

# skellengerbender

ATTORNEYS

## UNDERSTANDING THE LEGAL RISKS ASSOCIATED WITH DESIGN AND CONSTRUCTION OF ENGINEERED LOGJAMS

By  
Beth M. Andrus  
James L. Gessford, P.E.

### I. Introduction

Engineered logjams (ELJs) are a relatively new alternative to traditional bank stabilization methods. Artificial logjams are being designed and installed in streams and rivers to provide multiple ecological and hydraulic benefits, including: (1) improving and restoring aquatic and riparian habitat; (2) providing erosion control; (3) providing flood and grade control; and (4) increasing sediment retention within a channel reach and/or river system. ELJs are designed and constructed as permanent additions to a channel and focus on protecting infrastructure while restoring the natural environment.<sup>1</sup> ELJs have been described as an “emerging technology based upon the premise of applying rigorous scientific and engineering principles to the design and construction of structures to protect infrastructure in a manner that emulates natural systems.”<sup>2</sup>

Until recently, the use of large wood to restore habitat was confined to streams, but today ELJs are being used in high energy, large river environments with increasing frequency. Experts predict that this novel approach of combining the “hard” and “soft” sciences will become increasingly popular as a means of providing communities with a cheaper and greener alternative

<sup>1</sup> Jill Treuttel, *Engineered Logjams: Salvation for Salmon*, SEATTLE DAILY JOURNAL OF COMMERCE, July 17, 2003.

<sup>2</sup> CARL WARD, ENGINEERED LOGJAMS: AN ALTERNATIVE BANK-PROTECTION METHOD FOR US 101 ALONG THE HOH RIVER, WASHINGTON, Abstract (2005).

for flood control and stream restoration projects.<sup>3</sup> The anticipated increase in the use of ELJs underscores the need for a set of design and construction standards to mitigate the inherent risks these structures can create for infrastructure and human stream users. While design and construction standards are being developed to address the concerns expressed by owners, project sponsors, and insurers relating to this new technology, engineers participating in the process should understand both the legal framework under which such work will be performed and risks that can arise in this emerging area of work.

This white paper explores the risks associated with engineered logjams, ~~existing legal doctrines that govern liability for such structures,~~ and some recommended risk mitigation measures.

## **II. Risks Associated with Engineered Logjams**

### **A. Occupational Health and Safety Issues**

ELJs are built in the riverine environment. In addition to the occupational health and safety risks inherent in construction generally, working in or around rivers and streams presents a number of water hazards, including deep and swiftly moving water; steep, slippery and unstable slopes; and underwater obstacles such as rocks, trees and debris. Engineers, scientists, and contractors involved in the on-site installation of ELJs need to be aware of the risk of injury or drowning that they or their employees will face if working in or around rivers and streams. In Washington, all employers owe their employees a duty to ensure their safety in any location to which those employees are sent to perform work. RCW 49.17.060(1). Design firms sending employees in the field during construction of an ELJ should adopt an appropriate site safety plan.

Generally, design professionals are immune from suit by third parties injured during a construction project as long as (1) the design professional has not contractually assumed

---

<sup>3</sup> See *Engineering Logjams*, TECHNOLOGY NEWS, Apr. 6, 2005.

responsibility for site safety and (2) the design professional has not in fact assumed control of the construction site and the means and methods being employed by a contractor or his subcontractors. RCW 51.24.035.

Given that designers of ELJs may work very closely with a contractor in the field, it will be important for the design professional to make it clear, through a contractual disclaimer, and with written notice to the contractor, that the design firm has no responsibility for site safety for anyone other than the firm's own employees and that the owner and contractor need to determine what precautions need to be taken to avoid injury during the construction of an ELJ.

#### **B. Hazard to River Users or Children**

ELJs pose safety hazards to river recreationists such as kayakers, rafters, swimmers, and fishermen. By design, ELJs involve the placement of large logs in and adjacent to streambanks, often with their rootwads intact. ELJs, even those that are properly designed and constructed, can capture a recreational user who is unaware of the underwater snag and unable to see it. The risk of an ELJ "snagging" or "pinning" an unsuspecting kayaker, swimmer or fisherman, or puncturing a raft or inner tube is especially great in fast moving rivers or streams.

