

language from other western states and efforts by local jurisdictions in Washington. Of particular interest is a King County effort to address this issue. In response to a 2007 King County Council Motion, the King County Department of Natural Resources and Parks developed procedural standards and design guidelines for installing large wood in rivers and streams. On June 29, 2009, the King County Council passed an ordinance (Attachment A) requiring the adoption of these standards as rules.

Based on its research, RCO staff identified and considered various options for incorporating public safety concerns and ELJ/LWD projects funded by the board.

Analysis

Staff considered options that would best balance public safety interests with effective habitat restoration and consulted with RCO's Assistant Attorney General. Options were considered in light of factors such as:

- The potential burden of additional requirements on project sponsors and their ability to implement projects;
- The likelihood that the option would provide public safety benefits; and,
- The potential liability of the board as a funder and RCO as grant administrator of instream placement projects.

Recommended Approach

Based on staff discussion and legal review, staff is recommending the following approach, which is based upon the work of King County and its effort to address large wood placements and potential public safety issues. There are various components that could stand alone or be combined.

1. *Recommend that sponsors follow King County procedural standards.* Generally these standards are as follows. (See Attachment C for more detail.)
 - Identify projects where large wood will be installed
 - Define the primary purpose of the project and the intended function of the wood in the project
 - Develop conceptual-level design
 - Identify outreach activities appropriate for the project (e.g., activities to inform recreational water users, neighboring community, etc.)
 - Seek input on proposed design concepts and outreach activities from stakeholders
 - Consider a range of design options for large wood placement
 - Final design and permitting
 - Monitor outcome and apply adaptive management strategies
2. *Recommend that design guidelines be considered in the development of projects with large wood instream structures.*
 - These guidelines would be the relevant sections on large wood in the Washington State Stream Habitat Restoration Guidelines and/or the Washington State Integrated Streambank Protection Guidelines. (Staff does not suggest design *standards* because of the need to maintain flexibility in design and because there are not necessarily "industry" standards regarding design/engineering of ELJ/LWD projects.)

Staff recommends that this option be distributed for public comment and input so that the board can understand the perspectives of both the public and other state agencies addressing this issue¹.

Next Steps

Upon direction of the board, RCO staff will distribute the option described above for public comment. Staff will summarize any public comment and present to the board at its October 16 meeting. In October, the board may direct staff to revise the proposed procedural approaches or adopt staff recommended procedural approaches. Manual 18 would be updated accordingly for the 2010 grant round.

Attachments

- A. King County Ordinance
- B. King County, Department of Natural Resources and Parks report, *Addressing Public Safety in Placement of Large Wood in King County Waterways* (March 2008).
- C. Appendix C - King County Procedures for Consideration of Public Safety in Placement of Large Wood in Waterways.

¹ Other state agencies also are concerned with public safety and instream structures. Both the Departments of Natural Resources and Transportation are considering this issue from their perspectives. RCO staff has engaged in conversations with these agencies to gain further understanding of the issue. Any approach adopted by the SRFB will help to inform other agency discussions.

RIVER SAFETY COUNCIL

July 22, 2009

Salmon Recovery Funding Board 360 902-3086
Mr. Steve Tharinger, Chair
c/o Rebecca Connolly Rebecca.connolly@rco.wa.gov
Room 172, Natural Resources Building
1111 Washington Street SE
Olympia WA 98504

Re: LWD and public safety in river construction

Thank you for your reply to our letter regarding consideration of public safety in the design of projects constructed in rivers. We hope to have the opportunity to present this issue to your board members at your August meeting.

As you may be aware, King County has just passed Ordinance 2009-0367 requiring public safety be of primary consideration in design of large woody debris (LWD) projects planned by the King County Department of Natural Resources and Parks River Section.

This ordinance is a significant acknowledgement by King County Councilmembers familiar with the issues that some in-channel projects can create significant dangers to river users. We hope you will make the members of the Salmon Recovery Funding Board aware of this stance and take similar steps.

It has been over a year since Martha Parker of the River Safety Council made your organization aware of the danger of construction in rivers and the unfortunate death of a young woman on the Sol Duc River in a large woody debris project build by WSDOT on the outside bend of a river.

Although you have stated that the project safety review is a responsibility of the project designer, liability might attach to funders and others facilitating such projects when they are aware of the issues.

We look forward to a discussion of this issue.

Judith Phillips, Chair
River Safety Council
3405 SE 7th Street
Renton WA 98058

Enclosure: King County Ordinance 2009-0367



File #: 2009-0367, Version: 3

..title

AN ORDINANCE requiring the adoption of rules addressing procedures for establishing large wood emplacements in rivers or streams.

body

STATEMENT OF FACTS:

1. Public agencies, development and habitat restoration project proponents and private landowners have increasingly made use of large wood emplacement in recent years, as a means of enhancing fisheries and aquatic habitat values, reducing erosion and scouring to river banks, deflecting flows to minimize impacts to river banks, offsetting the impacts of development projects and protecting shorelines.
2. Public safety concerns have emerged regarding the potential hazard presented by some of these emplacements to recreational boaters, floaters and other water users.
3. Based on these concerns, the King County council directed that the department of natural resources and parks prepare a report on the circumstances associated with large wood emplacements, addressing means of mitigating against public safety hazards.
4. That report was prepared and presented to the council, noting, among other findings, certain procedural approaches to large wood emplacements that are generally observed by the department of natural resources and parks.
5. Those procedural approaches have not been adopted as administrative rules and are not readily available to the public.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

SECTION 1.

A. By March 31, 2010, the executive shall adopt rules addressing the procedures that the King County department of natural resources and parks shall follow when installing large wood emplacements in rivers or streams.

