

Fueling Extinction: How Dirty Energy Drives Wildlife to the Brink



**The Top Ten U.S. Species
Threatened by Fossil Fuels**



Introduction

As Americans, we are living off of energy sources produced in the age of the dinosaurs. Fossil fuels are dirty. They're dangerous. And, they've taken an incredible toll on our country in many ways.

Our nation's threatened and endangered wildlife, plants, birds and fish are among those that suffer from the impacts of our fossil fuel addiction in the United States. This report highlights ten species that are particularly vulnerable to the pursuit of oil, gas and coal. Our outsized reliance on fossil fuels and the impacts that result from its development, storage and transportation is making it ever more difficult to keep our vow to protect America's wildlife.

For example, the Arctic Ocean is home to some of our most beloved wildlife—polar bears, whales, and seals. Our own government has warned that a massive oil spill could result from drilling there. Meanwhile there has been no substantial progress in oil cleanup technology; some scientists liken our current methods to sopping up oil with paper towels. For the threatened bowhead whale, an oil spill could easily wipe out the small remaining population that exists solely in the icy Arctic waters.

The planned Keystone XL pipeline is simply an accident waiting to happen. Transporting oil over 2,000 miles through a half-dozen states is an old-school approach that does not befit a country with our entrepreneurial spirit. Given the size of this project, virtually any route it could take would intersect with threatened or endangered species, as well as put residents and their drinking water at risk from exposure to toxic chemicals.

In Appalachia, hundreds of mountaintops are being blown up to get at the coal underneath, dumping toxic mining waste into nearby streams and impacting drinking water and fish habitat. Not surprisingly, fish such as the threatened Kentucky Arrow Darter and other wildlife find it difficult to live in the environment created by this destructive practice. And, they're not alone. These polluted waterways have been linked to human diseases downstream, such as cancers and birth defects.

So, what have we gained from our nation's unquenchable appetite for fossil fuels?

We certainly do not have more dollars in our pockets. The oil and gas industry is subsidized with huge tax breaks and numerous loopholes. Taxpayers will hand out nearly \$100 billion to oil and gas companies in the coming decades.

The myth that we can lower gas prices with our own oil reserves has been disproved time and again. It is a well-known fact that the United States uses about 22% of the world's oil, but we sit on only 1.5% of proven oil reserves.

That hasn't stopped oil and gas companies from gobbling up permits and leases for millions of acres of our pristine public land, which provides important wildlife habitat and supplies safe drinking water to millions of Americans. And the industry is demanding ever more leases, even though it is sitting on thousands of leases it isn't using—an area the size of Pennsylvania.

Oil companies have generated billions of dollars in profits, and paid their senior executives \$220 million in 2010 alone. Yet ExxonMobil, Chevron, Shell, and BP combined have reduced their U.S. workforce by 11,200 employees since 2005.

The American people are clearly getting the short end of the stick from the fossil fuel industry, both in terms of jobs and in preserving our natural heritage.

The oil, gas and coal industries pour millions into campaign coffers, and some members of Congress have benefited greatly from this largesse. We should not sacrifice our irreplaceable natural resources in order to make politicians and oil companies rich. Nor, do we have to. By continuing to invest in sustainable energy production and practices, we can move away from the fossil fuels produced in the age of the dinosaurs and expand our clean energy economy. Change takes time and progress is occurring. But, we must do more, because an energy-efficient and renewable energy economy is the clear path for the future.

We, as Americans, have a choice to make. Do we continue to invest in unsustainable, destructive fossil fuel production, or do we use American innovation and know-how to support a new energy economy? That decision will shape our country, our natural and wildlife legacy, and even our own health.

Kemp's Ridley Sea Turtle

Scientific Name:

Lepidochelys kempii

Range:

The Gulf coasts of Mexico and the United States and the Atlantic coast of North America.

Conservation Status:

Kemp's ridley sea turtles are listed as endangered under the Endangered Species Act. No designated habitat has yet been set aside for the turtles.

Remaining Population:

About 5,500 nesting females remaining (in 1947, an amateur video shows 43,000 females nesting in one day)

Threat:

The decline of this species occurred primarily due to human activities, including the direct harvest of adults and eggs and incidental capture in commercial fishing operations. Now that egg collection is illegal and turtle excluder devices are required in commercial shrimp trawl nets, the population appears to be in the early stages of recovery. Today, one of the turtle's biggest threats is oil and gas activity.



©NPS



federal government and non-profit conservation groups, and wildlife enthusiasts from across the nation, baby sea turtles are released into the ocean at this national seashore.

Threats From Fossil Fuel Development

Kemp's ridley sea turtles came to the attention of the American public during the BP oil catastrophe. Of all the turtles that were impacted by BP's spill, the Kemp's ridley suffered the highest death toll. A total of 809 Kemp's ridleys were found impacted by the BP oil spill—of those 328 were harmed and 609 were killed. For a species with such low numbers to begin with, that death toll is unacceptable.

This isn't the turtle's first time facing a catastrophic oil spill. The Ixtoc 1 oil spill in 1979 contaminated over 160 miles of U.S. beaches with the 71,500 barrels, requiring the relocation of thousands of Kemp's ridley sea turtles to prevent their death. Their nesting population plummeted to fewer than 500 individuals of the entire species in the aftermath of the Ixtoc 1 spill.

In addition to oil spills, Kemp's ridleys face death from, explosive decommissioning of oil platforms, from the ingestion of debris from offshore oil facilities, and vessel strikes. The turtles also face indirect threats from the expansion of oil and gas operations along nesting beaches and foraging grounds which threaten to destroy nesting, feeding, and migrating areas. In addition, indirect threats occur from the chronic exposure to oil and gas products that poison their environment and from the acoustic disturbance of oil and gas exploration and operations offshore.

A harsh political climate exists for the protection of endangered Kemp's ridleys from the oil and gas industry. In the wake of the BP oil spill, no new protections for sea turtles from oil have been established, either locally or nationally. Our smallest sea turtle remains our most vulnerable to fossil fuel development.

