



# The Water Report™

*Water Rights, Water Quality & Water Solutions in the West*

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## WATER QUALITY STANDARDS & FISH CONSUMPTION

EFFORTS IN THE PACIFIC NORTHWEST TO ADOPT MORE STRINGENT WATER QUALITY STANDARDS  
BASED ON HIGHER FISH CONSUMPTION RATES

by Michael Campbell, Stoel Rives LLP (Portland, OR)

### Introduction

Fish consumption rates are used to derive water quality standards for the protection of human health from toxic substances. Because consuming more fish increases the exposure to toxics in the fish, higher fish consumption rates require lower (i.e., more stringent) water quality standards to provide the same level of protection. Oregon, like many states, followed the US Environmental Protection Agency’s (EPA’s) recommendation in basing its standards on a default fish consumption rate of 17.5 grams per day (about three-fifths of an ounce). Although this rate represents the national 90th percentile adult consumption of freshwater and estuarine fish and shellfish, tribal governments in particular argued that the standards inadequately protected their members, who consume much more fish. After years of controversy, Oregon in 2011 revised its standards to reflect a fish consumption rate of 175 grams per day (a little more than 6 ounces per day or 2.7 pounds per week) — ten times the national rate and currently the highest statewide rate in the nation. Now, Washington and Idaho, whose currently effective standards are based on a fish consumption rate of only 6.5 grams per day (less than a quarter of an ounce) are under pressure to revise their standards.

Proponents of the use of higher fish consumption rates say the increases are needed to adequately protect tribal members, sport fishers, and others who consume or would consume relatively large amounts of fish and shellfish. However, municipal wastewater treatment plant operators, industries, and others whose wastewater discharges would be required to meet more stringent water quality standards are concerned that standards based on fish consumption rates approaching or exceeding those used by Oregon would be too expensive and perhaps impossible to meet. Moreover, they assert that more stringent controls on their discharges will have little effect on water quality because most sources of toxic pollutants are either legally or practically unregulated. These unregulated sources include natural concentrations of metals (e.g., arsenic), pollutants transported from outside the state through interstate and international air deposition (e.g., mercury), and legacy contaminants that are now ubiquitous in the environment (e.g., polychlorinated biphenyls (PCBs)).

This article describes: (1) the legal and technical context of the fish consumption rate debate; (2) Oregon’s decision to use a much higher rate, as well as its three years of experience with standards based on that rate; and (3) Washington’s and Idaho’s current efforts to consider a higher rate. The fish consumption rate issue has absorbed much of the attention of state environmental agencies, EPA, tribal governments, municipal and industrial associations, and environmental advocacy organizations for several years.

## CWA & Fish Consumption

### Doubtful Results

### Revisions Process

### Water Quality Standards

### Designated Uses

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Whether more stringent water quality standards based on the use of higher fish consumption rates will have the crippling economic effects that many municipalities and industries fear remains to be seen. It is unlikely, however, that more stringent standards will result in the significant water quality and human health improvements that proponents hope for. Except for perhaps a few waterbodies in the Pacific Northwest, it is doubtful whether the sources that will be required to comply with more stringent standards contribute enough to existing concentrations of toxic pollutants for further controls to make a significant difference. To achieve substantial reductions in toxic pollutant concentrations in most waterbodies, measures other than more stringent water quality standards will be needed.

### Water Quality Standards under the Clean Water Act

The federal Clean Water Act (CWA) requires states to adopt and periodically review and revise water quality standards. Whenever a state revises its water quality standards by adopting, modifying, or repealing a standard, it must submit the revised standard to EPA for approval. If EPA approves the standard, it becomes the effective standard for purposes of the CWA. If EPA disapproves the standard, the state must revise the standard to address EPA's objections. If the state fails to do that, or if EPA otherwise determines that a state standard must be revised to meet the requirements of the CWA, EPA must promulgate a revised standard for the state. A state may adopt a water quality standard that is more stringent, but not less stringent, than the CWA requires. Therefore, EPA may not disapprove a state standard because it is too stringent.

Water quality standards principally consist of two elements: (1) the designated uses of a waterbody; and (2) water quality criteria to protect those uses. (Water quality standards must also include an "antidegradation policy" to limit the circumstances under which existing water quality may be allowed to degrade. States may also choose to include in their standards, subject to EPA approval, regulations affecting their application and implementation, such as provisions for "mixing zones" and variances.) Typical use designations include "fish and aquatic life," recreation, fishing, drinking water, and irrigation. Although states have some discretion in designating the uses for their waters, use designations must "serve the purposes of" the CWA. These purposes include "the protection and propagation of fish, shellfish, and wildlife" and "recreation in and on the water." In addition, EPA's regulations require a state to designate any use that is "actually being attained" in a waterbody and prohibit the removal of any designated use that is an "existing use," i.e., a use "actually attained" in a waterbody on or after November 28, 1975.

States must include in their standards water quality criteria that are sufficient to "protect" the designated uses of a waterbody — including the "most sensitive" designated use — regardless of whether the waterbody is actually used for the designated use. For example, if the designated uses of a waterbody include "drinking water," the water quality criteria for the waterbody must be sufficient to protect the waterbody's use as a drinking water source even if no one actually uses the waterbody for drinking water. Water quality "criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use[s]." 40 C.F.R. § 131.11(a). Apart from certain toxic pollutants (for which states must establish numeric criteria), the criteria may be expressed either as numeric criteria or as "narrative" criteria. Numeric criteria apply to specific pollutants or specific water characteristics — e.g., inorganic arsenic (a pollutant) may not exceed a concentration of 2.1 micrograms per liter; pH (a water characteristic) may not be outside the range of 6.5 to 8.5 units. Narrative criteria prohibit more broadly stated conditions (e.g., "Toxic substances may not be introduced...in waters of the state in amounts, concentrations, or combinations that may be harmful...[to] public health, safety, or welfare or aquatic life, wildlife, or other designated beneficial uses," Or. Admin. Rule 340-041-0033(2)).

Neither the CWA nor EPA's regulations specify the degree to which water quality criteria must "protect" designated uses. EPA, however, issues and periodically updates recommended water quality criteria based on relatively detailed methodologies that EPA has developed for protecting various designated uses. These methodologies involve a number of technical and policy decisions regarding the level of protection needed. Although EPA's recommended criteria and the methodologies used to derive them are not legally binding, states generally will rely on them when adopting their water quality criteria because they typically lack the resources to develop or scientifically justify other methods and criteria.

### Deriving Water Quality Criteria for Toxic Substances

#### EPA'S METHODOLOGY FOR THE PROTECTION OF HUMAN HEALTH FROM TOXIC EXPOSURE

Waterbodies that are designated for uses that may involve human exposure to toxic substances in the water — such as drinking water, fishing, and recreation — must have water quality criteria sufficient to protect human health from such exposures. EPA has developed a methodology for deriving these criteria. EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health* (2000). The methodology treats carcinogens somewhat differently than non-carcinogens. It also generates different recommended criteria for protection from exposure through, on the one hand, both drinking

## CWA & Fish Consumption

### Criteria Methodology

water and consuming fish and shellfish, and, on the other hand, from exposure through consuming fish and shellfish alone. The latter criteria are appropriate for saltwater and other waters for which drinking water is not a designated use.

EPA's methodology for deriving recommended human health criteria for carcinogens can be described in the following simplified equations:

For carcinogens, the equation is:

$$WQC = [BW * RF] \div [CPF * (DI + (FI * BAF))]$$

For non-carcinogens, the equation is:

$$WQC = [RfD * RSC * BW] \div [DI + (FI * BAF)]$$

Where:

WQC = recommended water quality criterion (milligrams per liter (mg/L))

BW = body weight (kilograms (kg))

RF = risk factor (e.g.,  $10^{-6}$  (1 in 1,000,000))

CPF = cancer potency factor (a measure of toxicity) (mg/kg/day)

DI = drinking water intake rate (liters per day (L/d))

FI = fish (and shellfish) intake rate (kg/d)

BAF = bioaccumulation factor (a measure of the degree to which substances in a waterbody accumulate in fish and shellfish; a higher BAF will result in higher exposure to a toxic through eating fish and shellfish, and therefore a lower recommended water quality criterion) (L/kg)

RfD = reference dose (a measure of toxicity) (mg/kg/day)

RSC = relative source contribution (%)

Increasing any factor to the left of the division symbol in the equation will increase the recommended water quality criterion, i.e., make it less stringent; increasing any factor to the right of the division symbol will decrease the recommended water quality criterion, i.e., make it more stringent.

For both equations, body weight (BW) is to the left of the division symbol, and drinking water intake (DI) and fish intake (FI) are to the right. Thus, the higher the assumed body weight used in the calculation, the less stringent the recommended water quality criterion will be. Similarly, the higher the assumed drinking water and fish intake rates used in the calculation, the more stringent the recommended water quality criterion will be. EPA's 2000 methodology recommends default values of 70 kg (about 154 pounds) for body weight and 2 liters per day for drinking water intake. For fish intake, it recommends a default rate of 17.5 grams per day for the general population and 142.4 grams per day (about 5 ounces) for subsistence fishers (for criteria intended to protect subsistence fishers directly, rather than indirectly through protecting the population as a whole). These values are only recommended default values. States may, if they have sufficient data or other scientific justification, use other values when developing their human health water quality criteria. Moreover, where EPA believes that the default values are inconsistent with available information and would result in insufficiently protective criteria, EPA may disapprove state water quality criteria that are based on the default values.

EPA has recently proposed to replace its recommended body weight, drinking water intake, and fish intake values with the following values: a body weight of 80 kg (about 176 pounds, the mean weight for adults); a drinking water intake of 3 liters per day (about 3.4 quarts, the 90th percentile rate from all sources for adults); and a fish consumption rate for the general population of 22 grams per day (about three-quarters of an ounce, the 90th percentile national adult consumption rate for freshwater and estuarine fish and shellfish). The higher recommended body weight would increase the recommended criteria, but this would be offset by the higher recommended drinking water and fish intake rates, which would decrease the recommended criteria.

Other factors in the equations play equally or more significant roles in determining the resulting criteria. For carcinogens, EPA assumes that there is no "safe" level and that the risk posed to humans is linearly related to exposure — e.g., doubling the exposure doubles the risk. The toxicity of a carcinogen is expressed by the "cancer potency factor" (CPF) — the higher the CPF, the lower the recommended criterion will be. Because there is assumed to be no "safe level" of a carcinogen, the recommended water quality criterion is intended to reduce the incremental increase in cancer risk from drinking water and consuming fish and shellfish to an acceptable level. The incremental risk is expressed in the criteria equation by the risk factor (RF), which is the predicted increase in lifetime cancer risk from exposure to the carcinogen through drinking water and consuming fish and shellfish in waters protected by the CWA. The risk factor is to the left of the division symbol in the equation, and so the application of a higher risk factor, such as  $10^{-5}$  (1 in 100,000) in lieu of  $10^{-6}$  (1 in 1,000,000), results in a less stringent criterion. EPA's 2000 methodology states that a risk factor of  $10^{-6}$  or  $10^{-5}$  would be acceptable for the general population, provided that highly exposed populations would be protected at least at a  $10^{-4}$  (1 in 10,000) risk level.

### EPA Default Values

### Recent EPA Proposal

### Risk Factors



## CWA & Fish Consumption

### General v. Highly Exposed Population

### Non- Carcinogens

### "Point Source" Discharges

### Municipal Stormwater

For example, suppose the fish consumption rate of the general population is 10 grams per day and that this rate is used to derive the human health water quality criterion. If the fish consumption rate for a highly exposed population were 100 grams per day, EPA's methodology would allow the risk level used in the equation to be  $10^{-5}$ . This would protect the general population at a risk level of  $10^{-5}$  and protect the highly exposed population at a risk level of approximately  $10^{-4}$ , assuming that the fish consumption rate were the only difference in the exposure of the two populations. But if the fish consumption rate of the highly exposed population were 1000 grams per day, setting the risk level for the general population at  $10^{-5}$  would result in a risk level of more than  $10^{-4}$  for the highly exposed population, which EPA would find unacceptable. The unacceptable risk for the highly exposed population could be remedied in one of two ways: (1) the risk level for the general population could be reduced to  $10^{-6}$ , which would reduce the risk level for the highly exposed population to approximately an acceptable  $10^{-4}$ ; or (2) the 1000 gram per day fish consumption rate for the highly exposed population could be used in the equation instead of the rate for the general population, and the risk factor in the equation could be set at a risk level of  $10^{-4}$  or lower, such as  $10^{-5}$  or  $10^{-6}$ . In this example, if the 1000 gram per day fish consumption rate of the highly exposed population were used in the equation together with a  $10^{-6}$  risk factor, a member of the general population that consumed 10 grams per day would be protected at an extremely low risk level of approximately  $10^{-8}$  (1 in 100,000,000).

For non-carcinogens, EPA generally assumes that there is a "safe level" of exposure and that the risk posed is not linearly related to exposure. In the criteria equation for non-carcinogens, the reference dose (RfD) is an estimate of the highest daily exposure amount "that is likely to be without appreciable risk of deleterious effects over a lifetime." Unlike the recommended criteria for carcinogens — which are intended to reduce the incremental cancer risk from drinking water and consuming fish in waters protected by the CWA to an acceptable level — the recommended criteria for non-carcinogens are intended to ensure that exposure to the substance from all sources does not exceed the RfD. To account for exposure from sources other than the consumption of water and aquatic organisms in waters protected by the CWA, the criteria equation for non-carcinogens includes a factor for "relative source contribution" (RSC). If all of the exposure to a non-carcinogen is from the consumption of water and aquatic organisms in waters protected by the CWA, the RSC is 100% or 1. If only 20% of the exposure is from these sources (i.e., 80% of the exposure is from other sources), the RSC is 20% or 0.2. Because the RSC is to the left of the division symbol in the equation, the smaller the RSC, the lower or more stringent the water quality criterion will be. In the "absence of scientific data" to the contrary, EPA takes the position that a default RSC of 0.2 is necessary to ensure that the criteria sufficiently protect human health.

### Role of Water Quality Criteria under the CWA

Although the CWA obliges states to adopt water quality standards, it does not require either the states or EPA to take all measures necessary to achieve the standards. Nor does it require the states or EPA to regulate all sources that may contribute to a violation of water quality standards. A state's adoption of more stringent water quality criteria, then, will not necessarily result in any improvement in water quality. The CWA regulates only "point source" dischargers of pollutants. These include wastewater discharges from sewage treatment plants and industries, municipal and industrial stormwater discharges, concentrated animal feeding operations (CAFOs), and a few other sources. But there are many sources of water pollution that are not regulated by the CWA. These include most non-municipal and non-industrial stormwater discharges and agricultural sources other than CAFOs. If these sources are regulated at all, they are regulated only under state law. Moreover, states may not practicably be able to regulate many other significant sources of water pollution — e.g., natural sources, "legacy" contaminants that are ubiquitous in the environment, and air emissions from outside the state that deposit pollutants within the state.

Discharge permits for those point sources that are regulated by the CWA must include conditions sufficient to meet a number of CWA requirements, including conditions that will ensure that the source does not "cause or contribute" to a violation of water quality standards. (A significant exception is a permit for municipal stormwater discharges, which is not required to ensure that the discharges do not cause or contribute to a violation of water quality standards. The permit, however, must require controls to reduce the discharge of pollutants to the "maximum extent practicable.") If the receiving water for a discharge already does not meet water quality standards, the requirement not to "cause or contribute" to the violation will typically require the discharge itself to meet water quality standards at the point of discharge and before it mixes with the receiving water. Furthermore, although the CWA in limited circumstances may allow a discharger to delay compliance with this requirement because of technological or economic infeasibility, such grounds do not exempt a discharger from compliance.

Proposals to adopt more stringent human health criteria based on higher fish consumption rates or other factors have caused concern among regulated sources. Many of the more stringent criteria are far below the

**CWA & Fish Consumption****Industry Concerns**

concentrations to which wastewater can feasibly be treated with current or foreseeable technologies. Even where the treatment technology is available, the economic and environmental costs of treatment may more than offset any gains in improved water quality. Moreover, it may not be possible to eliminate the pollutant in the wastewater by changing processes or substituting raw materials. This impossibility may be due to the absence of any viable alternative process or raw material, or may be because the pollutant is present in the facility's intake water or raw materials as a result of its ubiquity in the environment (e.g., legacy PCBs, which are present at low levels even in otherwise pristine waters). Another substantial source of concern is that some of the more stringent human health criteria are less than the instream concentrations caused by natural, legacy, and other unregulated sources. For these criteria, no instream dilution would be available to dischargers, who would need to meet the criteria at the point of discharge in order to avoid contributing to the violation. In addition, many of the more stringent criteria are below the levels that can be accurately measured using currently approved analytical methods. Future improvements in analytical methods could lead to unpleasant surprises by identifying compliance issues that are not currently known to exist and that were not accounted for in the location and design of industrial and municipal facilities and their wastewater treatment systems.

**Improvement Questioned**

Regulated sources also fear that the additional restrictions on their discharges will not result in any significant improvement in water quality or human health. Indeed, proposals for more stringent water quality criteria based on higher fish consumption rates have *not* been accompanied by detailed analyses of the extent to which the more stringent criteria would actually result in water quality improvements, much less improvements in human health through those water quality improvements. The adoption of more stringent water quality criteria, however, is neither a sufficient nor a necessary condition for such improvements.

**Cost Increases**

On the other hand, it would also be fair to say that only limited analyses have been conducted of the extent to which the more stringent water quality criteria resulting from the use of higher fish consumption rates would result in increased water pollution control costs or the closure of facilities that could not meet the criteria. Some facilities may find that more stringent criteria can be achieved through modest improvements in control technologies or through minor changes in raw materials or manufacturing processes. For many facilities, the more stringent criteria will be for pollutants that are not present in the facility's discharge or not present in concentrations that can be detected using currently approved analytical methods. And for yet other facilities, the change in the criteria may not substantially affect the facilities' ability to comply, either because their existing treatment systems can meet the lower criteria or because the facilities cannot feasibly meet either the former or the new criteria.

