

freshwater





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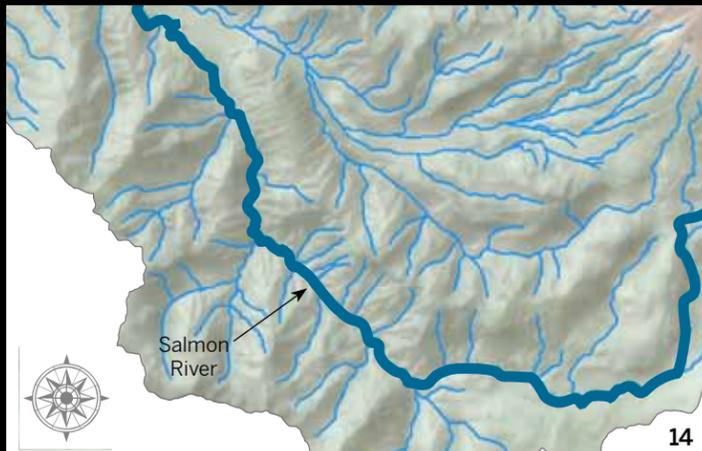
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— ZACK SCHNEPPF

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— DON JACOBSON, www.donjacobsonphoto.com



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From the President



PHOTO BY VIVIAN JOHNSON

“Even ‘best management practices’ can get better, and they must, because doing more of the same will result in more of the same.”

Being state-of-the-art demands relentless and honest self-assessment. Though bedrock principles do not change, how they apply successfully to evolving realities means developing – and embracing – the next generation of techniques. Even “best management practices” can get better, and they must, because doing more of the same will result in more of the same.

Still a relatively new field within conservation (compared to wilderness preservation, for example), restoration continues to gain momentum as a vital response to climate disruption. Given the sheer scale of needed ecosystem resilience in the face of coming pressures, protecting pristine places is but one piece of the puzzle. This is particularly true in the case of freshwater, as this natural resource alone interfaces with every other. From high meadow reconstruction to basin-wide implementation of continuous corridors of river function, restoration is essential to maintaining freshwater resources for habitat, recreation and economic vitality. But if understanding comes first, actualization must follow closely behind if we hope to make a difference in time.

In this issue of freshwater, articles examine aspects of an evolving field, from watershed-scale restoration planning to the importance of improving natural water storage. In addition, Richard Louv, noted expert on the growing epidemic of “nature deficit disorder” among youth, provides valuable insight on how notions of stewardship are most easily engaged at a young age – and daylights this as an area where society has fallen down.

I hope you enjoy the read; maybe even learn something and pass it along. And thank you for your continued support of The Freshwater Trust.

In earnest,

Joe S. Whitworth
President



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Anglers Can Help Make Waterways Healthy

How To Reduce the Spread of Aquatic Invasive Species

by Sean Beers

Aquatic invasive species produce harmful impacts on our freshwater ecosystem function, and they are on the march: more than 4,500 non-native species are found in North America. They can choke habitats, out-compete native species and create conditions for disease and impede fish recovery. An obvious example of how these get introduced is through ballast water containing non-indigenous species, but there are a number of ways in which these travel – including on us and our equipment.

Our world has expanded. Anglers seek to explore beyond their local waters in search of new and exciting fishing destinations. And while we all want to find new water, there comes an associated risk of spreading invasive species. Those in the river community – anglers, equipment manufacturers, industry organizations, conservation groups and public agencies – agree that the spread of invasive species such as zebra mussel and New Zealand mud snail and non-native organisms that cause whirling disease challenge the long-term viability of aquatic health.

“As one of the most challenging environmental issues, aquatic invasive species are reducing game and fish populations, fouling pristine waters and ruining recreational equipment, making lakes and rivers unusable for all aquatic recreation users,” said Joe Starinchak from the U.S. Fish and Wildlife Service.

In response to increasing concerns regarding the impact of aquatic invasive species, a number of entities have studied and analyzed the issue, enacted protective regulations and built awareness of the need to reduce their spread – all evidenced by the growing number of websites, blog posts, media coverage and educational campaigns on this topic from federal, state and private organizations.

Within the angling community, much of the initial attention on how to reduce the spread of invasives has focused on felt soles of wading boots, with some suggesting that banning this material as panacea for preventing their spread. Although felt can play a role in transferring invasives, they can also spread via other mediums, from waders and gear to boats and trailers. And questions remain as to whether an absolute ban on felt would provide enough benefit in addressing the scope of the invasives problem to outweigh the safety benefits it provides, as felt soles are still considered the best option for angler safety under certain river conditions.

According to research conducted by Korkers, a wading boot manufacturer, most anglers choose their outsoles depending on any number of factors, including weather, water conditions, skill level and whether they fish from a boat or a bank. Undoubtedly, anglers want to prevent the spread of invasives while remaining safe by

choosing equipment that best helps them chase fish. Ultimately, the best solution enables anglers to reduce the spread of invasive species while using gear that best fits their needs.

Though the problem of invasive species will continue, the successful solution to preventing their spread will involve many constituents and many actions. Conservation groups can continue to build awareness and provide education regarding the issue, so that the most up-to-date and accurate information is available. Manufacturers can continue to innovate around gear options, including alternative materials for wading gear. Retailers can carry innovative products to expose their customers to all available options. Agencies managing boat launch areas can take responsibility for educating clients and users about the conditions of the waters in which they operate and promote gear cleaning at take-out locations. And most importantly, individual anglers can become educated about the issue, spread awareness to fellow anglers, treat their gear responsibly and follow the Clean Angling Pledge (www.cleananglingpledge.org).

As Dave Kumlien, Executive Director of the Whirling Disease Foundation notes, “What we as anglers need to do is lead the public effort to shift thinking about aquatic invasive species, and to be more aware of the risk of spreading these plants and critters.” There is an old saying that Dave often quips to sum up the appropriate attitude and approach to the invasives issue: “I can’t do everything, but I can do something, and what I can do, I ought to do and what I ought to do, I will do.” That’s an idea I can buy into. 🐟



↑ Top: As anglers seek exciting destinations like Argentina, they are becoming more aware of invasive species. – JIM KLUG

Bottom: Thoroughly cleaning equipment prevents the spread of invasive species. – JEREMY MONROE, FRESHWATERS ILLUSTRATED

Sean Beers is Chief Executive Officer of Korkers Products LLC, an Oregon-based gear manufacturer that is committed to developing innovative solutions that help protect our rivers while promoting angler safety. To learn more about Korkers, please visit www.korkers.com.



↑ Top: Zebra mussel infestation attached to submerged wood in Erie Canal, New York. – WHITNEY CRANSHAW, COLORADO STATE UNIVERSITY, BUGWOOD.ORG

Bottom left: Non-native species like these New Zealand mud snails choke some of our critical waterways. – LARRY MAYER

Bottom right: Close up of a New Zealand mud snail. – U.S. GEOLOGICAL SURVEY

INVASIVE SPECIES FACTS

 42% of listed endangered species are significantly impacted by non-native species.

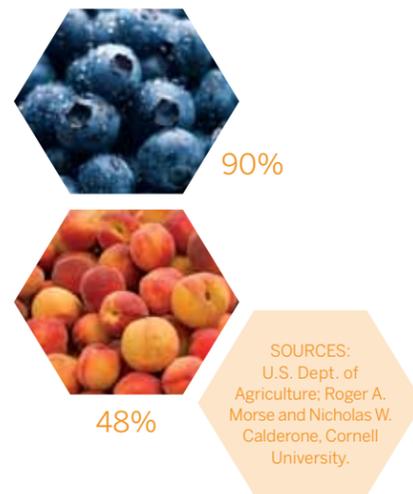
 Non-native species cause an estimated \$137 billion in damages each year.

 Great Lakes water users spend \$30 million annually to monitor and control zebra mussels.

 Number of non-native species in selected freshwater ecosystems:

- San Francisco Bay/ Inland Delta, CA – **234**
- Great Lakes – **139**
- Hudson River, NY – **154**
- Coos Bay, OR – **67+**
- Florida inland – **154+**
- Chesapeake Bay – **120+**

Adapted from Aquatic Nuisance Species Task Force



SOURCES:
U.S. Dept. of
Agriculture; Roger A.
Morse and Nicholas W.
Calderone, Cornell
University.

Put Nature to Work

by Suzanne Greene

NATIVE POLLINATORS

Bumblebee
Bombus sp.



PHOTO BY JOYCE GROSS

Eastern Tiger Swallowtail
Papilio glaucus



Blister Beetle
Lytta magister



To learn more about native U.S. pollinators visit www.xerces.org.

Water quality relies heavily on native plants, and many factors play into how these plant communities function. One getting more attention of late is the vigor of our pollinators. From butterflies to bees, these insects are in trouble. But the good news is that there are some simple and worthwhile things we can do to nurture our native wildlife and help what some deem to be the hardest workers in nature – pollinators.

Plight of the pollinator

You may have heard the news regarding the crisis hitting our native honeybees – whole colonies of bees are mysteriously vanishing from their hives, leaving crops from almonds to apples unable to fruit. While the bees get a lot of press, there are more than 100,000 species of pollinators in the world, many of which are in peril. Though there is a lack of comprehensive research, the population of wild bees, butterflies, bats and hummingbirds are clearly trending downward.

Pollinators are hugely important to our ecosystem and our economy. They control the reproduction of countless plant species that keep our wild areas diverse and productive and form the base of our ecosystems. Drew Merritt, a native plant expert at Humble Roots Farm and Nursery in Mosier, Oregon, says “Our forests would look a whole lot different without pollinators.”

Even more worrisome is our dependence on pollinators for edible and industrial crops, 80 percent of which rely on pollinators for fruit production or reproduction. Indeed, soybean and cherry crops account for \$40 billion worth of products in the United States each year, making pollinators a vital component of our economy as well as our edible food resources.

So what’s happening to our pollinators? Lack of habitat leaves pollinators without places to nest and

forage. Pesticides meant to kill off garden weeds don’t kill indiscriminately. They hit a native bee the same as a boll weevil. Disease and competition from introduced species deplete the already scarce resources and upset the delicate balance developed over centuries of evolution.

Native gardens and pollinator conservation

Native plants have grown and evolved to adapt to the conditions of their ecosystem; once established, they will thrive with no fertilizer, pest control or irrigation. A summer drought is no problem for natives – they are adapted to local climates and do not need additional water or protection.

Using natives in gardens also provides a vital source of food and shelter for wildlife. Merritt says, “Ornamental landscaping plants, those that haven’t evolved alongside our insects, aren’t able to provide the food necessary for a functioning food web,” whereas native plants have co-evolved with vegetable-eating insects of the ecosystem. In fact, “90 percent of herbivorous insects are specialized to eat a single or a few species of plants and only have the enzymes to digest those specific compounds,” Merritt says. Research has shown that landscaping that includes native shrubs instead of ornamentals support 12 times the abundance of native butterflies and trees. Without the habitat and nutrients for insects to nest and grow, these insects won’t exist to fulfill their vital role in pollinating our food crops, trees and flowers.

When it comes to hybridized versions of native plants, there is no room for compromise as far as a pollinator sees it, according to Matthew Shepherd, from the Xerces Society, an organization dedicated to the protection of invertebrates. Hybrids and varieties can breed out the pollen-producing parts of the plant and offer very little food for an insect or none at all. Shepherd says that these plants “don’t

provide a resource, only a distraction.” The bees must move on to find another source of food.

Chaos and the native garden

A messy garden is the key to cultivating native pollinators. While a traditional English garden may call for neatly trimmed hedges, deadheaded flowers and crisp rolling lawns, this model is far from friendly for pollinator conservation. Shepherd says, “If you garden too tidy, you’ll be taking up a lot of useful habitat.” He suggests incorporating these three easy tips for a garden that can help our native wildlife in a simple, cost-effective way.



