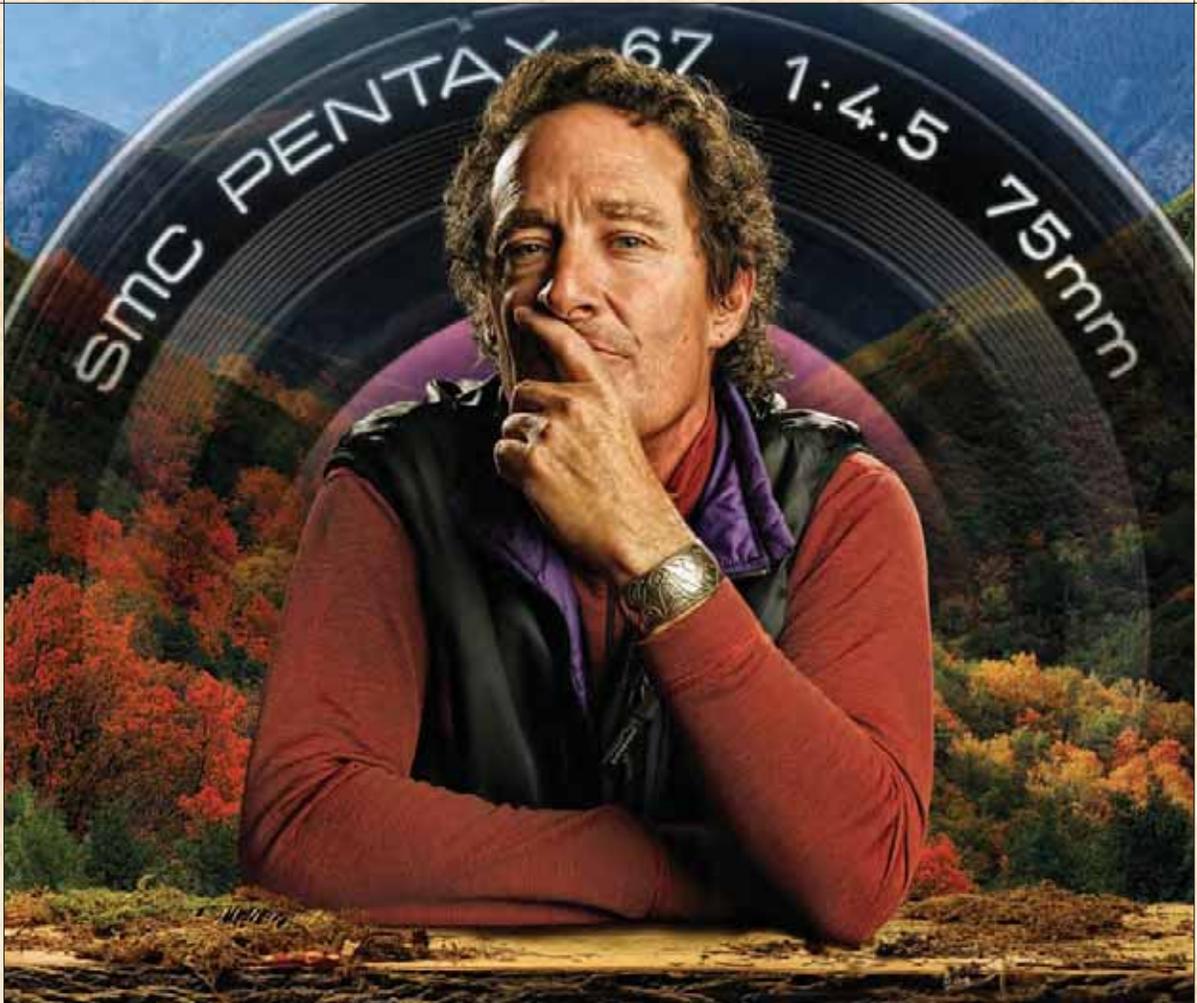


Inalienable Rights: What About the Land? ■ **Always Getting Ready:** The Yup'ik Eskimos of Southwest Alaska ■ **Wild Salmon and the Circle of Life** ■ **Earth View** The Political Science of Water Resources ■ **The Terrible Truth about Arsenic** ■ **Legislation and the Land** Understanding the Effects Upon Southwest Alaska ■ **Sustainable Solutions** Going 'Green' at Portland State University ■ **Building Smart** The Magic of a Green Roof ■ **Knowledge Sharing** Conservation and Compatible Land Use ■ **Going Global** Bali Global Business Day ■ **Change Agents** Warm Springs, Wasco and Paiute Tribes: Leaving a Legacy for the Future ■ **Personal Perspective** Finding Your Purpose in Life

livebetter

April • May 2008 volume 2 • number 2



Robert Glenn Ketchum

Nature's Tireless Advocate

A Conviction of the Heart



KUHNS BROS. LOG HOMES

SUSTAINING OUR FUTURE... TODAY.



A log home is a true sustainable and environmentally-friendly choice for new construction – designed, constructed and operated to boost environmental, economic, health and personal performance. In fact, these resource-efficient, environmentally-sound and healthy homes reduce waste, save energy, improve indoor air quality and mood while offering a healthier and more satisfying living environment.

Just a few sound reasons to choose solid log construction:

- Solid log components consume less energy and labor between harvest and placement on the housing site.
- "Surface-as-finish" savings are significant. Solid log walls eliminate the need for building material layers while fully utilizing the value of timber, the only renewable construction material on earth.
- Log homes provide the benefits of thermal mass – using log walls' heat-retention capacity to reduce annual heating and cooling energy demands.
- Log homes may be expected to perform from 2.5 percent to more than 15 percent more energy efficiently compared to identical wood-frame houses.

Kuhns Bros.' commitment to each other and to our environment is important to us. We do everything we can to preserve the quality of life for future generations. We all depend on it.

REMEMBER . . . ONE FAMILY, ONE EARTH.
BE PART OF IT.



www.kuhnsbros.com
1.800.326.9614



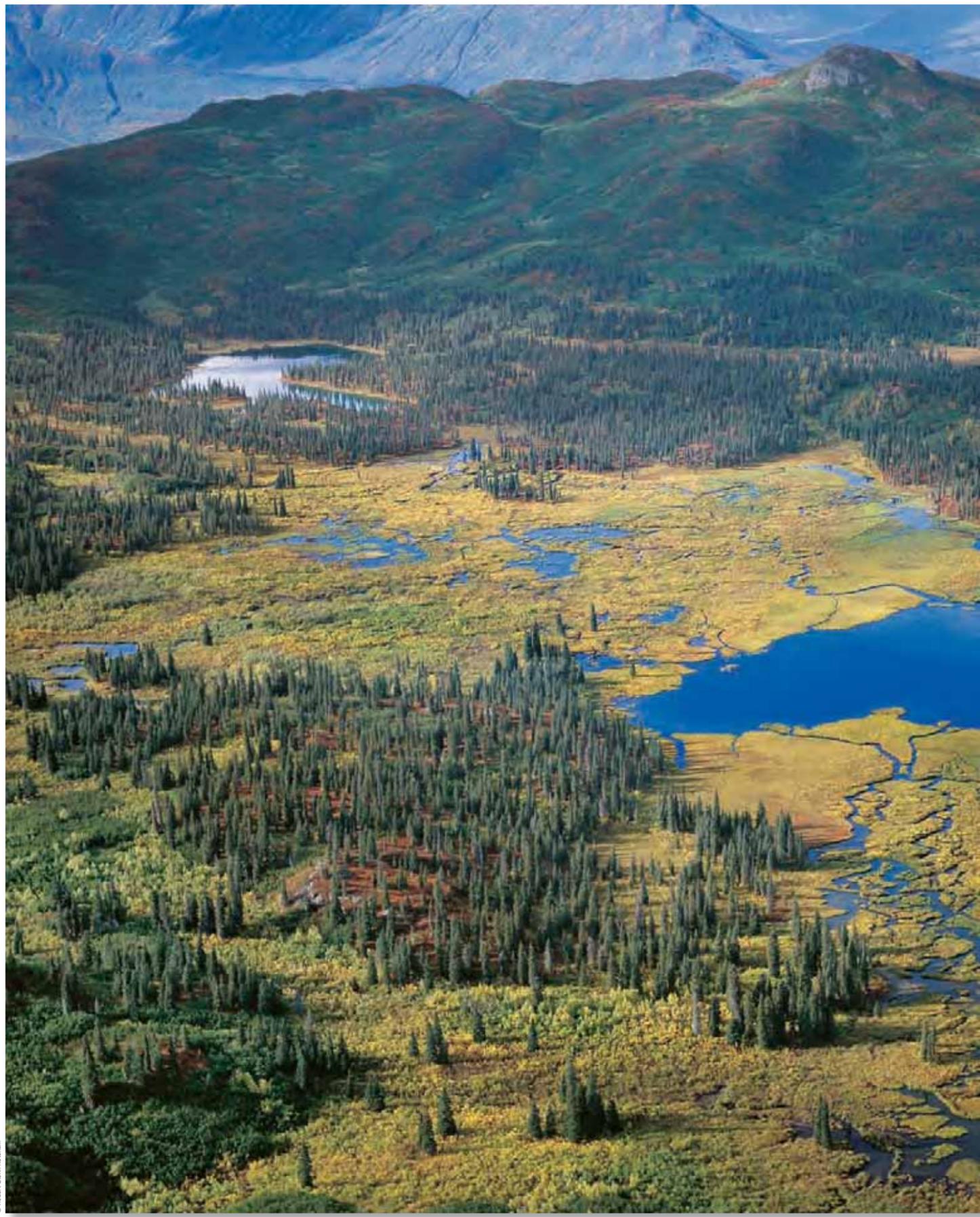
www.countrylogcabins.com
1.800.326.9614



LIVING WITH WOOD AND SURROUNDED BY WOOD

brings us back into harmony with nature,
which is one reason why more and more people are choosing to build log homes.





livebetter

April • May 2008 volume 2 • number 2



cover story

Nature's Tireless Advocate:

A Conviction of the Heart 26

features

34 Always Getting Ready:
The Yup'ik Eskimos of Southwest Alaska

40 Legislation and the Land:
Understanding the Effects Upon
Southwest Alaska

46 Inalienable Rights:
What About the Land?
Words and Photographs by Robert Glenn Ketchum

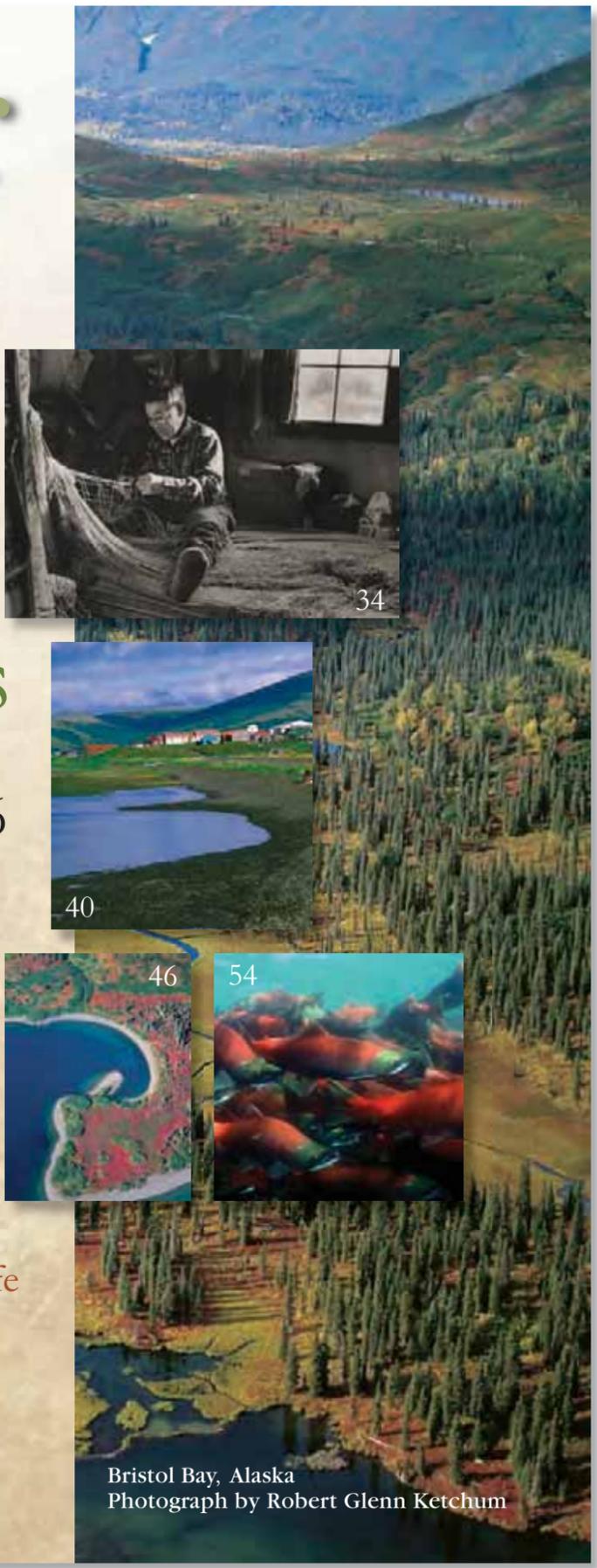
54 Wild Salmon and the Circle of Life

departments

- 10 Human Ecology
- 16 Knowledge Sharing
- 22 Building Smart
- 60 Worth Considering
- 63 Sustainable Solutions

columns

- 4 Publisher's Comments
- 8 Change Agents
- 14 Earth View
- 20 Going Global
- 64 Personal Perspective



34

40

46

54

Bristol Bay, Alaska
Photograph by Robert Glenn Ketchum

Words of Wisdom from Albert Einstein

“I am absolutely convinced that no wealth in the world can help humanity forward, even in the hands of the most devoted worker in this cause. The example of great and pure characters is the only thing that can produce fine ideas and noble deeds. Money only appeals to selfishness and always tempts its owners irresistibly to abuse it. Can anyone imagine Moses, Jesus, or Gandbi armed with the money-bags of Carnegie?” Albert Einstein

Albert Einstein is one of my heroes. He was a brilliant man but, more importantly, he was a great humanitarian. When I first read his remarks, I thought they made a lot of sense but believed there must be exceptions to the rule. After all, who wants to admit that money can't benefit humanity or that striving for it might be a character flaw? Following much deliberation about Albert's words of wisdom, I must agree with him. Only when we have nothing to gain does it appear that our self serving minds willingly take a step backward, which allows our spirits to take a step forward. Only then are we able to experience "Truth" rather than "truth as we understand it." The difference is that the former is absolute; the latter is totally subjective.

I experienced "subjective" reality again, just recently, when contemplating the root cause of human induced environmental damage and the resultant tragedies. At first I wanted to blame everybody but me. Corporate greed, inept politicians and journalists who focus on celebrity foolishness rather on the important stories about which people need to be educated were first on my list. But then I realized what part I play in all of this. Although no one is perfect, I acknowledged that what I require or expect of others, I should first require or expect of myself. So, in light of that decision, I've begun to critically examine, or more accurately, re examine the motives for everything I do.

One thing that I've already learned from this self discovery is that many people believe they're altruistic. But, in reality, they're often just self serving without realizing it. No one can serve two masters, especially those rooted in the mutually exclusive philosophies of materialism and selflessness. To ". . . help humanity forward . . ." we must start by being brutally honest about who we are and what we have to gain by every decision we make. And, if the answer is "nothing" then maybe we're on the right track. So today, as I reflect upon how I can be of better service to humanity, I will reconsider some other immortal words that are close to my heart. This message, with its glorious phrases, is even older than Albert's and is played out in every major religion with just cause:

" . . . Blessed are the poor in spirit: for theirs is the kingdom of heaven. Blessed are they that mourn: for they shall be comforted. Blessed are the meek: for they shall inherit the earth. Blessed are they which do hunger and thirst after righteousness: for they shall be filled. Blessed are the merciful: for they shall obtain mercy. Blessed are the pure in heart: for they shall see God. Blessed are the peacemakers: for they shall be called the children of God. Blessed are they which are persecuted for righteousness' sake: for theirs is the kingdom of heaven. . . ." – The Beatitudes from The Sermon on the Mount

Thanks, Albert, for setting me straight.

Rosemarie Calvert
Independence, WV

P.S. If you like *Livebetter* and want to continue receiving it, please log onto our website at www.centerforabetterlife.com to become a member; it's free. Electronic versions are gratis, as are printed copies provided on a rotational basis. Of course, we'd welcome you and your friends as paid subscribers, who receive every published issue. Please see our amazingly reasonable annual rates in the online masthead or in this issue. Thanks!



© iStockphoto.com/frecklemagier

*Great and pure characters
are the only things that can
“produce fine ideas
and noble deeds.”*



Want to continue receiving LiveBetter magazine?
Go to our website and sign up to become a member.

It's that easy and it's FREE!
(No strings attached)



Center for a Better Life

www.centerforabetterlife.com to join us
or write us at P.O. Box 247, Newburg, WV 26410

CARPET IS NOW SO GREEN, YOU ALMOST HAVE TO MOW IT.

WHEN IT COMES TO "LIVING GREEN," TODAY'S CARPET HAS IT COVERED—INDOORS AND OUT.

Look for the Seal of Approval from the Carpet and Rug Institute (CRI) when choosing carpet cleaning products. Because the seal certifies products proven to improve indoor air quality while also keeping your carpet investment in peak condition.

And for proof that today's carpet industry is committed to green practices, consider this: we reused, recycled and reclaimed more than 261 million pounds of carpet in 2006 alone, keeping waste out of landfills and preserving natural resources.

Visit carpet-rug.org to learn more. Because today's carpet comes in every shade you want—and every one of them is green.

carpet-rug.org



livebetter

the official magazine of the Center for a Better Life
www.centerforabetterlife.com

Cover Photo—Bill Simone
Cover Design—Rick Wattai

In Memoriam

livebetter is dedicated to John G. Colson, who passed away from lymphoma in 2007. He was not only a consummate publisher but also a good friend. Without his enthusiasm, guidance and support this magazine might not have been possible.

Center for a Better Life

Rosemarie Calvert

President
rcalvert@centerforabetterlife.com

John C. Gordon, Ph.D.

Forestry and Environmental Advisor

Sherry A. Cunningham, C.P.A.

