

## **APPENDIX A**

### **PROCEDURES FOR CONSIDERING PUBLIC SAFETY WHEN PLACING LARGE WOOD IN KING COUNTY RIVERS**

#### **I. Purpose**

The purpose of this document is to define and document procedures that the Department of Natural Resources and Parks will follow in order to:

- a. Consider public safety issues in the design of projects involving the placement of large wood in King County rivers and streams;
- b. Evaluate strategies for design of wood placements that will maximize project benefits and minimize risks to public safety; and
- c. Make available to the public the opportunity to provide input on proposed projects utilizing large wood.

#### **II. Applicability**

This procedure applies to all King County Department of Natural Resources and Parks' projects involving the placement of large wood in King County rivers and streams.

#### **III. Definitions**

- Large wood: The term "large wood" refers to downed trees, but does not include rooted, standing vegetation. (Large wood is also known as logs, large woody debris, coarse woody debris, snags, and large organic debris.)
- Large wood placement: The deliberate placement of large wood by physically depositing pieces in or near the channel, or installing them in an engineered structure, for any purpose, including flood protection, bank stabilization, mitigation, and habitat improvement or restoration.
- Public safety: Unless otherwise noted, the term public safety is used in this document to reflect the safety of members of the public and water users of the rivers and streams in King County.

#### **IV. Background and policy context**

Pacific Northwest rivers and streams have historically contained large amounts of naturally-deposited large woody materials recruited through bank erosion, channel migration and wind-throw. Wood plays a major role in channel forming and stabilizing processes, physical habitat formation, sediment and organic-matter storage and the formation of flood refuge habitat. However, during the 19<sup>th</sup> and 20<sup>th</sup> centuries, logging,

navigational improvements and flood control efforts resulted in the removal of most of the large wood from Pacific Northwest rivers, including those in King County. Moreover, logging and clearing of riparian areas has compromised the future potential for large wood recruitment.

For many reasons, it is neither possible nor desirable to return to the wood clearing practices of the past, and in fact, there are many reasons King County is actively replacing wood in its rivers and streams. At the same time, boating and other water-oriented recreation have a long history in King County. Recreational users may come into contact with the wood being placed in King County's rivers and streams. It is widely recognized that riverine water sports, including fishing, wading, swimming, boating, and floating, can involve considerable risk. The level of risk is influenced by many factors, including the recreationist's health, maturity, level of experience, skill, and judgment; the appropriateness of their vessel and associated safety equipment; river conditions, such as flow levels, depth, turbulence, velocity, temperature, and bank form; and instream elements, such as large wood, boulders, artificial structures and debris. Large wood may be a potential hazard for some recreational water users, depending on its location and positioning within the channel, as well as flow levels and decisions taken by the users themselves. On the other hand, many recreational water users recognize wood as a natural feature of the river which, while requiring caution, can enhance their experiences – for example, wood can make river trips more interesting and aesthetically pleasing and can improve fishing opportunities.

The historic removal of large wood contributed to the degradation of fish and wildlife habitat, including habitat for species currently listed as threatened or endangered under the Endangered Species Act (ESA). It has become widely understood and accepted that placing large wood in local rivers is vital to the recovery of salmonid populations (A bibliography regarding the ecological role of large wood can be found on the County website). Large wood placement is frequently included as a major component of habitat restoration projects in the Puget Sound Salmon Recovery Plan, in part to compensate for the long time-lag between riparian reforestation efforts and subsequent, natural wood recruitment. Wood placement is also often required as mitigation for habitat impacts resulting from public works projects and other human activities.

Since the early 1990s, King County has placed wood in rivers for several reasons. The County places wood in rivers to improve public safety by reducing scour and erosion through the repair and maintenance of streambank protection facilities, and frequently incorporates bioengineered bank stabilization techniques that may include installation of large wood in combination with large rock and live plant materials. The function of the wood is to interact with river sediments, deflect and slow erosive stream velocities along the banks, and provide ecological benefits. In many cases, large wood is needed to comply with permit conditions.