Create egg laying sites: Pollinator habitat is a key issue affecting populations. Most native bees nest in the ground in excavated tunnels. Try leaving areas of bare, dry ground or sand piles in sunny places for bees to make their homes. Some native bee species prefer dead trees as a nesting site, but old logs or bundles of hollow-stemmed plants like bamboo make a great substitute.



Plant native flowers: Plant a variety of native flowers that bloom throughout spring, summer and fall. Consider leaving dead flower heads on the plant to provide cover and nesting ground for pollinators. Research native pollinators in your region to find species that will serve as a host for caterpillars and butterflies.



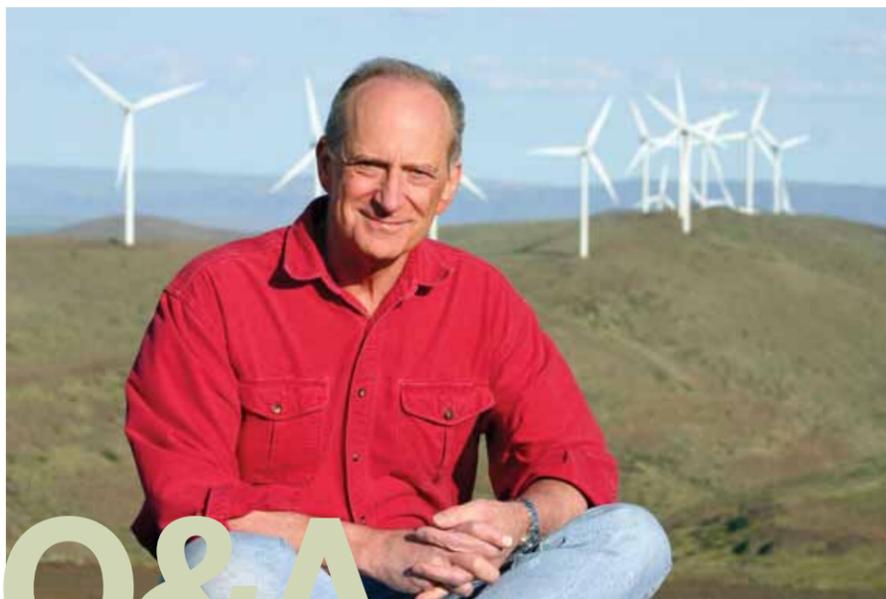
Minimize pesticides: Chemicals that target garden pests may inadvertently affect native pollinators. Plant natives and use organic compounds as sparingly as possible.

Looking for a list of native plants and where to buy them? Visit www.plantnative.org.

Suzanne Greene works for *The Freshwater Trust* and can be reached at suzanne@thefreshwatertrust.org.

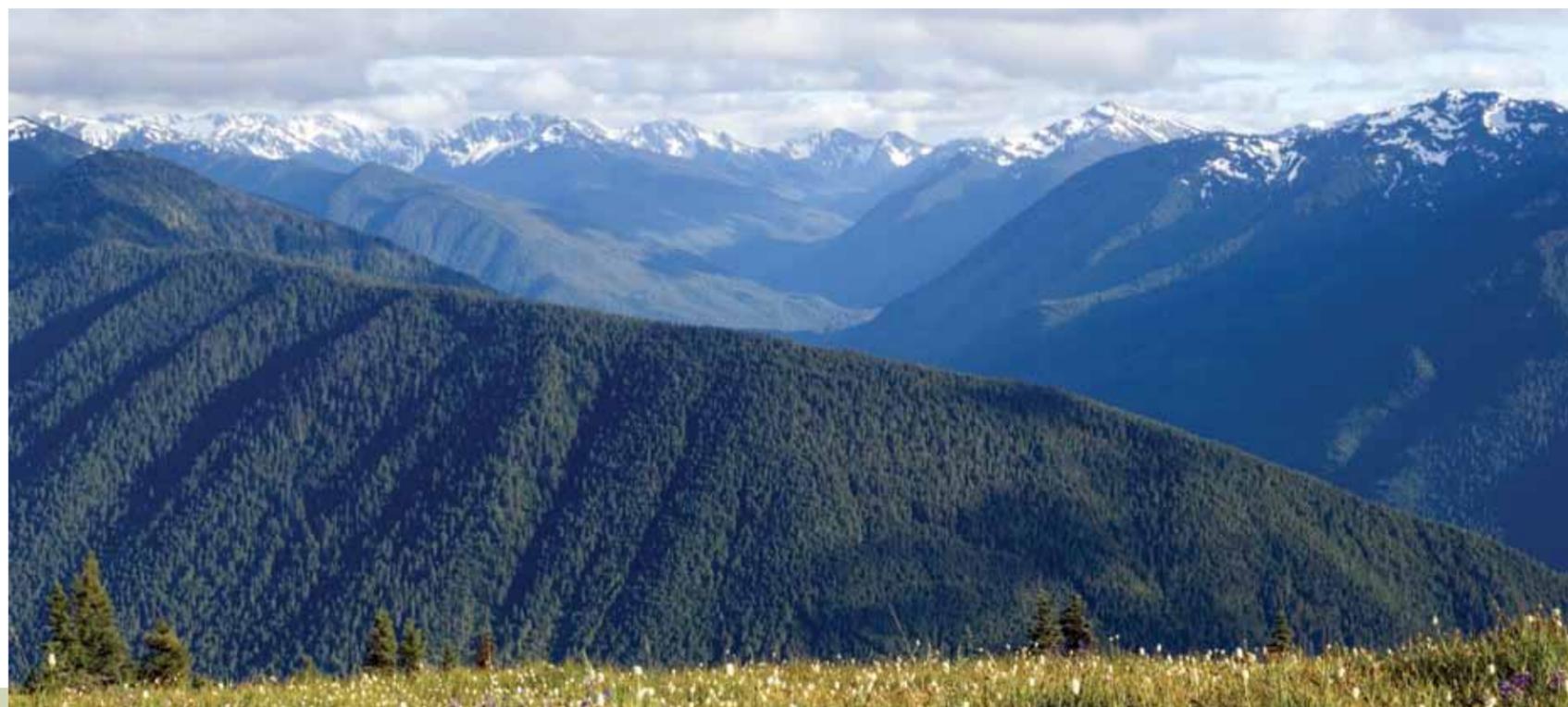


Constructed wetland garden. – SARAH TOMAN-HILDBRAND, ENVIRONMENTAL CONCERN



Q&A

with Denis Hayes Environmental Catalyst



Becoming a practical visionary takes time. You start with a big idea, and then see it through – all the way through. In the case of Denis Hayes, who coordinated the first Earth Day, this means stretching the entire fiber of your being over the course of decades and across a spectrum of adversities. His tenacity in pursuit of an ideal has taken many forms and fueled a remarkable journey that few contemporaries can match; his original fire burns hot still.

Q: With the 40th anniversary of Earth Day this year, what do you think has been the most significant advancement in environmentalism?

A: Amid the raft of far-reaching legislation, landmark legal victories, Presidential Executive Orders, the creation of new professions (environmental lawyers, environmental engineers, green architects, etc.), I think I will single out a fundamental change in public values. When I was growing up, breathing a thick fog of sulfur dioxide was almost-universally considered to be simply the smell of prosperity. Absurd as it now sounds, poisoning ourselves was viewed as a necessary cost of "progress." Today, we all believe that we have a fundamental right to a clean, healthy, sustainable environment. That change in values has allowed us to push for transformational changes in both public and private sectors.

Q: What do the next 40 years look like?

A: The next 40 years will not be shaped by "fate." It will be the sum of myriad discrete choices that we, our elected leaders and our business leaders make. If I focus on 30 years of federal stalling on

addressing climate disruption, 20 years of stalling on endocrine disruption, throwing away our huge lead in renewable energy development, near-total inattention to the hydrological cycle and the nitrogen cycle as well as the carbon cycle, etc., it is easy to get pretty pessimistic. But pessimism isn't in my job description. In Darwinian terms, pessimism offers no survival value.

Q: Can you articulate the difference between conservation and environmentalism?

A: Conservation has a long, proud tradition of protecting natural habitat and wildlife. It conjures up names like Audubon, Muir, Leopold and Roosevelt. Environmentalism encompasses conservation and adds to it a human dimension of public health, urban ecology, sustainable agriculture, biomimicry design, renewable energy sources, etc. Environmentalism views the entire biosphere, including humans, as an interrelated set of ecosystems.

Q: Since 1992, you've been the president of the Bullitt Foundation, whose mission is to protect, restore and maintain the natural physical environment of the

Pacific Northwest. You grew up in Camas, Wash. In your mind, what makes the Pacific Northwest special?

A: The people of the Pacific Northwest are, as a generalization, unusually well-educated, well-read, technically savvy, politically progressive, green and outdoor-oriented. The economy of the region has been swiftly moving into the industries of the future and into sustainable versions of the traditional industries. With the Cascades, the Olympic Peninsula, the Columbia Gorge, Puget Sound and the other extraordinary sources of natural beauty, it inspires deep love from those who live here. This is a near-perfect setting to try to create a sustainable society.

Q: What got you started down this path?

A: Human motivation, even my own, is always difficult to distill into a sentence or two. But a huge part of it was my early recognition that many of the most difficult problems facing society could be solved if we stopped viewing humanity as something somehow apart from nature. Cheap abundant energy let us ignore some of the fundamental principles of ecology for a couple of centuries. I figured that if we could re-learn those principles and begin to redesign our lives around them, we would be happier, healthier and much better off.

Q: What drives you now?

A: I have a daughter and a granddaughter, and I'm genuinely embarrassed at how little progress we've made on the issues to which I've devoted my life. Although I've experienced numerous failures and false starts, I've enjoyed just enough success to let me think I still have some important things to

achieve. Quite literally, when my (now-5-month-old) granddaughter eventually asks me, "Grandpa, why didn't you do more?" I want to be able to honestly answer, "I did everything I could."

Q: Time Magazine coined you "Hero of the Planet." Who is your hero of the planet?

A: To my amazement and joy, the world is quite literally filled with heroes. Every year, the Goldman Prizes, the Blue Planet Prizes, the Heinz Awards, the Tyler Prize, the Sasakawa Prize and innumerable other awards are given to people from around the planet who have done extraordinary things. Many of them worked to protect the environment not just at great financial sacrifice to themselves but also at great personal risk. Every year, I come across more of these true heroes whom I'd never heard of before.

Heroism, as I view it, is a choice that everyone can make. The press is wrong to refer to superb athletes or intellectuals as heroes; most of us don't have what it takes to win a Nobel Prize or an Olympic gold medal no matter how hard we try. But winning, say, a Congressional Medal of Honor is possible for anyone who acts with valor in the face of extraordinary adversity. A hero is the person who paddles out into the waves to rescue a surfer who was bitten by a shark, even though the shark is still around.

Rather than single out one environmental hero of the planet, I'll just express my respect for that element of the human character that leads so very many people to act selflessly on behalf of all humanity, as well as all the other forms of life, in our biosphere. 🌱



EARTH DAY FACTS

 Former Wisconsin U.S. Senator Gaylord Nelson founded Earth Day "to shake up the political establishment and force this issue onto the national agenda." He recalled later, "It was a gamble, but it worked."

 In 1970, Earth Day national coordinator Denis Hayes and his staff organized coast-to-coast rallies. Twenty million Americans took to the streets, parks and auditoriums to demonstrate for a healthy, sustainable environment.

 The first Earth Day led to the creation of the United States Environmental Protection Agency and the passage of the Clean Air, Clean Water and Endangered Species Acts.

