

THE TRUE COST OF COAL

The Coal Industry's Threat to Fish and Communities in the Pacific Northwest

NATIONAL WILDLIFE FEDERATION

2012



Flickr: Dmitry Klimenko



Report

THE TRUE COST OF COAL

The Coal Industry's Threat to Fish and Communities in the Pacific Northwest

Executive Summary

The era of Big Coal in the United States is on the ropes. Over the last decade we have steadily reduced our reliance on this dirty fuel, both because of its impacts on public health and our global climate, and because coal has been eclipsed by cheaper, cleaner energy options. But despite the gains we have made, the coal industry remains a political powerhouse that isn't going down without a fight: Peabody Energy, Arch Coal, and the other mega-producers have now set their sights on the Asian market, where pollution and climate concerns have taken a backseat to a rabid demand for cheap energy.

In an irony lost on no one, the cheapest and fastest route from the western coal fields of the Powder River Basin goes straight through the Pacific Northwest — a region that is probably the most environmentally conscious in the country. People in the Pacific Northwest know how important a clean environment is to their economy and quality of life, whether that means healthy salmon runs or clean air and water. Sportsmen, Tribes, and citizens everywhere know they face a choice between those values and the opportunity to become a stopover for one of the world's dirtiest industries: To date, Big Coal has proposed at least six export terminals in

Washington and Oregon. If all of them are built we could see 150 million tons or more of coal moved by rail, barge, and tanker every year through those states.

Until recently, coal exports weren't even on the list of people's concerns for the Columbia River, Puget Sound, and the other rich but fragile fisheries in Washington and Oregon. Decades of overfishing, pollution and impassible dams took their toll, but progress has been made in recent years as cities and towns prioritize smart development, fish habitat is being restored, Columbia River dams are allowing more juvenile fish to pass and the Northwest's remaining coal plants are being shut down. Fishing remains a multi-billion dollar industry in the region, so when evidence surfaced that the world's dirtiest industry was planning an all-out blitz, residents began to take notice and speak out.

In *The True Cost of Coal Exports*, we examine the likely impacts these projects would have on the communities and ecosystems in their path, with a focus on the danger posed to fisheries and the people who depend upon them for their livelihoods, recreation, and cultures.





Power Past Coal

The dangers the Pacific Northwest faces from exporting coal include:

- Diesel emissions and coal dust from mile-and-a-half long rail cars would reduce air quality and deposit toxic elements such as mercury into waterways;
- Port construction and a huge scaling up of barge traffic would harm crucial fish habitat;
- Burning more coal in Asia would drive global warming, ocean acidification, mercury deposition, and other crises that affect species like salmon and steelhead that help power the economies of Washington and Oregon.

We also peel back the curtain on the companies behind the rush to export, and the lessons are clear: Big Coal has razed, dynamited, and excavated immense swaths of once-pristine areas like the Appalachian Mountains and the Powder River Basin, leaving behind a toxic legacy of pollution and shattered communities. Not only is the mining

process a fundamentally destructive one, but, as a whole, the coal industry has earned a reputation for unscrupulous—and often illegal—behavior. As if the point needed any emphasis, they have already gotten off on the wrong foot in the Northwest, deceiving regulators about the scope and size of their latest export plans. It is the wrong industry, at the wrong place, at the wrong time.

We have an opportunity to say “NO!” to coal, but it will take a united effort by citizens, states, and the federal government. So far the first two groups have stepped up to the plate, with a growing coalition of diverse Northwestern voices opposing the plans: the health community, conservationists, tribes, fishermen, faith leaders, elected officials and many others. All agree that these proposals contradict deeply held regional values, and come with too high a price. As such, this report is a call to action for Americans to stand up against Big Coal to protect our natural resource legacy and public health.

But the local and regional voices may not be sufficient to push back against the multi-billion dollar expansion plans that Peabody Energy, Arch Coal, and others are determined to push forward.

Given the broad impact that increased coal shipments will have, not only on the local communities and the region’s critical natural resources, but also on the global climate, national scrutiny and oversight is essential. And national leadership to pursue an alternate energy path for our country is urgent. We lack crucial data on these issues, and National Wildlife Federation recommends a series of policy steps to ensure that we know the full extent of these proposals’ impacts on our environment and public health. A full list of recommendations can be found at the end of this report.

INTRODUCTION

STOPPING COAL IN ITS TRACKS

Here's the very good news: In the United States, we have steadily reduced our dependence on coal. In 1988, coal-fired power plants supplied 57 percent of the nation's electricity.¹ At the end of 2011, it had dropped to less than 40 percent.²

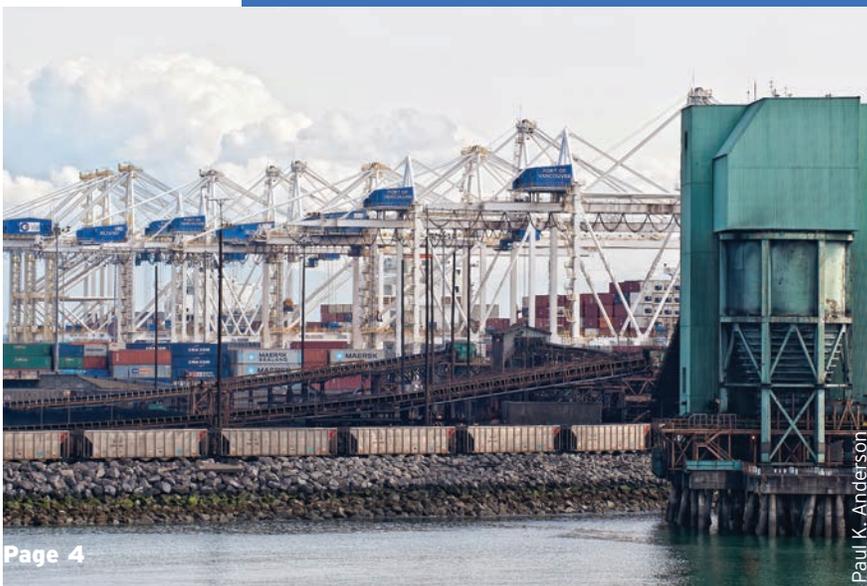
Coal will assuredly continue to decline as a domestic energy source, for good reason: it is a dirty fuel, with destructive impacts that harm our health, poison our waters and foul our air. A national movement that includes scientists, health care professionals, sportsmen, Tribal leaders, elected officials from both major parties, parents and business leaders are demanding that we replace coal with smarter, more modern, and less caustic energy sources. New coal-fired power plant construction is at a virtual standstill, old ones are slated for retirement, and more renewable energy is coming online every day. As one top industry analyst astutely remarked, "Coal is a dead man walking."

It's not dead yet. The bad news is that the coal industry is responding to this shrinking domestic market by shipping more dirty fuel overseas, especially to growing markets in China and India. Some of the largest coal companies in the U.S. propose building or expanding six coal ports in

Oregon and Washington, states that have rejected coal for their own energy needs. (See map, Page 16)

These controversial proposals have opened a new front in the coal wars. In addition to building or enlarging ports in sensitive aquatic habitat, the export plan includes a massive build-up of rail traffic, ferrying tens of millions of tons of coal annually from Wyoming and Montana, through Idaho to ports along the Columbia River and in Puget Sound. Mile-and-a-half long freight trains, known in the railroad world as "black snakes," would leave a trail of coal dust, toxic pollution, health problems and disrupted communities from Wyoming's Powder River Basin to the Pacific Ocean.

The prospect of damaged fisheries, fugitive coal dust and diesel from freight cars, and toxic pollution from burning coal are all good reasons to oppose these port expansion proposals, but there's more: burning coal is one of the world's biggest sources of carbon pollution.³ Carbon dioxide is a heat-trapping gas when it lodges in our atmosphere. Once there, it warms the planet in much the way wearing a down parka on a warm day will make you overheat. Carbon dioxide build-up is one of the major contributors to higher global temperatures, melting ice caps, and rising seas that researchers have documented all over the globe, and contributes to the strange weather patterns that have escalated in the last century. Our oceans are also absorbing carbon dioxide, which is turning them more acidic and stressing marine life. We can substantially reduce carbon emissions using existing, affordable technologies, but sending American coal to China is simply outsourcing our pollution, and climate change and toxic emissions don't respect international boundaries.

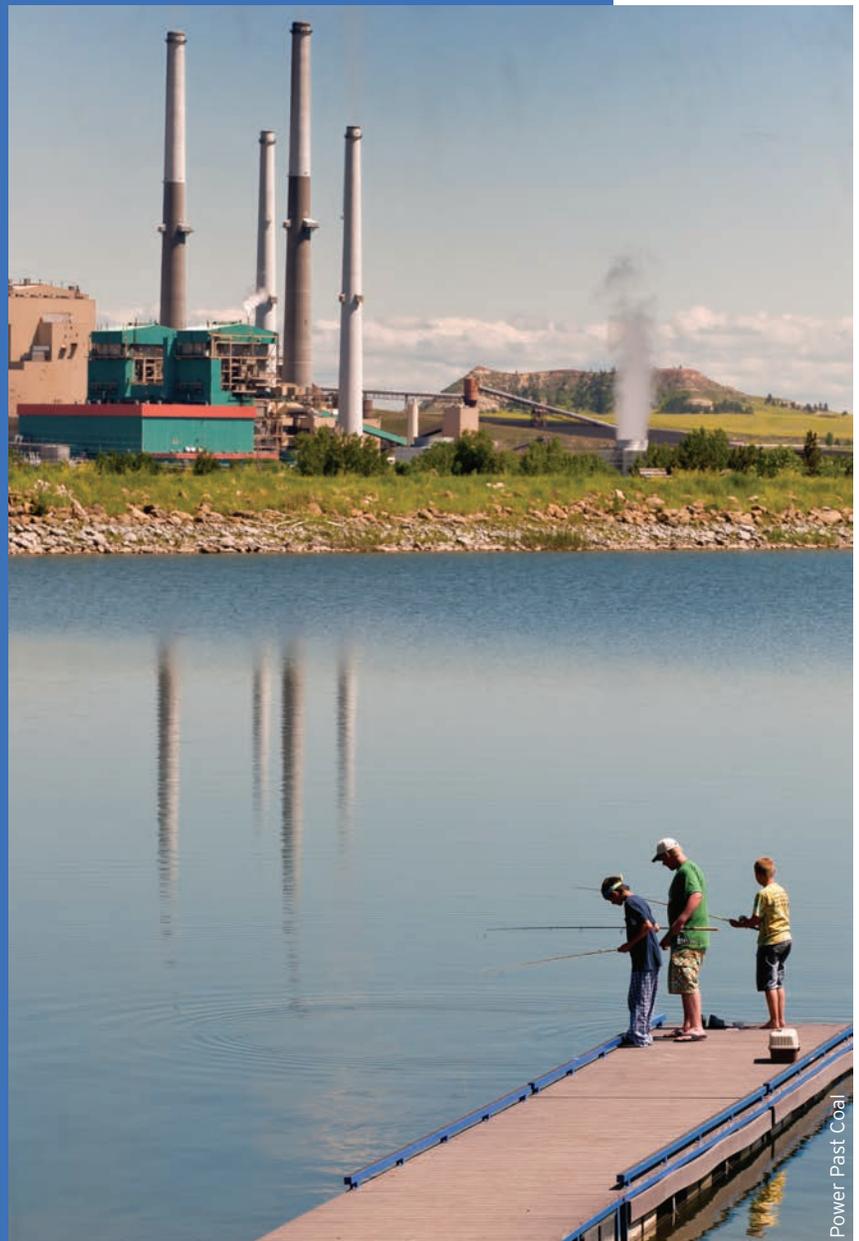


COAL AFFECTS US ALL

The fact is these coal expansion proposals affect us all, whether we live near Puget Sound or the Chesapeake Bay. It is an intensely local issue for citizens who live where coal is mined, transported and shipped. It is an issue for any Pacific Northwesterner who values living in one of the country's greenest regions, home to some of the nation's most productive fisheries and progressive energy politics. It is also a national issue for those who care about an energy future that does not include spewing vast quantities of toxics and carbon pollution into our planet's atmosphere.

Fortunately, these port expansion proposals are by no means a done deal. There's a growing backlash to these plans from a wide swath of Pacific Northwest residents and around the nation, despite coal companies' promise of a relatively small number of permanent jobs and additional tax revenues for the states. People who are more accustomed to waiting for salmon runs on riverbanks than "black snakes" at railroad crossings are making their objections known—from Bozeman, Montana to Bellingham, Washington, from Sandpoint, Idaho to Clatskanie, Oregon. Citizens are writing letters, attending meetings, and voicing objections to the proposals. Residents are asking why they should support a commodity whose benefits to the region are overwhelmingly outweighed by its costs.

This report details the main proposals to expand ports and loading facilities in the Pacific Northwest, and walks readers through the plans, companies and concerns associated with this new coal juggernaut. As we said in the



Power Past Coal

beginning, the good news is that a growing number of Americans realize that a successful future will require weaning ourselves off coal while expanding our use of renewable and less carbon-intensive energy sources. This report will help you understand why these coal port expansions are a bad idea, and what you can do to help stop these black snakes from multiplying.