**Cost/Benefits Unknown**

The debate over fish consumption rates and resulting human health water quality criteria has taken place and continues to take place in a near vacuum of information about likely costs and benefits. This makes it almost impossible to resolve the debate rationally. Both the fears of the economic, social, and environmental costs of adopting the criteria and the fears of the environmental, cultural, and health costs of not adopting the criteria cannot be adequately addressed in the absence of reliable facts and careful analyses of: (1) the existing risks to human health through exposure to toxics in the water; (2) the extent to which more stringent water quality criteria would reduce those risks by further regulating point source discharges; and (3) the costs of complying with those more stringent criteria.

### **Oregon's Use of a Much Higher Fish Consumption Rate to Derive Human Health Water Quality Criteria**

In 1987, Oregon adopted water quality criteria for the protection of human health from toxic substances. The criteria were based on EPA's recommended criteria at the time, which relied on a fish consumption rate of 6.5 grams per day. In the following years, EPA updated its recommended criteria, including by using a higher fish consumption rate of 17.5 grams per day. In 2004, the Oregon Department of Environmental Quality (ODEQ) proposed to revise Oregon's criteria to reflect EPA's updated criteria recommendations. The Oregon Environmental Quality Commission (EQC) adopted the proposed revisions in May 2004, and ODEQ submitted them to EPA for approval.

**Criteria Controversy**

Although ODEQ perhaps may have assumed that the revised criteria — most of which were more stringent than the previous criteria — would be noncontroversial and quickly approved by EPA, environmental advocacy organizations and tribal governments strongly objected to them. Tribal governments, in particular, were concerned that the 17.5 grams per day fish consumption rate used to derive the human health criteria did not reflect higher fish consumption rates by tribal members. They pointed to a fish consumption survey of Pacific Northwest tribal members from the 1990s, which showed a 95th percentile adult fish consumption rate of 175 grams per day and a 99th percentile adult fish consumption rate of 389 grams per day (about 14 ounces per day). Because of this and other controversies over Oregon's toxics criteria, EPA initially took no action on them, neither approving nor disapproving them.

## CWA & Fish Consumption

### Revised Consumption Rate

To resolve the fish consumption rate issue, ODEQ began discussions with stakeholders on the use of a higher fish consumption rate than EPA's nationally recommended rate. These discussions did not result in a consensus on an appropriate rate, but eventually led the EQC in October 2008 to direct ODEQ to develop revised human health criteria based on a fish consumption rate of 175 grams per day. Tribal governments generally supported this rate as a reasonable compromise between 17.5 grams per day and the 99th percentile adult tribal member consumption of 389 grams per day, and municipal and industrial interests ultimately did not challenge the rate. Recognizing the burden that criteria based on 175 grams per day might impose on dischargers, however, the EQC also directed ODEQ to "carefully consider the costs and benefits of the fish consumption rate" and to propose rules that would allow the resulting criteria to be implemented "in an environmentally meaningful and cost-effective manner." This directive led ODEQ, EPA Region 10, and tribal governments to form an advisory committee that met from 2008 to 2010 to develop and evaluate such "implementation tools."

### Consent Decree

Meanwhile, because EPA had not acted on Oregon's 2004 criteria within the 90 days required by the CWA, an environmental advocacy organization filed an action in federal court to force EPA to approve or disapprove the criteria. This action resulted in a 2008 consent decree that, after several extensions, ordered EPA to act on the criteria by June 1, 2010. In compliance with the decree, EPA disapproved all the criteria that were based on a fish consumption rate of 17.5 grams per day. The somewhat circular reason that EPA gave for the disapproval was that the EQC, by directing ODEQ in October 2008 to revise the criteria based on a rate of 175 grams per day, had already determined that the rate of 17.5 grams per day was insufficiently protective in Oregon. In this way, EPA avoided a determination that criteria based on a rate of 17.5 grams per day were necessarily insufficiently protective under the CWA.

The advisory committee played a substantial role in developing ODEQ's proposals for revised human health criteria and implementation tools, but the committee did not reach a consensus on either the criteria or the tools. Ultimately, ODEQ submitted the following proposals to the EQC, which the EQC adopted in June 2011:

### Protecting the Highly Exposed

#### 1) *Revised Human Health Criteria*

The human health criteria were revised based on the then-current EPA human health criteria recommendations but using a fish consumption rate of 175 grams per day. For carcinogens, the criteria were based on a risk level of  $10^{-6}$  (1 in 1,000,000), even though the fish consumption rate was that of a highly exposed population, rather than the general population. Thus, the general population, which consumes much less fish, is protected at a very high level. For example, Oregon's water quality criterion for PCBs is now 0.0000064 micrograms per liter ( $\mu\text{g/L}$ ), or 6.4 parts per *quadrillion*. The water quality criterion for 2,3,7,8-TCDD (a form of dioxin) is 0.0000000051  $\mu\text{g/L}$ , or 0.51 parts per *quintillion* (510 parts per *sextillion*). These concentrations are not only far below the concentrations that can be reliably measured using standard analytical techniques, they may also be below global background concentrations and thus could be exceeded even in pristine waterbodies.

### Unregulated Sources

#### 2) *Efforts to Reduce Toxics from Sources Not Regulated by the CWA*

ODEQ's proposals included a number of largely non-regulatory measures to reduce toxics from sources not regulated by the CWA. These measures included a state "toxics reduction implementation strategy" to encourage and coordinate efforts to reduce the use and discharge of toxic substances. Also included were revisions to Oregon's total maximum daily load (TMDL) rules to give greater emphasis to working with the Oregon Departments of Forestry and Agriculture to achieve TMDL pollutant load allocations to nonpoint forestry and agriculture sources.

### Intake Water

#### 3) *Measures to Reduce the Burden of More Stringent Criteria on Sources That Do Not Cause a Net Increase in Toxic Substances in Oregon Waters*

Many sources discharge to the same waterbody from which they obtain their intake water. If the intake water contains a toxic pollutant, a source might discharge to the waterbody the same or a smaller amount of the pollutant than it removed from the waterbody in its intake water. Nonetheless, because a source is responsible for the pollutants in its discharge — even those obtained from the waterbody to which it discharges — and because a source may not cause or contribute to a water quality standards violation, a source's discharge may be inconsistent with the CWA even if it does not increase the amount of a pollutant in a waterbody.

For example, suppose the water quality criterion for a toxic pollutant in a river is 10 micrograms per liter ( $\mu\text{g/L}$ ), the concentration of that pollutant in the river is 20  $\mu\text{g/L}$ , and an industrial facility uses the river as a source of noncontact cooling water, which it discharges back to the river. If none of the cooling water evaporates, the facility will return the cooling water to the river at the same toxic pollutant concentration of 20  $\mu\text{g/L}$ . Moreover, because the same amount of water is returned to the river as was



**CWA & Fish  
Consumption****Discharge  
“Contribution”**

removed, the concentration in the river will be unchanged. But the discharge concentration of 20 µg/L would nonetheless exceed the water quality criterion of 10 µg/L, and therefore could be deemed to “contribute” to the violation of the criterion in the river. To take a slightly different example, if half the cooling water evaporated before the water was discharged to the river, the concentration of the toxic pollutant in the discharge would increase to 40 µg/L, even though the amount of the pollutant returned to the river would be the same as the amount removed. Again, the discharge would exceed the water quality criterion of 10 µg/L and could be deemed to “contribute” to the violation of the criterion in the river. In addition, however, the facility in this example would increase the concentration of the pollutant in the river, even though it would not change the mass of the pollutant in the river. This is because, as a result of the evaporation of the cooling water, the volume of water discharged to the river would be less than the volume removed, thereby reducing the flow of the river while maintaining the same amount of the toxic pollutant. Nonetheless, the concentration increase in the river could be insignificant if the amount of water evaporated by the facility were insignificant in relation to the total flow of the river.

To avoid or minimize the burden that more stringent criteria might impose on facilities such as these — i.e., those that would not increase the net amount of a toxic pollutant in a waterbody and that would not increase the concentration of the toxic pollutant by more than an insignificant amount — ODEQ developed and proposed two measures that the EQC subsequently adopted: (1) an “intake credit”; and (2) “site-specific background pollutant criteria.”

**Intake Credit**

The intake credit, codified in Or. Admin. Rule 340-045-0105, allows ODEQ, in determining permit discharge limits, to find that a discharge will not cause or contribute to the violation of a water quality criterion if the following circumstances (among others) apply: (i) the facility obtains all its intake water containing the pollutant from the waterbody to which it discharges; (ii) the mass of the pollutant in the facility’s discharge does not exceed the mass removed from the waterbody; and (iii) the discharge does not cause the concentration of the pollutant in the waterbody to increase. Although the intake credit may prove to be useful to some facilities, it does not apply to facilities that do not discharge to the waterbodies from which they obtain their intake water or to facilities that increase the mass or concentration of the pollutant in the waterbody, no matter how insignificantly.

**Background  
Pollutant  
Criteria**

The provision for site-specific background pollutant criteria, codified in Or. Admin. Rule 340-041-0033(6), would allow facilities in a very limited number of circumstances to increase by an insignificant amount the concentration of a pollutant in a waterbody that already exceeds the water quality criterion for that pollutant. The purpose of the provision is to allow a facility to increase the concentration of a pollutant in a waterbody by a de minimis amount, provided that it does not increase the mass of the pollutant in the waterbody. Although water quality standards allowing a de minimis increase above a water quality criterion are not uncommon (Oregon and Washington’s water quality standards for temperature, for example, include such provisions), Oregon’s site-specific background pollutant criteria provision may be the only provision in the nation that applies to toxic pollutants. Nonetheless, the circumstances to which the provision applies are so narrowly defined that few facilities may be able to use it. The provision applies only if (among other requirements): (i) the water quality criterion is a human health criterion for a carcinogen (this is because the “risk factor” used to derive criteria for carcinogens provides an objective means of defining a de minimis increase that does not result in criteria that are insufficiently protective); (ii) the facility has an existing discharge permit, and there is no increase in the discharge as a result of the provision; (iii) the mass of the pollutant discharged does not exceed the mass of the pollutant removed from the same body of water in the facility’s intake water; (iv) the discharge does not cause the concentration of the pollutant in the waterbody to increase by more than 3% after the discharge completely mixes with the waterbody (or mixes with 25% of the flow of the Columbia or Willamette Rivers); and (v) the resulting concentration of the pollutant does not represent a risk level of more than  $10^{-4}$  (e.g., if the concentration in the waterbody already exceeds the criterion by an amount that represents a risk level of  $10^{-4}$  or more, the site-specific background pollutant criterion provision cannot be used).

**4) Water Quality Variances****Variance  
Impediments**

During the advisory committee discussions, EPA promoted water quality variances as the principal tool to allow continued discharges by regulated dischargers who could not meet more stringent human health criteria. A variance is a temporary exemption from complying with water quality standards. Although variances have been used in other areas of the country for this purpose, they have rarely been used in the Pacific Northwest, and never in Oregon or Washington. To encourage greater use of variances, ODEQ proposed, and the EQC adopted, several revisions to Oregon’s variance rule that were acceptable to EPA, although not to many environmental advocacy organizations. Nonetheless, the revisions, which are codified in Or. Admin. Rule 340-041-0059, still leave many substantial impediments to obtaining a variance. These impediments make it questionable whether more than a handful of facilities will seek, much less obtain, a variance.

## CWA & Fish Consumption

### Prohibitive Costs

### Procedural Impediments

### Metals Evaluation

### Arsenic

### Data Assumptions

### Arsenic Reduction Policy

The impediments to obtaining a variance are both substantive and procedural. Among the substantial substantive impediments is that a discharger has the burden of demonstrating that “attaining” the water quality criterion is not “feasible” for one of the same six reasons that EPA’s regulations require to remove a designated use altogether. These reasons include: naturally occurring pollutant concentrations or conditions prevent the attainment of the use; human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or controls more stringent than those required by the CWA’s “best technology” requirements would cause “substantial and widespread economic and social impact.” On the other hand, the rules prohibit granting a variance if any “existing use” would be “impaired” by doing so, including jeopardizing the continued existence of any species listed under the Endangered Species Act or causing an “unreasonable risk to human health.” For many dischargers, the expense of making these demonstrations would be prohibitive.

The procedural impediments for obtaining a variance are equally substantial. Variances are limited to the five-year term of a discharge permit and any extension of that term pending action on a renewal application. To renew a variance, the discharger must demonstrate *again* that it qualifies for the variance. EPA, in addition to ODEQ, must also approve all variances. Formerly, variances were limited to three years and also required the approval of the EQC, but the allowance of a somewhat longer term and the elimination of the requirement for EQC approval are unlikely to make variances substantially more attractive to dischargers who have difficulty meeting more stringent human health criteria.

#### 5) Revisions to Specific Human Health Criteria

Because intake credits, site-specific background pollutant criteria, and variances were unlikely to be useful to more than a few dischargers (and variance requests would be expensive and time-consuming to process for both ODEQ and dischargers), ODEQ carefully evaluated the human health criteria for three metals that were likely to be exceeded in many waterbodies throughout the state: iron, manganese, and arsenic.

ODEQ determined that the human health criteria for iron were based on “welfare” effects (e.g., taste and odor), rather than health effects. In addition, EPA’s recommended human health criterion for manganese was based solely on exposure through consuming marine organisms. The EQC therefore repealed the criteria for iron and repealed the criteria for manganese in freshwater.

Arsenic presented a greater challenge. Oregon’s EPA-approved human health criterion for arsenic, which was based on an outdated EPA recommendation, was 0.0022 µg/L, and even EPA’s current recommendation at a fish consumption rate of only 17.5 grams per day would increase the criterion to only 0.018 µg/L. Naturally occurring concentrations in Oregon’s waters, however, were orders of magnitude higher, generally ranging from 0.5 to 3.0 µg/L, but reaching even higher concentrations in some waterbodies. To avoid adopting new criteria that would continue to leave almost all of Oregon’s waterbodies out of compliance with the criteria, ODEQ devoted a substantial amount of its limited standards development resources to reevaluating the data and assumptions that EPA used to develop its recommended criteria. Based on this reevaluation, ODEQ proposed and the EQC adopted much higher arsenic criteria of 2.1 µg/L in freshwater and 1.0 µg/L in saltwater. These criteria reflected the same 175 grams per day fish consumption rate used to derive the other human health criteria, but ODEQ deviated from several of EPA’s recommendations regarding other factors. These deviations included: (i) EPA’s recommended criteria applied to the sum of both organic and inorganic forms of arsenic, but only inorganic arsenic is substantially toxic to humans. Oregon’s revised criterion is based on only the inorganic form; (ii) EPA’s recommended criteria used a bioconcentration factor (somewhat analogous to a BAF) of 44. After reevaluating the underlying data, ODEQ reduced the factor to 1. Moreover, because studies showed that toxic inorganic arsenic generally is less than 10% of total arsenic, ODEQ applied a further “inorganic proportion factor” of 10% (0.1), which effectively reduced the bioconcentration factor to 0.1 (1 \* 0.1); (iii) To further increase the arsenic criterion, ODEQ applied a risk level of 10<sup>-4</sup> in lieu of Oregon’s much lower standard risk level of 10<sup>-6</sup>. This risk level was acceptable to EPA because the use of a 175 grams per day fish consumption rate ensured that the risk level for highly exposed populations was not less than the minimally acceptable 10<sup>-4</sup>; (iv) Lastly, because the criteria were based on a higher than normal risk level, the EQC adopted and included in Oregon’s standards an “arsenic reduction policy” (codified in Or. Admin. Rule 340-041-0033(7)) to reduce to “the maximum extent feasible” discharges of arsenic that might significantly increase inorganic arsenic in public drinking water supplies. Because of the high natural concentrations of arsenic in Oregon waters, and because the revised criteria relied on the fish consumption rate of 175 grams per day, tribal governments supported the criteria notwithstanding the use of a higher risk level.



<b>CWA &amp; Fish Consumption</b>	<p align="center"><b>Oregon's Experience Thus Far with Human Health Criteria Based on a Fish Consumption Rate of 175 Grams per Day</b></p>
<b>Initial Impacts Limited</b>	<p>EPA approved Oregon's revised human health criteria in October 2011. The approval included Oregon's variance and site-specific background pollutant criteria provisions. (With EPA's agreement, Oregon did not submit the intake credit provisions to EPA for approval because EPA deemed the provisions to be permitting regulations rather than water quality standards.) Thus far, no one has challenged the revised criteria and associated provisions or EPA's approval of them.</p>
<b>Detection Limits</b>	<p>Although it has been nearly three years since EPA approved the criteria, they have not yet had any substantial effect on dischargers, and they have had no effect on water quality. Nor has anyone sought a water quality variance or a site-specific background pollutant criterion. In large part, this has been because, for reasons unrelated to the revised criteria, ODEQ has issued few permits for substantial discharges since the criteria were approved. For most of the few substantial permits that have been issued, the analytical methods used to characterize the discharges did not detect pollutants subject to the human health criteria or did not detect them in concentrations that would cause or contribute to a violation of the criteria. In a few instances, discharge limits were established based on the revised criteria, but the limits were well below the concentrations that could be detected using currently available and approved analytical methods. Because the dischargers' existing treatment facilities are able to reduce the pollutant concentrations below the analytical detection levels, the more stringent discharge limits based on the revised water quality criteria will likely have no effect on the discharges unless improvements in analytical methods substantially lower the detection levels.</p>
<b>Compliance Changes?</b>	<p>As ODEQ continues to issue new or renewed discharge permits for more substantial discharges, the new human health criteria may begin to require additional wastewater treatment or changes in raw materials or manufacturing processes — which may or may not be feasible. In some instances, however, the more stringent criteria may not lead to results that are different from those that would have occurred under the former criteria. The same treatment or other measures needed to comply with the new criteria might have been needed to comply with the former criteria. Or, the facility might not be able to comply with either the former or the new criteria. For example, EPA's recommended human health criteria for PCBs, based on a fish consumption rate of 17.5 grams per day, is 0.000064 µg/L (64 parts per quadrillion). Although this is ten times less stringent than Oregon's criterion of 0.000064 µg/L (6.4 parts per quadrillion) based on a fish consumption rate of 175 grams per day, both of these criteria are so low that it may be no easier or harder to achieve Oregon's criterion than it would have been to achieve a criterion based on EPA's recommended criterion.</p>
<b>Actual Improvements?</b>	<p>ODEQ's issuance of additional permits with more stringent discharge limits based on the new criteria could eventually result in water quality improvements. But with the exception perhaps of a few local water quality problems, the municipal and industrial sources that are regulated by the CWA and that must comply with water quality standards do not contribute a substantial portion of the toxic pollutants in Oregon's waters. For that reason, more substantial controls on these sources may not have a significant effect on water quality.</p>
<b>National Toxics Rule</b>	<p align="center"><b>Efforts to Revise Washington's Human Health Criteria Based on a Higher Fish Consumption Rate</b></p>
<b>Tribal Concerns</b>	<p>Unlike Oregon, but like several other states, Washington failed to adopt numeric water quality criteria for the protection of human health from toxics, as required by the CWA. In response, EPA in 1992 promulgated human health criteria for Washington and 13 other states as part of its "National Toxics Rule," which can be found at 40 C.F.R. § 131.36(d)(14). Because of their age, these criteria are based on EPA's former national recommended fish consumption rate of 6.5 grams per day. The criteria for carcinogens, however, follow Washington's established policy of applying a relatively low risk factor of 10<sup>-6</sup>.</p>
<b>Ecology Rulemaking</b>	<p>After Oregon's decision to use a fish consumption rate of 175 grams per day, EPA Region 10, tribal governments, and environmental advocacy organizations began urging the Washington Department of Ecology (Ecology) to adopt human health criteria based on a rate substantially higher than 6.5 grams per day. The fish consumption surveys on which Oregon based its decision also included tribal members from Washington and Idaho. Many Washington tribes, particularly coastal tribes, argued that their members consumed fish at even higher rates than those tribes included in the survey. They and others argued that Washington should use a higher rate than Oregon, either statewide or regionally.</p> <p>Ecology in 2011 initiated a rulemaking process to develop human health criteria for toxics, including consideration of a higher fish consumption rate. Ecology later began a separate rulemaking process to consider "implementation tools" for the new criteria, such as the variances and other measures considered by Oregon. But these efforts have generated even more controversy than Oregon's revised criteria.</p>

## CWA & Fish Consumption

### September Deadline

### Washington Principles

The rulemaking process has moved slowly and has changed direction several times. In October 2013, environmental advocacy organizations filed both a federal court action and a separate administrative petition to force EPA to promulgate revised human health criteria for Washington. As of July 2014, motions for summary judgment were pending in the federal court action, and EPA had not yet acted on the administrative petition.

