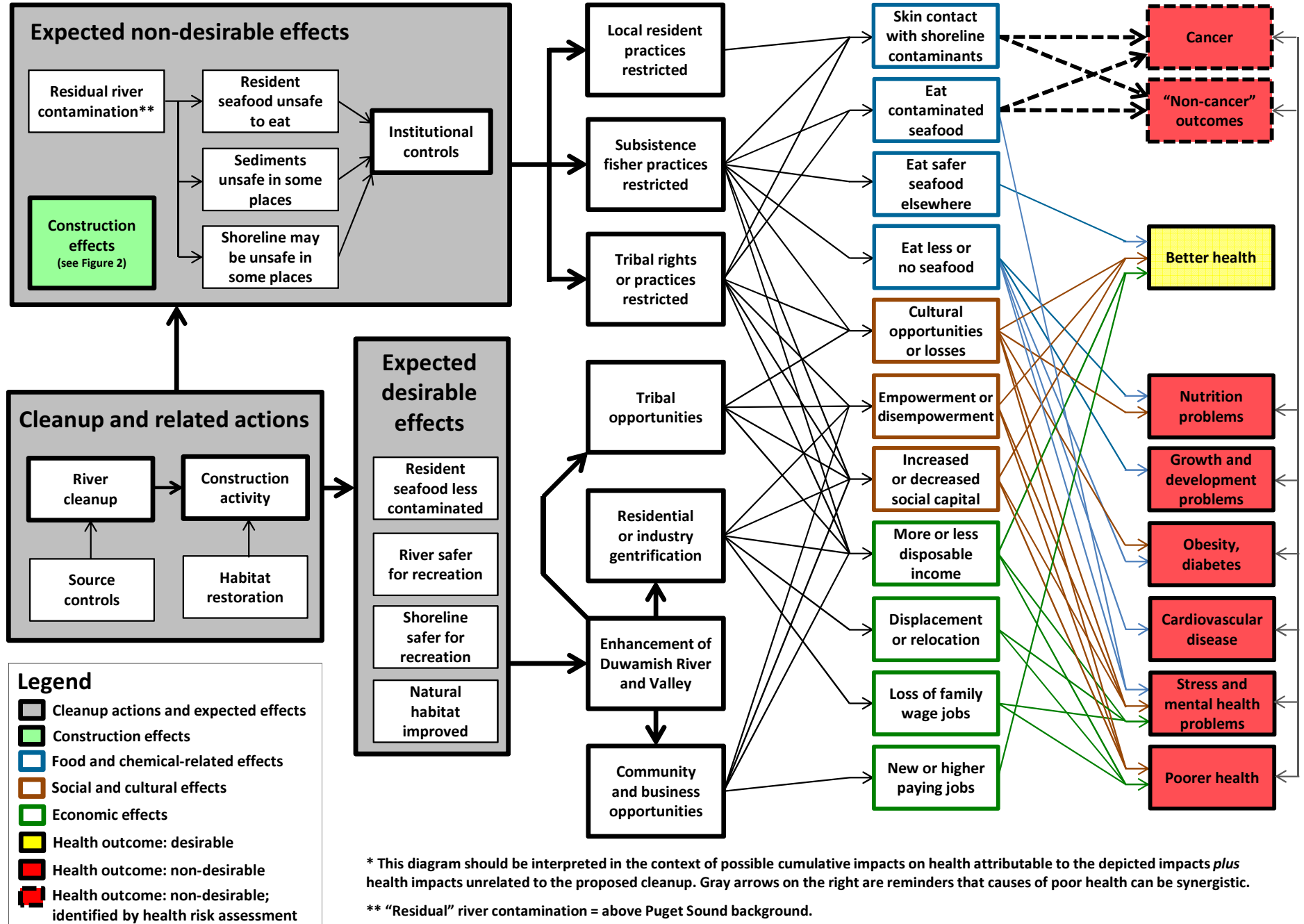
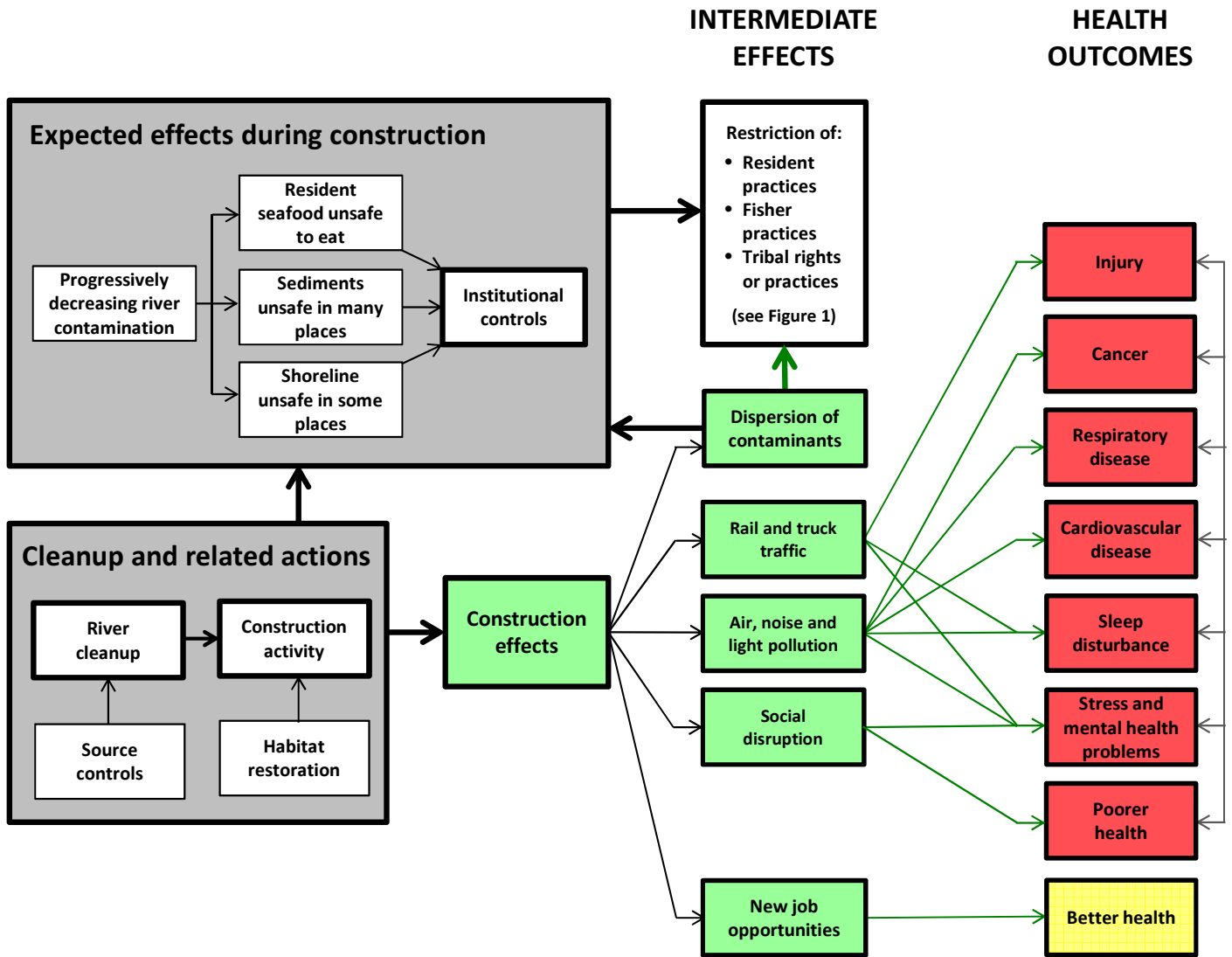


Figure 2: Potential health impacts of proposed construction *



* This diagram should be interpreted in the context of Figure 1, as well as possible cumulative impacts on health attributable to the depicted impacts plus health impacts unrelated to the proposed cleanup. Gray arrows on the right are reminders that causes of poor health can be synergistic.

Duwamish Superfund HIA – Effect Characterization

As we planned in our Scoping Report, our effect characterizations primarily relied on categories and definitions from *Health Impact Assessment: A Guide for Practice* (Bhatia, 2011). We made some modifications to the *Guide* definitions, as described below.

Likelihood

How plausible (and certain) is it that the decision will affect health determinants or outcomes, irrespective of the frequency, severity, or magnitude?

- **Unlikely/ Implausible** Logically implausible effect; substantial evidence against mechanism of effect.
- **Possible** Logically plausible effect; limited or uncertain supporting evidence.
- **Likely** Logically plausible effect; substantial and consistent supporting evidence, and no substantial uncertainties.
- **Very Likely / ~~Certain~~** Adequate evidence for a causal and generalizable effect.
- Insufficient Evidence / Not Evaluated

The general definition, categories and category definitions come from the Bhatia *HIA Guide*, with minor wording modifications (documented elsewhere).

Magnitude *

How much will health outcomes change as a result of the decision? What is the expected change in the population frequency of the symptoms, disease, illness, injury, disability, or mortality?