Business Advisor

Bader Giggenbach

Legal Counsel

Rick Wattai

Creative Director
rwattai@centerforabetterlife.com

Bill Simone

Director of Photography
bsimone@centerforabetterlife.com

Steve Fabian

Interactive Director
sfabian@centerforabetterlife.com

Sebastian Bleich

German Translator

Yarianni Bustamante

Spanish Translator

livebetter

magazine

Rosemarie Calvert

Publisher & Editorial Director
rcalvert@centerforabetterlife.com

Pamela Yagle

Editor-in-Chief

Graciela Sagrada, Barbara Bein

Senior Editors

Michael Dorsch

Editorial Assistant

Alex Criss, Vanessa de Vale, Zafar Nomani, Leah Cunningham

Staff Writers
editorial@centerforabetterlife.com

Robert Wood

Senior Designer
rwood@centerforabetterlife.com

Jerry Bullock

Circulation Assistant

Editorial: 304-892-3811 • Fax 304-892-3883
Advertising: 304-892-3811 • Fax 304-892-3883
Subscriptions: 304-368-7936

Printed in the U.S.A. *livebetter*, the magazine dedicated to sustainable living, invites the widest expression of opinion and participation. Material in *livebetter* is protected by copyright. It may, however, be photocopied for educational purposes with appropriate credit. Copyright © 2008 Forest Partners, LLC.

SUBSCRIPTIONS: U.S.: \$12/year, Students: \$8/year. Seniors: \$8/year. Government: \$8/year. Military: \$8/year. For foreign subscriptions please call 1 304 892 3811 or email rcalvert@forestpartners.net for more information. Send U.S. funds to *livebetter*, P.O. Box 247, Newburg, WV 26410 or log onto our website at www.centerforabetterlife.com to subscribe via the internet.

Live Better
Center for a Better Life Fdn., Inc. • Forest Partners, LLC
P.O. Box 247 • Newburg, WV 26410
Phone: 304-368-7936 • Fax: 304-892-3883
Email: rcalvert@forestpartners.net



Below is a partial list of some really great human beings who have been kind enough to share their time, energy and enthusiasm with us in an effort to promote the importance of sustainability.

1. Robert Glenn Ketchum, Nature Photographer, Conservationist and Author
2. The Kuhns Family, owners of Kuhn Bros. Log Homes
3. Alex Beehler, Acting Deputy Under Secretary of Defense (Environment and Installations)
4. James Barker, Photographer and Author
5. Greg Syverson, Photographer and Conservationist
6. Vice Admiral Michael Loose, Deputy Chief of Naval Operations for Fleet Readiness & Logistics, U.S. Navy
7. Lloyd Timberlake, Director, North American Office, World Business Council for Sustainable Development
8. Dr. Ed Link, Ph.D., Professor, University of Maryland; Director, Interagency Performance Evaluation Task Force
9. Frank Hurd, Vice President and Chief Operating Officer, the Carpet and Rug Institute
10. Major General Del Eulberg, U.S. Air Force Civil Engineer; President, Society of American Military Engineers (SAME)
11. Mark Rey, Under Secretary, Natural Resources and Environment, U.S. Department of Agriculture
12. Joe Porrovecchio, Vice Chair, U.S. Green Building Council, N.J. Chapter; SAME Fellow
13. Major General Don Riley, Director of Civil Works, HQ U.S. Army Corps of Engineers
14. Chuck Williams, Asst. Deputy Under Secretary of Defense, Installations
15. John Gordon, Pinchot Professor Emeritus of Forestry and Environmental Studies, Yale
16. Roger Ballentine, President, Green Strategies; (Green Consultant to Wal Mart; and former Energy Advisor to President Clinton)
17. Chris Haddox, Visiting Asst. Professor, Sustainable Design, West Virginia University Davis College
18. Gary Morishima, Board Member, Intertribal Timber Council (a consortium of more than 60 American Indian Tribes and Alaska Native Corporations)
19. Don Motanic, Technical Director, Intertribal Timber Council; American Indian Science and Engineering Society Foundation Trustee
20. Lieutenant General Carl Strock, Retired Commander in Chief, U.S. Army Corps of Engineers
21. John Vitello, Forester Senior Specialist, Dept. of the Interior, Bureau of Indian Affairs
22. Captain Ed Rau, Environmental Health Officer, National Institutes of Health
23. Professor Vincent Gaffney, Chair in Landscape Archaeology and Geomatics, University of Birmingham, The Institute of Archaeology and Antiquity, Edgbaston Birmingham, United Kingdom
24. Bill Downes, Chief Forester, Dept. of the Interior, Bureau of Indian Affairs
25. Captain Bill Nordai, Executive Officer, Directorate of Civil Works, HQ U.S. Army Corps of Engineers

Thank you for caring deeply about the world, humanity, the environment and its many inhabitants.



Warm Springs, Wasco and Paiute Tribes: Leaving a Legacy for Future Generations

By Jim Manion, member of the Wasco Tribe
General Manager, Warm Springs Power and Water Enterprises

A 19th-century Indian superintendent once remarked that the Warm Springs Indian Reservation was one of the poorest reservations ever established. Located on the rugged eastern slopes of the Cascade Mountain range, traversed by deep canyons, covered by basaltic lava flows and having harsh temperature variations, the reservation was largely uninhabited even before the arrival of white trappers and settlers.

Now its 640,000 acres is home to a confederation of three Indian tribes: the Warm Springs, Wasco and Paiute Tribes. And sustainable development, such as renewable energy development, is an important part of the reservation's past and future. "The land was so poor that few non Indians wanted any part of it; and the Confederated Tribes were, unlike many other tribes, able to maintain the land base against losses to non Indians," explained Ron Suppah, chairman of the 11 member Tribal Council that governs the reservation.

Although the reservation contains little arable land, it has an abundance of water, sun, volcanic activity and wind, which makes it ideal for renewable energy generation. In fact, hydroelectric energy is now the Tribe's major source of income with tribal leadership providing strong support for developing additional renewable resources.

In 1910, when the U.S. Congress recognized that the Deschutes River, which forms the eastern boundary of the reservation, was an ideal

hydroelectric site, it set aside federal and tribal lands along the river as Federal and Indian Power Site Reserves. Years later, in 1955, Portland General Electric Company (PGE) and the Tribe signed an agreement authorizing PGE to build the 440 MW Pelton Hydro electric Project. It remains today the largest hydro project entirely within the state's boundaries and provides enough energy for about 300,000 homes.

A three dam complex went into operation over the next 10 years, and the Tribe began receiving rentals for use of its lands. As part of the agreement with PGE, the Tribe reserved the right to install generators in the Reregulating Dam that would be part of the project if it ever became financially feasible. In the late '70s, with passage of the Public Utilities Regulatory Policy Act, the Tribe decided the time was right and, by 1982, put into operation a 19 MW plant that was the first hydroelectric project ever licensed to an Indian tribe by the Federal Energy Regulatory Commission (FERC).

Through this project the Tribe gained the experience necessary to announce in 1996 that it would file a competitive application for the new FERC license for the entire Pelton project, whose license was due to expire in 2001. PGE and the Tribe eventually settled their differences and agreed to become co owners of the project with an initial 1/3 share purchased by the Tribe from PGE and the Tribe's right (over the term of the new license) to buy a controlling interest in the project. For many years the Tribe had disputes with PGE over compensation issues. Now, as partners, the Tribe and PGE are able to explore joint opportunities.

Warm Springs has significant additional hydro potential; however, environmental and fish issues probably rule that out. The Tribe and PGE have committed more than \$125 million over the next few years to restore salmon and steelhead above the Pelton project; and all efforts will be tar

geted toward making the dream a reality.

Although the Tribal government now receives significant support from power sale revenues, historically the Tribe has relied on its timber resource more than 400,000 acres to maintain tribal governmental



© Photograph: Jim Netoboom

But Warm Springs Power & Water Enterprises (WSPWE) has been active on other fronts. For the past five years the Tribal enterprise has been gathering wind data in the Mutton Mountains on the reservation's east side. The data looks very promising. The Tribe has significant Class 3 wind potential, perhaps as much as 150 MW. Similarly, WSPWE has been conducting a methodical investigation of geothermal resources on the land. Mount Jefferson, on the southwest corner of the reservation, is the youngest volcano in the Cascade Range; and preliminary analysis indicates that its eastern flank on the Reservation has significant geothermal potential. So far the analysis has not included any drilling because of cost.

On yet another front, National Renewable Energy Laboratory solar maps demonstrate significant solar potential on the Reservation. Most Oregonians from the soggy Willamette Valley are well aware

of the sunny Central Oregon climate causing resort developments to spring up like mushrooms in the past few years. Improving technology and spreading state mandatory renewable energy requirements make it only a matter of time before the solar option becomes feasible at Warm Springs.

Warm Springs is strategically positioned to take advantage of transmission opportunities as well. The Bonneville Power Administration and PGE already have high voltage lines crossing the reservation; and the Tribe is actively exploring, with a number of parties, options for increasing transmission capacity over the vital east west path.

The Tribe is committed to sustainable development on other fronts as well via, for example, certification by the Forest Stewardship Council. This international symbol of good forestry was awarded to Warm Springs several years ago in recognition of its management program. In addition, the Pelton hydroelectric project was recently certified "green" by the Low Impact Hydro Institute. And a carbon sequestration program to develop carbon credits from tribal forest management is in development. The Tribe is even designing a program for its planned casino to have a neutral carbon footprint.

"We believe that we were put on this land and cannot own it. We only borrow it. We must take care of it so that others that come after us will also have a place," concluded Chief Heath.

For more information on sustainability log onto www.centerforabetterlife.com.



© Photograph: Jim Netoboom

"We believe that we were put on this land and cannot own it. We only borrow it." Chief Heath

The Terrible Truth about Arsenic

“Bangladesh is grappling with the largest mass poisoning of a population in history. . . the scale of this environmental disaster is greater than any seen before,” stated Dr. Allan H. Smith, renowned scientist, advisor to the World Health Organization (WHO) and a University of California at Berkeley professor of epidemiology.

Dr. Richard Wilson, Harvard University Mallinckrodt Research Professor of Physics, calls the disaster “the largest identified man made environmental catastrophe.” At the United Kingdom’s annual conference of the Royal Geographical Society in August 2007, both Wilson and Dr. Peter Ravenscroft, another distinguished British researcher who worked in Bangladesh for more than a decade, warned the world: We face a serious health threat because of arsenic in drinking water. Ravenscroft said arsenic laced drinking water threatens 137 million people in 70 countries and it poses long term health risks “exceeding every other potential water contaminant.”

Smith continued: “Most countries have some water sources with dangerous levels of arsenic, but only now are we beginning to recognize the magnitude of the problem. It is the most dangerous contaminant of drinking water in terms of long term health risks, and we must test all water

sources worldwide as soon as possible.” Even Pope Benedict, worried about the world’s water quality, recognized this danger in the Sept. 27, 2007, Vatican Letter.

The Bangladeshi Crisis

According to Wilson’s August ’07 Royal Geographical Society paper: “In Bangladesh at the turn of this century, there were 60 million people who were drinking water with arsenic levels higher than the U.S. Environmental Protection Agency (EPA) standard (which is 10 parts per billion). . . As a result, many people developed dyspigmentation, keratoses (excessive growth of horny tissue of the skin) and skin cancers. If villagers walk on feet with keratoses, they develop gangrene and a foot has to be removed. Internal cancers, bladder, kidney and lung cancers are anticipated in due course. Estimates vary, but over a million people will have adverse health symptoms before the problem is solved; and between 100,000 and 1,000,000 will die. This exceeds by over tenfold the Chernobyl catastrophe, where less than 100 died outright and 1,200 children developed thyroid cancer, of which only 20 have proven fatal. Calculations predict that there will be 5,000 fatal cancers from Chernobyl in Belarus, Ukraine and Russia and perhaps 20,000 worldwide. When other regions, such as West Bengal, Bihar and Nepal, etc. are added into the arsenic poisoning equation, the comparison is even more dramatic.”

According to Wilson, “The Bangladesh catastrophe need not have happened and can, therefore, be called man made as much as Chernobyl.” Lying in the deltaic region of the Ganges and Brahmaputra rivers, Bangladesh is frequently ravaged by floods from these two rivers and by cyclones from the Bay of Bengal. Within 52,000 square

miles, about the size of Louisiana, is one of the most densely populated areas of the world; about 2,308 people live in each square mile. This is also one of the poorest countries with a per capita GNP of \$470 in 2005, compared to a per capita GNP of \$43,740 in the United States during the same period. The country’s people face further miseries from the unhygienic, dirty, bacteria contaminated surface water they drink as it causes epidemic diarrhea, cholera and other health problems.

Ironically, to provide clean water to Bangladeshis, millions of ground water wells, called “tube wells,” were installed in the 1970s and 1980s with the recommendation of world agencies, the World Bank and the British Geological Survey. It seemed simpler than treatment of surface waters, mostly with chlorine, as practiced for the last 150 years in the developed world. Apparently the well water looked clean; but, in most cases, it contained the invisible, odorless poison: arsenic. After consuming this water for more than a decade, thousands started exhibiting symptoms of arsenic poisoning. Groundwater contamination was first detected in West Bengal some 25 years ago, but not until 1993 in Bangladesh in the northeastern part of the country, according to the Bangladeshi Department of Public Health Engineering, a federal agency. Wilson explained: “Ten million tube wells had been dug before there were serious searches for arsenic. . . . The world toxicology community was silent while the wells were being dug. To their credit, the World Bank, UNICEF and the British Government have reacted positively to help. I call upon the whole world scientific community to help also.”

In response to this horrific tragedy, both UNICEF and the World Bank are playing leading roles in Bangladesh’s “arsenic miti-

gation” programs. Non governmental or organization projects reach about 75 percent of villages, or a quarter of the population, and foreign donors are spending several million dollars annually on “arsenic mitigation” projects. Existence of these extensive networks, with their close links to donors, has helped expand mitigation efforts and to raise public awareness about arsenic poisoning dangers.

Arsenic 101

Arsenic is a notoriously toxic, odorless and tasteless semi metal. It was thought to be harmless or, ironically, helpful in low and intermediate doses; therefore, it was used medicinally from the late 1700s through the mid 1970s. It was also used profusely in agriculture. Negative, traceable health effects began to appear as early as the late 1800s in vineyard workers and in other farmers until the EPA proposed a 1980 modification of the arsenic standard, according to Wilson. He posits that health standards weren’t changed earlier because no ill effects were ever found in studies on rats, mice, dogs or chickens. In fact, dogs thrived on arsenic.

Naturally occurring arsenic enters drinking water primarily through mine flooding, dust, insecticides, pesticides, industrial waste dumps and leaching of natural arsenic from the earth’s crust. In fact, the United States has a two centuries old history of miners’ and other industrial workers’ becoming ill and dying from arsenic exposure before changes were instituted. In the deltaic regions of Bangladesh and West Bengal and in other river beds of the world, it is mostly this natural arsenic from the earth’s crust that poisons water. Water wells not only bring water up but also arsenic in the water. When people ingest water with high levels of arsenic for a long

“The Bangladesh catastrophe need not have happened and can, therefore, be called man-made as much as Chernobyl.”



© iStockphoto.com/lumengraphicsinc



© iStockphoto.com/Alja



© iStockphoto.com/vladim

period, arsenic poisoning symptoms such as skin lesions, numbness and fatigue appear.

Within the United States, the U.S. Geological Survey (USGS) has “developed maps that show where and to what extent arsenic occurs in groundwater across the country. Current maps are based on samples from 31,350 wells. Widespread high concentrations of arsenic were found in the West, the Midwest and the Northeast.” To check out the arsenic levels in any given area, please go to <http://water.usgs.gov/nawqa/trace/arsenic>. The arsenic problem is not limited to Bangladesh and to the United States but includes other parts of the world. According to Royal Geographical Society presentations last year, high arsenic levels in drinking water exist in Inner Mongolia, China, Thailand, Cambodia, Myanmar, Northern Chile, Peru, the Andean High land of Bolivia, Nicaragua and Mexico.

Non-Natural Sources of Arsenic

Arsenic enters drinking water supplies in another intentional way through public water systems. It is used as an additive to reduce the risk of microbial and chemical contamination in the water supply. The standard for arsenic in drinking water was 50 parts per billion (ppb); that remained unchanged from 1942 through January 23, 2006, although WHO changed the standard to 10 ppb in 1993, and the European Union changed to 10 ppb in 1998. Many believe that the 10 ppb standard is still too high. For instance, California and New Jersey governments have passed laws putting their limits at 4 ppb and 5 ppb, respectively. Based on the EPA standard of 10 ppb, 4,000 U.S. community water systems, or about 5 percent of the total water supply which serves 13 million

people, could require additional treatment. Well water is more likely to have higher levels of arsenic than surface water. It’s estimated that 14 million private wells in the United States don’t meet the EPA standard.

Today one of the main commercial and industrial uses of arsenic compounds is pesticides. In fact, according to Wilson, “20,000 tons a year was imported into the USA, and perhaps double that amount was used to spray on crops in the USA alone. No attention was paid to the ultimate fate of the chemical; and, in consequence, arsenic now appears in the foodstuffs.” Weed killers may also contain arsenic, so be sure to check out the weed killers and pesticides at home and replace them with less toxic pesticides, such as pyrethrums.

Other sources of non naturally occurring arsenic include telephone poles, railway ties and any pressure treated lumber prior to January 1, 2004. In fact, a 2005 study by University of Miami, University of Florida and Florida International University researchers shows that arsenic treated wood has a long toxic legacy. According to the study, as much as 40 percent of wood treated with a preservative called chromate copper arsenate (CCA) “. . . will leach into the environment over its entire in service lifespan, which varies from nine to 13 years for products such as decks and is 40 years or more for utility poles. . . . That leaves 60 percent of the arsenic remaining in the wood when it’s discarded, typically in unlined construction and demolition debris landfills.” Arsenic leaching is a serious health risk because it could poison soil and water. In addition, CCA treated wooden playgrounds and decks, which have been around for more than 20 years, are often major sources of arsenic exposure for children and families.

What should people do with existing pressure treated wooden structures? Test them; replace them; seal them; but don’t burn them. Never burn CCA wood because it creates a highly toxic ash.