B. The rules shall require the department of natural resources and parks to:

1. Develop a conceptual design of the wood emplacement for each proposed project. The project-specific conceptual design shall address proposed location, size, shape and anchoring of the wood; whether wood recruitment, which is the intentional accumulation of wood, floating down the river, at the installed emplacement site, is proposed; whether wood is intended to remain fixed or is intended to be moveable; and how the emplacement is to function to meet project goals;

2. Include in each conceptual design a description of how public safety considerations have been incorporated into the project's design;

3. Provide timely notice by the department of natural resources and parks to recreational water users, environmental interests, the neighboring community and others indicating an interest, about a proposed project and how interested parties may comment on the conceptual design;

4. Involve interested parties, who commented on the conceptual design, in a discussion and outreach to revise and refine the wood emplacement design for a proposed project, including:

- a. identifying the type and extent of recreational use in the project area;
- b. identifying public concerns related to the conceptual design; and
- c. considering ideas for reducing or eliminating concerns regarding public safety, to the extent possible; and

5. Provide for periodic independent monitoring and inspection of large wood emplacements by an appropriate third-party provider. Reports of such inspections shall be provided to the department and to all councilmembers. Eleven copies of any inspection report made under this subsection shall be filed with the clerk of the council for distribution to councilmembers.

C. The rules shall include reference to the Guidelines for Bank Stabilization Projects in Riverine Environments in King County and the State of Washington's Integrated Streambank Protection Guidelines as the guide for project design for wood emplacements. At least every three years, the department of natural resources and parks shall convene a group of stakeholders, including but not limited to river residents, recreationalists, tribes, river boating interests, appropriate regulatory agencies, King County sheriff office representatives, and water resource inventory area representatives, to review the department's large-wood emplacement rules and update them as needed. The department shall report to the chair of the physical environment committee, or its successor, any changes to the rules resulting from this review process. Two copies of any report made under this subsection shall be filed with the clerk of the council, for distribution to the chair of the physical environment committee, or its successor.

D. The adopted rules are intended to support the department of natural resources and parks' process to evaluate various strategies for location and design of wood emplacements, to maximize project benefits and to minimize risks to public safety.

E. The rules shall apply over all rivers within the jurisdiction of the department of natural resources and parks.

F. 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.

G. The rules are supplemental to applicable provisions of the Revised Code of Washington and Washington Administrative Code.



File #: 2009-0367, Version: 3

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Report Addressing Public Safety in Placement of Large Wood in King County Waterways

March 2008



King County

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Appendix A: Agencies, Groups, and Individuals Involved in Placement of Large Wood

Appendix B: Permit and Regulatory Framework for Large Wood Placement

Appendix C: Proposed King County Procedures for Consideration of Public Safety in Placement of Large Wood in Waterways

Appendix D: King County Protocol for Responding to Reports of Naturally Occurring Large Wood in Navigable Rivers and Streams

**Report Addressing Public Safety in Placement of Large Wood in King
County Waterways**
March 1, 2008

I. INTRODUCTION

A. Purpose

On November 27, 2007, the King County Council passed Motion 2007-0622 directing the Water and Land Resources Division (WLRD) of the Department of Natural Resources and Parks (DNRP) to develop procedural and design standards addressing public safety and health concerns in the placement of large wood in the waterways of the County. The Motion specifically directed the WLRD to:

- Develop procedural and design standards regarding placement of large wood in the waterways of King County;
- Inventory all known agencies, groups, and individuals involved in design or permitting for placement of large wood in waterways of King County; and
- Summarize the current design process and regulatory framework applied within King County to large wood installations.

This report provides background and history on this subject; outlines the process used to respond to the Motion request; and delivers the findings, recommendations and products.

B. Large Wood and Public Safety of Recreational Water Users: Background

Boating and other water-oriented recreation has always been a part of King County's culture. It is widely recognized that watersports, including swimming, boating, and floating, carry considerable risk. This risk is influenced by many factors, including the person's level of experience, skill, and judgment, as well as conditions in the waterway, such as flow levels, depth, turbulence, velocity, temperature, bank form, and instream elements. One common element in a river or stream is naturally-occurring large wood. Many recreational water users consider large wood to be a potential hazard, depending on its location and positioning within the channel. One thing is certain -- flowing water can be a powerful force, and must be taken seriously by everyone involved in either the placement of instream features or recreation in and around water.

Pacific Northwest rivers and streams have historically contained large amounts of naturally-deposited large woody materials recruited through bank erosion, channel avulsion and wind-throw. This wood has played 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. Until the late 1970s, King County commonly used its flood control authority to remove fallen trees from rivers as a means of reducing possible impediments to the conveyance of floodwaters. King County has now abandoned these routine channel clearing practices due to the improved understanding of function of large wood in riverine environments and the need to focus on more effective flood hazard management actions. Despite the fact that the routine removal of large wood was abandoned decades ago, some boaters are still accustomed to the more open river and stream systems that were typical as a result of these past practices.

Today, rather than automatically removing downed trees, King County assesses the site specific conditions, and selectively cuts, relocates or removes those deemed to pose a potentially serious hazard. Accumulations of large wood are removed if these accumulations pose a direct and imminent threat to public safety, public infrastructure and developed public property, private structures or significant natural resources. Recently there were three instances in which naturally occurring large wood was removed due to threats to public safety, private property, and public infrastructure:

- In April of 2006 a large tree fell across the Green River and was dislodged so that it could be repositioned in a manner that reduced the threat to a King County levee.
- In July 2006 a naturally occurring log jam on the Middle Fork Snoqualmie River was determined to pose a significant threat to public safety and was removed.
- In January 2007 a log jam blocking a culvert on Clough Creek was causing water to overtop the banks and flood several adjacent private properties. It was dislodged and removed from the site.

For many reasons, it is not possible 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 under the Endangered Species Act (ESA). It has become widely understood and accepted that retaining, and even replacing, large wood in local rivers is vital to the recovery of threatened salmonids. Installation of constructed log structures is frequently included as a major component of habitat restoration projects in local salmon habitat recovery plans and is often required as mitigation for habitat impacts resulting from public works projects and other human activities.