 With 200 million people in 141 countries, Earth Day went global in 1990, giving way to a huge boost in recycling efforts worldwide and paving the way for the 1992 United Nations Earth Summit in Rio de Janeiro.

 Earth Day 2000 engaged 5,000 environmental groups who reached out to hundreds of millions of people in a record 184 countries.

Adapted from Earth Day Network

Needed: Natural Leaders in the Children and Nature Movement

by Richard Louv

In our family, as Norman Maclean put it, “there was no clear line between religion and flyfishing.” Or hiking. Or building a fort in the canyon. Or waking, in the old van, to a sun rising over red water.

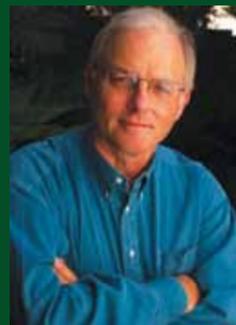
As much as we could, my wife and I raised our sons in the natural world. To our delight, they both understand, in their own individual ways, the healing qualities of nature, as well as its more invigorating aspects. We suspect that knowledge will help them thrive for the rest of their lives.

Now, we need to make sure all children have that privilege – no, make that a right.

Many of us know nature is good for us, we just don’t always know why. And, like many of us, too many researchers have taken the child-nature connection for granted. How could something so timeless change in such a short time? A few years ago, even if some researchers did ask that question, others dismissed it as an exercise in nostalgia. One reason being, there was no commercial reason to ask.

In the 1970s, concern about outdoor air pollution, energy conservation and fear of strangers converged with advances in technology; new houses, workplaces, public buildings and schools became virtual biospheres, sealed from the outside with windows that did not open. Seeking a safe alternative to outdoor play, some parents drive their children to fast-food restaurants and let them loose in admission-free indoor tunnel-mazes and accompanying “ball pits,” as they’re called, which the journal *Pediatric Nursing* describes as seedbeds for the spread of serious infectious diseases. We have grown fat, insulated, inured.

Nature is an abstraction, a tee-shirt otter – until a hurricane or two comes along and levels our assumptions.



Richard Louv, author of “Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder,” is the co-founder and chairman of the Children & Nature Network (www.childrenandnature.org) and recipient of the 2008 Audubon Medal. For more information, please visit www.lastchildinthewoods.com. Segments from “Last Child in the Woods” and his “Field Notes from the Future” blog were included in this article.

A few years ago, while conducting interviews for “Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder,” I had a conversation with a researcher who for years had been studying why some children and adults are more active than others. He was at that time, as he is today, a director of a multi-year, multi-million dollar effort to discover how to design recreational facilities and whole communities so they stimulate people of all ages to be more active.

I asked him what he had learned about how children use woods, fields, streams, canyons and vacant lots – in other words, unstructured natural sites.

“We don’t ask about those places,” he said.

The work the foundation had been sponsoring was important and useful, but the focus of the research, as you might expect, was on the built environment. Research on the health and cognition benefits of nature to children was unlikely to be funded, I soon learned, because of where the research money was most likely to come from: commercial interests who, at least until recently, saw little if any profit to be made in the realm of natural play.

Nonetheless, evidence of a generational break from nature – gathered since the 1980s – has been mounting in the United States and elsewhere.

In the United States, as many of us know firsthand, children are spending less time playing outdoors – or playing in any unstructured way. From 1997 to 2003, there was a decline of 50 percent in the proportion of children nine to twelve who spent time in such outside activities as hiking, fishing, walking, beach play, and gardening, according to a study by Sandra Hofferth at the University of Maryland. Also, Hofferth found that children’s free play and discretionary time in a typical week declined a total of nine hours over a twenty-five-year period. Some investigators suggested that the nature deficit is growing fastest in English-speaking countries. That may be true, but the phenomenon is occurring around the world.

The overarching importance of this accumulated data, combined with the knowledge of other changes in the culture, demanded a shorthand description, so after much thought I came up with the term nature-deficit disorder, which found its way into the book title. The meaning of the phrase was immediately clear. The definition for this admittedly very-unscientific term includes diminished use of the senses, attention difficulties, and higher rates of physical and emotional illnesses. The disorder can be detected in individuals, families and communities. Nature deficit can even change human behavior in cities, which could ultimately affect their design, since long-standing studies show a relationship between the absence

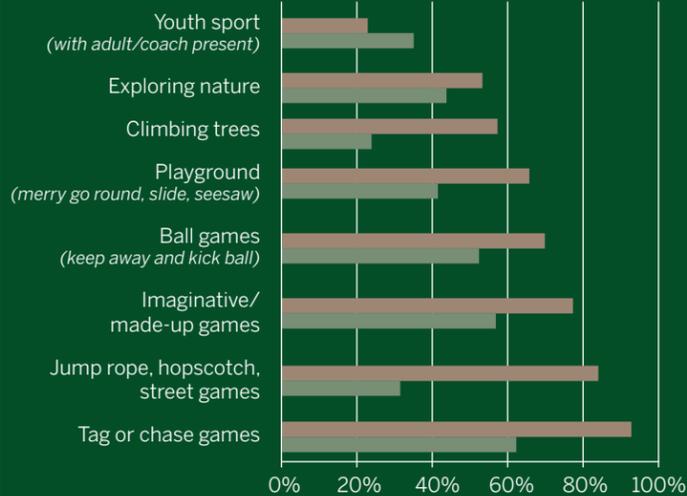


OUTDOOR PLAY

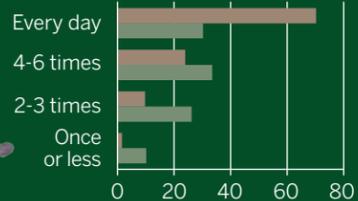
Mother as a Child vs. Their Child

Mother ■ Child ■

Specific Outdoor Activities



Time Spent in Outdoor Play Per Week



Adapted from "An Investigation of the State of Outdoor Play," by Dr. Rhonda Clements

ALEXIS PEWA, 8TH GRADE, REALMS



or inaccessibility, of parks and open space with high crime rates, depression and other urban maladies.

Robin Moore, a professor of landscape architecture at North Carolina State University, first charted the shrinkage of natural play spaces in urban England, a transformation of the landscape of childhood that occurred within a space of fifteen years. Another British study discovered that average eight-year-olds were better able to identify characters from the Japanese card trading game Pokémon than native species in the community where they lived: Pikachu, Metapod, and Wigglytuff were names more familiar to them than otter, beetle and oak tree. Similarly, Japan's landscape of

From 1997 to 2003, there was a decline of 50 percent in the proportion of children nine to twelve who spent time in outdoor activities.

childhood, already downsized, had also grown smaller. For almost two decades the well-known Japanese photographer Keiki Haginoya photographed children's play in the cities of Japan. In recent years, "children have disappeared so rapidly from his viewfinder that he has had to bring this chapter of his work to an end," Moore reported.

"Either indoor spaces have become more attractive, or outdoor spaces have become less attractive – or both."

What do we miss seeing, hearing and knowing because we allow modern-day demands, and that tangle of high-tech electronic wire, to tighten a little more each day?

KEENAN GIAMANCO, 8TH GRADE, REALMS

After "Last Child" was published in 2005, I received messages of concern from people in Africa, India, Europe, Australia – so, clearly the childhood break from nature is part of a larger dislocation: physical restriction of childhood in a rapidly urbanizing world, with nature experience a major casualty.

Since then, many of us have been encouraged by the emergence of an international movement to connect children to nature. Many of the people who devote their lives to reconnect children with nature have been doing this kind of work quietly for a long time, and continue to do so. Now they are not so alone.

Legislation has been passed in several states to encourage the child-nature reconnection; dozens of peer-reviewed studies have become available online; 71 Grassroots Leadership Campaigns are under way in North America, at last count on the Children & Nature Network (C&NN) website, www.childrenandnature.org; and many other international, national and local programs further the cause, some of them government funded. The public has an opportunity to hear a number of youngsters tell about their experiences as watershed stewards at Students Speak: A Watershed Summit, to be held in Bend, Oregon in May. These students now have a personal connection to their home waters. Through them, so do we.

These and other young people could emerge as the most important leaders in children and nature movement.

Recently, the Children & Nature Network, which I chair, launched the Natural Leaders Network, a campaign to engage teenagers, college students and other young people in the movement. Our goals: to network young people; support new and existing programs for outdoors youth involvement; and encourage them create innovative ways to serve as catalysts and leaders.

"Often we find that the people who are talking about connecting youth with nature are not so young, so the Natural Leaders Network seeks to connect all the youth who are already doing so and those who want to but don't know where to look for a support system," says Juan Martinez, coordinator of the Natural Leaders Network.

His personal story is a testament to the power of nature to help young people develop their own leadership. Now 25, he grew up in South Central Los Angeles. Suzanne Bohan, a reporter for the Bay Area News Group, wrote in 2007: "A glorious night sky filled with piercing

stars changed Juan Martinez's life forever when he was 15 and on the edge of entering a life of gangs, drugs, fast money and violence ... After he stepped off a bus at Grand Teton National Park in Wyoming,

dispatched as part of an ecology program at his South Central high school in Los Angeles, the night sky dazzled him." Martinez told Bohan, "I'd never seen anything like it. It was curiosity that came back to me. And I started realizing my life could be more than just what I thought possible."

After that experience, Martinez rejected any gang affiliation. He went on to become the statewide volunteer coordinator for the Sierra Club's Building Bridges to the Outdoors program and director of C&NN's Natural Leaders Network. He hopes to become an environmental lawyer.

We believe there are thousands of young people who will join the movement to connect all of us to the natural world. 🌱



Students take part in tree planting and water monitoring as part of the Sandy River restoration project. For more information on the project and student involvement, see pages 14 and 24.

– HEIDI HOFFMAN, HEIDIHOFFMANPHOTOGRAPHY.COM

Students Speak: A Watershed Summit

Keynote Speaker – Richard Louv

McMenamins Old St. Francis School, Bend, Ore.
May 13th, 2010 • 10 AM – 3 PM

The Freshwater Trust, Upper Deschutes Watershed Council and WolfTree are coordinating a watershed summit for local students to present their innovative watershed projects in art, science, videography and hands-on restoration with community members, parents, teachers and other students. These outdoor experiences build upon experiential watershed education practices that support the philosophies of Richard Louv. For more information and tickets, contact kolleen@thefreshwatertrust.org.



ELI HOPPER, 8TH GRADE, REALMS



Restoration at **SCALE**

A WHOLE WATERSHED APPROACH

by Alan Horton

Over the past 20 years in the relatively new field of stream restoration, agencies, non-governmental organizations (NGOs) and others have developed a growing tool kit to improve river function – from comparatively simple efforts like removing invasive plants, restoring riparian vegetation and water rights leasing and flow restoration to highly-engineered projects like dam and road removal. Though these efforts are scientifically sound, they are often applied piecemeal with projects sporadically implemented around watersheds. As John MacDonald, a board member at Tualatin Soil and Water Conservation District puts it, “We are guilty of random acts of conservation.”

Restoration professionals have long sought to knit disparate projects together within a watershed to provide the contiguous corridors of healthy function required for complete stream restoration. This ambition proves challenging in the real world, however. Land ownership along streams is largely mixed with public parcels sandwiched between private owners. Indeed, many of the streams that need attention run on private lands, but recruitment of private landowners to the cause of stream restoration is slow. While most landowners support the goals of restoration – improved water quality and aquatic habitat – involving them in implementing a project

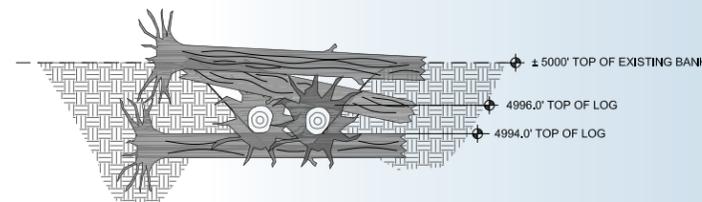
requires time and planning, alongside proof that the project will not unduly impact land-based businesses or cost the landowner significant amounts of money. Most restoration professionals believe that the best way to engage landowners is by pointing to a neighbor who has successfully completed a project, as proof that restoration can benefit land and water, from urban areas to working landscapes.