The Bottom Line

The new attention on arsenic poisoning has sparked a consumer boom in the sale of water testing kits, such as Merck’s EM Quant® Arsenic Test Kit (see Worth Considering, p. 60). Other producers and online kit sellers include National Safety Products, Inc., WaterFiltersOnline.com, Purewater4U.com and Air & Water, Inc. Price depends mainly upon the number of tests that can be performed per kit. Each state’s health and environmental testing laboratory, county agriculture extension agents and county health departments are possible resources, sometimes even offering free testing services.

To raise public awareness, many federal and state agencies are providing arsenic information through free publications and new websites. Considering the risks that arsenic poses to public health, consumers, no doubt, should test their drinking water and consider purification processes. We need to stop the flow of our world’s “invisible killer” into every home.

To help the poor people of Bangladesh get pure arsenic free water, please support Richard Wilson’s Arsenic Foundation, Inc., a non profit 501(c)(3) corporation dedicated to aiding the suffering people. For more information please contact Dr. Wilson directly at wilson5@fas.harvard.edu or go to his website at <http://physics.harvard.edu/~wilson/arsenic/Arsenic%20Foundation.html>. All gifts are tax deductible. 🌱

For more information on sustainability log onto www.centerforabetterlife.com.

Connect

your environmental values with opportunities in your community.
Learn what you can do at www.neefusa.org



National Public Lands Day

September 27, 2008

The nation’s largest single day of volunteerism to improve public lands.

National Sponsor – Toyota Motor Sales, USA



National Environmental Education Week

April 13-19, 2008

An inspired week of Environmental Learning before Earth Day.

Made possible by **Canon**



The National Environmental Education Foundation provides objective environmental information to help Americans live better. At a time of conflicting and challenging messages about the state of our environment, we provide trusted knowledge, resources and opportunities to improve our lives and the health of the planet. **Join the millions of volunteers, teachers and students who will create lasting positive change by volunteering in 2008!**



National Environmental Education Foundation

Knowledge to live by

The Political Science of Water Resources

By Dr. Lewis E. Link, University of Maryland
Department of Civil and Environmental Engineering and
Director, Interagency Performance Evaluation Task Force

Water issues are constantly in the news – too much in some areas and too little in others – with water quality a critical subject around the world. In all cases the challenge to local, state and national authorities is what to do when the severity and frequency of weather-driven events is increasing in conjunction with the vulnerability of people crowding into coastal, floodplain and semi-arid zones. In addition, officials face the uphill battle of an aging infrastructure and archaic policies rooted in the past.

U.S. leaders critically examined water resources strategy and policies over half a century ago. The Harvard Water Project brought together these individuals from diverse settings to examine and to apply lessons learned from water resources development over the first half of the 20th century as well as to evaluate emerging concepts for operations research and systems analysis. This foundation for new initiatives, including sophisticated computer simulation and multi objective economic analysis and benefits, spawned new protocols and practices for water resources planning. While they served the world well, these policies are no longer adequate to deal with today's more complex water and political environments or the uncertainties of the future.

Almost any water resource program or project must be effectively multi purpose. Water quantity and quality are inseparable; while too much and too little water may be at opposite ends of the spectrum, our water policies and infrastructure must deal with both. And for all aspects of water resources, the scale of consideration must go beyond that of any specific water management issue at hand. Understanding basin wide ramifications of actions planned or taken at any point within a basin is a critical part of sustainable solutions. Criteria for success or justification for action must go beyond traditional economic benefits to incorporate life safety, indirect economic, environmental, social and cultural measures.

Public officials must also deal with a continuum of change. Climate, conveniently assumed to be stationary in the past, now is recognized as dynamic and as the driver of significant change in water regimes. Infrastructure, usually intended to deal with a relatively stable requirement for its design life, is often challenged with changing water regimes and transitioning operational and functional requirements. Each alteration can put a larger population at risk, compromise the adequacy of existing infrastructure and create a dilemma for both the people exposed to a new type or level of vulnerability as well as for a political system that does not deal well with change. The bottom line is more risk, yet "risk" is not prominent in our current policy vocabulary.

Within the United States, defining responsibilities and authorities exposes many ambiguities. Most water initiatives transcend local political boundaries, where multiple jurisdictions and divided authorities already complicate decision making. Add state, regional and federal entities, as well as private stakeholders, into the mix; and the complexity can be daunting. Priorities and authorities often conflict because of the local desire for development and the federal focus on protection. Yet all have a valid, important role in determining solutions that will stand the test of time. As a result, the focus has been far too oriented toward short term solutions, project by project, largely because America's political system is aligned to geopolitical boundaries and to the election cycle rather than to the hydrologic boundaries and infrastructure life cycles.



Time is also a big factor. With major public water resources infrastructure, the feasibility, planning, design and construction can all happen under different political regimes – local, state and federal. For example, the New Orleans' hurricane protection system, which was initiated in the late 1950s, remained incomplete in 2005, when Katrina struck. Over approximately five decades the hazard had changed (more frequent and more severe storms); the approach for protection had changed; the potential consequences of flooding had changed; and the nation had ten different presidents.

Initially federal funding provided the resources for major water projects in areas of national interest. During the past century, however, the U.S. government introduced local/federal cost sharing to ensure local involvement and commitment to major projects. This process has inadvertently diminished the ability to achieve long term systems solutions because it is impacted by a local community's immediate and priority interests, as well as its financial resources.

America has inconsistent national standards and policies by which we formulate, justify and develop water initiatives. Water quality, supply, navigation and flood protection are governed by separate distinct policies and standards. Even within a particular domain, such as flood protection, multiple approaches prevail. Dam safety minimizes the risk of loss of life; levees are designed to reduce economic damage. Until New Orleans, public safety was not in the equation. With levees the target standard is frequently "100 year protection." This policy, which has a 1 percent chance of occurring or being exceeded each year and which is used in the National Flood Insurance Program, leaves a home owner with a one in four chance of being flooded over the life of a 30 year mortgage. As a result, structures are often designed to perform to a specific level with little resilience to larger events. In New Orleans that led to massive breaching of levees that had performed well until they were overtopped and eroded by cascading waters. Why not resilience? Some would say "increased cost" while others would say "it goes beyond the protection authorized." Neither reason seems warranted after catastrophic breaching and flooding have occurred.

In addition, sustainability is also a major goal that is not explicitly in current policy. One critical sustainable imperative would be to regain the social and environmental benefits of floodplains and coastal marshes. Besides being critical ecosystems, both provide significant benefits in managing water quality and water quantity. However, reversing trends that have created the current crisis will not be easy; there is no quick fix. The Dutch have demonstrated their resolve through their "room for the rivers" initiative; and, in the United States,

efforts like the Coastal Louisiana and the Louisiana Coastal Protection and Restoration projects are positive but still in the thinking stage.

So where do we stand? In the 21st century the world is making do with politics and policies that were better suited for the slower pace and financial situation of the mid 1900s. Today's complex issues need better system wide consideration, more effective integration and collaboration (both vertically and horizontally) as well as the agility to adapt to changes that are clearly present but, as yet, not well quantified. In many instances our situational awareness is spotty and incomplete, which makes it difficult to develop a coherent long term strategy. Fortunately, change is happening. In the United States California's leaders are dealing with their major water issues by turning the usual

top down hierarchy at least on its side.

It is no longer affordable or practical to have a national water strategy that is, in essence, a compilation of projects addressing local priorities. It is imperative that America's leadership make investments that will stand the test of time and not pass the big issues on to future generations. For that we need a new strategy backed by enabling policies. The recently passed Water Resources Development Act, our de facto national water policy, reflects positive direction. It charges officials to avoid unwise use of flood plains and flood prone areas, recommends a risk analysis approach to planning and calls for the use of life and safety as well as economic benefits in evaluating projects. These ingredients are essential for more effective policies. If we can turn these words into actions, we will all live better. 🌱

For more information on sustainability log onto www.centerforabetterlife.com.



© iStockphoto.com/Glanvok

Sustainability is also a major goal that is not explicitly in the current policy . . .

Conservation and Compatible Land Use

By Alex Beehler, Acting Deputy Under Secretary of Defense
(Installations and Environment)

It is a scene that is being repeated across the nation. Everywhere pristine tracts of land that have been farmland for centuries — or wilderness for millennia — are increasingly being snapped up by developers looking for the next great home sites that can be marketed as being “away from it all.” (Except sometimes they aren’t.) In the war against suburban sprawl community activists, land trusts and conservation groups have a new ally: the Department of Defense (DoD).



© Photograph, Department of Defense

As metropolitan area boundaries extend ever outward from their urban cores, newly arrived residents are discovering they may have some noisy neighbors. Originally built miles from urban areas about the time of World War II, military installations are starting to sit next to homes as a result of runaway development and poor or ill informed land use decisions.

To address the problems posed by development, Congress authorized the Department of Defense in 2003 to partner with state, local governments and nonprofit organizations such as the Trust for Public Lands, the Nature Conservancy, the Conservation Fund and local land trusts to purchase lands and land easements adjacent to military bases. The result the department’s Readiness and Environmental Protection Initiative has helped to create vital buffer zones around the bases while contributing to the preservation of ecosystems and to the protection and restoration of endangered species.

A Natural Fit

Although a partnership between the Department of Defense and conservation organizations may seem unlikely, the Nature Conservancy had already been working with the Department under the legal framework from a 1960 law, the Sikes Act which allows the use of public funds to protect wildlife habitat on military installations when, in 1990, an environmental group threatened to sue the DoD over declining populations of an endangered species, the red cockaded woodpecker, at Fort Bragg, N.C.

Instead of turning into a long and protracted dispute, the lawsuit was an opportunity for the Department to partner with the U.S. Fish and Wildlife Service and with conservation groups to find ways to improve woodpecker habitat outside the installation’s boundaries.

“This was a pivotal event,” says Rick Studenmund, who coordinates the Nature Conservancy’s work with the Army at Fort Bragg. “What brought us all together was the recognition that what happened to the habitat off post was key to both the species and the Army. We started working together and with willing landowners to create protective buffers on private land near Fort Bragg. This helped to ensure the survival of the species and, at the same time, ensure that the Army could continue to train soldiers.”

Extending the partnership with conservation organizations was a natural fit. Jim Van Ness, an environmental attorney for the Pentagon, explains: “At the DoD we are neophytes when it comes to negotiating and acquiring conservation easements, and we need expert conservation land managers to protect the habitat that we are acquiring. We prioritize the training mission; they work to find and protect the habitat on



© Photograph, Department of Defense

“What brought us all together was the recognition that what happened to the habitat off post was key to both the species and the Army.”

and off the base. Hopefully, that will let us operate without the constant threat of more restrictions. You could say that we’ve learned the hard way that wildlife makes a much better neighbor to a military base than a subdivision.”

In June 2006 the U.S. Army and the U.S. Fish and Wildlife Service announced recovery of the North Carolina Sandhills population of the red cockaded wood pecker five years earlier than anticipated the first recovery ever documented for this species.

Good Stewards

Home to more than 30 species of concern and five federally listed endangered species, Fort Bragg is not unique among military installations around the country in having become a de facto wildlife refuge. Its 161,000 acres are also home to one of the largest remaining tracts of longleaf pine and wiregrass forest, an endangered ecosystem that once dominated the Southeastern landscape from Virginia to Texas.

Like other ecosystems longleaf pine depends on periodic fires for renewal. Unlike unprotected areas that have seen a loss of biodiversity because of fire suppression, land on Fort Bragg remains in pristine condition from controlled burns that have been used to keep the forest open for military training purposes as well as from fires set off by munitions and other training. As the Department works with partners to conserve more areas around Fort Bragg, these lands become oases for the red cockaded woodpecker and other species that depend on the ecosystem for their survival.

This story is repeated at other military installations approximately 425 totaling more than 30 million acres where there are nearly 330 endangered or threatened

species. This number is greater than even those found on National Park Service lands, which comprise nearly three times as many acres.

Runaway commercial development poses a problem beyond noise complaints from neighbors in new subdivisions. Running out of habitat elsewhere, species begin to take refuge on military installations. Van Ness says, “While we protected the [wildlife] habitat on our part, it was being lost outside and making ours more important than ever.” Ironically, pressure to save endangered species was one significant factor the Department considered in its 2005 round of base closings (BRAC Base Realignment and Closures), which led to a powerful argument for surrounding communities in which the environment may not have been a primary concern.

But the military can’t just pick up and open new bases somewhere else, says Bob Barnes, a retired Army brigadier general now working for the Nature Conservancy. “The military has to take good care of the land it’s got because it’s not likely to get any new bases.”

This fact of life means that conservation efforts must be comprehensive. “You can’t just protect one tiny place where the species lives and say you’ve done your job,” explains George Carellas, a former senior Army environmental official. “What if you lose that one place? What if that one place is crucial to some aspect of military training? The buffering strategy is proactive, trying to preserve the ecosystem as a whole not just pieces here and there.”

Who Benefits?

Beyond environmental benefits initiated by conservation, other advantages are enjoyable to the public as well. At places like Fort Custer in Michigan and Camp



© Photograph, Department of Defense

Pendleton in California the latter of which is a de facto greenbelt between sprawling development of the Los Angeles and San Diego metropolitan areas preserved lands surrounding the bases are being opened to the public for hiking, fishing and other recreational uses.

Farmers and ranchers have also benefited from easements' preserving their way of life, especially near plains states' installations such as Fort Sill in

Oklahoma and Fort Riley in Kansas, where an agreement with the U.S. Department of Agriculture's Natural Resources Conservation Service has provided new opportunities for coordinated conservation.

Additionally, land trusts have a new weapon in their arsenal to preserve open space and an area's rural character. For example, the Harford Land Trust in Harford County, Md., with funding from the Department of Defense and the Army,

now has preserved open space instead of a new development on 269 acres of land adjacent to the Aberdeen Proving Ground's Churchville Test Area.

“Complying with environmental laws is not the only reason the military has protected lands on its bases.”

Finally, environmental benefits go well beyond the buffering projects themselves. Examples such as those near Camp Pendleton and Marine Corps Air Station Beaufort, S.C., support existing conservation efforts and provide further enhancements. The Northwest Florida Greenway Project, an effort to link Eglin Air Force Base with the Apalachicola National Forest, is providing a vital corridor between two preserved lands for wildlife freedom of movement and biodiversity.

“Complying with environmental laws is not the only reason the military has protected lands on its bases,” says Barnes. “As far as the military's mission goes, the environment is a stage for practicing the art of war; and soldiers need a swamp to be a swamp, a desert to be a desert.” In the face of increasing development and disappearing habitat for endangered species, the Department is benefiting from more substantial funding to create buffers that improve training conditions for our service members and quality of life for generations of Americans to come. Along the way the Department of Defense is happy to gain new found allies in its endeavors. 🌿

For more information on sustainability log onto www.centerforabetterlife.com.



© Photograph, Department of Defense



WOOLRICH®

EST. 1830

For more than 175 years Woolrich has offered products inspired by the outdoors and designed for your life.

To see our complete line of apparel for men and women, blankets, furniture and accessories, visit us online at www.woolrich.com.

Call 1-800-966-5372 to request a free Woolrich mail-order catalog.



Designed for your life.

Bali Global Business Day

By Thorsten Arndt
Communications Manager
World Business Council for Sustainable Development

Companies from around the world gathered Dec. 10, 2007 for a “business day” at the United Nations’ (UN) Climate Change Conference in Bali, Indonesia, to call upon governments to devise clear policy that would guide future business energy investment decisions. The event, organized by the World Business Council for Sustainable Development (WBCSD) and the International Chamber of Commerce (ICC), sent a powerful message that business wants a successful completion of a new global climate change framework beyond 2012, when the Kyoto Protocol expires. The conference brought together 350 leaders from companies, governments, inter-governmental and non-governmental organizations to review the issues at stake while, at the same time, suggesting new ways forward.

“Businesses have already made major changes in the way they operate, introducing new processes, products and services that help reduce greenhouse gas emissions. And while business recognizes the challenges, we also see opportunities for progress and for new markets in the move to cleaner energy, development and deployment of low carbon technologies in all sectors and greener lifestyles,” said Laurent Corbier, chair of the ICC Commission on Environment and Energy and Vice President of Sustainable Development and Continuous Improvement at the French energy company AREVA.



© iStockphoto.com/DanCaraffi

Businesses have already made major changes in the way they operate.

Speaking at the event, Yvo de Boer, executive secretary of the UN Framework Convention on Climate Change, said: “I firmly believe that the engagement of the business sector in fighting climate change is crucial. They are the key to a low carbon future. An international climate change deal for the post 2012 period should, therefore, be designed in a way that makes sense from a business point of view. But first we need political agreement on the launch of negotiations on such a new climate deal.”

The main point of the Bali meeting – mapping a path of negotiations toward a post Kyoto climate and energy framework – was fairly successful in its ability to draw a crucial roadmap along with a plan to have a framework agreed to by 2009. Among the subjects discussed were how business could become more engaged in the process of developing a post 2012 framework, what business and markets need to continue making progress in addressing climate change, opportunities in carbon free technologies and energy efficiency and how to get markets, trade and investment frameworks working in concert to mitigate and to adapt to climate change. Leading companies from a variety of sectors detailed their climate change strategies.

The U.S. delegation to the official UN conference drew criticism from other developed nations’ representatives, as well as from the press, for opposing agreed upon CO2 emission targets although such targets were never really the goal of the meeting. Instead, U.S. companies such as DuPont and GE (founding members of the U.S. Climate Action Partnership and members of the WBCSD) urged the U.S. Administration to take more action.

Companies want policy agreement for two main reasons: first, many energy saving and carbon saving efforts by business do not make economic sense without a carbon tax or a cap and trade carbon market that raises the “price” of carbon emissions. Certainly costly technologies like those that capture and store carbon

could not be justified to shareholders under present policy regimes. Second, as Corbier suggested, companies see new market opportunities for energy efficient, carbon saving technologies under a stricter carbon policy regime. This consideration is especially important in the U.S., where companies have leading positions in such technologies

leads that are dwindling as the U.S. remains largely a non participant (some would say a “spoiler”) in the global climate negotiations. In fact, it is widely reported that China will soon take the lead in renewable energy technologies.

But the Bali conference’s decision to hammer out a new framework in the next two years makes things challenging for the U.S. government. President Bush is a lame duck, and 2008 is an election year. It would be a miracle of bureaucratic speed if a new administration could develop a position and a negotiating team to play a substantive role in the talks by the end of 2009, when discussions are supposed to be finished.