CHAPTER ONE

Shadows over the Pacific Northwest

Opening the floodgates to Big Coal undermines a region's identity – and self-interest

In March 2011, Washington Governor Christine Gregoire announced plans to close the state's last coal-fired electrical generating plant by 2025. Citing a need to reduce pollution, develop renewable power, and curb the state's greenhouse gas emissions, the Governor joined state legislators, labor unions, and conservation groups to herald the end of the state's coal burning era. Responding to this radical plan, Lou Florence, director of TransAlta, the energy company that runs the coal power plant in Centralia, told the *Centralia Chronicle*: "TransAlta supports the goal of a coal-free Washington."

Oregon had already announced

plans to shutter the Boardman Coal Plant by the end of the decade. Boardman is the state's only remaining coal-fired power plant — and its largest single carbon polluter. Instead of burning coal, officials trumpeted that a biofuel refinery would be built in Boardman, and will make ethanol out of poplar trees, wheat straw, and corn stalks. Governor John Kitzhaber said the new plant "will support the long-term development of renewable energy resources and boost economic rural development."

A deeply ingrained environmental ethic runs through the Pacific Northwest, like the Chinook and Coho

fingerlings that dart through its waters. The region's natural beauty and bounty bestow both a source of income and a sense of cultural identity to its residents. Its lawmakers, citizens and businesses emphasize smart, green, long-term planning. The politics, economics and industry of the Pacific Northwest have been shifting — away from intense resource extraction like clearcutting timber and overfishing salmon, toward more sustainable and viable long-term stewardship.

In contrast to these deep-rooted values, Big Coal's proposals to use Oregon and Washington as conduits for millions of tons of dirty fuel on their way to Asian markets are shocking.

Part of what draws people to the Pacific Northwest is a lifestyle linked to clean creeks and streams, healthy conifer forests, outdoor recreation and an appreciation of its abundant natural beauty. Places like Hood River, along the Columbia, have become a global destination for windsurfers, and on a broader scale, consumer spending on outdoor recreation generated \$256 billion in 2011, supporting 2.3 million jobs in Western States.⁴ Native tribes like the Lummi and the Yakama, the Warm Springs and the Nisqually, whose cultures are inextricably entwined with the salmon and shellfish of the region, see troubling downsides to these proposals.

Another reason that opposition to these proposals is fierce — and getting fiercer — is that despite the region's environmental leadership today,



Flickr: robert.hamilton

there's no question that the Pacific Northwest's fisheries have suffered from past development. Salmon runs are slowly being restored after dams, overfishing and toxins depleted them, yet many key species are still endangered or threatened. Ecosystems already struggling to recover do not need the additional stress of dredging, construction, tons of coal dust, and more pollution from coal combustion floating on the jet stream from Asia to coat America's streams and soil.⁵

In a nutshell, here's the irony facing residents of the Pacific Northwest: Just as Washington and Oregon are winding down coal burning because of a long list of environmental and health impacts, coal companies want to use the region's railways, rivers and ports to deliver millions of tons of a pollutant that will haunt the region for decades (see Impacts, Chapter 4). In return, coal companies and their partners are offering a few dozen permanent jobs and some increased tax revenue to offset the coal dust, mercury poisoning, arsenic deposits, congestion and noise that increased rail traffic and port expansions will spawn.

For many in the Pacific Northwest, that's a fool's bargain, and people are organizing to head off this bad idea before it gathers too much steam.



The Proposals

LONGVIEW, WA: The proposed Millennium Bulk Logistics Longview Terminal is located on the Columbia River Estuary and would potentially become a "mega-terminal," the largest West Coast export facility in the nation, exporting up to 60 million tons of coal a year.⁶ The estuary is important for shallow-water salmon, smelt, and other marine species.⁷ It is also near the confluence of the Cowlitz River and the Columbia; and the lower Columbia River area has been identified as vital habitat for a range of species, from Dungeness crabs to sea lions, starry flounder and shellfish like oysters, clams and mussels.⁸ In addition, this stretch of the river is a favorite for sport anglers, especially during spring and fall salmon runs, when hundreds of boats converge upon this famous fishing spot.

The terminal is partly owned by Arch Coal, one of the two biggest coal companies in the U.S., in partnership with the Australian company Ambre Energy. The corporate entity created by Ambre Energy is Millennium Bulk Logistics, which got off on the wrong

foot when they lied about the size of the project in their initial proposal, withdrew their permit, and reapplied after paying a fine (see Meet the Players, page 18).

CHERRY POINT, WA: The proposed Gateway Pacific Terminal near Bellingham, WA, could ship up to 54 million tons of coal per year. Seattle-based SSA Marine joined Peabody Energy, the country's biggest coal company, to promote this expansion in Whatcom County. (The embattled New York financing company Goldman Sachs owns a portion of SSA's parent company.) SSA Marine already found itself in hot water with Whatcom County, when one of its contractors cleared trees in a wetland without the necessary permits (see page 20).

Located within the Cherry Point Aquatic Reserve,⁹ this facility is near one of the region's most important herring spawning grounds. Herring are a key food link for marine species, from Chinook salmon to killer whales, and herring populations are already under stress and declining.¹⁰



Daniel Dancer

The Lummi Nation, whose lands border the facility, holds treaty rights to the fishing grounds in the area, and is concerned about the impacts on those legal rights.¹¹ There is vocal opposition from Bellingham residents, who fear the port expansion will degrade their quality of life. A report by Public Financial Management, Inc. of Philadelphia concluded that instead of adding jobs, impacts on the city's image as a clean, healthy city could harm job growth, drive away tourism, and detract from investment.¹²

PORT OF ST. HELENS, OR: Near Clatskanie on the Columbia River, Kinder Morgan Energy Partners plans a facility that could ship as much up to 30 million tons of coal annually (received by rail from the Powder River Basin in Wyoming and Montana).

To build this port, Kinder Morgan will partner with a subsidiary of Ambre Energy, the same Australia-based company involved in Longview. As with the Longview project, there are allegations that information about the project's impacts have been kept from the public. Oregon Gov. John Kitzhaber warned that the terminal "should not happen in the dead of night. We must have an open, vigorous public debate before any projects move forward."¹³

PORT OF MORROW, BOARDMAN, OR: Upstream from Port St. Helens on the Columbia River, Ambre Energy is planning another expansion — this one a transfer station that would off-load coal from rail cars, load them into barges, and take them downriver to St. Helens. Another Ambre subsidiary, the Coyote Island Terminal LLC of Salt Lake City, is behind this proposal to handle 8.8 million tons of coal per year. The company's own biological assessment showed that port construction and operations would "result in unavoidable impacts to protected species and critical habitat as project activities take place."¹⁴ In April, Governor Kitzhaber sent a letter to federal officials in charge of approving the project, expressing concerns about the "significant" cumulative impacts of all the coal projects and requesting a thorough review.¹⁵

GRAYS HARBOR, WA: The proposed expansion of the Port of Grays Harbor in Hoquiam is near the Grays Harbor National Wildlife Refuge, one of the biggest staging areas for migrating birds in the lower 48.¹⁶ Grays Harbor is an important stopover for Alaska-bound cruise ships, and residents worry that increased coal traffic

(reports put the amount at 5 million tons per year) will put a damper on its ability to market its tourist trade. It is also home to important and growing runs of king and coho salmon during fall migration.¹⁷

COOS BAY, OR: The Port of Coos Bay, whose linchpin is wood products, has announced it is in "discussions" with coal developers. This plan, known only as "Project Mainstay," is shrouded in secrecy but could bring 6-10 million tons of coal through Coos Bay annually.

Add it all up and Northwest ports could be shipping over 150 million tons of coal per year, a staggering number that is deeply at odds with the region's ethos, economic aspirations, and future dreams.



Paul K. Anderson

CHAPTER TWO

What's Fishy about Coal

Fish, and fishermen, help define the Pacific Northwest, like crabbers in the Chesapeake, shrimpers on the Gulf Coast, and lobstermen in Maine. The salmon and steelhead that make their improbable journey from the Pacific Ocean, up the Sandy and the Skykomish, the Willamette and the Kalama, the Cowlitz and the Columbia, and spawn as far away as Idaho's Salmon River are as much a part of Oregon and Washington's identity as the rain that paints coastal conifer forests into seas of misty green.

Commercial fishermen, professional fishing guides, boaters, weekend anglers, oyster farmers, clam diggers, even the fishmongers at Seattle's famous Pike Place Market, all depend on healthy fish and shellfish stocks to support the local economy. Oceans, estuaries, rivers, sounds, streams, creeks and wetlands are vital parts of the region's employment — and enjoyment — for millions of people in our region. Recreational fishing accounts for \$2.7 billion a year to the

Washington and Oregon economies¹⁸ — in addition to the substantial commercial fishing and aquaculture industries. A 2011 report for the Seattle Marine Business Association calculated that the commercial fishing industry in Washington alone contributed \$3.9 billion to the state economy.¹⁹

In recent decades, the Northwest's aquatic abundance has declined as a result of what fishing guide Bob Reese calls "a thousand cuts."²⁰ (See "A Guide's Guide to Coal Exports," page 12.) Dams, railroad construction, ports, housing developments, toxins from industrial waste, and even invasive species have all combined to create tough times for fish that live here.²¹ Herring, a "keystone species" that salmon rely on, have been in steep decline due to some of these stressors. Not surprisingly, salmon populations have been on a 160-year downward trend and are now a fraction of historic levels. Some salmon runs have slowed to a crawl and others have disappeared altogether.²²



Expanding coal exports here will make the difficult process of restoration even harder. None of these proposals will make life better for the fish or the people who depend on them — for their livelihoods, for their recreation, for their regional identity, or for their peace of mind.

Potential Impacts to Pacific Northwest Fish

When it comes to the Pacific Northwest, the coal industry is rushing to build without studying the full consequences of their proposals. There's a big gap in our scientific understanding of how our region's fisheries would be impacted by coal mining, transport, and burning, and common sense tells us to get this information before deciding whether to risk our vital natural resources. Although data for Oregon and Washington are hard to come by, case studies of similar developments around

the world paint a troubling picture: From the effects of coal dust on mangroves near Cape Town, South Africa²³ to the adverse effects of coal combustion on juvenile fish populations in South Carolina,²⁴ from studies of juvenile salmonids and coal dust dispersal in British Columbia²⁵ to the effects of fly ash dumping on algae off England's coast,²⁶ these studies provide insight into the impacts we may face in the Pacific Northwest.

Based on the knowledge available, we are concerned about five major

potential impacts to our land, water, and fisheries: (1) increased coastal riparian and marine habitat degradation from port expansions and shipping traffic; (2) decreased water quality from coal dust; (3) increased mercury deposition from coal burning and wind-driven transport; (4) increased carbon pollution from coal transport, export, and burning that is driving dangerous climate-related extreme weather nationally and globally; and (5) increased ocean acidity from coal burning.



Flicker: Spabbyjones

Increased coastal riparian and marine habitat degradation from port and rail expansions — Human development has squeezed the spawning grounds, estuaries, riverbanks and creekside habitat of all salmon species.²⁷ Each port expansion would require dredging, filling, new pylons, and shoreline grading.

- In the lone biological assessment prepared for any of these proposals to date, numerous ill effects were catalogued for the Morrow Pacific project in Boardman. For example, “The proposed construction at the Port of Morrow will involve piling installation using vibratory and impact hammers, which produce sound levels above the thresholds for fish disturbance and injury.”²⁸ Construction would also result in increased water turbidity and possible toxic discharges.²⁹ And an expected doubling of barge traffic would raise the incidence of fuel leaks, wake strandings, noise disturbance, sedimentation, ship strikes, and a host of other threats to Columbia River fish.³⁰ Closer to the mouth of the river and the Pacific Ocean, marine mammals like orcas would be put in harm’s way from possible strikes by barges and tankers.³¹
- Just across the Canadian border from the proposed Cherry Point export facility, dredging and filling for port construction at the Roberts Bank

terminal (below) resulted in loss of cobble beach and sandflat habitat, conversion of shallow-water to deepwater habitat, and drying of moisture-dependent eelgrass habitat.³² Some of these areas are now unusable by fish such as juvenile salmonids, which prefer shallow-water habitat, while further research is needed to examine changes to feeding habits and migration routes as a result of dredging and filling.³³

- Increasing rail traffic along the Columbia River will require additional construction of rail lines, turnarounds, and passing loops long enough to allow trains operating on a single track to pass each other. There have been at least 30 coal train derailments in the U.S. since 2010 alone, raising the specter of massive coal contamination into river systems.³⁴ With increased rail traffic, an increase in fuel spills is also likely, which would further damage habitat.
- More exports means more tanker traffic, raising the risk of invasive species. In fact, a few hundred miles down the Pacific coast, San Francisco Bay has some of the highest levels of non-native species in the world: 85 invasives total, two-thirds of which are considered “harmful.”³⁵ In that ecosystem, animals like the Chinese mitten crab were introduced by ballast water discharges, and now pose a risk to native fish (juvenile salmon are a major prey species for the crabs).³⁶

Decreased water quality from coal dust

— Nobody can predict the exact amount of coal dust that will enter Pacific Northwest watersheds as a result of these proposals, but the evidence doesn’t look good. According to BNSF Railway, a major railroad company that transports coal from the Powder River Basin, fugitive coal dust is a significant problem for its track maintenance.³⁷ BNSF has estimated that each coal car loses between 500 and 2000 pounds (1/4 ton to 1 ton) during rail transit.³⁸ In scientific studies, coal dust has been shown to have a host of biological effects to the marine environment.³⁹

- A study of juvenile Chinook in British Columbia found that exposure to the polyaromatic hydrocarbons (PAHs) found in coal dust increased the expression of certain genes that play “crucial roles in cellular metabolism,” one of which can convert cancer-causing substances found in PAHs into active carcinogens.⁴⁰
- Coal can physically damage fish habitat: Off the coast of England, a study showed that coal dust and fly ash dumping reduced light penetration and inhibited the growth of algae and bottom-dwelling plants and animals.⁴¹
- In the marine sediments adjacent to the Westshore Terminals coal facility on Roberts Bank, British Columbia, the concentration of coal residues doubled between 1977 and 1999.⁴²

Right: Wind kicks up a massive cloud of coal dust at the Westshore Terminals export facility in Vancouver, BC.