Background

Kemp's ridleys are the smallest species of sea turtle and remain a mystery to scientists. They participate in an amazing natural phenomenon—a synchronized nesting. The turtles gather off a particular nesting beach and then wave upon wave of females come ashore and nest in what is called an "arribada," which means "arrival" in Spanish (with the vast majority of the females participating in an arribada near Rancho Nuevo, Mexico). The answer to what triggers an arribada remains elusive to scientists. These unique sea turtles are the only species that nest during the day, making their arribadas extremely vulnerable to poaching. Kemp's ridleys are the most seriously endangered of all sea turtles. Their unique behavior, limited geographic range, and the deficiency of data specific to this species' physiology, life history, foraging range, and biology make this species very important to scientists.

They're not only interesting to scientists, but to the American public as well. Kemp's ridley sea turtles bring thousands of visitors each year to the upper Texas Coast and the Padre Island National Seashore in southern Texas, providing a significant economic boost to the region. In a successful collaboration between the

Spectacled Eider

Scientific Name:

Somateria fischeri

Range:

Three primary nesting grounds remain: the central coast of the Yukon, Kuskokwim Delta, the Arctic Coastal Plain of Alaska, and the Arctic Coastal Plain of Russia. A few pairs nest on St. Lawrence Island located west of Alaska in the Bering Sea, as well.

Conservation Status:

Listed as a threatened species since 1993. Critical habitat has been designated for the Spectacled Eider starting in 2001.

Remaining Population:

The U.S. population is approximately 3,000-4,000 nesting pairs.

Threat:

Fossil fuel extraction and associated infrastructure is a threat to the Spectacled Eider.



©FWS



Background

Named for the large white "spectacles" around its eyes, the Spectacled Eider's striking look sets them apart from other marine birds.

When they are not nesting, these ducks spend most of the year in the frigid waters of the Arctic, where they eat bottom-dwelling mollusks and crustaceans. During the winter months, these ducks move far offshore to deep waters, where they often gather in dense flocks in openings of nearly continuous sea ice. When nesting, Spectacled Eiders feed on mollusks, insect larvae, midges, small freshwater crustaceans, and plants and seeds in shallow freshwater, brackish ponds, or on flooded tundra.

Threats From Fossil Fuel Development

Historically, Spectacled Eiders nested along much of the coast of Alaska, from the Nushagak Peninsula in the southwest, north to Barrow, east nearly to the Canadian border, and along much of the Arctic coast of Russia. However, climate change and oil and gas development have drastically reduced their habitat range. As a result the western Alaskan population of Spectacled Eiders dropped by 96 percent between 1957 and 1992.

The threat of oil and gas development in and near Teshekpuk Lake, known as an Important Bird area of global significance, is a possible threat to the Spectacled Eider's future.

Representative Doc Hastings' proposed legislation to drill in the National Petroleum Reserve-Alaska could open up the most sensitive areas like Teshekpuk Lake to drilling and lead to the downfall of this threatened species.

Infrastructure and transportation used to extract fossil fuels in the area around Prudhoe Bay is already pushing the Spectacled Eider out of its habitat. Aircraft, vessel traffic, and seismic survey acoustic activities can all negatively impact the Spectacled Eider's habitat and cause deaths of significant numbers of the bird when they collide with manmade objects during their migration.

The Spectacled Eider also faces possible threats from oil and gas development in the Arctic Ocean (which could happen as soon as summer 2012), as there is currently no effective way of cleaning an oil spill in the Arctic sea ice environment. Unlike other sea ducks, Spectacled Eiders appear to remain in only a few areas and become vulnerable during their molting season as they cannot fly away from a hazard. Spectacled Eiders also use long large cracks in the ice where water flows in their migration. If even a small spill reached a spring lead (one of these cracks in the ice), it could kill a substantial number of Spectacled Eiders. An oil spill could easily become treacherous for the Spectacled Eider.

Bowhead Whale

Scientific Name:

Balaena mysticetus

Range:

Bowheads travel close to the edge of the Arctic icepack. The U.S. population of bowhead whales lives off the Alaska coastline—in the Bering, Beaufort, and Chukchi Seas in winter, feeding in the Arctic Ocean in summer.

Conservation Status:

Status: Endangered species

Remaining Population:

Likely to be near 10,000

Threat:

The primary threat to the bowhead is oil and gas development off Alaska's northern coast—with the potential of a spill, increased noise, or deadly collisions with ships the bowhead's population is increasingly threatened. The bowhead's habitat is also affected by global warming which is melting their icy home and reducing their food supply. Secondly, despite a moratorium on non-native hunting, illegal whaling still occurs.



© Martha Holmes/naturepl.com/ARKive.org



coastal Inupiat are strongly opposed to offshore drilling, largely because it can interfere with the migratory patterns and well-being of the bowhead whale." Subsistence harvest is regulated by quotas set by the International Whaling Commission and enforced by the Alaska Eskimo Whaling Commission.

Threats From Fossil Fuel Development

Bowhead whales should be an Endangered Species Act success story. Following the prohibition of commercial whaling, its population rebounded. But, the introduction of oil development off the North Slope of Alaska created a new and dire threat, seriously hindering the progress that has been made in their recovery.

The Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) admitted that a very large spill could occur from drilling in Beaufort or Chukchi Seas if oil drilling is allowed to proceed. Despite this fact and the lack of adequate cleanup processes and technologies for oil spills in the Arctic sea ice environment, BOEMRE has conditionally approved a number of permits for Shell Oil's plan to drill in the Arctic Ocean as soon as summer 2012.

The whale takes in huge quantities of water and then filters out its food. If the bowhead were to feed near an oil slick, the oil would foul its baleen plates and be ingested by the whale. Since these whales surface to breathe, they would likely inhale oil droplets, vapors and fumes. This could damage the whale's mucous membranes or airways or even kill the whale. Despite their size, bowheads are gentle giants. Depending on the timing and location of an oil spill, many would be likely to suffer irreparable harm.

Secondarily, the whales are in danger from noise and deadly collisions with ships. Bowheads have extremely sensitive hearing and may rely on calls for navigating under ice packs. With increased industrialization in the Alaskan Arctic, man-made sounds have increased, and bowheads change course to avoid them. The extent to which noise may impact these whales is still unknown.