© iStockphoto.com/Heirfoosh

The WBCSD, which has more than 200 members – the world’s largest companies with a total market share of more than \$6 trillion – is itself playing an active role in UN and other negotiations about climate change. It has developed and published Policy Pathways to 2050, a quantifiable, long term (50 year) global greenhouse gas emissions reduction pathway that would help reduce uncertainty about technological development, deployment and business contributions.

Council members believe that the basic flaw of the Kyoto Protocol, which the U.S. never ratified, was that it did not recognize the simple truth that energy policies are made by nations; the protocol tried to impose a “top down” goal. A new approach should recognize that energy and climate policy must be set at national levels; then national or sectoral programs could be voluntarily linked to a growing interna-

tional carbon market, which would introduce international market flexibility into the setting of national objectives.

David Hone of Shell, an important drafter of the WBCSD policy document, said that countries do need to come up with definite emissions targets, broken down into clearly segmented timeframes. Then “the real confidence would ultimately come once we’ve set and passed one or two (target) deadlines and someone’s held to task if we don’t meet them. If that doesn’t happen, then the whole thing starts to unravel.”

Many complex recommendations of the Council’s Policy Pathways to 2050 have been taken up by the U.S. and other governments. The WBCSD Cement Sustainability Initiative is exploring whether carbon targets could be set for the cement industry as a whole. And, if so, could this be done by other industry sectors? The Council also has established projects to promote energy neutral buildings, more

The WBCSD, which has more than 200 members – the world’s largest companies with a total market share of over \$6 trillion – is itself playing an active role in UN and other negotiations about climate change.

efficient operations by the power generation sector and sustainable energy sources for developing countries.

Despite all of this activity, business must still figure out how to cooperate with governments in “saving the climate.” Shell Chief Executive Jeroen van der Veer told the New York Times early this year, “I am a strong believer and strong advocate of free enterprise. If you would like to solve the carbon problem in the world, free enterprise has to work in close cooperation with governments to form the right framework. How you tackled the sulfur dioxide problem in the United States was the basic inspiration for the European trading system of carbon. So there are examples from the past we can apply to overcome that problem. But we can’t do it on our own as an industry. We need cooperation from governments.”

Discussions are already taking place with the Polish government for a business event at the 2008 UN Climate Change Conference. We can hope this event will see quantifiable participation by the United States government in an effort to work directly with business to address these critical and timely issues.

For more information on sustainability log onto www.centerforabetterlife.com.

The Magic of a Green Roof

“No other architectural style provides such a wide range of positive effects for buildings, inhabitants and the environment. ▶ Thus, green roofs meet one of the essential conditions of sustainable development – the reconciliation between economy and ecology,” explains an International Green Roof Association (IGRA) spokesman. ▶ With an inordinate amount of attention being paid to green roofs, no one can deny that, of all American green building trends, green roofs are the darlings of the sustainability world. ▶ But what exactly are green roofs? ▶ What do they do? ▶ How do they work, and why are they such a good idea?



©Photograph: Tetra America Corp.

Most people don't know that green roofs have a long, successful European tradition and history before that. In fact, King Nebuchadnezzar II built the Hanging Gardens of Babylon, one of the “Seven Wonders of the Ancient World,” in about 600 B.C. Green roof predecessors, such as the sod roofs of early Scandinavia, American Indian soil and vegetation roofs, as well as the more recent “soddies” of North America are testaments to the saying “All that's old is new again.” Germany is credited with developing contemporary green roof technology more than 30 years ago. Today an estimated 12 percent of their roofs are green with the industry achieving growth rates of 10-15 percent per year in Germany.

A green roof is a plant filled rooftop garden that can be either an integrated system built onto the rooftop in an intricate set of layers or a modular system, assembled on site and applied over an



©Photograph: Tetra America Corp.

already existing rooftop structure. Visually, a green roof will behave much like its surrounding landscape. For example, plants will go dormant in the winter around the same time the tree canopy loses its leaves. Some plants will die back while others remain evergreen, but colors change to dark reds and browns. Spring growth will resume with warm days and rain showers; plants will bloom throughout the growing season.

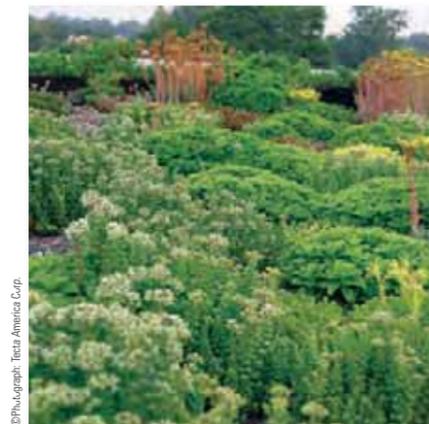
Green Roof Types

There are two basic types of green roofs: extensive and intensive. The more common, extensive green roofs, are lightweight systems with thin layers of drought tolerant, self-seeding vegetated plants requiring little irrigation or fertilization after establishment. Extensive green roofs are built when the primary desire is for an ecological roof cover with limited human access. This system can be built on a flat roof or on a sloped roof with specially designed structural “pockets” to ensure that the soil media stays in place and doesn't simply wash away during the first rain.

Green roofs are built on top of high quality membrane roofing systems. Extensive green roofs include six layers: a waterproof roofing system, a membrane protection layer, a drainage layer, a filter mat, a lightweight growth media and plants. These systems usually have three to six inches of engineered growing media, which is lighter weight than traditional soil because it is comprised of lightweight aggregates and minimal organic matter. The growing media is designed not to decay over time and needs little amending to provide adequate nutrients to plant material. Extensive green roofs are meant to be self-sustaining and add a low weight increase of only 16-35 pounds/square foot when saturated.

Intensive green roofs are primarily aesthetic yet provide sustainability plus urban beautification by using a wider variety of plants, including shrubs and trees.

Intensive green roofs are primarily aesthetic yet provide sustainability plus urban beautification by using a wider variety of plants, including shrubs and trees. Intensive green roofs require a deeper growing medium and result in increased weight. Maintenance requirements, especially watering, are more demanding; often an irrigation system is specified. Structural integrity, of course, should always be checked prior to green roof installation.



©Photograph: Tetra America Corp.

On extensive green roofs vegetation should grow to cover the soil surface, usually within two years. Initially green roofs are fairly sparse with plugs planted on 8" x 12" centers. Generally, starters fill in; and a green roof becomes lush and verdant. Drought tolerant indigenous plants, usually succulents, grow quickly. Most Sedum for instance, have adventitious roots, meaning they can form new ones at the stems and leaves in a suitable environment.

Green roofs are living systems so proper maintenance is critical for them to survive and succeed, particularly during the first 24 months. And, because it is still a roof environment, safety precautions are vital. Green roof installers must know their trade, and some offer maintenance as part of their

recommended ongoing preventive plans. During hot, dry spells the system should receive water. While irrigation seems counter-intuitive for a roof designed to capture and to detain stormwater, irrigation is imperative to have a healthy, functioning, long term green roof system.

Environmental and Other Benefits

The IGRA documents the following private benefits of green roofs:

- 1. Increased Roof Life** – Naked roof life expectancy is 15-25 years because of physical, chemical and biological stresses. Temperature variations, coupled with UV radiation and high ozone ratios, accelerate the aging process and lead to material fatigue, shrinking, crack formation and leakage. Green roofs buffer temperature stresses and variations plus create a protection layer for waterproofing in case of hail, wind or vandalism damage.
- 2. Reduced Noise Level** – Green roofs “reduce sound reflection by up to 3 dB and improve sound insulation by up to 8 dB,” which is particularly important for people living near noisy environments. Additionally, IGRA experts maintain that “electromagnetic waves from transmitting stations can effectively be shielded by the vegetation layer.”
- 3. Heat Shield** – The IGRA further maintains that, “during the summer months, green roofs reduce indoor temperatures through transpiration.” This process allows apartment microclimates underneath a green roof to be comparable with ones on the base floor. Summer attic overheating can be avoided while decreasing air conditioning and energy consumption. In addition, green roofs add an officially credited R Value layer of thermal insulation.

The IGRA documents the following public benefits of green roofs:

1. Natural Habitats for Animals and Plants

Sealing a landscape by human building activities, particularly in large urban areas, has negative effects on the ecosystem and on the human habitat. Low maintenance extensive green roofs act as “stepstone habitats” or “elevated flowering meadows” by promoting biodiversity through species such as wild bees, butterflies and birds that find food and shelter there.

2. Stormwater Retention – Green roofs are important in preventing local flooding because, according to the IGRA, “immediate water run off can be reduced by 50-90 percent. Most of this water returns into the natural water cycle by transpiration/evaporation of the green roof.” Used in combination with other forms of modern rainwater management, the rainwater can be entirely infiltrated on the landowners’ ground.

3. Reduction of Dust and Smog Levels

“Nitrogen oxides, carbon monoxides, volatile organic compounds and diesel exhaust gases create dangerous combinations of toxic substances for urban inhabitants. One square metre of green roof can filter approximately 0.2 kg smog and aerosol dust particles per year, while nitrates and other harmful materials in the air and from rainfall are deposited in the growing medium,” conclude experts from the IGRA.

These well documented social and environmental benefits provide building owners with a significant return on investment, which is why companies such as Skokie, IL based Tecta America Corp., the nation’s largest commercial roofing contractor, are making a commitment to this important environmental effort. “Tecta America strives to develop roofing solutions that can help to turn our customers’ roofs into an environmental asset,” says its CEO and President,

Mark Santacrose. “Tecta’s Environmental Solutions provide the perfect combination of environmentally pro active energy producing ideas, as well as solutions that help to abate negative outcomes such as the urban heat island effect.”



©Photograph: Tecta America Corp.

Dollars & Sense

Initial green roof installation cost can be one and one half to two times the cost of a traditional roof. But, with proper maintenance, a green roof can double the roof’s life expectancy. Add to that heating and cooling savings, amortized over a roof’s life, and a well kept green roof comes out on top fiscally. “Green roofs can save millions of dollars in energy consumption, improve air quality and reduce greenhouse gas emissions. We’re committed to making green roofs an important part of our future commercial roofing efforts,” said Tecta America’s Green Roof Program Manager, Angie Durhman.

Environmentally conscious leaders in cities like Washington, D.C.; Seattle; Minneapolis; and Chicago agree as they continue to promote green roof incentives in programs modeled after European ones. As part of Mayor Richard Daley’s efforts to make Chicago the most environmentally

friendly city in the nation, in addition to providing green roof grants, the Windy City now requires that buildings receiving tax increment financing [TIF] support include a green roof element as part of their construction and building plans, and the city has fast tracked permits that include a green roof element.

The American Society of Heating, Refrigerating and Air Conditioning Engineers [ASHRAE] even has conducted a study about Chicago’s City Hall Green Roof and identified a direct correlation between decreased ambient air temperature and cooling energy use. Every one degree drop in Fahrenheit temperature elicited a 1.2 percent drop in cooling energy use. This equates to enormous savings because, on a 90 degree day, green roofs maintain a 95 degree surface temperature while a dark roof’s surface temperature is a blistering 160 degrees. The study suggests that if, over a 10 year or longer period, all of Chicago’s buildings were retrofitted with green roofs (to cover 30 percent of the total land area), savings could yield \$100 million annually from reduced cooling load requirements. This strategy would also slow chemical processes that produce ground level ozone, nitrous oxides and smog and, would help offset production of sulphur dioxides from coal fired utilities.

“Green roofs benefit neighborhoods and the environment in many ways, which is why forward thinking cities continue to promote their use when considering new construction or rehabbing older construction,” explained Durhman. Generally, given the increased life expectancy and long term minimized maintenance costs, coupled with energy savings and tax/building incentives, over time, green roofs end up costing about the same price as traditional roofs. Yet the bottom line environmental and social benefits are priceless. 🌱

For more information on sustainability log onto www.centerforabetterlife.com.



SUSTAINABILITY

For our children, and all future generations, we’d like to leave the earth in better condition than we found it. That philosophy permeates everything we do. Contact us for more information 303.533.1900.

MWH...your abbreviation for
“Building a Better World.”



BUILDING A BETTER WORLD

Robert Glenn Ketchum

Nature's Tireless Advocate: A Conviction of the Heart



Robert Glenn Ketchum is a world-renowned photographer, conservationist and author. For 40 years his imagery and books have helped to define contemporary color photography. At the same time both he and his work have passionately and successfully addressed critical environmental issues. Dedication to the natural world, particularly within North America, has earned him numerous awards and critical acclaim including: *American Photo* magazine's "100 most important people in photography," *Audubon's* 100 people who "shaped the environmental movement in the 20th Century" and the United Nation's Outstanding Environmental Achievement Award. Ketchum has been in the company of kings and queens, princes and princesses, admirals and generals, and even a few presidents. Historians will remember Ketchum as a great artist but, more importantly, as a truly great human being who never wavered from a struggle or faltered in his convictions.

“I took some studio classes and one of those introduced me to the camera. We got along from the very minute that I picked it up.”



© Photograph: Cynthia J. Wootley

A Fortuitous Beginning

Ketchum's life and career play out like a movie with a fortuitous beginning, a momentous middle and an evolving outcome. Like a set of building blocks, one securely placed upon the other, events have created a self-fulfilling prophecy that has brought him closer to his clearly defined destiny. Ketchum believes the beginning of this journey originated with a “convergence of ideas that were filtering around in public consciousness and education at that particular moment in time.” A product of an all-boys' boarding and prep school with a “very rigorous high school academic background,” this disciplined and logical thinker entered UCLA in 1966, at the same time that Eliot

Porter, Rachel Carson and *Silent Spring*, and Aldo Leopold came to the forefront of American education, and American consciousness was blossoming, arguably, like never before.

A true poster child for why the Arts should be part of every curriculum, Ketchum was exposed to this new world for the first time because of UCLA's mandatory “breadth requirements in the Arts.” “I took some studio classes, and one of those introduced me to the camera. We got along from the very minute that I picked it up; I just liked it. There's a certain magic to it; there always has been, even about taking the picture. And so it captured me; it captured my imagination,” remembers Ketchum. He and his camera became best friends, traveling everywhere together, their identities evolving congruously within UCLA's gigantic campus. “As circumstance would have it, I had the opportunity to hook up with and end up in the entourage of some of the era's preeminent rock bands like the Doors, Cream and Hendrix. And so through college, I picked up date change, movie money, gas money and things like that by taking 8" x 10" black and white glossies of casual moments with various bands on stage, behind stage, in cars and in studios. It was pretty junk photography because I was a pretty bad photographer; but it kept me engaged in photography, and it got me in and out of scenes; it gave me an identity,” explains the artist.

Silently and imperceptibly, Carson, Leopold and emerging organizations like the Sierra Club were helping to mold Ketchum's ideas and perceptions. One day, while camping in Big Sur on his way back from the Monterey Pop Festival, Ketchum wandered alone up a narrow Redwood canyon with a beautiful stream. “I had this magnificent moment in the forest where I took my first landscape pictures, and I tied a whole bunch of things together—things that Carson said in her book and things that Leopold had said about our personal ethic with regard to the land. Everything was ringing around in my head, manifesting



© Robert Glenn Ketchum



© Robert Glenn Ketchum

“I decided that maybe there was some way, within the work, to speak out on behalf of the land or to make the work serve it.”

themselves in this epiphanal moment in the Redwoods. . . . I decided that maybe there was some way, within the work, to speak out on behalf of the land or to make the work serve it. I had this view of myself as a photographer and all these things that needed to be done on behalf of the environment and ideas that the public needed to be connected with, and I could clearly see how I could play into that,” remembers Ketchum. “And when I graduated in 1970 from UCLA, a lot of those heroes of rock 'n roll, who I had admired and photographed, had killed themselves so I thought it was a good idea to get myself out of that and go somewhere else. I went up to central Idaho, where I had previously hunted and fished with my dad, figuring that I would go to work as a professional photographer.” This decision was the beginning of the artist's second life chapter,

which was marked by outstanding events and high profile working relationships.

A Momentous Middle

“So I went up there like most kids do after college . . . by having those other ideas banging around inside my head, I brought them together in an interesting way because I found myself with my healthier, more athletic local friends in central Idaho, skiing in the backcountry, rock climbing in the summer, backpacking, starting to do things that were taking me out into wild country and introducing me to a whole other pattern of behavior. I found myself taking commercial landscape photography that was going into places like the Sierra Club wall calendars and Wilderness Book calendars. So through most of the '70s, I was making those photographs and working out those ideas in my head,” Ketchum continues.

By the end of the '70s, as a result of his successful and widely recognized involvement within the academic community, Ketchum ascended to Curator of Photography at the National Park Foundation, for whom he put together an exhibit called “American Photographers in the National Parks.” Ketchum recalls: “It was also a big Viking book, and it was a huge show—in big museums all over the U.S.—a huge exhibition surveying photography from the 1850s to the present. It was very well received. It explored the way the photographers and the parks had been interactive with each other in the beginning the photography helping to create the parks and later the parks helping to create the photographers. It confirmed for me that the photographers had been successful using their work in the political system for a long time in a very significant way. I was especially moved by Eliot Porter's book, *Glen Canyon: The Place No One Knew*, which was the first time I had seen such an incredible body of color photography and then linked to an advocate text. Now, in



© Robert Glenn Ketchum

that case it was a lament; and I sort of made a personal pledge that I never wanted to be involved with a lament. I wanted to be out in front of things happening – to keep them from happening so there weren't any more laments."

This event set a "tone" for Ketchum but, more importantly, it empowered him as an individual photographer. He explains, "I wanted to take my work from the place where I was using Nature to pay my bills to the place where I was serving Nature in the belief that the bills would pay themselves." His new philosophy of "do the work well and with good intention, and everything else will serve you" was the beginning of a new way of thinking and working, leading him to the Lila Wallace Fund and to the Hudson River. Ketchum recalls the project: "When I photographed the Hudson, I saw 400 years of American history and a metaphor for the way we treated a major American river in those 400 years of evolutionary

thought. And I speculated, 'If I can do it in pictures, it would be a really interesting reflection on what we had done to a river like that.' And so, I photographed everything – the good, the bad and the ugly and everything in between." Ketchum never thought the Fund would use his less complimentary photos because he presumed they were looking for "nice, tidy art" for the planned Hudson River book; but they surprised him by saying they were "conservation-based" and his photographs were exactly what they were looking for.