Similarly, children, inquisitive by nature, and unable to appreciate the inherent risks posed by an ELJ, are likely to be drawn to a pile of wood or to debris sticking out of the water. Both inviting and dangerous, ELJs present an irresistible risk to the curious child who is exploring the river for a place to play.

#### **C. Flooding**

ELJs have the potential to increase the roughness of the channel, constrict the channel cross-section through the reach where they are placed, and cause water to back up behind the structure. These effects, either individually or cumulative, can lead to flooding upstream of the ELJ.

**D. ~~Structural Failure and Subsequent Damage to Infrastructure and~~  
~~Downstream Property~~**

Improperly anchored ELJs and/or the woody debris that the ELJ is designed to collect are susceptible to being dislodged during large storm events. The dislodged material can subsequently become hung up on or block culverts or bridge openings, and cause pier and abutment scour, channel evulsion, or bridge overtopping. Furthermore, the floating debris has the potential to collide into and cause damage to downstream property, including streambanks, irrigation diversions, storm drainage outfalls, docks, and other bank protection projects.

**E. Erosion**

ELJs, even those that are properly designed and constructed, will likely result in channel adjustments upstream and downstream of the ELJ structure. Channel erosion can cause the channel grade to become steeper over time, increasing the velocity of the channel and exacerbating many of the previously identified risks of ELJs. Erosion of adjacent streambanks can result in adjacent landowners losing portions of their land. Sediment deposition in response to modified channel hydraulics also can produce shifts in channel position and grade.

**III. Legal Doctrines and Statutes Applicable to Engineered Logjams**

Because of the risks that ELJs pose to human health and safety, infrastructure, and stream channels and banks, they pose unique liability issues for the individual engineers that design them, for firms that design ELJ structures, and for design firms that lead projects in which ELJs are designed by others. Streambank stabilization and channel restoration work is often only one aspect of a multi-faceted design project such as a culvert or bridge replacement, channel realignment, drainage channel outfall, or roadway embankment. Streambank stabilization and channel restoration work, including the design of ELJs, is now frequently completed by an unlicensed scientist, rather than a registered professional engineer.

What qualifications should an ELJ designer possess? Who can stamp an ELJ design? What analyses should be performed prior to placing logs in a river? What notices of hazards should be posted? What is the risk of legal liability if an ELJ causes physical injury or property damage? These questions can be answered, at least in part, by existing Washington statutes and common law.

#### A. Recreational Use Immunity Statute

Under RCW 4.24.210, Washington's recreational use immunity statute, landowners are generally immune from liability to recreational users of rivers, lakes and streams:

(1) Except as otherwise provided in subsection (3) or (4) of this section, any public or private landowners or others in lawful possession and control of any lands whether designated resource, rural, or urban, or water areas or channels and lands adjacent to such areas or channels, who allow members of the public to use them for the purposes of outdoor recreation, which term includes, but is not limited to, . . . *fishing*, camping, picnicking, *swimming*, hiking, . . . clam digging, . . . *boating*, nature study, winter or *water sports*, viewing or enjoying historical, archaeological, scenic, or *scientific sites*, without charging a fee of any kind therefore, shall not be liable for *unintentional* injuries to such users.

(2) Except as otherwise provided in subsection (3) or (4) of this section, any public or private landowner or others in lawful possession and control of any lands whether rural or urban, or water areas or channels and lands adjacent to such areas or channels, who offer or allow such land to be used for purposes of a *fish or wildlife cooperative project*, or allow access to such land for cleanup of litter or other solid waste, shall not be liable for unintentional injuries to any volunteer group or to any other users. . . .<sup>4</sup>

The purpose of the recreational use immunity statute is “to encourage owners of land or others in lawful possession and control of land and water areas or channels to make them available to the public for recreational purposes by limiting their liability toward persons entering thereon and toward persons who may be injured or otherwise damaged by the acts or omissions of persons entering thereon.”<sup>5</sup> To this end, “the recreational use immunity statute

---

<sup>4</sup> RCW 4.24.210 (emphasis added).