Background

The physical presence of the bowhead whale is immense and powerful—almost beyond human comprehension. It grows up to 66 feet long with a massive head making up one-third of its body. Its mouth can be 16 feet long and its tongue weighs one ton. The bowhead is insulated with nearly two feet of blubber! It has a forehead so powerful that it can smash through up to two feet of ice to take a breath.

Believed to be one of the oldest mammals on earth and with one of the longest life spans (more than 100 years), the bowhead is the only whale that spends its entire life in Arctic waters. This significantly restricts its range and viable habitat. Additionally, the bowhead's reproductive cycle is long—females only give birth to one calf every three to four years. These factors increase the risks to this already vulnerable species.

For centuries, bowheads have been integral to the life of Arctic natives. They have used parts of the whales for food, implements, construction and even art. President Obama's Commission on the BP Deepwater Horizon Report stated: "[Bowhead whales] are the most important subsistence animal for the coastal communities of northwest and northern Alaska. . . . No other communal activity involves as high a level of participation. Many

Greater Sage-Grouse

Scientific Name:

Centrocercus urophasianus

Range:

Presently occur in parts of Washington, Oregon, California, Idaho, Utah, Montana, Wyoming, Colorado, North Dakota and South Dakota, and the Canadian provinces of Alberta and Saskatchewan. The species is extirpated from Nebraska, Arizona and British Columbia.

Conservation Status:

The U.S. Fish and Wildlife Service determined greater sage-grouse was “warranted, but precluded” for protection under the Endangered Species Act in March 2010. Both the Bureau of Land Management and the Forest Service list the sage-grouse as a “sensitive species” range-wide.

Remaining Population:

Estimated as low as 142,000. Range-wide abundance has decreased between 69-99 percent from historic levels.

Threat:

Habitat loss and fragmentation from energy development, livestock grazing, agricultural conversion, invasive species, wildfire, urbanization, fences, pipelines and utility corridors.



© Photos.com



ROCKY MOUNTAIN WILD



© Alan St. John

Background

First described by Lewis and Clark in 1805, nineteenth century travelers and settlers reported huge flocks of sage-grouse that darkened the sky as they lifted from valley floors. Today, this charismatic icon of the Sagebrush Sea is sparsely distributed across just half of its historic range.

The sage-grouse is a large, rounded-winged, spike-tailed, ground-dwelling bird, about two feet tall and weighing from two to seven pounds. Females are a mottled brown, black and white. Males are larger and have a large white ruff around their neck and bright yellow air sacks on their chest, which they inflate during their elaborate spring mating displays conducted on breeding areas known as leks. The birds are found at elevations ranging to 9,000 feet and are highly dependent on sagebrush for nesting, cover and feed.

Sagebrush steppe is home to a surprising abundance of flora and fauna that depend on this complex, fragile ecosystem. Sage-grouse are an indicator species for sagebrush habitats. Their continued decline is indication of human mismanagement of the landscape.

Threats From Fossil Fuel Development

Greater sage-grouse are adversely affected by energy development and infrastructure, even when mitigative measures are implemented. The species is affected by direct habitat loss, fragmentation of important seasonal habitats by roads, pipelines and power lines, and human and vehicle-related disturbance. The impacts of energy development often add to the effects of other land uses and development, resulting in marked declines in local sage-grouse populations. For example, 12 years of coalbed methane gas development in the Powder River Basin of Wyoming has coincided with a 79 percent decline in the greater sage-grouse population. In the Jonah and Pinedale Anticline gas fields of western Wyoming, a scientific study in 2005 predicted extirpation of sage-grouse within 19 years if habitat conditions remained constant. Instead drilling has intensified, threatening sage-grouse in the region. Well densities greater than one wellpad per square mile, drilling activity within three miles of leks, as well as the placement of producing gas wells within two miles of leks have all been linked to declines in breeding populations. Negative impacts have been shown to extend as far as four miles from energy development in the Powder River Basin. Population declines associated with energy development results from abandonment of leks (courtship sites), decreased attendance at the leks that persist, reduced nest initiation, poor nest success and chick survival, decreased yearling survival, displacement of sage-grouse (especially yearlings) to habitats beyond the edges of gas fields, and avoidance of energy infrastructure in important wintering habitat.

It is predicted that continued energy exploration and development will increase over the next 20 years. Greater sage-grouse populations are predicted to decline 7 to 19 percent from the effects of oil and gas development in the eastern part of the range, continuing historic population declines range-wide.

Graham's Penstemon

Scientific Name:

Penstemon Grahammi

Range:

Occurs only in the Uinta Basin of eastern Utah and the very edge of northwestern Colorado

Conservation Status:

Candidate species

Remaining Population:

Estimated to be only 5,500 – 7,000 plants

Threat:

Graham's penstemon occurs only on oil shale soils, targeted for oil shale mining and processing. It is also at risk from traditional oil and gas drilling.



© Susan Meyer

Background

Edges, barren and striated, loom over the expanse of the Uintah Basin. Gullies and gaps weave between the plateaus. And interrupting the sea of sagebrush, is the brilliant lavender flower, the *Penstemon Grahammi*—a wildflower, which blooms right on top of the exposed oil shale of Utah's Uintah Basin. On these flaky outcrops of dry stone and rocky soil little else perseveres.

Commonly named Graham's Penstemon, this unique native can be identified by large tubular flowers that typically range from lavender to pale violet with bright orange tongues. It is estimated that a mere 5,500 to 7,000 individuals currently exist, all of them within a very small range of land on the Utah-Colorado border—land that has largely been leased for oil development.

Threats From Fossil Fuel Development

Graham's Penstemon, the beautiful rare flower without quantifiable legal protection since 1975, is threatened by one of the most powerful industries—oil. The flower has the misfortune of being found entirely on oil shale. If oil shale development becomes commercial in eastern Utah, protecting this delicate flower from Shell Oil and others will become increasingly difficult. Almost all the methods being explored to draw oil from stone—the definition of oil shale development—threaten total devastation of the flower. The footprint of this industry on the landscape is massive. Water use for oil shale mining is tremendous—the flowers are alternately at risk of

being starved of water or drowned under new reservoirs. And, since oil shale soils are very unstable, even development adjacent to the flowers could bury or uproot them.