Most recently, Washington Governor Jay Inslee in July 2014 directed Ecology to issue a draft human health criteria rule by September 2014 based on the following principles:

- *Fish consumption rate.* The criteria would be based on a fish consumption rate of 175 grams per day. Washington would thereby join Oregon in using the highest statewide fish consumption rate in the nation.
- *Risk level.* Unlike Oregon, which uses a  $10^{-6}$  risk level for carcinogens, Washington would increase its risk level to  $10^{-5}$ . For most carcinogens, this would largely or completely offset the effect of increasing the fish consumption rate to 175 grams per day from EPA's current national recommendation of 17.5 grams per day. The use of this risk level in conjunction with a fish consumption rate that reflects the consumption of a highly exposed population, however, is consistent with EPA's human health criteria methodology.
- *Relative source contribution (RSC) factor.* For non-carcinogens, EPA recommends a default RSC of 0.2, meaning that only 20% of the exposure to the substance is due to drinking water and consuming fish from waters protected by the CWA. Ecology will use an RSC of 1, which assumes that all of the exposure is from these sources. Using an RSC of 1 will result in much less stringent criteria than an RSC of 0.2. Because using a default RSC of 1 is inconsistent with EPA's current position, whether EPA will approve criteria based on it remains to be seen.
- *Other exposure assumptions.* Ecology has stated that it will base the criteria on EPA's draft recommended body weight of 80 kg (an increase from the previous recommendation of 70 kg). Ecology, however, will retain the currently recommended drinking water intake rate of 2 liters per day, even though EPA's draft recommended drinking water intake rate is 3 liters per day. Both of these factors will result in less stringent criteria than factors of 70 kg and 3 liters per day.
- *No less stringent criteria.* If these or other factors would result in a criterion that is less stringent than a comparable criterion that is currently in effect in Washington under the National Toxics Rule, Governor Inslee has directed Ecology to retain the existing criterion.
- *Specific decisions on arsenic, mercury, and PCBs.* Because of their ubiquity in the environment, the criteria for arsenic, mercury, and PCBs are particularly likely to affect permitting decisions. For that reason, Ecology proposes to address the human health criteria for them separately.

### Arsenic

For arsenic, Ecology will use the much less stringent arsenic drinking water "maximum contaminant level" (MCL) of 10 µg/L under the Safe Drinking Water Act (SDWA). Although EPA has approved the MCL as the human health criterion for arsenic in other states, Oregon decided that it could not justify the adoption of the MCL because, unlike a human health criterion under the CWA, an MCL under the SDWA may take into consideration the feasibility of achieving it. Oregon adopted inorganic arsenic human health criteria of 2.1 µg/L for freshwater and 1.0 µg/L for saltwater.

### Mercury

Ecology decided to postpone any action on mercury human health criteria because it concluded that EPA's recommended criteria (which are based on methylmercury in fish tissues) are difficult to implement. Washington will continue to use the National Toxics Rule for mercury in the interim.

### PCBs

Ecology will use a risk level higher than the standard  $10^{-5}$  but less than  $10^{-4}$  to retain the existing National Toxics Rule human health criterion for PCBs of 0.00017 µg/L (170 parts per quadrillion). By comparison, EPA's recommended criterion (at a fish consumption rate of 17.5 grams per day and a risk level of  $10^{-6}$ ) is 64 parts per quadrillion, and Oregon's criterion is 6.4 parts per quadrillion. Although Ecology has used a higher risk level to justify retaining the National Toxics Rule criterion, the risk level is within the range that is acceptable under EPA's human health criteria methodology, and EPA has approved Oregon's use of different risk levels for different pollutants (as Oregon did for arsenic).

### New Tools

- *Implementation tools.* Governor Inslee has directed Ecology to propose implementation tools to help dischargers comply with the revised human health criteria, including revisions to the water quality variance regulations, compliance schedules, and intake credits. As Oregon's experience suggests, the tools that are consistent with the CWA may be of limited usefulness, cumbersome, and expensive.

### Unregulated Sources

- *Proposals to identify and reduce significant sources of toxics, including currently unregulated sources.* Because many sources of toxic pollutants are unregulated by the CWA, Governor Inslee's proposals for revised human health criteria also include a wide range of conceptual proposals for additional measures to control or eliminate existing sources of toxics, including in consumer products. Some of these measures will require legislative action by the 2015 Washington legislature. The Governor and Ecology have stated that Ecology will not adopt revised human health criteria until after the legislative session. This appears to be an effort to pressure the legislature by linking the adoption of the revised criteria to the legislature's approval of the Governor's toxic reduction proposals.

**CWA & Fish Consumption****EPA Disapproval****Inadequate Data Consideration****New Idaho Surveys****No "Train Wreck"****Questionable Results****Efforts to Revise Idaho's Human Health Criteria to Reflect Higher Fish Consumption Rates**

Idaho revised its human health criteria in 2006 to reflect EPA's recommended criteria, including EPA's national recommended fish consumption rate of 17.5 grams per day. Tribal governments and environmental advocacy organizations objected to the criteria, particularly the fish consumption rate on which they were based. On May 10, 2012, EPA disapproved the criteria. EPA was not persuaded that the rate of 17.5 grams per day was sufficiently protective of the health of Idaho population groups that EPA believed consumed substantially more than 17.5 grams per day. EPA particularly pointed to the Pacific Northwest tribal fish consumption surveys that Oregon had relied on to increase its fish consumption rate.

When EPA disapproved Oregon's use of a fish consumption rate of 17.5 grams per day, EPA relied on the fact that the EQC had already directed ODEQ to develop revised criteria based on a fish consumption rate of 175 grams per day. EPA did not directly determine that using a rate of 17.5 grams per day was not protective. Idaho, by contrast, had determined that using a rate of 17.5 grams was protective and had not made any subsequent determination to the contrary. Although EPA's decision on the Idaho standards was based on its assertion that Idaho had not adequately considered the available fish consumption data — and thus did not expressly preclude Idaho from retaining a 17.5 grams per day rate if Idaho could justify it as adequately protective of highly exposed populations — Idaho may find it difficult to obtain EPA approval of criteria that are derived using a fish consumption rate for the general population, rather than a rate that reflects the fish consumption of more highly exposed populations. This could lead Idaho to follow an approach similar to that proposed by Washington Governor Inslee, which uses the fish consumption rate of highly exposed populations, but also uses higher risk factors to avoid adopting dramatically more stringent criteria.

Idaho is conducting additional fish consumption surveys and plans to begin a "negotiated rulemaking" process to respond to EPA's disapproval decision. The current rulemaking schedule calls for a proposed rule late in 2015 and legislative approval of a final rule with revised human health criteria during the 2016 legislative session.

**Conclusions**

Oregon's brief experience with standards based on a higher fish consumption rate has not resulted in the effects that opponents feared or proponents hoped. Many municipal and industrial dischargers may in the next few years begin to see more stringent discharge limits and increased costs as discharge permits are renewed and as improved analytical methods are able to detect the very small concentrations of toxic pollutants at issue. But the economic "train wreck" that many predicted the new standards would cause has not yet materialized. On the other hand, the new standards have not yet resulted in any improvements to water quality in Oregon. Furthermore, the new standards' long-term effects on water quality and human health are likely to be very limited because, with perhaps a few exceptions, the dischargers that must comply with the standards are a relatively small source of toxic pollutants in Oregon, as they are in Washington and Idaho. If anything, Oregon's experience may demonstrate the wisdom of the Clean Water Act's original focus on improvements in pollution control technologies and management practices, rather than water quality standards — a focus that has been lost in the last two decades of fights over water quality standard revisions that have become increasingly meaningless to water quality.

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**Author Michael Campbell will be presenting:**

***Puget Soundkeeper v. EPA - The Battle Over Washington's Fish Consumption Rate***  
at the

**5th Annual Fisheries & Hatcheries Seminar**  
**Seattle, September 17**

**For info: The Seminar Group, [www.TheSeminarGroup.net](http://www.TheSeminarGroup.net) or 206/ 463-4400**

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## ESA Takes



## FEDERAL ENDANGERED SPECIES ACT DECISIONS



THE RETURN OF *SWEET HOME* IN TEXAS WHOOPING CRANE CASE  
A SIGN THAT ESA ISSUES WILL BE BACK BEFORE THE US SUPREME COURT

by Steven Richardson, David Weinberg, Andy Wang, and Craig Fansler  
Wiley Rein LLP (Washington, DC)

## Introduction

Recent appellate court decisions regarding the federal Endangered Species Act (ESA) provide greater protection from liability for “takings” of endangered species but also more uncertainty about the deference owed to federal agencies during ESA consultations.

A US Fifth Circuit Court of Appeals (Fifth Circuit) decision in June should increase the comfort of water users, growers, and pesticide registrants with regard to ESA “takings” claims. *The Aransas Project v. Shaw*, 13-40317, 2014 WL 2932514 (5th Cir. June 30, 2014) (*Aransas*), provides the clearest statement to date that agencies that grant permits or licenses for water or pesticide use (and the private parties who receive them) are not responsible under the ESA for every subsequent harm to listed species. Such a clear boundary on the reach of the ESA should give government agencies a freer hand in issuing permits and licenses. In *Aransas*, a three-judge panel found that a Texas state agency’s issuance of a permit allowing private parties to withdraw upstream water was not a foreseeable cause of the downstream deaths of 23 endangered whooping cranes. In short, the Fifth Circuit found that the chain of causation from permit issuance to the death of the birds was too attenuated and too remote to support a “taking” claim against the permit issuer.

State agencies and the US Environmental Protection Agency (EPA) take a wide range of licensing actions — from routine permitting to issuance of pesticide registrations. These actions could potentially result in the “take” of an endangered or threatened species. The *Aransas* ruling provides some protection to state permitting entities and EPA, as well as involved water users, when defending against alleged “takings” of species listed as threatened or endangered under the ESA. Although the water users and farmers who benefited from the permits were not defendants in the *Aransas* case, the decision’s reasoning should apply equally to them, as long as they are drawing water consistent with state-issued permits or applying pesticides in accordance with EPA-administered labels.

However, the Fifth Circuit *Aransas* case is not the only ESA litigation to watch. Earlier this Spring, the Ninth Circuit created headlines (and a split among federal appellate courts) when it upheld a biological opinion (BiOp) of the US Fish & Wildlife Service in *San Luis & Delta-Mendota Water Authority v. Jewell*, 747 F.3d 581, 592-93 (9th Cir. 2014), petition for rehearing en banc denied, No. 11-15871 (9th Cir. July 23, 2014). The BiOp at issue essentially denied 20 million agricultural and domestic users access to water from the Central Valley Project in California, in order to protect a small number of ESA-listed delta smelt. In doing so, it granted considerable deference to the US Fish & Wildlife Service’s views.

Individually, both these federal circuit decisions promise immediate changes in the ESA context: one better protects government agencies and private parties from ESA civil and criminal penalties, and the other may lessen the duties of the consulting services when explaining the denial of a permit or license. Taken together, ESA litigation likely will result in a meaningful US Supreme Court opinion in the not-too-distant future — with far-reaching implications for water users, landowners, and pesticide users.

Background of *Aransas* Litigation

The central importance of *Aransas* is its conclusion that environmental challengers must show that permitting action is a foreseeable cause of the “take” of a threatened or endangered species. The road to *Aransas*, though, began with an earlier US Supreme Court decision that in large part introduced the requirement that plaintiffs must prove proximate cause in ESA Section 9 “takings” cases.

Under Section 9 of the ESA, a “take” means “to harass, harm,...wound, [or] kill” protected species. 16 U.S.C. § 1532(19). A subsequent regulation implementing the provisions of the ESA clarified that “harm” includes — beyond direct harm to a protected species — “significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.” 50 C.F.R. § 17.3(c).

This regulation could be interpreted expansively: to make state and federal agencies liable for a “take” whenever harm resulted to a protected species, its behavioral patterns, or its habitat, with a continuing threat of liability during the entire term of a license or permit. Such a broad interpretation would constrict agencies’ ability to issue water permits and pesticide registrations. But the US Supreme Court chose

Agency  
&  
Permittee  
Liability

ESA “Taking”

Water Users’  
Liability

Delta Smelt  
Case

Supreme Court  
Ruling?

Foreseeable  
Cause

Take  
Defined

Liability  
Interpretation

## ESA Takes

### Proximate Cause

### Remote Consequences

### Fact-Dependent

### Proximate Cause Limits

### Whooping Crane Case

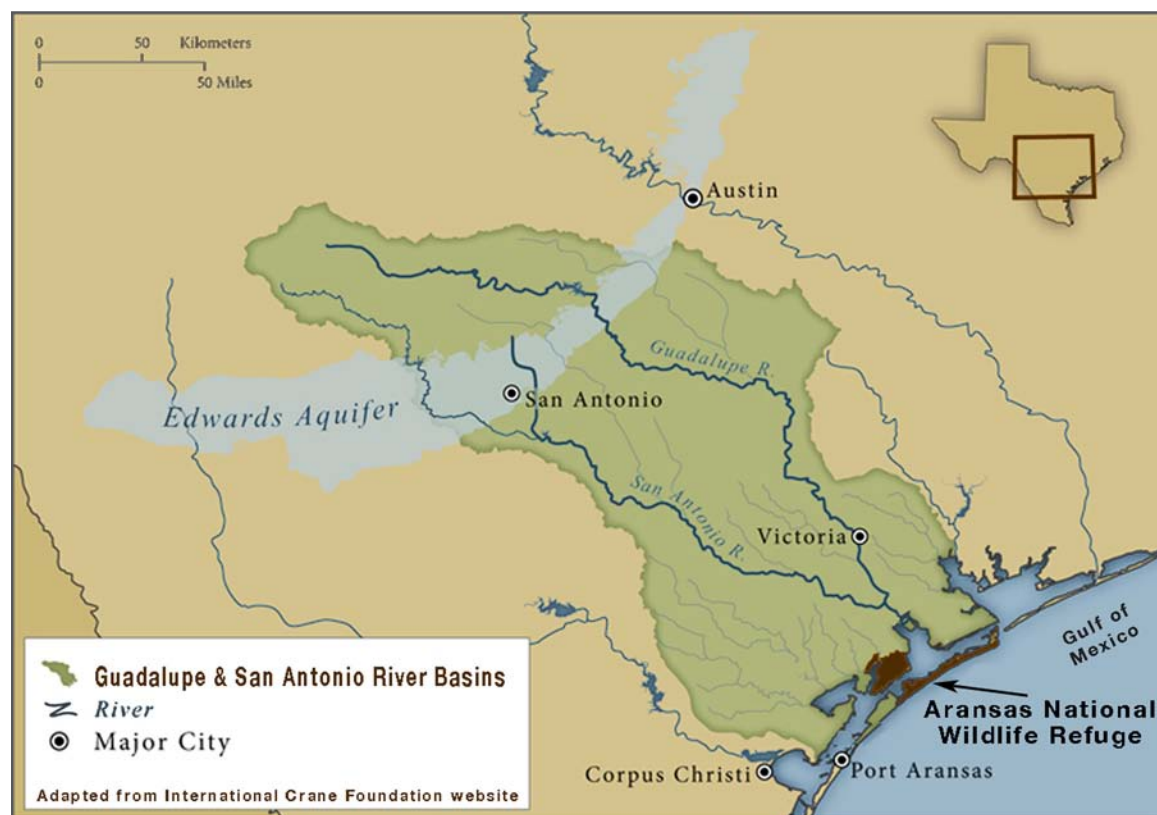
Figure 1

a narrower interpretation in *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 700 n. 13 (1995) (*Sweet Home*). As a result, an agency is only liable where its action was the proximate cause of the taking of a listed species, and not for every subsequent harm that may occur after the initial grant of a license or permit. The explication of this requirement was provided in a concurrent opinion by Justice O'Connor: if "a farmer who tills his field and causes erosion that makes silt run into a nearby river which depletes oxygen in the water and thereby injures" a protected species, the farmer likely would not face "take" liability. *Id.* at 713 (O'Connor, J., concurring). Instead, ESA "take" liability extends only to "foreseeable rather than merely accidental" actions. *Id.* at 709. This limitation, according to Justice O'Connor, "depends to a great extent on considerations of the fairness of imposing liability for remote consequences" and on the particular facts of a case. See *id.* at 713, where Justice O'Connor stated that "[t]he task of determining whether proximate causation exists in the limitless fact patterns sure to arise is best left to lower courts."