As King County continues to participate in activities to construct and maintain the flood protection facilities and other essential public infrastructure and to restore threatened and endangered species, it can be expected that large wood will continue to be placed in local waterways. In light of the trend towards maintaining a greater amount of large wood in local waterways, some members of the recreational boating community have expressed concern about public safety with respect to the installed wood. Their concern has focused primarily on the untrained, occasional recreational users, who may be unaware and unprepared to respond to the potential hazards associated with large wood or other obstacles in the water.

C. Large Wood Placement: Current Practices in King County

King County has been placing large wood back into river and stream systems for a variety of purposes and functions since the early 1990s. Almost from the outset, these wood placements triggered concerns by the boating community, which led to direct interaction between the WLRD and recreational community and ultimately the development of both formal and informal practices to address recreational safety issues in project design. These practices have worked successfully to obtain public input and address safety concerns at numerous projects throughout King County's major river and stream systems. To date, no fatalities or injuries have been reported as a result of large wood placed in King County's projects. In the testimony to the Council on this Motion, the recreational representatives applauded the outreach efforts of King County to date, citing the recent placement of large wood in the Green River's Briscoe Levee and South 228th Street repair projects completed this past summer. However, while these practices are widely used within King County's WLRD, they are not necessarily uniformly implemented across all Departments within King County, and they do not apply to external project proponents. The recreational stakeholder representatives have expressed the desire to see these types of practices expanded to all projects, both public and private, throughout King County.

One of the tools guiding current practice is the Guidelines for Bank Stabilization Projects in Riverine Environments of King County (Guidelines) approved in June 1993. These guidelines were developed by the WLRD River and Floodplain Management Program to assist scientists and engineers with the design of bank stabilization projects for river and streambank protection. The Guidelines document contemporary methodologies for evaluating alternative solutions in the design and construction of flood protection facilities to improve performance for flood protection, improve consistency with regional habitat restoration efforts, and meet present-day permit requirements. The Guidelines promote the use of bioengineered bank stabilization techniques, which often include installation of large wood in combination with large rock and live plant materials. The function of the wood is to deflect and slow erosive stream velocities along the slope toe and banks and to mitigate the environmental impacts of the facilities themselves. The Guidelines have been widely referenced across the County and beyond, as they represented a model of newer design concepts at the time it was published.

In response to major floods in 1990, 1995 and 1996 the WLRD's River and Floodplain Management Unit (RFMU) embarked on an ambitious program to repair many damaged flood protection facilities based on design concepts from the Guidelines. In 1995, the RFMU was approached by recreational water users, who expressed concern about potential impacts to recreational safety as a result of large wood installations at the Elliott Levee Setback and Repair Project on the Cedar River. This began a positive dialogue that continues to this day, between County staff and members of the recreational community, to share information about proposed large wood placements, explore safety concerns, and seek ways to minimize risk. This coordination was made more formal in 1997, when, in an appeal by a recreational river user to the County's programmatic State Environmental Policy Act (SEPA) Environmental Checklist for routine maintenance and repair of its flood protection facilities, the King County Hearing Examiner determined that public safety for recreational users should be a specific consideration in the design of river management projects. This led to formation of an ad hoc Boater Safety

Advisory Committee, comprised of boaters and community representatives. This committee convened annually to review new project design concepts and provide input from a safety perspective throughout the course of the repairs from the major floods of the 1990s. The structure and membership of this group has evolved, but a core group of representatives remains engaged in this process.

King County Department of Transportation (DOT) typically places wood in a different manner and for other purposes. The DOT (Road Services Division, Metro Transit Division, and Transportation Planning Office) installs wood as mitigation for unavoidable impacts associated with transportation projects and maintenance activities. The DOT has in place a number of formal and informal processes to notify the general public regarding proposed projects and actions. This includes conducting public outreach as required under the National and State Environmental Policy Acts (NEPA and SEPA), maintenance of web pages that provide notification and information on current projects, public meetings, and posting of a community outreach calendar. In addition, project teams may select to incorporate additional outreach through informational mailings, surveys or open house forums. These additional mechanisms are utilized on a case-by-case basis depending upon the issues and identified stakeholders.

In addition to those programs, the WLRD Capital Projects Program constructs projects that restore ecological function to wetlands, streams, and – less frequently – rivers. Wood is used to improve ecological processes that create complex, productive habitats that are self-sustaining, as is necessary for implementation of approved watershed recovery plans. As such, wood is installed to capture and stabilize sediment, absorb hydraulic energy, create geomorphic complexity such as scour and plunge pools and gravel bars, shade and cool water, recruit food species and other nutrients, and provide refuge areas for fish. Wood is also prescribed by regulatory agencies to mitigate the impacts of construction in and near water. These projects are typically constructed to mimic natural conditions by allowing an element of dynamic response to environmental forces over time. To reflect these potential changes, designs are analyzed for possible long-term impacts to infrastructure, natural areas, and hydraulic response, as well as to recreational safety, for some distance up- and downstream.

Safety considerations of County designers now routinely include the location, position, and anchoring technique for wood placed within the water corridor; depth, velocity, and direction of flow; backwater impacts on property and infrastructure; and the type and extent of recreational use in the project area. Projects proponents consider the suggestions and concerns provided through stakeholder input and can make project revisions or modifications prior to drafting the project designs for permit submittals. Over time, a shared understanding has begun to emerge between project designers and boaters, and the County's initial designs concepts have started to reflect careful consideration of safety concerns from the outset.

II. APPROACH USED TO RESPOND TO THE MOTION

A. Stakeholder Identification and Information Gathering

Outreach was conducted to identify entities and individuals from federal, state, and local agencies, tribes, engineering associations, conservation groups, and recreational groups who

design, permit or are affected by large wood placements. This broad-based group of representatives and individuals was invited to participate as stakeholders to help inform the response to all aspects of this Motion. These interests are described in greater detail in the Findings Section of this report, and a representative summary is a product of this report and is found in Appendix A.

Stakeholders were sent a questionnaire that asked them to describe their current role in design, construction or permitting of projects placing large wood in King County's rivers and streams. This information was critical to defining current practices and identifying some of the issues of concern for stakeholders. This information is described further in the Findings Section of this report, and portions are also summarized and provided as a product in Appendix B.