Graham's penstemon is also at risk from traditional oil and gas drilling. Nearly all its known populations are within oil and gas fields with multiple well pads and access roads. *Tens of thousands of well permits have been issued in the flower's habitat* and new oil and gas leases continue to be issued here. Oil and gas drilling destroys habitat: individual flowers are trampled, the fragile habitat is permanently changed, invasive weeds and diseases are introduced, and dust and air pollution are increased.

The flower has also faced a political threat. Utah politicians and the oil industry have been heavy advocates of oil shale development. Under the Energy Act of 2007, oil shale research was actively encouraged, and a federal leasing program was enacted. Pressure was so strong that when the FWS proposed the flower for listing in 2006, the Bureau of Land Management formed what they called their "penstemon no-listing team" to devise information and management schemes to derail the listing. This led to a withdrawal of the listing proposal. Earlier this year a federal court finally directed the FWS to throw out this tainted decision to abandon proposed protections for the wildflower. Clearly it is a species that must move off of the candidate list and be placed on the threatened and endangered species list.

Dunes Sagebrush Lizard

Scientific Name:

Sceloporus arenicolus

Range:

Approximately 1,200 square miles in southeastern New Mexico and western Texas

Conservation Status:

Proposed for listing as "endangered" (December 2010)

Remaining Population:

Unknown

Threat:

The dunes sagebrush lizard is found only in rare shinnery oak-sand dune habitat in southeast New Mexico and western Texas. The lizard has one of the smallest distributions of any lizard in North America. Its narrow range is threatened by extensive oil and gas development in the Permian Basin, which destroys and fragments its habitat.



©Michael T. Hill



Threats From Fossil Fuel Development

Oil and gas extraction is the primary threat to the dunes sagebrush lizard and its habitat. The Permian Basin, at 75,000 square miles, is the largest onshore oil field in the United States. Oil companies have drilled *tens of thousands of oil and gas wells* in the region, including thousands of wells in lizard range. Unfortunately, this lizard is extremely sensitive to habitat disturbance. A single well can reduce its population by almost 50 percent in the surrounding 250 meters. Densities of 30 wells per square mile would reduce lizard populations by 50 percent. Disturbance from well pads, effects from leaking pipelines, and high concentrations of toxic hydrogen sulfide gas emitted from wells all contribute to the decline of dunes sagebrush lizard populations.

In 2001, the U.S. Fish and Wildlife Service (FWS) made the lizard a candidate for listing under the Endangered Species Act because it faced "high magnitude, imminent" threats to its survival, especially from oil and gas drilling. In December 2010, FWS proposed the species for listing as "endangered," noting the lizard's continued decline despite the species' conservation plans.

Unfortunately, congressional opponents have loudly proclaimed that listing will "shut down" oil and gas development in the Permian Basin. Representative Steve Pearce (R-NM-2nd) and colleagues have tried every conceivable tactic to prevent FWS from protecting the species. Pearce's opposition to listing the lizard is without basis, however, as the dunes sagebrush lizard occurs on less than 2 percent of the Permian Basin, and even its tiny range has been drilled with thousands of oil and gas wells. FWS has repeatedly stated that listing the lizard will have negligible effects on oil and gas development—but Pearce and his colleagues are undeterred. He and other members of Congress recently pressured FWS to delay the final listing decision for six months, allowing opponents more time to sharpen their attacks on this tiny reptile.

Background

Slithering amidst spare stands of shinnery oaks and over the scorched sand hills of the Permian Basin, the dunes sagebrush lizard makes its home. The silence and stillness of this land, which befits the incredibly sensitive nerves of this perpetually alert dunes crawler, has become noisier than ever with the grinding hum of oil and gas wells and compressors.

An insatiable insectivore—eating ants, small beetles, crickets, grasshoppers, and spiders—and prey of local vipers, the dunes sagebrush lizard relies on its skittish speed for survival. Incredibly attuned to this harsh landscape, the lizard depends on the shinnery oak—a small, three-to-five foot tree with an extensive root system—for shelter and cover from predators. The dunes sagebrush lizard is so particular about its quarters that even the size of the granules of sand around the base of a shinnery oak impact its decision to stay. It lives in wind-hollowed depressions in sand "blow-outs" within the dunes that are generally a little over 300 centimeters deep and around 30 meters long.

In extreme southeast New Mexico and west Texas, these oaks are often the only vegetation on the horizon. Their increasing sparsity and the proliferation of oil wells on the landscape is responsible for the decline of the lizard's slim, crescent-shaped range to nearly half of what it was in 1982.

Wyoming Pocket Gopher

Scientific Name:

Thomomys clusius

Range:

A small geographic range in Sweetwater and Carbon Counties, Wyoming, with a possible occurrence in northern Colorado. The pocket gopher is believed to be the only vertebrate animal that occurs exclusively in Wyoming.

Conservation Status:

The Wyoming regional offices of the Bureau of Land Management (BLM), USDA Forest Service, Wyoming Game and Fish Department and the Wyoming Natural Diversity Database, list the Wyoming pocket gopher as a species of management concern, but no legislative protections have been extended to this species.

Remaining Population:

The Wyoming pocket gopher population is unknown but assumed to be very limited and to have a very restricted distribution. Since its discovery, in 1875, fewer than 40 individuals have been scientifically documented to exist.

Threat:

Oil and gas development are considered a major threat. Urbanization and road and pipeline construction have fragmented and degraded remaining available habitat, as well as vegetative shifts caused by grazing, drought and global climate change.



© Wyoming Natural Diversity Database



© BLM Rawlins Field Office



© Wyoming Natural Diversity Database

Background

As mysterious as they are secretive, pocket gophers are powerfully built mammals that are strongly adapted to life under the soil, with small ears, small eyes, fur-lined cheek pouches used to carry food, and very strong front limbs with long nails used for digging. They are important in soil development by incorporating organic matter into and aerating soil, thereby promoting water storage in soil during spring runoff.