### The Aransas Decision

The application of proximate cause as the controlling standard places a limitation on liability for the "take" of a listed species. As a result, state and federal agencies (and the users who receive permits or licenses from these agencies) are not liable for harm that is far removed from the issuance of the permit. However, because it is a fact-dependent standard, guidance from subsequent cases is particularly important. *Aransas* is the most recent of these subsequent cases to better insulate government agencies and private parties from the risk of litigation for "takings" under the ESA. In *Aransas*, the Fifth Circuit found that the US District Court for the Southern District of Texas (District Court) had ignored the proximate cause requirement when it imposed liability on a Texas state agency for a too-remote harm to a listed species. The problem, according to the court, was the district court's "untethered linking of governmental licensing" with every resultant harm to an endangered species. The appellate court held that "[f]inding proximate cause and imposing liability...in the face of multiple, natural, independent, unpredictable and interrelated forces affecting the cranes' [habitat] goes too far..." *Aransas*, 2014 WL at \*14.

The species at issue in *Aransas* was the whooping crane, which is listed as endangered under the ESA. According to the court record, the world's only wild flock resides in Aransas National Wildlife Refuge (see Figure 1) during each winter before migrating to Wood Buffalo National Park in Canada in the summer. *Id.* at \*1. Between 2008 and 2009, an estimated 23 of the 300 wild cranes in the flock died. The Aransas Project (TAP) sued directors of the Texas Commission on Environmental Quality (TCEQ) under the ESA for committing an unauthorized "take" of the cranes. [See Robb, *TWR* #85]



## ESA Takes

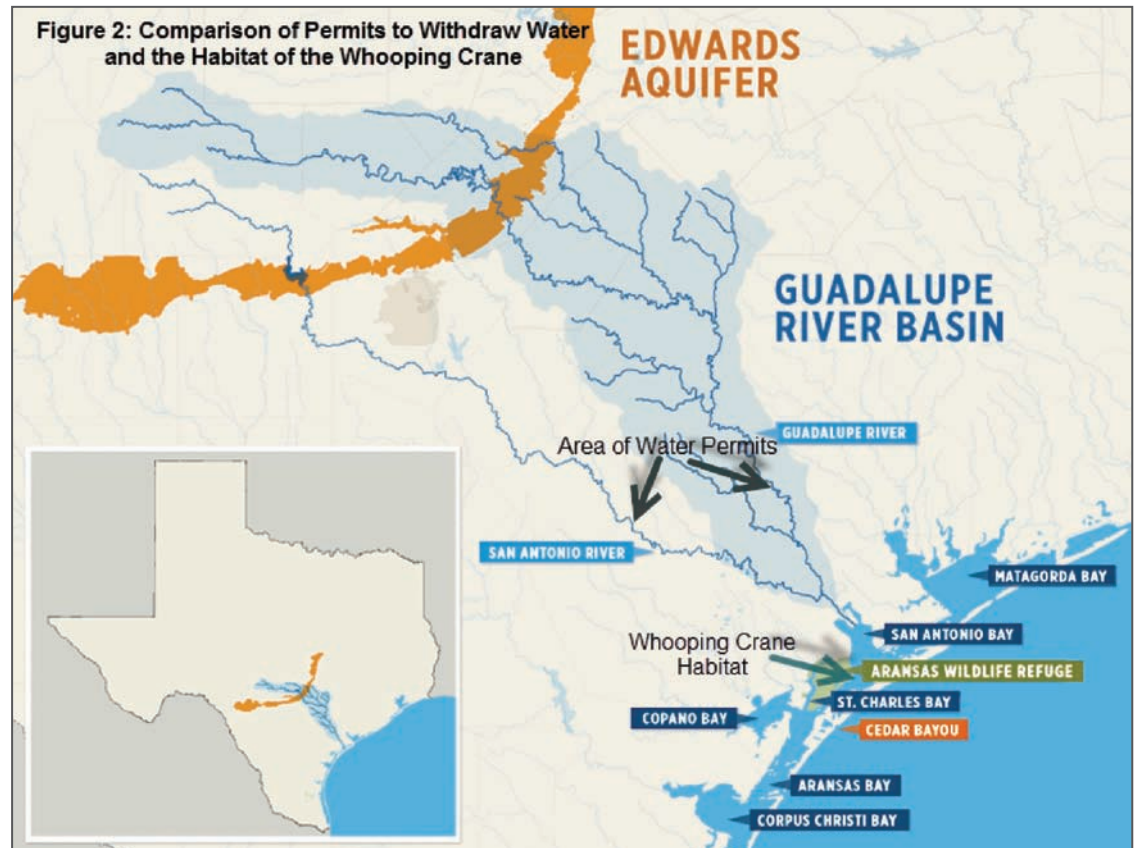
Causation  
Theory

TCEQ regulates surface water use in Texas through the issuance of permits. *Id.* In this case, TCEQ had issued permits to private parties to withdraw surface water from the San Antonio and Guadalupe Rivers. TAP argued that TCEQ committed an unauthorized take of the 23 cranes by issuing these permits to private water users for withdrawing water from the rivers, in turn leading to a significant reduction in:

freshwater inflow into the San Antonio Bay ecosystem. That reduction in fresh-water inflow, coupled with a drought, led to increased salinity in the bay, which decreased the availability of drinkable water and caused a reduction in the abundance of blue crabs and wolfberries, two of the cranes' staple foods. According to TAP, that caused the cranes to become emaciated and to engage in stress behavior, such as denying food to juveniles and flying farther afield in search of food, leading to further emaciation and increased predation. Ultimately, this chain of events led to the deaths of twenty-three cranes during the winter of 2008–2009.

*Id.* at \*2.

The District Court accepted TAP's theory of causation (illustrated graphically in Figure 2) and held that TCEQ had violated the ESA through their water-management practices. *Id.* at \*3.



Source: The Aransas Project, A Troubled Basin, <http://thearansasproject.org/situation/basin-management/>

Chain of  
Causation

On appeal, the Fifth Circuit reversed the District Court's decision. Relying on the US Supreme Court's 1995 *Sweet Home* ruling, the Fifth Circuit held that "proximate cause and foreseeability are required to affix liability for ESA violations." *Id.* at \*12. The court determined that the long chain of causation separating TCEQ's issuance of a permit from the death of any individual crane — of which every link required "modeling and estimation" — made TCEQ's actions too remote, attenuated, and unforeseeable to be considered the proximate cause of the cranes' deaths. *Id.* at \*15. As a result, the court determined that as a matter of law, proximate cause and foreseeability were lacking. *Id.* at \*17.

**Aransas in Light of Decisions of Other Federal Circuit Courts**Liability  
Limits

Appellate courts in other circuits generally agree with the *Aransas* decision that actions that are too attenuated (and thus not foreseeable) do not constitute a "take" under the ESA. But the unique contribution of *Aransas* is that, unlike prior cases from other circuit courts, it resulted in a conclusion that the agency was not liable. As a result, the *Aransas* decision gives the clearest statement yet of the outer limits of causation under the *Sweet Home* proximate cause doctrine.



<div data-bbox="138 178 324 216">ESA Takes</div> <div data-bbox="175 258 287 323">Agency Liability</div> <div data-bbox="120 499 342 537">Intervening Gap</div> <div data-bbox="152 745 310 879">Direct or Foreseeable Result</div> <div data-bbox="125 1165 337 1203">Chain of Events</div> <div data-bbox="142 1514 321 1551">Circuits Split</div> <div data-bbox="120 1759 342 1827">Proximate Cause Question</div>	<p>Earlier cases from other circuits went the other way, finding actions that were sufficient to meet the proximate cause standard. For instance, in <i>Strahan v. Coxe</i>, 127 F.3d 155, 158 (1st Cir. 1997), Massachusetts officials were found to have violated the ESA for issuing licenses that authorized gillnet and lobster pot fishing. The officials knew that “entanglement with commercial fishing gear...is a major source of human-caused injury or death to the Northern Right whale” and numerous whales were previously found with such injuries. Though Massachusetts argued that the mere licensing action could not satisfy proximate cause, the First Circuit disagreed. Rather, granting licenses to use gillnets and lobster pots foreseeably, and perhaps even expectedly, causes injury to endangered whales. A similar case is <i>Animal Prot. Inst., Ctr. for Biological Diversity v. Holsten</i>, 541 F. Supp. 2d 1073, 1077–78 (D. Minn. 2008), in which the federal district court found that the Minnesota Department of Natural Resources had, by authorizing and allowing third parties to engage in trapping and snaring activities, taken the endangered Canada Lynx.</p> <p>One way to conceptualize this standard is to assess whether a gap (which may include a gap in time, space, or an event outside the control of the authorizing agency or the holder of a permit) exists between the action authorized by a permit or license and the harm to the endangered species. In both <i>Coxe</i> and <i>Holsten</i>, trappers or fishers receiving licenses harmed the endangered species as part and parcel of that license or permit. No intervening gaps existed between their actions (trapping and fishing) and the harm to endangered species (injury caused by snares and nets).</p> <p>In fact, in cases where a government licensing agency or person who received such a license was found to have proximately caused a “take,” the action authorized by a license or permit directly resulted or foreseeably could result in harm to the endangered species. See <i>Loggerhead Turtle v. Cnty. Council of Volusia Cnty., Fla.</i>, 148 F.3d 1231, 1258 (11th Cir. 1998) (failure to regulate beach front artificial lighting caused endangered turtles to crawl in the direction of the light and to get run over by traffic); <i>Sierra Club v. Yeutter</i>, 926 F.2d 429, 438–39 (5th Cir. 1991) (timber company logging practices would result in illegal take of endangered red-cockaded woodpeckers); <i>Defenders of Wildlife v. EPA</i>, 882 F.2d 1294, 1301 (8th Cir. 1989) (registration of pesticides containing the harmful chemical would result in illegal “take” when pesticides sprayed on crops); <i>Animal Welfare Inst. v. Martin</i>, 588 F. Supp. 2d 70, 99 (D. Me. 2008) (Maine’s issuance of trapping licenses likely to lead to prohibited takings); <i>Seattle Audubon v. Sutherland</i>, CV06-1608MJP, 2007 WL 1300964 (W.D. Wash. May 1, 2007) (logging in an area occupied by an endangered owl could result in harm); <i>Pacific Rivers Council v. Oregon Forest Indus. Council</i>, No. 02-243-BR, 2002 WL 32356431 at *11 (D.Or. Dec. 23, 2002) (state forester’s authorization of logging operations likely to result in a “take” sufficient for liability).</p> <p><i>Aransas</i>, however, followed a different pattern. The death of the cranes was not caused by the water users who received a government permit to withdraw water. Rather, several intervening events existed between the action authorized by the permit and the harm to the cranes. The plaintiffs argued that the deaths of the cranes were caused by a chain of events: the withdrawal of water increased the salinity of the water, which then flowed from the river into a bay and estuary, which in turn reduced the cranes’ food source, which then led to stress migration, and which finally led to emaciation and death of the cranes. The new contribution from <i>Aransas</i> is thus to define of the outer limits of proximate cause, at which point the authorizing agency is no longer liable for any harm. <i>Aransas</i>, in combination with the cases from the other circuits, shows that any intervening steps in the chain of causation that separate the action authorized by a permit to withdraw water or apply pesticides and the harm to species cast into doubt whether the government agency can be considered the proximate cause of the “take” of an endangered species.</p> <p>Not every circuit has followed the proximate cause analysis first employed in <i>Sweet Home</i> and most recently applied in <i>Aransas</i>. In the Ninth Circuit (encompassing Alaska, Arizona, California, Hawaii, Idaho, Montana, Nevada, Oregon, and Washington) and Eleventh Circuit (Alabama, Florida, and Georgia), for example, proximate cause as defined in <i>Aransas</i> and <i>Sweet Home</i> may not be the standard for government licensing and permitting activities. See <i>Loggerhead Turtle v. County Council of Volusia County, Fla.</i>, 148 F.3d 1231, 1251 n.23 (11th Cir. 1998); <i>Palila v. Hawaii Dep’t of Land &amp; Natural Res.</i>, 852 F.2d 1106, 1107 (9th Cir. 1988). One district court has reached a similar result. See <i>Animal Prot. Inst., Ctr. for Biological Diversity v. Holsten</i>, 541 F. Supp. 2d 1073, 1078 (D. Minn. 2008), where the court found, “[F]irst, the Court notes that the footnote in the <i>Sweet Home</i> decision relied upon by Defendants is dicta...” (citing <i>Loggerhead</i>, 148 F.3d at 1251 n.23). [Editor’s Note: Since the <i>Sweet Home</i> footnote was found to be “dicta,” it would not have precedential value for the court to follow.] In <i>Loggerhead</i>, the Eleventh Circuit expressed some reluctance to adopt the proximate cause requirement in <i>Sweet Home</i>, and found that a county could be held liable for not regulating beachfront lighting, which in turn caused endangered turtles to crawl toward the lighting, where they were subsequently injured by vehicles. <i>Loggerhead Turtle</i>, 148 F.3d at 1251 n.23.</p>
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## ESA Takes

Proof  
v.  
ModelingAgency  
DeferenceConflicting  
Recent  
Decisions

Both the *Palila* and *Loggerhead Turtle* decisions, however, are more than 15 years old and the *Palila* case predates *Sweet Home* and was disclaimed by Justice O'Connor's *Sweet Home* concurrence — so *Aransas* may be persuasive even in the Ninth and Eleventh Circuits. Indeed, one federal district court in California, in the Ninth Circuit, recently found the approach in *Aransas* persuasive. See *California River Watch v. Cnty. of Sonoma*, C 14-00217 WHA, 2014 WL 3377855 (N.D. Cal. July 10, 2014), which relied on *Aransas* to find that “the plaintiff did not meet its burden of proving” causation because its claim that land development would endanger protected salamanders required the use of approximation and modeling.

## Other Developments in ESA Litigation

The Fifth Circuit is not the only forum for retesting the limits of the ESA. Since the enactment of the ESA, courts have balanced the protections afforded to endangered species against the need for state and federal agencies to fulfill their statutory responsibilities to register pesticides, apportion water, and provide power. Great deference has been given to the US Supreme Court's 1978 ruling that “[t]he plain intent of Congress in enacting this statute was to halt and reverse the trend toward species extinction, whatever the cost.” *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184 (1978). In *TVA v. Hill*, this broad protection led the US Supreme Court to halt construction of a \$100 million dam to ensure the “survival of a relatively small number of three-inch fish.” *Id.* at 172-73. Even in *Sweet Home*, other members of the majority were not prepared to join in Justice O'Connor's concurrence.

A case testing the deference owed to action agencies and the consulting services under Section 7 may soon present an opportunity for the US Supreme Court to revisit this balance. In its March *San Luis* decision, the Ninth Circuit reinstated a 2008 Fish & Wildlife Service BiOp that urged restriction of the US Bureau of Reclamation's delivery of water from the Sacramento Delta to over 20 million agricultural and domestic water users in central and southern California. The concern at issue was potential effects on the delta smelt, a 2-3 inch fish in danger of extinction, from Sacramento River diversions. *San Luis*, 747 F.3d at 592-93. Despite recognizing the legitimacy of concerns with several aspects of the modeling and analysis on which the BiOp's “reasonable and prudent alternatives” (RPAs) were based, the Ninth Circuit held it was obliged to defer to the expertise of the Service, whatever the economic implications.

The *San Luis* decision expressly rejected the opposite conclusion that had been reached by the Fourth Circuit last year in *Dow AgroSciences LLC v. National Marine Fisheries Service*, 707 F.3d 462 (4th Cir. 2013). In that case, the court vacated a National Marine Fisheries Service BiOp that addressed the potential impact of the use of several pesticides on salmon. The difference in results between the two courts' views, despite similar criticisms of the BiOps, is demonstrated in Box 1.

The difference between the *San Luis* and *Dow AgroSciences* holdings is not academic. The delta smelt decision has a far more immediate impact than *Dow AgroSciences*. In light of the ongoing California drought, the *San Luis* decision will mean that much of the enormously-fertile San Joaquin Valley and areas south will be denied the water. In addition, the decision creates a split between the two circuits that could result in US Supreme Court attention.

## Box 1: Comparison of Biological Opinions in San Luis and Dow AgroSciences

<i>San Luis</i> , sustaining BiOp	<i>Dow AgroSciences</i> , vacating BiOp
“First, the BiOp is a bit of a mess. And not just a little bit of a mess, but, at more than 400 pages, a big bit of a mess.” 747 F.3d at 604.	“[T]he BiOp was not the product of reasoned decision-making in that the Fisheries Service failed to explain or support several assumptions critical to its opinion.” 707 F.3d at 464.
“It is a ponderous, chaotic document, overwhelming in size, and without the kinds of signposts and roadmaps that even trained, intelligent readers need in order to follow the agency's reasoning.” <i>Id.</i> at 606.	“The BiOp explained that the 96-hour exposure assumption was a laboratory standard” but “without explaining why the 96-hour exposure assumption accurately reflected real-world conditions,” relied upon that assumption. <i>Id.</i> at 470-71.
“The BiOp should have been more explicit in describing exactly which studies it used in its analysis.” <i>Id.</i> at 612 n. 25.	“[T]he BiOp never adequately explained why it relied on older data despite the existence of new data and the potential drawbacks of using the older data.” <i>Id.</i> at 472.

## ESA Takes

### Economic Analysis (3rd Party)

Technically, that split arises from the two courts' different handling of several issues. The first is how the consulting services must consider the economic feasibility of reasonable and prudent alternatives to a planned action. *Cf.* 50 C.F.R. § 402.02. Whereas *San Luis* held that the BiOp is not required to address the economic feasibility of alternatives, *Dow AgroSciences* favored a robust economic analysis of alternatives, based on the regulations implementing the ESA. Second, the two cases also differ in their approach to assessing the feasibility of alternatives on third parties. Whereas *San Luis* held that the impact on third parties need not be addressed in a BiOp, *Dow AgroSciences* suggested that consequences of a particular action on third parties must be addressed.