Why Whole Watershed Restoration Matters

Rivers and streams are like blood vessels. Smaller, stream “capillaries” join main river “veins” that carry water to the mouth, akin to blood vessels carrying blood back to the heart. The key here is flow: blood does not stop and wait around in one spot (or at least, it shouldn’t). It moves continuously. A healthy circulatory system requires entire lengths of blood vessels to be free of blockage and disease. When examining circulation, doctors do not focus on disconnected, random points along the blood’s route; they view the entire system and prescribe diet, exercise or medication intended to maintain systemic health.

While most agencies and restoration professionals value whole system approaches to restoration, actual application of that strategy is rare. Instead, “random acts of conservation” throughout the system provide localized benefit to flowing water. Comparing a river system to your circulatory system, let’s suppose you paid no attention to

Restoration is more effective using a whole watershed approach.

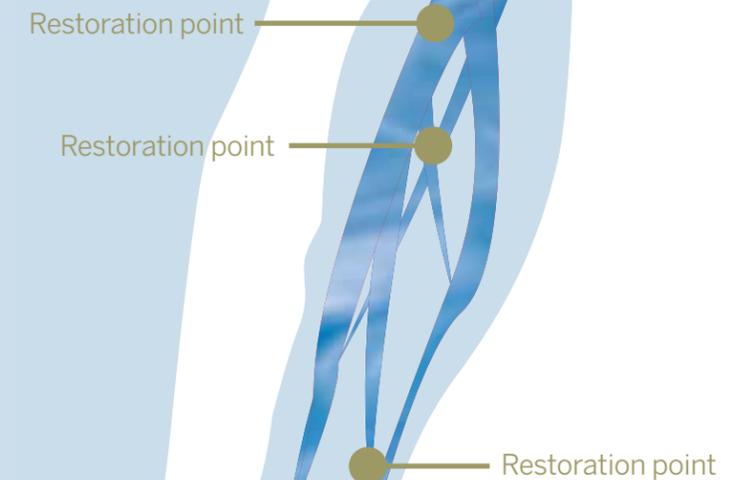


overall system health, eating fast food for every meal and resisting all exercise. Rather, you periodically elected surgery on three or four random blood vessels, making sure those short sections were healthy. The problem is, blood flows. If the areas before and after the surgically repaired areas grow clogged and unhealthy, circulation throughout the body suffers, despite the special attention paid to certain segments. Over time, this strategy will fail, and the body will no longer enjoy the full circulation needed to function.

River systems are no different. If water in a given stream is too warm due to lack of adequate riparian shade, we cannot lower that water temperature by restoring a small percentage of shady areas. Water flowing out of a hot, shade-free region through a short, shady section, and then through another hot stretch stays hot. A significant percentage of the entire stream must be shaded to have a meaningful impact on that stream’s temperature. The same is true with salmon and steelhead habitat. Returning adult salmon need resting spots (often called “refugia”) along a river, as they migrate to spawning areas, and juvenile salmonids need these same pools and other holding areas to rear prior to their trip to sea. Along a 50-mile stream, refugia must be spaced frequently if salmon are to use the stream for migration and spawning – one or two spots along the entire river are not enough.

HOW RESTORATION OFTEN HAPPENS

Water flows within rivers systems like blood flows through the body. Today, “random acts of conservation” along rivers are akin to spot treatments within the human circulatory system – neither leads to systemic health and overall function.



BUT WHAT ABOUT THE REST OF THE SYSTEM?

Sandy River Basin Partners

Association of Northwest Steelheaders
Bureau of Land Management
City of Portland Water Bureau
Clackamas County Dept. of Transportation & Development
Columbia Land Trust
East Multnomah Soil & Water Conservation District
The Freshwater Trust
METRO
Multnomah County
National Marine Fisheries Service/NOAA Fisheries
The Nature Conservancy
Oregon Department of Fish & Wildlife
Sandy River Basin Watershed Council
U.S. Fish & Wildlife Service
U.S. Forest Service
Western Rivers Conservancy

For more information about the Sandy River Basin Partners please visit www.sandyriverpartners.org.



The Whole Watershed Challenge

With general consensus that a whole watershed approach is needed, and general understanding that engaging private landowners remains a significant challenge, what is the best path forward to restoring entire basins? Examples of successful application of a whole watershed approach are rare, but offer valuable lessons for other basins. One such example is the Sandy River Basin near Portland, Oregon.

One Case: The Sandy River Basin

In the fall of 2006, the Sandy River Basin Partners stamped their final approval on a remarkable document. The Sandy River Basin Aquatic Habitat Restoration Strategy was developed over several years by 12 collaborative partners. The document outlines a scope of work to undertake every single known restoration action in the basin, one of the first comprehensive, basin-wide, restoration strategies ever developed.

The Sandy River Basin Partners, formed after Sandy River salmon and steelhead were listed under the Endangered Species Act, originally gathered in the late 1990s to sign off on a new Habitat Conservation Plan with the City of Portland for the Bull Run watershed – long the primary source of Portland’s drinking water. Later, this same group expanded to discuss watershed implications from Portland General Electric’s planned removal of the Marmot Dam in 2007 and Little Sandy Dam in 2008. That gathering accelerated into a broader effort to plan basin-wide restoration. The resulting strategy jumps off the dam removals and continues today with tiered implementation of projects, starting with large scale restoration of the Salmon River, a major tributary of the Sandy, as well as the Sandy River corridor below Zigzag River near Welches, Ore. to the mouth, and Still Creek. According to the plan, more work along the Sandy mainstem and other tributaries will follow.

The Partner’s vision was grand yet straightforward. They recognized the decline of anadromous fish populations in the Pacific Northwest was generally attributed to the effects of the “four Hs”: harvest (fishing), hatchery impacts, hydroelectric facility operations and habitat degradation. Portland General Electric was already planning to remove one of the “H”s from the Sandy River Basin equation with the decommissioning of its hydroelectric dams. Harvest and hatchery issues were being addressed by Oregon Department of Fish and Wildlife’s 2001 Sandy River Basin Fish Management Plan. Therefore, the Partners chose to focus on the final “H” – habitat required to rebuild wild salmon and steelhead populations. This kept the scope of work manageable and focused, yet the vision remained grand: to identify and implement every known restoration action within the basin. The Partners believed that a complete basin strategy would aid in fundraising for projects, as state and federal agencies would more readily support efforts in line with a basin-wide strategy. In turn, readily available funding and a comprehensive vision would aid in landowner recruitment. These assumptions proved valid, as funding flowed into projects and early landowner participation hovered near 100 percent.

The restoration plan for the 33-mile long Salmon River addressed all significant limiting factors for the subbasin. Efforts began in 2008 and will continue through 2011. Actions include the restoration of about 20 historic side channels; the removal of invasive plants, such as Japanese

With guidance from restoration professionals, a Chinook helicopter placed large logs instream, many were provided by Oregon Department of Transportation as they clear trees for highway work.

Everybody needs to look after their entity’s interests, but the end game ultimately is restoring wild fish and functioning watersheds.

knotweed and reed canary grass; and the replanting of riparian areas to shade the river and side channels. In addition, placing large logs instream to create rearing pools and increase stream complexity.

The Salmon River work has been successful so far, with strong financial and organizational support from state and federal agencies, implementation of projects on publicly owned land and nearly complete participation from private landowners. These early efforts validate the watershed-wide approach and provide a roadmap for similar efforts in other basins. Duane Bishop, Supervisory Fisheries Biologist for the Zigzag Ranger District with the U.S. Forest Service, has been involved with the Sandy River Basin Partners since the very beginning.

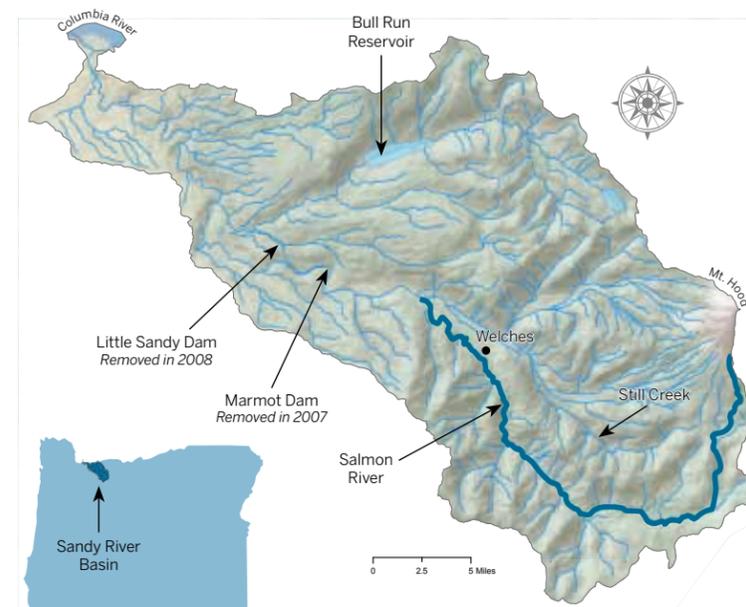
“While every basin is unique, others can apply lessons learned from what we did in the Sandy,” says Bishop. “Not so much the specific steps we set, but any group going about a basin-wide plan needs to buy off on an upfront, clear goal, and all the participating parties must commit to stay at the table until the task is done. We did that and it worked.”

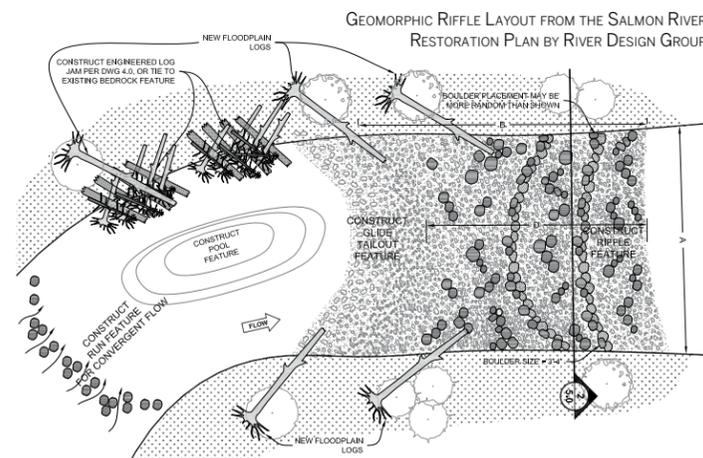
Although Bishop has been involved in the effort since the beginning, others joined later or representatives changed. Every time someone fresh came in, though, they bought off on the group’s practical objectives.

“Everybody needs to look after their entity’s interests, but the end game ultimately is restoring wild fish and functioning watersheds,” says Bishop. “We were not afraid to ask anyone, ‘How does your agency or NGO help fish and watershed health?’ If it didn’t we would move past it and keep going. Everyone got called out if they were not working towards our clear goals.”

Bishop emphasized that NGO involvement is critical. “There are lots of things agencies cannot do that NGOs can, from seeking certain grants to lobbying. They also bring passion and real commitment to that basin.”

NGOs often have better success with landowner recruitment as well, as many landowners are reluctant to talk with government representatives. When agencies do engage with landowners, however, the comprehensive planning work is critical.





A clear objective, good data and comprehensive planning are key to advancing a whole watershed approach. These elements also help to engage landowners who might be reluctant to restoration efforts.