Jerry Bierens

Although not yet observed at this site, the concern is that sediments with high levels of coal will become devoid of the oxygen that bottom-dwelling plants and animals need to breathe.⁴³

Increased toxic deposition from coal burning and wind-driven transport —

Burning coal, whether in Centralia or Beijing, releases not just greenhouse gases but also poisonous substances like mercury and arsenic.⁴⁴ Toxic chemicals from Asian power plants rise on the winds and carry back across the Pacific Ocean to land on the Pacific Northwest: studies have placed nearly one-fifth of the mercury in the Willamette River, and 14% of the mercury on Mt. Bachelor in central Oregon, as originating from Asia.⁴⁵ According to the U.S. Environmental Protection Agency, “coal-burning power plants are the largest human-caused source of mercury emissions to the air in the United States, accounting for over 50 percent of all domestic human-caused mercury emissions.”⁴⁶ Mercury from coal plants has huge impacts on both land and sea.⁴⁷ Mercury accumulates in the food chain, affecting not only fish but also fish-eating mammals and birds. Mercury warnings have become a part of modern life, cautioning citizens (especially pregnant women) to limit their consumption of many marine and freshwater species including swordfish, smallmouth bass, yellow perch and tuna.⁴⁸

Contributing to global climate change —

Although the politics of climate change are contentious, the science is unequivocal: the human activities of burning coal and other fossil fuels are releasing vast amounts of heat-trapping gases into our atmosphere that have contributed to increasing the average temperature of the planet. The range of climate-related problems is breathtaking:

- Higher temperatures have already contributed to sea level rise, melting



Flickr: ChrisGoldNY

glaciers, and increased extreme weather events like droughts, hurricanes, and floods.⁴⁹

- Rising temperatures are warming rivers, contributing to the stress and even causing die-offs of cold-water fish like salmon and trout, particularly in the summer months.⁵⁰
- Climate change is disrupting everything from bird migrations to when farmers can plant their crops, and evidence is mounting that ecosystems and species are changing rapidly — and sometimes disappearing as a result of these rapid changes.⁵¹ For example, in the Pacific Northwest in 2005, a three-month delay to the normal start of upwelling (a crucial marine process that brings nutrients and food sources such as plankton close to shore) was associated with a number of detrimental effects including low survival of Coho and Chinook salmon, complete nesting failure by the seabird Cassin's Auklet, and widespread deaths of other seabirds (common murre, sooty shearwaters).⁵²

Increased ocean acidity from coal burning —

The rising acidity of our oceans may be one of the most devastating — and underpublicized — effects of burning fossil fuels, with serious consequences for salmon, steelhead, and other anadromous species. Use of fossil fuels, like burning

coal, releases massive quantities of carbon dioxide (CO₂) into our atmosphere. The ocean absorbs much of this carbon dioxide, initiating a chemical reaction that changes the ocean's acidity: oceans are 26% more acidic than they were at the dawn of the Industrial Revolution.⁵³ One local effect, recently documented by a team of Oregon State University researchers, is that baby oysters in the Pacific Northwest have been dying as a direct result of higher concentrations of CO₂.⁵⁴ Furthermore, ocean acidification directly affects the ability of mollusks, corals, pteropods, and other organisms to develop their shells and skeletons.⁵⁵ In fact, the rate at which reef-building corals produce their skeletons, the ability of marine algae and zooplankton to maintain protective shells, and the survival of larval marine species are reduced.⁵⁶ These small creatures are an important food source for salmon and other fish, which are in turn food for orcas, bears, and humans.⁵⁷ Coal burning therefore affects not just the tiny creatures that salmon eat, but the entire marine food web we all depend upon.

Although the United States has taken some important steps toward reducing our own carbon pollution, our credibility is at stake: Sending U.S. coal to Asian countries shows that we're not serious about putting the brakes on this dirty fuel, and diminishes U.S. authority during any future climate negotiations.

A GUIDE'S GUIDE TO COAL EXPORTS

Sixth-generation Oregonian Bob Rees knows pushing more coal through the Northwest is a dangerous idea. One of the most respected fishing guides in the region, Rees doesn't pretend to be a political activist who knows the ins and outs of energy politics. But he is a dedicated angler who believes that if we don't stop burning coal, there will be fewer fish to catch — a nightmare scenario for him. Rees, the executive director of the Northwest Guides and Anglers Association, has cast up and down the Columbia River, its tributaries and estuaries since he was a kid growing up near Tillamook. "It's just in my blood," he says. "Like a salmon, I'm drawn to the river."



Rees knows first-hand that salmon populations are swimming a fine line between salvation and decline. He's watched salmon runs improve after the courts ordered new flow and spill regimes for the dams a few years ago, and lately he's been buoyed by great spring and fall salmon runs.

But Rees also knows that salmon health remains in a precarious state, due to a host of problems — from dams to diminished water quality to overfishing to disappearing food sources. The scientific consensus that emerged from the huge "Salmon 2100" project,⁵⁸ Rees says, is this: "If we don't take some serious steps, some of these salmon are as good as extinct."

Plans to increase coal exports strike Rees as a serious step — in the wrong direction. Rees has heard people worry that more coal trains might bring pollution from the coal dust and diesel traffic, as well as construction in critical shoreline fish habitat, but for him there's one overarching problem: the widespread burning of coal is turning the oceans more acidic.

Anybody who has ever taken a high school chemistry class knows that if you add carbonic acid to water, its pH will decline and the water will become more acidic. That's exactly what happens when coal-fired power plants spew carbon dioxide into the seven seas. "It doesn't matter where the coal is burned," Rees says. "It's having monumental effects on the ocean."

It's also bound to harm the salmon and other species that Rees and others depend on for the \$2.7 billion dollar recreational fishing industry. Tiny crustaceans, juvenile crab, and shrimp larvae are all having a tough time adapting to the rapid changes in ocean chemistry. Those tiny marine animals are important food sources for the salmon. "It's happening at such a rapid rate," Rees says.

Rees says that many sportsmen already understand the problems that acid rain causes to lakes and streams, but they need to realize that burning coal is one of the biggest reasons that oceans are becoming more acidic. Encouraging more coal trains to pass along the Columbia River where he's been fishing his whole life just doesn't make any sense to him. "We have to take care of our side of the street, or we're going to be largely responsible for the destruction of the species we love the most," says Rees. "It's time to pay attention."

The Salmon People's Concerns

Northwest tribes' concerns over the coal port proposals echo many of the others listed in this report, but there are additional issues that directly affect Native ways. If you're wondering if these proposals will have any effect on Native life and culture in the Northwest, consider the words of Nisqually elder Billy Frank, Jr.: "Pretend you're a salmon."

Pretend you're a salmon that has been struggling with dams, pesticides, herbicides, nuclear facilities, mercury contamination, barge traffic, diesel pollution, overfishing, clear cutting, piers and pylons, rock and metal rip-rap from road and rail construction, bridges, weirs, diversions, dredging, dikes, warming water, acidification and other indignities over the past century and a half.

Pretend you're a salmon that has noticed some recent improvements. A dam gets taken down. A Native hatchery helps your fry survive. A dike is modified, a forest replanted, a wetland restored, a spawning stream becomes accessible again. The humans that you share these rivers with appear to be paying more attention to what you need. Things seem to be looking up.

Now, pretend you're a salmon about to face another onslaught: more dredging, more coal dust containing mercury and arsenic coating your

rivers, warmer water, more diesel, more spills, more acid, more barge traffic. More trouble ahead.

The tribes of the Pacific Northwest — the "Salmon People" — don't need to be told what a long and difficult path they've trod to get to the point where treaty language from the 1850s actually began to mean something:

“ *The exclusive right of taking fish in all the streams, where running through or bordering said reservation, is hereby secured to said confederated tribes and bands of Indians; as also the right of taking fish at all usual and accustomed places, in common with citizens of the Territory, and of erecting temporary buildings for curing them; together with the privilege of hunting, gathering roots and berries, and pasturing their horses and cattle upon open and unclaimed land.* ”

—Yakama Treaty of 1855⁵⁹

These hard-fought treaty rights mean much more than simply claiming the right to fish.⁶⁰ They mean that Northwest tribes have the right to have healthy populations of fish. They

mean the right to have fish that don't contain contaminants, and that are suitable for subsistence, for livelihoods, and for cultural practices.

These treaty rights are again in the cross-hairs, this time from industry's high-impact set of proposals that will use the railroads and ports along the region's waterways to transport one of the dirtiest commodities imaginable.

The coal proposals will mean ongoing habitat destruction, which the tribes have long opposed and continue to fight. In a July 2011 report from the Treaty Indian Tribes in Western Washington entitled "Treaty Rights at

Steelhead at Lucia Falls



Flickr: Greg Shields



Daria Leslie



Flickr: Michael @ NW Lens

Risk: Ongoing Habitat Loss, the Decline of the Salmon Resource, and Recommendations for Change,” the first and most important point was simple and direct: “Stopping habitat degradation is the cornerstone of salmon recovery.” As Mike Grayum, executive director of the Northwest Indian Fisheries Commission said, “The problem here is that we’re losing it faster than we can restore it.”

There is more than just salmon recovery at stake for Native peoples in the coal debates. What is at stake is nothing less than the tribes’ efforts to find balance — between humans and other creatures that cohabit this planet; between old ways and modern times; between operating in the United States’ political sphere and maintaining tribal sovereignty.

It is hard to list all the impacts these proposals will have on Indian ways. The impacts on treaty rights, mentioned above, are paramount. But tribes are also concerned about impacts to cultural resources and traditional cultural properties, access to tribal fishing grounds, increased barge and rail traffic that will impact subsistence fishermen

disproportionately, and increased mercury contamination in salmon, which constitute a much higher percentage of Native diets than among non-Natives. While salmon are critical, shellfish and the subsistence gathering of wild foods are also threatened by the cumulative effects of more coal mining, transport and burning.⁶¹

Increased rail traffic will make it more difficult for Native fishermen to access the river and will almost certainly kill or maim more people in rail accidents.⁶² Shellfish, filters of the estuaries and coasts, will have to contend with even more toxics and particulates that may suffocate or poison them. Even as tribes celebrated the demolition of the Elwha and Condit dams that might signal a salmon renaissance, the herring stocks they depend on face another threat: the dredging, in-filling and expansion at Cherry Point, in the Lummi Nation’s backyard. The barge traffic on the Columbia and on Puget Sound, already impacting Native fishermen, will increase many times.

Tribes are at a legal and biological crossroads in their efforts to recover

the salmon and sustain Native cultures, and these coal expansion plans spell nothing but bad news for those efforts. Already, the Yakama Nation has written extensive letters to the Oregon Department of State Lands and the U.S. Army Corps of Engineers, outlining the tribe’s deep concern over the wide-ranging impacts of “‘development’ undertaken in the name of immediate economic gain and without regard for the long-term consequences.” The Lummi Nation is undertaking a comprehensive review of the likely impacts of more coal coming to the region, and Merle Jefferson, Sr. of the tribal council wrote in the *Bellingham Herald* that the proposed development “would substantially impact the ability of Lummi fishermen to exercise their treaty rights.”⁶³ The Columbia River Inter-Tribal Fish Commission, in a letter to the Army Corps of Engineers (the federal agency tasked with oversight), voiced concern about the multiple impacts from these projects, saying that “the pressures on the Basin fish will be substantial.”

It’s clear that these coal export proposals stand in direct conflict with the time-honored Native worldview of maintaining reverence for nature while seeking a balance between humans and non-humans. They threaten to unravel many modern Native achievements and aspirations.