Little information is known about the Wyoming pocket gopher. Assumptions on its distribution, ecology, and status are based on a handful of museum records and anecdotal reports from over 30 years ago, and there have been only recent systematic surveys for the Wyoming pocket gopher. Recent surveys failed to document gophers at several historic localities, leading to speculation of population declines. The possibility of decline appears quite serious, given that pocket gophers are vulnerable to disturbance due to their highly limited distribution, limited dispersal ability, and uncertain ecology.

Threats From Fossil Fuel Development

In spite of the consensus among the government agencies that the pocket gopher is in need of conservation action, in 2010 the U.S. Fish and Wildlife Service (FWS) determined that insufficient data on pocket gopher population trends is available. Therefore, FWS stated that there may be a possibility that their population density and range had remained unchanged, although they had no way of knowing whether it did or not. Accordingly, FWS determined that the pocket gopher does not warrant Endangered Species Act protection.

Since 2000, the Wyoming BLM has been issuing unprecedented numbers of oil and gas exploration and drilling permits in the range of the pocket gopher, sometimes without even mentioning the pocket gopher in the environmental impact statements generated in the process of issuing these permits. Once under way, these gas and oil field developments degrade pocket gopher habitat with the construction of roads, pipeline and power line infrastructures and well pads. Activities ranging from exploration to extraction adversely impact this pocket gopher's only known habitat. Developing gas and oil fields along with associated truck and other vehicle traffic, over time, results in compacted soil which fragments the gopher's habitat, cutting off potential mating opportunities, potentially leading to harmful inbreeding.

Given the facts that fewer than 40 Wyoming pocket gophers are known to exist and that thousands of oil and gas wells are being planned that will disrupt this rarest of mammal's only known range, the loss of one individual gopher is one loss too many.

Kentucky Arrow Darter

Scientific Name:

Etheostoma sagitta spilotum

Range:

Found only in six counties in eastern Kentucky in the headwaters of the upper Kentucky River Basin

Conservation Status:

Candidate species

Remaining Population:

Unknown

Threat:

Mountaintop removal coal mining threatens the arrow darter throughout its entire range due to the filling in of streams with mining waste and water pollution from erosion and toxins.



© Conservation Fisheries, Inc., conservationfisheries.org



Background

The headwaters of the Kentucky River Basin reach a nexus in the heart of Appalachia: the northern Tennessee and southeastern Kentucky border, where a series of streams and shallow pools swirl and eddy. It is a countryside that seethes with abundance, a biodiversity richer than any on the North American continent. The arrow darter is a native to these creeks and seeps that snake about remote forests. Protecting the darter's habitat would protect habitat for a suite of other rare species, including aquatic insects, crustaceans, fish, salamanders and other amphibians. These species in turn are an important food source for birds, reptiles and mammals of the region.

The darter thrives in shallow pools, migrating to stands of water no deeper than 15 centimeters during the mating season. Darters quiver and dash in elaborate mating rituals. Though typically colored a pale yellow or green, they develop bright spots and stripes of blue, orange, and scarlet to attract their mates.

A subspecies of perch, male arrow darters defend their nests—a behavior that is quite rare in fish. Males establish their territories and defend their eggs until they've hatched.

Threats From Fossil Fuel Development

Mountaintop removal coal mining uses explosives to blast off a mountain's summit—hundreds of vertical feet—to expose the underlying coal. The mining waste is then pushed directly into nearby streams, permanently filling in the streams and poisoning downstream wildlife and human communities. More than 500 mountaintops and 2,000 miles of stream have already been permanently destroyed.

The Kentucky arrow darter is being buried and poisoned for cheap coal. Disturbingly, mountaintop removal occurs throughout the fish's range. There are currently more than 465 active coal-mining permits in the upper Kentucky River basin. The U.S. Fish and Wildlife Service reports that the arrow darter has already been wiped out from more than half of its range. In the most recent survey, the darter was found in only 33 of its 68 historic streams.

Since the Kentucky arrow darter is merely a candidate and hasn't made it to the endangered and threatened species list, it receives no regulatory protection. The Environmental Protection Agency has recently taken steps to attempt to reduce water pollution caused by mountaintop removal in Appalachia, but these efforts are under political attack.

Ironically, while the darter's mountain streams lack legal protection, they provide crucial benefits for humans. Protecting the arrow darter and its habitat would protect drinking water by preserving ecologically critical headwater streams. In some eastern Kentucky counties, more than 20 percent of the land has already been permitted for surface coal mining. Appalachian streams, which have been polluted by coal mining have also been linked to human health impacts, such as increases in cancer and birth defects. For that reason, the remaining headwater streams are of critical importance to the well-being of both the neighboring human communities and wildlife.

There is currently a reintroduction program for the Kentucky arrow darter. Despite this reintroduction effort, habitat that currently supports the darter continues to be lost to surface coal mining. Due to the threats facing this fish, the U.S. Fish and Wildlife Service added the Kentucky arrow darter to the candidate list in 2010 of its own accord. As the result of a legal settlement with the Center for Biological Diversity, the Service has agreed to propose listing the arrow darter in 2015.

Tan Riffleshell

Scientific Name:

Epioblasma florentina walkeri

Range:

Found only in two rivers in Eastern Tennessee and three in southwest Virginia. Unconfirmed populations reportedly found in the Cumberland River in Tennessee.

