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PUBLIC REVIEW DRAFT

PROCEDURES FOR CONSIDERING RECREATIONAL SAFETY WHEN PLACING LARGE WOOD IN KING COUNTY RIVERS

I. 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 19th and 20th 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. 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 for 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 meet permit requirements to provide ecological benefits.

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

1 spawning, rearing and foraging habitat for anadromous salmonids as well as other fish
2 and amphibians.

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

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

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

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

31 It is within this conservation, policy and regulatory context that the proposed procedure
32 addresses recreational safety in King County rivers. Boating and other water-oriented
33 recreation have a long history in King County. It is widely recognized that riverine water
34 sports, including fishing, wading, swimming, boating, and floating, carry considerable
35 risk. The level of risk is influenced by many factors, including the recreationist's health,
36 maturity, level of experience, skill, and judgment; the appropriateness of their vessel and
37 associated safety equipment; river conditions, such as flow levels, depth, turbulence,
38 velocity, temperature, and bank form; and instream elements, such as large wood,
39 boulders, artificial structures and debris. Large wood may be a potential hazard for some
40 recreational water users, depending on its location and positioning within the channel, as
41 well as flow levels and decisions taken by the users themselves. On the other hand, many
42 recreational water users recognize wood as a natural feature of the river which, while

1 requiring caution, can enhance their experiences – for example, wood can make river
2 trips more interesting and aesthetically pleasing and can improve fishing opportunities.

3 The proposed procedure describes how recreational safety is taken into account during
4 the design of projects that include large wood elements. Public safety is an important
5 consideration in the design and construction of any in-water project. The responsibility
6 for design decisions rests with the County’s multi-disciplinary design teams and licensed
7 engineers, as well as agencies that regulate these activities. This procedure explains the
8 design and decision-making process as it relates to recreational safety, and identifies
9 specific opportunities for the incorporation of public input. The County recognizes that
10 input from knowledgeable members of the public may help to produce projects that meet
11 the County’s primary design objectives while reducing risks to recreational river users.

12 The decision to recreate in rivers is ultimately the responsibility of each individual.
13 Enhancing awareness through public education and outreach – whether by the State,
14 County, or non-governmental organizations – is perhaps the most important strategy for
15 reducing risks for recreational river users.

16 **II. Purpose**

17 To define and document procedures that the Department of Natural Resources and Parks
18 will follow in order to:

- 19 a. Take into account recreational safety issues in the design of projects involving
20 the placement of large wood in rivers commonly used for recreation in King
21 County; and
- 22 b. Evaluate strategies for design of wood placements that will maximize project
23 benefits and minimize risks to public safety.

24 **III. Applicability**

25 This procedure applies to projects managed by the Department of Natural Resources and
26 Parks within King County.

27 **IV. Definitions**

- 28 • Large wood: The term ‘large wood’ refers to downed trees that may be living or dead,
29 but does not include rooted, standing vegetation. (Large wood is also known as logs,
30 large woody debris, coarse woody debris, snags, and large organic debris.)
- 31 • Large wood placement: The deliberate placement of large wood, in rivers commonly
32 used for recreation, by physically depositing pieces in or near the channel, or
33 installing them in an engineered structure, for any purpose, including flood
34 protection, bank stabilization, mitigation, and habitat improvement or restoration.

- 1 • Rivers Commonly Used for Recreation: river reaches that have been identified as
2 those that are readily accessible for in-water recreational use, and are typically
3 identified as areas of high use within King County.

4 **V. Procedure for considering recreational safety in the development and**
5 **design of capital projects that include placement of large wood in**
6 **rivers commonly used for recreation**

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

8 The Department Director or the Director's designated representative will assign a lead
9 staff person (or committee of staff persons) to track and coordinate the implementation of
10 this procedure. This section describes the process for considering recreational safety in
11 the development and design of capital projects involving the placement of large wood in
12 rivers commonly used for recreation. The process includes opportunities for public input.
13 Some procedures may need to be modified or streamlined for emergency situations, such
14 as urgent repairs to flood protection facilities. With the exception of emergency projects,
15 projects that incorporate large wood placement in their design will undergo standard
16 capital project design and development phases and practices. The exact names and
17 number of phases in the design process may vary somewhat among the different capital
18 programs within the Department. However, in each case, the recommended review steps
19 to consider recreational safety shall be incorporated into that standard design process.