Resolution of either of these issues could have far-reaching implications. If the case reaches the US Supreme Court, it could lead the US Supreme Court to revisit two conclusions of the seminal 1978 *Tennessee Valley Authority v. Hill* decision that have provided the underpinnings of a great deal of ESA precedent ever since. These contrasting decisions by panels in two separate appeals courts regarding ESA consultations provide a basis to elevate *San Luis* to review by the US Supreme Court.

### Conclusion

The recent appellate court decisions addressed in this article show that the ESA is a still-active area of environmental litigation, rife with new developments and the potential for US Supreme Court development. With debates about the scope of proximate cause in ESA "take" cases, and how much deference is owed to environmental authorities (agencies) that have created circuit splits, it is foreseeable, and perhaps even likely that one or more of these issues is on the path to being granted a writ of certiorari by the US Supreme Court in order to sort out the differences in circuit decisions.

Until the US Supreme Court acts, however, *Aransas* promises the most immediate nationwide impact. It affects the day-to-day operations of pesticide registrants, farmers, or water users across the nation operating under government licenses or permits who may be concerned about the threat of continuing liability for harm that may be far separated in time or distance from the original issuance of a permit or license. *Aransas* places an outer limit on such liability, providing additional protection to private parties and the government agencies that issue licenses and permits.

The impact of the *San Luis* case also is real, as California struggles with a historic drought that may or may not be ameliorated by new legislation promoted by California Senate and House delegations. Moreover, if *San Luis* reaches the US Supreme Court, the case could change the landscape for how much deference should be given to a federal agency's analysis and conclusions in an ESA action and what role economic and technical feasibility should play in such decisions. Any future ruling that changes the extent to which agencies must consider economic implications in their ESA-related actions could have extraordinary implications.

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### Limit on Liability

### Economic Implications

**Steven Richardson's** practice reflects 20 years' experience in key staff roles on Capitol Hill and at the U.S. Department of Interior and over a decade in private law practice. He focuses on regulation, public policy, and litigation in complex, high-profile matters involving water, wetlands, hydroelectric, land, energy, and environmental law. Mr. Richardson has extraordinary experience in successfully resolving complex water quality and allocation disputes and is a leader in helping companies site electric generation facilities and transmission lines. He has unique expertise in promoting and defending projects in environmentally-sensitive locations and fast-growing urban areas. Mr. Richardson also represents clients in "green building" and related energy efficiency issues and in defending against challenges under the National Environmental Policy Act (NEPA). He regularly writes and speaks on the legal, environmental, and social barriers to obtaining authority for new generation and transmission facilities.

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**Craig Fansler** represents clients in environmental, safety, natural resources, and energy law. He advises clients regarding administrative appeals and litigation and a broad range of regulatory compliance matters regarding federal and state environmental, water, and natural resource laws and regulations, including the National Environmental Policy Act (NEPA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), the Endangered Species Act (ESA), Administrative Procedure Act (APA), the Clean Water Act (CWA), the Clean Air Act (CAA), and various state chemical and product regulations.

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## Mudsnails

## US Infestations

## ESA Impacts

Puget Sound  
ImpactsFoodweb  
Disruption

## NEW ZEALAND MUDSNAIL INFESTATIONS

## PUBLIC POLICY IMPLICATIONS

by Paul Bucich, PE, Assistant Director of Engineering, Bellevue Utilities  
&  
Kit Paulsen, Watershed Planning Supervisor  
City of Bellevue, Washington

## INTRODUCTION

New Zealand mudsnails are tiny, non-native, physically slow moving, impossible to eradicate, and virtually all female and pregnant from the moment they are hatched. They have documented infestations in the United States at concentrations up to 500,000 per square meter. In locations in Europe they have been recorded in numbers as high as 800,000 per square meter. Within the past five years, infestations have been located in Thurston, King, and Snohomish Counties in Washington State. The impact of infestations of New Zealand mudsnails on recovery of species listed under the federal Endangered Species Act (ESA) such as Puget Sound Chinook salmon has not been fully studied. However, projections based on other areas within the US and Europe indicate that once established, snail population growth is likely to have significant impacts on local ecosystems. This includes impacts to the benthic food chain that threatened salmonids rely on for sustenance and to thrive. Not only will the snails push out our native macroinvertebrates, but when consumed by most fish, these tough snails pass through the digestive tracts and come out ready to reproduce.

State and federal agencies and local municipalities are spending millions of dollars annually in an attempt to slow, stop, and reverse the damages to the Puget Sound and its drainages from long-term human impacts on the environment. These efforts are directly associated with the declining health of our ecosystem as evidenced by the ESA-listing of Chinook Salmon, the Puget Sound Orca, and other aquatic animals. Given the significant expenditures to clean up Puget Sound and recover threatened salmon and other species, awareness and implementation of preventative measures for invasive species that place these efforts at risk should be well understood, adequately funded, and widely adopted.

Invasive species, such as New Zealand mudsnails (*Potamopyrgus antipodarum*), have the capacity to change the ecology and foodweb of streams, lakes, and wetlands. These mudsnails have a wide tolerance to environmental conditions and in areas they have infested, mudsnails have become the dominant organism, displacing native species. Infestations are commonly caused by human transport that could be avoided. Unfortunately, best management practices for avoiding the transport of invasive species and decontamination protocols are not widely known, nor implemented. This article will present the current practices used for decontamination and prevention measures to slow or contain the spread of this highly invasive species. Further, it will identify gaps in state agencies and municipal operations, private sector consulting services, construction practices, and long term maintenance procedures that place our significant natural resources at eminent risk of infestation.

An understanding of the threat and countermeasures available to local, state, and federal interests should lead to a robust discussion on the implications of using scarce resources, both funding as well as staffing, on attempts to restore infested water bodies for salmonid recovery. In Washington State, many local jurisdictions are actively engaged in Water Resource Inventory Area (WRIA) efforts to restore local waterways as part of a holistic effort within the Puget Sound drainage to recover endangered salmon. The Washington State Salmon Recovery Funding Board (SRFB) is a major source of funding for restoration projects for local jurisdictions and is now requiring applicants to identify what measures they have implemented to prevent the spread of this invasive species both prior to the application as well as for the project, both in design as well as construction. This recognizes the likelihood of long-term success by protecting the project and associated waterways from infestation.

## BACKGROUND

New Zealand mudsnails were first identified in the United States in 1987 in the Snake River basin in Idaho. Since then, the snails have been identified in Montana, Utah, Nevada, Arizona, Colorado, Washington, Oregon, California, the Great Lakes, Pennsylvania, and Vancouver Island. The US Geological Survey (USGS) has a time-lapse New Zealand mudsnail US infestation map series available online at: <http://nas.er.usgs.gov//queries/SpeciesAnimatedMap.aspx?speciesID=1008>.



Capitol Lake, Olympia  
Photo by John Ryan

## Mudsnails

### Infestation Spread



### Transmission Modes

Based on an evaluation of the likely modes of transmission, it is unlikely that the wide and rapid spread of the species occurred without human facilitation. Based on the physical characteristics of the snail, the most likely means of spread include: the boots of fishermen (felt soles are ideal transport mechanisms); vessels (such as boats and other aquatic craft); field operatives (such as maintenance staff, consultants, surveyors, contractors, etc); construction equipment; and stream restoration materials. It is thought that the initial infestation vector was either through ballast water or importing of fish that contained the snails inadvertently. The first infestation in western North America is believed to be from the commercial movement of trout eggs or live fish (Bowler 1991; Bowler and Fresh 1992).

### Mudsnail Characteristics

Mudsnails are small, typically less than 6 millimeters, about the size of short grain rice, with 7-8 whorls in their cone-shaped shell. Their color ranges from golden to almost black. The mudsnails reproduce primarily by cloning, so a single organism can cause a new infestation. Each female can produce over 200 offspring per year, which can result in over 12 million snails in three years. In its native New Zealand habitat, as many as 14 parasitic trematode worms reduce cloning ability in the female mudsnails, so reproduction is substantially lower.

### Mudsnail Resiliency

Mudsnails are extremely hardy, able to colonize habitats ranging from cold mountain streams to warm muddy estuaries. Mudsnails can tolerate degraded water quality, including urban runoff, high turbidity, excessive nutrient loading, and even sewage. The snails have been found to 50 meters (164 ft) depth in lakes. Periphyton, diatoms, and detritus are their primary food source.

Because they have an operculum (trap door) that seals tightly, the snails can withstand weeks out of water in humid or damp conditions. New Zealand mudsnails can pass unharmed through the intestines of fish and then produce viable offspring within hours. The fish that eat mudsnails have the sensation of feeding, but without gaining any nutritional benefits, resulting in decreased health, fitness, and viability.

## IMPLICATIONS

Mudsnails can displace native insects and other prey for resident trout and salmon. A study by the US Bureau of Land Management and Utah State University linked poor condition of trout to infestations of New Zealand Mudsnails, likely because the snails provided very little nutritional value and displaced natural prey (Vinson and Baker, 2008). They found that Rainbow trout feeding exclusively on an unlimited amount of mudsnails lost 0.14-0.48% of their initial body weight per day. Research in the Yellowstone River identified reduced fish growth rates and populations in infested streams.

In Washington State, New Zealand mudsnails have, since 2011, expanded their range from Capital Lake in Olympia to Thornton Creek in Seattle, Kelsey Creek in Bellevue, McAleer Creek in Lake Forest Park, and the Snohomish estuary at Smith Island in Everett. While most of the infested streams are in small urban drainages, the recent infestation of the lower Snohomish River, expands the infestation into a major chinook salmon recovery and public recreational area. Almost \$2.4 million dollars has been spent for restoration in the Smith Island area alone.

### Fish Health Impacts

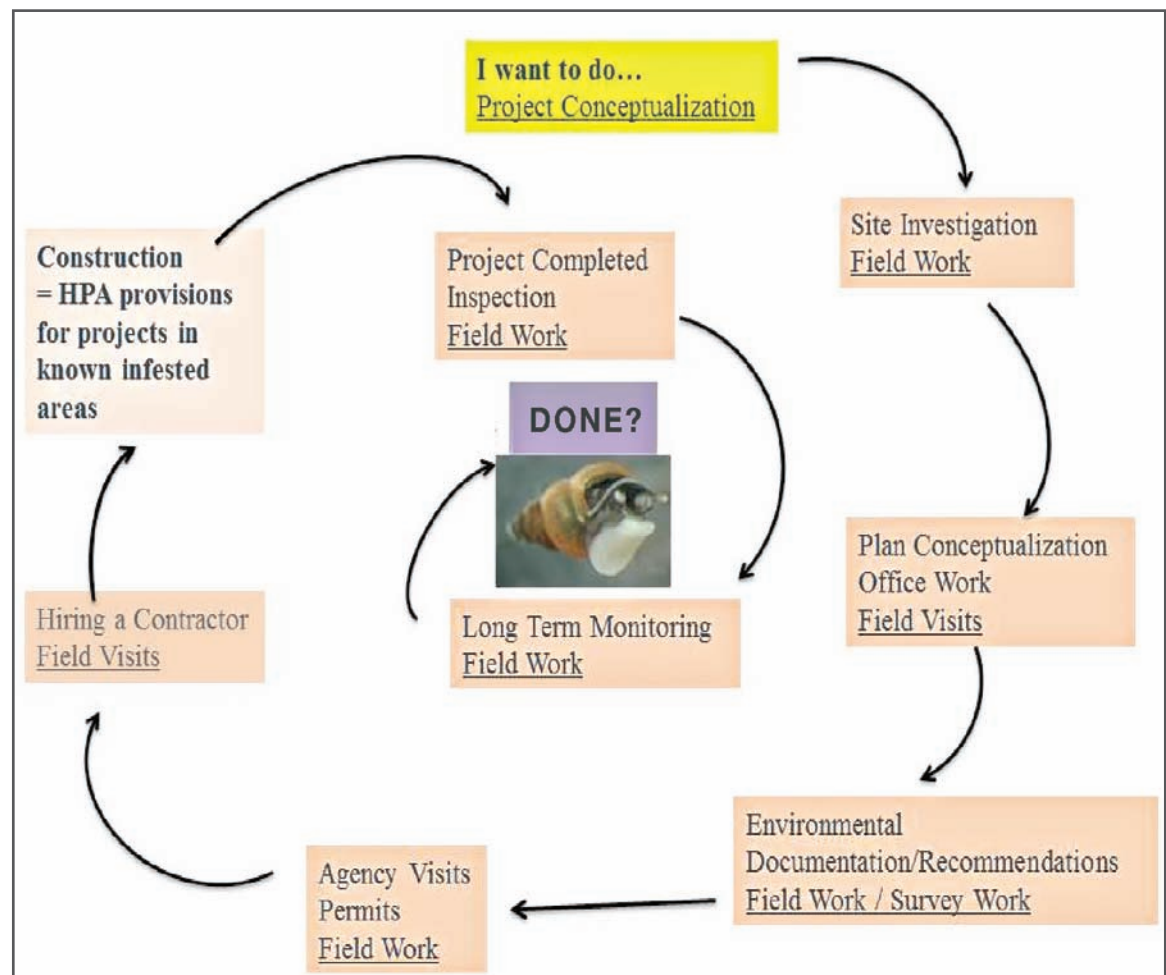
### Washington Spread

**Mudsnails****Awareness  
Lacking****Contamination  
Vectors****Fish Recovery  
Investments  
At Risk**

Given the current lack of awareness and appropriate practices, expansion of infestations is almost certain. There is no general outreach on protective measures for invasive species. Informal survey and investigation conducted by City of Bellevue staff found that other local jurisdiction staff, consultants, and contractors have typically never heard of New Zealand mudsnails and are not utilizing Washington State Department of Fish and Wildlife (WDFW) protocols for decontamination. State Hydraulic Approval Permits (HPA) only include decontamination language after a site has been documented to be infested and the permits only apply to construction, not design.

The figure below illustrates the potential contamination vectors a typical design/construction project provides for New Zealand mudsnails infestation. Thoughtful consideration of each step identifies the opportunities for contamination as well as the ability to prevent contamination. Of great risk is the importation of contaminated materials used by contractors from one “stream” project to another. In a typical scenario, client A pays for gravel and stream materials removal to prevent flooding while client B has a project that needs materials for restoring an impacted stream for increased salmonid production. A savvy contractor will balance both projects and be low bidder on both by using materials paid for removal on one project for installation on the other. Without proper decontamination methods in place, both the equipment used and the transported materials are potential vectors. To avoid being a contamination vector, sourcing of materials for restoration projects will need to be a consideration on all future restoration projects.

While decontamination requires additional staff hours, equipment, and planning, these costs are much less than the cost of invasive infestations in our streams, lakes, and wetlands. Washington State’s Salmon Recovery Funding Board reports \$216 million dollars in their 2011-13 capital budget for recovery of salmon across the state. The Puget Sound three-year work plan identifies \$240 million in habitat needs. It is up to individuals, companies, local governments, tribes, and other agencies to assure that those investments are not at risk from New Zealand Mudsnails and other invasive species.

**Potential Contamination Vectors in a Typical Design/Construction Project**



## Mudsnails

### Decontamination Protocols

### Other Risks Addressed

### Initial Identification

#### DECONTAMINATION

New Zealand mudsnails are highly resistant to traditional cleansing techniques, such as bleach or detergents. Decontamination protocols are provided by Washington Department of Fish & Wildlife (WDFW), at: <http://wdfw.wa.gov/publications/01490/wdfw01490.pdf>  
WDFW decontamination requirements include:

#### Level 1 Decontamination (minimum recommended for all water bodies)

Inspect, Clean, Drain, Dry – clean or contain all sediment, debris, and water on-site and for transport. Inspect, clean, and drain all pumps, bilges, wheel wells, hoses, and other areas that contact water or banks of water bodies. Rinse with potable water, if available.  
Assure no mud or debris are transported or dripped onto streets, highways, or catch basins.  
Clean and dry equipment (minimum of 48 hours) prior to use in other water bodies. This means fully dry for a minimum of 48 hours. If still damp, the 48-hour clock has not started.

#### Level 2 Decontamination (known infestation)

All equipment, gear, and personal protection materials must be decontaminated using one of the following procedures prior to leaving site. Dispose of wash materials to sewer, not to storm drain, or contain for transport for proper disposal. All sediment or other material from the site must also be decontaminated prior to re-use or disposal.

- Hot Water: 140°F/60°C for 5 minutes
- Freezing: -14°F/-10°C for 8 hours
- Chemical:
  - Virkon Aquatic 1% solution for 10 minutes
  - Formula 409 Antibacterial/degreaser formula, 100% solution for 10 minutes
  - Hydrogen Peroxide, 3% solution for 10 minutes (not recommended for Gortex or similar materials)

Application of these decontamination measures also reduces the risk of other invasive species, such as Quagga/Zebra mussels, viruses, or Didymo (“rock snot”). Note that the decontamination procedures typically used for other invasive species is not sufficient for decontamination of New Zealand mudsnails.

#### CITY OF BELLEVUE EXPERIENCE

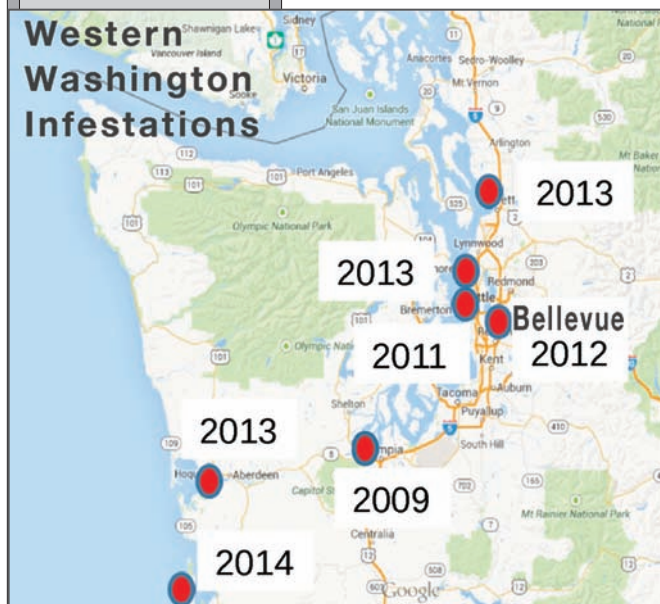
In the City of Bellevue, New Zealand mudsnails were found in Kelsey Creek in 2012 by King County during routine ambient monitoring sampling. WDFW staff from the agency’s invasive species program taught identification and investigation skills to the City biologist. They also helped establish the extent of the infestation in the basin and conducted an additional day of investigations in other streams. City staff continued investigating streams with construction or maintenance activities.