Conservation Status:

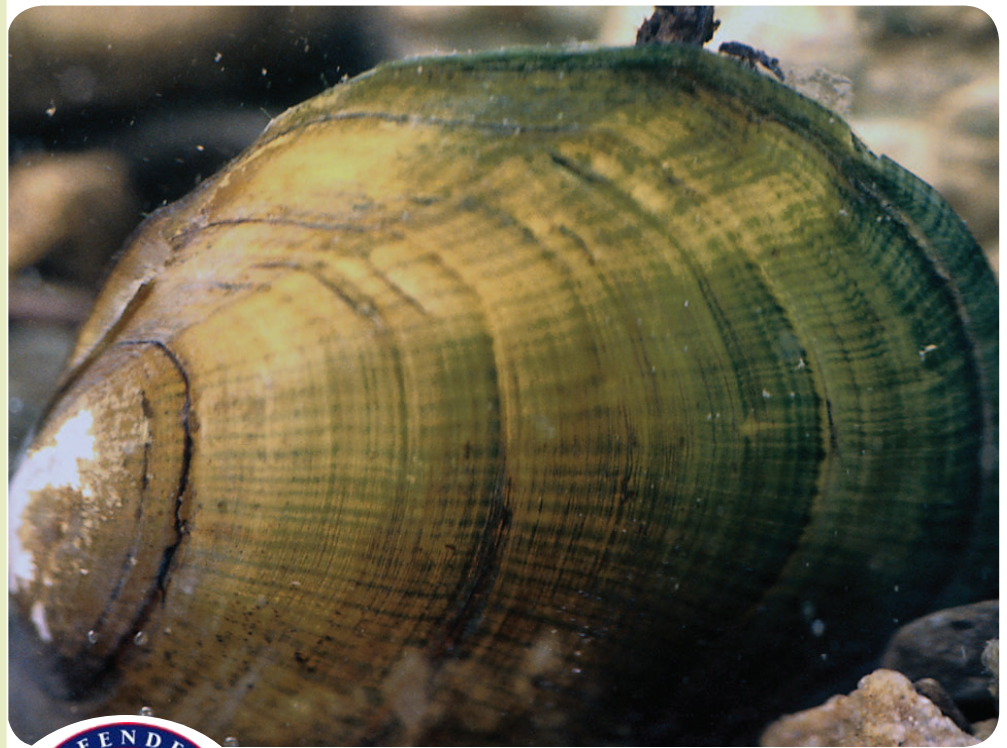
Listed as endangered in 1977. No critical habitat has been designated.

Remaining Population:

The current population is unknown. The 2001 population in Indian Creek was determined to be around 2000 adults.

Threat:

Coal mining, and particularly coal ash, has polluted the rivers where the Tan Riffleshell lives.



©FWS



Background

The tan riffleshell might not look exciting—it is a medium-sized freshwater mussel with a brown to yellow colored shell with numerous green rays. But the decline of this little-known mollusk is proving to have profound effects on Appalachian river habitats.

Freshwater mussels are the proverbial “canary in the coal mine” for America’s rivers and lakes. These tiny shellfish make a living by eating small particles suspended in the water, acting as a filter and producing clean water. So when these “filter feeders” are inundated with sediment and pollution and entire colonies start dying, alarm bells should be going off. Consider that, of the 300 mussel species that once existed in North America, more than 75 are currently considered at-risk of extinction, and 38 have already gone extinct.

Riffleshells of the genus *Epioblasma* are the most endangered genus of unionids in the United States and are on the brink of extinction: 16 of the 25 recognized taxa in the genus were already presumed extinct in 1998, and all but one of the remaining species in the genus are listed as endangered as of 2001. The tan riffleshell may even be the only remaining representative of the genus subspecies *E. florentina*, and therefore represents an important genetic component of the freshwater mussel order *Unionida*.

The only known reproducing population of tan riffleshells can be found on a two-kilometer reach of Indian Creek, a tributary to the Clinch River in southwest Virginia.

Threats From Fossil Fuel Development

The specific threat that led to the species’ listing in 1977 was water quality degradation. At the time of the tan riffleshell’s endangered listing, water quality from mine acid was the main threat to the species’ ongoing existence. In addition, mercury and lead contamination in the middle fork of the Holston, low dissolved oxygen levels in the west fork Stones River, and a history of spills of fly ash and sulfuric acid and heavy metal contamination in the Clinch River are documented pollution concerns for these historic populations. Fossil fuel development impacts were not its only threats. When the Tennessee Valley Authority Dam was built, it killed the remaining populations in the Duck River drainage and invasive species—the Asiatic clam (*Corbicula fluminea*) and the zebra mussel (*Dreissena polymorpha*)—are also likely contributing to its decline.

At this point, these impacts still remain, yet the extent to which the species is affected by the coal industry in particular is notable. The species is being impacted by water pollution due to acid mine drainage and sedimentation from coal mining. Coal ash landfills are contaminating the mussel’s habitat with sulfuric acid and heavy metal contamination. (When coal is combusted to produce energy, it leaves behind a residue that may contain any number of toxins. This is referred to as coal ash.) In the Clinch River watershed in particular – the location of the last remaining reproducing population – both types of coal impacts have threatened the species.

Whooping Crane

Scientific Name: *Grus americana*

Range:

The whooping crane once ranged from the Arctic south to Mexico and from Utah to the East Coast. Due to hunting and habitat loss, today there are only three wild crane populations—a self-sustaining population that nests in Canada and winters in Texas, a population that migrates between Wisconsin and Florida, and a non-migratory Florida population.

Conservation Status:

The whooping crane was protected as one of the first endangered species in 1967.

Remaining Population:

There are 437 wild whooping cranes and 162 cranes in captivity. Due to recovery efforts, the population has grown from only 54 birds in 1967 when the species was protected to 599 birds today.

Threat:

The proposed Keystone XL Pipeline threatens the whooping crane along its migratory route from Canada to Texas. The tar sands oil pipeline threatens the crane with oil spills, toxic waste ponds, and collisions and electrocutions from power lines for the pumping stations.



©FWS



Background

Whooping cranes, North America's tallest birds, are nearly five feet tall and live for more than 30 years. The crane's common name comes from the "whooping" call it makes with its mate. Whooping crane pairs participate in "unison calling"—a kind of bird duet in which the whooping crane couple makes a series of complex calls, which they coordinate with each other. They also dance—bow, jump, run and flap their wings.

Due to Endangered Species Act protection, these majestic red-crowned birds made an amazing comeback from the brink of extinction when only 15 birds survived in 1940. Following decades of effort, whooping cranes are now on the path to recovery, but this success could be erased by the proposed Keystone XL pipeline.