20 **2. Development of project list/database**

21 The Department will develop and maintain a list of rivers and river reaches commonly
22 used for recreation. The Department lead staff person (or committee of staff persons)
23 will develop and maintain a list of projects where large wood will be or is likely to be
24 installed in one of these river reaches. This project list will be updated every year and
25 made available by request and via the county website. For each project, the project
26 manager will develop the following information, once it is determined that large wood
27 will be used, (typically at project initiation but sometimes in the concept level design
28 phase):

- 29 • Brief project description and location
- 30 • Primary purpose of the project and its relative importance to the success of
31 County programs and mandates;
- 32 • Project goals and objectives;
- 33 • Existing project site conditions;
- 34 • Type, intensity and seasonality of recreational uses, if known;
- 35 • Intended function of the wood;
- 36 • Project status and timing of conceptual design input opportunities; and
- 37 • Timing of planned project construction.

1 **3. Recreational uses and project design**

2 The Department’s project design teams rely on sound engineering and design principles
3 in development of all County-sponsored projects and consider a wide range of public
4 safety issues, including recreational safety, in every project. The King County
5 Guidelines for Bank Stabilization Projects in the Riverine Environments of King County
6 and the WDFW Integrated Streambank Protection Guidelines serve as reference
7 documents for levee repair and other bank stabilization projects. Potential impacts of
8 large wood on recreational safety are considered on a case-by-case basis during several
9 phases of project development and design.

10 A. Concept-level (30%) Design Phase

11 During the concept-level design phase (resulting in approximately 30% plan
12 development), the design team assembles information and considers the design
13 objectives, constraints, risks (including, but not limited to, recreational safety
14 risks), and potential solutions. Analyses of alternatives may be conducted during
15 this phase and the design team may consider a range of design options for large
16 wood placement. By the conclusion of the concept-level design phase, each
17 project should be developed sufficiently to describe the basic details of wood
18 placement (e.g., number and type of installation, location, approximate size).
19 Project managers will seek input from the public during this phase, when it can
20 most effectively be included in design considerations. See Section V.4 for details
21 about public outreach activities.

22 The following describes key steps during the conceptual design phase.

- 23 i) For all projects located in a river commonly used for recreation, the
24 project design team will gather information on the type and level of
25 experience of recreational river users frequenting the project area.
26 Information gathered may include recreation studies, consultation with the
27 King County Sheriff’s Office, data on reported accidents involving
28 recreational river users in the area, and communication with interested
29 members of the public via the steps identified in Section V.4, Public
30 Outreach.
- 31 ii) In designing the placement of wood in the project, the project team will
32 take into account the expected type, frequency and seasonality of
33 recreational uses to determine the appropriate level of consideration given
34 to recreational concerns.
- 35 iii) Consideration of recreational safety in the conceptual design will include
36 but not be limited to the following factors: the location, orientation,
37 elevation, and size of the wood placement, and the overall degree of
38 interaction between flowing water and the placed wood during flows
39 commonly experienced in the recreational seasons.

1 iv) In designing the specific placement of large wood, the design team will
2 seek to maximize achievement of stated project goals and objectives while
3 reducing potential risks to recreational users.

4 v) Conceptual project designs will be informed by standard design practices
5 with input from professional designers with expertise in fluvial
6 geomorphology, ecology, river hydraulics and civil engineering with
7 hydraulic analysis expertise, as appropriate.

8 vi) All projects that incorporate large wood in rivers commonly used for
9 recreation will undergo review and approval of engineering plans and
10 analysis from a Licensed Professional Civil Engineer.