B. Stakeholder Involvement in Developing the Response to the Motion

To initiate the conversation among stakeholders, WLRD staff developed a preliminary list of key issues. This list was an assemblage of a multitude of perspectives, expressed through the Motion and both formal and informal conversations with stakeholders, on the subject of large wood and public safety. A stakeholder workshop was hosted on January 25, 2008, to engage in a discussion of the issues and how they might be addressed through proposed solutions and potential recommendations in this report. As part of this workshop, participants reviewed the list of issues and identified the key statements with which they either agreed or disagreed. Through this exercise, strong agreement emerged about the need for clear and transparent decision-making processes for large wood management, as well as the importance of river safety education and training. Areas of disagreement include the relative weight of safety versus ecological function in large wood projects, whether wood should be considered an integral element of flood protection and bank stabilization, whether recreation in running waters is an inherently risky activity, and what level of risk is considered acceptable. Central to this workshop was a detailed stakeholder review of a preliminary draft of the procedural standards, requested by this Motion, for addressing public safety in future project designs. The other major element of the workshop was a presentation on the current permit process for large wood installation projects in King County.

III. FINDINGS

The challenge of balancing flood risk reduction, natural resource protection and restoration of endangered species with public uses of waterways is a common dilemma that extends well beyond King County. Preliminary research on this topic, including a limited review of how other jurisdictions handle the issue of boater safety in and around large wood, reveals that there is no uniform or standardized approach. This research indicates that King County is highly proactive with respect to how it works with the recreational community to address their concerns in a balanced and meaningful way.

Within King County, one of the most notable findings is the fact that almost anyone that owns property or has land management authority or access along a river or stream may apply for permits to place large wood in a waterway. Further, existing permit and regulatory authorities do not explicitly require the consideration of potential recreational safety impacts of large wood placements.

Projects sponsored by the King County WLRD benefit from the procedures that have been used since the mid 1990s, where recreational user input is sought during the design phase of projects that intend to place large wood. However, this procedure is not documented, nor is it uniformly implemented across all Departments. This leaves a lot of uncertainty for both project proponents and the recreational community.

Education, outreach, regulation and advocacy targeted toward passive water recreation activities appears to possibly be an area of unmet need, but because the major waterways span county jurisdictions, may need to be addressed at both the State and local levels. There is no single public agency that serves as an advocate for non-motorized recreational water users and their issues. The State does have boating programs, but it does not appear to provide comprehensive coverage, either educational or regulatory, for non-motorized boating and floating safety in natural river systems. The King County Sheriff's Office has an educational outreach program in the elementary schools, but does not extend to middle or high schools where kids may be more likely to engage in unsupervised water-oriented activities. A number of non-profit groups also provide education and outreach in the schools, but again, it is not uniformly conducted throughout the region.

A. Agencies, Groups, and Individuals Involved in the Placement of Large Wood in Waterways

A broad range of people have an interest in the placement of large wood in King County's waterways, including individual landowners, community groups, non-profit organizations, professional associations, recreational groups, conservation groups, and public agencies at all levels of government. **Appendix A: Agencies, Groups, and Individuals Involved in Placement of Large Wood**, lists those persons or groups involved in placement of large wood in identified recreational waterways in King County, and categorizes their involvement. A representative cross-section of all these interests was intended in the composition of the stakeholder group. Their positions and interests are equally wide-ranging, and there is not a single consensus opinion on how best to manage wood in our river systems. Stakeholders do agree, however, on the importance of both public safety and healthy riverine ecosystems. The agreement provides the foundation for the recommendations in this report.

B. Summary of Existing Permit, Procedural, and Regulatory Framework

Placement of large wood may be a primary element of a project's design, or it may be done as an element of permit compliance to mitigate for environmental impacts of a project with different primary objectives. Projects using large wood as a design feature in King County waterways often require an extensive permit or regulatory review process. These reviews are authorized and directed by adopted policies, codes, and regulations and local, state, and

federal levels. For the most part, permit review is directed toward protection of environmental resources or adjacent land uses. Overall review of a project's impact on recreational use is very limited. There is language in the regulatory purpose sections of the King County Department of Development and Environmental Services (DDES) permitting regulations that calls for protection of public health and safety. However, none of the permit reviews at the local, state, or federal levels provide specific conditions or criteria to evaluate safety as it relates to water-oriented recreation; this is generally considered to be the responsibility of the project proponent. A summary table of permits, procedural, and regulatory authorities governing large wood placement is attached in **Appendix B: Permit and Regulatory Framework for Large Wood Placement**.

Within King County, DDES reviews and approves building permits, clearing and grading permits and shoreline approvals where large wood may be installed, including habitat restoration or enhancement projects; construction and maintenance of slope stabilization and other flood protection projects; compensatory mitigation for road crossings and culvert replacements; compensatory mitigation for other alterations of critical areas; and emergency work.

Conditions placed on these permits may require consistency with other programs and permit authorities, including County regulations; Washington Administrative Code (WAC); Washington State Integrated Streambank Protection Guidelines; and the Guidelines for Bank Stabilization Projects in Riverine Environments in King County. Permit conditions may also require adherence to specific terms and conditions, including construction methods, materials, and schedule; Best Management Practices for erosion and sediment controls; limitations on work in or near water; removal of sediment and debris from the site; inspections; notifications; compensatory mitigation including planting plans, monitoring and maintenance schedule; and coordination with the Washington State Department of Fish and Wildlife and the U.S. Army Corps of Engineers.

Despite the rigor of the permitting process, there are only two regulatory permit processes applicable to projects in King County where recreational use is addressed in the review. Neither of these permits is issued at the local level. These are the State Environmental Policy Act (SEPA) review and the U.S. Army Corps of Engineers permit under the authority of Section 10 of the Rivers and Harbors Act, which applies to some types of work in navigable waters of the U.S.