At the time, the Washington State Department of Transportation (WSDOT) was actively working with Eastside Construction Contractors (ECC) a design-build team to rebuild State Road (SR) 520 between

Lake Washington and SR 405 — which runs through Bellevue. City staff discussed the issue of the New Zealand mudsnails with WSDOT staff both at WSDOT Headquarters and at the SR 520 project. Based on Bellevue’s concerns, and with the assistance of WDFW, WSDOT realized that its project and routine maintenance activities were placing local streams at risk.

Based on these conversations, both WSDOT and Bellevue conducted an investigation into local storm drainage facilities. Bellevue staff investigated catch basins and detention facilities to determine if prior operations had already transported the New Zealand mudsnails from now-known infested areas into other areas. WSDOT conducted an investigation into both the catch basins and the stream segments along the SR 520 project reaches.

New Zealand mudsnails were not found in any catch basins or project stream reaches either in proximity to the large transportation project or elsewhere in the City in proximity to known infestations. Unfortunately, they were found in a local stormwater decant facility. This discovery indicated that the mudsnails had been transported with field equipment prior to staff being made aware of the infestation.



## Mudsnails

### Outreach & Training

### City Response Measures

### Development Plans

### Construction Protocol

### Effective Detection

### Successful Technique

### Watershed Proposal

Bellevue has since incorporated investigation and treatment practices to reduce the risk of transfer and infestation. These measures include extensive outreach and training to staff across the City. Many different City staff have contact with streams, lakes and wetlands, potentially exposing Bellevue's water bodies to cross contamination risks from New Zealand mudsnails. Utilities and code compliance staff, engineers, surveyors, maintenance staff, biologists, parks and transportation staff, volunteers for stream team efforts, illicit detection and elimination staff, police and fire fighters — to name a few — are all potentially required to enter into the zones where New Zealand mudsnails can inhabit.

In order to manage these different potential vectors of contamination, trainings have been conducted, literature provided, and decontamination supplies have been purchased and located in City vehicles and offices. A new hot water decontamination station has been installed at the City's maintenance facility for use on boots and small equipment. A pressurized steam cleaner is now available for cleaning large vehicles and construction equipment. In addition to decontaminating personal protective gear like boots and raingear, City protocols require that all involved equipment and any removed sediments must be decontaminated prior to reuse or disposal. Decontamination protocols require pre-planning of all work to avoid contact, minimize risk, and avoid transferring invasive organisms. Unless there is a justifiable reason to go into the potential infestation zone, staff are encouraged not to enter. As draconian as the measures might first appear, after two years no additional infestations have been observed within the City. With this specific invasive species, it is *not* assumed that everyone will remember the proper protocols based on a one-time training. Annual training and review of protocols is now our standard operating procedure.

Recognizing early on that staff are but one means of potential contamination, the City requires all consultants and contractors to prepare a decontamination plan, similar to erosion control plans, any time a contract is associated with aquatic areas within the City limits. The additional construction costs range from 0.3% of project costs for Level 1 decontamination sites to as high as 2.3% for Level II decontamination for a large stream project in an infested area.

### VISUAL IDENTIFICATION & eDNA

The City of Bellevue has initiated a protocol for all construction projects that are in or in proximity to a water body. Prior to advertising a project, City staff conduct a field investigation of the project site to identify if New Zealand mudsnails are visually present. If none are found, then the contractor is required to conduct the Level 1 decontamination protocols. Otherwise, Level 2 decontamination is required through the contract specifications.

Long-term, the limitations of a visual inspection are recognized. The snails are so small that they could be hiding under the proverbial "un-turned stone." In the fall of 2013, City staff became aware of a new technique using environmental deoxyribonucleic acid (eDNA) for detecting mudsnail DNA contained in sloughed-off cells as an indicator of possible infestation. The protocols require only a four liter sample of stream water to analyze for the mudsnail DNA. Working with Dr. Caren Goldberg, formerly at the University of Idaho, a pilot test on drainages within Bellevue was conducted and the results are very encouraging. Given the challenges of visually detecting low infestations of mudsnails, this process has great potential for rapid assessment of a larger watershed and the City is requesting that the Washington Invasive Species Council consider supporting a larger assessment for the Lake Washington drainages.

For the pilot project, Bellevue conducted two blind tests where the lab at the University of Idaho was not aware of the stream infestation conditions. To further validate the testing, City staff worked with Seattle Public Utilities to collect samples in the protected Cedar River Watershed where there are known indigenous snails but no mudsnails. Due to it being a primary drinking water source for Seattle and its client jurisdictions, access to this watershed has been tightly controlled for decades and is therefore at minimal risk of any mudsnail infestation.

Water samples from a highly infested stream, a moderately infested stream, and a lightly infested stream were collected for analysis from Bellevue streams. All samples, even ones where only small water samples were filtered correctly, identified the known infested streams. The sample from the Cedar River Watershed was negative for mudsnail infestation — a validation of the process.

The cost for the eDNA testing is relatively low and reasonable. The total cost per sample (laboratory analysis, filters, shipping, etc.) is approximately \$50. In our pilot test, between three-eight filters (depending on the clarity of the water) were needed to process the full four liters of water. Therefore, the final costs were between \$150-\$400 for individual streams.

Bellevue is very interested in seeing this work further validated and expanded to the entire Lake Washington Watershed. Staff have proposed an annual testing program for Bellevue streams through the current budget process and this testing, coupled with visual observations, is being used on all of the in-stream project sites for 2014 construction activities.

## Mudsnails

### Necessary Actions

Bellevue would like to participate in a comprehensive assessment of the Lake Washington Watershed and/or support state agencies to investigate this further with the intent of making it a standard process for all jurisdictions and agencies should it be further validated.

### CONCLUSION

New Zealand mudsnails have reached Washington State and are a potential threat to recovery efforts for Chinook salmon and other ESA listed species. Widespread application of identification, prevention, and decontamination protocols by all state, federal, local municipal agencies, consultants, and contractors will be vital to slowing or stopping the spread of the snail. Failure to identify and address this threat could well irreparably harm efforts to restore some of the Northwest's most iconic animals.

### FOR ADDITIONAL INFORMATION:

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### Additional Online Resources

WDFW: [http://wdfw.wa.gov/ais/potamopyrgus\\_antipodarum/](http://wdfw.wa.gov/ais/potamopyrgus_antipodarum/)

USGS: <http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=1008>

Oregon Sea Grant: <http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g10001.pdf>

Oregon Sea Grant species guide: [http://seagrant.oregonstate.edu/sites/default/files/invasive-species/toolkit/nz\\_mudsnail.pdf](http://seagrant.oregonstate.edu/sites/default/files/invasive-species/toolkit/nz_mudsnail.pdf)

King County: [www.kingcounty.gov/environment/animalsAndPlants/biodiversity/threats/Invasives/Mudsnails.aspx](http://www.kingcounty.gov/environment/animalsAndPlants/biodiversity/threats/Invasives/Mudsnails.aspx)

Kelly Stockton thesis on wader decontamination: [www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5422690.pdf](http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5422690.pdf)

Snail identification — showing native and non-native: [www.bellevuewa.gov/ais/SnailIdentification.html](http://www.bellevuewa.gov/ais/SnailIdentification.html)

Washington Invasive Species Council: [www.invasivespecies.wa.gov/](http://www.invasivespecies.wa.gov/)

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**Paul Bucich** is the Assistant Director of Engineering with the City of Bellevue, Washington.

He is a Civil Engineer with 27 years of experience supporting or leading a wide range of issues and projects in water resources within the Puget Sound region. He has spent more than 22 years with local municipalities and five as a private consultant. Paul has designed collection and conveyance systems, designed and evaluated regional stormwater facilities, investigated contaminated sediments, and assisted with the Tri-County response to the listing of Chinook Salmon (Pierce County). Mr. Bucich's experience includes watershed planning activities, surface water utility operations, erosion and sediment control for construction, stream restoration, fish passage requirements and design, litigation support, and facilities maintenance requirements. He is experienced in NPDES Phase I and II municipal requirements along with ESA requirements for stormwater and associated habitat improvements.

**Kit Paulsen** is the Watershed Planning Supervisor at the City of Bellevue. She is a marine

and freshwater biologist with over 25 years of experience in aquatic resource restoration and monitoring, watershed planning, and intergovernmental efforts. She has held technical and policy roles for salmon recovery planning, regional and state monitoring committees, transportation mitigation initiatives, local responses to Municipal Stormwater NPDES permits, water supply planning for instream flows, and other surface water programs.



## WATER BRIEFS

**MINING & FISHERIES****AK****EPA PROPOSAL FOR BRISTOL BAY**

On July 18, EPA Region 10 released its proposal to protect Bristol Bay, Alaska's salmon fisheries from the risks posed by large-scale mining at the Pebble Mine. According to EPA, development of this mine, backed by Northern Dynasty Minerals and the Pebble Limited Partnership, would be one of the largest open pit copper mines in the world and would threaten one of the world's most productive salmon fisheries. EPA Region 10 is seeking public comment on its proposal from July 21 to September 19, 2014, and will hold public meetings in Alaska from August 12-15.

"Bristol Bay is an extraordinary ecosystem that supports an ancient fishing culture and economic powerhouse," said Dennis McLerran, Regional Administrator for EPA Region 10. "The science is clear that mining the Pebble deposit would cause irreversible damage to one of the world's last intact salmon ecosystems. Bristol Bay's exceptional fisheries deserve exceptional protection. We are doing this now because we've heard from concerned tribes, the fishing industry, Alaskans and many others who have lived and worked for more than a decade under the uncertainty posed by this potentially destructive mine. Simply put, this will be a uniquely large mine in a uniquely important place."

Based on information provided by Northern Dynasty Minerals to investors and the US Securities and Exchange Commission, EPA estimates the mine would require excavation of the largest open pit ever constructed in North America and would cover nearly seven square miles at a maximum depth of over 3/4 of a mile (Grand Canyon's maximum depth is about one mile). Mine waste, including mine tailings and waste rock, would fill a major football stadium up to 3,900 times. Mine tailings impoundments would cover approximately 19 square miles and waste rock piles that would cover nearly nine square miles would be located in an area with productive streams, wetlands, lakes and ponds important for salmon.

The Clean Water Act (CWA) generally requires a Section 404 permit from the US Army Corps of Engineers

before any person places dredged or fill material into streams, wetlands, lakes and ponds. Under Section 404(c), EPA is authorized to prohibit or restrict fill activities if a project would have unacceptable adverse effects on fishery areas. EPA has used its 404(c) authority sparingly, beginning the process in 30 instances and completing it only 13 times in the 42-year history of the CWA.

EPA Region 10 has initially concluded that mining the Pebble deposit would affect the South Fork Koktuli River, North Fork Koktuli River and Upper Talarik Creek watersheds. The proposed restrictions are outlined in a document called the Proposed Determination. The restrictions are based on the construction and operation of a 0.25-billion-ton mine. This was the smallest of the three mine scenarios EPA analyzed in the Bristol Bay Assessment and is significantly smaller than the mine presented to Northern Dynasty Minerals investors. EPA has determined that even the development of this smaller mine would result in unacceptable adverse impacts.

Based on scientific analysis, EPA proposes to restrict all discharge of dredged or fill material related to mining the Pebble deposit that would result in any or all of the following: Loss of streams — the loss of five or more miles of streams with documented salmon occurrence (coho, Chinook, sockeye, chum, pink); or the loss of 19 or more miles of streams where salmon are not documented, but that are tributaries of streams with documented salmon occurrence; Loss of wetlands, lakes, and ponds — the loss of 1,100 or more acres of wetlands, lakes, and ponds that connect with streams with documented salmon occurrence or tributaries of those streams; Streamflow alterations — streamflow alterations greater than 20% of daily flow in nine or more linear miles of streams with documented salmon occurrence. According to EPA, losses of the nature and magnitude listed above would be unprecedented for the CWA Section 404 regulatory program in the Bristol Bay region, as well as the rest of Alaska and perhaps the nation.

In addition to holding public meetings, EPA will meet with tribes for formal consultation. The Bristol Bay region is home to 31 Alaska Native

Villages. Residents of the area depend on salmon both as a major food resource and for their economic livelihood and nearly all residents participate in subsistence fishing.

**For info:** EPA Bristol Bay website at: [www.epa.gov/bristolbay](http://www.epa.gov/bristolbay)

**GROUNDWATER THREAT WEST****COLORADO RIVER BASIN GW USE**

A new study released July 24 by NASA and the University of California, Irvine (UC Irvine), found that more than 75 percent of the water loss in the drought-stricken Colorado River Basin since late 2004 came from underground resources. The extent of groundwater loss may pose a greater threat to the water supply of the western United States than previously thought. The Colorado River is the only major river in the southwestern US. Its basin supplies water to about 40 million people in seven states, as well as irrigating roughly four million acres of farmland.

This study is the first to quantify the amount that groundwater contributes to the water needs of western states. According to the US Bureau of Reclamation, the basin has been suffering from prolonged, severe drought since 2000 and has experienced the driest 14-year period in the last hundred years. The study has been accepted for publication in *Geophysical Research Letters*, a journal of the American Geophysical Union.

The research team, led by NASA and UC Irvine scientists, used data from NASA's Gravity Recovery and Climate Experiment (GRACE) satellite mission to track changes in the mass of the Colorado River Basin, which are related to changes in water amount on and below the surface. Monthly measurements of the change in water mass from December 2004 to November 2013 revealed the basin lost nearly 53 million acre feet (65 cubic kilometers) of freshwater, almost double the volume of the nation's largest reservoir, Nevada's Lake Mead. More than three-quarters of the total — about 41 million acre feet (50 cubic kilometers) — was from groundwater. "We don't know exactly how much groundwater we have left, so we don't know when we're going to run out," said Stephanie Castle, a water resources specialist at UC Irvine

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and the study's lead author. "This is a lot of water to lose. We thought that the picture could be pretty bad, but this was shocking."

Pumping from underground aquifers is regulated by individual states and is often not well documented.

"The Colorado River Basin is the water lifeline of the western United States," said senior author Jay Famiglietti, senior water cycle scientist at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, on leave from UC Irvine. "With Lake Mead at its lowest level ever, we wanted to explore whether the basin, like most other regions around the world, was relying on groundwater to make up for the limited surface-water supply. We found a surprisingly high and long-term reliance on groundwater to bridge the gap between supply and demand." Famiglietti noted that the rapid depletion rate will compound the problem of short supply by leading to further declines in streamflow in the Colorado River. "Combined with declining snowpack and population growth, this will likely threaten the long-term ability of the basin to meet its water allocation commitments to the seven basin states and to Mexico," Famiglietti said.

Coauthors included other scientists from NASA's Goddard Space Flight Center, Greenbelt, Maryland, and the National Center for Atmospheric Research, Boulder, Colorado. The research was funded by NASA and the University of California.

**For info:** Report at: <http://news.agu.org/press-release/satellite-study-reveals-parched-u-s-west-using-up-underground-water/>

#### CONSERVATION PLAN WEST COLORADO RIVER SYSTEM

On July 30, municipal water providers in Arizona, California, Nevada, Colorado and the federal government signed a landmark water conservation agreement called the Colorado River System Conservation program. The Agreement was designed in support of the Colorado River basin states drought contingency planning to address a long-term imbalance on the Colorado River caused by years of drought conditions. Central Arizona Project, Denver Water, The Metropolitan

Water District of Southern California and Southern Nevada Water Authority are partnering with the US Bureau of Reclamation to contribute \$11 million to fund pilot Colorado River water conservation projects (\$3 million from Reclamation; \$2 million each from the agencies). The projects will demonstrate the viability of cooperative, voluntary compensated measures for reducing water demand in a variety of areas, including agricultural, municipal and industrial uses.

For more than a decade, a severe drought — one of the worst in the last 1,200 years — has gripped the Colorado River, causing the world's most extensive storage reservoir system to come closer and closer to critically low water levels. The Colorado River and its tributaries provide water to nearly 40 million people for municipal use, and the combined metropolitan areas served by the Colorado River represent the world's 12th largest economy, generating more than \$1.7 trillion in Gross Metropolitan Product per year along with agricultural economic benefits of just under \$5 billion annually. As noted in the Agreement at page four: "...recent Colorado River system modeling projections show a serious near-term risk that water elevations in both Lakes Mead and Powell could decline to levels that would trigger shortages and could interrupt the ability of certain municipal users to draw or benefit from water from both lakes and certain hydropower users to benefit from hydroelectric energy generation..."

All water conserved under this program will stay in the river, helping to increase storage levels in Lakes Mead and Powell and benefiting the health of the entire river system by enhancing flows in areas upstream of the reservoirs. "Half of Denver's water supply comes from the Colorado River, so we have a direct interest in the health of the entire system," said Jim Lochhead, Denver Water CEO. "This is a proactive contingency plan for drought years to help secure our water supply future with a balanced, economic and environmental approach. This is clearly the right thing to do for our customers, our future water supply and the basin." The Colorado River System

Conservation program will provide funding for pilot conservation programs in 2015 and 2016. Successful programs can be expanded or extended to provide even greater protection for the Colorado River system.

In order to ensure that local concerns are addressed, and that there is equity and fairness among all parties, in the Lower Colorado River Basin, the Bureau of Reclamation will manage the conservation actions in Arizona, California and Nevada in a manner consistent with past programs, while in the Upper Basin, the Upper Basin states of Colorado, New Mexico, Utah and Wyoming, and the Upper Colorado River Commission will have a direct role in program efforts.

**For info:** Rose Davis, Reclamation, 702-293-8421 or [www.usbr.gov/](http://www.usbr.gov/); Agreement at: [www.usbr.gov/newsroom/docs/2014-07-30-Executed-Pilot-SCP-Funding-Agreement.pdf](http://www.usbr.gov/newsroom/docs/2014-07-30-Executed-Pilot-SCP-Funding-Agreement.pdf)

#### DAM POLLUTION WA/OR CORPS' OIL LEAKAGE SETTLEMENT

A groundbreaking settlement announced August 4 between Columbia Riverkeeper and the US Army Corps of Engineers (Corps) will guarantee an end to uncontrolled toxic oil leakage at eight Columbia and Snake River dams, bringing some of the nation's biggest dams into compliance with the Clean Water Act. The Corps is the largest owner-operator of dams in the US, meaning the settlement could signal a new era of accountability for hydro dams across the country.