As Billy Frank said, “pretend you’re a salmon.” But this time, make sure it’s a salmon that can talk, write letters, attend meetings, and press tribal councils and other leaders to act.



Flickr: bretvogel

“WE NEED TO START MAKING NOISE”

Bruce Jim is a veteran’s veteran of the Northwest’s salmon wars. As a kid, he’d fish the Celilo Falls with his grandfather, Chief Henry Thompson, in the days before the Dalles Dam silenced the legendary fishing grounds. As an adult, he’s fought for Native treaty rights, served as the past chairman of the Columbia River Inter-Tribal Fish Commission, and still puts out his gill nets along the river he’s fished his entire life. He says that to be honest, he had gotten used to the coal train traffic that passes within 50 feet of his home and near his fishing sites, until one day a coal train passed and was silhouetted by the sinking sun. In that backlight, Jim saw what looked like a gigantic cloud of black, sparkly mist, and wondered, “What the hell is that?” Soon he realized what it was: “Man, that’s a lot — a lot — of coal dust!”

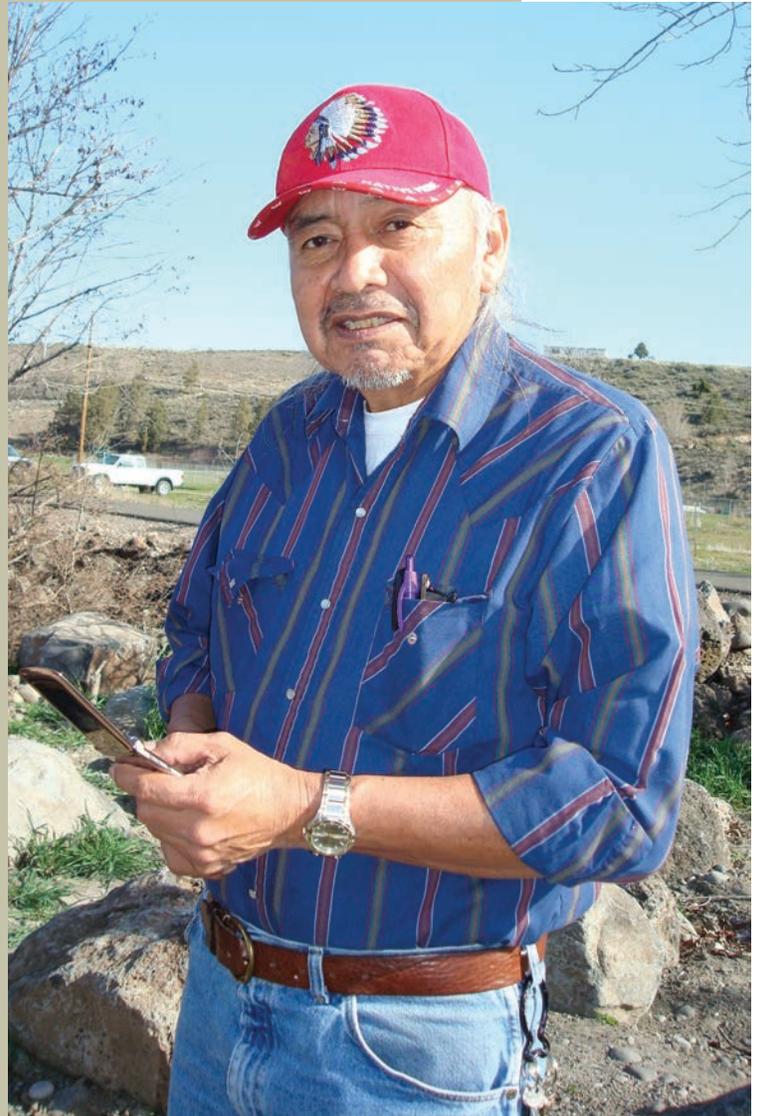
To Jim, a Warm Springs tribal elder who serves as a member of the tribe’s fish and wildlife committee, adding even more coal dust to the mix is what a bad idea looks like. It’s both a tribal issue and a personal one. Jim has fishing rights at three sites that are directly impacted by the proposed expansion of the port near Boardman, where he lives. In late August every year, Jim heads down to the beach and sets up his 300-foot nets, anchoring one to the shore and one to a buoy in the river. Three hundred feet downstream, he repeats the set-up, and then does it again. “Those sites will be wiped out completely,” he says, which is exactly what happened to one of his sites after a previous expansion at the Coyote Island Terminal.

Jim can’t see an upside in allowing more coal to pass along the Columbia. The tribes have made great strides in restoring habitat, not just for the salmon but also for other “First Foods,” like deer and chokeberries, mountain sheep and wild roots. The coal dust, he’s convinced, can’t be good for those food sources, which are still vital to him and other tribal members. “That’s what worries me,” he says.

What also worries him is the persistent cough he’s developed, which he can’t swear is from the coal dust but sure makes him wonder. “People are breathing this and don’t realize it,” he says. “I never realized it until I saw it in that light.”

For Jim, the issue about whether government agencies should approve these coal proposals boils down to the same thing he’s been fighting most of his life: treaty rights. “All these government agencies, they have a trust responsibility,” Jim says. “Part of that responsibility means asking the question, ‘how is this going to affect the tribes?’ I remind them of that at every meeting.”

He says that growing up, it was impossible to believe that places like Celilo Falls or Indian Head Rapids could disappear. “Then, in a blink of an eye, it’s all gone.” The lesson that Jim takes from those sad chapters in history is that it’s important to stand up before the damage is done, and get loud. “When a baby makes noise, the mother is going to pay attention,” says Jim. “If nobody cries, nobody will pay any attention.” Pausing to think about a message he wants to share with other tribal members, he answers with conviction: “We need to start making noise.”



PLANNED PORTS OR P



PORT OF GRAYS HARBOR:
Amount: 5 million tons annually. Developer: RailAmerica Inc.



CHERRY POINT:
Amount: 54 million tons annually. Developer: Peabody and Pacific International Terminals, a subsidiary of SSA Marine.



LONGVIEW:
Amount: Up to 60 million tons annually. Developer: Millennium Bulk Terminals Longview LLC, owned by Ambre Energy and Arch Coal Inc.



PORT OF ST. HELENS:
Amount: 15-30 million tons annually. Developer: Kinder Morgan.



COOS BAY (OR):
Amount: 10 million tons annually. Developer: unknown



PLANNED PORTS OR PLANNED EXPANSIONS KEY



 Proposed Coal Train Routes

 Powder River Coal Basin

 Towns within 10 Miles of Proposed Coal Train Route

PLANNED EXPANSIONS



PORT OF MORROW (OR):
Amount: up to 8.8 million tons annually. Developer: Ambre Energy.

Paul K. Anderson



Flickr: NWF Fisheries

The salmon and steelhead runs on the Columbia River are legendary, with Spring, Summer and Fall Chinook, Summer Steelhead, Coho and Sockeye all offering strong prospects for sport fishermen, commercial fishermen and tribes. Despite the relative health of these runs there currently exists thirteen separate Columbia River salmon and steelhead runs listed as Threatened or Endangered by the NOAA Fisheries.



Barbara Wheeler/USFWS

The Powder River Basin is one of the best habitats for mule deer. Biologists believe that mule deer and their habitats can be harmed because of oil, gas and mineral exploration and extraction. An increase in mortality, ingestion of toxins, loss of habitat, barriers to migratory mule deer that move from winter to summer ranges, and disturbance that fragments and degrades habitats have the potential to affect mule deer populations.

CHAPTER THREE

Meet the Players:

Brought to you by the same people who...

One of the gifts of the Information Age is that bad corporate citizens can no longer hide as easily from their records. Tricks that were successful in the past, like creating shell companies to duck responsibility, can now be tracked back to their sources with a couple of mouse clicks. Court decisions, federal and state sanctions, and ongoing lawsuits can be more easily uncovered and shared. Ordinary citizens can scrutinize companies to

see whether their promises square with their past actions.

In the case of the companies involved in the coal export expansions, their track records leave considerable doubt about their willingness to obey environmental laws and be good neighbors. The coal companies, their subsidiaries, port owners, investors and transportation outfits at the heart of the Northwest's coal export proposals have a record of polluting



Power Past Coal

the communities where they operate, exerting ruthless political clout to reduce environmental and workplace safeguards, settling lawsuits for undisclosed millions of dollars without admitting “wrongdoing,” and even facing convictions for criminal behavior. From their notorious practice of mountaintop removal mining to their support of groups that seek to discredit climate scientists, and even their disingenuous “clean coal” campaign, Big Coal has a disturbing legacy of environmental degradation and scorched earth political tactics.

Jeff Goodall's intrepid book *Big Coal: The Dirty Secret Behind America's Energy Future* details Peabody and other coal companies' influence peddling — and influence. In 2009, the coal mining lobby donated more than \$10 million to members of Congress, according to the Center for Responsive Politics.⁶⁴ Two of the top contributors were Peabody Energy and Arch Coal. In 2010, they also spent \$6.5 million in reported lobbying activity, mostly to counter efforts to tighten pollution standards for power plants.⁶⁵

Like tobacco companies (see sidebar *Big Tobacco, Big Coal*, page 21), the coal industry has spent millions of dollars on disinformation campaigns, including trying to convince the public that “clean coal” technologies were on the horizon.⁶⁶ The truth is that carbon sequestration techniques have never been



Power Past Coal

implemented at the scale necessary for industrial coal-fired power plants — and none are likely to come online anytime in the near future. Author Goodall calls clean coal “one of the great oxymorons of our time.”⁶⁷

PEABODY ENERGY

Singer/songwriter John Prine immortalized this company in his song, “Paradise,” when he wrote about how the company ravaged the Appalachian countryside: “Mr. Peabody’s coal train has hauled it away.” The company — the world’s largest private sector coal firm — has a long history of strong-arm tactics with its workers, countless safety violations, and an unabashed abuse of political donations and lobbying to beat back environmental, health and workplace safety laws.

Peabody and the coal industry have a long history of funding concerted efforts to discredit mainstream climate change science. The company has been a supporter of the American Legislative Exchange Council (ALEC), a powerful, behind-the-scenes group that has worked to entrench climate change denial in public school curriculums.⁶⁸ Peabody has also been linked, through leaked emails and memos, to organized efforts to “sow discord” in regions that are trying to limit greenhouse gas emissions from coal-fired power plants.⁶⁹

Peabody has repeatedly tried to delay or eliminate rules that would reduce the amount of toxic pollution the industry emits. One infamous memo to the former Peabody CEO tries to discredit efforts to reduce mercury, a potent neurotoxin. “Our strategy in dealing with mercury has been two-fold:” the memo explained. “Prevent states from taking precipitous or unwarranted action to regulate mercury and engage in the federal rulemaking to protect the interests of coal-based electricity.”⁷⁰

The federal Mine Safety and Health Review Commission has repeatedly



found Peabody to be a leader in violations, and in 2011 the MSHA began fining Peabody for not providing Peabody’s records for a federal audit.⁷¹ According to the company’s own annual report, it received 3,233 notices of violations — about 9 per day — from the federal mine inspection agency, which proposed nearly \$6 million in fines for Peabody.⁷² In March 2011, Peabody settled a longstanding and bitter \$600 million lawsuit with the Navajo Nation over allegations that Peabody cheated the tribe for years.⁷³ The terms of the settlement were not revealed.

ARCH COAL

Arch Coal, the nation’s second-largest coal company, purchased a 38 percent stake in the proposed Longview Port in early 2011. Arch has settled many cases involving alleged violations of the Clean Water Act in Virginia, West

Virginia and Kentucky, where they practice “mountaintop removal” mining, and has been involved in repeated lawsuits regarding its failure to clean up toxic runoff from its mine sites.⁷⁴ Some recent lowlights:

- In March 2011, the EPA and the U.S. Justice Department announced that Arch Coal would pay \$4 million to settle a Clean Water Act case.⁷⁵
- In April 2011, the U.S. Department of Justice filed suit against Arch Coal Inc. to try to recover money the federal Superfund program spent cleaning up the company’s Cape Girardeau site in Missouri.⁷⁶
- In January 2012, Arch agreed to pay a \$750,000 fine to the federal government and contribute \$6.75 million to the West Virginia Land Trust, to settle a suit over selenium pollution.⁷⁷



Paul K. Anderson

AMBRE ENERGY

The Australian-based company purchased a majority stake in the Longview Port, and owns parts of other proposed Pacific Northwest coal export expansion plans. Ambre and its subsidiaries are already under fire for their calculated attempt to deceive local officials about the scope of their plan at Longview: The company originally asked Cowlitz County for a permit to export 5.7 million tons of coal, and received the permit in 2010. When a coalition of environmental groups challenged the permit, company documents revealed their real plans were to export 10 times that amount — up to 60 million tons per year. Internal company emails between Ambre executives indicated that deception was part of the plan: “Any expansion plans...should not be made available to any outside party,” read one leaked email.⁷⁸ Another read: “We are at too sensitive a juncture to raise the plans to build a second berth. The community is small and the risk to the current permit path is too large.”⁷⁹

The press also reported recently that Ambre Energy is on shaky financial footing, after losing a major project in Australia that was rejected by the local government after meeting strong resistance from farming communities. According to *The Australian* newspaper, Ambre posted a \$24 million loss last calendar year (2011).⁸⁰

SSA MARINE

Seattle-based SSA Marine boasts that the company and its affiliates “operate more cargo terminals than any other company in the world.”⁸¹ Apparently, though, bigger isn’t always smarter: SSA also got off on the wrong foot with its preliminary work on the Cherry Point facility. After a Whatcom County Councilmember noticed some illegal clearing of a wetland while he was walking his dog, he traced it to an SSA Marine contractor. At first, SSA denied doing anything wrong, but when it became apparent they didn’t have the required permits, they admitted they had made a mistake. The county fined them what local advocates said was a laughable amount: \$4,200 — a \$2,000 fine and \$2,400 to cover county staff costs.