- **Limited** Few people affected; weak association between determinants and health outcomes; and/or minor to modest changes in health determinants.
- **Moderate** A substantial minority of the population affected; moderate association between determinants and health outcomes; and/or modest to substantial change in health determinants.
- **Substantial** A majority of the population affected; moderate to strong association between health determinants and outcomes; and/or substantial changes in health determinants.
- Insufficient evidence / not evaluated

* The general definition and categories come from the Bhatia *HIA Guide*. However, the *Guide* category definitions focused exclusively and precisely on change in population frequency: limited, change <0.1%; moderate, change between 0.1% and 1%; substantial, change >1%. Those definitions seemed narrow and specific for our situation. As the *Guide* notes, this is “an example of one typology that can be used or adapted for HIA.” Therefore, we constructed alternative, expanded category definitions, in collaboration with our technical advisor. These definitions are consistent with text in the Bhatia *Guide*:

“The magnitude represents how much a health outcome might change as a result of a decision course of action. A magnitude may include the expected change in the population frequency of symptoms, disease, illness, injury, disability, or reduced life-expectancy and is typically an estimated function of several factors, including (1) the size of the population, (2) the baseline frequency of disease, injury, illness, or mortality in the population, (3) the size of the change in the health risk or resilience factor, and (4) the size or strength of association between an affected health risk factor and health outcomes (e.g., the relative risk).”

The magnitude category definitions use “and/or” to indicate that the overall weight of evidence for each element must be considered, if all of the three elements are not clearly consistent with a single magnitude category.

Distribution

Will the effects, whether adverse or beneficial, be distributed equitably across populations.
Will the decision reverse or undo baseline or historical inequities?

- **Disproportionate harms** The decision will result in disproportionate adverse effects to populations defined by demographics, culture, or geography.
- **Disproportionate benefits** The decision will result in disproportionate beneficial effects to populations defined by demographics, culture, or geography.
- **Restorative equity effects** The decision will reverse or undo existing or historical inequitable health-relevant conditions or health disparities
- Insufficient Evidence / Not Evaluated

The general definition, categories and category definitions come from the Bhatia *HIA Guide*.

Severity or Importance *

How important is the effect with regards to human function, well-being, or longevity, considering the affected community's current ability to manage the health effects?

- **Low** Acute, short-term effects or chronic effects with limited and reversible effects on function, well-being, or livelihood that are tolerable or entirely manageable within the capacity of the community health system. *
- **Medium** Acute, chronic, or permanent effects that substantially affect function, well-being, or livelihood but are largely manageable within the capacity of the community health system;
OR
Acute, short-term effects on function, well-being, or livelihood that are not manageable within the capacity of the community health system.
- **High** Acute, chronic, or permanent effects that are potentially disabling or life-threatening, regardless of community health system manageability;
OR
Effects that impair the development of children or harm future generations.
- Insufficient Evidence / Not Evaluated

* The general definition, categories and category definitions were adapted from the Bhatia *HIA Guide*. Note, we use the terms "severity" or "importance" interchangeably for the purpose of effects characterization. Although "severity" is a more conventional term (e.g., in Bhatia *HIA Guide*), this term was not readily understandable by readers when we applied to a beneficial effect (e.g., a favorable outcome with moderate or high "severity"). We also modified the Bhatia definition for "low" severity or importance by adding "or chronic effects" (...with limited and reversible effects...tolerable or entirely manageable..."); otherwise, stress-related outcomes could only have been rated as "medium" severity, which we concluded would be overly harsh for many situations.



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Duwamish River Superfund Cleanup Health Impact Assessment Stakeholder Engagement Plan

1. Introduction

This Health Impact Assessment (HIA) will inform the Environmental Protection Agency (EPA) selection of a cleanup plan for the Lower Duwamish Waterway (LDW) Superfund site in Seattle, WA. Key health issues associated with the site and planned cleanup include consuming contaminated seafood, air and soil pollution, construction noise, traffic safety, access to goods and service, and community cohesion. Assessment of possible cleanup plans have been conducted by EPA and a consortium of responsible parties called the Lower Duwamish Waterway Group (Seattle, King County, Port of Seattle, and Boeing), but existing assessments neglect some unintended consequences with associated impacts on health, such as changes in tribal and subsistence fish consumption, gentrification and displacement in surrounding residential neighborhoods, and opportunities for economic revitalization. The Duwamish HIA will make recommendations that focus on opportunities to minimize health impacts, maximize health benefits, and reduce existing health disparities in these formerly neglected areas.

2. Regulations and Requirements

Federal law requires public review and formal agency consideration of and response to public comments received on EPA's Proposed Superfund Cleanup Plans. Results of the Duwamish HIA will be presented to EPA for formal consideration and response during public comment on the agencies' Proposed LDW Cleanup Plan, to be released in September, 2012. In addition, project partner DRCC/TAG is EPA's designated Community Advisory Group (CAG) for the LDW site and will continue to work with EPA to understand and integrate recommendations of the Duwamish HIA following formal public review and comment.

3. Summary of Previous Stakeholder Engagement Activities

Project partner DRCC/TAG has served as EPA's CAG for the LDW site since 2001, and has been engaged in all aspects of the Superfund Site investigation and evaluation of alternatives, including via a series of Public Meetings on cleanup alternatives described in the Lower Duwamish Waterway Group's "Feasibility Study" for site cleanup in 2010. DRCC/TAG serves ten founding stakeholder groups

that include neighborhood/community, environmental, small business, and tribal stakeholders. DRCC/TAG and project partner, Just Health Action, are simultaneously conducting a Cumulative Health Impacts Analysis of the site, and all three project partners are working together on identification, prioritization and development of action plans to address local health impacts from other local exposures and socio-economic health influences. Information from all of these other activities will inform and complement the Duwamish HIA.

4. Project Stakeholders

Key stakeholders for the Duwamish HIA include:

(a) health-impacted communities: The HIA will focus on the three populations whose health will be most directly impacted by cleanup activities and decisions – all three are "environmental justice" communities:

- (i) residents of two riverside neighborhoods, who are predominately low-income and ethnic minorities;
- (ii) three Native American Tribes with historic and cultural rights to the river, including two federally recognized Tribes with treaty rights to fish, and one with a commercial salmon fishery on the river;
- (iii) non-tribal subsistence fishing communities, which are predominantly immigrant (especially Asian and Pacific Islander), low-income and/or homeless.

(b) regulatory agencies: EPA and the Washington State Department of Ecology are the regulatory agencies and decision-makers responsible for the river cleanup.

(c) responsible parties: the City of Seattle, King County, Port of Seattle, and Boeing Company (collectively known as the Lower Duwamish Waterway Group) and a large number of small businesses and municipalities are responsible for cleanup costs and activities.

(d) other stakeholders: a variety of other interested parties include environmental organizations, public and private social and health service providers, labor and business organizations, cultural and ethnic associations (such as the Commission on Asian Pacific American Affairs), and others.

5. Stakeholder Engagement Program

The purpose of the Stakeholder Engagement Program is to ensure that the Duwamish HIA is informed by and responsive to the health needs and concerns of the affected communities, has access to and utilizes the best available data and evidence, and develops appropriate and feasible recommendations to obtain the best possible health outcomes.

Information compiled in the development of the Duwamish HIA will include: community health profiles, community health concerns, community perspectives on optimum methods of minimizing health impacts and maximizing benefits of the proposed project, and stakeholder input on feasibility and costs. This information

will be communicated to the affected community and other stakeholders in a variety of ways:

- Fact sheets/pamphlets/brochures describing the project and community health profiles
- Displays at community events, fairs, meetings, food banks, farmers markets, and info centers
- Brief (2-3 minute) "digital stories" about community health concerns and proposed/ recommended solutions
- Community dinners, "living-room" meetings, and larger community meetings and workshops
- Local news media outlets, including community newspapers and Spanish-language radio program

Methods that will be used to compile information from and consult with affected community members and other stakeholder groups will include:

- Surveys of local residents' about community health exposures and concerns
- Community "street beats" to identify and map community health hazards and amenities
- Interviews with tribal and subsistence fishers about fishing practices and desirable/effective mitigation measures for anticipated fishing restrictions or advisories
- Focus groups with key stakeholder groups (e.g., non-English speaking subsistence fishers, youth)
- Community meetings and workshops to discuss and prioritize possible pathways and recommendations
- Formation of and regular consultation with a Community Advisory Committee comprised of affected community members
- Formation of and regular consultation with a Liaison Committee comprised of government regulators, public and private service providers, and responsible parties

6. Timetable

EPA has delayed release of its Proposed Cleanup Plan for the Duwamish River until September 2012. As a result, we anticipate completing most of the Duwamish HIA Stakeholder Engagement Program prior to and during the public review of the Proposed Plan.

Winter 2012:

- Formation of Community Advisory Committee (CAC) and Liaison Committee (LC)
- Distribution of project description brochures
- Development of and disseminating information about Community Health Profiles
- Beginning of community health concerns surveys

Spring–Summer 2012:

- Meetings/consultations with CAC and LC
- Affected community member/tribal and subsistence fisher interviews, focus groups, "street beats" (CBPR) + community dinners and "living room" meetings
- Displays at community events and public venues
- Continuation of community health concerns surveys
- Development/selection of "digital stories" to document community health concerns/proposals (if funded)

Fall 2012:

- Community workshop(s) to discuss and prioritize possible pathways and recommendations
- Focus groups with key affected community/stakeholder groups
- Distribution of draft HIA recommendations to CAC and LC for review and comment
- Meetings/consultations with CAC and LC
- [Submit Preliminary HIA to EPA]

Winter 2012–13:

- Community meeting to release/disseminate HIA and recommendations
- [Submit final HIA to EPA]

Spring 2013:

- Community/stakeholder evaluations

7. Resources and Responsibilities

DRCC/TAG will serve as the lead partner for Community and Stakeholder Engagement, in consultation with UW School of Public Health and Just Health Action. DRCC/TAG Project Manager (HIA Project Coordinator) BJ Cummings will be supported by DRCC/TAG Program Manager, Alberto Rodriguez and Community Outreach staff, Paulina Lopez (both Spanish/English bilingual). In addition, field interviewers will be contracted to conduct interviews and other engagement activities in a variety of languages prevalent in the affected communities, including Vietnamese, Chinese, Thai, and other languages as needed. Information for Community Health Profiles will be provided by Just Health Action and results of community health concerns surveys will be provided by Antioch University, as part of their roles in related community health initiatives managed by DRCC/TAG and funded by EPA. UW School of Public Health graduate student, Amber Lenhart will serve as project assistant and liaison for Tribal engagement, among other responsibilities. The original project budget for DRCC/TAG summarizes the anticipated expenditures.