According to Ketchum, the Wallace Fund bought volumes of the book from the publisher and distributed them within the conservation community. He witnessed first-hand how to execute a project with

alternate funding sources, rather than through traditional commercial outlets, and recalls "I got to witness how to turn publishing from coffee table to advocacy." Instead of waiting for people to pick up books from library shelves, this process directed the books to the people by giving them away. According to Ketchum, "Now in the case of the Wallace Fund, they did it from largesse, but the idea was born and I've learned how to progressively down-scale it so that the environmental groups benefit with as minimal an expense as possible."

Ketchum's second, and probably best known, endeavor was his Tongass Rain Forest Project, which began in 1985. This opportunity, the result of another non-profit foundation commission, sent him to Alaska

to create pictures to enhance the dry legislation that was being proposed as the "Timber Reform Bill." Ketchum remembers: "I read the 600+ pages of the Bill and thought 'Oh, my Gosh! If this is what everyone has to read, no one will even read the Bill, let alone pass it.' So I really was on a mission to get it, to understand what was going on, and to present it in as honest, direct and well-researched a way as I could. I went up to Alaska, contrary to the way the book may sound, with the idea that logging and tree farms were fair options. As it turns out, the biology and the sound science don't read like that up in the Tongass. The market is pretty poor for the timber being cut vs. the biology being saved. As a matter of fact, I look at the Tongass more like it's a corporate welfare and our tax money is being used to subsidize corporations that can't make a clear profit on the timber. So, to me, it's an inexcusable use of tax dollars. It's a bad way to run the federal government



© Robert Glenn Ketchum



© Robert Glenn Ketchum

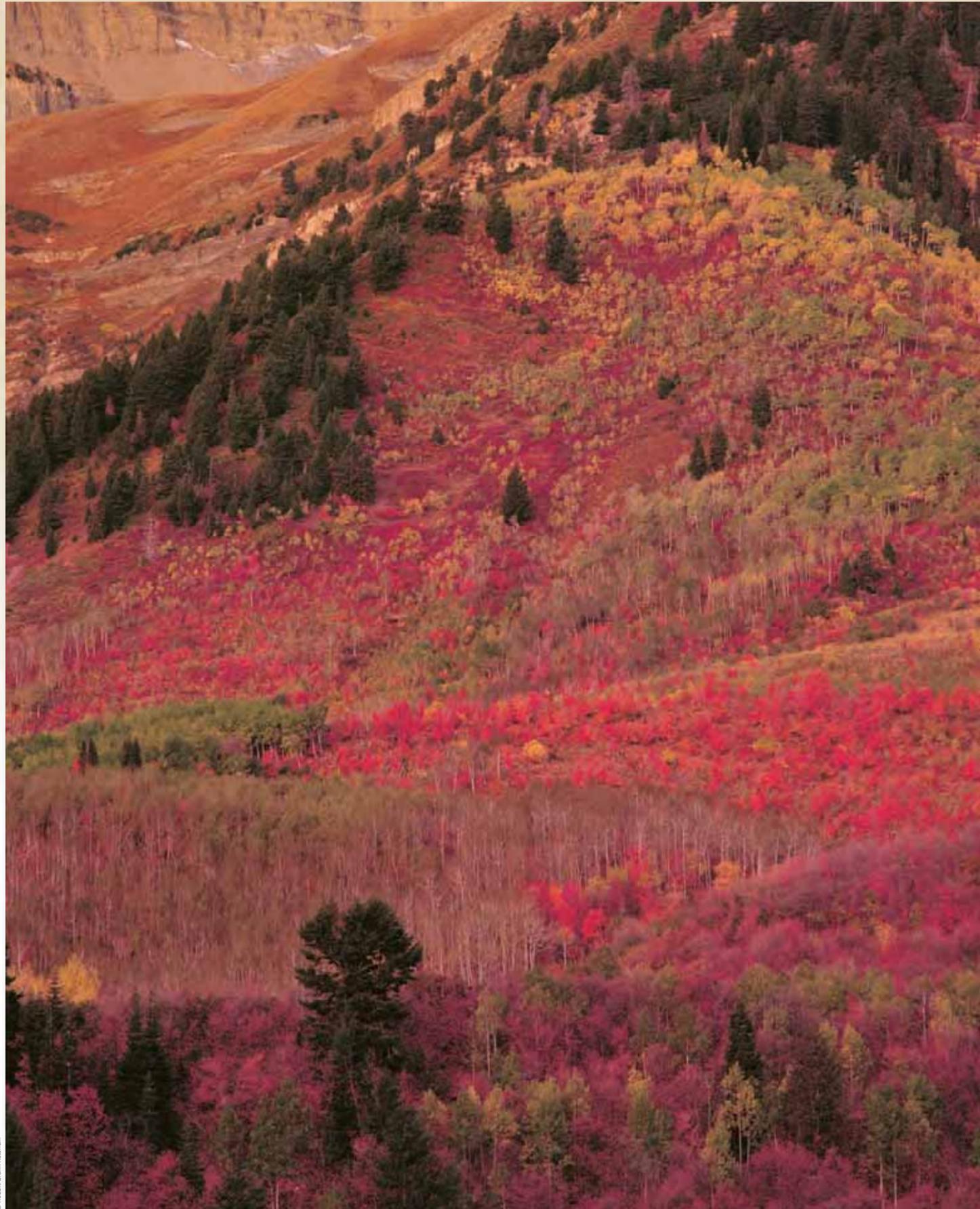
Ketchum's second, and probably best known, endeavor was his Tongass Rain Forest Project.

and a very bad biological practice. That's what I learned from two years on the ground in Alaska trying to do as much neutral research as possible. In the end, with the book, I came to my own conclusions." And in the end, Ketchum's work in the Tongass is credited with helping to pass the Tongass Timber Reform Bill of 1990. This significant legislation established five major wilderness areas and simultaneously protected more than 1 million acres of old-growth trees in the world's largest temperate rain forest.

Other memorable events followed upon the heels of the Tongass, including helping Congressman John Siberling, the National Park Service and the Akron Art Museum work on the Cuyahoga Valley area and giving the Valley a public image. Another

was Sundance. "I did a residency with Robert Redford at Sundance. I was the first visual artist in residence at Sundance, and I did that on and off for three years. Having never met him, I was surprised when Redford called me directly, but he knew my work on the Tongass because it's one of the issues that's principal to the Natural Resources Defense Council, and Redford is a spokesman for the NRDC. And at that point, the Tongass campaign had been quite widely viewed. I had an audience with George Bush Sr. after the Tongass Timber Bill was signed. And then King Gustaf and the President of Brazil gave me the United Nations' Outstanding Environmental Achievement Award in the Pulitzer Hall in Stockholm, Sweden. There was a lot of media and magazine coverage. I was visible and people saw that, so that's probably where Redford picked that up," concludes Ketchum.

"I wanted to take my work from the place where I was using Nature to pay my bills to the place where I was serving Nature in the belief that the bills would pay themselves."



© Robert Glenn Ketchum

Like nature, Ketchum is becoming older, wiser and more independent in his meticulous choices. In the beginning and middle stages of his life, he was driven by external events and happenstance, but now he is in the driver's seat.

An Evolving Outcome

With each progressive project, Ketchum becomes more adept at what he can accomplish—not only in how to weave text into pictures to make a book work but also an exhibit, which are two entirely different things. He elaborates, “I’ve also become more adept at how to take the larger body of work and drive media with it as I’ve been doing for almost 12 years with Southwest Alaska and for some 25 years on the Tongass Rain Forest. You can see how it got started, why other people are attracted to it, how all of us are in there now and how it creates a much larger, unified, inter-related source of information. And, I think, this makes for a stronger, better informed public that you would hope would be more politically responsive.”

Like nature, Ketchum is becoming older, wiser and more independent in his meticulous choices. In the beginning and middle stages of his life, he was driven by external events and happenstance, but now he is in the driver's seat. The 60 year old concurs: “That’s absolutely the truth. I think, in the beginning, I was carried along in good projects by great mentors and, as it should be, I tried to learn as much as I could as fast as possible. And, ultimately, those mentors have died or dropped out of the fierceness of the battle or whatever. And, it was time for me to step up and take that information and my ‘remix’ of the things that I learned and come out with my own version of it that would serve in some kind of way. I can see aspects of William Henry Jackson’s battle, handing out his book in Congress so people would understand Yellowstone, clearly reflected in my Tongass battle. And the same holds true with *Livebetter* magazine on our Bristol Bay battle. This strategy has a long

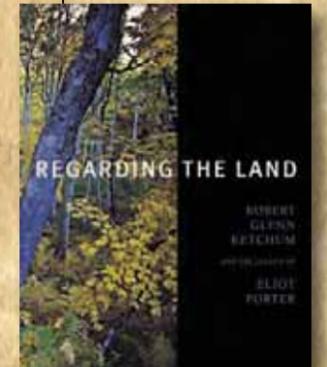
history, and we’re just sort of repeating it. But, we’re upgrading it with a better story and flashier pictures, hoping to make it a little clearer and a little more efficient—hoping that the users get more benefit out of it.”

Robert Glenn Ketchum is an enigma—aggressive and driven in his convictions yet tender and passionate in his words and wisdom. He is, at the same time, an artist, an entertainer, an educator, a mentor, an advocate and a friend. His approach is sophisticated but simple, enlightened yet respectful of all concerned... striving never to belittle or alienate, always hoping people will find their own way in their own time. Ketchum aims to lead people to an “informed decision.” “Anybody who’s in the media or who makes photographs is, to some degree, manipulating the perspective. The question is ‘are you doing it deftly and fairly, or are you doing it in an overreaching manner?’ I think ‘wildness’ is not only an extraordinary place but one that actually probably has all the answers. Not only do we not know them; we don’t even know all the questions yet. We need to pace ourselves more slowly and more respectfully if we’re going to survive. And, I can see that very clearly in relationships between factions that don’t necessarily agree over issues. The bottom line is that we all have to get there together. Because to go forward, that’s all we have left,” concludes the incomparable Ketchum. 🌿

Ketchum is lecturing widely in conjunction with his Southwest Alaska traveling exhibition. He hopes to help prevent the most productive wild salmon fishery in the world’s history, Bristol Bay, from being destroyed by offshore oil and gas development and onshore mining. Please go to www.robertglennketchum.com for more information.

Robert Glenn Ketchum:

Regarding the Land



A unique, limited edition publishing offer to benefit the League of Conservation Photographers

Published by the Amon Carter Museum, *Regarding the Land: Robert Glenn Ketchum and the Legacy of Eliot Porter* is a 40-year retrospective comparing and contrasting the career of contemporary color photographer Robert Glenn Ketchum with that of Eliot Porter, color photography’s equivalent of Ansel Adams.

Featuring more than 80 color plates, this edition has been limited to 125 copies and is paired with a rare, original Ketchum print. The 7.5” x 9.5” “Sun Dance” image, printed on Fuji Crystal Archive photographic paper, and the book are housed in an elegant linen hardbound slipcase. \$250 of each \$1,500 purchase price, which includes tax and shipping, will be donated by the artist to the International League of Conservation Photographers.

For more information please call 1-310-472-3681.

“All through the year we are always getting ready; getting ready for fishing, for berry picking, for potlatches, getting ready for winter. We are always getting ready to go somewhere to get foods. And because we are so spiritual, you know, we are always getting ready for the next life.”

Agnes Kelly Bostrom



Always Getting Ready:

The Yup'ik Eskimos of Southwest Alaska

Words by James H. Barker
and Robin Barker
Photos by James H. Barker

I set out to document the experience of life in a subsistence culture. Through my work I wanted to see how living close to the environment would shape people in their relationships with each other and with the land. I have always tried to make sure that my photographs would be used in a way that would support the Yup'iks concern for the environment and their culture. I realize that I have responded most to people at their best, looking for moments when the people I visited and traveled with were most at peace with themselves and with each other, when they were most thoughtful, intelligent and vital. Thus I hope that this work presents those aspects of the life and people of the delta as they search for their own future.





This is not an attempt to give a complete picture of life on the delta, quite an impossible undertaking. This is, more simply, a selection of words and photos of people who have a unique style of living that I care very much about. These are people who seemed very different from me at first. When there is a moment of real connection or a sense of understanding, then, perhaps because we are different, I have a sense of catching something universal. I make these particular pictures not to show others something new or foreign. I hope instead to strike a chord of familiarity.

A Point of Departure

Alaska's two largest rivers emerge from the interior and come within 25 miles of each other before bending apart for the final 200 meandering miles to the Bering Sea. The Kuskokwim and Yukon river waters carry immense quantities of silt eroded from the interior. Over eons this silt has filled in to form an expansive, flat delta. The delta now is a region of subarctic tundra covered with

a mixture of moss and grasses that float on a permanently frozen layer of silt or "permafrost." Stunted willows, cotton woods and spruce line the rivers in some inland areas, but for the most part the delta is treeless. From the air the region looks like a tenuous compromise that the land has made with the sea. In summer when the land is soft and spongy, the only possible surface travel is by boat.

Nick O. Nick, from the village of Nunapitchuk, described the delta: "Our land is not the same as the land in the lower 48. I've seen the outside, it's nice and sturdy land. However, here in the Kuskokwim area, here in the lower area, not the upper area, it's different, it's bad. But it's good with its fish, our subsistence."

The delta is about the size of Kansas. Most maps of the region will show few signs of habitation in this fan shaped area. However, the delta supports a firmly established population of Eskimo people. They are now the largest group of Alaska Natives to live on their traditional lands, over twenty thousand people in fifty villages. They are

Yup'iks, a Bering Sea Eskimo group who speak a different language from that spoken by the northern Inuit.

The climate of the delta is moderated by the Bering Sea. Except in parts of the delta that are closer to the state's interior, the winter temperatures usually do not register below minus 30° F, but these temperatures, combined with constant winds, frequently generate chill factors near 100 below. Summer temperatures are also moderated by the sea with readings averaging in the 50s and lower 60s. The wind and weather can change quickly. One never leaves home without a coat even in the summer, and safe travel in the winter requires much emergency gear and survival skills.

In the 1950s the Bureau of Indian Affairs began flying students out of the region to attend high schools in the lower 48 states and in Sitka. I have been told that some times near the end of summer a plane would land at a village, and a man would climb out with a clipboard and start reading off names. Students would scurry around, given just minutes to pack their things

before boarding. They would be gone for nine months.

From the early 1970s until the mid 1980s the Bureau of Indian Affairs gradually relinquished control of village schools to the state system, which had run the "white" schools in larger communities since statehood in 1959. Although the transition of teenagers back into the villages after so many years has not been easy, there is now a new interest among young people in traditional dance and other activities, which has given new hope to the area in its effort to maintain its traditional identity. Parents are still struggling to gain the influence they need over their children's education. They try to determine how the schools should best prepare their children for the ever changing future and also incorporate the knowledge of the elders into the curriculum.

The gathering of subsistence food, however, remains an essential, underlying them of the current culture. Though outboards, snowmachines and CB radios are used, it is only because food can more easily and

safely be procured with these means. Yup'iks, faced by the demands of a difficult climate where hunger is never far away, have always been pragmatic and technologically adaptable.

A large portion of the Yup'ik diet is meat, fish and fowl, food that can be harvested locally. Many items in the American diet, such as milk products, fruits, vegetables and grains are expensive and difficult to obtain. Surveys completed in the mid 1980s by the Alaska Department of Fish and Game in nine villages in the delta, show that villagers were harvesting an average of 700 pounds of wild food per person per year. At the same time the mean consumption of store bought meat, poultry and fish by Americans was 222 pounds a year. Of the 700 pounds, 518 were fish, 75 were land mammals, 66 were sea mammals and 41 were other harvests such as greens, waterfowl and berries. Before the acquisition of snowmachines in the 1960s, families had to harvest an additional few thousand pounds of fish to feed their dog teams.

These figures represent a tremendous

ongoing effort. This sense of constant preparation may come from the fact that subsistence activities depend on being ready at the exact moment that the conditions are right and from the fact that the right moment is unpredictable. Technology for subsistence has changed in recent decades. What has not changed is the spiritual connection between man and the animal world which is born out of intimate knowledge and dependence.

A generation or two ago Yup'iks had all the skills needed to provide food, shelter and clothing for survival on the tundra. Many of those skills are disappearing now. They are being replaced by newly needed ones: the ability to make enough money to buy heating oil and such things as outboard motors, snowmachines and guns for more safe and efficient access to subsistence resources. The Yup'iks are also learning the skills necessary to negotiate regulations and advocate for conservation and management of the resources.

However, traditional beliefs dictate that Yup'iks be deeply cautious about any

manmade changes that might have an effect on the productivity of the land and waters. It is enough that capricious natural events affect their food supplies. In testimony offered to the Bureau of Land Management in 1975, Peter Seton of Hooper Bay suggests how vulnerable his people feel: "It has been our concern for many years that it is not good to destroy our food potential. When any kind of waste spills or drains into our rivers, the fish will be destroyed thus destroying our main food supply. Even when there is a natural disturbance on the land there always seems to be a great reduction in the fish and wildlife around the area of that disturbance."

The Alaska Native Land Claims Settlement Act, passed by Congress in 1971, attempted to resolve disputes between Alaska Natives, the state of Alaska and the oil companies over land ownership. Under the Act, Alaska Natives relinquished claims based on aboriginal rights and received title to 44 million acres of land and \$962.5 million. Native people became shareholders in thirteen regional corporations created by the Act and in newly organized village corporations. Calista is the corporation most Yukon Kuskokwim natives hold shares in. Calista and the village corporations each received portions of the funds and title to specific lands. In addition a nonprofit arm of Calista was established in Bethel to address health needs of the region. The corporations were run like any others, with elected boards, paid management and, by 1991, the possibility of selling shares to anyone wanting to buy. The Yup'iks have struggled to learn the skills needed to serve on boards, manage their corporation businesses and deal with government requirements. Perhaps most importantly, the Act has defined them as owners and stewards of the land, roles which run directly counter to their conception of who they are as humans in relation to the natural world.

In the last decade there have been growing concerns about the long term impact of the Settlement Act. Questions about buy outs, potential loss of the land to creditors and about what will happen as Yup'iks are divided by their year of birth into shareholders and non shareholders have come to light. One response, known as the sovereignty movement, has been an attempt by several villages to seek self determination under a 1936 federal law, the Indian Reorganization Act. Under this plan, these villages hope to retain future control of their lands in spite of the Settlement Act. In addition they strive for Native control over such services as schools, child protection and law enforcement. This conflict over what form governance should take typifies the complex issues currently faced by the region.