<sup>5</sup> RCW 4.24.200.

changed the common law by altering the entrant's status from that of a trespasser, licensee, or invitee to a new statutory classification of recreational user."<sup>6</sup>

While the grant of immunity is relatively broad, a landowner will remain liable for injuries caused by "known dangerous artificial latent conditions" unless he posts a notice to warn recreational users of the hazard. RCW 4.24.210(4) provides:

Nothing in this section shall prevent the liability of a landowner or others in lawful possession and control for injuries sustained to users by reason of a *known dangerous artificial latent condition* for which warning signs have not been conspicuously posted. . . . *Nothing in RCW 4.24.200 and this section limits or expands in any way the doctrine of attractive nuisance. . . .*

(Emphasis added). The exception to immunity is triggered when all of the requisite elements – *known, dangerous, artificial* and *latent* – are present in the alleged injury-causing condition.<sup>7</sup>

"Each of the elements modifies the term 'condition,' not one another."<sup>8</sup> The landowner's duty to post a sign warning of the potential danger arises when all of these elements are present.<sup>9</sup>

### 1. Known Condition

For purposes of the statute, "known" refers to landowner's actual, as opposed to constructive, knowledge that a dangerous artificial latent condition exists.<sup>10</sup> Obviously, if a landowner retains an engineer to design an ELJ, that landowner will have actual knowledge of its presence.

### 2. Dangerous Condition

In the absence of a statutory definition, a condition that poses an unreasonable risk of harm is "dangerous."<sup>11</sup> In *Cultee v. City of Tacoma*, the Washington Court of Appeals found that "water moving in and over the property, combined with uneven, eroding roads" was a dangerous

<sup>6</sup> *Davis v. State*, 102 Wn.App. 177, 184, 6 P.3d 1191 (2000), *aff'd*, 144 Wn.2d 612, 30 P.3d 460 (2001).

<sup>7</sup> *Davis*, 102 Wn.App. at 185 (citing *Tabak v. State*, 73 Wn.App. 691, 695, 870 P.2d 1014 (1994) (emphasis added)).

<sup>8</sup> *Id.* (citing *Ravenscroft v. Washington Water Power Co.*, 136 Wn.2d 911, 920, 969 P.2d 75 (1998)).

<sup>9</sup> *Ravenscroft*, 136 Wn.2d at 920.

<sup>10</sup> See *Cultee v. City of Tacoma*, 95 Wn.App. 505, 517, 977 P.2d 15 (1999).

<sup>11</sup> *Gaeta v. Seattle City Light*, 54 Wn.App. 603, 609, 774 P.2d 1255 (1989).

condition.<sup>12</sup> It is thus likely that an ELJ will be viewed by our courts as a dangerous condition.

### 3. Artificial Condition

An undefined term in a statute should be given its plain and ordinary meaning unless a contrary legislative intent is indicated,<sup>13</sup> and the dictionary defines “artificial” as “humanly contrived often on a natural model; man-made.”<sup>14</sup> In *Ravenscroft v. Washington Power Co.*, the Supreme Court of Washington found that a power company created an artificial condition when it cut down trees, left stumps near the middle of the river and then raised the river to a level that concealed the stumps because the condition was created by human effort, not by natural causes.<sup>15</sup> An ELJ, a man-made structure, will probably qualify as an “artificial” condition under the statute.

### 4. Latent Condition

The term “latent,” within the meaning of the recreational use immunity statute, means not readily apparent to the recreational user.<sup>16</sup> To fall within the exception to the recreational use immunity statute, the condition itself, and not simply the danger it poses, must be latent.<sup>17</sup> In *Van Dinter v. City of Kennewick*, the Supreme Court of Washington found that the danger posed by antennae sticking out from the head of a five foot high metal caterpillar-shaped climbing toy was obvious, and as a result the city was immunized from liability with respect to injuries suffered by a park user who struck the antennae.<sup>18</sup> There are no reported cases addressing whether an ELJ will be deemed a “latent” condition for purposes of the recreational use immunity statute. Common sense, however, suggests that a concealed or partially concealed ELJ will be considered a latent condition by courts when this issue is ultimately considered.

---

<sup>12</sup> *Culte*, 95 Wn.App. at 519.

<sup>13</sup> *Ravenscroft*, 136 Wn.2d at 920-21 (citing *Cowiche Canyon Conservancy v. Bosley*, 118 Wn.2d 801, 813, 828 P.2d 549 (1992)).

<sup>14</sup> See Merriam Webster’s Online Dictionary, available at <http://www.m-w.com/dictionary>.

<sup>15</sup> *Ravenscroft*, 136 Wn.2d at 923-24.