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**Health Impact Assessment
Proposed Cleanup Plan for the
Lower Duwamish Waterway Superfund Site**

May 2013

Dissemination Strategy

Proposed Duwamish River Cleanup Plan Health Impact Assessment Dissemination Strategy

1. Purpose of HIA Dissemination Strategy

EPA is preparing a Proposed Cleanup Plan for the Duwamish River Superfund Site in Seattle, WA, which will be released for public review and comment in January 2013. The purpose of the Duwamish River Cleanup Plan Health Impact Assessment Dissemination Strategy is to ensure that the results and recommendations of the HIA are communicated to stakeholders and decision makers in order to encourage adoption of measures to minimize unintended health impacts, maximize health benefits, and promote health equity for affected environmental justice communities.

2. Key Audiences

The Duwamish River Superfund cleanup is a complex environmental remediation and restoration project with a large number of stakeholders and decision makers at the local, state, and national level. Some decision makers with control or influence over recommended actions are regulators, while others are responsible parties or local/regional government agencies with applicable programs or services.

Many of the key audiences have been involved in the HIA through the project's stakeholder engagement strategy, which is tightly interwoven with the HIA dissemination strategy. The Duwamish HIA has four central stakeholder groups assisting with and advising the project:

- **Community Advisory Groups:**

Groups of community advisors are assisting the HIA team in identifying concerns, providing data, developing recommendations, and engaging affected community members within each of the targeted environmental justice communities:

- local residents
- Tribes, and
- non-tribal subsistence fishers.

Two of these community advisor groups – residents and Tribes – are structured as formal committees which have met regularly throughout development of the HIA. The non-tribal subsistence fishing advisors work with the HIA team through one-on-one consultations due to the disparate nature of this community, which includes low-income and immigrant fishers from many different cultural communities throughout the greater Seattle area.

- **Liaison Committee:**

In addition, government agencies and responsible parties with a decision-making role or other interest in the cleanup are engaged through the HIA Liaison Committee, which receives regular updates on the progress of the HIA and provides feedback to the HIA team. The engagement of the Liaison Committee builds decision-maker confidence in the assessment through transparency, contributions of specific data and information, and overall inclusion in the process.

Throughout this document, reference will be made to those audiences who have had representatives involved in these HIA stakeholder committees.

A. Cleanup Plan regulators

i. U.S. Environmental Protection Agency (EPA)

EPA has regulatory authority for the Superfund cleanup program and will issue the final cleanup order for the Duwamish River site.

Recommendations that are specific to elements of the cleanup plan that come under EPA's regulatory authority will be the focus of the dissemination of HIA findings and recommendations to EPA.

a. Region 10

EPA Region 10 manages the Duwamish River Superfund Site, has prepared the Proposed Cleanup Plan for public release in January 2013, and will select the final remedy and issue the cleanup order in 2014.

There are three primary strategies for disseminating the HIA results and recommendations to EPA Region 10:

Engage EPA in developing HIA through Liaison Committee

EPA Region 10 staff from the Superfund and Environmental Justice Programs have been recruited to serve on the HIA Liaison Committee, advising and serving as a resource to the project. This role ensures that EPA managers responsible for the cleanup project are informed of the HIA throughout its development, and encourages early "buy in" by having an integral role in development of the HIA.

Submit HIA recommendations as formal written comment and testimony during the public comment period on Proposed Plan

The HIA Team will submit the HIA Report & Recommendations as formal written comments on the Proposed Plan and will testify at EPA Public Hearings during the public comment period. In addition to being a dissemination strategy for delivering the HIA to EPA, this also ensures that EPA will provide a written response to the HIA recommendations and explain how they influenced EPA's final cleanup decision, thereby assisting with the HIA Team's effectiveness evaluation at the conclusion of the project.

Community Advisory Group will convey and advocate for HIA recommendations during and after the public comment period

HIA Team member DRCC/TAG serves as EPA's Community Advisory Group to EPA for the Duwamish River Superfund Site

and will brief EPA staff and managers on the HIA results and recommendations. DRCC/TAG will advocate for and advise EPA on how to incorporate the HIA recommendations in their final cleanup decision, both during and after the public comment period.

b. Headquarters

In order to ensure that EPA Headquarters is informed of the HIA Report and provides the necessary support of EPA Region 10's incorporation of the HIA recommendations, the HIA team is developing relationships with Headquarters management and will provide the report to those managers electronically, and in person whenever possible. As the first HIA conducted for a Superfund cleanup site, EPA Headquarters has already indicated its interest in the project and has met with members of the HIA team to receive updates on the work in progress.

ii. Washington State Department of Ecology (WA Ecology)

WA Ecology is the Duwamish River Superfund Site co-manager with EPA, and has primary responsibility for controlling pollution sources to the site to prevent recontamination. The Duwamish River is on both the WA State contaminated sites list and EPA's national Superfund Site list. WA Ecology must concur with EPA's final cleanup decision for the river, otherwise the river will remain on the WA State list of contaminated sites, even if it is removed from the national Superfund sites list. WA Ecology representatives, including the Duwamish Site Manager and Environmental Justice Division Coordinator, serve on the HIA Liaison Committee.

The HIA Team will transmit the HIA Report and Recommendations to WA Ecology site managers, at the same time that it is transmitted to EPA, and will specify which recommendations are specific to actions that should be taken by WA Ecology, particularly those related to pollution source control or under the control of other state programs.

B. Public Responsible Parties

Responsible parties are those who are responsible, and therefore liable for the costs of remediating, past contamination at a Superfund site. Responsible parties for the Duwamish River Superfund Site have not yet been formally identified, but will include both businesses and landowners, as well as those who actively released or caused the release of pollution. At the Duwamish River Superfund Site, several potentially responsible parties are public agencies representing Seattle, King County and the Port of Seattle, who will have responsibility and liability for the site as a result of releases of pollution through sewage and stormwater (Seattle and King County) and/or as owners of property along the river (Port of Seattle). EPA's final cleanup decision is

expected to be implemented, in part, through an "Agreed Order" with the public responsible parties. In addition, the City of Seattle, King County, the Port of Seattle and the Boeing Company have formed the "Lower Duwamish Waterway Group," which has been conducting cleanup studies and developing cleanup plans under a voluntary agreement with EPA.

i. Seattle

Several City of Seattle agencies are expected to be identified as responsible for contamination of the river through conveyance of pollution through city sewer and stormwater lines, and because city-generated waste material was released to the river either by city agencies or by third parties. City agencies with potential responsibility for past pollution, and a role in the design and execution of the cleanup, include Seattle Public Utilities and Seattle City Light.

Representatives of the City of Seattle are serving on the project's HIA Liaison Committee, including representatives from Public Health of Seattle and King County and Seattle Public Utilities' Environmental Justice and Service Equity Division. The final HIA Report and Recommendations will be provided to all members of the Liaison Committee. In addition, the Draft HIA Report and Recommendations will be distributed to the Liaison Committee for comment prior to finalizing the report. Through Liaison Committee meetings and review of the draft report, Seattle will be both informed of the HIA results and recommendations, and the HIA Report is expected to reflect input from Seattle throughout the assessment process.

A briefing/presentation on the final HIA Report and Recommendations will be offered to the potentially responsible City of Seattle agencies.

ii. King County

King County is expected to be identified as responsible for contamination of the river through conveyance of pollution through county sewer and stormwater lines. County agencies with potential responsibility for past pollution include King County Wastewater Treatment Division.

Representatives of King County are serving on the project's HIA Liaison Committee, including representatives of Public Health of Seattle and King County and the county's Department of Natural Resources and Parks. The final HIA Report and Recommendations will be provided to all members of the Liaison Committee. In addition, the Draft HIA Report and Recommendations will be distributed to the Liaison Committee for comment prior to finalizing the report.

Through Liaison Committee meetings and review of the draft report, King County will be both informed of the HIA results and recommendations, and the HIA Report is expected to reflect input from King County throughout the assessment process.

A briefing/presentation on the final HIA Report and Recommendations will be offered to the potentially responsible King County agencies.

iii. Port of Seattle

The Port of Seattle is expected to be identified as responsible for contamination of the river both as a result of spills and other releases related to its own shipping activities, and as one of the largest landowners on the river, which conveys responsibility for releases resulting from its tenants' activities, as well as any inherited contamination of property acquired by the Port.

Representatives of the Port of Seattle are serving on the project's HIA Liaison Committee. The final HIA Report and Recommendations will be provided to all members of the Liaison Committee. In addition, the Draft HIA Report and Recommendations will be distributed to the Liaison Committee for comment prior to finalizing the report. Through Liaison Committee meetings and review of the draft report, the Port will be both informed of the HIA results and recommendations, and the HIA Report is expected to reflect input from the Port throughout the assessment process.