“When I show up on a private landowner’s doorstep, I always have one document with me: the [Sandy River Basin Aquatic Habitat Restoration] Strategy. Landowners need to see a thoughtful plan based on eight or nine years of analysis. It’s much more saleable if they know you’ve thought it out,” says Bishop.

John Borge, a landowner on side channel 18 on the Salmon River, agrees. “This group has shown that they have the science down. That helps sell the landowners. For the most part, folks understand the pressures on species, and they want to help.”

Borge also believes that landowners’ knowledge of stream restoration varies significantly – some are very familiar with the science and practice of restoring rivers, while others have a lot more concern, largely due to incomplete understanding. A comprehensive strategy helps bridge that gap.

“In that sense, the Salmon River is a microcosm of rivers everywhere, with different kinds of landowners with many different intentions,” explains Borge. “Some here have homes on the river, which are precious to them. Others have investments, and are naturally leery of how restoration may complicate future development. And the elephant in the room are the potential implications of restoration on future flooding.” Borge adds that most landowners understand the

inherent risk of owning property next to rivers, but that fear, among others, is eased by comprehensive planning.

“And that’s what they got right with the Sandy. This was a consortium of government agencies and conservation groups working together, groups that were not always on the same page in terms of priorities. This model shows it can be done.”

In terms of funding projects, Duane Bishop points out that comprehensive planning is also essential when seeking grants, since most grantmakers ask about basin-wide strategies. “A good plan puts you well ahead of most grant seekers,” he says.

In terms of advice for others seeking a basin-wide strategy for their watershed, Bishop keeps it simple. A clear objective is crucial, but so is a well-informed, and preferably NGO, convener.

“You need to identify critical issues and drivers, known by all the partners, so there’s an informed footing,” says Bishop.

Advancing the Whole Watershed Approach

As Duane Bishop recounts the process for developing the Sandy River Basin Aquatic Habitat Restoration Strategy, clearly a lot of work is involved. Still, clear ingredients for success emerge:

- ➔ A knowledgeable NGO to act as convener, and to help secure funding from sources only available to NGOs. Conservation groups or watershed councils are good candidates.
- ➔ Good data. The Sandy River Basin Partners had years of watershed analysis to draw upon. “Quality data is essential,” says Bishop.
- ➔ A clear objective, set at the start. The Partners elected to focus on habitat restoration actions required to meet known limiting factors for the basin. They did not set strategies around harvest or hatcheries, and hydroelectric facility impacts were already being addressed. This allowed the group to focus on a targeted scope of work.
- ➔ Finally, a commitment from all participants to remain engaged until the work is done is key to the success of the whole watershed approach. 🌱

Alan Horton works for The Freshwater Trust and can be reached at alan@thefreshwatertrust.org.

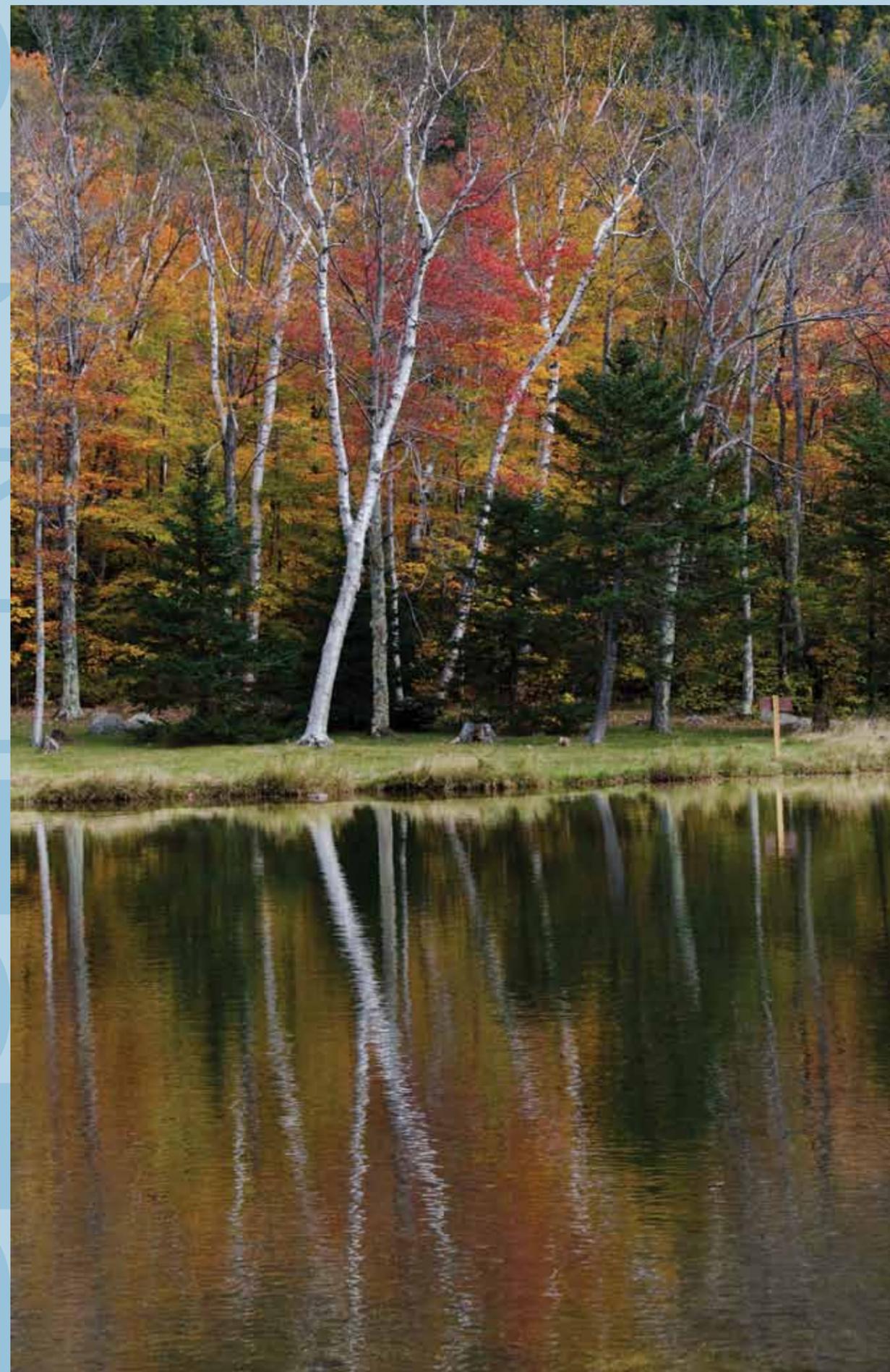
Challenges to the Whole Watershed Approach

Even with robust planning and comprehensive landowner recruitment, there remain other significant challenges to the whole watershed approach that are being addressed by various agencies and conservation groups.

Funding: While planning makes funding easier, it is still time-consuming and difficult to access for many local restoration professionals and landowners. Many state and federal grantmakers are currently working with NGOs to advance more streamlined access to funding, such as Oregon Watershed Enhancement Board’s Special Investment Partnerships, which apply significant resources to targeted basins with basin-wide planning.

Permitting: Permitting processes can slow project implementation. Many of the regulatory hurdles put in place through legislative and administrative efforts were originally intended to slow impacts, but have the largely unintended effect of slowing restoration. Work is underway to ease these barriers. In Oregon, for instance, the Department of State Lands recently advanced legislation to exempt certain restoration actions from the state permitting process.

Local capacity: Restoration projects are best implemented locally, with professionals on the ground who can combine and leverage local geographic knowledge and landowner relationships with project implementation elements like local contractors, nurseries and school programs. Further, as barriers to restoration projects are lowered, improving the capacity of local entities to manage greater volume becomes essential.



Blue Prints



← (previous page)
New Hampshire's Crawford Notch State Park.
— DON JACOBSON
www.donjacobsonphoto.com

→ The net drying loft in Astoria, Oregon. — RACHEL HOUGHTON

↓ Left: Kayaker on Bear Creek in Montana's Bitterroot Mountains. — JASON SHREDER

Right: Waterfall in Silver Falls State Park near Salem, Oregon. — IVAN STANIC



Want to see your photo in Blue Prints?

Whether it's a photo of you fishing, kayaking or just a beautiful shot of a stream, send your stunning freshwater shots to photo@thefreshwatertrust.org. Make sure to include the details: who, what and where.



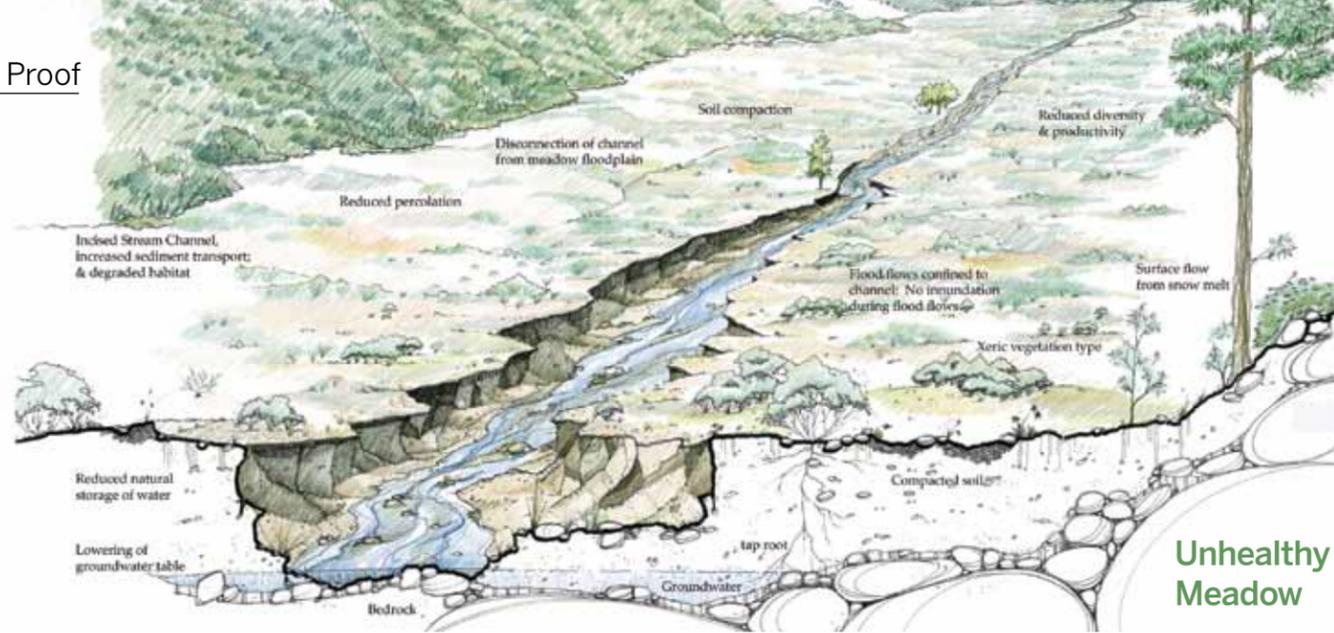
← Left: Rainland Fly Club member Burt Went enjoying a fall morning on the Nehalem River in Oregon. — STEVE WASCHER

Right: Stream crossing in the Waipi'o Valley on the Big Island of Hawaii. — JENN GREENE