For many people in the area, this breach of trust warned of further troubles ahead. “Their actions have already spoken louder than their words,” said Bob Ferris, Executive Director of RE Sources for Sustainable Communities, a local advocacy group.

KINDER MORGAN

Energy conglomerate Kinder Morgan is behind the proposal to expand the Port of St. Helens along the Columbia River and ship up to 30 million tons of coal to Asian markets. According to a report by the Sightline Institute, Kinder Morgan’s track record in the Northwest and beyond “is one of pollution, law-breaking, and cover-ups.”⁸² The report details how Kinder Morgan’s coal export facilities in Louisiana, Virginia, and South Carolina have contaminated local communities with coal dust pollution, and shows how Kinder Morgan officials have been implicated in bribery scandals, theft, lying to regulators, and managing pipelines that have exploded and leaked. And maybe Oregon should expect much of the same: a company spokesman told the *Portland Business Journal*, “What we’re proposing is not something we don’t already do.”⁸³



Paul K. Anderson

BIG COAL AND BIG TOBACCO

Whatever your opinion is about smoking, it's obvious that the tobacco industry has plenty of skeletons in the closet. Tobacco companies once advertised the health benefits of cigarettes and spent millions suppressing information about tobacco's deadly effects. But after the link between cigarettes and diseases became indisputable, including the dangers of second-hand smoke, Americans responded. It took an all-out fight to force companies to admit the medical facts about their product, but the Surgeon General succeeded in putting a warning label on every pack of cigarettes: "Smoking Causes Lung Cancer, Heart Disease, Emphysema, and May Complicate Pregnancy."



The similarities of coal's story to the tobacco industry are eerie. The coal industry bills itself as a cheap, abundant, domestic energy source, but as the health and environmental impacts of mining and burning coal became clear (including causing some of the same diseases as cigarettes), Americans began opposing new coal-fired plants and closing old ones.



Like Big Tobacco, Big Coal isn't going down without a fight. In April 2012, the coal lobby launched a \$120 million, three-year, national television campaign touting cheap electricity from coal, complete with waving American flags and an ominous voice that warns, "The clock is ticking, America."⁸⁴

Like Big Tobacco, coal wields enormous political influence. In 2011, according to the Center for Responsive Politics, the coal lobby spent \$18.1 million in donations to Congress, while the tobacco industry spent \$17 million.⁸⁵ Even more telling is how much these industries intensified their lobbying to counter changing societal values: In 1998, when Big Tobacco was fighting a landmark settlement case of more than \$200 billion, it spent a whopping \$65 million in lobbying.⁸⁶ In the meantime, Big Coal ramped up their lobbying efforts, from \$2.1 million in 1998 to \$18 million in 2011. It's one sure sign that coal is feeling the heat.

Much like cigarettes harm our lungs, particulate from coal-burning power plants infiltrates the air, causing hundreds of thousands of cases of asthma and other respiratory diseases.⁸⁷ One significant difference between tobacco and coal, however, is that coal's "second-hand smoke" affects the entire planet. The equivalent of the Surgeon General for the environment warns that coal is hazardous to our planet's health — in March 2012, the U.S. Environmental Protection Agency (EPA) set new rules to discourage coal-fired electricity generation, and a recent letter from the EPA to the Army Corps of Engineers (which is reviewing the Pacific Northwest coal export proposals) noted that transporting coal through the Pacific Northwest "has the potential to significantly impact human health and the environment."⁸⁸

Sound familiar? The stark truth is that coal should come with a warning label, similar to those required on cigarettes: Coal is Hazardous to Our Health.

WARNING: Mining, transporting and burning coal can be harmful to your health. Ingredients in coal can cause black lung disease, emphysema, birth defects, asthma, heart attacks, and cancers. Pregnant women, children and the elderly are particularly vulnerable to emissions from burning coal. Mammals, fish and other animals are harmed by mercury and arsenic, two components released by coal burning. Transporting coal by rail releases coal dust, produces diesel pollution, increases congestion in rural communities, and delays emergency medical response times.

CHAPTER FOUR

Spotlight on the Powder River Basin:

Massive coal mines take their toll on wildlife, water, and wild places

Driving near the town of Sheridan, Wyoming, visitors can see and feel the impact of Big Coal at its biggest. Giant dust plumes from blasting rise from the plains, and a few gigantic coal-pit crevasses are visible from the road, tens of miles long and hundreds of feet deep. A steady stream of coal trains rumbles along tracks that parallel the highway, sending 40 percent of the nation's coal to far-flung domestic power plants.

This is the heart of the Powder River Basin, a vast coal stronghold straddling northeastern Wyoming and southeast Montana. Bordered by the

Big Horn Mountains and the Black Hills, interlaced by iconic western rivers like the Yellowstone and the Tongue, the Little Missouri and the Platte, the nation's top coal-producing region has also created a monstrously large problem for future generations of people — and wildlife.

According to the Western Organization of Resource Councils, the problem with coal mining in the region boils down to this: "Coal extraction in the Powder River Basin is detrimental to land, water, air and public health for the communities and people that live in and around coal production areas,

and leaves behind a legacy of reduced productivity and waste."⁸⁹

The region's high plains and rolling hills, sagebrush flats and pine covered ridges provide food and shelter for mule deer and elk, sage grouse, wild turkey and antelope. Sportsmen know the Powder River Basin is one of the most special and valuable places for hunting in the nation, drawing thousands of hunters every year. In the river bottoms and valleys, ranching communities struggle to maintain traditions under increasing threat from mineral extraction, as water quality and quantity suffer with





Stephen Ting, USFWS

Impacts

When humans began burning huge amounts of coal to fuel the Industrial Revolution in the 1800s, there were few energy alternatives that could power mass manufacturing, and little was known about the effects of mining and burning coal. Fast forward into the 21st century. Humans now know that every step of the coal industry's life cycle comes with destructive side effects to human health and to the planet that sustains us. Today, many alternatives exist to produce electricity without burning coal: wind, solar, sustainable biofuels, and natural gas are just some of them.

Some of the main impacts from exporting coal through the Pacific Northwest:

MINING

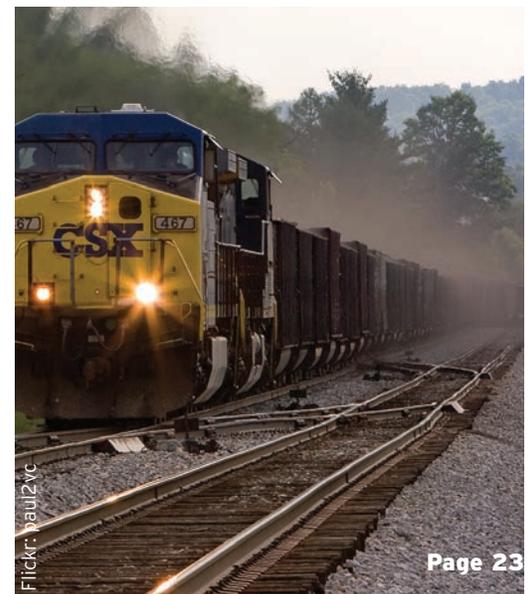
Powder River Basin coal is a relatively cheap, bulk commodity that sells for an average of about \$12-15 *per ton*, according to the U.S. Energy Information Administration.⁹⁰ Vast amounts need to be mined to be profitable, and mining is an incredibly destructive process, a massive industrial operation that permanently alters the terrain. Coal mining contaminates groundwater, eats up forests and prairie habitat, and creates sacrifice zones where animals can no longer survive, and where humans are forced to relocate or live with a profoundly altered landscape. Furthermore, coal mining can cause respiratory diseases, including black lung — not just in underground mines but also at surface mines like those in the Powder River Basin.⁹¹

RAIL TRANSPORT

If all of the industry's proposals go forward, exports to Asia would increase by around 150 million tons annually — compared to just 3.8 million tons in 2009.⁹² Getting this colossal amount from the Powder

River Basin to the coast means railroads — and lots of them. These mile-and-a-half long coal trains will shed toxic coal dust, belch diesel emissions that damage ecosystems and wildlife, and disrupt communities along the way. Adding insult to injury, rail lines would need to be improved, and past experience has indicated that taxpayers, not private companies, may be left with the infrastructure bill.⁹³

- Each coal train carries about 15,000 tons, usually in open cars that shed coal dust en route to their destinations. According to a report by the Western Organization of Resource Councils, about 10 coal trains currently pass through the region every day, but increasing exports to the scale proposed by industry would require at least a six-fold increase in train traffic — or 60 trains a day.⁹⁴ (Keep in mind each train has to travel to *and* from the mines on each trip.) Because conditions vary substantially, it is difficult to assess the exact amount of coal dust that floats away during transport, but BNSF says it is concerned about coal dust escaping from loaded coal cars in transport from the Powder River Basin to the new terminals.⁹⁵



Flickr: nau2vc

- Health professionals in the Pacific Northwest and elsewhere have catalogued a litany of negative health impacts from diesel particulate matter, including impaired pulmonary development in children, increased incidence of asthma, higher cancer rates, more heart attacks, and other diseases.⁹⁶
- The World Health Organization recently declared that diesel exhaust (like the engine emissions from coal trains) is carcinogenic to human; of particular concern is its link to lung cancer.⁹⁷
- A less obvious impact from rail transport is the increased noise exposure for citizens living near railroad tracks. Medical literature shows that exposure to the kinds of noise levels associated with increased train traffic comes with a price: high blood pressure, cardiovascular disease and sleep disturbance.⁹⁸
- A train wreck in the Columbia River Gorge in July 2012 resulted in the derailment of 30 coal cars in Mesa, Washington, spilling coal and blocking a busy rail corridor. An increase in rail traffic would almost certainly lead to an increase in these accidents.
- Many communities along the rail lines already experience temporary road closures when trains pass through. A substantial increase in



Flickr: rsetup

rail traffic through these towns will likely result in longer delays for emergency medical treatment and lost productivity for local businesses.⁹⁹

- Trains routinely kill and maim people in accidents. According to the National Transportation Safety Board, in 2010 there were 813 rail fatalities in the U.S.¹⁰⁰

WATER TRANSPORT

Several of the coal terminal proposals would increase barge traffic on the Columbia River, and all of them would result in more tanker traffic near coastal zones. The Morrow Pacific project in Boardman, for example, would entail more than 5,000

additional barge trips per year (once upriver, once downriver), a 94% increase over 2010 levels.¹⁰¹ A biological assessment prepared for Ambre Energy and submitted to the Army Corps of Engineers admitted that “the proposed project will result in unavoidable impacts to protected species and critical habitat,” potentially harming steelhead, salmon, bull trout, green sturgeon, and dozens of other fish and aquatic mammals.¹⁰²

BURNING

The level of atmospheric carbon dioxide has risen substantially over the past 150 years, much of that from burning fossil fuels like coal.¹⁰³ Today, coal-fired power plants account for about one-third of energy-related CO₂ emissions in the US.¹⁰⁴

Burning coal, even overseas, has three main impacts that should concern Pacific Northwesterners: It changes the ocean’s chemistry and makes it more acidic (see What’s Fishy about Coal, page 9); it releases mercury and other toxic chemicals that infiltrate the food chain, and it contributes to a warmer planet that creates more extreme weather events and changes ecosystems so fast that many species cannot adapt.



Flickr: Captain Kimo

A DOC'S VIEW

For Dr. Frank James, a Bellingham, WA family physician and San Juan County Health Officer, an increase in coal exports will cause two certain side effects: an increase in disease, and an increase in deaths.

James has pored over the medical literature along with his colleagues in the “Whatcom Docs,” a group of about 200 local physicians who are concerned about the health and safety impacts of the Cherry Point proposal. They don’t like what they’ve found: Evidence points to greater health problems for communities near coal export facilities or near rail corridors, and James is calling for a comprehensive (and independent) Health Impact Assessment to drill down on just how much port and rail communities would be affected by the coal industry’s projects.