Although Yup'iks today retain much of their ancestors' value system, they must contend with an unprecedented onslaught of change: mechanization, a cash economy, the Native corporation, land ownership, the pressure of outside interests on natural resources. They live in a culture in rapid evolution, with the excitement of new things affecting their lives every year. Just since I arrived in the Yukon Kuskokwim Delta in 1973, many significant changes have occurred.

Television was introduced and now most villages receive many channels via satellite. Telephones were introduced, first as a single village phone and later in most homes. Health clinics with local paraprofessionals were established in each village. High schools were built in every village and government funded housing was constructed in most. These projects brought an influx of outsiders, some of whom settled in the region, and this in turn brought small businesses, particularly to Bethel. A regional community college was founded.

These changes come at a cost that is hard

to measure. Problems including suicide, domestic violence and alcoholism are discouragingly prevalent. Non Yup'iks and Yup'iks alike identify the connection between rapid cultural change and the serious social problems of the area and are often critical of the disruptions in lifestyle that have taken place. Many regret the passing of old ways while others point out that all cultures are dynamic. They argue that maintaining the trappings of the past and having a firm spiritual connection with it are not necessarily the same. It may not be the change itself so much as the speed of transition that causes such disorientation. The challenge faced by the people of the delta cannot be to resist all change but rather to resist changes that run counter to their spirit and to meet the future with confidence in who they are as a people.

"In many ways, Yup'iks seem to be coming to terms with these vast changes. The business of taking stock, seeing where we have been and where we might go from here, keeps us busy. Always, Yup'iks treasure the ability to find and express the humor in life. I think this comes out in the photographs as well as Jim Barker's observations of us. It is a fascinating and provocative time to be a Yup'ik in the Yukon-Kuskokwim Delta."

Mary C. Pete, Bethel, Alaska

For a more thorough understanding of the Yup'ik in this Alaskan region please refer to James H. Barker's book, *Always Getting Ready: Yup'ik Eskimo Subsistence in Southwest Alaska*, University of Washington Press. Copyright © 1993 by James H. Barker. Certain photos and words from this feature were taken directly from this book.

For more information on sustainability log onto www.centerforabetterlife.com.



LEGISLATION AND THE LAND:

UNDERSTANDING THE EFFECTS UPON SOUTHWEST ALASKA



© Robert Glenn Ketchum

For more than 9,000 years the natives of Alaska have been stewards to one of the most incredible ecosystems on the planet. Living harmoniously with the land, they have maintained a subsistence lifestyle that has protected their diverse habitat. For generations the indigenous peoples have supported themselves with a sustainable economy by relying upon a rich, renewable resource—the salmon population—to continue their way of life. Torn between the desire to preserve their culturally rich heritage and the need to keep up with Western society economics, the people

of Southwest Alaska are divided on the fate of their area. Hailed as “the greatest conservation challenge facing North America,” the outcome lies not only in the hands of elected state and national officials, but also in the hands of the people brave enough to dedicate themselves to the preservation of America’s last great wilderness.

Now more than ever politicians are emphasizing the need for America to wean itself off foreign resources. Mineral rich Alaska is again a main focus not only for politicians but also for companies looking to “make a quick buck” at the

environment’s expense. “The nation’s appetite to use more natural resources is causing a lot of problems for us,” explains Ralph Anderson of the Bristol Bay Native Association (BBNA). As a result, people of Southwest Alaska, particularly of the Bristol Bay region, are facing critical challenges with the discovery of land considered to be a world class copper and gold reserve. The crux of the problem is the proposed Pebble Mine location—at the headwaters of the world’s two most incredible fisheries (see *Livebetter’s* Jan./Feb.’08 issue).

At the state level two bills have been introduced to protect this fragile ecosystem and essentially to halt the prospect of Pebble Mine production. In January 2007, Senate Bill 67, also known as “The Jay Hammond State Game Refuge proposal,” was introduced by Senate Majority Leader Gary Stevens, R Kodiak, AK. Should this bill pass, not only would it protect the salmon, trout, caribou, brown bear and other species in a new game refuge on state lands between the Kvichak and Nushagak Mulchatna River drainages, but it would also ban storage of industrial waste and

pollution discharges that do not meet water quality requirements for fish. Hunting and fishing would be allowed, but staking any new mineral claims inside the refuge would be prohibited.

Dillingham, AK legislator Democrat Rep. Bryce Edgmon introduced similar legislation, House Bill 134, also known as the “Alaska Wild Salmon Protection Act.” This bill would prevent anyone from diverting or polluting water that runs into five rivers—the Nushagak, Kvichak, Naknek, Egegik and Ugashik—that nourish Bristol Bay’s fisheries. Two of these

ivers are near the Pebble deposit. The proposed bill would block anyone from damming salmon bearing water bodies within the five river drainages. The penalty for violating the proposed law: \$10 to \$5,000 per day for an individual and \$100,000 to \$1 million per day for a corporation. Of course, until Canadian based Northern Dynasty proposes a development plan, it’s difficult to determine potential environmental consequences. Many now predict it may well be 2009 before Northern Dynasty announces its Pebble Mine proposal.



© Robert Glenn Ketchum

While most would expect the natives to be united in support of proposed legislation and against the Pebble Mine, the reality is that the complex conflict has split some families down the middle. According to Anderson, the biggest challenge is improving the economy by creating jobs in the region while protecting the traditional subsistence resources and lifestyle of the natives. Life in Alaska is not the same as in the lower 48 states; by all accounts it is much harsher and less forgivable. The majority of Alaskan natives concentrate on obtaining the necessities of life not on accumulating material wealth. In a subsistence lifestyle the concept of materialism does not exist so only minimal surpluses are created; therefore, a reliance on renewable resources within the natural environment is critical to survival.

With gas costing up to \$5 per gallon and some villages paying as much as \$10 per gallon for heating fuel, the natives' traditional lifestyle is in jeopardy. "We can't live a minute in our villages without cash," explains Anderson. To help alleviate the strain of "trying to make ends meet," the BBNA, with the help of CITGO, has implemented

a fuel program to provide 100 gallons of free oil to each native. Many are taking advantage of the program, but some of the more conservative tribes consider the offer unpatriotic and call it "devil oil."

Economic decline, cost of energy and lack of jobs are forcing many area residents to believe the benefits of tapping into the region's mineral resources would help boost the economy. Should a proposal such as Pebble Mine go into production, questions will still remain: "Who is actually going to be employed? Will there be any skill building or training for the natives as a long term economic benefit to the region?" Danny Consenstein of the Renewable Resources Coalition (RRC) says, "The people they bring in to run the mine the engineers, geologists they probably won't even come from Alaska."

In Northern Alaska the Red Dog Mine experienced this phenomenon. Located in the Northwest Arctic Borough, the mine is the world's largest source of zinc while possessing a significant source of lead. At first the Red Dog Mine did hire locals; but after they obtained the jobs, most moved away because of the two weeks on, one week off

work schedule. While many natives benefit economically from the mine, they still depend on a healthy environment. The latter is increasingly problematic because, according to the Environmental Protection Agency (EPA), the Red Dog Mine releases more toxic waste than any other operation in the United States.

Economic decline, cost of energy and lack of jobs are forcing many area residents to believe the benefits of tapping into the region's mineral resources would help boost the economy.

Bristol Bay residents fear the same outcome if Pebble Mine becomes a reality. Obviously no one in the region is opposed to jobs, but many believe one resource should not be sacrificed for another. According to Consenstein, economic studies show that 6,300 jobs depend on the wild salmon which, in turn, depend on protection of their habitat. "If you take care of the salmon and what they need to survive, you can continue to have those jobs for

generations. That's the difference between sustainable jobs and non sustainable jobs," he explains. When Northern Dynasty told Luki Akelkok, a Native elder from Ekwok, they could provide jobs for his people for the next 50 years, he replied, "That's great, but what about after that?"

Is a short term boom from mining's busy resource extraction worth destroying the sustainability of a resource that Bristol Bay natives have relied upon for more than 9,000 years? To evaluate this properly, it is important to first grasp the massive scale of the Pebble Project, once fully developed. Pebble Mine is, in itself, physically burdensome with its proposed open pit stretching up to two miles long and several thousand feet deep. Then consider the 1,000 square miles of mining claims surrounding the actual Pebble deposit. After establishing the infrastructure, which includes a 100 mile access road, essentially a city for the workers, a power plant, power lines and slurry pipes, the next question is access to power for the plant.

The mine at full production, in theory, would use as much power as Anchorage, the biggest city in Alaska with 250,000 residents. Experts posit, from all available information, that Northern Dynasty will obtain power from coal, which would require a probable strip mine to extract the coal, a gasification plant to process the coal and a journey to the mine fill. This, in itself, would change the economics of some smaller mineral deposits making Pebble Mine one of the largest mining districts on the planet. In addition to creating extremely difficult environmental monitoring requirements, toxic waste would remain in dams



© Robert Glenn Ketchum



© Robert Glenn Ketchum

permanently situated in a geologically unstable location at the headwaters of Bristol Bay; the largest of these dams is projected to be taller than the Hoover or Grand Coulee Dams.

Many believe the answer to Southwest Alaska's economic crisis lies in its already abundant supply of the region's No. 1 resource, fish. "Before we throw the baby out with the bathwater and build the largest open pit sulfide bearing mine in North America, maybe we should try to figure out ways to maximize our fisheries resource," says Tim Bristol of Trout Unlimited (TU) (www.tu.org), an organization aimed at conserving, protecting and restoring North America's cold water fisheries and their watersheds. "People could easily help locals receive more money for their fish," Bristol says. To that end, TU has developed its "Vote with Your Fork" campaign, which is delivering Alaska's renowned fresh sockeye salmon into new fish markets such as the New Seasons Market in Portland, OR. The campaign, still in its early stages, is uniting wild salmon harvesters and processors with caring consumers willing not only to pay top dollar for the fish but also willing to take the extra step to write Congress to demand the long term viability of this exceptionally nutritious food source.

"The Alaskan sport fishing industry has been underrepresented as well in regard to its contributions as far as the local, regional and state economy," Bristol points out. TU

has reports that show \$60 million-\$100 million annually from the sport fishing industry alone. People travel to Bristol Bay and spend large amounts of money for the privilege of catching salmon or trout. According to Bristol, some of the best rainbow trout fishing on the planet is in Bristol Bay, which is why people come from all over the world.

TU, along with Felt Soul Media, an award winning producer of fly fishing films, will reveal the beauty and bounty of the pristine Bristol Bay watershed in a documentary titled *Red Gold*. Upon completion Felt Soul Media and TU Alaska plan to take *Red Gold* on the road. They will show it at public venues throughout Alaska and in the lower 48 states while also submitting it to film festivals throughout the world. This project will give a voice to the commercial, sport and subsistence fishermen who are united against the face of mining development and the proposed Pebble Mine.

Many other non profits, such as RRC, are actively fighting to support sustainable industry in the Bristol Bay Region, which is already being threatened by Northern Dynasty's preliminary planning. According to Consenstein, "The caribou and moose are already moving out because of all the helicopters flying around." For an indigenous people who depend on the land for everything, this could easily become a life or death situation. That's why RRC, other groups and individuals have been working



© Robert Glenn Ketchum

to get an initiative on the ballot. It is sponsored by three local gentlemen: two natives and one lodge owner. The proposal, the Clean Water Initiative, asks Alaskan voters to decide on new restrictions for large scale mineral mines to prevent the discharge of pollutants into water used for drinking or for salmon habitat. In just the last two months of 2007, 30,000 signatures were collected, a feat never before accomplished. "When these signatures hit the desk, the legislature is going to feel that," says Consenstein. The initiative will likely be on the August primary ballot; however, there is some chance that it will be on the November general election ballot.

Many people hope Pebble Mine will never go into production; regardless, a main conflict still exists. The people of Southwest Alaska are still wondering how they are going to improve their economy. Ralph Anderson of the BBNA would like to help solve this problem with a federal bill titled "The Native American Challenge Demonstration Project of 2007," HR 3351. This proposed legislation, introduced on both sides of Congress, is a five year program aimed at reducing poverty in two regions with Bristol Bay being one of them. BBNA is hoping the bill will gain traction in 2008.

For people who know Alaska, the irony is evident when reflecting upon the complex issues surrounding the region's distribution of natural resources and the natives' ability to access these resources to improve their quality of life.

Unfortunately, other controversial legislation has already passed, and it's causing anxiety for Southwest Alaska's indigenous peoples. After President Bush lifted the ban on offshore oil and gas drilling in January 2007, fragile waters off the coast of Bristol Bay were left unprotected for the first time since the Exxon Valdez spill in 1989. Soon after the restriction was lifted, the Minerals Management Service finalized its Outer Continental Shelf (OCS) five year Plan for Oil and Gas Leasing 2007-2012. In response, Rep. Jay Inslee (D WA) introduced H.R. 1957, known as the Bristol Bay Protection Act, to Congress. In addition Sen. John Kerry (D MA) introduced S. 1311, which is identical to H.R. 1957. This legislation would permanently protect the salmon rich waters of Bristol Bay from oil and gas leasing. Both bills are still in

the first stages of the legislative process and have been referred to the Sub Committee on Energy and Mineral Resources.

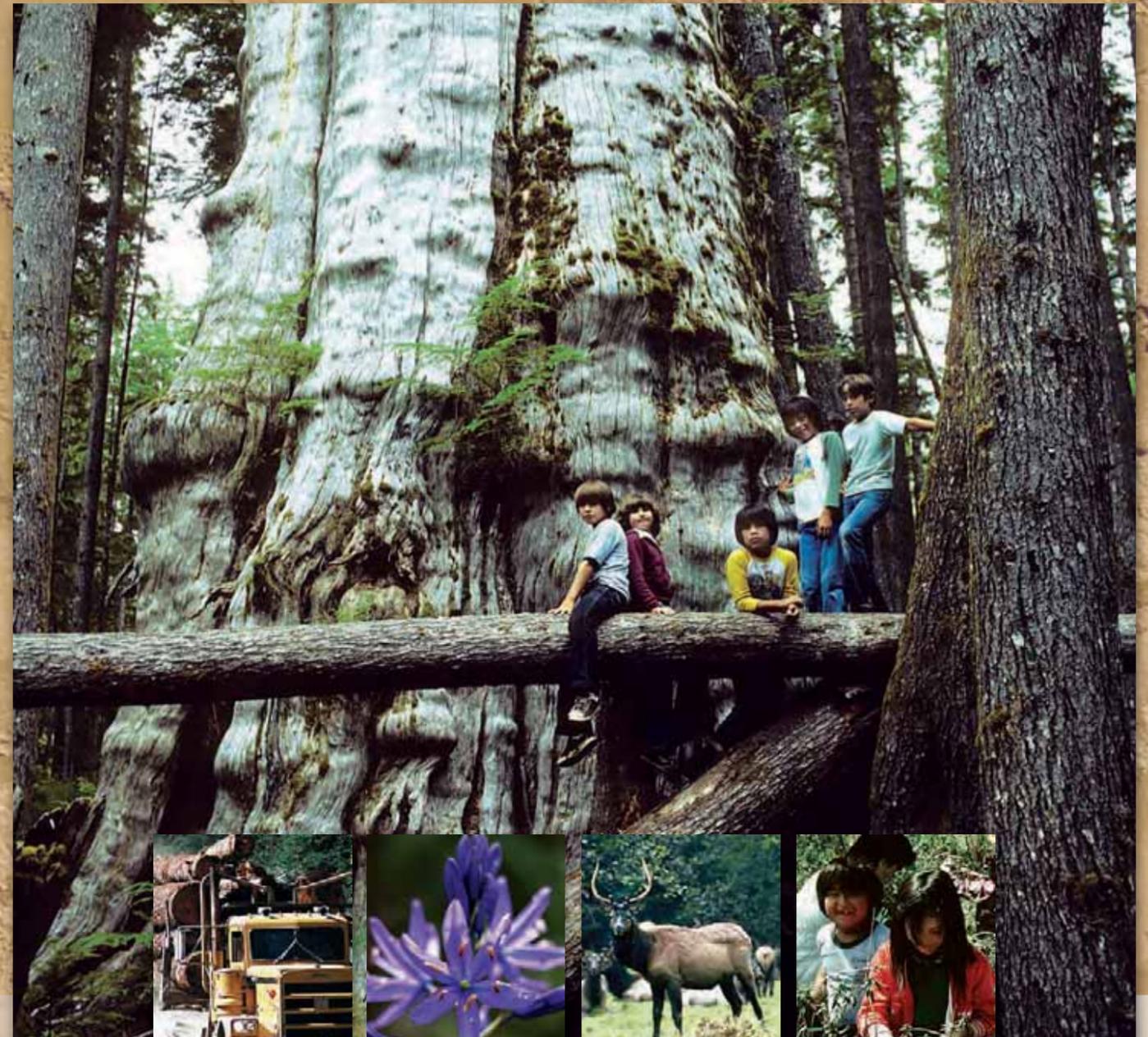
For people who know Alaska, the irony is evident when reflecting upon the complex issues surrounding the region's distribution of natural resources and the natives' ability to access these resources to improve their quality of life. "Take a look at Alaska; we're one of the leading oil producers in the nation, yet we're still paying these outrageous prices for fuel," explains Anderson.

In the Bristol Bay region, electricity is usually generated by diesel fuel and oil is used to heat homes. Gas is essential in conducting native hunting activity. As a result, utilization of fuel technology is a major issue among the natives. Many, including Consenstein, believe that developing more innovative forms of energy could create jobs and could reduce residents' painfully high energy costs.

For America the issues surrounding Southwest Alaska require us to finally address the fundamental questions of how to balance the economy with the environment while providing equity and justice for its Native Alaskans. When are we, as Americans, finally going to draw the line? Are we going to pride ourselves on having places like Bristol Bay and, in the process, support the indigenous owners and stewards of the greatest remaining salmon fishery in the world? Or are we just going to let it unravel by selling off America's last great wilderness while selling out Native Alaskans—one of the world's oldest peoples and, arguably, America's wisest and most unique living legacy. The bottom line is that it's "gut check time" not only for the state of Alaska but also for the entire United States (especially every person of voting age).

Seize the opportunity to make a difference; make the world a better place for everyone. In the end, you'll be making a better world for yourself and for your family. 🌱

For more information on sustainability log onto www.centerforabetterlife.com.