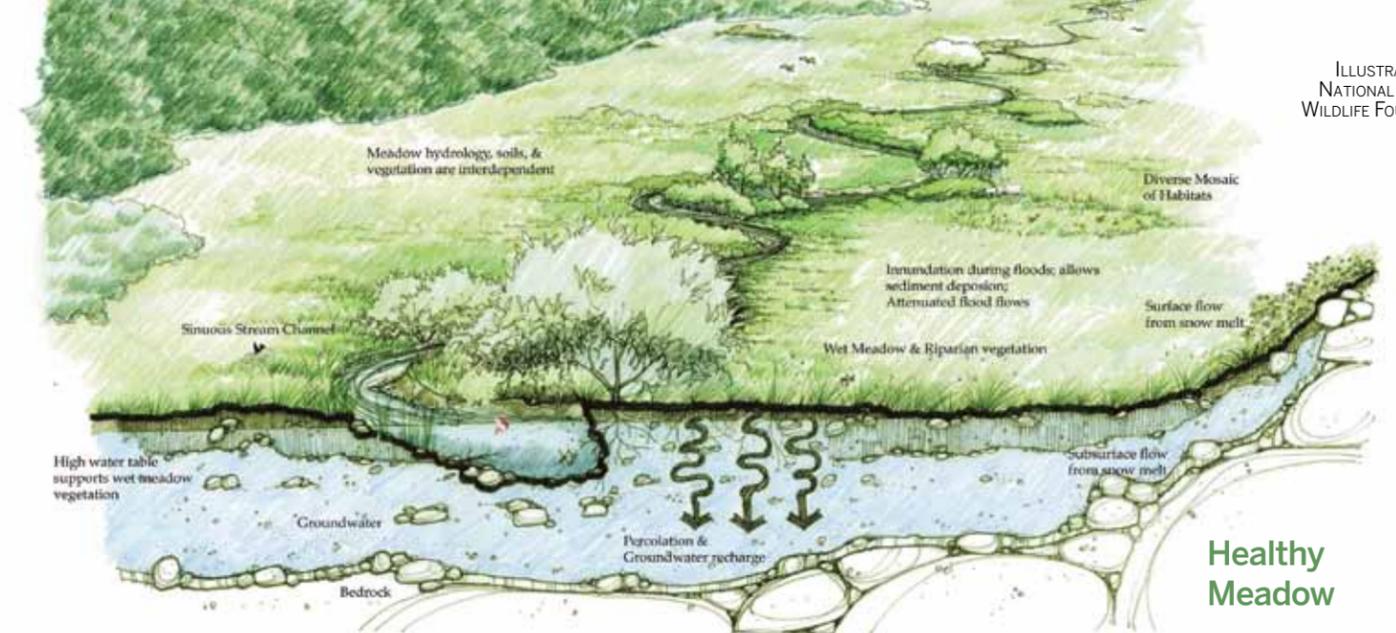
↓ Top: Getting ready to cool off in Montana's Flathead Lake, the largest freshwater lake west of the Mississippi River. — MARLEY GADDIS

Bottom: Grasses growing in the North Fork Rogue River, Oregon. — PHIL MENDIGUREN





Unhealthy Meadow



Healthy Meadow

ILLUSTRATIONS BY NATIONAL FISH AND WILDLIFE FOUNDATION

High Elevation Meadow and Floodplain Restoration:



by Ken Bierly

While climate change is being publicly debated, clear evidence indicates warming and changes in precipitation patterns. These changes make it imperative to understand management options for watersheds to absorb, store and slowly release water. Human activity has greatly reduced the fish and wildlife habitat of high elevation meadows and floodplains. Restoration of these areas can bring back these habitats and improve the storage of water within the watershed.

Ecological and Agricultural Implications of Flooding

Variations in stream flow reflect precipitation and temperature patterns. Extreme events are called floods, or droughts. Historically, flooding has largely been treated as a nuisance due to impacts on agricultural crop production and residential development. Flood events shape stream channels, move natural materials (e.g., trees, rocks), and recharge wetlands, side channels, and streamside meadows, thereby creating the pools, cover and other habitat important to fish, water quality and wildlife. Climate change is predicted to increase flood events as well as drought periods by shifting the timing and volume of snow-melt and converting many snow-dominated stream systems to rain-dominated systems.

Flooding Policy and Declining Beaver Populations

Damage to high elevation meadows started early by economic forces. The Hudson Bay Company tried to create a “beaver desert” to keep out American trappers. This practice significantly reduced beaver populations in the western U.S., causing impacts still felt today. Beavers dams were and still are an integral part of the western landscape and its mountain

meadows; they slow runoff and push water to the surface, creating ponds and increased connection between the floodplain and stream. In a sense, beavers are the original hydrologic engineers.

Historically, the federal government treated flooding as a local matter and played no role in either flood abatement or damage mitigation. Beginning with the 1936 Flood Control Act and subsequent versions, the federal government took an active role, authorizing channel straightening, streambank hardening and removal of logs and gravel bars as federal activities, sometimes cost-shared by local sponsors. The typical reaction to regular flood events was to construct works to move water faster downstream and “protect” property and structures susceptible to flood damage. While these federal acts did not apply to all lands, the engineering concepts developed were used to advise landowners in agricultural areas served by the Soil Conservation Service and the State Engineer when advising drainage and flood control districts.

The result of engineering concepts focused on straight streams with smooth channels, combined with the loss of beaver populations, was alteration of aquatic ecosystems on a massive scale – from floodplains in high elevation mountain meadows to estuarine channels affected by daily tides. Primary impacts on high elevation meadows have been rapid loss of both snow-melt and rainfall due to quick conveyance through these simplified habitats to lower elevations. In turn, this has created destabilized, steep streambanks and meadow desiccation. Compared to historic conditions, many floodplains and meadows are disconnected from their streams, less able to retain and store water or provide critical habitat. Research on habitat loss in the Blue Mountains of Oregon confirms a link between degraded stream habitat and activities including beaver removal and channel straightening.

Creating Resilience in the Face of Climate Change

These activities also played a role in the listing of bull trout and 27 runs of salmon and steelhead in the Pacific Northwest under the Endangered Species Act.

Reversal of these habitat losses requires treatment of entire systems, from the headwaters to the estuary. Uplands that feed streams below play an important role in maintaining stream hydrology. While whole watersheds require attention to the specific conditions of each, a simple principle applies to nearly all: restoration actions that start higher in the watershed will have cumulative effects downstream. Creating resilience in higher elevation portions of watersheds is critical for maintaining coldwater-dependant resources. Because upland meadows and floodplains can assist in the retention of water in the soil for longer in the year, restoration activities focused on these areas have great potential to affect stream hydrology and overall health.

Natural Water Storage: An Opportunity for Resilience

Criticism of stream restoration for failure to monitor both short-term and long-term effects has hindered a number of activities. High elevation wet meadow restoration; however, is one activity that has been conducted with significant science direction and review. Restoration monitoring and quantification of the effects in the Sierra Nevada and the Rockies provide information on the likely outcomes for other western areas like the Blue Mountains or Cascades.

Benefits of high elevation meadow restoration are not limited to water quantity and watershed function. There are significant wildlife and fisheries benefits from meadow restoration – from amphibians like the Columbia spotted frog to birds like the northern waterthrush and the upland sandpiper to wild fish like bull trout, summer steelhead and spring Chinook – all of which are dependent on meadow habitats.

Monitoring in the Sierras and other high elevation meadow restoration locations has shown significant increases in shallow ground water storage, and increased frequency and duration of floodplain connection. Monitoring carbon relations in Colorado wet meadows has shown that restoration also results in decreased carbon loss. These results all speak to the value of keeping more water higher in the watershed as opposed to deep cut channel sections that quickly convey water to lower elevations.

The National Fish and Wildlife Foundation has determined that 50,000 to 500,000 acre feet of water could be stored in high elevation meadow systems if restored to address current conditions. Both measured and modeled water tables have shown increased water storage in restored meadows of more than a meter, which results in better than three acre feet of water storage per acre of meadow restored. While comprehensive evaluations of the potential areas appropriate for such restoration needs further attention in Oregon and in other western states, general observations have shown there are many sites where such restoration is appropriate.

Focused investment in the cooperative efforts between private landowners, restoration entities and funding entities could make a difference in maintaining resilient watershed function in times of changing climatic regimes. Meadow restoration provides an opportunity to alter the temporal distribution of streamflow so that less water flows downstream during peak runoff periods and more is released instream during the summer low-flow period. Restoration at large scale could result in significant water savings, as well as benefits to fish and wildlife habitat – creating resilience in the face of climate change.

Ken Bierly is the deputy director for the Oregon Watershed Enhancement Board, a state agency that supports efforts to restore salmon runs, improve water quality and strengthen ecosystems that are critical to healthy watersheds and sustainable communities.

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Forging Lifelong Stewards

Students Speak About Their Experience on the Sandy River

Students like Katey and Missy play an important role in restoration work in the Sandy River Basin.

Contributions include:

- Removing invasive species
- Planning and planting riparian vegetation
- Collecting valuable data including macro invertebrates, photo points and water quality indicators



by Katey Linkous, junior, Sandy High School

As the sun peeked up over the horizon, I ventured off into an unexpected opportunity. It was my sophomore year in high school and my first year getting

involved with our school's Green Club. Club members were informed we would be attending a Green School Conference where there were multiple workshops we would randomly be assigned to. It so happened that I was placed in a workshop that would inspire my growth as a conservationist and environmentalist.

This workshop covered photo point monitoring. We began our introductions, sharing who we were and where we came from. I shared that I attended Sandy High School and lived in Welches, Oregon. Instantly, interest in where I lived spiked because of a major restoration project happening near my home. Although I knew little about restoration, I realized what they were doing in the heart of

my community and what I was missing. I eagerly jumped in to help.

As time went on I learned more about the significance of restoration projects. I learned how a restoration project influences multiple components in an environment. Restoration replenishes food sources for things like macro invertebrates, birds, and mammals, as well as allowing communities' involvement. Working alongside restoration professionals increased my passion for conservation awareness and that students are just as significant in the conservation process as adults. This is why I applied to be an intern with The Freshwater Trust. My internship includes managing side channel 21 on the Salmon River and attending a number of partnership meetings. Though these meetings are long, I rarely find myself bored. Attending them has heightened my awareness and broadened my knowledge of the issues that occur with restoration plans.



by Missy Paulson, senior, David Douglas High School

An amazing project that is giving students the chance to get out into nature and learn the skills of taking field data is the Salmon River Project.

It takes place at side channel nine of the Salmon River in Welches, Oregon.

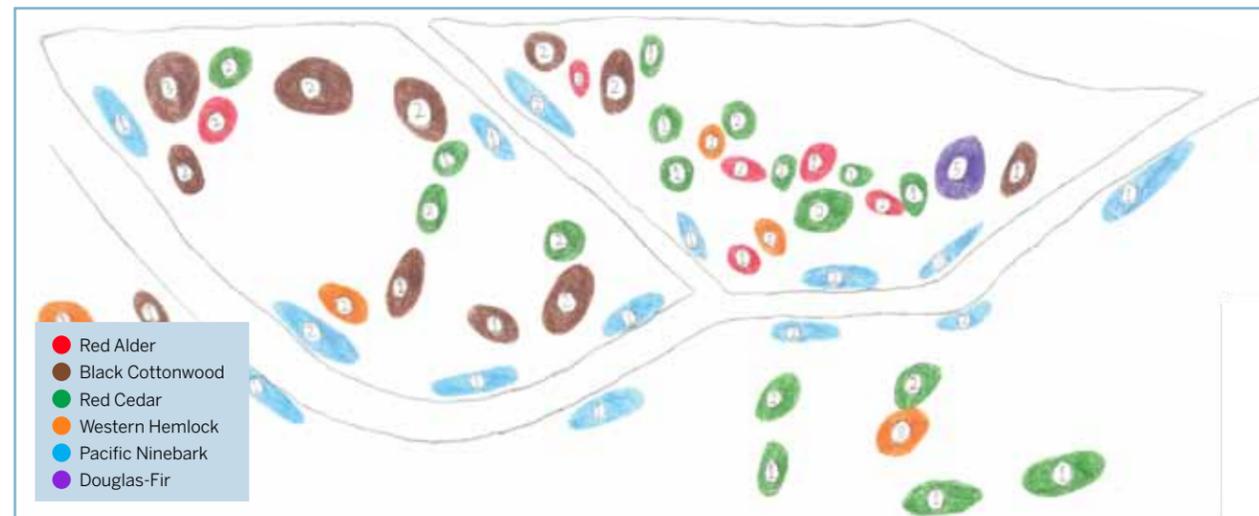
This ongoing project, in its third year, consists of eight juniors and three seniors that visit side channel nine once every month to take pre and post field data. To gather the data, students are divided into four groups: macro invertebrates, photo points, water quality analysis or plants.