The County also designs and constructs projects that restore the ecological function of wetlands, streams and rivers. Wood is used to improve ecological processes that create complex, productive, self-sustaining aquatic habitats. Large wood installations are necessary for implementation of King County Council approved watershed recovery plans, particularly in the absence of mature riparian corridors that would naturally recruit

wood. The intent of wood installation in this context is to capture and stabilize sediment; absorb hydraulic energy; create geomorphic complexity, such as scour pools and gravel bars; shade and cool water; retain nutrients to support a healthy fauna; and to provide spawning, rearing and foraging habitat for anadromous salmonids as well as other fish and amphibians.

Finally, federal, state, and local regulatory agencies often require King County and other applicants to install wood as mitigation for unavoidable impacts associated with transportation and flood control projects. Regulatory agencies – such as the U.S. Army Corps of Engineers, Washington Department of Fish and Wildlife (WDFW), and the County’s Department of Development and Environmental Services – routinely require the placement of large wood in rivers as a condition for approval of permits and final project designs.

Whatever the specific purpose of a large wood placement project, any actions taken by the County must be done in a manner that is consistent with all applicable federal, state, and local policies and regulations. Examples of policies that pertain to the placement of large wood in rivers and streams and the goal of salmon recovery include:

- King County Comprehensive Plan policies E-405, E-406, E-408, E-422, E438, E-471, supporting watershed restoration and protection to support river and stream ecological processes;
- King County Council adopted salmon recovery plans for Water Resource Inventory Areas 7, 8, and 9 (King County Council Action 2005 and 2006) and Federally Approved Endangered Species Act Chinook Salmon Conservation Plan (2007);
- King County Flood Hazard Management Plan (King County Council Action 2007) policies G-3, G-9, G-10, PROJ-6, RCM-1, RCM-2, and other references.

Moreover, up to fifteen permits or environmental review processes are commonly needed for projects in unincorporated King County, including: Hydraulic Project Approval (HPA), National Environmental Policy Act, State Environmental Policy Act, Clean Water Act Section 404, Rivers and Harbors Act Section 10, Endangered Species Act Section 7, Critical Areas Ordinance, clearing and grading permits, and others. Not all permits are required for all projects. The HPA, administered by the WDFW, is the most commonly needed permit for work in rivers, streams and wetlands, and is the most frequent permit to require large wood placement to reduce or mitigate environmental impacts of a project.

It is within this policy and regulatory context that the proposed procedure addresses public safety in King County rivers. This procedure explains the steps to be taken in the design and decision-making process as it relates to public safety, and identifies specific opportunities for the incorporation of public input. The County recognizes that input from knowledgeable members of the public may help to inform the design teams in their efforts to produce projects that meet the County’s primary design objectives while minimizing risks to public safety.

As to public safety as it relates to recreational users of rivers and streams in King County, it should be noted that the decision to recreate in rivers is ultimately the responsibility of each individual. Enhancing awareness through public education and outreach – whether by the State, County, or non-governmental organizations – is perhaps the most important strategy for reducing risks for recreational river users.

## **V. Procedure for considering public safety in the development and design of capital projects that include placement of large wood in rivers and streams in King County**

### **1. Responsibility and use of the procedures**

The Department will coordinate the implementation of this procedure. This section describes the process for considering public safety in the development and design of capital projects involving the placement of large wood in King County rivers and streams. The process includes opportunities for public input. Some procedures may need to be modified or streamlined for emergency situations, such as urgent repairs to flood protection facilities. The Department will ensure that, in implementing the rules, the procedures and design options affording the greatest safety for river users shall be of primary consideration in design concerns involving a balancing of important public purposes as the county addresses safety issues in large wood emplacements and other in-stream designs.

### **2. Assess recreational uses, potential project impacts on public safety, and develop project design**

The Department's project design teams rely on sound engineering and design practices in the development of all Department projects and consider a wide range of public safety issues, including recreational safety, as well as potential flooding and erosion effects on infrastructure, neighborhoods, critical facilities, and other land uses. The responsibility for design decisions rests with the County's multi-disciplinary design teams and licensed professional engineers. All projects must be designed to meet their important underlying goals and objectives. Within the context of those goals and objectives, public safety will be of primary consideration in selecting design alternatives.