The settlement comes a year after Columbia Riverkeeper first sued to end the unchecked pollution. The original suit described dozens of oil spills and chronic oil leaks at the dams. For example, in 2012, the Corps reported discharging over 1,500 gallons of PCB-laden transformer oil at the Ice Harbor Dam on the Snake River. According to the US Environmental Protection Agency (EPA), PCBs cause cancer, as well as a variety of other adverse health effects on the immune system, reproductive system, nervous system, and endocrine system. The oil from the Ice Harbor spill contained PCBs at levels 14,000,000% greater than state and federal chronic water quality standards.

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Highlights of the new settlement include: EPA oversight — within one year, the Corps must apply to EPA for Clean Water Act (CWA) permits for eight of the largest dams on the Columbia and Snake Rivers. Currently, there is little to no oversight; Pollution limits — the CWA permits will limit the amount of oil and toxic pollution discharged by the dams. The permits will require the Corps to install “best available technology” to control spills; Pollution monitoring — for the first time the Army Corps must monitor the amount of pollution being discharged into the largest rivers in the Pacific Northwest; Environmentally friendly oil — the Corps must switch from using toxic petroleum products as lubricants in dams to using vegetable or other biodegradable oils if the Army Corps determines switching is feasible.

The case was dismissed without prejudice and the court retained jurisdiction for the purpose of resolving any disputes that come before the court by petition from the parties. In the settlement, the Corps admitted no wrongdoing, misconduct or wrongdoing, and the parties agreed that there were no admissions of law or fact. The Corps did agree to pay \$143,500 to the Plaintiff.

The eight dams included in the settlement are Ice Harbor, Lower Monumental, Little Goose and Lower Granite in Washington state and Bonneville, the John Day, The Dalles and McNary in Oregon.

**For info:** Proposed Order with Settlement: <http://columbiariverkeeper.org/wp-content/uploads/2014/08/Proposed-Order-with-Settlement-Agreement.pdf>; Brett VandenHeuvel, Columbia Riverkeeper, 503/ 348.2436 or [bv@columbiariverkeeper.org](mailto:bv@columbiariverkeeper.org)

## ESA “RANGE” OF SPECIES US FINAL POLICY ANNOUNCED

On June 27, NMFS and USFWS (the Services) announced a final policy to clarify the interpretation of the phrase “significant portion of its range” in the Endangered Species Act as it applies to decisions to list species as endangered or threatened. Pursuant to the new policy, the Services would be able to list a species as threatened or endangered throughout its range if the best available science shows that the species is

threatened or endangered in a vital portion of that range, the loss of which would put the species as a whole at risk of extinction. That portion of the range would be determined to be “significant.”

Specifically, the policy clarifies a species’ “range” as the geographical area within which that species is found *at the time of the listing determination*. The term “significant portion” is defined to mean a portion of that range whose contribution to the viability of the species is so important that, without the individuals in it, the species as a whole would be in danger of extinction (meriting an endangered status), or likely to become so in the foreseeable future (meriting a threatened status).

The agencies emphasize that the “significant portion of its range” definition will only come into play under certain limited circumstances. If a species is determined to be endangered or threatened throughout all its range, it will be listed as such in its entirety without any further analysis of portions of that range. But if a species is determined to be neither endangered nor threatened throughout all its range and a subsequent analysis reveals it is endangered or threatened within a significant portion of that range, then the entire species will be listed as an endangered or threatened species accordingly. While the Services expect this latter circumstance to arise infrequently, in cases where it does occur, this policy will allow ESA protections to help species in trouble before large-scale declines or threats occur throughout the species’ entire range.

The final policy revised the proposed definition of “significant” to mean “if the species is not currently endangered or threatened throughout all of its range, but the portion’s contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range.” This is a lower threshold than what was previously proposed and will increase the potential for a listing decision to be made based upon the status of a species within a significant portion of its range. The final policy is effective on July 31, 2014. *See also* Water Briefs, TWR #78.

**For info:** USFWS website: [www.fws.gov/endangered/improving\\_ESA/SPR.html](http://www.fws.gov/endangered/improving_ESA/SPR.html)

## PUBLIC TRUST DOCTRINE CA GROUNDWATER REGULATION

On July 14, a Sacramento Superior Court (Court) ruled for the first time that groundwater pumping must be regulated to protect nearby rivers, under a legal rule known as the “public trust doctrine.” Judge Allen Sumner held that Siskiyou County (County) has an affirmative duty to consider the public trust when it issues permits to appropriate groundwater. *Environmental Law Foundation, et al. v. State Water Resources Control Bd., et al.*, Case No. 34-2010-80000583 (July 14, 2014). “If the County’s issuance of well permits will result in extraction of groundwater adversely affecting the public’s right to use the Scott River for trust purposes, the County must take the public trust into consideration and protect public trust uses when feasible.” *Slip Op.* at 12.

The case was filed by the Environmental Law Foundation (ELF), Pacific Coast Federation of Fishermen’s Associations, and the Institute for Fisheries Resources in June of 2010 to stop unregulated pumping of groundwater in the Scott River Valley, located in Siskiyou County. “This is a monumental decision, and changes everything about groundwater in California. California—the only Western State that does not regulate its precious groundwater—is one step closer to the modern world and protecting this vital resource,” said James Wheaton, President of ELF and lead lawyer for the groups.

Judge Sumner is the first to rule that the public trust doctrine protects navigable rivers from “the harm caused by extraction of groundwater...” *Id.* at 8. “If pumping groundwater impairs the public’s right to use a navigable waterway for trust purposes, there is no sound reason in law or policy why the public trust doctrine should not apply,” Judge Sumner concluded. *Id.* at 10. The ruling relied on a watershed case from the California Supreme Court in 1983 to protect Mono Lake, which had been drying up due to diversions of its feeder streams by Los Angeles. *See National Audubon Society v. Superior Court*



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(1983) 33 Cal.3d 419, 446 (*National Audubon*).

The Court's Order was made on various motions for judgment on the pleadings and was therefore made at a preliminary stage of the proceedings. As a Superior Court decision it does not provide direct precedent for other California courts, like a California Supreme Court decision would. The Court was also cautious to limit its ruling, stating that "the court does not hold the public trust doctrine applies to groundwater itself. Rather, the public trust doctrine applies if extraction of groundwater adversely impacts a navigable waterway to which the public trust doctrine does apply." *Id.* at 9.

The County raised several arguments opposing the application of the public trust doctrine, including among others, that the doctrine does not apply to groundwater, because groundwater is not navigable; that "extraction of groundwater is not a diversion" (Court's emphasis; and that the facts in this case (unlike *National Audubon*) do not involve a diversion of tributaries. The Court, however, dismissed these arguments as essentially "distinction[s] without a difference." *Id.* at 9-10. "The end result is the same — less water in a navigable river harming public trust uses." *Id.* at 10.

**For info:** Court Order at: [www.envirolaw.org/documents/ScottOrderonCrossMotions.pdf](http://www.envirolaw.org/documents/ScottOrderonCrossMotions.pdf)

#### ABORIGINAL TITLE CANADA HISTORIC COURT DECISION

On June 26, 2014, the Supreme Court of Canada issued a historic decision for Aboriginal title claims that could significantly impact the implementation of Canada's natural resource and energy policy. In *Tsilhqot'in Nation v. British Columbia*, the Supreme Court granted the Tsilhqot'in Nation (Nation) Aboriginal title to certain lands within their traditional territory in British Columbia, based upon evidence of the Nation's regular and exclusive use of the claimed lands. Significantly, the Court granted title to land beyond specific sites of settlement, to include areas the Nation regularly used for hunting and fishing. Additionally, the Court held that British Columbia had breached its duty to consult with the Nation prior to issuing

logging permits in the claimed title lands, confirming the Constitutional limitations on government activity in areas where an Aboriginal title claim is asserted or established.

Like many indigenous groups in British Columbia, the Tsilhqot'in Nation has unresolved land claims to much of its traditional territory in the province's remote interior. In 1983, British Columbia granted a commercial logging license to an area within the Nation's territory. The Nation objected and filed suit for Aboriginal title, which was opposed by the provincial and federal government. Following several years of litigation, British Columbia's trial court held that the Nation had established Aboriginal title by demonstrating regular and exclusive use of the claimed area; however, on appeal, the British Columbia Court of Appeals reversed the decision, and applied a narrower test of Aboriginal title based on intensive cultivation and site-specific use. The Supreme Court rejected the Court of Appeals' site-specific test and upheld the decision of the trial court, holding that: Aboriginal title may be established by demonstrating regular and exclusive use of the land; in areas where Aboriginal title is asserted, Section 35 of the Constitution Act, 1982 requires the government to consult with First Nations prior to authorizing encroachments; and in areas where Aboriginal title is established, Section 35 of the Constitution Act, 1982 prohibits government encroachment without consent of the First Nation, unless the government can provide a compelling or substantial public purpose.

This decision provides much-needed legal clarity for indigenous groups with unresolved land claims in Canada. By endorsing a contextual Aboriginal title test that takes into account both Aboriginal and common law perspectives regarding ownership and use, the Court has provided a possible pathway for other First Nations to assert title claims in areas used for hunting, fishing, and cultural practices. In concert with the Court's interpretation of the Constitutional limits on government encroachments in Aboriginal title land, this decision will likely have a significant impact on Canada's natural resource and energy

policy, especially with respect to the proposed Tar Sands pipeline. It may also present an opportunity to strengthen strategic alliances in circumstances where Canadian First Nations and U.S. Tribal governments are facing cross border issues of common concern.

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#### RECLAIMED WASTEWATER WA NEW GUIDANCE FOR LOCAL GOV

Washington's Department of Ecology (Ecology) has announced that it is developing guidance for local governments for an approved, standardized, approach to reclaim water. Reclaimed water is treated by sewer plants to ensure it's safe for non-drinking uses, such as irrigating crops, flushing toilets, or even controlling dust. It can also be used to create, restore, and enhance wetlands, recharge groundwater, and increase river flow.

Work paused in 2010 during the recession now picks up where the state left off. Ecology is going back to the beginning of the formal rule-making process, but not on the development and writing of the rule. The completed rule will provide technical standards and efficient regulatory review and permitting for local governments to reclaim water. Ecology is aiming for greater regulatory certainty when facilities want to reclaim water.

Details are on Ecology's website: [www.ecy.wa.gov/programs/wq/reclaim/index.html](http://www.ecy.wa.gov/programs/wq/reclaim/index.html). Ecology will reinstate a Rule Advisory Committee to address lingering issues or questions with the rule as needed.

**For info:** Dennis McDonald, 360/ 407-6321 or [reclaimedwater@ecy.gov](mailto:reclaimedwater@ecy.gov); Reclaimed Water Rules FAQ at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1410034.html>

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**SEWAGE DISCHARGES CA  
CWA SETTLEMENT**

The US Environmental Protection Agency (EPA) announced a Clean Water Act settlement on July 28 requiring the East Bay Municipal Utility District (EBMUD) and seven East Bay communities to conduct extensive system repairs aimed at eliminating millions of gallons of sewage discharges into San Francisco Bay. Under the agreement, EBMUD and the communities will assess and upgrade their 1,500 mile-long sewer system infrastructure over a 21-year period. The work is expected to cost approximately \$1.5 billion. The entities will pay civil penalties of \$1.5 million for past sewage discharges that violated federal environmental law.

Since 2009, EPA, state and local regulators and environmental groups have worked to reduce sewage discharges from East Bay communities. During that period, interim actions required EBMUD and the East Bay communities to improve their sewer maintenance practices and gather information to identify priorities for investment. "For many years, the health of San Francisco Bay has been imperiled by ongoing pollution, including enormous discharges of raw and partially treated sewage from communities in the East Bay," said Jared Blumenfeld, EPA's Regional Administrator for the Pacific Southwest. "Many of these discharges are the result of aging, deteriorated sewer infrastructure that will be fixed under the EPA order."

The settlement is the result of a Clean Water Act enforcement action brought by the EPA, US Department of Justice, the California State Water Resources Control Board, San Francisco Bay Regional Water Board, San Francisco Baykeeper and Our Children's Earth Foundation. The seven East Bay communities in the EBMUD settlement are the cities of: Alameda; Albany; Berkeley; Emeryville; Oakland; and Piedmont; and the Stege Sanitary District.

As part of the agreement, EBMUD and the seven communities will: repair and rehabilitate old and cracked sewer pipes; regularly clean and inspect

sewer pipes to prevent overflows of raw sewage; identify and eliminate illegal sewer connections; continue to enforce private sewer lateral ordinances; and ensure proactive renewal of existing sanitary sewer infrastructure. EBMUD will also immediately begin work to offset the environmental harm caused by the sewage discharges, which are expected to continue until these sewer upgrades are completed, by capturing and treating urban runoff and contaminated water that currently flows to the Bay untreated during dry weather.

The proposed settlement is subject to a 30-day public comment period and final court approval.

**For info:** Settlement at: [http://www.usdoj.gov/enrd/Consent\\_Decrees.html](http://www.usdoj.gov/enrd/Consent_Decrees.html); EPA's national wastewater enforcement initiative at: <http://go.usa.gov/5pak>; San Francisco Bay activities at: <http://www2.epa.gov/sfbay-delta>

**GAO FRACKING REPORT US  
UIC RECOMMENDATIONS**

On July 28, the US Government Accountability Office (GAO) released a report published June 27 entitled "EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement." GAO found fault with EPA's oversight, noting in particular that EPA may not be able to enforce all state program requirements.

Every day in the US, at least 2 billion gallons of fluids are injected into over 172,000 wells to enhance oil and gas production, or to dispose of fluids brought to the surface during the extraction of oil and gas resources. These wells are subject to regulation to protect drinking water sources under EPA's UIC class II program and approved state class II programs. Because much of the population relies on underground sources for drinking water, these wells have raised concerns about the safety of the nation's drinking water.

Overall, EPA and state program officials reported that EPA and state safeguards in place are protective, resulting in few known incidents of contamination. According to GAO,

however, the safeguards do not address emerging underground injection risks, such as seismic activity and overly high pressure in geologic formations leading to surface outbreaks of fluids. EPA officials said they manage these risks on a state-by-state basis, and some states have additional safeguards to address them. EPA has tasked its UIC Technical Workgroup with reviewing induced seismicity associated with injection wells and possible safeguards, but it does not plan reviews of other emerging risks, such as high pressure in formations. Without reviews of these risks, class II programs may not have the information necessary to fully protect underground drinking water.

The GAO also found that EPA is not consistently conducting two key oversight and enforcement activities for class II programs. First, EPA does not consistently conduct annual on-site state program evaluations as directed in guidance because, according to some EPA officials, the agency does not have the resources to do so. The agency has not, however, evaluated its guidance, which dates from the 1980s, to determine which activities are essential for effective oversight. Without such an evaluation, EPA does not know what oversight activities are most effective or necessary. Second, to enforce state class II requirements, under current agency regulations, EPA must approve and incorporate state program requirements and any changes to them into federal regulations through a rulemaking. EPA has not incorporated all such requirements and changes into federal regulations and, as a result, may not be able to enforce all state program requirements. Some EPA officials said that incorporating changes into federal regulations through the rulemaking process is burdensome and time-consuming. EPA has not, however, evaluated alternatives for a more efficient process to approve and incorporate state program requirements and changes into regulations. Without incorporating these requirements and changes into federal regulations, EPA cannot enforce them if a state does not take action or requests EPA's assistance to take action.

## WATER BRIEFS

GAO also found that EPA collects a large amount of data on each class II program, but the data are not reliable (i.e., complete or comparable) to report at a national level. EPA is working on a national database that will allow it to report UIC results at a national level, but the database will not be fully implemented for at least two to three years.

GAO recommends that, among other things, EPA review emerging risks related to class II program safeguards and ensure that it can effectively oversee and efficiently enforce class II programs. EPA agreed with all but the enforcement recommendation. GAO continues to believe that EPA should take actions to ensure it can enforce state class II regulations, as discussed in the report.

**For info:** Report available at GAO website: <http://www.gao.gov/products/GAO-14-555>; Jose A. Gomez, GAO, 202/ 512-3841 or [gomezj@gao.gov](mailto:gomezj@gao.gov)

## USFS GROUNDWATER US

### COMMENT PERIOD EXTENDED

On July 31<sup>st</sup> the US Forest Service (USFS) announced a 30-day extension in the amount of time the public has to comment on a proposal to clarify the agency's direction for groundwater (see Brief, *TWR* #124). The agency proposal is intended to help USFS maintain and enhance water resources on national forests and grasslands. The comment period will now end on September 3, 2014.

According to USFS, the agency currently does not have a consistent approach to evaluating the potential effects to groundwater from the multiple surface uses of National Forest System (NFS) lands or to evaluate the role that groundwater plays in ecosystem function on NFS land. Nor does it have a consistent approach to responding to proposals that require USFS authorization when those proposals might impact groundwater resources. By improving the agency's ability to understand groundwater resources, the proposed directive intends to make the agency a better and more consistent partner to States, tribes and project proponents.

Earlier in July, the Western Governors Association (WGA) expressed concern to Agriculture Secretary Tom Vilsack about the recent proposed directive. In a letter to the Secretary, WGA noted that the proposed directive only identifies states as "potentially affected parties" and asserts that the proposed actions would "not have substantial direct effects on the states." WGA review, however, lead Western Governors to believe that the measure could have significant implications.

The Governors requested that USFS seek "authentic partnership" with the states. The WGA letter also asked a number of questions, including: Given the legislative and legal context, what is the legal basis for the assertion of federal authority in the context of the proposed directive? How will USFS ensure that the proposed directive will not infringe upon or abrogate states' exclusive authority to allocate and administer rights to groundwater?

Will states be able to weigh-in with information regarding the unique hydrology within certain areas?

The USFS' July 31 Press Release stated that "the proposed directive does not specifically authorize or prohibit any uses, and is not an expansion of agency authority. The agency recognizes and honors the States' authority in the allocation and appropriation of water. The proposed directive would not infringe on a State's authority to allocate water, nor would it impose requirements on private landowners."

Through comments on specific proposed USFS decisions, and through other avenues, the public has increasingly indicated that it expects USFS to review and address potential impacts to groundwater resources as part of the analysis it performs to support its decisions and actions.