SEPA compliance is generally required for larger or more complex projects in Washington, such as those undertaken by public agencies. A SEPA review requires public notification about the proposed project, and allows for a review and comment period. The SEPA analysis considers potential effects of the project on whether existing recreational uses would be displaced and the project proponent may need to consider measures to reduce adverse impacts; however, the analysis does not specifically address recreational safety. The language in the SEPA checklist is fairly limited with respect to the issues raised by this Motion. Nonetheless, it is a tool available to recreational users who wish to review, comment on, or challenge the analysis of potential environmental impacts of the proposed project.

While the SEPA review can be a useful tool for consideration of recreational safety, it is not performed for all projects. Private projects, for example, are often at a scale that is below the threshold for requiring SEPA compliance. Without an opportunity for public notice and comment, designers of some small or private projects may not be aware of the safety concerns of recreational users. The careful planning and placement of the wood that might be done in a County-sponsored project, based on agreed upon procedures to coordinate with recreational users in the design phase, does not necessarily apply to private projects.

In fact, some County-sponsored projects with large wood may not be required to go through SEPA review because the project is exempt, or may be reviewed only at a broader or programmatic level and thus forego site-specific review. Many of the smaller habitat restoration projects are eligible for a SEPA exemption. When the project proponent is a public agency, that agency is usually also the SEPA lead agency, and can elect to do additional, project-specific SEPA review. The WLRD has, on occasion, elected to provide additional SEPA review for a project which was otherwise eligible for an exemption, specifically to provide greater opportunity for public input.

Section 10 of the federal Rivers and Harbors Act prohibits the obstruction or alteration of navigable waters of the United States without a permit from the U.S. Army Corps of Engineers. Placement of large wood waterward of the Ordinary High Water Mark in navigable waters may also be reviewed under Section 10.

C. Permit and Procedural Standards Used in Other Jurisdictions

King County conducted a limited review of the large wood management policies, procedures, protocols, and boater safety considerations of a number of other public agencies. Large wood management policies generally focus on retaining wood for bank stabilization and habitat purposes. Removal or modification of large wood, where allowed, is considered a last resort, and is only then considered if it can be shown that the wood increases risk to public infrastructure, private property, or is causing a fish migration barrier. None of the agencies surveyed had provisions to consider risk to recreational river users in their management policies, nor did they include formal or informal notification and outreach to the recreational boating community. In the few cases where recreational river use is explicitly recognized, actions are limited to placement of signage to identify potential hazards, public comment during the permit process (i.e. NEPA and SEPA equivalents), selection of appropriate anchoring techniques for the large wood, or protocols for responding to 'unusual situations or emergencies'.

IV. PROPOSED PROCEDURAL AND DESIGN STANDARDS

The Motion directs the development of procedural and design standards to address public health and safety concerns in the placement of large wood in waterways. A number of engineering "design standards" (a term that carries a specific meaning in the field of

engineering) or guidelines already exist to direct work in and around river and stream systems. King County proposes approval of a set of formal procedural standards (described further in subsection B and attached in Appendix C) and evaluation of existing County design guidelines for possible amendments or updates to give full consideration to impacts on public safety and health, and to minimizing hazards to recreational water users from the placement of large wood in waterways.

These procedural standards will document a methodology for design of large wood placements that will provide a clear and transparent means for dialogue and engagement in the design process. In contrast, design standards are detailed proscriptions intended to produce identical outcomes each time, regardless of application or circumstance. The rigidity of design standards leaves little room for flexibility, innovation, or consideration of site-specific conditions. Such standards are suitable for constructed features such as buildings and roads. Rivers and streams, by comparison, are unique, ever-changing, and difficult to control. Projects implementing King County's salmon recovery efforts, for example, will increasingly rely on improving the ecological condition of mainstem rivers and large tributaries in a manner that fosters dynamic, self-sustaining channel processes.

Design *guidelines* are preferable to design *standards* for directing the design of future wood placement projects that will simultaneously meet the objectives of recreational safety, salmon recovery, flood hazard management, and mitigation efforts. Future projects could be hampered by overly rigid proscriptions on wood placement. The many important functions of County government may be impeded by unintended consequences which can emerge from the application of simple –seemingly, logical rules – to highly complex and variable problems. For these reasons, design guidelines are the recommended mechanism for 1) maintaining project effectiveness; 2) preserving options; 3) providing full consideration to impacts to public safety and health; and 4) minimizing hazards to recreational water users from the placement of large wood in waterways.

The Motion spells out six points to explicitly be addressed. The following section highlights how each of these points is addressed through this response.

1. How such woody debris can be placed such as to minimize hazards to recreational water users

The proposed procedural standards address this need by encouraging project proponents to solicit feedback on the conceptual project design and planned outreach activities from a panel of stakeholders that includes recreational water users. Stakeholders are asked to describe known recreational uses of the project area and their concerns about how large wood is proposed to be placed (number, size, shape, location). Stakeholders are also asked for input on outreach activities intended to inform recreational water users and the neighboring community about the proposed project and water safety awareness. Project proponents ultimately select a preferred project design that seeks to strike an acceptable balance between project effectiveness and risk minimization. It is recognized that there is a strong likelihood that not all projects will be successful in finding a design that is fully embraced by all

stakeholders. However, the process for considering public safety will be fully documented and transparent.

2. Avoiding placement of such woody debris in narrow channels or canyons where opportunity for egress by recreational water users is limited

The procedural standards state that project proponents should identify suitable locations for wood placement, based on both quantitative and qualitative factors, including performance criteria, environmental context (channel morphology, hydrology, and existing riparian conditions), and stakeholder input on public safety issues. Wood does occur, and can play important roles in trapping gravels and dissipating energy in smaller stream systems that may have narrow channels or canyons. However, for projects mimicking natural and dynamic river processes, wood would rarely be placed in narrow channels or canyons of gravel-bedded mainstem rivers and large tributaries, such as those typically used by novice recreational water users. This is because large wood is typically flushed from narrow channels and canyons (or 'transport reaches') and is therefore naturally scarce. Large wood is more commonly located in depositional areas such as: shallows, island heads, point bars, and immediately downstream of eroding outer banks of meanders. In these locations, wood can form pools and side channels, aid in channel migration, and create protected areas for vegetation establishment. Further, it is anticipated that stakeholders' input would identify areas where narrow channels or canyons are hazardous locations to place wood. The project proponents could then decide to construct a portage (landward detour) or to abandon the project if an acceptable design solution could not be found.