A briefing/presentation on the final HIA Report and Recommendations will be offered to the potentially responsible Port of Seattle division(s).

C. Private Responsible Parties

Over 100 private businesses and landowners have received notice that they may be identified as a responsible party for the Duwamish River Superfund Site. EPA has not yet made the final determination about responsible parties, but several have been identified as responsible for Early Action Cleanup Areas, which are being handled on a faster schedule than the riverwide cleanup plan that is the subject of this HIA. It is expected that Early Action Area responsible parties will also be apportioned some responsibility for the larger river cleanup, as a result of pollution transport up- and downriver.

i. Boeing

The Boeing Company is one of the largest private potentially responsible parties for the Duwamish River Superfund Site, and the only one that has already acknowledged likely responsibility for some portion of the riverwide cleanup. Boeing is a member of the four-party

Lower Duwamish Waterway Group (LDWG), which has conducted the riverwide cleanup-related investigations and alternatives analysis that EPA relied on for its Remedial Investigation and Feasibility Study – the basis for the EPA Proposed Cleanup Plan to be released in 2013. The other three LDWG parties are the public entities discussed above.

A Boeing representative is serving on the project's HIA Liaison Committee. The final HIA Report and Recommendations will be provided to all members of the Liaison Committee. In addition, the Draft HIA Report and Recommendations will be distributed to the Liaison Committee for comment prior to finalizing the report. Through Liaison Committee meetings and review of the draft report, Boeing will be both informed of the HIA results and recommendations, and the HIA Report is expected to reflect input received from Boeing throughout the assessment process.

ii. Jorgensen Forge

Jorgensen Forge is an industrial business and landowner on the Duwamish River which is conducting an Early Action Area cleanup of pollution from activities at their site. It is possible, though not yet confirmed, that Jorgensen Forge will also have some responsibility for the riverwide cleanup to be described in EPA's Proposed Cleanup Plan. Jorgensen Forge has not been directly involved in the HIA assessment process to date.

The HIA Team will invite Jorgensen Forge to at least one public forum on the HIA Report and Recommendations, and will provide Jorgensen Forge with information about the HIA project and an electronic copy of the final HIA Report and Recommendations.

iii. Other (not yet identified)

As responsible parties are identified by EPA, they will be posted to EPA's Duwamish Superfund Site web site. The HIA Team will monitor new additions to this site and will provide newly listed responsible parties with information about the HIA project and an electronic copy of the final HIA Report and Recommendations.

D. Other Public Agencies

Numerous other public agencies may be identified in the HIA Report as having the tools, resources or authority to carry out recommendations resulting from this assessment. Some of these agencies may already be involved in the assessment by serving on the HIA Liaison Committee. All agencies serving on the HIA Liaison Committee will be provided with a copy of the final HIA Report and Recommendations, and the HIA Report is expected to reflect input received from these agencies throughout the assessment process. These agencies include:

- Puget Sound Clean Air Agency
- Washington State Department of Health
- U.S. Agency for Toxic Substances and Disease Registry

If other agencies that have not served on the HIA Liaison Committee are identified as having the tools, resources or authority to implement HIA recommendations, the HIA Team will contact those agencies, provide a copy of the HIA Report and Summary Fact Sheet, and request an opportunity provide a briefing/ presentation on the HIA Report and Recommendations, as well as requesting that agency's assistance in responding to the recommendations, as appropriate. Anticipated agencies that may be included in this dissemination include U.S. Housing and Urban Development (HUD) and the Seattle Indian Health Board. Others will be identified as the HIA recommendations are developed.

E. Elected Officials

While local governments and their respective public agencies are responsible parties for the Duwamish Superfund cleanup, elected officials do not necessarily hold the same positions with respect to the cleanup as the executive branches of the governments they represent, and may in some cases be more receptive and responsive to public opinion. The HIA Team will disseminate HIA results and recommendations to elected officials independent its dissemination to responsible government agencies.

i. Seattle City Council

As EPA's Community Advisory Group and as a representative of communities affected by the Duwamish River Superfund Site, HIA Team member DRCC/TAG has conducted one-on-one meetings with a majority of Seattle City Council members to brief them on the community's leading concerns with regard to the river cleanup. These briefings included information about the UW HIA and a request that council members consider the HIA recommendations when complete. As a result, most City Councilmembers have already been informed about the pending HIA Report. DRCC/TAG has also requested an opportunity to provide a briefing to City Council on the HIA results. The HIA Team will work to schedule a briefing to the appropriate City Council committee and/or the full Council before the close of EPA's public comment period on the Proposed Cleanup Plan. In addition, an HIA Summary Fact Sheet and electronic copies of the HIA Report and Recommendations will be sent with a cover letter requesting consideration of the recommendations to each Councilmember.

ii. King County Council

As EPA's Community Advisory Group and as community representatives affected by the Duwamish River Superfund Site, HIA Team member DRCC/TAG has conducted select one-on-one meetings

with select County Council members to brief them on the community's leading concerns with regard to the river cleanup. These briefings included information about the UW HIA and a request that council members consider the HIA recommendations when complete. As a result, some County Councilmembers have already been informed about the pending HIA Report. DRCC/TAG has also requested an opportunity to provide a briefing to County Council on the HIA results. The HIA Team will work to schedule a briefing to the appropriate County Council committee and/or the full Council before the close of EPA's public comment period on the Proposed Cleanup Plan. In addition, an HIA Summary Fact Sheet and electronic copies of the HIA Report and Recommendations will be sent with a cover letter requesting consideration of the recommendations to each Councilmember.

iii. Seattle Port Commission

As EPA's Community Advisory Group and as community representatives affected by the Duwamish River Superfund Site, HIA Team member DRCC/TAG has conducted select one-on-one meetings with select Port of Seattle Commissioners to brief them on the community's leading concerns with regard to the river cleanup. These briefings included information about the UW HIA and a request that Commissioners consider the HIA recommendations when complete. As a result, some Port Commissioners have already been informed about the pending HIA Report. DRCC/TAG has also requested an opportunity to provide a briefing to the Port of Seattle Commission on the HIA results. The HIA Team will work to schedule a briefing to the Port Commission before the close of EPA's public comment period on the Proposed Cleanup Plan. In addition, an HIA Summary Fact Sheet and electronic copies of the HIA Report and Recommendations will be sent with a cover letter requesting consideration of the recommendations to each Commissioner.

iv. WA State legislators/committees

There has been little involvement by Washington State legislators to date, although the state representatives of the Duwamish Valley neighborhoods are generally aware of the Superfund process and pending EPA cleanup decision. Upon completion of the HIA Report and Recommendations, the HIA Team will request meetings with local state representatives Bob Hasagawa and Zack Hudgins, provide a HIA Summary Fact Sheet and copy of the final HIA Report and Recommendations to each, and request assistance in scheduling a briefing to the appropriate Washington State legislative committees regarding the HIA Recommendations directed at WA Ecology and other state agencies, as appropriate.

v. U.S. Congressional and Senate representatives

Staff representing Seattle Congressman Jim McDermott and State Senators Maria Cantwell and Patty Murray have been following EPA's cleanup decision-making process and have been in periodic consultation with HIA Team member DRCC/TAG regarding public concerns and priorities with respect to the cleanup goals and process.

Upon completion of the HIA Report and Recommendations, the HIA Team will request meetings with Congressman McDermott and Washington's U.S. Senators, provide a HIA Summary Fact Sheet and copy of the final HIA Report and Recommendations to each, and request their support for the HIA Recommendations. As federal legislators, the support of the Seattle and Washington State Congressman and Senators is a key objective, with the potential to be highly influential in EPA's adoption of the HIA Recommendations.

F. Affected Communities

The Duwamish HIA identified three "environmental justice" communities that would be most affected by EPA's Proposed Cleanup Plan and ultimate cleanup decision: residents, Tribes, and subsistence fishers. Throughout the HIA scoping and assessment process, residents and members of the HIA Liaison Committee emphasized the importance of the health of, and specifically impacts to, the industrial and business sector as a key component of the community's overall health. As a result, the HIA scope has been expanded to include a discussion of anticipated impacts to the industrial/business sector, and the Dissemination Strategy will be inclusive of this constituency as well.

i. Residents

The neighborhoods of South Park and Georgetown are on the Duwamish River and are the closest and most directly impacted by the Proposed Cleanup Plan and EPA's ultimate cleanup decision. Both neighborhoods are low-income; ethnically and linguistically diverse; and have among the highest environmental exposures to land, air and water pollution sources in the City of Seattle. Along with Beacon Hill, the neighborhoods comprise the 98108 ZIP code, one of the nation's most diverse. Forty-two percent of 98108 residents are foreign born, and 32% live below 200% of the poverty level. A full Community Profile and Cumulative Health Impacts Analysis will be provided in the final HIA Report.

a. South Park (pop. 3,873)

South Park lies directly along the Duwamish River, with waterfront homes, public parks, and a marina making it the home of the largest reach of publicly accessible riverfront. South Park is also home to one of Seattle's largest immigrant

communities, with nearly 38% of its population identifying as Latino and 18% as Asian and Pacific Islander. Other smaller sub-populations include African and African-American, Native American/Alaska Native, multiracial, and others.