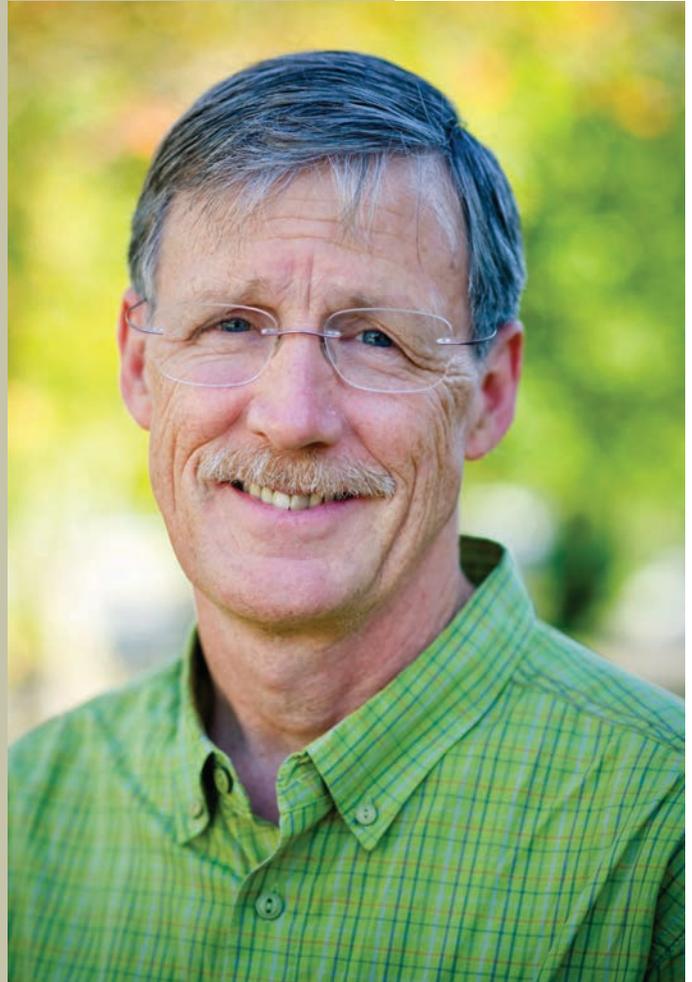
For James, the issue is both personal and professional. An asthmatic since he was a child (a condition he ascribes partly to the fact that his father was a heavy smoker) James has seen the effects of bad air on children’s lungs in his family practice. Living with his family near the railroad tracks only increases his concerns.

What troubles James most is the increase of diesel particulate matter that will be a certain by-product of four-engine rail convoys coming through town, up to 20 times a day. Between that and the increase of “Cape class ships” — the world’s largest oceangoing vessels — the amount of diesel pollution around Bellingham will increase. “It will bring a dramatic drop in the quality of the air,” says James, “as well as the quality of our lives.”

That in turn will affect the health of Bellingham’s residents, especially the young, the elderly, and those closest to the tracks. The Whatcom Docs have catalogued potential health impacts to the community in four categories: diesel particulates, which especially trouble James; coal dust; noise exposure; and delays in emergency medical responses when train traffic shuts down road crossings.¹⁰⁵ Simply put, he says, “It’s not about ‘Jobs vs. the Environment.’ Real people’s health will be impacted — our patients and your families. Heart attacks, strokes, asthma and many other conditions will become more common, and current patients will be made worse.”

James and his colleagues have combed the peer-reviewed medical literature and made inquiries to colleagues around the country. In Spokane, WA, James found studies that indicated increased cancer deaths near the tracks. He phoned officials in Newport News, VA, and found out that everything from asthma rates to property values have been affected by the coal export facilities there.

The Whatcom Docs include cardiologists, infectious disease specialists, radiologists, and general practitioners, and they all agree: These projects would result in significant increases of airborne pollutants from diesel engines and coal dust, would raise levels of noise pollution, and would elevate the risk of vehicle and pedestrian injuries along the tracks. It’s a heavy cost to pay, and one that would be borne by communities, not the coal industry.



Recommendations

Given the broad impact that increased coal shipments will have, not only on the local communities and the region's critical natural resources, but also on the global climate, national scrutiny and oversight is essential. And national leadership to pursue an alternate energy path for our country is urgent.

THE NATIONAL WILDLIFE FEDERATION CALLS ON ELECTED OFFICIALS TO:

1. Require a thorough examination of the climate impacts of an expanded coal export market (both in the Pacific Northwest and elsewhere), and include these considerations as part of any environmental analysis evaluating

federal decisions involved in exporting coal, extracting coal or leasing federal lands for coal development, given the evidence at hand that we are nearing the tipping point for disastrous climate effects;

2. Require the U.S. Army Corps of Engineers to complete a comprehensive, area-wide analysis to fully assess the potential impacts — including climate and other factors — from these port and rail expansions; and ensure that Endangered Species Act consultation takes place with federal wildlife agencies to ensure that populations of salmon, marine mammals and other

protected species are kept from harm;

3. Direct the National Academy of Sciences to conduct a study on the impact of major coal port expansions (and associated infrastructure such as rail expansions) on terrestrial and marine habitat, in particular that of endangered and threatened salmon species in the Pacific Northwest;

4. Require federal and state permitting agencies to fully engage Tribes in the process of analyzing these proposals; and make sure that Tribal treaty rights are upheld without exception.



CHAPTER FIVE

Get Involved

Top 5 reasons not to invest in coal export terminals



- 1. Coal kills** — The mining, transport and burning of coal impacts human health, plants and animals, changes global ocean chemistry, and contributes to the world's increasingly extreme weather events and changing climate.
- 2. Coal has no place in the Pacific Northwest** — Oregon and Washington plan to shut down their remaining coal-fired plants; the region is a leader in sustainable development and should not be used as a conduit for dirty coal.
- 3. Coal companies and their partners have been bad neighbors** — The main players in the Northwest export expansions have a demonstrated legacy of pollution, broken environmental laws, and ruthless business practices. For Peabody, Arch Coal and the rest, their bottom line — not good citizenship — is the most important thing.
- 4. Coal is dirty** — Humans were burning coal when horse and carriage transport was commonplace and whale oil was still in widespread use. Many cleaner energy options have been developed and continue to come online in the U.S. and around the world. The future of the world energy economy lies in renewables, not dirty fossil fuels.
- 5. Coal will harm economic development** — Negative impacts on salmon and other species will hurt our fishing economy, and as the Public Financial Management report showed in Bellingham, coal exports would box out other industries like tourism.

Local, state and federal agencies will be examining all of the port proposals in the months and years to come. There will be ample opportunity — at public meetings, “scoping hearings,” public comment periods, and through other forms of citizen involvement, to influence their decisions.

It won't be easy to fend off the coal industry. The companies involved know how to play the political game at the highest levels — through political contributions, lobbying efforts, high-priced public relations firms, and other tried and true methods of influence.

But citizens around the country have been successful in demonstrating to their elected officials that coal is not a

welcome neighbor. New coal-fired power plants have been stopped in their tracks in dozens of communities around the country, and groups around the Pacific Northwest have formed to bring persuasive local voices to the table.

NWF is an active member of the *Power Past Coal* coalition (www.powerpastcoal.org), a regional coalition of organizations working to prevent the export of coal from the Northwest. Major partners include Climate Solutions, Columbia Riverkeeper, Earth Justice, Sierra Club, Washington Environmental Council, and the Western Organization for Resource Councils. In partnership with the Power Past Coal Coalition, NWF is

focused on three areas that are essential for blocking the plans of the coal industry:

- 1.** Prevent the permitting of new port projects along the Columbia River and Puget Sound that would be needed to support increased coal exports;
- 2.** Prevent expanded coal rail infrastructure between Eastern Montana and the Pacific coast, that would cross pristine river valleys, farms and ranches, and prime hunting grounds; and
- 3.** Prevent new coal mine leases in the Powder River Basin.

To find out about current ways to have your voice heard on this issue, go to: www.nwf.org/coalexports where you'll see a list of tools to help you participate.

Perhaps the most important thing you can do is let decision-makers know that you're paying attention. Write your members of Congress, and tell them that the country needs an energy policy that moves away from coal and other fossil fuels towards more renewable, sustainable energy and energy conservation strategies.

References

Barton, A., B. Hales, G.G. Waldbusser, C. Langdon, and R.A. Feelyd (2012). The Pacific Oyster, *Crassostrea gigas*, shows negative correlation to naturally elevated carbon dioxide levels: Implications for near-term ocean acidification effects. *Limnol. Oceanogr.* 57(3): 698-710. Abstract available online at http://www.aslo.org/lo/toc/vol_57/issue_3/0698.html (accessed May 31, 2012).

Bindoff, N.L., J. Willebrand, V. Artale, A. Cazenave, J. Gregory, S. Gulev, K. Hanawa, C. Le Quéré, S. Levitus, Y. Nojiri, C.K. Shum, L.D. Talley and A. Unnikrishnan. (2007). Observations: Oceanic Climate Change and Sea Level. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Edited by Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge, United Kingdom and New York, NY, USA Cambridge University Press.

Campbell, P.M. and R.H. Devlin. (1997). Increased CYP1A1 and ribosomal protein L5 gene expression in a teleost: the response of juvenile Chinook salmon to coal dust exposure. *Aquatic Toxicology.* 38(1-3): 1-15.

Dalton, M, L.B. Eisner, R.J. Foy, T.P. Hurst, J.F. Morado, J.W. Short, R.P. Stone, and M.F. Sigler (2008). *Forecast fish, shellfish and coral population responses to ocean acidification in the North Pacific Ocean and Bering Sea: An ocean acidification research plan for the Alaska Fisheries Science Center.* AFSC Processed Rep. 2008-07, 17109 Point Lena Loop Road, Juneau AK 99801: Alaska Fisheries Science Center, NOAA, National Marine Fisheries Service, 35 pgs.

Feely, Richard A., Scott C. Doney, and Sarah R. Cooley. (2009). Ocean acidification: present conditions and future changes in a high CO₂ world. *Oceanography.* 22(4): 36-71.

Hauri, C., N. Gruber, G.-K. Plattner, S. Alin, R.A. Feely, B. Hales, and P.A. Wheeler. (2009). Ocean acidification in the California Current System. *Oceanography.* 22(4): 60-71.

Hopkins, W.A., J.W. Snodgrass, J.H. Roe, B.P. Jackson, J.C. Gariboldi, and J.D. Congdon . (2000). Detrimental effects associated with trace element uptake in lake chubsuckers (*Erimyzon sucetta*) exposed to polluted sediments. *Arch. Environ. Contam. Toxicol.* 39: 193-199.

Hopkins, W.A., J.W. Snodgrass, B.P. Staub, B.P. Jackson, and J.D. Congdon. (2003). Altered swimming performance of a benthic fish (*Erimyzon sucetta*) exposed to contaminated sediments. *Arch. Environ. Contam. Toxicol.* 44: 383-389.

Intergovernmental Panel on Climate Change (IPCC). (2007a). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)].* Geneva: IPCC.

Intergovernmental Panel on Climate Change (IPCC). (2007b). Summary for Policymakers. *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Edited by Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Intergovernmental Panel on Climate Change (IPCC). (2007c). *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007.* Edited by Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.

Isaak, D.J., C.H. Luce, B.E. Rieman, D.E. Nagel, E.E. Peterson, D.L. Horan, S. Parkes, and G.L. Chandler . (2010). Effects of climate change and wildfire on stream temperatures and salmonid thermal habitat in a mountain river network. *Ecological Applications.* 20(5): 1350-1371.

Isaak, D.J., S. Wollrab, D. Horan, D, and G. Chandler. (2011) Climate change effects on stream and river temperatures across the northwest U.S. from 1980-2009 and implications for salmonid fishes. *Climatic Change.* doi: 10.1007/s10584-011-0326-z.

Johnson, R. and R.M. Bustin. (2006). Coal dust dispersal around a marine coal terminal (1977-1999), British Columbia: The fate of coal dust in the marine environment. *International Journal of Coal Geology.* 68: 57-69.

Kroeker, K.J., R.L. Kordas, R.N. Crim, and G.G. Singh. (2010). Meta-analysis reveals negative yet variable effects on ocean acidification on marine organisms. *Ecology Letters* 13: 1419-1434.

Levings, C.D. (1985). Juvenile salmonid use of habitats altered by a coal port in the Fraser River Estuary, British Columbia. *Marine Pollution Bulletin.* 16(6): 248-254.

Mantua, N., I. Tohver, and A. Hamlet. (2010). Climate change impacts on streamflow extremes and summertime stream temperature and their possible consequences for freshwater salmon habitat in Washington State. *Climatic Change.* 102: 187-223.

Molnar, J.L., R. Gamboa, C. Revenga, and M. Spalding. (2008) Assessing the global threat of invasive species to marine biodiversity. *Frontiers in Ecology and the Environment.* <http://ballast-outreach-ucsgp.ucdavis.edu/files/136965.pdf> (accessed July 23, 2012) .

Naidoo, G. and D. Chirkoot. (2004). The effects of coal dust on photosynthetic performance of the mangrove, *Avicennia marina*, in Richards Bay, South Africa. *Environmental Pollution.* 127(3): 359-366.