3. Minimizing the chances that recreational water users may be swept into overhanging roots or limbs of woody debris

The proposed procedural standards require that project proponents provide stakeholders an opportunity to provide input on how large wood is proposed to be placed, including approximate number, size, shape, location(s), and anchoring technique(if any). Stakeholders can provide suggestions on how to modify proposed large wood structures to minimize the potential risks to recreational water users from overhanging roots or limbs. Suggestions are incorporated into the design where appropriate.

4. Minimizing the opportunity for entrapment of recreational water users in large woody debris, through entanglement of arms or legs, or through the action of the debris as a "sieve" against which a water user can be caught

The proposed procedural standards help project proponents identify suitable locations and designs for wood placement, based on both quantitative and qualitative factors, including performance criteria, environmental context (channel morphology, hydrology, and existing riparian conditions). Stakeholder input will be sought to identify design elements that pose an unacceptable risk to safety, and will be invited to offer suggestions for design modifications to minimize the opportunity for entrapment or entanglement. These suggestions will be used to inform the selection of the final project design.

5. Minimizing placement of such woody debris where the action of the water current may push a water recreationist into the debris, such as on the outside edge of a bend in a river

Large wood placements for habitat improvement are not commonly sited on the outside edge of river bends. This is because restoration projects typically mimic natural distribution patterns by placing wood in natural depositional areas such as: shallows, island heads, point bars, and immediately downstream from eroding banks on the outside of channel meanders. However, the outside bend of a river is often where the fastest portion of the flow is directed, leading to bank erosion and channel migration. Where this occurs, wood is often used in projects to deflect the erosive flows that impinge against flood protection facilities, public infrastructure, and protected land uses such as agriculture, and private residences. Wood is not only incorporated in these structures as a structural element of bank protection, but is also a way to mitigate for the detrimental effects of arresting the natural process of channel migration. As a result, the location of bank stabilization and repairs is often along outside bends. Therefore, while completely avoiding work in these areas by King County is not possible, projects to protect our shorelines can often be done in a manner that minimizes risk. For example, logs can be aligned along the bank parallel to flow; rootwad ends can be tucked in behind blunt ends that act as "bumpers" for floaters, or large rock can be integrated into the design – all methods that have successfully been used by King County in recent years.

6. How interested recreational water safety groups can be involved in commenting upon division plans for projects involving the placement of such woody debris

The procedural guidelines state that a forum or panel of representatives should be convened for a presentation and open discussion to serve several functions:

- 1) To identify the type and extent of formal and informal recreational use in the project area;
- 2) To identify specific public safety concerns related to the conceptual design; and
- 3) To discuss ideas for reducing or eliminating public safety concerns, and ideas for placement location and design, as well as outreach activities.

A. Design Guidelines

The Guidelines for Bank Stabilization Projects in the Riverine Environments in King County (Guidelines, 1993) and the Washington State Integrated Streambank Protection Guidelines (ISPG, 2003) are existing locally developed and relevant manuals that provide guidance in the design of in-water projects. Rather than producing a new set of design standards, King County WLRD will update the Guidelines to improve its effectiveness in addressing public safety. The currently adopted Guidelines can be found at <http://dnr.metrokc.gov/wlr/biostabl/>.

B. Proposed Procedural Standards

Testimony heard from the public in support of the Motion applauded and supported the County's existing practices to address boater safety. It was stated that the coordination with water users that has been underway in King County for more than a decade has helped provide a means for dialogue and feedback during project design and has made projects safer. One of the primary intents of this Motion is to formalize those practices. The proposed **King County Procedures for Consideration of Public Safety in Placement of Large Wood in Waterways** is included as an attachment in **Appendix C** of this document.

These proposed procedural standards address all King County projects where large wood is proposed to be placed in identified recreational waterways, including the major river systems and their tributaries. These procedural standards are not intended to be applied to drainage ditches, wetlands or smaller tributaries. The identified recreational waterways include:

River Section	River Miles and Reach Description	Approx. River Miles
South Fork, Skykomish River	County Line to Foss River Camp	9
North Fork, Snoqualmie River	RM 0 to Sunday Creek; RM 16	16
Middle Fork, Snoqualmie River	Falls at RM 41 to Taylor River; RM 65	24
South Fork, Snoqualmie River	RM 0 to Twin Falls State Park; RM 11	11
Lower Snoqualmie River	RM 0 to Snoqualmie Falls; RM 40	40
North Fork, Tolt River	RM 0 to above Yellow Creek; RM 15	15
South Fork, Tolt River	RM 0 to Dam; RM 8	8
Raging River	RM 0 to State Route 18; RM 8)	8
Sammamish River	Lake Washington to Lake Sammamish	14
Cedar River	RM 0 to Landsburg Dam; RM 21	21
Green River	RM 0 to Tacoma Headworks; RM 61	61
Miller River	Skykomish R. to confluence of East and West Forks	6
Greenwater River	White River confluence to Burns Creek	12
White River	County Line to Greenwater River	55
		300 total

These proposed procedural standards (**Appendix C**) are not intended to address naturally occurring wood, as its location and position cannot be controlled, but rather, managed. Naturally occurring wood will be managed under the procedures that are already documented and in place. Those procedures involve coordination between WLRD, resource agencies, and the King County Sheriff's Office in evaluating risk, identifying possible solutions, and

implementing actions. The procedures for responding to naturally occurring wood are attached in **Appendix D**.

The timeframe of applicability for these proposed large wood placement procedures includes the design and construction phase, as well as a monitoring phase that includes, at a minimum, the permit monitoring period for the log installation elements of the project.