The HIA Summary Fact Sheet will be distributed to South Park residents in English, Spanish, and Vietnamese (at a minimum), electronically via the South Park Neighborhood Listserv, and will be included in DRCC/TAG's Proposed Cleanup Plan Fact Sheet and sent via U.S. Postal Mail to every residence in South Park. Fact Sheets will also be distributed via community organizations, including the South Park Information Center, South Park Library, South Park Community Center, Environmental Coalition of South Seattle, and others.

Presentations about the HIA Recommendations will be made at the South Park Neighborhood Association monthly meetings, and as part of DRCC/TAG's community workshops on EPA's Proposed Cleanup Plan, which will take place in advance of EPA's Public Hearings during the Proposed Plan public comment period, and at EPA's Public Meetings and Hearings held in the South Park neighborhood

b. Georgetown (pop. 1,287)

While larger geographically, Georgetown is a predominately industrial neighborhood, with a small residential population and retail core. Georgetown lies along the I-5 highway corridor, BNSF rail line, and under the King County Airport/Boeing Field flight path. Georgetown is connected to the Duwamish River via an industrial street (8th Avenue South) leading to a small, community-built, riverside park.

The HIA Summary Fact Sheet will be distributed to Georgetown residents electronically via the Georgetown Community Listserv, and will be included in DRCC/TAG's Proposed Cleanup Plan Fact Sheet and sent via U.S. Postal Mail to every residence in Georgetown. Georgetown has fewer community organizations than South Park, but publishes a print community newsletter, the Georgetown Gazette. Fact Sheets will be distributed and presentations about the HIA Recommendations will be made at the Georgetown Community Council's monthly meetings. In addition, the HIA Team will submit an article summarizing the HIA findings and recommendations to the Georgetown Gazette, which is distributed door-to-door and at neighborhood kiosks and merchants throughout the retail core. Finally, the HIA Recommendations will be included as part of DRCC/TAG's community workshops on EPA's Proposed Cleanup Plan, which

will take place in advance of EPA's Public Hearings during the Proposed Plan public comment period, and at EPA's Public Meetings and Hearings held in the Georgetown neighborhood.

ii. Tribes

Three Tribes are affected by the EPA Proposed Cleanup Plan and ultimate cleanup decision; two are federally recognized Tribes with treaty fishing rights on the Duwamish River – the Muckleshoot and Suquamish Tribes, and the Duwamish Tribe, which is not currently federally recognized, but is petitioning for federal recognition.

a. Duwamish

The Duwamish Tribe has historical and cultural claims to the Duwamish River, and is currently petitioning for federal recognition. The Tribe owns property and operates the Duwamish Tribal Longhouse and Cultural Center across West Marginal Way from the Duwamish River Superfund Site, near the site of their historic winter fishing village – a designated protected archaeological site. The Tribe currently has ~600 members, scattered throughout the region due to the lack of a central reservation. The Tribal Council has been chaired since 1970 by Cecile Hanson, a great grandniece of Chief Seattle. The Duwamish Tribe has two representatives serving on the HIA Tribal Advisory Group. The Tribe has also served on the Advisory Board of HIA Team member DRCC/TAG since 2001.

The Draft HIA Report and Recommendations will be provided to the Duwamish Tribal Advisors and Duwamish Tribal Council for review prior to finalizing the report. The final HIA Report and Recommendations, and the HIA Summary Fact Sheet will be provided to the Duwamish Tribal Council upon completion, and the HIA Team will request the opportunity to present a briefing/ presentation on the findings to the Duwamish Tribal Council and board of directors of its associated non-profit organization, Duwamish Tribal Services. In addition, HIA Team member DRCC/TAG will offer to print and mail the HIA Summary Fact Sheet to all Duwamish tribal members, if desired by the Duwamish Tribe, and to present the HIA Recommendations at the Duwamish Tribe's annual meeting and at events at the Longhouse and Cultural Center.

b. Suquamish

The Suquamish Tribe is federally recognized and has treaty rights to harvest fish and shellfish from the Duwamish River and other areas throughout central Puget Sound, though currently restricts its harvesting to the area north (downriver)

of the Superfund Site through an agreement with the Muckleshoot Tribe. The Suquamish Tribe has two non-tribal staff representatives serving on the HIA Tribal Advisory Group.

The Draft HIA Report and Recommendations will be provided to the Suquamish Tribe's designated Tribal Advisors for review prior to finalizing the report. The final HIA Report and Recommendations, and the HIA Summary Fact Sheet will be provided to the Suquamish Tribe's designated Tribal Advisors upon completion. The Suquamish Tribe has assigned responsibility for determining the appropriateness of any additional dissemination to Tribal Council or Tribal members to its designated representatives. At their request, the HIA Team will consult with them upon completion to determine the appropriate dissemination strategy.

c. Muckleshoot

The Muckleshoot Tribe has treaty rights to harvest fish and shellfish from the Duwamish River, and currently operates a commercial salmon fishery on the river. The Muckleshoot Tribe is not participating in the Duwamish Cleanup HIA.

The HIA Team will provide a Draft HIA Report and Recommendations to Muckleshoot Tribe staff and invite their review and comment. The final HIA Report and Recommendations and the HIA Summary Fact Sheet will be provided to Muckleshoot Tribe staff upon completion, and a briefing/presentation to staff and/or Tribal Council will be offered, if desired.

iii. Subsistence Fishers

The subsistence fishing community presents a unique challenge for disseminating the findings and recommendations of the HIA Report. The majority of Duwamish River fishers are food insecure, including low-income and homeless individuals, and Asian, Pacific Islander, and other immigrant and refugee community members with limited English proficiency. Cultural barriers and lack of trust will also be likely factors hindering attempts to disseminate the HIA results. As a result, much of the approach to HIA dissemination in this community is through community organizations and leaders who will serve as a proxy for and liaison to the communities they represent.

a. Ethnic community organizations

Several Community Advisors are assisting the HIA team in evaluating potential impacts of the Proposed Cleanup Plan and associating fishing restrictions and mitigations ("institutional

controls") on the Duwamish River subsistence fishing communities. Several of these Advisors represent community organizations serving the Asian, Pacific Islander, and other ethnic communities known to engage in subsistence fishing in Seattle area waters. The Draft HIA Report and Recommendations will be provided to these HIA Community Advisors for review, as well as the final HIA Report and Recommendations. The HIA Summary Fact Sheet will be translated into a variety of languages, as recommended by the HIA Advisors, for distribution to community members through their respective community and cultural organizations. A partial list of organizations anticipated to participate in disseminating the HIA findings include the Vietnamese Friendship Association, Filipino Community Center, and Washington State Commission on Asian and Pacific Islander Affairs (a state agency).

b. Individual fishermen

The HIA Team will explore avenues for dissemination of HIA findings and recommendations directly to individual fishermen through (a) visits to fishing docks, (b) distribution of information at food banks, and (c) distribution of information at homeless encampments in the Duwamish Valley. This component of the dissemination strategy will need to develop unique multilingual and visual/graphic communication tools, in order to overcome language and cultural barriers. The HIA Team will also explore the potential to partner with local Asian/Pacific Islander youth organizations in order to help overcome cultural and trust barriers in communicating results to the subsistence fishing community.

iv. Industrial/business sector

The HIA Summary Fact Sheet will be provided to the Manufacturing Industrial Council, South Park Business Association, city staff implementing the Duwamish Industrial Development pilot program, and all individual industry and business representatives who participate in the assessment of impacts to the business sector. Additional details of the HIA dissemination strategy to the industrial/business sector will be further refined as contacts are developed through the course of the assessment.

G. HIA Professionals

The HIA Team will disseminate the Duwamish HIA Report and Recommendations to practitioners and academics through presentations at conferences and universities, submission of papers to academic and professional journals, and posting the HIA Report on the University of

Washington's Department of Occupational and Environmental Health web site, as well as the web sites of HIA Team members Just Health Action and Duwamish River Cleanup Coalition/Technical Advisory Group.

Anticipated conference presentations include:

2013 American Public Health Association (APHA) Conference

2013 or 2014 Health Impact Assessment Conference (if applicable)

2013 University of Washington/University of British Columbia/San

Francisco University Environmental, Occupational, and Population Health Symposium.

The Duwamish HIA project, as a work in progress, has already been presented at the 2012 APHA Conference. Selection of journals for submission of papers on the Duwamish HIA project has not yet been determined.

H. Media

While media will be utilized as a strategy for disseminating HIA results to various audiences, the news media is also a key audience in itself. The University of Washington issued a news release upon launching the Duwamish HIA project, and will do so upon completion of the HIA Report and Recommendations. In addition, HIA Team member DRCC/TAG maintains a list of active mainstream, neighborhood and multilingual news media that will be available to assist with media contacts.

The HIA Team will issue a News Release upon completion and release of the HIA Report and Recommendations, and will host a News Conference and conduct one-on-one interviews with key local environmental and health reporters at mainstream outlets, including the Seattle Times, Puget Sound Business Journal, online Seattle Post-Intelligencer, InvestigateWest, King 5, KIRO, KOMO, KCTS, KPLU, and KUOW. In addition, we will contact community newspapers and blogs, including the West Seattle Herald, West Seattle Blog, South Park Blog, and Georgetown Blog. Finally, we will target multi-lingual news outlets, including Asian-language newspapers serving the International District, and Spanish-language newspapers, radio and TV stations serving South Seattle and South King County.