<sup>16</sup> *Van Dinter v. City of Kennewick*, 121 Wn.2d 38, 45, 846 P.2d 522 (1993).

<sup>17</sup> *Chamberlain v. Dept. of Transp.*, 79 Wn.App. 212, 901 P.2d 344 (1995).

<sup>18</sup> *Van Dinter*, 121 Wn.2d at 48.

The recreational use immunity statute, by its language, only directly covers landowners or people with control of the land involved. It may thus not extend to designers hired by the landowner. However, if the landowner is sued after an injury, the designer faces the risk of a claim by the landowner of negligence in the design of the ELJ. For that reason, the designer will want to take steps to ensure that the landowner does not lose his immunity. One sensible way to mitigate the risk is for the designer to contractually require the owner to post and to maintain the "conspicuous" signs warning of the hazards that the ELJ presents as required by the recreational use immunity statute. The design firm should also consider requiring a specific indemnification from the owner for any claims in the event the warning signs are not posted or properly maintained for as long as the ELJ remains in the river or stream.

#### **B. Attractive Nuisance Doctrine**

Ordinarily, a property owner has no duty to safeguard trespassers from harm. However, many courts, including the Supreme Court of Washington, have carved out an exception for "attractive nuisances," commonly defined as inherently dangerous objects or conditions that can be expected to attract the attention of children who are unable to appreciate the risks they pose. Landowners have been held liable under the attractive nuisance doctrine for injuries children have sustained while playing in or on abandoned cars, swimming pools, trampolines, construction equipment, and piles of dirt and other construction materials. Under the doctrine, the landowner is expected to exercise a heightened standard of care and assumes a duty to take extra precautions to protect against the normal behavior of young, inquisitive children.

In Washington state, application of the attractive nuisance rule requires that: (1) the condition must be dangerous in itself; (2) the condition must be attractive and alluring, or enticing, to young children; (3) an injured child was incapable, by reason of her youth, of comprehending the danger; (4) on the day of an injury, the condition was left unguarded and



exposed in a place where children are accustomed to or reasonably expected to be; and, (5) it was reasonably practicable and feasible to prevent the child's access to the condition, or for the owner to render it innocuous, *without obstructing any reasonable purpose or use for which it was intended*.<sup>19</sup>

Depending on where it is installed, the first four requisite factors could be met by a child injured while playing on an ELJ. ELJs are designed to snag woody debris and sediment and as such involve the placement of large logs underwater where they might also easily snag children who are swimming, floating, fishing or playing in or along the river. However, the fifth factor should protect property owners from liability for bodily injuries sustained by children playing on or around an ELJ. The only way to render an ELJ innocuous would be to remove the logs from the river, which would in turn eliminate the very purpose for which the ELJ was intended. There may be ways to limit access to an ELJ site. This issue should be evaluated during the design phase to determine if a feasible and cost effective approach exists. If access restrictions are not possible, then conspicuous signs warning of the danger would again be prudent. Again, the goal should be to ensure that the attractive nuisance doctrine provides a property owner (and by extension the designer working for the property owner) with a defense to liability for an injury or death to a child.

### **C. Common Enemy Doctrine**

The common enemy doctrine has governed Washington surface water law since 1896 and the case of *Cass v. Dicks*.<sup>20</sup> In its strictest form, the common enemy doctrine allows property owners to dispose of unwanted surface water in any manner they see fit without incurring liability for damaging a neighbor's property. The rationale for the doctrine is that surface water

---

<sup>19</sup> See *Ochampaugh v. City of Seattle*, 91 Wn.2d 514, 518, 588 P.2d 1351 (1979) (citing leading case of *Schock v. Ringling Bros. and Barnum & Bailey Combined Shows*, 5 Wn.2d 599, 105 P.2d 838 (1940)) (emphasis added).

<sup>20</sup> 14 Wash. 753 (1896).

is an enemy against which any landowner can defend himself.<sup>21</sup>

In order to avoid the inequities associated with a strict application of the doctrine, the Supreme Court has adopted several exceptions to the rule.<sup>22</sup> The first exception to the rule is that landowners may not inhibit the flow of a watercourse or a natural drainway.<sup>23</sup> A property owner, or the engineer working for the owner, could arguably be held liable under the first exception to the common enemy doctrine for damage to upstream or downstream property caused by the construction of an ELJ. A downstream property owner could argue that the ELJ inhibited the flow of the stream or river by redirecting the flow, causing a loss of marketable land. An adjacent property owner could argue that the ELJ created a backwater or a diversion that caused flooding resulting in the loss of land.