This proposed procedural standard was developed to reflect what is already working and to improve on it where possible. This standard covers all projects where King County is directly involved in the placement of large wood in any section of identified recreational waterway. This coverage includes all areas within unincorporated King county, as well as those project located in cities for which the County is project participant. It does not, however, apply to projects solely designed and built in the cities' jurisdictions.

V. RECOMMENDATIONS

Findings all indicate that much of what is currently being done is working well. However, there is room for improvement and clarification. These recommendations are intended to formalize what is working, improve practices where possible, increase transparency, and give some certainty to both project designers and the public.

Based on the research conducted by staff, an assessment of County policies and practices, the results of the stakeholder workshop, and the additional input received from agencies and other stakeholders, the following recommendations are proposed to address the issues raised by this Motion.

Recommendation #1: The King County Department of Natural Resources and Parks (DNRP) and Department of Transportation (DOT) should immediately adopt, and update as needed, the proposed procedural standards to notify and seek input from stakeholders and to include full consideration of public safety issues in design and construction of all County-sponsored projects proposing placement of large wood in identified recreational waterways.

Recommendation #2: The King County WLRD should conduct a thorough review and update of its Guidelines for Bank Stabilization Projects in the Riverine Environments in King County to direct the consideration of public safety in the design and construction of future bank stabilization projects countywide. A scoping product, including a review of the existing Guidelines, identification of update needs, preparation of an updated outline for the Guidelines, and a detailed work program and schedule for completion of the update would be completed by June 30, 2008. A target for the draft product would be completed by December of this year, and the final updated document by June 2009.

Recommendation #3: The King County DDES should require that all project proponents assess and document consideration of recreational safety issues in projects which place wood in identified recreational waterways in unincorporated King County.

Recommendation #4: King County DDES should establish a policy requiring that any project authorized as an emergency measure be selected from an approved menu of action alternatives. DDES should develop a menu of actions alternatives that would minimize the adverse impacts on critical areas and public recreational safety. These actions are only intended to provide temporary relief and protection until the project providing a longer term solution can proceed through regular permit review. Policy amendments along with a limited menu of actions would be completed by June 30, 2008, and the full menu of action alternatives would be developed by September 30, 2008.

Recommendation #5: King County should promote increased awareness about the location of installed wood projects and river safety principles. This may include, but is not limited to: installing temporary or permanent informational signage at project sites, where appropriate; posting information on the DNRP web pages that provides descriptions, maps, and photographs of project sites; and supporting educational campaigns, sponsored by the Sheriff's Office and other organizations, in local schools and communities. This effort should be ongoing.

VI. CONCLUSIONS

King County is committed to providing many public benefits and services, including construction and maintenance of the public infrastructure; protection and restoration natural resources and ecosystems; recovery of endangered species; and provision of public safety. It is the responsibility of the County to seek ways to meet each of these obligations and to find mutually beneficial solutions.

The increased importance of placing large wood in local waterways is apparent in many public works projects. Wood is integral to fish and wildlife habitat restoration, flood protection facility design; and even road and bridge construction. However, members of the recreational boating community have expressed concern about the potential for large wood, depending on how it is placed, to heighten the risks inherent in water-oriented recreational activities. Therefore, it is essential that the County be very deliberate in how we place wood, so that we build structures that provide a reasonable measure of public safety. Implementation of a clear and transparent methodology for consideration of public safety issues in the design of future projects involving large wood placement is one of the most powerful tools for achieving the projects' desired functional outcomes and public safety. Further, adoption of a clear protocol will provide a level of certainty to both project proponents and recreational users.

Members of the recreational boating community have also requested assistance in finding ways to employ greater consideration of public safety issues in projects sponsored by other agencies as well as private individuals within King County. One way to reduce the likelihood that private projects would inadvertently create a hazardous situation is for King County to modify its permit authorities or policies to better inform and guide the designs alternatives and design considerations used by private project proponents.

Based on the success we have had to date in working collaboratively with the recreational community to improve recreational safety in the vicinity of the County's in-water projects, we can be confident that formally adopting the recommendations in this report will further enhance public safety and promote constructive dialogue in implementing the County's many important projects.

**Report Addressing Public Safety in Placement of Large Wood in King
County Waterways – List of Appendices**

Appendix A: Agencies, Groups, and Individuals Involved in Placement of Large Wood

Appendix B: Permit and Regulatory Framework for Large Wood Placement

Appendix C: Proposed King County Procedures for Consideration of Public Safety in
Placement of Large Wood in Waterways

Appendix D: King County Protocol for Responding to Reports of Naturally Occurring
Large Wood in Navigable Rivers and Streams

APPENDIX C

KING COUNTY PROCEDURES FOR CONSIDERATION OF PUBLIC SAFETY IN PLACEMENT OF LARGE WOOD (LW) IN WATERWAYS

I. PURPOSE:

- To define and document procedural standards that address public safety issues in the design of projects involving the placement of large wood in identified recreational waterways (rivers and streams) in King County.
- To define and document procedural standards that give full consideration to impacts on public safety and health and to minimizing hazards to recreational water users or property.

II. ORGANIZATIONS AFFECTED:

This procedure applies to all departments and divisions within King County.

III. DEFINITIONS

- **Large wood (LW):** Downed or fallen trunks and limbs ≥ 1 m in length and ≥ 10 cm in diameter, as well as rootwads. Large wood may be living or dead, but does not include rooted, standing vegetation. (Large wood is also known as large woody debris, coarse woody debris, snags, and large organic debris.)
- **Large wood placement:** The *direct human action* of adding large wood to rivers by physically depositing pieces in or near the river, or by installing them in an engineered structure, for any purpose, including flood protection, bank stabilization, mitigation, and habitat improvement or restoration.
- **Large wood recruitment:** The *natural action* of adding new pieces of large wood to the river as a whole, or to a specific location in the river. This action results from the delivery of large wood from: 1) forests by tree death and toppling, bank undercutting, wind-throw and breakage, avalanches, and/or landslides; and 2) upstream reaches via transport by water and subsequent trapping by shoals and bars, boulders, trees, and other channel obstructions. Recruitment may be the *indirect result of human actions* (for example, removal of channel constraints and riparian tree plantings) that restore those natural processes.
- **Identified recreational waterways:** Waterways or waterway segments that are used for water-oriented recreation in King County. These include the accessible portions of mainstem rivers and large tributaries, including:
 - South Fork Skykomish River, County Line to Foss River Camp