The HIA Team will consult with staff at the Health Impact Project and local non-profit organization Resource Media on messaging once the Recommendations are formulated and prior to completion and release of the HIA Report.

3. Strategies (match/code each to key audiences)

A. Distribute HIA Report

The HIA Report and Recommendations will be distributed electronically as described above, and print copies will be available upon request.

B. Develop/distribute Summary Fact Sheet

The HIA Team will develop a 2–4 page HIA Summary Fact Sheet for electronic and print publication to a wide variety of audiences.

C. Develop educational display(s)

The HIA Team will develop a simple tabletop and/or poster display explaining the HIA project and summarizing its main findings and recommendations for use at community meetings and public events.

C. Deliver presentations/briefings

The HIA Team will develop a powerpoint presentation for use in providing public presentations and agency/council/elected official briefings on the findings and recommendations of the Duwamish HIA, as described above. Additional presentations will be developed for academic and professional conferences, as appropriate.

D. Host community events

The HIA findings and recommendations will be communicated to the public using the tools above at community workshops and events organized by HIA Team member DRCC/TAG, in its role as EPA's Community Advisory Group for the Duwamish River Superfund Site.

D. News releases/interviews

The HIA Team will jointly develop a news release announcing the HIA Report and Recommendations, host a news conference, and provide interviews to interested news outlets.

E. Social media: web sites, FB, Twitter

The UW School of Public Health, Just Health Action and DRCC/TAG all maintain web site and will post the HIA Report and Recommendations, Summary Fact Sheet, news release, and any media coverage of the HIA on their sites. DRCC/TAG also maintains an active Facebook page and Twitter account, and will disseminate the HIA recommendations and related news coverage through these social media.

F. Integrate into fact sheets, comment letters & testimony on cleanup plan

Each HIA Team member is expected to provide formal written comment and testimony on EPA's Proposed Cleanup Plan for the Duwamish River Superfund Site. The HIA findings and recommendations will be an integral component of these comments and testimony, and it will be submitted in its entirety to EPA for formal consideration and response during the public comment period. In addition, in its role as EPA's Community Advisory Group, DRCC/TAG will incorporate the HIA Recommendations into its Community Fact Sheet on the Proposed Cleanup Plan, which is distributed to ~5,000 people.

G. Request organization/council endorsements of HIA recommendations

The HIA Team will seek endorsement for the Duwamish HIA

Recommendations from community organizations, elected officials, and public health professionals, in order to encourage consideration and adoption by EPA and other decision-makers with the authority to implement the HIA recommendations.

Dissemination Strategy Summary Table

	Regulators	PRPs	Other Agencies	Elected Officials	Affected Communities	Professionals/Academics	Media
HIA Report	✓	✓	✓	✓	✓	✓	
Fact Sheet				✓	✓		✓
Educ. Display					✓	✓	
Present/Briefings	✓	✓	✓	✓	✓	✓	
Comm. Events					✓		
News Release							✓
Social Media				✓	✓		
Public Comment	✓	✓					
Endors-ments	✓			✓	✓		



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**Duwamish River Superfund Cleanup
Health Impact Assessment; Pew #2277**

**Evaluation plan
March 9, 2013**

This cover letter is accompanied by two documents that constitute our HIA evaluation plan. Please note, one of our HIA team members, Jonathan Childers, will conduct the evaluation as his MPH degree project. We are submitting his thesis proposal plus an appendix. Both documents are in MS-Word format.

We look forward to comments and suggestions. Please contact me if you have questions.

William (Bill) Daniell

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PS: For our internal records, the original filenames are:
13_02_17 HIA evaluation project proposal.doc
13_02_17 HIA evaluation project proposal_Appendices.doc

**RESEARCH PROJECT PROPOSAL:
QUALITATIVE ANALYSIS AND EVALUATION OF THE HEALTH
IMPACT ASSESSMENT FOR THE DUWAMISH RIVER SUPERFUND
CLEANUP**

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Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

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Specific Aims

To address the potential health impacts of the U.S. Environmental Protection Agency's (EPA) proposed remediation (Cleanup) of the Lower Duwamish Superfund Site on vulnerable populations, the University of Washington (UW), in partnership with two local non-profit organizations (HIA team), has secured grant funding from The Pew Charitable Trusts and the Robert Wood Johnson Foundation to conduct a health impact assessment (HIA) of the EPA's proposal. To better understand the value of the HIA for informing ongoing consideration of plans for the Cleanup, the HIA will be evaluated via qualitative analysis of input gathered from interviews and focus groups conducted with Cleanup decision-makers and stakeholders. The specific aims of the evaluation project are:

1. To conduct semi-structured interviews and focus groups with key informants to gather evaluative information regarding the Duwamish HIA process, recommendations, and effects;
2. To follow previously derived methods of interpretative examination to analyze qualitative data collected from informants, in order to discern common themes and ideas pertinent to evaluation of the Duwamish HIA; and
3. To use evaluative findings regarding the Duwamish HIA to:
 - increase the HIA team's understanding of the HIA effort's strengths and weaknesses;
 - inform considerations and discussion among project decision-makers, responsible parties, and stakeholders regarding ongoing implementation of the Duwamish Cleanup; and
 - influence the approaches followed by? other health, planning, and policy professionals in future health impact assessments and related research for other environmental projects.

Pursuing these aims will provide the Duwamish HIA team, and the broader community of professionals conducting HIAs and other related environmental analyses, with clearer understanding of how useful the Duwamish HIA was for:

- providing voice for, and consideration of, concerns of vulnerable stakeholders,
- conducting analysis that was communicated clearly to the public and informed valuable recommendations, and

Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

- making reasonable and useful recommendations that substantively affected considerations of the decision makers regarding the Cleanup.

Such effects of the HIA are of interest because strengthening community voice, carefully considering concerns of vulnerable populations, increasing the political capital of groups with underrepresented concerns, and broadening health assessment protocol to include more than physical exposure and risk assessment, would all be expected to benefit population health.

Abstract

To evaluate the Duwamish River Cleanup Health Impact Assessment (HIA), a cross-sectional study will be conducted among Cleanup decision makers and stakeholders. Participants will include informants from the HIA's Liaison Committee, Resident Community Advisory Committee, and Tribal Community Advisory Committee, as well as other pertinent respondents identified via the knowledge of the committee participants. Perspectival input regarding the process and effect of the HIA will be gathered through semi-structured key informant interviews and focus group discussions. Qualitative analysis of the data will be conducted according to standard practices outlined in the social science literature.

Background and Significance

The Duwamish Valley is a mixed industrial and residential area in Seattle and King County, WA. The lower Duwamish River has long been a natural resource serving the needs of an industrial core. According to the United States Environmental Protection Agency, past and present activities have left chemical pollution in the lower Duwamish River and the sediment along the bottom of the waterway. The pollution comes from many sources, including industries along the waterway and stormwater runoff. Many of the chemicals in the waterway stay in the environment for a long time, so they have built up to unhealthy levels in the sediment and in the fish and shellfish that live in the waterway year round. Because of these health risks to people and animals exposed to contaminated sediments, in 2001-2002, the EPA and the Washington Department of Ecology (Ecology) listed the Lower Duwamish Waterway as a priority site for cleanup under the federal Superfund law and Washington's Model Toxics Control Act.¹

Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

The Lower Duwamish Waterway is considered one of the most polluted Superfund sites in the nation.² To clean up the site, the EPA has proposed four primary goals: to protect the benthic environment in the river, to protect plants and wildlife in the river, to protect recreational users of the river, and to protect people who eat fish from the river. However, the EPA has stated that it is not feasible to achieve the last goal. It is not expected that contamination of fish in the Duwamish River will be reduced to a level safe for unlimited human consumption. Thus, the EPA plans to rely on non-engineered institutional controls, such as social, administrative, and legal actions, to inhibit fish consumption.³

Due to this shortcoming, as well as other social, economic, and environmental implications of the Cleanup, the Duwamish River Cleanup has the potential to result in a variety of unintended health consequences. To address the potential health impacts of the Cleanup, the University of Washington (UW), in collaboration with the Duwamish River Cleanup Coalition/Technical Advisory Group (DRCC/TAG) and Just Health Action (JHA), received funding from The Pew Charitable Trusts and the Robert Wood Johnson Foundation to conduct a Health Impact Assessment (HIA) of the EPA's proposed plan for the Duwamish River Cleanup. The project is being conducted in accordance with the nationally recognized six-step protocol for conducting HIAs, comprising: Screening, Scoping, Assessment, Recommendations, Reporting, and Monitoring and Evaluation.⁴

Screening and Scoping

As described above, the Duwamish Cleanup could foreseeably result in unintended health effects on vulnerable populations. Accordingly, in *screening* the potential effects of the Cleanup, it was found the Cleanup was a suitable subject for HIA.⁵ In then *scoping* the range of subjects for analysis in the HIA, it was determined the assessment should principally address effects on several distinct populations that would be most vulnerable to outcomes of the Cleanup. The Georgetown and South Park neighborhoods, adjacent to the Duwamish River and the cleanup site, comprise populations with lower median incomes and greater ethnic minority composition than many other areas of Seattle. In addition, three Native American tribes (two federally-recognized and one unrecognized) have tribal treaty rights or historic fishing ties to the river. There are also a variety of other non-Tribal individuals who rely on the river for subsistence fishing. Finally, a fourth affected population was identified during the scoping process. The Duwamish Valley is home to Seattle's largest industrial district. It is conceivable that the Cleanup could affect the viability of some businesses and industries, with direct impacts on worker employment and health, and secondary impacts on the

Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

other assessed populations that are economically and socially entwined with the local workers. Together, these four respective groups: Residential Communities; Tribes; Non-tribal Fishers; and Workers in Duwamish Valley businesses compose the focal affected groups for the HIA analysis.⁶

As part of the HIA process, liaison and advisory committees were formed to help identify potential health impacts of concern to stakeholders, and to help advise and frame the HIA. A Liaison Committee was composed of locally involved government agencies, including the EPA and Ecology, as well parties potentially responsible for the Duwamish Cleanup, including the Boeing Company, the City of Seattle, the Port of Seattle, and King County. A Residential Community Advisory Committee was also created, consisting of members of the South Park and Georgetown neighborhoods and technical advisors. In addition, a Tribal Community Advisor Committee was formed, including representatives from the Duwamish and Suquamish Tribes and technical advisors.