11 vii) All projects that incorporate large wood with the stated objective of
12 providing ecological benefits will undergo review and approval from a
13 professional ecologist (i.e., staff with an advanced degree in aquatic and/or
14 biological sciences from an accredited university).

15 At the conclusion of the concept-level design phase, the project manager will
16 document the following information:

- 17 • Wood placement location, orientation, size and shape;
- 18 • Wood stability and anchoring technique, if applicable, and whether the wood
19 is intended to remain fixed or be moveable;
- 20 • Intended functions of placed wood features (e.g., effects on bank, bed,
21 hydraulics, fish, forest, sediment, nutrients, organic matter), including whether
22 the accumulation of natural wood is an intended outcome of the project;
- 23 • Expected longevity of placed wood features;
- 24 • Design alternatives evaluated: If an alternative analysis was conducted
25 regarding placement of large wood, describe the alternatives considered and
26 the rationale for selection of the currently preferred alternative; and
- 27 • Recreational safety considerations: Describe how recreational safety
28 considerations have been addressed in design, including why and how any
29 impacts to recreational safety can be or have already been avoided or reduced
30 through the design of the project.

31 At the conclusion of the 30% design phase, the Department will update the project
32 list to reflect project-specific outcomes of the conceptual design and will share the
33 list with the public via the procedures described below in Section V.4, Public
34 Outreach.

35 If the ability to achieve project objectives is substantially compromised by design
36 changes motivated by recreational concerns, the design team may employ the
37 following options:

- 1 • Relocate project, if possible, to an alternative site where objectives can be
2 fully achieved;
- 3 • Work with the King County Sheriff to restrict recreational use in the project
4 area so that the project can meet its objectives while also protecting public
5 safety;
- 6 • Continue with project and implement additional mitigation measures (such as
7 additional large wood placement at a comparable location in the same river
8 reach) to compensate for reduced project performance.

9 B. 60 or 70% Design Phase

10 Most recreational concerns should already have been identified at the outset of the
11 60 or 70% design phase. In this design phase, the design team will complete
12 substantial technical studies, make design decisions, and develop project details.
13 During this phase, the project design team will review, evaluate, and use the input
14 received from the public during the concept-level design phase as appropriate. By
15 the completion of this phase, the public input opportunity has closed, except as
16 noted below. The project manager will summarize public comments and how
17 those issues were addressed.

18 Plans developed during this phase typically have sufficient detail to submit to
19 regulatory agencies with permit applications. Permit submittals may generate
20 additional modifications and/or mitigation requirements from regulatory agencies.
21 Regulatory agencies frequently request that large wood be included in project
22 designs before permit applications are submitted, or require wood placement to
23 mitigate adverse environmental impacts as a permit condition. These agencies
24 often require that projects be built in accordance with the design plans that were
25 submitted with the application. These requirements mean that it is difficult to
26 remove or revise wood placement after permit applications have been granted.
27 Revised designs may require additional regulatory review and approval

28 If substantial changes to the large wood design occur during the 60-70% phase,
29 the design team will:

- 30 • Disseminate new design information to and seek input from the public, as
31 appropriate, following the procedures described in Section V.4. Public
32 Outreach.
- 33 • Update documentation of the project design and recreational safety
34 considerations.

35 C. 90% Design Phase

36 Additional design details are developed during this phase. Generally most major
37 large wood decisions have occurred prior to this design phase. However, if a
38 substantial change in the use of large wood occurs at this phase for a project, the
39 design team will re-evaluate recreational safety concerns, including potentially

1 requesting additional input from the public via the mechanisms described in
2 Section V.4 below.

3 D. Final (100%)Design Phase

4 Final design decisions and details are made during this last design phase,
5 including development of 100% plans and construction specification packages, if
6 necessary. Substantial design changes, including major modifications of large
7 wood, do not occur during this phase.