Orr, J.C., V.J. Fabry, O. Aumont, L. Bopp, S.C. Doney, R.A. Feely, A. Gnanadesikan, N. Gruber, A. Ishida, F. Joos, R.M. Key, K. Lindsay, E. Maier-Reimer, R. Matear, P. Monfray, A. Mouchet, R.G. Najjar, G.K. Plattner, K.B. Rodgers, C.L. Sabine, J.L. Sarmiento, R. Schlitzer, R.D. Slater, I.J. Totterdell, M.F. Weirig, Y. Yamanaka, and A. Yool. (2005). Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. *Nature.* 437: 681-686.

Peterson, W. and F. Schwing. (2008). California Current Ecosystem. In *Climate Impacts on U.S. Living Marine Resources: National Marine Fisheries Service Concerns, Activities and Needs.* Edited by K. E. Osgood. U.S. Dep. Commerce, NOAA Tech. Memo. NMFS-F/SPO-89, 118 pgs.

Shelton, R.G.J. (1973). Some effects of dumped, solid wastes on marine life and fisheries. North Sea Science, NATO North Sea Science Conference. Aviemore, Scotland, November 15-20th. Ed. Edward D. Goldbury in Pearce, B.C., and McBride, J., 1977. A Preliminary Study on the Occurrence of Coal Dust in Roberts Bank Sediments and the Effect of Coal Dust on Selected Fauna. Fisheries and Marine Service Technical Report No. PAC/T-77-17. 25 pp.

Sigler, M. F., R.J. Foy, J.W. Short, M. Dalton, L.B. Eisner, T.P. Hurst, J.F. Morado, and R.P. Stone. (2008). *Forecast fish, shellfish and coral population responses to ocean acidification in the north Pacific Ocean and Bering Sea: An ocean acidification research plan for the Alaska Fisheries Science Center.* AFSC Processed Rep. 2008-07, 17109 Point Lena Loop Road, Juneau AK 99801: Alaska Fisheries Science Center, NOAA, National Marine Fisheries Service, 35 pgs.



Photofisc Getty Images

Endnotes

- ¹ Nuclear Energy Institute, *U.S. Electricity Generation Fuel Shares (1973 - 2011)*. <http://www.nei.org/resourcesandstats/documentlibrary/reliableandaffordableenergy/graphicsandcharts/uselectricitygenerationfuelshares/>
- ² U.S. Energy Information Administration. *Coal's share of total U.S. electricity generation falls below 40% in November and December*. March 9, 2012. <http://205.254.135.7/todayinenergy/detail.cfm?id=5331#>
- ³ U.S. Environmental Protection Agency. *Greenhouse Gas Emissions: Carbon Dioxide Emissions*. 2012. <http://www.epa.gov/climatechange/ghgemissions/gases/co2.html>
- ⁴ Western Governors' Association. *A Snapshot of the Economic Impact of Outdoor Recreation*. June 2012. <http://www.westgov.org/reports>
- ⁵ U.S. Environmental Protection Agency. *Final Report: Inflow, Chemistry and Deposition of Mercury to the West Coast of the United States*. October 24, 2008. <http://cfpub.epa.gov/ncer/abstracts/index.cfm/fuseaction/display.abstractDetail/abstract/5952/report/F/> (accessed July 5, 2012)
- ⁶ Project Platinum: US West Coast Port Redevelopment. <http://bloximages.chicago2.vip.townnews.com/tdn.com/content/tncms/assets/v3/editorial/e/9b/e9b143e6-3a0f-11e0-9c10-001cc4c03286/4d5c3b256ec35.pdf>
- ⁷ U.S. Fish & Wildlife Service: Lewis & Clark National Wildlife Refuge. December 1, 2011. <http://www.fws.gov/lc/wildlife/wildlife.html>
- ⁸ U.S. Environmental Protection Agency, Water: Targeted Watershed Grants Program. *Lower Columbia River Partnership Watershed Initiative Proposal*. November 2002. http://water.epa.gov/grants_funding/twg/upload/2004_07_19_watershed_initiative_2003_proposals_lower_columbia.pdf
- ⁹ Washington State Department of Natural Resources. *Cherry Point Environmental Aquatic Reserve Management Plan*. November 2010. http://www.dnr.wa.gov/Publications/aqr_cp_mgmt_plan_2010.pdf
- ¹⁰ U.S. Department of Commerce: National Ocean and Atmospheric Administration. *Status Review of Cherry Point Pacific Herring*. June 2006. http://www.nwfsc.noaa.gov/assets/25/6539_08072006_141228_HerringTM76Final.pdf
- ¹¹ Merle Jefferson Sr. *Lummi Nation Reviewing Proposed Deepwater Proposal*. The Bellingham Herald, December 1, 2011. <http://www.bellinghamherald.com/2011/12/01/2296638/whatcom-view-lummi-nation-reviewing.html>
- ¹² Public Financial Management, Inc. *The Impact of the Development of the Gateway Pacific Terminal on the Whatcom County Economy*. March 6, 2012. <http://www.communitywisebellingham.org/economic-impacts-of-the-gpt-development/>
- ¹³ Scott Learn. *Oregon Gov. John Kitzhaber calls for sweeping review of planned coal exports from Northwest ports*. The Oregonian, April 25, 2012. http://www.oregonlive.com/environment/index.ssf/2012/04/oregon-gov-john-kitzhaber_call.html
- ¹⁴ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf>
- ¹⁵ Governor John Kitzhaber. *Governor Kitzhaber Calls for Action on Coal Exports*. April 25, 2012. http://governor.oregon.gov/Gov/docs/042512_McHughSalazarCoalLetter.pdf?ga=t
- ¹⁶ U.S. Fish & Wildlife Service: Grays Harbor National Wildlife Refuge. January 4, 2012. <http://www.fws.gov/graysharbor/>
- ¹⁷ The Chehalis Basin Partnership Habitat Work Group. *The Chehalis Basin Salmon Habitat Restoration and Preservation Work Plan for WRIA 22 and 23*. September, 2008. http://www.co.grays-harbor.wa.us/info/pub_svcs/ChehalisBasin/Docs/WRIA20080922-23.pdf
- ¹⁸ American Sportfishing Association. *Sportfishing in America*. January 2008. http://www.igfa.org/images/uploads/files/Sportfishing%20in%20America%20Rev_%207%2008.pdf (accessed July 24, 2012)
- ¹⁹ Hans D. Radtke, Ph.D. *Washington State Commercial Fishing Industry Total Economic Contribution*. January 2011. <http://www.fishermensnews.com/attachmentsPDF/RadtkeReport.pdf>
- ²⁰ Robert T. Lackey. *Pacific Northwest Salmon: Forecasting Their Status in 2100*. Reviews in Fisheries Science. 11(1): 35-88. 2003. <http://www.epa.gov/wed/pages/staff/lackey/pubs/salmon2100.pdf>
- ²¹ Lackey, Robert T. *Restoring wild salmon to the Pacific Northwest: chasing an illusion? In: What We Don't Know about Pacific Northwest Fish Runs – An Inquiry into Decision-Making*. Patricia Koss and Mike Katz, Editors, Portland State University, Portland, Oregon, pp. 91-143. 2000. <http://www.epa.gov/wed/pages/staff/lackey/pubs/illusion.htm>
- ²² Lackey, Robert T. *Salmon Decline in Western North America: Historical Context*. In: Encyclopedia of Earth. Eds. Cutler J. Cleveland (Washington, DC, Environmental Information Coalition, National Council for Science and the Environment). 2008. <http://www.epa.gov/wed/pages/staff/lackey/pubs/ENCYCLOPEDIA-OF-EARTH-LACKEY-SALMON-HISTORY-MS-2008.pdf>
- ²³ Naidoo, G. and D. Chirkoot. (2004)
- ²⁴ Naidoo, G. and D. Chirkoot. (2004), Hopkins et al. (2000). Hopkins et al. (2003).
- ²⁵ Campbell, P.M. and R.H. Devlin. (1997, p. 11)
- ²⁶ Campbell, P.M. and R.H. Devlin. (1997), Johnson, R. and R.M. Bustin. (2006), Levings, C.D. (1985), Shelton, R.G.J. (1973)
- ²⁷ International Year of the Ocean: National Oceanic and Atmospheric Administration. *Northwest Salmon: Causes of Salmon Decline*. 2011. <http://www.yoto98.noaa.gov/books/salmon/salmon3.htm> and Lackey, Robert T., Denise H. Lach, and Sally L. Duncan. 2006. *Policy options to reverse the decline of wild Pacific salmon*. Fisheries. 31(7): 344-351. 2006. <http://oregonstate.edu/dept/fw/lackey/SALMON-2100-PROJECT-SUMMARY-2008.pdf>
- ²⁸ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf> (sec.3-7)
- ²⁹ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf> (sec.6-2)
- ³⁰ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf> (sec. 6-5)
- ³¹ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf> (sec. 6-6)
- ³² Levings, C.D. (1985)
- ³³ Levings, C.D. (1985)
- ³⁴ Paul K. Anderson. *Coal Train Facts*. 2012. <http://www.coaltrainfacts.org/coal-train-derailments>
- ³⁵ Molnar et. al (2008)
- ³⁶ "World's Coastal Waters Riddled with Invasive Species." Environment News Service 24 Feb. 2008. 23 Jul. 2012 <http://www.ens-newswire.com/ens/feb2008/2008-02-24-01.asp>.
- ³⁷ BSNF Railway Company. 2011. <http://www.coaltrainfacts.org/docs/BNSF-Coal-Dust-FAQs1.pdf>