With regard to non-tribal subsistence fishers and workers in Duwamish Valley businesses, the composition and breadth of the potentially affected populations were not clear at the outset of the HIA. Thus, it was not feasible to establish defined HIA advisory committees for these groups. However, a small group of Community Advisors with extensive knowledge about local non-tribal subsistence fishing communities is informing the HIA and assisting identification of key informants and focus group participants that are providing further guidance regarding non-tribal subsistence fishing. In addition, a few key informants are providing information and guidance with respect to workers in Duwamish Valley businesses.

Assessment, Recommendations, and Reporting

The Liaison Committee and advisory groups described above have independently identified health concerns regarding the Duwamish Cleanup for investigation in the HIA. In response to this guidance, the HIA team is currently conducting their *assessment* to document health changes that may result from the proposed Cleanup and to make *recommendations* to maximize health benefits and minimize harm in affected communities. The HIA is being prepared for submission, in early 2013, as a public comment (*reporting*) regarding the EPA's proposed Cleanup Plan.

Monitoring and Evaluation

The currently proposed research will serve as the final phase of the HIA process. *Monitoring and evaluation* involves determining how an HIA affects decisions regarding the assessed plan/project. Given the limited budgets and timeframes constraining most HIAs, the challenge of objectively

Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

reviewing HIA qualities, and the complexity of defensibly establishing connections between HIAs and plan/project outcomes, monitoring and evaluation is neglected in numerous HIA efforts.⁷ The proposed evaluative research may thus have future significance in providing a model for other HIA endeavors.

Monitoring is technically oriented toward defining the effect of HIAs on the outcomes of assessed plans/projects. Due to the timing of many assessed plans/projects, monitoring may often not be reasonably conducted near the timeframe of HIA report completion. This is unfortunately the case for the Duwamish Cleanup HIA. In light of the prolonged agency decision period expected prior to finalization and implementation of the Duwamish Cleanup plan, and considering the long duration of project actions anticipated under the plan, monitoring the effects of the HIA on long-term outcomes of the Cleanup is not feasible as part of the current HIA effort.

However, meaningful evaluation of the Duwamish Cleanup HIA is still possible. With the relatively large network of decision makers and stakeholders enlisted as committee members guiding the HIA, there is a large pool of sources available that may offer informed and insightful perspectives regarding the HIA. Seeking to collect and analyze qualitative input from such sources is in line with current expert guidance that suggests qualitative methods are key to effective evaluation of HIA processes and impacts.⁸ Indeed, through analysis of in-depth input from interviews and focus groups with parties familiar with the HIA, the proposed qualitative research project should yield a substantive appraisal of the HIA's effectiveness in:

- *informing* affected parties about key aspects of the Duwamish Cleanup project;
- *responding* to their perceptions and concerns regarding effects on health by competently *analyzing* pertinent health effects of the Cleanup;
- *reporting* on progress and findings regarding the health impact analysis; and
- *making useful recommendations* to improve health outcomes for affected communities.

Study Framework

As suggested by leading guidance regarding HIA protocol, the proposed evaluation of the Duwamish Cleanup HIA will address both the HIA process and its impact on decision-making processes regarding the Cleanup.^{9,10}

Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup

Process Evaluation

To guide and inform ongoing implementation of the Duwamish HIA, anonymous process evaluation surveys have been conducted after meetings with members of the Liaison Committee and Residential and Tribal Community Advisory committees. The anonymous survey input has been used to monitor: whether the HIA team is perceived to understand and respond to concerns and suggestions of the committees; issues requiring review or further discussion; and practical suggestions for meeting formats and communication procedures.

The input from these committee surveys will provide a framework for analyzing the HIA process. At a general level, the surveys may be used to track the overall progression of committee member perceptions throughout the HIA process. In addition, many committee members took advantage of the opportunity to assign themselves unique and anonymous respondent identification codes. Accordingly, it is possible to review the progression of individual member input from meeting to meeting, while still maintaining their anonymity. Thus, it should be feasible to discern the evolution through time of individual stakeholders' perceptions of the HIA process.

Impact Evaluation

To evaluate the impact of the Duwamish Superfund Cleanup HIA, a cross-sectional study is proposed, to consist of qualitative analysis of perspectival evaluative data regarding the HIA, collected from affected populations and decision makers via focus groups and key informant interviews.

Subject Population

Parties with especially valuable knowledge and evaluative perceptions regarding the Duwamish HIA will be recruited as focus groups participants and key informants for interviews evaluating the HIA. Among the many individual and organizational actors associated with the Cleanup, those with particularly strong influence over, or sensitivity to, aspects of the Cleanup will be targeted for participation. With some foresight, representatives of these influential and sensitive parties have been included on the HIA advisory committees, and thus have substantial familiarity with the HIA.

Parties with strong influence over the Cleanup, including EPA and Ecology planners and decision makers regarding the Cleanup, and parties potentially responsible for implementing the Cleanup, including the Boeing Company, the City of Seattle, the Port of Seattle, and King County will be

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sought to participate in evaluative interviews regarding the HIA. Members of these groups sitting on the Liaison Committee are likely to have uniquely informed and salient perspectives on the HIA and will be expressly recruited as key informants for interviews. These committee members may also provide contacts for additional interested parties that may be desirable interview participants. For example, members of the Liaison Committee may provide contact information for decision makers in their organizations, or in the broader decision-making network, who have heard about the HIA via the committee members and who intend to review HIA when it is published. These distant members of the audience for the HIA could provide unique and important evaluative perspectives; such decision makers may ultimately determine the full influence and impact of the HIA.

Parties considered particularly vulnerable to effects of the Cleanup (i.e. residential communities, Tribal members, non-tribal fishers, and workers in Duwamish Valley businesses) as well as parties responsible for considering the needs of these vulnerable populations (e.g. agency environmental justice specialists) will be invited to participate in evaluative focus groups regarding the HIA. Members of these groups sitting on the Liaison Committee or the Residential or Tribal Community Advisory Committees are likely to have uniquely informed and salient perspectives on the HIA and will be expressly recruited to participate in focus groups.

Study Participants

Individuals with keen knowledge of, and evaluative perceptions regarding, the HIA will be eligible key informants and focus group participants. Thus, the study will include:

- Subjects with strong influence over Cleanup planning, decisions, implementation, or regulation; and
- Subjects potentially vulnerable to the impacts of the Cleanup.

Details regarding recruitment of particular study participants and specific data collection processes will be further developed via a formative planning process. The team of researchers currently conducting the HIA will determine, in collaboration with potential study subjects, the most suitable approach for gathering information from about 20 to 35 total study participants. Through this planning, the team will refine the desired size and composition of the study sample, and discern whether key informant interviews or focus groups are most suitable for garnering information from particular participants.

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For all interview and focus group participants, contact information limited to name, study identification code, and preferred contact method will be kept on a password-protected server at the University of Washington for the duration of the study. Data connecting participants to specific interviews or focus groups will be destroyed following completion of data analysis.

To encourage participation, each focus group subject will receive a cash incentive of \$ ## (TBD).

Study Setting

Key informant interviews and focus groups will take place at locations identified as accessible to the participants. For example, if a group of South Park residents were identified for participation in a focus group, then the group meeting would be conducted at a venue in South Park readily accessible to the participants. As identification and recruitment of potential evaluation participants will be ongoing and adaptive as the HIA process continues, final interview and focus group locations cannot be specifically identified until the participants have been recruited.

Data Collection

Self-descriptive data to be collected from study participants will include general (non-identifying) information useful to broadly frame input. Evaluative information to be collected from participants will include their perceptions of changes resulting from the Duwamish River HIA, and the benefits and drawbacks of those changes.

This information will be gathered through interviews and focus group discussions. Initial results from interviews and focus groups will be de-identified and shared with the HIA team in time for grant-required submission of preliminary evaluative documentation regarding the HIA to The Pew Charitable Trusts and the Robert Wood Johnson Foundation, likely between May and August 2013.

Methods

Key informant interviews and focus group discussions will be recorded, and field notes will be logged. Audio recordings will be transcribed and checked with participants for accuracy. Following data analysis, the audio recordings will be destroyed to maintain confidentiality. There is no need for photography during interviews or focus groups, and no key informants or focus group participants will appear in any photographs used in the final report.

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Key Informant Interviews

Interviews with key informants will be conducted to collect data regarding the perspective of decision makers and other responsible parties regarding the HIA. Prior to the interviews, participants will be offered the opportunity to provide general self-descriptive (non-identifying) information useful for framing the context of the interview (Appendix A). Descriptive information to be collected will include broad age range (voluntary), self-identified gender (voluntary), and general role in relation to the Duwamish Cleanup HIA.