USFS stated that the proposed directive would allow the agency to clarify existing policy and better meet existing requirements in a more consistent way across the National Forest System.

USFS intends to: Create a consistent approach for gathering information about

groundwater systems that influence and are influenced by surface uses on NFS land, and for evaluating the potential effects on groundwater resources of proposed activities and uses on NFS lands.

Bolster the ability of Forest Service land managers to make informed decisions, with a more complete understanding of the potential impacts for activities on NFS lands to and from groundwater.

Support management and authorization of various multiple uses by better allowing the Forest Service to meet its statutory responsibility to fully analyze and disclose the potential impacts of uses or activities.

### For info:

RE WGA concerns: Joe Rassenfoss, WGA Communications, 720-897-4555  
USGS proposal available at: [www.fs.fed.us/geology/groundwater.html](http://www.fs.fed.us/geology/groundwater.html)

## CLIMATE & UTILITIES US

### REPORT ON EXTREME WEATHER RESPONSE

The report, "*Water/Wastewater Utilities and Extreme Climate and Weather Events: Case Studies on Community Response, Lessons Learned, Adaptation, and Planning Needs for the Future*" examines how water, wastewater, and stormwater utilities — and other local water resource managers — make decisions in response to recent extreme weather events. The report is based on the results of six local workshops, organized to include participants that experienced different types of extreme events throughout a river basin or watershed in various regions of the US. The study examines what happened, how information was used to inform decisions, what institutional dynamics helped or hindered, and how water utilities and their communities plan to manage impacts and build resiliency for future extreme events. The research was jointly sponsored by EPA, NOAA, Water Environment Research Foundation, Water Research Foundation, Concurrent Technologies Corporation, and Noblis.

**For info:** Report available at: <http://cpo.noaa.gov/sites/SARP/CC7C11%20web.pdf>



	<p>Learn how to overcome the challenges of redeveloping contaminated properties in this conference for developers, property owners, cleanup professionals, regulators, &amp; municipalities.</p>
<div> <div> <b>Re-Using Contaminated Land</b> </div> <div> <b>Oct. 2 2014</b>            Seattle, WA         </div> </div> <p><i>Transactions • Technologies • Techniques</i></p>	

**Re-Using Contaminated Land / October 2nd, Seattle**  
**Northwest Environmental Business Council Conference**  
**For information: [www.nebc.org](http://www.nebc.org)**

**Agenda At-A-Glance**

TRACKS	<b>A</b> <i>Development Issues &amp; Tools</i>	<b>B</b> <i>Public Sector Strategies</i>	<b>C</b> <i>Cleanup Approaches &amp; Technologies</i>
7:00	Registration & Continental Breakfast		
8:30-9:15	Welcome & Opening Panel		
9:30-10:45 SESSION 1	Re-Use Project Economics – Critical Factors	Understanding the Business of Redevelopment	Practical Approaches to Cleanup
10:45-11:15	Networking Break		
11:15-12:30 SESSION 2	Managing Liability – Regulatory & Contractual Tools	Financing Public Projects – A Packaged Approach	Innovations in Cleanup
12:30-2:00	LUNCH & Keynote Address: A-P Hurd, Touchstone Corporation		
2:00-3:15 SESSION 3	Paying for Cleanup	Public/Private Development Agreements	Integrating Site-use Planning with Cleanup
3:15-3:45	Networking Break		
3:45-5:00 SESSION 4	Obstacles to Redevelopment	Community-Level Planning & Engagement	Emerging Issues in Remediation
5:00-6:30	Cocktail Reception		

**August 19-20 CA**

**2014 California Adaptation Forum!**, Sacramento. Sheraton Grand Sacramento Hotel. Presented by Local Government Commission & State of California. For info: [www.californiaadaptationforum.org/](http://www.californiaadaptationforum.org/)

**August 19-22 CO**

**The Environmental Bootcamp**, Colorado Springs. For info: [www.epaalliance.com/publictraining.html#](http://www.epaalliance.com/publictraining.html#)

**August 20 WEB**

**Emergence of Wastewater as a New Supply Webinar, WEB**. 1:00 PM. Presented by American Water Resources Ass'n. For info: [www.awra.org](http://www.awra.org)

**August 20-22 CO**

**Colorado Water Congress Summer Conference, Snowmass**. Westin Resort. For info: [www.cowatercongress.org/cwc\\_events/Summer\\_Conference.aspx](http://www.cowatercongress.org/cwc_events/Summer_Conference.aspx)

**August 20-22 CO**

**SPCC & Stormwater Compliance Workshop, Colorado Springs**. Antlers Hilton. Presented by EPA Alliance. For info: [www.epaalliance.com/spccstormwaterworkshop-aug14.html](http://www.epaalliance.com/spccstormwaterworkshop-aug14.html)

**August 25-26 ID**

**Understanding the Snake River Basin Adjudication Resolution, Boise**. Centre on the Grove. Presented by Idaho College of Law, Kempthorne Institute & the Idaho Supreme Court. For info: [www.uidaho.edu/law/newsandevents/upcoming-events/?i=1](http://www.uidaho.edu/law/newsandevents/upcoming-events/?i=1)

**August 25-26 Canada**

**Grey to Green: A Conference on the Economics of Green Infrastructure, Focusing on Health, Toronto**. For info: [www.greytogreenconference.org](http://www.greytogreenconference.org)

**August 25-27 CA**

**Remote Sensing Applications Workshop, Pasadena**. Sheraton Pasadena Hotel. Presented by Western States Water Council. For info: <http://www.westernstateswater.org/remote-sensing-applications-workshop/>

**August 26-28 TX**

**Texas Groundwater Summit, San Marcos**. Embassy Suites & Conference Ctr. Presented by Texas Alliance of Groundwater Districts. For info: [www.regionline.com/builder/site/Default.aspx?EventID=1453503](http://www.regionline.com/builder/site/Default.aspx?EventID=1453503)

**August 28 CA**

**Wetlands Regulation & Mitigation Course, Sacramento**. Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, <http://extension.ucdavis.edu/>

**September 3 AZ**

**Requiem for the Santa Cruz: An Environmental History of an Arizona River (Brownbag), Tucson**. WRRS Sol Resnick Conf. Rm., 350 N. Campbell Avenue, 12-1:30pm. Presented by Arizona Water Resources Research Center. For info: <http://wrrc.arizona.edu/events/all>

**September 4-5 CO**

**Celebrating the Great Law: The Wilderness Act at 50 Conference, Boulder**. Wolf Law Bldg., University of Colorado. Presented by the Getches Wilkinson Center. For info: [www.colorado.edu/law/research/gwc/events](http://www.colorado.edu/law/research/gwc/events)

**September 7-10 TX**

**29th Annual WaterReuse Symposium, Dallas**. The Fairmount Dallas. Presented by WaterReuse Ass'n. For info: [www.watereuse.org/](http://www.watereuse.org/)

**September 9-10 WA**

**Fifth Annual Pacific Northwest Climate Science Conference, Seattle**. University of Washington (Kane & Meany Halls). Presented by Climate Impacts Group (UW). For info: <http://pnwclimateconference.org/>

**September 9-10 WA**

**Introduction to Aquatic Toxicology Training, Kirkland**. ComputerClassroomsinSeattle.com. For info: <https://nwetc.org/course-catalog/etox-410-sept-9-10-2014>

**September 9-12 CA**

**13th IWA Specialist Conference on Watershed & River Basin Management, San Francisco**. JW Marriott Union Square. Organized by Ecological Engineering Research Program at the University of the Pacific & the International Water Association. For info: Chelsea Spier, IWA, 209/ 946-2595, [iwa2014wrwm@gmail.com](mailto:iwa2014wrwm@gmail.com); [www.iwa2014sanfrancisco.org/](http://www.iwa2014sanfrancisco.org/) or [www.eerp.org](http://www.eerp.org)

**September 10-12 WY**

**Wyoming's Big Horn General Stream Adjudication 1977-2014: University of Wyoming Symposium 2014, Riverton**. Wind River Hotel & Casino. Presented by U of Wyoming College of Law. For info: UW College of Law, 307/ 766-6416, [lawmain@uwyo.edu](mailto:lawmain@uwyo.edu) or [www.uwyo.edu/law/events/big%20horn%20symposium/index.html](http://www.uwyo.edu/law/events/big%20horn%20symposium/index.html)

**September 11-12 NM**

**New Mexico Water Law Conference, Santa Fe**. Hilton Historic Plaza. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**September 12 OR**

**2014 Oregon Environmental Cleanup Conference, Portland**. World Trade Center. For info: Environmental Law Education Center, 503/ 282-5220, [info@elecenter.com](mailto:info@elecenter.com) or [www.elecenter.com](http://www.elecenter.com)

**September 15-17 CA**

**Urban Stormwater Management - Integrated, Innovative & Green: 2014 CASQA Tenth Annual Conference, Garden Grove**. Hyatt Orange County. Presented by California Stormwater Quality Ass'n. For info: [www.casqa.org/events/annual-conference/registration-attend](http://www.casqa.org/events/annual-conference/registration-attend)

**September 15-17 KS**

**One Water Leadership (OWL) Summit, Kansas City**. Westin at Crown Center. For info: Hope Hurley, US Water Alliance, 202/ 223-2299, [hhurley@uswateralliance.org](mailto:hhurley@uswateralliance.org) or [www.uswateralliance.org/events](http://www.uswateralliance.org/events)

**September 16-17 TX**

**TCEQ 2014 Water Quality/Stormwater Annual Seminar, Austin**. DoubleTree Hotel. For info: TCEQ: [www.tceq.texas.gov/p2/events/stormwater.html](http://www.tceq.texas.gov/p2/events/stormwater.html)

**September 16-18 MT**

**Wetland Regulations: Understanding Federal, State & Local Regulations & Permitting Process in Montana Course, Bozeman**. MSU. For info: [water.montana.edu](http://water.montana.edu)

**September 17 WA**

**5th Annual Fisheries & Hatcheries Seminar, Seattle**. City University of Seattle, 521 Wall Street. For info: The Seminar Group, 800/ 574-4852, email: [info@theseminargroup.net](mailto:info@theseminargroup.net), or website: [www.theseminargroup.net](http://www.theseminargroup.net)

**September 18-19 OH**

**Ohio Surface Water Conference, Cleveland**. Marriott Downtown at Key Center. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**September 18-19 CA**

**Endangered Species Act Conference, San Francisco**. Hotel Nikko. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**September 21-26 Portugal**

**World Water Congress & Exhibition: Shaping Our Water Future, Lisbon**. Lisbon Congress Centre. Presented by the Int'l Water Ass'n. For info: [www.iwua2014lisbon.org](http://www.iwua2014lisbon.org)

**September 22-23 WA**

**International Columbia River Seminar, Seattle**. Renaissance Seattle Hotel. For info: Law Seminars Int'l, 800/ 854-8009, [registrar@lawseminars.com](mailto:registrar@lawseminars.com) or [www.lawseminars.com](http://www.lawseminars.com)

**September 22-23 TX**

**Texas Water Law Conference, Austin**. Radisson Hotel. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**September 22-24 VA**

**Fish Consumption: Health Risks & Benefits (National Forum), Alexandria**. Westin Alexandria Hotel. Presented by EPA. For info: <http://water.epa.gov/scitech/swguidance/fishshellfish/fishadvisories/fishforum2014.cfm>

**September 25-26 CA**

**GIS for Watershed Analysis: Beginning (Course), Davis**. UC Davis, 1137 Lab - Plant & Environmental Sciences. For info: UC Davis Extension, <http://extension.ucdavis.edu/>

**September 27-Oct. 1 LA**

**WEFTEC 2014: Where the Greatest Minds in Water Meet (Conference), New Orleans**. Morial Convention Ctr. Presented by Water Environment Federation. For info: [www.weftec.org](http://www.weftec.org)

**September 28 LA**

**One Water Innovations Gala, New Orleans**. The Republic. Presented by WaterReuse Ass'n. For info: [www.watereuse.org/node/3226](http://www.watereuse.org/node/3226)

**September 29 CO**

**Hydraulic Fracturing Conference, Denver**. Grand Hyatt. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**October 1-3 CO**

**Colorado Water Officials Ass'n Conference, Steamboat Springs**. For info: Brian Romig, Steamboat Springs Water Commissioner, 970/ 846-0036 or [brian.romig@state.co.us](mailto:brian.romig@state.co.us)

**October 2 WA**

**Re-Using Contaminated Land Conference, Seattle**. DoubleTree Seattle Airport Hotel. Presented by NW Environmental Business Council. For info: [www.nebc.org](http://www.nebc.org)

**October 2-3 AZ**

**Arizona Riparian Council Annual Meeting, Tucson**. Riverpark Inn. For info: <http://azriparian.org/2014/07/09/save-the-date-arizona-riparian-council-annual-meeting/>

**October 3 UT**

**Utah Water Law Conference, Salt Lake City**. Marriott Hotel. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**October 5-8 WA**

**Groundwater Protection Council Annual Forum, Seattle**. WA State Convention Ctr. For info: [www.gwpc.org/events/annual-forum](http://www.gwpc.org/events/annual-forum)

**October 6 CA**

**California Environmental Quality Act Seminar, Santa Monica**. DoubleTree Guest Suites. For info: Law Seminars Int'l, 800/ 854-8009, [registrar@lawseminars.com](mailto:registrar@lawseminars.com) or [www.lawseminars.com](http://www.lawseminars.com)

**October 6-7 CA**

**CalDesal 3rd Annual Conference, Monterey**. Portola Hotel. For info: Ron Davis, CalDesal, 916/ 492-6082, [rond@caldesal.org](mailto:rond@caldesal.org) or [www.caldesal.org](http://www.caldesal.org)

**October 7 CA**

**Hydrology for Lawyers Seminar, Santa Monica**. DoubleTree Guest Suites. For info: Law Seminars Int'l, 800/ 854-8009, [registrar@lawseminars.com](mailto:registrar@lawseminars.com) or [www.lawseminars.com](http://www.lawseminars.com)

**October 7 NV**

**WaterSmart Innovations Conference - Pre-Show Workshops, Las Vegas**. South Point Hotel & Conf. Ctr. See October 8-10 Event. For info: [www.snwa.com/about/news\\_wsi.html](http://www.snwa.com/about/news_wsi.html)

**October 7-9 MT**

**81st Annual Fall Water School, Bozeman**. Montana State University. For info: [www.msun.edu/grants/metc/training.asp](http://www.msun.edu/grants/metc/training.asp)

**October 8-10 AZ**

**Western States Water Council's 176th (Fall) Council Meeting, Scottsdale**. Talking Stick Resort. For info: [www.westernstateswater.org/upcoming-meetings/](http://www.westernstateswater.org/upcoming-meetings/)



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## CALENDAR

(continued from previous page)

**October 8-10 MT**

**Floods, Forests & the Flathead - MT AWRA Conference, Kalispell.** Hilton Garden Inn. Field Trip on 10/8. For info: [www.montanaawra.org/](http://www.montanaawra.org/)

**October 8-10 NV**

**Water Smart Innovations Conference & Expo, Las Vegas.** South Point Hotel & Conf. Ctr. Presented by the Southern Nevada Water Authority. For info: [www.watersmartinnovations.com](http://www.watersmartinnovations.com)

**October 9 WA**

**Comprehensive Review of Hydropower in the Northwest Seminar, Seattle.** Hotel 1000. For info: The Seminar Group, 800/ 574-4852, email: [info@theseminargroup.net](mailto:info@theseminargroup.net), or [www.theseminargroup.net](http://www.theseminargroup.net)

**October 9-10 MT**

**Montana AWRA Conference, Kalispell.** Hilton Garden Inn. For info: Nancy Hystad, MT Water Center, 406/ 994-6690, [nancy.hystad@montana.edu](mailto:nancy.hystad@montana.edu) or [www.montanaawra.org/](http://www.montanaawra.org/)

**October 9-10 CA**

**Russian River Tour, Santa Rosa.** Presented by Water Education Foundation. For info: [www.watereducation.org/toursdoc.asp?id=2979](http://www.watereducation.org/toursdoc.asp?id=2979)

**October 13-16 PA**

**Fracture Trace & Lineament Analysis: Application to Groundwater Characterization & Protection Course, State College.** Presented by Nat'l Groundwater Ass'n. For info: [www.ngwa.org/Events-Education/shortcourses/Pages/241oct14.aspx](http://www.ngwa.org/Events-Education/shortcourses/Pages/241oct14.aspx)

**October 15 CA**

**Understanding the Sacramento-San Joaquin Delta: An Overview of Delta Governance & Regulation Course, Sacramento.** Sutter Square Galleria, 2901 K Street. For info: UC Davis Extension, <http://extension.ucdavis.edu/>

**October 16-17 NV**

**Tribal Water Law Conference, Las Vegas.** Planet Hollywood. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**October 17 CA**

**Ass'n of California Water Agencies Regions 6 & 7 Water Forum, Visalia.** TBA. For info: Katie Dahl, ACWA, 916-441-4545 or [katied@acwa.com](mailto:katied@acwa.com)

**October 18-22 LA**

**WEFTEC: 87th Annual Water Environment Federation Technical Exhibition & Conference, New Orleans.** For info: Water Environment Federation, 800/ 666-0206 or WEFTEC website: [www.weftec.org](http://www.weftec.org)

**October 19-22 CA**

**Ass'n of Metropolitan Water Agencies Annual Meeting, Newport Beach.** Balboa Bay Resort. For info: [www.amwa.net/cs/conferences/future](http://www.amwa.net/cs/conferences/future)

**October 20 AZ**

**Colorado River Conference, Phoenix.** The Arizona Biltmore. For info: CLE Int'l, 800/ 873-7130 or [www.cle.com](http://www.cle.com)

**October 20 WA**

**Wetlands in Washington Seminar, Seattle.** TENTATIVE. For info: Law Seminars Int'l, 800/ 854-8009, [registrar@lawseminars.com](mailto:registrar@lawseminars.com) or [www.lawseminars.com](http://www.lawseminars.com)

**2014 AWRA-WA Annual State Conference**

**Water Resources Infrastructure**  
Emerging Frameworks to Meet Multiple Objectives

**October 23**  
**Seattle, Washington**  
American Water Resources Association Washington Section

Details and registration at  
**[www.waawra.org](http://www.waawra.org)**