AMERICA'S FIRST STEWARDS

WE'VE LIVED HERE FOR THOUSANDS OF YEARS.
OUR ANCESTORS TAUGHT US THAT OUR PEOPLE, CULTURES AND ECONOMIES ARE ONE.

WE RESPECT AND HONOR OUR RESOURCES BY MANAGING THEM TO MAINTAIN THEIR HEALTH AND PRODUCTIVITY. TO US, SUSTAINABILITY IS NOT A SLOGAN; IT'S OUR WAY OF LIFE. WE CARE FOR THE LAND, AIR, WATER AND ALL THINGS THAT WALK, FLY, SWIM, CRAWL OR GROW ROOTS. IT'S OUR RESPONSIBILITY TO THE GENERATIONS THAT FOLLOW.

SEEK PARTNERSHIPS WITH AMERICA'S FIRST STEWARDS.
WE HAVE MUCH MORE TO OFFER THAN JUST TIMBER.

INTERTRIBAL TIMBER COUNCIL

1112 N.E. 21ST AVE., SUITE 4, PORTLAND, OREGON 97232 · PHONE: (503) 282-4296
FOR MORE INFORMATION ON THE INTERTRIBAL TIMBER COUNCIL GO TO WWW.ITCNET.ORG

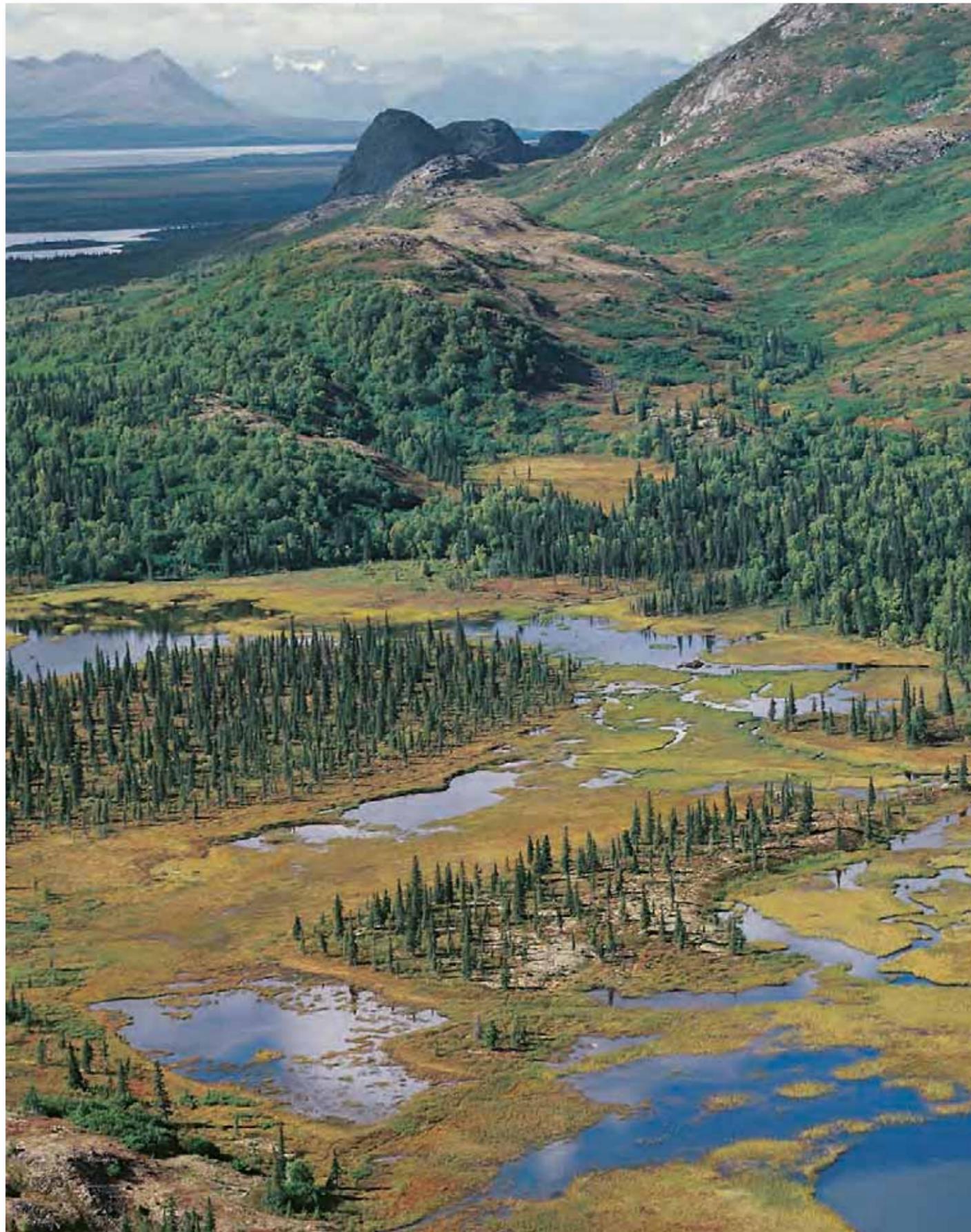


Inalienable Rights: What About the Land?

Photos and captions by Robert Glenn Ketchum

When I wrote the book, *The Tongass: Alaska's Vanishing Rain Forest*, one of the chapters asked the question "Do trees have standing?" In other words, do they have legal rights – rights perhaps earned by their contribution to our existence other than in board feet? Surely their beauty, their age and their ability to adapt must harbor some knowledge with it. The focus of my new work is dedicated to protecting the intact fishery and onshore habitat of Southwest Alaska. And, again, it seems the same questions should be asked about this landscape. As a productive, supportive, bio-dynamic world from which we benefit, should it not have some respect from us and some legal right to exist? Remember Thoreau: "In wildness is the preservation of the world."

▲ "Tree islands" stand above the lake-dotted, lowland tundra of Southwest Alaska. The saturated, water-rich habitat is great for fish but problematic if developed as one of the largest open-pit copper and cyanide gold-leach mines in the world. The proposed Pebble Mine complex would threaten the air quality of surrounding national parks and wild lands, introduce cyanide into the fishery and use more electricity in a single day than the entire city of Anchorage.

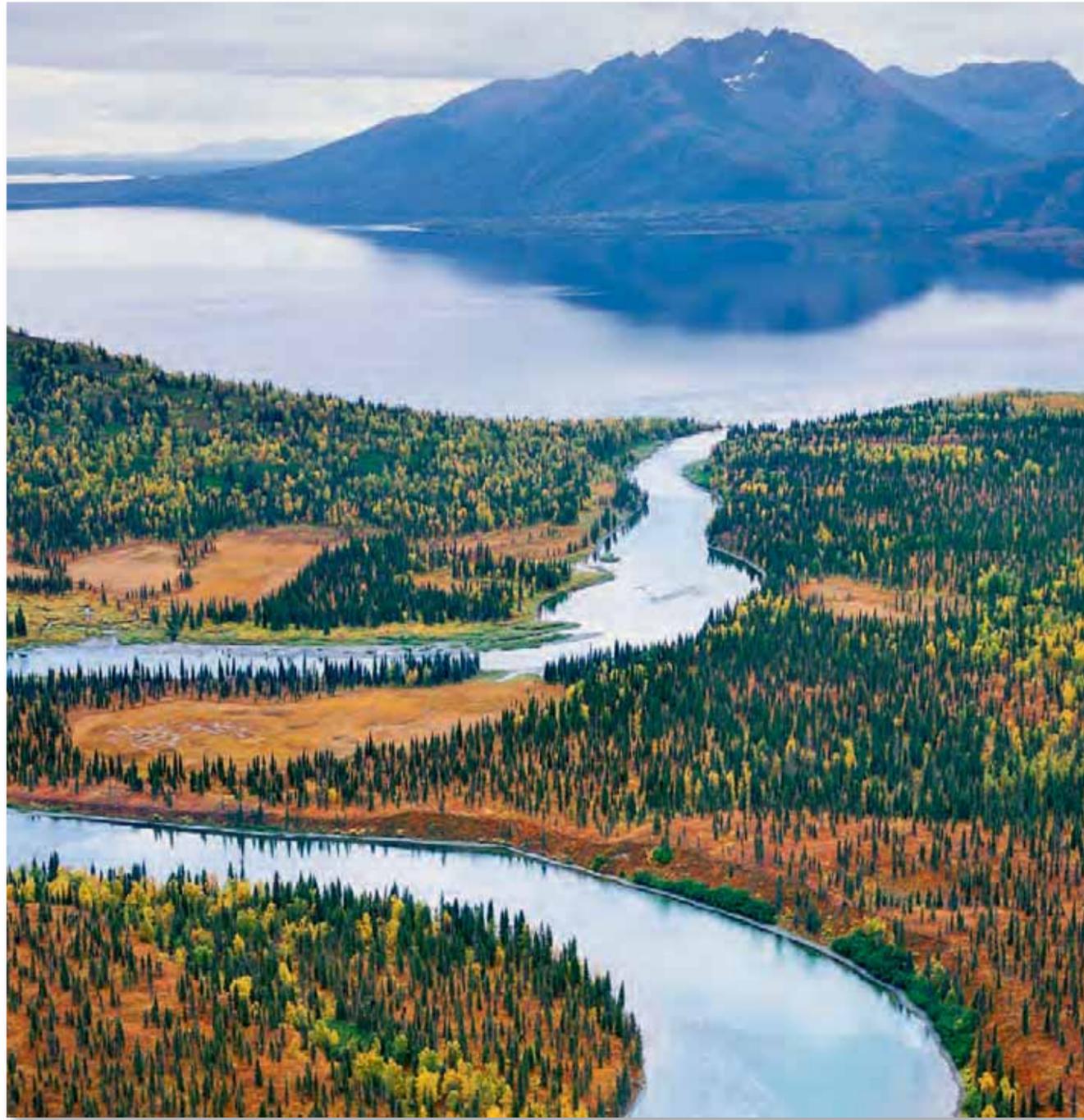


◀ Southwest Alaska is the habitat of the Bristol Bay fisheries, the most productive commercial wild salmon fishery in the world's history – a well managed \$1 billion per year renewable industry. Southwest is also the home of two national parks, Katmai National Park and Lake Clark National Park, three national wildlife refuges and four state designated areas, one of which is Wood Tikchik, Alaska's largest state park.

▲ Southwest Alaska, roughly the size of Washington State, has only two small cities and some thirty smaller villages. Roads and human disruption are minimal. Fed by snowmelt from the Alaska Range, the Wood Mountains and the spectacular glacial lake system of Wood Tikchik State Park, Southwest is one of North America's most biologically diverse freshwater systems, supporting huge populations of all five species of Pacific salmon, Arctic char, Dolly Varden and some of the largest rainbow trout in recreational fishing.

Fish and the sizable habitat sustain healthy populations of bear, eagle, wolf, caribou and goat. Hundreds of thousands of birds migrating along the Pacific Coast also stop over to rest, feed and breed here. Bristol Bay, the marine system into which Southwest Alaska waters flow, hosts a walrus reserve on offshore islands. And, in addition to the vast numbers of salmon that migrate annually through this unspoiled area, it is rich with marine mammals such as whale and orca, crab, herring, many species of rockfish and unique corals.





The Bush Administration recently announced that 1.5 million acres of offshore leases are to be made available for oil and gas exploration within Bristol Bay, the heart of the salmon industry. With the onshore Pebble Mine proposal, it is clear that Southwest Alaska is at a crossroads. It remains for the public to judge whether we should trade these sustainable, commercially productive wild systems for short term industrial disruption that could alter those systems forever, or worse, eliminate them altogether. 🌿



WOOLRICH®

EST. 1830

For more than 175 years Woolrich has offered products inspired by the outdoors and designed for your life. To see our complete line of apparel for men and women, blankets, furniture and accessories, visit us online at www.woolrich.com.

Call 1-800-966-5372 to request a free Woolrich mail-order catalog.

Designed for your life.



Wild Salmon

and the Circle of Life

Photography by Greg Syverson

Most people think of salmon as being good to eat and good for you, but most don't know the fascinating story behind these remarkable fish.

Wild salmon are a gift of nature. One of the world's healthiest foods, they are a rich source of Omega 3 fatty acids, potassium, Vitamin D, the B vitamins, phosphorus and protein—all of which reduce the risk of heart disease and stroke, dementia and Alzheimer's, different types of cancer, depression and hypertension, just to name a few of America's most insidious diseases. The innate food benefits, unreplicated in farmed salmon or in supplements, are reportedly a critical factor in the health and longevity of many Native Alaskans—particularly the Inuit, formerly known as "Eskimos."

Once swimming in abundance throughout much of the Atlantic and Pacific Oceans, wild salmon have dwindled precipitously since the days of Lewis and Clark (to less than 3 percent of their original total in the Columbia River) because of a number of primarily human-induced actions. Today's largest salmon populations exist in northern British Columbia and in Alaska. Within the latter's Bristol Bay region, the world's largest and most sustainable wild salmon fishery, these bright, beautiful

and tenacious fish are the keystone to the entire ecosystem's preservation.

Most people think of salmon as being good to eat and good for you, but most don't know the fascinating story behind these remarkable fish. Indeed, they possess phenomenal adaptive characteristics that enable their unique life cycle and cause them to have profound effects upon the environment. According to David Johnson from the Washington State Department of Fish and Wildlife, salmon "... are a major source of high energy food" necessary to the survival of many other wildlife species such as the bald eagle, Caspian terns, harlequin ducks, killer whales, river otters, and brown, black and grizzly bears. All have "strong consistent relationships" with salmon by depending

largely upon them for sustenance. In fact, a study by Scott Gende, et. al. of the National Park Service showed that of 1,933 salmon tagged in three different streams of Southwest Alaska, 64.3 percent of them were killed by bears alone!

Besides directly contributing to a large part of various wildlife diets, salmon indirectly supply all animals and plants in their habitats with nutrients that would otherwise not be present. These extraordinary contributions to so many other wildlife species lead to salmon's designation as a "keystone" species, according to Milo Adkison from the School of Fisheries and Ocean Sciences, University of Alaska, Fairbanks. Being a "keystone" is like being the beginning point of a domino effect; a change in a "keystone" may result in alterations over time for all wildlife with a relationship to it. Thus, in the Pacific Northwest and, especially in Southwest Alaska where they abound, salmon have a critical and irreplaceable impact on the ecosystem.

One of the most crucial adaptive characteristics to salmon's existence is "anadromy," which is their ability to live in both fresh water and in salt water.

This adaptation allows salmon to have an intricate life cycle, maximizing the benefits from freshwater and saltwater habitats in different ways. For example, juvenile salmon benefit from rearing in freshwater lakes and streams because of decreased risk of predation. However, freshwater habitats provide limitations resulting from less available food. Because it's in a salmon's best interest to grow as large as possible to produce the largest number of eggs to sustain the species, the juvenile salmon migrate to the ocean, where the food supply is more abundant and where they can more safely mature into fully grown adults.

Besides directly contributing to a large part of various wildlife diets, salmon indirectly supply all animals and plants in their habitats with nutrients that would otherwise not be present.

Salmon are able to bridge these vastly different habitats because they undergo a unique physiological change, called "smoltification," in estuaries where the waters of the two vastly different worlds of rivers and oceans collide. While young and living in freshwater, salmon excrete excess water through their kidneys and take up salt through their gills. However, this process is reversed during smoltification, enabling the salmon to actively excrete salt and to take up water—a unique process.

Bruce Hampton's *Rivers of Life* essay, featured alongside Robert Glenn Ketchum's stunning photography, gives an eloquent account of the life cycle and journey of salmon. This species' incredible life journey begins with a very small "... fluid filled



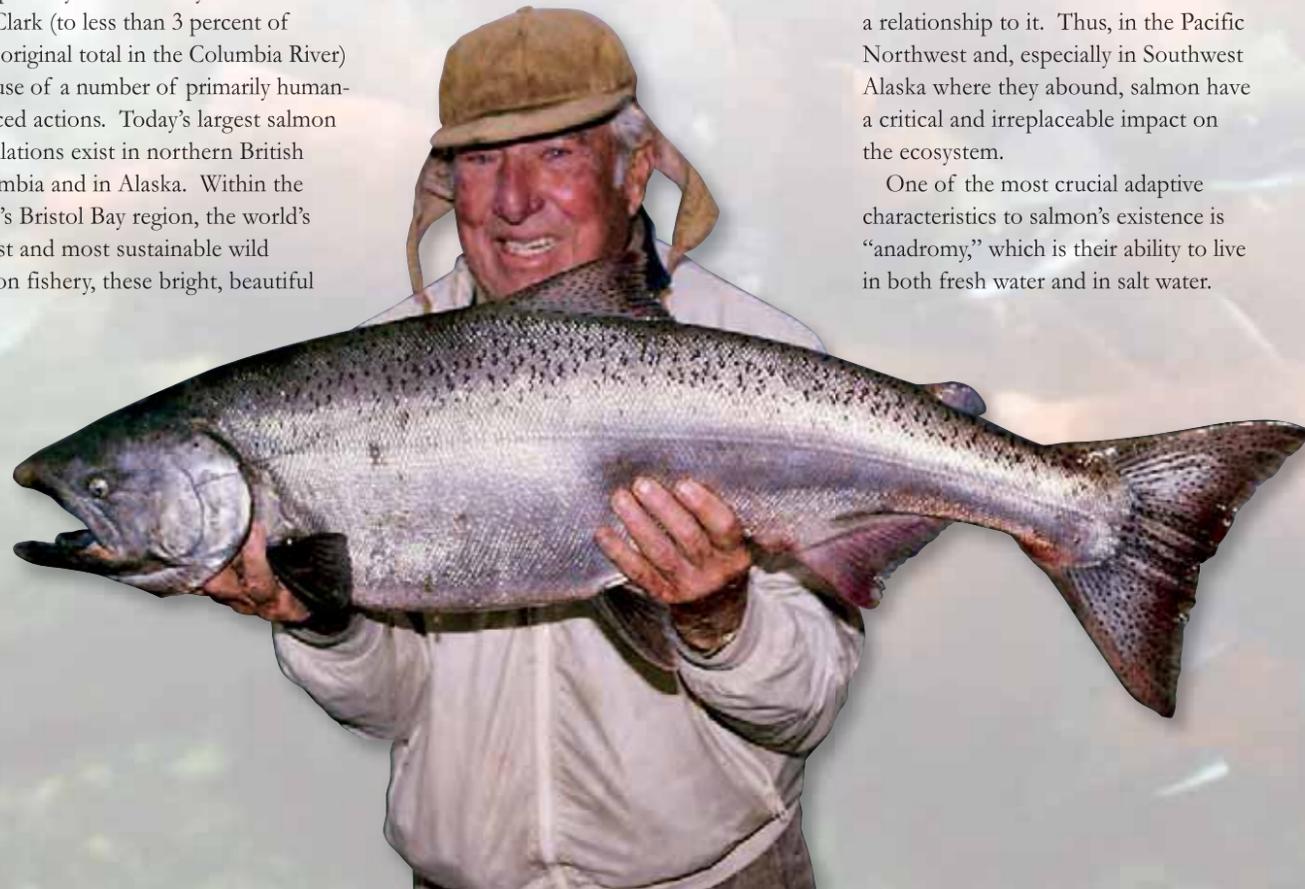
egg containing the genetic material that will dictate the adult salmon's size and shape and provide the framework that enables salmon to create a 'map' of the Northern Pacific." Thus, the phenomenal ability for salmon to navigate thousands of lifetime miles is a gift from birth. Salmon are predictable, and Hampton attributes their precise schedules to an internal biological clock, based on circadian rhythms, which enable the fish to keep track of the time of year and the year itself. That is why, later in life, adult salmon are able to return annually to their freshwater homes to spawn at the same time.