- North Fork Snoqualmie River, Mouth to Sunday Creek (RM 16)
- Middle Fork Snoqualmie River, Snoqualmie Falls (RM 41) to Taylor River (RM 65)
- South Fork Snoqualmie River, Mouth to Twin Falls State Park (RM 11)
- Lower Snoqualmie River, Mouth to Snoqualmie Falls (RM 40)
- North Fork Tolt River, Mouth to above Yellow Creek (RM 15)
- South Fork Tolt River, Mouth to Dam (RM 8)
- Raging River, Mouth to State Route 18 (RM 8)
- Sammamish River, Lake Washington to Lake Sammamish
- Cedar River, Mouth to Landsburg Dam (RM 21)
- Green River, Mouth to Tacoma Headworks (RM 61)
- Miller River, Skykomish River to confluence of East and West Forks
- Greenwater River, White River confluence to Burns Creek
- White River, County Line to Greenwater River

NEW PROCEDURAL STANDARDS FOR PLACING LARGE WOOD

1. Identify projects where LW will be installed

Each affected Department will designate a lead staff or workgroup to track and coordinate the process for consideration of public safety in projects involving large wood installations.

2. Define the primary purpose of the project and the intended function of the wood in the project

Large wood is installed for a wide range of purposes, and the project design will need to reflect the intended goals and objectives.

- Define goals and objectives for LW placement (e.g., bank stabilization, instream habitat improvement, restoration of natural river and floodplain processes).
- Describe existing project site conditions.
- Describe the intended function of the wood, and how it is intended to affect the existing site conditions.
- Define the context of the proposed project within County program objectives and mandates.
- Determine and describe the significance of the project within the full set of possible projects intended to meet the project's specific goal or objective.

3. Develop conceptual-level project design

A project concept will need to be developed sufficiently to describe how large wood is likely to be placed or deposited within the project area. Draft placement locations and designs should be informed by professional expertise in fluvial

geomorphology, ecology, and engineering as well as public safety considerations. Factors to consider relative to public safety include flow velocity, depth, and direction; wood location, configuration, and anchoring techniques; common recreational uses of the site; backwater flood impacts; and potential impacts on public infrastructure.

- Describe or show how large wood is proposed to be placed in the project, including approximate size, shape, location(s), and anchoring technique(s).
- Describe if large wood recruitment is an objective of the project, and if so, how.
- Describe if the wood is expected to remain fixed, or be dynamic (moveable).
- Describe how the wood is expected to function to meet the project's stated goals and objectives.
- Describe how public safety considerations have been addressed in the design to date.

4. Identify outreach activities appropriate for the project

- Identify project activities that will inform recreational water users, environmental interests, and the neighboring community about the proposed project.
- Describe ongoing or proposed activities that will promote an increased understanding and awareness about water safety within the community.

5. Seek input on proposed design concepts and outreach activities from stakeholders

Representatives from established stakeholder groups should be invited to provide feedback on the proposed project, to identify public safety concerns, if any, and to share ideas for improvements.

- Establish a forum to involve interested stakeholders in a presentation and open discussion on the design and outreach concepts with an emphasis on public safety.
- Identify the type and extent of formal and informal recreational use in the project area.
- Identify specific public safety concerns related to the conceptual design.
- Discuss ideas for reducing or eliminating public safety concerns. These should include ideas for placement location and design, as well as outreach activities.

6. Consider a range of design options for large wood placement

- Project proponents will evaluate various strategies for location and design of wood placement seeking to maximize project benefits and minimize risks to public safety. Large wood placement locations and designs will be proposed based on both quantitative and qualitative factors, including performance criteria (e.g., function, lifespan, and stability), environmental context (channel morphology, hydrology, and existing riparian conditions), permit requirements and legal constraints, and stakeholder input on public safety issues.
- Select a preferred project design option, seeking to strike an acceptable balance between project effectiveness and risk minimization. However, it is recognized that not all projects will be successful in finding a design that is acceptable to all stakeholders.
- Document the design selection process.
- Report findings, conclusions, and preferred project recommendations back to the stakeholder group.

7. Final Design and Permitting

- Complete the permit set of the design plans and apply for all applicable federal, state, and local permits.
- Modify project design plans, as necessary, to meet permit conditions and requirements.

8. Monitor outcome and apply adaptive management strategies

- Post construction monitoring will be conducted per permit requirements to detect major structural changes or failure, to evaluate project conditions and effectiveness relative to projected outcomes and performance criteria, and to assess the need for maintenance or retrofitting.
- Monitoring will also attempt to identify unacceptable risks to public safety due to changes over time.
- Monitoring and adaptive management will be used to assess the need for new actions to avoid unreasonable risks to public safety. Actions may include:
 - a. Removing or altering the position or structural components of the LW in order to change the nature of the risk;
 - b. Issuing bulletins or news releases or disseminating informational materials to advise the public of the potential risks of the LW in the waterway; or
 - c. Signing a waterway as hazardous and unsafe for recreational use or, in extreme circumstances, "closing" a portion of a waterway to recreational use.
- If a situation arises, which the King County Sheriff's Office or local jurisdiction determines may be life-threatening and requires an emergency

response, they will take appropriate steps to secure public safety. King County Sheriff's Office (or other local jurisdiction) will work with King County WLR Division, River and Floodplain Management Unit to mitigate risks. Emergency measures may include, but are not limited to, dispatching rescue personnel, altering the position of the wood, or closing the waterway to recreational use until the emergency situation can be addressed. Emergency actions do not require prior permit approval, but may require subsequent mitigation actions.

9. Final Documentation

- Project proponents will retain documentation of stakeholder involvement and input.
- The Department will maintain electronic or paper records of all LW project documentation.