This past summer side channel nine was excavated, which allowed water to flow to a previously dry side channel. By seeing this, I took a deeper interest in this project and see it as my own. It's something that I do once every month, and put so much energy into that I am able to look at it as a great accomplishment.

By being apart of this project, I have gained skills that will help me not only in the outdoors but

also in the professional world – from learning navigation using GPS and a compass, to how I can take that “just-right” picture for photo point monitoring. By interning with The Freshwater Trust, I have also learned what it's like to go to meetings, understand what and how many people it takes to get something done and how to speak in front of large groups of people.

Everything that I have gained from being involved in this project has allowed me to have chances that I would not have received anywhere else. A huge part of this is being able to share what our group has found, through being a part of a student panel, to participating in a summit at the end of both my years. These are just some of the reasons why coming back for a second year was a huge thing to me. Knowing that what I was doing was going to be of impact was amazing. I know that many students my age don't like to go outside and take data, especially on a Saturday at 8:30 in the morning at a cold river for a good chunk of the day, but all I can say to them is that you have to find something you can get out of it. 🌲



SALMON RIVER PLANTING MAP GENERATED BY DAVID DOUGLAS HIGH SCHOOL STUDENT ESTHER VERBRUGGEN

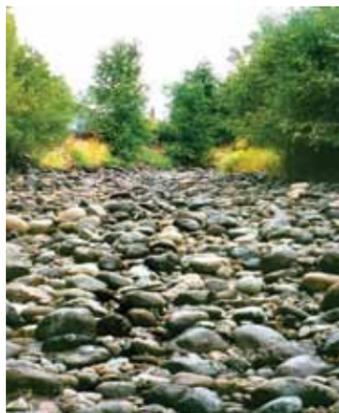
↑ Getting students outside connects them to the natural world and creates learning opportunities to forge lifelong stewards.
— HEIDI HOFFMAN, HEIDIHOFFMANPHOTOGRAPHY.COM

MEMBER UPDATES

→ Students from David Douglas High School took part in a tree planting along the Salmon River as part of a Student Stewardship Project. – HEIDI HOFFMAN, HEIDIHOFFMANPHOTOGRAPHY.COM

↓ Top: Dry river beds are a limiting factor to habitat. – ANDREW BURDICK

Bottom: Restoring flow to rivers and streams like Rudio Creek is vital to long-term freshwater health.



CONSERVATION UPDATE

2009 marked the first full year of The Freshwater Trust's operational existence. The merger between Oregon Trout and Oregon Water Trust resulted in a large, robust conservation department that has the ability to do work beyond the scope and volume either organization was previously able to achieve alone. The driving ecological premise behind the merger and the resulting work remains: rivers with great instream and riparian habitat are not healthy without flow, and rivers with ample flow are not healthy without great instream and riparian habitat. It takes both flow and non-flow restoration work to achieve our overall mission of preserving and restoring freshwater ecosystems. In 2009, we put our collective heads together and crafted a tactical plan focused on:

- Integrating flow and non-flow habitat based restoration work
- Increasing the pace and scale of restoration efforts



- Increasing the national relevance of our work
- Achieving basin-scale restoration results that demonstrate fish recovery and overall aquatic health through instream flow projects, other habitat projects and policy efforts.

Instream Flow

The Freshwater Trust's instream flow restoration and protection efforts in 2009 grew considerably compared to 2007 and 2008.

- **Total rate of protected water:** 160.83 cubic feet per second (cfs)

Of this total, 64.42 cfs came from long term deals (10+ years). This was an increase of over 2 cfs from 2008 and is the most water from long term deals ever. While it is good to see all numbers increase, we have and continue to work hard to increase the long term protection of water.

- **Of the 160 cfs protected:**

37.2 cfs came from the John Day Basin
 32.3 cfs came from the Grande Ronde Basin
 28.2 cfs came from the Rogue Basin
 18.2 cfs came from the Willamette Basin

Other Oregon basins range between 0.37 in the Malheur Basin and 13 in the Umatilla Basin, with other notable basins of activity including the Hood and Fifteenmile.

- **Based on the total rate:**

27.3% is from donated water
 72.7% is from purchased water

- **Project type ratios:**

41% of water coming from permanent transfers and
 36% coming from standard leases

2010 efforts should increase the total amount of permanent protected water in the John Day and other basins like the Umatilla and Walla Walla.

Salmon River – Sandy River Basin

The Freshwater Trust is currently embarking on large-scale restoration work in the Sandy River basin. Over the next several years, The Freshwater Trust and others within the Sandy River Basin Partners group will restore habitat complexity to an 11,500 foot reach of the Salmon River by implementing nearly 40 restoration actions, including side channel restoration, engineered log jams, large wood habitat features and pool-tailout habitat features. This project will undertake all



of the restoration actions necessary to take the Salmon River from current to historic conditions, and builds on our successful completion of similar multi-landowner projects in 2008. Beyond on-the-ground habitat improvements, this effort is intended to provide a restoration template for collaborative, basin-scale restoration throughout the Pacific Northwest.

In 2009, The Freshwater Trust retained River Design Group on behalf of the Partners to complete an existing conditions assessment and provide a restoration plan for the Salmon River. This assessment bridges the gap between earlier assessments and future on-the-ground restoration work by identifying specific sites to implement habitat restoration projects including large wood placement, road decommissioning and maintenance, dike removal, pool creation and the reactivation of historic side channels. The Sandy River Basin Partners provided specific habitat metrics – current and historic – and tasked River Design Group with identifying the suite of restoration actions necessary to achieve historic aquatic habitat conditions basin-scale in the Salmon River. The Sandy River Basin Partners now have a road map to address Salmon River limiting factors necessary to the recovery of federally listed salmon and steelhead. Look for implementation in 2010 and well beyond.

Rudio Creek – John Day River Basin

In 2009, The Freshwater Trust began implementing a basin-scale plan for the Rudio Creek, which drains into the lower North Fork John Day River. The intention is to advance basin-scale restoration by facilitating dialogue with and between landowners, and by building trust and support for restoration locally through concrete, on-the-ground action. To this end, we are working with the Columbia-Blue Mountain Resource Conservation and Development Council, Confederated Tribes of Warm Springs, Confederated Tribes of the Umatilla Indian Reservation, North Fork Watershed Council, Monument Soil and Water Conservation District and others to help coordinate restoration efforts. The board of Columbia-Blue Mountain Resource Conservation and Development formally voted to co-lead this effort in November 2009, and an initial meeting with landowners and agency partners was held on January 25, 2010 to begin the process of basin planning and identifying opportunities for collaboration.

The first project to be implemented as part of this effort is the Rudio Creek Ranch Restoration Project, which will restore habitat to recover federally-listed summer steelhead and spring Chinook. During the early and mid-1900s, the project site at Rudio Creek was straightened and channelized in order to drain wet meadow

In 2009, The Freshwater Trust restored 160 cfs, which is about 14 billion gallons of water.

How much is 14 billion gallons?

- It's enough water to fill 21,719 Olympic-sized swimming pools.
- It's enough water to fill the Portland Water Bureau's reservoirs on Mt. Tabor and Washington Park 65 times over.
- It's enough water to fill the Rose Bowl in Pasadena up to its brim 170 times.

Transforming youth from students to active freshwater caretakers requires participation and investment from the greater community. Please consider joining The Freshwater Trust and experience the work of students first hand at the following watershed summits.

CENTRAL OREGON:

→ McMenamins Old St Francis School Hotel on Thursday, May 13th, featuring keynote address by Richard Louv (see page 10 for more about Louv).

PORTLAND METRO:

→ Timberline Lodge on Wednesday, May 19th

Summits are in partnership with:



floodplain habitat and create livestock pasture. This channelization, coupled with agricultural development of the floodplain throughout the mid-1900s, led to the loss of beaver dam complexes and riparian hardwoods, resulting in a higher stream energy system with reduced habitat diversity and reduced cold-water storage. The project will increase pool habitat, habitat complexity, floodplain connectivity and riparian vegetation by restoring Rudio Creek to its historic channel alignment, constructing large wood habitat structures and restoring riparian vegetation. The work will result in habitat conditions that increase beaver population numbers and perennial dam complexes. We will extensively monitor this wet meadow and channel restoration work for its effectiveness in promoting climate change resilience through increased natural water storage, late-season flows and water temperature improvements.

StreamBank®: “Counting on the Environment” Projects

Last year marked StreamBank’s first public-private partnership with Oregon’s Department of Environmental Quality (DEQ) and the Jubitz Family Foundation. DEQ provided StreamBank with a Clean Water Act grant from the Environmental Protection Agency in order to complete pollution-reducing stream restoration projects in the Willamette Valley. We chose three projects: a large wood placement, alcove restoration and riparian planting on Woods Creek managed by the Marys River Watershed Council

in Philomath; and two invasive plant removal and tree planting projects spearheaded by the Johnson Creek Watershed Council in Portland and McKenzie Watershed Alliance in Springfield. The three projects were also evaluated and selected by the Willamette Partnership’s “Counting on the Environment” (COTE) project as pilots in advancing Oregon’s nascent ecosystem services marketplace. Ecosystem service calculations on baseline conditions and restoration uplift associated with these projects will result in salmon and water quality credits. These credits will then be formally registered and retired (not formally traded). This nationally-relevant effort will demonstrate COTE’s credit calculation methodology, StreamBank’s role in the ecosystem service marketplace and provide real-world examples of ecosystem service market functionality.

Conservation Policy

This November, Oregon voters will be presented with an important ballot measure intended to renew the state’s commitment to funding stream restoration work and other conservation actions with state lottery dollars. “Oregonians for Water, Parks and Wildlife” is a ballot initiative petition campaign committee seeking to reauthorize Oregon’s only dedicated source of state funding for work that includes the high elevation wet meadow and floodplain restoration projects discussed in this issue of *freshwater’s* Water Proof section. This highly successful program, first adopted overwhelmingly by voters in 1998, funds the work of the Oregon Watershed Enhancement Board and is critically important to advancing stream health statewide. The Freshwater Trust is supporting this ballot initiative campaign and urges you to do the same. For more information, visit www.waterparkswildlife.org.

EDUCATION UPDATE

Student Stewardship Projects

During the 2009-10 school year, the education department engaged 915 Oregon students from 23 schools in locally-based Student Stewardship Projects. Project participation provided students with the opportunity to become involved in the maintenance and preservation of their local watershed. Some project highlights include:

- Philomath and Corvallis High School students serving as teaching mentors for middle school students during Spring Stewardship Field Days at Newton Creek
- Students from Central Oregon presenting project results at an upcoming Watershed Summit to renowned author and keynote speaker, Richard Louv, and hundreds of community members



→ National Honors Society students from Sam Barlow High School working in conjunction with the StreamBank project on Johnson Creek, conducting water quality monitoring, riparian surveys, shade cover analysis and photopoint monitoring. Students also led a willow planting and invasive species removal.