Threats From Fossil Fuel Development

TransCanada's proposed 1,700-mile Keystone XL pipeline would carry crude tar sands oil from Canada to refineries on the Texas Gulf Coast. This pipeline would follow the migration of the endangered whooping crane for nearly its entire route, threatening the whooping crane in its nesting grounds in Canada and all along its migratory flyway. The pipeline threatens the crane with toxic tailings ponds and potential oil spills.

Furthermore, the Keystone XL pipeline requires the installation of power lines to supply power to pumping stations. The power lines pose a serious threat from collision and electrocution to whooping cranes and other migratory birds. Power lines are already the largest known cause of death for migrating whooping cranes.

Yet, the fossil fuel industry is intent on building the disastrous pipeline as soon as possible, and their allies in Congress are pushing the project forward without adequate environmental review. The companion bills passed by Congress in late December 2011 extending payroll tax cuts and jobless benefits included a rider forcing President Obama to make a decision on the pipeline's approval by February 21. The pipeline would be a disaster not only for the whooping crane, but also for other endangered species, rivers, and the drinking water of millions of Americans.



© State of South Dakota

American Burying Beetle

Once found in 35 central and eastern states and Canada, the American burying beetle has been lost from more than 90 percent of its historic range and today survives only in a handful of states. The American burying beetle is North America's largest carrion-feeding insect. An impressive 1.6 inches long and weighing as much as an adult hummingbird, the shiny black and red-orange American burying beetle plays a key role in nature as a decomposer.

The American burying beetle was threatened in the heart of its remaining range by the proposed Keystone XL pipeline. Due to successful activism, the proposed pipeline route has been moved and would now avoid the core of the beetle's range. Aside from Keystone, the beetle is also unfortunately still threatened by oil and natural gas development in Oklahoma, Arkansas, and Kansas.

Activist's Choice Award: In addition to the ten species that our scientists chose, we asked our activists to vote for the species that they were most concerned about. The polar bear won.

Polar Bear

Scientific Name: *Ursus maritimus*

Range: Northern polar region

Conservation Status:

Global population listed as threatened.

Remaining Population:

Scientists estimate that there are 3,500 in the United States and between 20,000-25,000 in the world.

Threat:

Polar bears, struggling from sea-ice habitat loss due to climate change, face threats from ongoing and imminent oil and gas development in the Arctic.



© USFWS



© USFWS



Recent years have brought immense political pressure for offshore oil drilling in polar bear habitat. As industrial activity increases, so does the risk of a catastrophic oil spill. Shell Oil is asking the federal government for permission to drill in the Arctic Ocean as soon as summer 2012.

There is no way to clean up an oil spill in icy Arctic waters, and during certain times of the year, any response may be impossible. Therefore, a large-scale oil spill could continue over many months, if not years. If a large spill reached polar bears along the coasts or on land waiting for sea ice to return, it could harm them in large numbers.

In considering a small-scale spill, the U.S. Fish and Wildlife Service (FWS) estimates up to eight percent of the Southern Beaufort Sea polar bears could be oiled. Given more realistic spill scenarios, a larger number of bears could be immediately impacted. And, the inability to quickly contain or clean up a spill would magnify the long-term impact, potentially killing large numbers of bears.

Even in the absence of an oil spill, daily oil and gas activities negatively impact polar bears. Seismic testing, icebreaking activities, aircraft flights, and ship activity disturb polar bears, and their ice seal prey. Proposed Marine Mammal Protection Act regulations for oil and gas activities in the Beaufort Sea demonstrate these impacts: as many as 150 polar bears per year may experience distress from oil and gas activities in the Beaufort Sea alone, and as much as 20 percent of the Southern Beaufort Sea population of polar bears could be impacted by industry operations in the next two years. Given that we already see starving and drowning polar bears, this additional stressor is gravely dangerous for polar bears.

In addition, Congress continues to push legislation to open the Coastal Plain of the Arctic National Wildlife Refuge to oil and gas drilling. The Coastal Plain is the most significant onland denning site for polar bears in the United States.

The oil industry has not proven it can develop in the Arctic responsibly. The Prudhoe Bay area, just west of the Arctic Refuge, is currently our nation's largest industrial site and experiences an average of an oil spill per day.

Background

The Arctic's most iconic species, the polar bear has become the poster child for the melting Arctic ice cap. This apex predator of the Arctic is in a fight it cannot win on its own. So uniquely adapted to the Arctic that only its breath is detectable by infrared photography, the polar bear evolved to exploit the Arctic sea ice and is completely dependent upon sea ice for survival.

Threats From Fossil Fuel Development

The polar bear was the first mammal listed as threatened based solely on climate change threats. Reducing greenhouse gases that lead to global warming, which in turn are melting the polar ice caps, is one of the most important problems facing the governments of the world today. Scientists have noted an increase in drowning and starvation in polar bears as the sea ice melts.

Potential oil spills are also a severe threat to polar bears. A polar bear cannot regulate its body temperature when its coat is covered in oil. And, if the bear ingests the oil while grooming, it could die. Furthermore, ice seals, polar bears' primary prey, are vulnerable to oiling and could pass contaminants to bears.

Acknowledgments

Endangered Species Coalition member groups from across the country submitted nominations for species that are threatened by fossil fuel development and transportation. We would like to thank each of these individuals for their submissions and/or for editing (and in some cases writing) the species profiles. Many thanks go to:

Alaska Wilderness League: Jessica Chute, Gwen Dobbs, Liz Vandenzen

Biodiversity Conservation Alliance: Duane Short, Erik Molvar
Center for Biological Diversity: Tierra Curry, Noah Greenwald, Catherine Kilduff, Rebecca Noblin

Defenders of Wildlife: Greg Buppert, Adam Kron

Hoosier Environmental Council: Tim Maloney

Rocky Mountain Wild: Josh Pollock, Megan Mueller

Sea Turtle Restoration Project: Carole Allen, Chris Pincetich, Ph.D.

Wildearth Guardians: Mark Salvo

Our thanks go to Peggy Meehan of High Noon Communications (www.highnooncommunications.com) who received and coordinated species submissions, prepared them for the judges' review and tallied judges' scores.