Salmon also possess a mechanism enabling them to gauge direction, as any navigator must. Hampton describes how the species create a navigational "map" utilizing cues from celestial objects like the stars and the sun. However, in response to the Northern Pacific's problem of often being cloudy, Hampton says researchers have discovered an extraordinary substance, called "magnetite," in salmon brains. Magnetite acts as an organic magnet and allows the fish to gauge their position—a unique utilization of the magnetic declination of the earth when celestial reference points aren't visible. In addition to their phenomenal abilities to navigate the oceans, salmon possess one more advantage from birth, their olfactory senses, which are so finely tuned that they can detect the smell equivalent to only one drop of water from their

home tributaries in 500,000 barrels of river water.

Until now, the tiny salmon egg containing its amazing navigational framework has lain shallowly buried in gravel by its mother, continues Hampton. This fortified incubation space provides protection from predators such as trout and birds throughout the cold winter months. In early spring a small salmon minnow or "fry" will leave the gravel for the water's surface and breathe life giving oxygen into its gills for the first time. This first inhalation provides the buoyancy needed to float downstream to lakes and to remain for a year or two. Adkison notes that this can be a troubling time as trout, larger salmon and many kinds of birds target the "fry" for food. When the young salmon are approximately two to three inches long, they are ready to head off to the ocean to undergo smoltification in the gradually more salty environment of estuaries. As this is a delicate time, Johnson explains that the salmon's weak state is an advantage to various predators such as river otters, Caspian and Arctic terns, gulls, larger fish plus even sea lions and seals.

Finally, salmon smolts reach the ocean environment where they will mature into fully grown adults over several years of ocean cruising and feeding. In this stage, they swim 10-30 miles per day in a counter clockwise circuit around the Northern Pacific. As they journey, they





grow larger by feeding off squid, krill, juvenile fish and zooplankton, which contribute to salmon's rich red muscle color. The ocean becomes a great predatory risk even to adult salmon although they possess impressive speed. During this time, according to Johnson, larger fish, beluga whales, sea lions and great orca whales feast on salmon. By the second or third year at sea, a fully mature adult salmon's approximate weight is between four and one half and six and one half pounds.

Following the mental calendar they are given at birth, salmon begin the trip home in late June and early July. Bruce Hampton's *Rivers of Life* essay describes this period as "... the time to see the bays' lower rivers choked with returning fish. One day they're empty; the next, overflowing with salmon." He continues, "... they move in pods of tens, hundreds or even thousands along stream edges where the currents are slowest." They cease feeding and rely upon their stored fat supply to fuel their journey each day progressing 20-60 miles a day up stream. Changes are confirmed visually as salmon lose their

ocean dwelling silvery pigment for bright crimson flanks and green purple heads.

Southwest Alaska's salmon populations gain a substantial benefit because of numerous rivers, large lakes and streams that abound in the region and provide opportunity for a diverse gene pool. According to Hampton, genetic variations of the area are demonstrated by distinctive colors, sizes, flesh textures and, arguably, even tastes. Once again salmon act as dinner for a new and varied group of hungry consumers such as sea lions, bears, bald eagles, mink, wolves, seabirds and songbirds but, this time, as returning adults. Bears, in particular, show notable behavior changes with the salmon's return to freshwater habitats. Usually solitary creatures, who generally avoid other bears, they have been known to gather in groups as large as 60 to feast on energy rich salmon in anticipation of their coming winter hibernation. University of Alaska's Adkison also notes that the population of the national bird, the bald eagle, has correlated with the population of returning salmon.

Humans have created a huge, historical dependence on adult salmon during the

famous Southwest Alaska runs. Native Alaskans, like Pacific Northwest natives, have been capitalizing off salmon's benefits for thousands of years. Salmon fisheries and processing industries have been major contributors to the Alaskan economy since the late 1800s. In addition to tribal and commercial fishing, Hampton notes that Alaska's world famous salmon populations attract a huge tourism market wishing to witness the planet's largest population first hand in this uniquely pristine environment.

After spawning, salmon begin to have their largest impact yet with a nutrient rich contribution to the freshwater environment. Because they have utilized 90 percent of their fat reserves to make the long journey home, salmon have lost nearly half of their body weight and begin to deteriorate. Hampton describes the horrific smell that the rotting salmon contribute to the air for a short period of time. As the pungent stench begins to wane, one begins to recognize the distinct waft of the ocean unfamiliar to freshwater locals. Adkison describes this process of decaying carcasses as indirectly providing marine derived

nutrients (MDN) to freshwater lakes, which contribute to overall productivity of the ecosystem. MDN represent a unique isotropic balance of nitrogen, phosphorus and organic carbon compounds that are not typical of freshwater habitats but that provide enormous benefit to the food webs of both Alaskan lakes and streams.

As demonstrated, salmon are huge contributors throughout all stages of their life-cycle and even in their death.

First, huge blooms of plankton depend on the decomposing salmon as their primary food source. This plankton, in turn, provides sustenance to juvenile fish, including juvenile salmon that forage directly on the adult salmon carcasses. According to Adkison, MDN are incorporated into both plankton and juvenile salmon as well as into terrestrial plants and soils, producing a notable increase in the growth of spruce trees. He continues, "... even wine grapes have been shown to grow better in drainages with spawning salmon!" Some studies have shown that tree ring analysis has gauged how large a returning salmon population was in a given year.

As demonstrated, salmon are huge contributors during all stages of their life cycle and even in their death. Thus, changes in their population size can have far reaching effects for other ecosystem members throughout the shared habitat. According to Johnson, almost all populations of Atlantic salmon in the eastern United States have become extinct; in addition, many of the Pacific populations of Washington, Oregon and California are qualified as "endangered," according to the Endangered Species Act, while some populations are completely extinct. Johnson and other researchers outline several likely explanations



for Pacific Northwest salmon population losses, all of which are the result of human interference: exploitation from commercial fishing, river channelization, log driving, land clearing, mining runoff pollution, removal of old growth forest, hydroelectric dam development, urban runoff, water and sediment contamination with toxic substances and a changing ocean environment possibly attributed to changing global temperatures.

Remarkably, in the face of all this, Alaskan salmon populations have "... remained some of the healthiest in the world; and many of the stocks seem to be self sustaining while still supporting larger commercial fisheries," Adkison says. Unlike in the Pacific Northwest, he points out, "Much of the freshwater habitat in Alaska remains in relatively pristine condition."

The fate of once great salmon populations, such as in Oregon's Columbia River valley, where millions of salmon have disappeared from their historically documented home territory, must not be ignored by those who care about Alaska's still thriving extraordinary wild salmon. Predictive patterns resulting from humankind's documented negative effect on these now gone or critically endangered populations, such as the introduction of toxic materials into the ecosystem, need to be closely monitored and/or avoided to ensure the sustainability of Southwest Alaska's salmon population for future generations. Americans need to ask themselves if they are willing to take a lesson from history, accept responsibility and carefully monitor further development in "the Last Frontier State." The multitudes of wildlife, fish and humans dependent upon salmon for their existence, as well as the fate of this relatively untouched environment that the salmon call "home," demand our vigilance.

For more information on sustainability log onto www.centerforabetterlife.com.





1. EM Quant® Arsenic Test

EMD Chemicals is the North American affiliate of Germany's Merck. The company has been conscious of its impact on the environment for years and assists customers in the proper handling and usage of, return of and recycling of waste chemicals. In addition, the firm provides important tests for many different volatile chemicals found in water and in soil extracts. Arsenic is one of the volatile chemicals that is often a result of groundwater contamination from a number of sources to include unsuitably sited waste dumps. EM Quant Arsenic Test can be used to monitor the levels of arsenic compounds in groundwater, which may contain up to 0.1 mg/l of arsenic. Mineral water, which may have a considerably higher arsenic concentration, soil extracts, pharmaceutical products, specimens and liquid foods can all be tested for arsenic concentration as well. For more information, visit them at www.emdchemicals.com or call 800-222-0342.

Five Products you should Check out

2. GreenFiber Insulation

GreenFiber™ is the manufacturer of natural fiber insulation, fire and sound products that not only offer permanent and proven fire resistance for the life of a structure but also reduce nuisance noise when used in walls to create a more comfortable living space. These products, produced in 11 electric-driven plants across the U.S., consist of 85 percent recycled paper fiber. Energy use for the production of GreenFiber's products is ten times less than the energy required to manufacture other insulation materials. GreenFiber's sustainability mission is the quest to leave the world better than their employees found it by conserving natural resources, fostering healthy work environments and communities, and creating economic growth. To learn more, visit www.greenfiber.com or 800-228-0024.



3. Green Power Generators

Green Power Generators™ (GPG) is pioneering new custom-built biodiesel fuel generators. Derived from biological sources such as vegetable oil, the biodiesel fuel used in operating them is safe to handle, is as biodegradable as sugar and reduces net carbon dioxide emissions by 78 percent compared to traditional petroleum diesel-fueled generators. GPG generators feature Cummins Tier-3 engines that meet the most stringent EPA emissions standards. Only 1 percent of generators currently used are Tier-3. The company also has its own supply of biodiesel fuel as well as transportation, utility and refueling trucks that run on fuel from the same source to ensure that all measures are taken to prevent unnecessary carbon emissions. For more information, please visit www.gpgenerators.com or call 323-960-0113.



4. PolyPavement

When your landscaping dream requires a paved area, your vision should include PolyPavement, the natural soil pavement. Unlike soil stabilizers that hold down dust and dirt marginally, PolyPavement provides a solid pavement wear surface. Converting the earth itself into a solid pavement, it allows the complete palette of Nature's earth tones, colors and hues. Environmentally safe PolyPavement is non-toxic to plants and animals; it contains no known carcinogenic ingredients such as vinyl acetate or acetaldehyde. In addition, it may be applied in environmentally sensitive areas without worry or concern. In tests PolyPavement has been proved safe for sensitive aquatic life and did not leach into groundwater. Natural Soil Pavement, more than two times stronger than asphalt, cannot be damaged by rain. It supports heavy vehicles yet requires little or no maintenance. Foot traffic areas, parking lots, service roads or other services may be specified to meet any and all design requirements. To find out more, visit www.poly pavement.com or call 323-954-2240.

5. Niagara EcoLogic 1.28 gpf HET Flapperless Toilet

Flapperless Toilets utilize new innovative "tipping bucket" technology that controls water flow by eliminating rubber flappers and seals often found in traditional toilets prone to leaks because of improper seating or normal "wear and tear" from corrosive minerals in the water. Flapperless toilets also have fewer moving parts than normal toilets so they greatly decrease the need for repair and maintenance. The "tipping bucket" ensures that no more than 1.6 gallons of water are used per flush (54 percent less than a 3.5 gallon per flush model). If a family of four replaced a 3.5 gallon per flush toilet with a Flapperless, EPA WaterSense-approved toilet, they would save more than \$90 annually on their water bill. Niagara Conservation's two EPA-approved models are N2225R and N2225E. For more information please visit www.niagaraconservation.com or call 800-831-8383.



WHAT CAN YOU DO WITH 261 MILLION POUNDS OF OLD CARPET?

ALMOST ANYTHING.

When you CARE to find solutions, the sky's the limit.

The Carpet America Recovery Effort (CARE) makes a vital contribution to the environment. A voluntary program of the nation's carpet manufacturers, CARE finds innovative ways to keep old carpet out of landfills and get it into new products. So you'll find post-consumer and post-industrial carpet and padding in everything from railroad ties to car parts — it's even being used to create energy.

In fact, in 2006, CARE kept 261 million pounds of post-consumer carpet from simply being thrown away — a 16% increase since 2005. And that's too important a fact to sweep under the rug. To learn more, visit www.carpetrecovery.org.



www.carpetrecovery.org

livebetter department sustainable solutions

Going 'Green' at Portland State University with Siemens Building Technologies

Since 2002 Oregon's Portland State University (PSU) has focused on designing new buildings as well as on retrofitting and renovating older campus structures with sustainability in mind. PSU's new Maseeh College of Engineering and Computer Science Building is the University's latest facility to go "green"; it's also a model for energy and resource efficiency. Certified LEED (Leadership in Energy and Environmental Design) Gold by the U.S. Green Building Council, the complex features natural lighting and ventilation, a rainwater harvesting system plus geothermal heating and cooling from underground springs.

Siemens Building Technologies supported PSU's sustainability goals by contributing a number of energy efficient strategies backed by innovative building systems and technology integration. To this end, Siemens provided sophisticated heating, cooling and laboratory environmental controls via its APOGEE® Building Automation System (BAS).

These high tech solutions regulate the geothermal water flow that is pumped from two separate aquifers and used for heating and cooling. A portion of the rainwater collected from the engineering building's roof is diverted through PSU's rainwater harvesting system to flush toilets and urinals on the first floor. In addition, students in the hydrology lab use the rainwater harvesting system to study water usage rates, rainwater quality, filtration methods and other aspects of environmental engineering to advance this technology.

From the storage tank a water sample is continuously pumped through a flow cell that is regulated by a Siemens Water Technologies Strantrol® 890 system. PSU's rainwater harvest system also uses two ultraviolet (UV) systems to disinfect



the water. In a single pass operation, water is treated as it is pumped to point of use while the second UV system continuously treats rainwater in the storage tank. These new automation systems also command the motorized operable windows plus provide indoor air quality measurement and adjustment via CO₂ sensors.

A Green Bottom Line

With the help of these energy and water efficient technologies, PSU uses 45 percent less energy than Oregon Code and nearly 40 percent less water than in prior years. PSU previously had three green buildings on campus: the Native American Student and Community Center, the Broadway Housing Building and the Stephen E. Epler Hall. With the latter two being certified LEED Silver, Siemens Building Technologies provided control solutions for all three. For the Broadway Housing Building, students from the University's engineering college monitor the green roof soil temperatures, water runoff and energy use. This synergy proves that not only do green buildings provide sustainable solutions that put green on the bottom line, but they also create state of the art 21st century educational solutions. 🌱

For more information on sustainability log onto www.centerforabetterlife.com.



Finding Your Purpose In Life

By Sherry Kuhns, Kuhns Bros. Log Homes

When starting to write this guest column, I was originally focused on sustainability, especially because Kuhns Bros. Log Homes is dedicated to preserving the quality of life for future generations. So, as I thought about what a gal from central Pennsylvania could say that would be of value to anyone, I immediately thought about our purpose in life.

For me sustainability begins where God would want me to be: Love my family; be best friends with my husband; build relationships; always say I “can” instead of “cannot” while simultaneously looking for the positives in life and focusing on the goals that are most important for success.

I believe that most everything happens in life for a reason; it shapes us into what and who we need to be for the purpose that we are meant to fulfill. Some people call it “destiny”; others call it by another name. By any other name, it is still the same thing – an intimate, powerful journey that constantly tests us, molds us and makes us into totally unique human beings.

I wonder, as I think most people do, if the tenets of the journey are such that they require us to focus on what’s most important. Is this to help strengthen us where we are most weak? Or is it to help us love just a little bit more? Sometimes I wonder if becoming who we are supposed to be is accomplished through simpler things, like taking time to listen or sharing with others.



© iStockphoto.com/malalay

Everything happens in life for a reason: shaping us into what we need to be.

I think about this everyday and, as a result, endeavor to understand what is most important to my customers, colleagues, employees, family members or even the human population in general. Constantly and consistently, I remind myself that this journey is both complex and simple and that this path is a sacred one that will lead me to where I need to be. Along the way it’s important to communicate clearly, to be honest and to never waver in integrity. Because clearly, within an instant, the journey can test one’s will, one’s faith, one’s patience and maybe even one’s virtue – sometimes all at the same time! Nobody said life was easy. . . .

We all know that, between work and family, life can swallow us up on a daily basis with our many things “to do.” My one word of wisdom to combat this chaos is “STOP.” Begin the journey if you haven’t already; travel the path; and find your purpose in life. It will become one of the most singular, uniquely powerful acts that you will ever set your mind to do. And it will set you free, making those otherwise mindless daily “to do’s” an act of love and commitment as you shape them to really matter. There is no magic potion, but in time life will go from rote to powerful, evolving into one of profound meaning because you will know your true purpose.

I truly believe that this re-evaluation of our own lives will bring to bear a positive mark for our future generations as well. This new purpose in life will, collectively, give us the strength of purpose to love our families just a little bit more, to make our significant others our very best friends and to work on building stronger relationships with others, regardless of race, creed or color. Last but not least, let’s challenge one another to make a new friend every chance we get. What other challenge could be better for “building a better world”? 🌱

For more information on sustainability log onto www.centerforabetterlife.com.

Way to go Al!



We join the planet in congratulating our Advisory Board member, former Vice President, and Nobel Laureate, Al Gore.



www.falconwaterfree.com

AMERICAN HERITAGE CRAFTERS

AMERICAN-MADE QUALITY HOME FURNISHINGS



A DIVISION OF KUHNS BROS. LOG HOMES
FOUNDING MEMBER, CENTER FOR A BETTER LIFE

877-790-2194

www.americanheritagecrafters.com