8 **4. Public outreach**

9 Public outreach is intended to reach a broad spectrum of the community, including river
10 user groups, environmental groups, tribes, cities, river residents and property owners,
11 emergency responders and numerous others. The Department's public outreach effort
12 will include the following:

13 Website information and e-mail notifications

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

- 17 • Notices of upcoming public meetings and opportunities for comment on individual
18 projects;
- 19 • Documents, including these procedures, the list of rivers commonly used for
20 recreation and other pertinent policy or technical documents;
- 21 • List of pending projects that are expected to utilize large wood, and information on
22 availability of concept-level design plans;
- 23 • Contact information for project managers; and
- 24 • Other resources and information, as appropriate.

25 The notification process will at minimum include an electronic mailing list that will be
26 established for this purpose. Interested individuals will be able to sign up for e-mail
27 notifications.

28 Printed/mailed notifications may also be implemented as appropriate. The goal of this
29 effort is to keep the public informed, and, at the same time, allow for two-way
30 communication between project managers and the public.

31 Annual notifications will include a comprehensive list of all Department projects
32 (developed under Section V.3) subject to these procedures.

33 Public meetings

34 The department will hold two meetings every year to discuss the project list developed
35 under Section V.3. The meetings, though similar in content and intent, will be held at
36 different times and locations to enhance public involvement. One meeting should be held

1 during daytime/business hours, and the other during evening hours. Department staff will
2 describe the project list and each project's status as well as opportunities for public input.
3 Conceptual designs for each project will be presented when available. Attendees will be
4 invited to ask questions and engage in discussion with appropriate staff about the project
5 list.

6 **5. Public input during project design**

7 Individuals can sign up to receive email notifications on projects and opportunities for
8 public input. The most effective and timely public input occurs prior to completion of the
9 30% design phase (see Part V.3). In general, projects that have made design information
10 available for sufficient public input during concept-level design will only solicit
11 additional public input at later design phases if substantial changes in the large wood
12 element of the project have occurred. If substantial concerns about a project are raised as
13 a result of issues identified at the public meetings or upon review of information provided
14 on the internet or through e-mail notifications, interested members of the public or the
15 project team may request additional discussion with one another. In these cases, input at
16 later phases may be considered, as appropriate.

17 **6. Reporting on final design and construction of projects**

18 DNRP will update the project list to reflect the anticipated project schedule as the
19 projects move through the final design and construction phases. This information will be
20 disseminated through the King County website, email notification, or both.

21 **7. Monitor project outcome and apply adaptive management strategies**

- 22 • The Department will conduct post-construction monitoring to assess overall project
23 effectiveness and safety, including relevant changes in the function, location,
24 orientation, elevation, and size of the placed wood. The need for any maintenance or
25 retrofitting will also be assessed. The scope, timeframe and schedule for post-
26 construction monitoring will vary according to project need and availability of
27 funding.
- 28 • Monitoring and adaptive management will be used to assess whether any new actions
29 at the sites of large wood installations are warranted. Actions may include:
 - 30 a. Issuing bulletins or news releases or disseminating informational materials
31 to advise the public of the potential risks posed by placed large wood in
32 the river;
 - 33 b. Signing a river as hazardous and unsafe for recreational use, or in extreme
34 circumstances and when deemed necessary by the King County Sheriff's
35 Office, "closing" a portion of a river to recreational use; or
 - 36 c. Removing or altering the position of structural components of the placed
37 large wood in order to further reduce any associated risk.
- 38 • If a situation arises in which the King County Sheriff's Office or local jurisdiction
39 determines that life-threatening conditions may exist and an emergency response is

1 necessary, they will take appropriate steps to secure public safety. The Department
2 will work with the King County Sheriff's Office (and other local jurisdictions as
3 appropriate) to mitigate risks associated with placed large wood. Emergency
4 measures may include, but are not limited to, posting warning signs; dispatching
5 rescue personnel; placed wood repositioning or removal; or closing the river to
6 recreational use.

- 7 • The Department will work with a qualified third-party provider to monitor and
8 inspect a representative sampling of projects with placed large wood in rivers. This
9 additional monitoring effort will be conducted every three years, and the results of the
10 evaluations will be provided to the King County Council.

11 **8. Final Documentation**

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

15