King County design teams refer to many relevant technical guidance documents in the course of project design, including but not limited to, the King County Guidelines for Bank Stabilization Projects in the Riverine Environments of King County and the State of Washington's Integrated Streambank Protection Guidelines and Stream Habitat Restoration Guidelines. Potential impacts of large wood on public safety are considered on a case-by-case basis during project development and design. Recreational use information and other stakeholder input will be sought during the conceptual design phase (up to approximately 30% design).

#### A. Conceptual (0%-30%) Design Phase

During the conceptual design phase (resulting in approximately 30% plan development), the design team assembles information and considers the design

objectives, constraints, risks (including, but not limited to, risks to public safety), and potential solutions. Analyses of alternatives may be conducted during this phase and the design team may consider a range of design options for large wood placement. By the conclusion of the conceptual design phase, each project should be developed sufficiently to describe the basic details of wood placement (e.g., number and type of installation, location, approximate size). Project managers will seek input from the public during this phase, when it can most effectively be included in design considerations. The specific mechanisms for sharing information and soliciting public input are described in detail in Section V.3 .

The following describes key steps during the conceptual design phase.

- i) In designing the placement of wood in the project, the project team will gather available information and take into account the expected type, frequency and seasonality of recreational uses as an important element in its overall consideration of impacts to public safety of the proposed project.
- ii) Consideration of public safety in the conceptual design will include but not be limited to the following factors: the location, orientation, elevation, and size of the wood placement, the method of anchoring or securing the wood placement, the degree of interaction between flowing water and the placed wood during projected flow regimes, including flows commonly experienced in the recreational seasons, and input received through the public outreach process.
- iii) In designing the specific placement of large wood, the design team will seek to maximize achievement of stated project goals and objectives while minimizing potential public safety risks, including risks to recreational users, and will seek to ensure that the procedures and design options affording the greatest safety for river users are of primary consideration in design concerns involving a balancing of important public purposes as it addresses safety issues.
- iv) Conceptual project designs will be informed by standard design practices with input from professional designers with expertise in fluvial geomorphology, ecology, river hydraulics and civil engineering with hydraulic analysis expertise.
- v) All projects that incorporate large wood in rivers and streams will undergo review and approval of engineering plans and analysis from a Licensed Professional Civil Engineer.
- vi) All projects that incorporate large wood with the stated objective of providing ecological benefits will undergo review and approval from a professional ecologist (i.e., persons with an advanced degree in aquatic and/or biological sciences from an accredited university or equivalent level of experience).

At the conclusion of the conceptual (30%) design phase, the project manager will document how public safety considerations have been addressed in the design, including why and how any impacts to recreational safety in particular can be or have already been avoided or reduced through the design of the project. Factors that will be addressed may include, as applicable, wood stability and anchoring technique; intended function of placed wood features and how they meet projects goals and objectives; expected longevity and recruitment potential; and a brief description of other design alternatives that may have been evaluated as part of an alternatives analysis.

At the conclusion of the conceptual (30%) design phase, the Department will:

- Update the project list (described in Section V.3, Public Outreach) to reflect project-specific outcomes of the conceptual design; and
- Share the updated list with the public via the procedures described below in Section V.3, Public Outreach.

If the Department determines the project is unable to successfully meet its goals and objectives while minimizing risks to public safety, it may choose to employ any of the following options:

- Work with the King County Sheriff's Office to alert river users to potential hazards using signage or other means, or to restrict use in the project area so that the project can meet its objectives while also protecting public safety; or
- Modify the project to further reduce public safety risks and concurrently implement mitigation measures (such as additional large wood placement at a comparable location in the same river reach) to fulfill the project goals and objectives; or
- Reconsider the scope of the project and whether to proceed or relocate the project, if possible, to an alternative site where objectives and public safety concerns can be fully achieved.