Data will then be collected via semi-structured adaptive interviews with key informants. The interview schedule will comprise open-ended questions generally regarding: changes that have occurred (or will likely occur) due to the Duwamish River Cleanup HIA; benefits of the changes; drawbacks of the changes; and the mechanisms by which the changes occur (Appendix B). Participants may be encouraged to consider issues such as: the HIA's influence on stakeholders' understanding the Cleanup project; the HIA's inclusion and consideration of stakeholders' concerns; the HIA's communication of information regarding the effects of the Cleanup project; the HIA's presentation of recommendations to advance health benefits and limit harm from the Cleanup in affected communities; and the HIA's influence on decisions regarding the Cleanup and future outcomes of the Cleanup project.

Additional questions and areas of concern may be identified as important through individual interview processes. These questions may be addressed as relevant during individual interviews and, where applicable, new questions may be added to the baseline interview schedule for future interviews. Thus, due to the iterative nature of adaptive qualitative research, the research process may slightly modify the preliminary interview schedule presented in this proposal.

Focus Groups

Prior to discussions, focus group participants will be offered the opportunity to provide the same self-descriptive (non-identifying) information as the key informants, to help contextualize the input received. Data will then be collected through semi-structured focus groups, to gain more holistic population-based perspectives regarding the HIA via the same open-ended questions presented to the key informants. As with the key informant interviews, the focus group research process may reveal additional important questions and areas of concern pertinent to the study. Such subjects may

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be pursued as relevant during focus group discussions, and may be added to questions for discussion in future focus groups.

Data Analysis

Whenever possible, key informants and focus group participants will assist with interpreting and organizing collected data in an iterative, discussion-oriented process. Analysis of key informant interviews and focus group discussions will rely on transcriptions and written notes, and will follow the principles outlined by Creswell¹¹ and Morgan and Krueger.¹² A table of primary overarching themes from the interviews and discussions will be generated and common themes and key words will be coded and identified. Relevant quotations from key informants and focus group participants will also be identified. These themes, key words, and quotations will be reviewed with the source participants to assure that they appropriately reflect their intentions and opinions.

Self-descriptive information collected at the beginning of interviews and focus group will be compiled into collective tables representing the key informants and focus group participants (see Table 1). A second table will summarize the major topics and themes identified from key informant interviews and focus group discussions (Table 2).

*Qualitative Analysis and Evaluation of the HIA for the Duwamish River Superfund Cleanup***Table 1: Study Participants' Self-Descriptive Data**

Non-Identifying Data	n	%
Age <40		
Age 40-65		
Age >65		
Male		
Female		
HIA advisor		
Cleanup planner		
Cleanup decision-maker		
Potentially responsible for implementing Cleanup		
Regulator for effects of Cleanup		
Agency environmental justice advisor		
Resident in community adjacent to Lower Duwamish Superfund site		
Tribal member		
Non-tribal fisher in Duwamish River		
Worker in Duwamish Valley		
Self-identifies as likely to experience changes in health due to Cleanup		

Table 2: Examples of major themes anticipated in qualitative analysis

Theme	Frequency of mention
Changes due to HIA	
Benefits of changes	
Drawbacks of changes	
Mechanisms of change	
[and so forth]	

Limitations

The proposed study will have some limitations. The range of potential opinions regarding the Duwamish Cleanup HIA is very broad, and all possible perspectives may not be collected and represented during the time-constrained study. Thus, absent perspectives could result in some bias in the overall results.

In addition, there may be a number of pertinent potential key informants or focus group participants that may decline to participate in the study due to concerns regarding the security of their anonymity and opinions. To counter such loss of valuable data, prospective participants will be informed about the ways in which their identities will be protected.

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Timeline

Initial results from interviews and focus groups will be shared with the HIA team in time for grant-required submission of preliminary evaluative documentation regarding the HIA, likely between May and August 2013. Further analysis and reporting will continue after that stage.

	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Literature Review													
Human Subjects Review and Approval													
Identify Key Informants and Focus Groups													
Key Informant Interviews													
Focus Groups													
Preliminary Analysis													
Preliminary results to HIA Team													
Continued Analysis													
Reporting													

*Recruitment and data collection will not begin until after human subjects approval.

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¹ Environmental Protection Agency. (2012b). *Lower Duwamish Waterway Superfund Site*. Retrieved from Region 10: the Pacific Northwest: <http://yosemite.epa.gov/r10/cleanup.nsf/sites/lduwamish>

² Duwamish River Cleanup Coalition. (2011). *Overview*. Retrieved from Duwamish River Cleanup Coalition/TAG: <http://www.duwamishcleanup.org>

³ Environmental Protection Agency. (2012a, December 12). *Institutional Controls (ICs)*. Retrieved from Superfund: <http://www.epa.gov/superfund/policy/ic/>

⁴ National Research Council of the National Academies. 2011. *Improving health in the U.S.: the role of health impact assessment*. Washington, DC: National Academies Press.

⁵ University of Washington School of Public Health, Just Health Action, Duwamish River Cleanup Coalition. (2012). *Duwamish River Superfund Cleanup Health Impact Assessment: Screening Summary*. Seattle: University of Washington School of Public Health.

⁶ University of Washington School of Public Health, Just Health Action, Duwamish River Cleanup Coalition. (2012). *Duwamish River Superfund Cleanup Health Impact Assessment: Scoping Summary*. Seattle: University of Washington School of Public Health.

⁷ Quigley RJ, Taylor LC. 2003. Evaluation as a key part of health impact assessment: the English experience. *Bulletin of the World Health Organization*. Vol. 81, No. 6.

⁸ Quigley RJ, Taylor LC. 2004. Evaluating Health Impact Assessment. *Public Health*. Vol. 118, pp. 544-552.

⁹ Bhatia R. 2011. *Health Impact Assessment: A Guide for Practice*. Oakland, CA: Human Impact Partners.

¹⁰ Bhatia R. Branscomb J. Farhang L. Lee M. Orenstein M. Richardson M. 2010. *Minimum Elements and Practice Standards for Health Impact Assessment*. North American HIA Practice Standards Working Group, Version 2.

¹¹ Creswell, J. (1998). *Qualitative Inquiry and Research Design*. Thousand Oaks, CA: Sage.

¹² Morgan, D., & Krueger, R. (1997). Analyzing and reporting focus group results. In *Focus Group Kit, Vol 6*. Thousand Oaks, CA: Sage.

Appendix A**Study Participant Self-Descriptive Survey Sample Questions**

Self-Descriptive Survey:**DEMOGRAPHICS**

1. What is your age?
 less than 40
 between 40 and 65
 older than 65
2. What is your gender?
 Female
 Male

ROLE WITH RESPECT TO DUWAMISH RIVER CLEANUP HIA

3. What is your role in relation to the Duwamish River Cleanup HIA (check all that are applicable)?
 HIA advisor
 Cleanup planner
 Cleanup decision-maker
 Potentially responsible for implementing Cleanup
 Regulator for effects of Cleanup
 Agency environmental justice advisor
 Resident in community adjacent to Lower Duwamish Waterway Superfund site
 Tribal member
 Non-tribal fisher in Duwamish River
 Worker in Duwamish Valley Business
4. Do you consider yourself likely to experience changes in health due to the Duwamish River Cleanup?
 Yes
 No

Appendix B

Key Informant Interview Sample Questions

Key Informant Interview

[Describe project]

This interview will take (time expected). The interview is part of a research project and is voluntary. You can choose to not answer any questions or stop the interview at any time. Are you still interested in participating in this interview (if yes, continue)?

Request to tape record interview (if OK, turn on recorder and continue; if not OK, take written notes)

Answer any questions about the project.

[complete Self-Descriptive Survey]

Key Informant Interview Schedule

[Iteratively repeat questions 1 through 4 through interview, with prompts to progressively consider different types of effects of the HIA...]

1. What changes have resulted from the Duwamish River Cleanup HIA?

(Prompts, progressively through interview:

Has the HIA changed stakeholders' understanding the Cleanup project?

Has HIA changed the inclusion and consideration of stakeholders' concerns?

Has the HIA changed the communication of information regarding the effects of the Cleanup project? the

Has the HIA affected recommendations for increasing health benefits and decreasing harms from the Cleanup in affected communities?

Has the HIA influenced decisions regarding the Cleanup?

Will the HIA change future outcomes of the Cleanup project)

[For each distinct change mentioned (e.g. "Regular people are getting the chance to have their say") complete questions 2 through 4...]

- 2. What are the benefits, if any, from (stated change)?** (e.g. "The EPA will have to listen to the regular people now, even though they were ignored before")
- 3. What are the drawbacks, if any, from (stated change)?** (e.g. "Local businesses along the River could have to pay even more for EPA's proposed Cleanup now, to address community complaints about issues that have nothing to do with the pollution in the River")
- 4. If (stated change) is different from before the HIA was conducted, how has that change occurred – or how will it occur?** (e.g. "By seeking out regular people to be on the the Resident Advisory Committee, the HIA team ensured the voices of some less powerful folks were heard.")

Appendix B

Key Informant Interview Sample Questions

[When finished discussing changes resulting from the HIA, shift to communication development]

- 5. To make sure I hear a range of different thoughts regarding the Duwamish River Cleanup HIA, I am looking for more people to participate in discussions. Are there people you would recommend that I talk to regarding the effects of the HIA?**