Students conducting Student Stewardship Projects are encouraged to enter their projects into StreamWebs and present project results at locally coordinated summits. By inviting students to participate in meaningful restoration projects that benefit their home waters, we provide them with opportunities that can spark career and higher education interests in science and ecology, while instilling a lifelong personal watershed stewardship ethic.

Watershed Summits

The Freshwater Trust invites students to participate in student watershed summits in May. Education coordinators have been working with teachers and local partners to encourage students who have participated in Student Stewardship Projects to compile and present their work to their peers, natural resource managers, school district personnel, watershed councils and other interested community stakeholders.

Watershed summits bring teams of students together to spotlight their unique watershed stories. Open to the public, watershed summits also offer regional and statewide recognition to students in their roles as freshwater stewards. The watershed summits offer exciting, high-profile

events for students to share their innovative watershed projects in art, science, videography and hands-on restoration. By offering students a professional forum to present their watershed stories, the summits validate the students’ efforts and empower them with a valuable sense of community engagement.

International Salmon Camp

What happens when twenty-four Russian, Oregonian and Canadian teenagers meet face to face on Sakhalin Island, Russia? The 2010 International Salmon Camp. This exciting exchange program for students ages 14 to 17 builds off of our award-winning Salmon Watch program and expands the 2009 International Salmon Camp that was co-hosted by The Freshwater Trust and Wild Salmon Center. Last summer, campers from Russia and Oregon spent a week together on the Salmon River learning about salmon while conducting field research to investigate important aspects of juvenile salmon habitat.

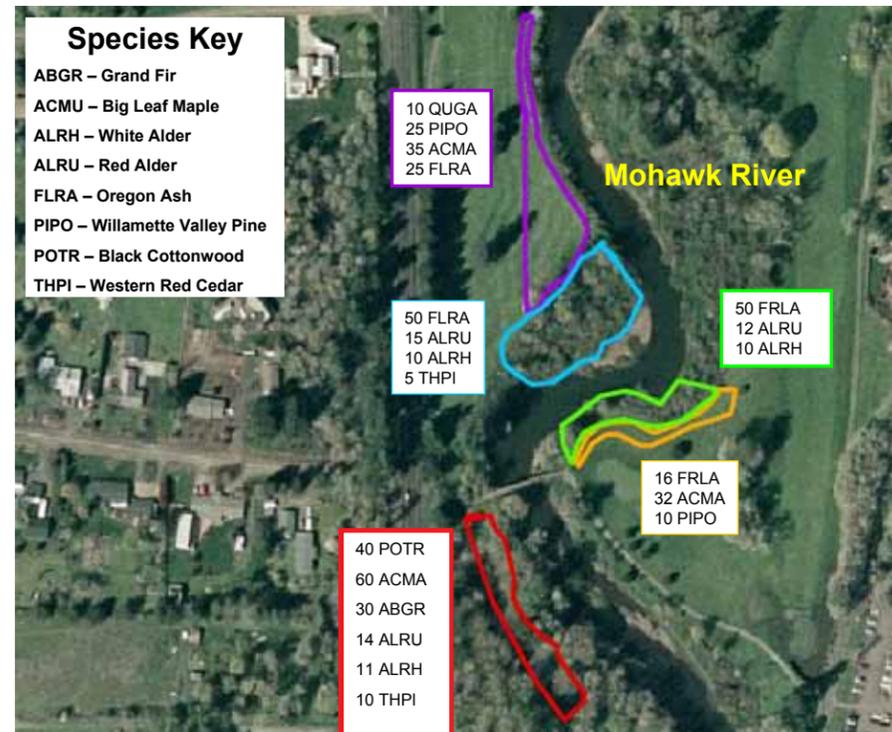
You can help The Freshwater Trust send Oregon students to Russia this summer by donating your unused airline miles. Your contribution will help:

- Cover travel expenses for eight Oregon students to Sakhalin Island, Russia
- Engage an international audience of campers from the U.S., Canada and Russia in viewing salmon spawning and conducting collaborative field investigations
- Campers participate in a salmon habitat restoration project on Sakhalin Russia



↑ Top and bottom: Students from Parkdale Elementary experience Salmon Watch. This summer in Russia, The Freshwater Trust and Wild Salmon Center will host International Salmon Camp based on Salmon Watch curriculum. – HANMI MEYER

← Map opposite page: McKenzie Watershed Alliance in Springfield leads the planting effort near the Mohawk River as part of a “Counting on the Environment” StreamBank project. – MCKENZIE WATERSHED ALLIANCE



- Campers develop leadership skills, cultural awareness and international friendship
- Foster the next generation of watershed stewards along the Pacific Rim

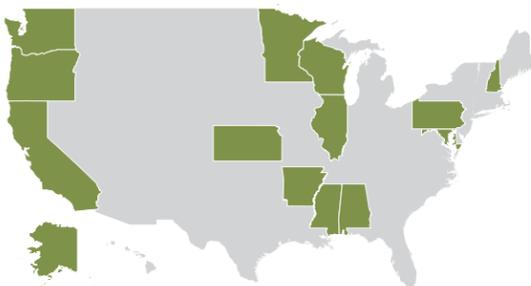
Donate your miles by visiting the websites listed below. Reference the appropriate account # when transferring your miles:

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<http://dn.delta.com/skymiles/purchasemiles/transfer>

United Mileage Plus: 03249245673
<http://www.ualmiles.com/TransferMiles.jsp>

Education Policy

The Freshwater Trust is pleased to report that the federal No Child Left Inside (NCLI) movement has been rapidly gaining ground. The NCLI Coalition currently boasts 1,500 organizational members



States that have enacted legislation to support environmental education

representing more than 50 million Americans. This is the largest coalition in our nation's recorded history. The sheer volume of support has aided in bolstering the inclusion of NCLI language in the reauthorization of the federal Elementary and Secondary Education Act. President Obama recently released his budget which included "environmental literacy" in the U.S. Department of Education's budget for the first time ever. The likelihood of NCLI passing the U.S. Congress is becoming more of a reality everyday.

This bodes well for the work of the No Oregon Child Left Inside task force. Traci Price, education director at The Freshwater Trust, has been appointed by Governor Kulongoski to chair the environmental literacy task force, charged with developing a state environmental literacy plan for Oregon's K-12 students. Meetings are underway with delivery of a completed state plan due in October 2010. Having a state environmental literacy plan in place will position Oregon to be eligible for federal dollars through NCLI which could amount to \$1 to \$2 million of new annual funding to strategically reconnect Oregon's youth with the natural world.

To learn more about The Freshwater Trust visit www.thefreshwatertrust.org and become a fan on [facebook](https://www.facebook.com/thefreshwatertrust) www.facebook.com/thefreshwatertrust.

Back Talk

AN AUSTRALIAN WATER STORY
 A Glimpse of the Future for the U.S.?

by Richard Hopkins

When the driest inhabited continent on earth experiences unprecedented drought, water management becomes a life or death concern. Australia has a history of extreme floods and droughts, but the most severe drought on record occurred over the last decade. Indeed, in the state of South Australia, water managers contemplated plans to hand out bottled water on street corners in the event that their water supply dried up. In the neighbouring state of Victoria, many irrigators received 0% allocations of the water they depend on for their livelihood.

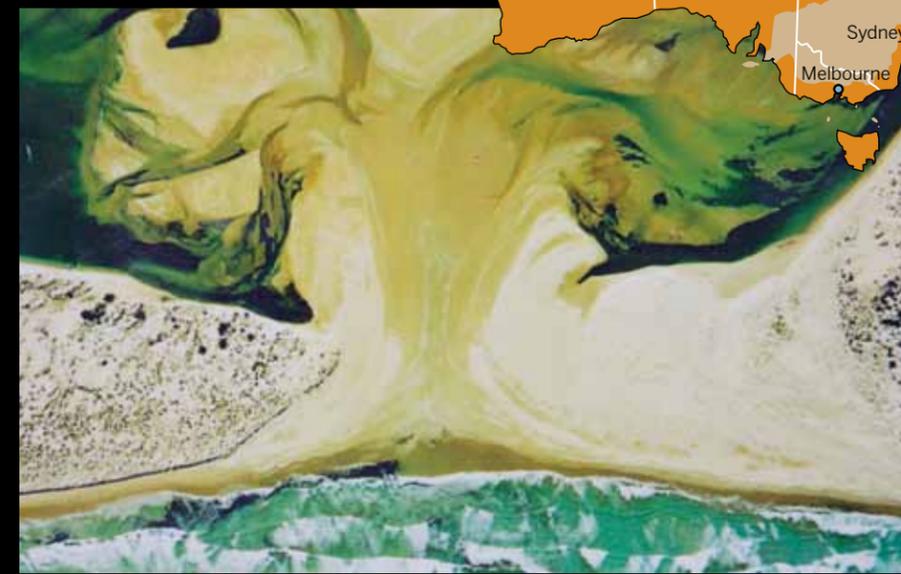
However, the impacts were less than they might have been, due largely to the framework of water policy reforms underway for nearly thirty years. The story of the Murray-Darling Basin, perhaps Australia's single most important river system, highlights both the difficulties and possibilities of water management reform.

The Murray-Darling Basin covers one-seventh of Australia including parts of four states and the national capital territory. By the early 1980s, development began to take its toll on the Basin's resources and environment. In 1981, for the first time in recorded history, the Murray River stopped flowing to the ocean due to upstream water withdrawals. This led to the highly visible near-collapse of the internationally recognized freshwater Lower Lakes and saltwater Coorong estuary.

Fortunately, the state governments within the basin had a mechanism to provide for managing their shared water resources - the Murray-Darling Basin Commission, a joint state forum for building consensus for major water reforms.

In the early 1990s, agreement was reached by the Basin states on a series of innovative reforms for the Murray-Darling Basin including a cap on water diversions, separation of legal titles of land and water to make water trading and markets more efficient, and significant restructuring of governance arrangements and the institutions responsible for water management. These reforms provided the framework for a new balance between environmental and consumptive water uses.

Implementation of the reform programme was underway when the situation worsened - the last five years have seen the most severe drought in the Basin's 130-year record. Though, it is still unclear whether this



is short-term drought or the early effects of long-term climate change. Either way, a water crisis was upon us.

As the crisis deepened in recent years, issues such as irrigation, urban water shortages and environmental degradation have attracted national attention. The pressure to hasten and expand the reform process subsequently motivated the basin states to agree to transfer some of their water regulating powers to the national government, creating the new Murray-Darling Basin Authority (MDBA).

The first task of the MDBA is to rewrite how water is allocated between environmental and consumptive uses, using efficiency upgrades, water markets and limits on diversion to achieve a variety of environmental and production goals. Due in mid-2010, the draft Basin Plan is expected to include deep cuts in existing water use entitlements and greater provision for environmental requirements. Not everyone will be pleased; however, the long history of the conversation and the sequence of steps of shared understanding and agreement assures reasonable expectations of success.

It would be easy to look at Australia's water scarcity problem and assume it will never be that bad in the U.S. However, with climate change, a booming population and already-dwindling water resources in many U.S. regions, Australia's lessons may indeed provide a valuable look at the possible future of the United States. That said, perhaps most valuable is the lesson that if planning and reform is not begun before crisis hits, it may be too late to affect the necessary scale of change.

This 1981 aerial photo demonstrates that upstream diversions from the River Murray exceeded the river's natural flow. This was the first year in recorded history that the river no longer reached the Southern Ocean. - SOUTH AUSTRALIAN DEPARTMENT FOR ENVIRONMENT AND HERITAGE

Richard Hopkins is the Chief Executive of The International Centre of Excellence in Water Resources Management (ICE WaRM) based in Adelaide, Australia. As well as sharing Australian water management expertise and experience internationally, ICE WaRM is contributing to growing the next generation of water managers to undertake ongoing challenges of the driest inhabited continent in the world.

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