Not all of these options are applicable to all projects, and it will be the responsibility of the Department to make an appropriate selection.

#### B. Conceptual to Final (30%-100%) Design Phase

In this design phase, the design team will complete any remaining technical studies, refine the project design, and obtain permits.

If the Department determines that substantial changes to the large wood design have occurred during finalization of the design, as a result of permit submittals or other design factors, the Department will:

- Disseminate new design information to, and seek input from the public as appropriate.
- Update documentation of the project design and public safety considerations.

### **3. Public outreach**

Public outreach is intended to reach a broad spectrum of the community, including river user groups, environmental groups, tribes, cities and other public agencies, river residents and property owners, emergency responders and numerous others. The goal of this effort is to keep the public informed and, at the same time, allow for two-way communication between project managers and the public. The Department's public outreach effort for each project using large wood will include one or more of the following: website information, e-mail notification, and public meetings.

#### A. Development of project list/database

The Department will develop and maintain a list of projects where large wood will be or is likely to be installed in a King County river or stream. This project list will be updated every year and made available by request and via the county website or e-mail notifications. For each project, the project manager will develop the following information for use in the public outreach process:

- Brief project description, including approximate type and amounts of wood expected to be used;
- Location of project;
- Primary purpose of the project and its relative importance to the success of County programs and mandates;
- Project goals and objectives;
- Existing project site conditions;
- Type, intensity and seasonality of recreational uses, if known;
- Intended function of the wood, including identification of how wood meets project goals and objectives;
- Project status and timing of conceptual design input opportunities; and
- Timing of planned and completed project construction.

#### B. Website information or e-mail notifications

The public outreach process will make use of the King County website or e-mail notifications to the public and interested stakeholders to provide the following types of information:

- Notices of upcoming public meetings;
- Documents, including these procedures, and other pertinent policy or technical documents;
- List of pending projects that are expected to utilize large wood, and notice of opportunities to comment;

- List of completed projects;
- Contact information for project managers; and
- Other resources and information, as appropriate.

The notification process will, at a minimum, include an electronic mailing list that will be established for this purpose. Interested individuals will be able to sign up for e-mail notifications. Printed/mailed notifications may also be used.

Annual notifications will provide a copy or web link to the comprehensive project list/database.

### C. Public meetings

The department will hold two meetings every year to discuss the project list. The meetings, though similar in content and intent, will be held at different times and locations to enhance public involvement. One meeting should be held during daytime/business hours, and the other during evening hours. Department staff will describe the project list and each project's status as well as opportunities for public input. Conceptual designs for each project will be presented when available. Attendees will be invited to ask questions and engage in discussion with appropriate staff about the project list.

## **4. Monitor project outcome and apply adaptive management strategies**

- The Department will conduct post-construction monitoring to assess overall project effectiveness and safety, including relevant changes in the function, location, orientation, elevation, and size of the placed wood. The need for, and feasibility of, any maintenance or retrofitting will also be assessed, including any anticipated regulatory requirements. The scope, timeframe and schedule for post-construction monitoring will vary according to project need and availability of funding.
- Monitoring and adaptive management will be used to assess whether any new actions at the sites of large wood installations are warranted. Actions may include:
  - a. Issuing bulletins or news releases or disseminating informational materials to advise the public of the potential risks posed by placed large wood in the river; or
  - b. Signing a river or a project site as potentially hazardous and warranting particular caution, notifying the King County Sheriff's Office who may impose use restrictions, or both; or
  - c. Removing or altering the position of structural components of the placed large wood in order to further reduce any associated risk. This step may require additional regulatory review, permitting, and mitigation actions.
- The Department will provide for periodic independent monitoring and inspection of large wood emplacements by an appropriate third-party provider. This additional monitoring effort will be conducted every three years on a representative sampling of

large wood emplacement projects. Reports of such inspections shall be provided to the Department and to all King County Council members.

**5. Final Documentation**

- The Department will maintain electronic or paper records of all relevant large wood project documentation in accordance with existing local and state record-keeping requirements for project information, including documentation of public input and any resulting project modifications.