- ³⁸ *ibid*
- ³⁹ Johnson, R. and R.M. Bustin. (2006)
- ⁴⁰ Campbell, P.M. and R.H. Devlin. (1997, p. 11)
- ⁴¹ Shelton, R.G.J. (1973)
- ⁴² Johnson, R. and R.M. Bustin. (2006)
- ⁴³ Johnson, R. and R.M. Bustin. (2006)
- ⁴⁴ U.S. Environmental Protection Agency. *Mercury: Basic Information*. February 7, 2010. <http://www.epa.gov/hg/about.htm> (accessed July 5, 2012)
- ⁴⁵ Science Daily. *Black Carbon Implicated in Global Warming*. July 29, 2010. <http://www.sciencedaily.com/releases/2010/07/100729144225.htm>, Ramana et al., *Warming influenced by the ratio of black carbon to sulphate and the black-carbon source*. "Nature Geoscience" (3): 542-545. 2010. <http://www.nature.com/ng/journal/v3/n8/full/ng0918.html>, and Bruce K. Hope. *An assessment of anthropogenic source impacts on mercury cycling in the Willamette Basin, Oregon, USA*. *Science of the Total Environment*. 356 (1-3):165-191. 2006. <http://www.mendeley.com/research/assessment-anthropogenic-source-impacts-mercury-cycling-willamette-basin-oregon-usa/#>
- ⁴⁶ U.S. Environmental Protection Agency. *Mercury: Basic Information*. February 7, 2010. <http://www.epa.gov/hg/about.htm> (accessed July 5, 2012)
- ⁴⁷ Charles E. Sams. *Methylmercury Contamination: Impacts on Aquatic Systems and Terrestrial Species, and Insights for Abatement*. <http://stream.fs.fed.us/afsc/pdfs/Sams.pdf>
- ⁴⁸ Ivy Sager-Rosenthal. *Reel Trouble: How Washington's Fish-Advisory Program Fails to Protect Consumers from Toxic Fish*. Washington Public Interest Research Group. 2002. <http://watoxics.org/files/reel-trouble> and U.S. and Environmental Protection Agency: Mercury. October 2002. <http://www.epa.gov/hg/exposure.htm#3>
- ⁴⁹ Bindoff et al. (2007), IPCC (2007a, 2007b)
- ⁵⁰ IPCC. (2007a), Isaak et al. (2010), Isaak et al. (2011), Mantua, Tohver, and Hamlet. (2010) and National Wildlife Federation. 2012. <http://www.nwf.org/Global-Warming/What-is-Global-Warming/Global-Warming-is-Causing-Extreme-Weather.aspx> (accessed July 5, 2012)
- ⁵¹ IPCC. (2007c)(accessed July 5, 2012)and United States Global Change Research Program. *Global Change Impacts in the United States*.2009. <http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts> (accessed July 5, 2012)
- ⁵² Peterson, W. and F. Schwing. (2008)
- ⁵³ Feely, Doney, and Cooley. (2009), Orr, J.C. (2005)
- ⁵⁴ Barton, A. et al. (2012). and Oregon State University. *Hatchery, OSU Scientists Link Ocean Acidification to Larval Oyster Failure*. April 11, 2012. <http://oregonstate.edu/ua/ncs/archives/2012/apr/hatchery-managers-osu-scientists-link-ocean-acidification-larval-oyster-failure> and http://www.aslo.org/lo/toc/vol_57/issue_3/0698.html
- ⁵⁵ Feely, Doney, and Cooley. (2009), Kroeker et al. (2011), Hauri et al. (2009)
- ⁵⁶ National Oceanic and Atmospheric Administration. *State of the Science Fact Sheet*. May 2008. http://www.nrc.noaa.gov/plans_docs/2008/Ocean_AcidificationFINA.L.pdf
- ⁵⁷ Hauri et al. (2009), Dalton et al. (2008)
- ⁵⁸ Robert T. Lackey. *Pacific Northwest Salmon: Forecasting Their Status in 2100*. *Reviews in Fisheries Science*. 11(1): 35-88. 2003. <http://www.epa.gov/wed/pages/staff/lackey/pubs/salmon2100.pdf>
- ⁵⁹ Center for Columbia River History. *The Tribal Right to Harvest*. <http://ccrh.org/comm/river/harvest.htm>
- ⁶⁰ *United States v Winans* (Held that the Treaty with the Yakama Nation protected their rights to fishing, hunting and other rights. This also upheld treaties similar to Yakama Nations. Also established Reserved Rights Doctrine). And 1970's *U.S. v Oregon* and *U.S. v Washington* (Adjudication of Treaty fishing rights. Also established tribes as sovereign co-managers of fishery resources)
- ⁶¹ Painter, Thomas H. et al.(2010). *Response of Colorado River Runoff to Dust Radiative Forcing in Snow*. Edited by Peter H. Gleick, Pacific Institute for Studies in Development, Environment, and Security, Oakland, CA. <http://www.pnas.org/content/107/40/17125.full>, and Epstein et al. (2011), *Full cost accounting for the life cycle of coal*. *Annals of the New York Academy of Sciences*, 1219: 73-98. <http://onlinelibrary.wiley.com/doi/10.1111/j.1749-6632.2010.05890.x/full>
- ⁶² National Transportation Safety Board: Office of Public Affairs. *U.S. Transportation Fatalities Estimated at 34,925 in 2010*. December 16, 2011. <http://www.nts.gov/news/2011/11216.html>
- ⁶³ Merle Jefferson Sr. *Lummi Nation Reviewing Proposed Deepwater Proposal*. The Bellingham Herald, December 1, 2011. <http://www.bellinghamherald.com/2011/12/01/2296638/whatcom-view-lummi-nation-reviewing.html>
- ⁶⁴ OpenSecrets.org. *Coal Mining Lobbying*. 2012. <http://www.opensecrets.org/lobby/induscode.php?id=E1210&year>
- ⁶⁵ SourceWatch.org. *Coal Money in Politics*. 2012. http://www.sourcewatch.org/index.php?title=Coal_money_in_politics
- ⁶⁶ SourceWatch.org. *Peabody Energy*. 2012. http://www.sourcewatch.org/index.php?title=Peabody_Energy
- ⁶⁷ Goodall, Jeff. *Big Coal: The Dirty Secret Behind America's Energy Future*. 2006. Houghton Mifflin Harcourt.
- ⁶⁸ Horn, Steve. *ALEC Model Bill Behind Push To Require Climate Denial Instruction In Schools*. Desmogblog.com. 2012. <http://www.desmogblog.com/alec-model-bill-behind-push-require-climate-denial-instruction-schools>
- ⁶⁹ Grandia, Kevin. *Leaked Clean Coal Strategy Memo TO Peabody Energy*. Desmogblog.com. 2009. <http://www.desmogblog.com/sites/beta.desmogblog.com/files/Clean%20Industry%20Strategy%20Letter%20To%20CEO%20of%20Peabody%20Energy.pdf>
- ⁷⁰ SourceWatch.org. *Peabody Energy*. 2012. http://www.sourcewatch.org/index.php?title=Peabody_Energy
- ⁷¹ U.S. Department of Labor: Mine Safety and Health Administration. November 19, 2010 <http://www.msha.gov/pov/2010/Letters/PPOV%20Letter%20to%20WillowLake%201103054.pdf>
- ⁷² SourceWatch.org. *Peabody Energy*. 2012. http://www.sourcewatch.org/index.php?title=Peabody_Energy
- ⁷³ ICTMN Staff. *Navajo Nation Settled Multi-Million Dollar Coal Royalty Case*. Indian Country Today Media Network. August 24, 2011. <http://indiancountrytodaymedianetwork.com/2011/08/24/navajo-nation-settled-multi-million-dollar-coal-royalty-case-48803>
- ⁷⁴ U.S. Environmental Protection Agency: Civil Enforcement. *Arch Coal Clean Water Act Settlement*. March 1, 2011. <http://www.epa.gov/compliance/resources/cases/civil/cwa/arch.html> and U.S. Department of Justice: Office of Public Affairs. *Arch Coal to Pay \$4 Million to Settle Clean Water Act Violations in Appalachian Mining Operations*. March 1, 2011. <http://www.justice.gov/opa/pr/2011/March/11-enrd-257.html>
- ⁷⁵ U.S. Environmental Protection Agency: Civil Enforcement. *Arch Coal Clean Water Act Settlement*. March 1, 2011. <http://www.epa.gov/compliance/resources/cases/civil/cwa/arch.html>
- ⁷⁶ Federal Register. *Notice of Lodging of Consent Decrees Under the Comprehensive Environmental Response, Compensation and Liability Act*. April 14, 2011 <https://www.federalregister.gov/articles/2011/04/14/2011-8967/notice-of-lodging-of-consent-decrees-under-the-comprehensive-environmental-response-compensation-and>
- ⁷⁷ The Associated Press. *Arch Coal settles selenium pollution lawsuit*. January 18, 2012. <http://dailymail.com/News/statenews/201201180131>



Power Past Coal

⁷⁸ Torkington, J. *MBL Project Document Definition*. Message to S. Whitton. July 19, 2010. Email. <http://bloximages.chicago2.vip.townnews.com/tdn.com/content/tncms/assets/v3/editorial/9/fa/9fa7ca8c-3a0e-11e0-bd60-001cc4c03286/4d5c38fb224fa.pdf.pdf> (accessed July 5, 2012)

⁷⁹ Laccinole, M. RE: 80528 - *Critical Path Permitting for Phase 1 New*. Message to L. Hobbs. November 5, 2010. Email. <http://bloximages.chicago2.vip.townnews.com/tdn.com/content/tncms/assets/v3/editorial/1/1f/11fed216-3a0e-11e0-a8a0-001cc4c03286/4d5c385bda01c.pdf.pdf> (accessed July 5, 2012)

⁸⁰ Klan, Anthony. *Miner Ambre Energy in Financial Trouble as Queensland Rejects its Coalmine Project*. April 02, 2012. <http://www.theaustralian.com.au/business/mining-energy/miner-ambre-energy-in-financial-trouble-as-queensland-rejects-its-coalmine-project/story-e6frg9e6-1226315904534>

⁸¹ SSA Marine. 2012. <http://www.ssamarine.com/company/index.html>

⁸² Eric de Place, *The Facts about Kinder Morgan*. Sightline Institute, April 2012. http://www.sightline.org/wp-content/uploads/downloads/2012/02/Coal-Kinder-Morgan-April-12_final.pdf

⁸³ Erik Siemers. *Companies Push for Coal*. Portland Business Journal, March 23, 2012. <http://www.bizjournals.com/portland/print-edition/2012/03/23/companies-push-for-coal.html?page=all>

⁸⁴ AmericasPower, April 3, 2012. http://www.youtube.com/watch?v=_eR6oNbJqQ4

⁸⁵ OpenSecrets.org, *Tobacco Lobbying, 2011*. <http://www.opensecrets.org/industries/lobbying.php?cycle=2012&ind=a02> and OpenSecrets.org, *Coal Mining: Lobbying 2011*. <http://www.opensecrets.org/industries/lobbying.php?cycle=2012&ind=E1210>

⁸⁶ OpenSecrets.org, *Tobacco Lobbying, 2011*. <http://www.opensecrets.org/industries/lobbying.php?cycle=2012&ind=a02>

⁸⁷ Lockwood, Alan H. et al., *Coal's Assault on Human Health*. November 2009. <http://www.psr.org/resources/coals-assault-on-human-health.html>

⁸⁸ U.S. Environmental Protection Agency. *Comments on Public Notice for Permit Application under Section 10 of the Rivers and Harbors Act*

for a Coal Transloading Facility, Port of Morrow, Oregon. April 5, 2012. http://media.oregonlive.com/environment_impact/other/EPA%20letter%20about%20PEIS.PDF

⁸⁹ Western Organization of Resource Councils. *Exporting Powder River Basin Coal: Risks and Costs*. January 2011. http://www.worc.org/userfiles/file/Coal/Exporting_Powder_River_Basin_Coal_Risks_and_Cost.pdf

⁹⁰ U.S. Energy Information Administration. November 2011. <http://www.eia.gov/coal/annual/pdf/table28.pdf>

⁹¹ Centers for Disease Control and Prevention. *Pneumoconiosis and Advanced Occupational Lung Disease Among Surface Coal Miners – 16 States, 2010–2011*. June 15, 2012. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6123a2.htm?s_cid=mm6123a2_w

⁹² Fischer, D. and Daily Climate. *Coal Exports Boost Train Impacts out West*. Scientific American. May 3, 2012. <http://www.scientificamerican.com/article.cfm?id=coal-exports-boost-train-impacts-out-west> (accessed July 5, 2012)

⁹³ Cornell University Law School. <http://www.coaltrainfacts.org/docs/Cornell-Univ-Law-School.pdf>

⁹⁴ Western Organization of Resource Councils. *Exporting Powder River Basin Coal: Risks and Costs*. January 2011. http://www.worc.org/userfiles/file/Coal/Exporting_Powder_River_Basin_Coal_Risks_and_Cost.pdf

⁹⁵ BNSF Railway. *BNSF Railway Statement on STB Coal Dust Decision*. 2012. <http://www.bnsf.com/customers/what-can-i-ship/coal/coal-dust.html>

⁹⁶ The Whatcom Docs present an annotated list of health effects here: <http://www.coaltrainfacts.org/whatcom-docs-position-statement-and-appendices>

⁹⁷ World Health Organization: International Agency for Research on Cancer. *IARC Diesel Engine Exhaust Carcinogenic*. June 12, 2012. http://press.iarc.fr/pr213_E.pdf

⁹⁸ World Health Organization: Regional Office for Europe. *Facts and Figures: Health Effects of Noise*. 2012. <http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/noise/facts-and-figures/health-effects-of-noise>

⁹⁹ Edward Koltonowski. *Cherry Point Coal Export Facility Rail Operations-Burlington; GTC #11-036*. Gibson Traffic Consultants, August 15, 2011 <http://www.coaltrainfacts.org/docs/traffic-study-Burlington.pdf>

¹⁰⁰ National Transportation Safety Board: Office of Public Affairs. *U.S. Transportation Fatalities Estimated at 34,925 in 2010*. December 16, 2011. <http://www.nts.gov/news/2011/11/216.html>

¹⁰¹ Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf> (sec.3-12)

¹⁰² Anderson Perry & Associates. *Biological Assessment for the Morrow Pacific Project*. April 2012. <http://columbiariverkeeper.org/wp-content/uploads/2012/04/Boardman-Coal-Terminal-BA-RFS.pdf>

¹⁰³ Union of Concerned Scientists: Global Warming. *What are the options for the vast stores of coal around the world?*. May 1, 2009. http://www.ucsusa.org/global_warming/science_and_impacts/science/coal-and-global-warming-faq.html

¹⁰⁴ U.S. Energy Information Administration. *Energy in Brief: What are greenhouse gases and how much are emitted by the United States?* June 21, 2012. http://www.eia.gov/energy_in_brief/greenhouse_gas.cfm (accessed July 7, 2012)

¹⁰⁵ Coal Train Facts. *Whatcom Docs Position Statement and Appendices*. 2012 <http://www.coaltrainfacts.org/whatcom-docs-position-statement-and-appendices>



ABOUT NWF

The National Wildlife Federation, America's largest conservation organization, works with more than 4 million members, partners and supporters in communities across the country to inspire Americans to protect wildlife for our children's future.

ABOUT THE ASSOCIATION OF NORTHWEST STEELHEADERS

The Association of Northwest Steelheaders works to promote responsible and enjoyable sport angling with good access to healthy, abundant and sustainable fisheries in the Northwest's healthy watersheds.

ACKNOWLEDGEMENTS

Report researched and edited by Peter LaFontaine, Nic Callero, and Patricia Tillmann. Contributors: Kassie Rohrbach, Felice Stadler, Kendall Mackey, Garrit Voggesser, Corey Vezina, Alexis Bonogofsky and Eric Young. We would like to thank our scientific reviewers: Dr. Doug Inkley (NWF), Dr. Michael Murray (NWF), and Dr. Jack Williams (Trout Unlimited). Additionally, several tribes and individuals provided valuable input during the drafting of this report, including the Yakama Nation, Bob Rees, Bruce Jim, and Dr. Frank James.

Report designed by Barbara Raab Sgouros. Map created by GreenInfo Network.

We gratefully thank the Alki Fund and the Energy Foundation for their generous financial support, without which this project would not have been possible.



INSPIRING AMERICANS TO PROTECT WILDLIFE FOR OUR CHILDREN'S FUTURE.



National Wildlife Federation
1100 Wildlife Center Drive
Reston, VA 20190
703-438-6000
www.nwf.org