The second exception to the rule is that landowners may not collect waters and channel them onto their neighbor's lands in quantities greater than or in a manner different from the natural flow.<sup>24</sup> This exception appears inapplicable here unless the ELJ is constructed in conjunction with other structures, such as a dam or weir, which could cause the collection and channeling of water onto a neighbor's land.

In *Currens v. Sleek*,<sup>25</sup> the Supreme Court of Washington joined most jurisdictions that follow the common enemy doctrine by adding a third exception. Under this exception, landowners are free to alter the flow of surface water provided they exercise good faith and avoid unnecessary damage to adjacent property owners.<sup>26</sup> An impacted landowner could arguably assert a claim under the third exception if he could show that the party who constructed the ELJ, or its engineer, failed to exercise good faith to avoid unnecessary damage to his property. This

---

<sup>21</sup> See *Id.*

<sup>22</sup> See *Currens v. Sleek*, 138 Wn.2d 858, 861-62, 983 P.2d 626 (1999).

<sup>23</sup> See *id.* at 862. See also *Island County v. Mackie*, 36 Wn. App. 385, 388, 675 P.2d 607 (1984).

<sup>24</sup> See *id.* See also *Wilber Dev. Corp. v. Les Rowland Constr. Inc.*, 83 Wn.2d 871, 875, 523 P.2d 186 (1974).

<sup>25</sup> 138 Wn.2d 858, 983 P.2d 626 (1999).

<sup>26</sup> See *Id.* at 863.

suggests that the designer should evaluate the potential upstream and downstream impacts of an ELJ during the design process and look for alternatives that will avoid “unnecessary” property damage.

Designers and owners should assume that any new flooding or water damage that could result from an ELJ can give rise to a claim. The best protection is to undertake “worst case” hydraulic modeling to identify potential flooding issues and to evaluate design options for mitigating the risks.

#### **IV. Recommended Risk Mitigation Measures**

Based on the current legal framework in Washington, we suggest the following recommendations:

1. Determine what WISHA regulations govern worker safety when you have engineers or other employees working in the riverine environment. Establish site safety protocols for the specific area in which work is being conducted and monitor compliance by your employees;
2. Include language in plans and specs warning construction workers of hazards associated with working in or near deep and fast moving water and on steep, slippery and unstable slopes;
3. Recommend that clients post and maintain conspicuous warning signs identifying the presence of an ELJ, its location, and the specific hazards the ELJ presents to recreational users of the river or include the signage in the design documents and position the signs in a location where a recreational user is likely to see it;
4. Provide opportunities for recreational users to get out of the water and portage around the ELJ;
5. Recommend that the client distribute pamphlets to nearby residents warning of the danger to children posed by ELJs;
6. Conduct hydrologic and hydraulic analyses of the river system to analyze the impact of ELJs for multiple flood events and recommend measures to mitigate the impacts, including cumulative impacts, of installing one or more ELJs on the river or stream;
7. Conduct geotechnical, structural and corrosion analyses on the channel banks, streambed, logs, cables, anchors, chains, pilings, and other structural elements of the ELJ to determine the forces acting on the individual components, the structure as a whole and the channel banks and bed under multiple loading conditions;

8. Recommend that the client monitor the channel, banks and habitat to ensure that the ELJs are performing as designed;
9. Recommend that the client perform routine maintenance on the ELJs, including replacing, adjusting and removing damaged, malfunctioning or deteriorated components, particularly following storm events equal to or greater in magnitude than the design storm event;
10. Inform clients and owners that ELJs are not necessarily "permanent," that they will gradually deteriorate with age, and that they may not withstand all major flood events;
11. Do not stamp or sign ELJ design documents that were not completed under your responsible charge and that are not backed up with sufficient analyses to demonstrate that the design will not lead to unnecessary upstream and downstream property damage; and
12. Ask the owner for appropriate indemnification protection in design services agreements, especially for claims relating to an owners failure to post and maintain the warning signs envisioned by the recreational use immunity statute.