We were very fortunate to have our board member, Jan Randall, Professor Emeritus of Biology at San Francisco State University, organizing the judging by our Scientific Advisory Committee (SAC). As always, the judges were knowledgeable, insightful, and wonderfully supportive of the work. In addition to Jan, our SAC includes: Jean Brennan, Ph.D., Research Associate, Virginia Tech, Conservation Management Institute, Richard Buchholz, Ph.D., Associate Professor of Biology, University of Mississippi, Gregory S. Butcher, Ph.D., Director of Bird Conservation for the National Audubon Society, Sylvia Fallon, Ph.D., Staff Scientist, Natural Resources Defense Council, Francesca Grifo, Ph.D., Senior Scientist and Director, Scientific Integrity Program, Union of Concerned Scientists, David Inouye, Ph.D., Professor and Director, CONS program, Department of Biology, University of Maryland, Gary Meffe, Ph.D., Professor, Department of Wildlife Ecology and Conservation, University of Florida, Camille Parmesan, Ph.D., Associate Professor of Integrative Biology, University of Texas, and Peter H. Raven, Ph.D., Director of the Missouri Botanic Garden.

Endangered Species Coalition staff members and contractors Elizabeth Fernandez, Derek Goldman, Mitch Merry, and Tara Thornton put an incredible amount of work into this report—writing, tracking down photographs, and coordinating the media.

Finally, we are grateful to our designer, Annemarie Feld from Feld Design (www.felddesign.com) who produced a beautiful and organized report.

References and Resources

Kemp's Ridley Sea Turtle:

1. National Marine Fisheries Service, U.S. Fish and Wildlife Service, and SEMARNAT. 2010. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. National Marine Fisheries Service. Silver Spring, Maryland
2. NMFS 2007. Endangered Species Act - Section 7 Consultation Biological Opinion, Gulf of Mexico Oil and Gas Activities: Five-Year Leasing Plan for Western and Central Planning Areas 2007-2012.
3. NMFS, 2003. Oil and Sea Turtles, BIOLOGY, PLANNING, AND RESPONSE.
4. Hall, R. J., A. A. Belisle, and L. Sileo. 1983. Residues of petroleum hydrocarbons in tissues of sea turtles exposed to the Ixtoc I oil spill. *J. Wildl. Diseases* 19(2): 106-109.
5. <http://www.nmfs.noaa.gov/pr/health/oilspill/turtles.htm>
6. Jernelöv, Arne; Lindén, Olof (1981). "The Caribbean: Ixtoc I: A Case Study of the World's Largest Oil Spill". *Ambio* (Allen Press for the Royal Swedish Academy of Sciences) 10 (6): 299-306.

Spectacled Eider:

1. U.S. Fish & Wildlife Service, Alaska Region, Spectacled Eider Factsheet, http://alaska.fws.gov/media/SpecEider_FactSheet.htm
2. Biological Opinion For Chukchi Sea Planning Area Oil And Gas Lease Sale 193 And Associated Seismic Surveys And Exploratory Drilling, Consultation with the Minerals Management Service - Alaska OCS Region Anchorage, Alaska, March 2007, http://www.alaska.boemre.gov/ref/BioOpinions/BO193/bo_193_1thru5.pdf.

Bowhead Whale:

1. American Cetacean Society Fact Sheet, Bowhead Whale, <http://www.acsonline.org/factpack/bowhead.htm>.
2. NOAA Fisheries Office of Protected Resources, <http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/bowheadwhale.htm>.
3. Rozell, Ned. Bowhead Whales May Be the World's Oldest Mammals, *Alaska Science Forum*, Article #1529, Feb 15, 2001.
4. Palumbi, S. R., C. S. Baker, and F. Cipriano. Molecular genetic identification of whale and dolphin products from commercial markets in Korea and Japan. *Molecular Ecology: Volume 5, Issue 5*, pp 671-685, Oct 1996.

Greater Sage Grouse:

1. The U.S. Fish and Wildlife Service designated the greater sage-grouse as a candidate species under the Endangered Species Act in March 2010 (75 Fed. Reg. 13910, www.sagebrushsea.org/sage_grouse_listing_decision.htm).
2. WildEarth Guardians' species settlement agreement with the Fish and Wildlife Service, www.wildearthguardians.org/site/PageServer?pagename=priorities_wildlife_ESA_listing_milestone
3. Aldridge, C. L., S. E. Nielsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, M. A. Schroeder. 2008. Range-wide patterns of greater sage-grouse persistence. *Diversity and Distrib.* 14(6): 983-994.
4. Connelly, J. W., M. A. Schroeder, A. R. Sands, C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. *Wildl. Soc'y Bull.* 28(4): 967-985.
5. Knick, S. T. and J. W. Connelly. 2011a. Greater sage-grouse and sagebrush: an introduction to the landscape in S. T. Knick and J. W. Connelly (eds). *Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats*. Studies in Avian Biol. Series, vol. 38. Univ. Calif. Press. Berkeley, CA.
6. Knick, S. T. and J. W. Connelly (eds). 2011b. *Greater Sage-Grouse: Ecology and Conservation of a Landscape Species and Its Habitats*. Studies in Avian Biol. Series, vol. 38. Univ. Calif. Press. Berkeley, CA.
7. Knick, S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, W. M. Vander Haegen, C. van Riper. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. *3 Condor* 105(4): 611-634.
8. Patterson, R. L. 1952. *THE SAGE GROUSE IN WYOMING*. Sage Books, Inc. Denver, CO.
9. Rich, T., and B. Altman. 2001. Under the sage grouse umbrella. *Bird Cons.* 14: 10.
10. Rowland, M. M., M. J. Wisdom, L. H. Suring, C. W. Meinke. 2006. Greater sage-grouse as an umbrella species for sagebrush-associated vertebrates. *Biol. Cons.* 129: 323-335.
11. Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, J. W. Connelly, P. A. Deibert, S. C. Gardner, M. A. Hilliard, G. D. Kobriger, S. M. McAdam, C. W. McCarthy, J. J. McCarthy, D. L. Mitchell, E. V. Rickerson, S. J. Stiver. 2004. Distribution of sage-grouse in North America. *Condor* 106: 363-376.
12. Connelly, J. W., S. T. Knick, M. A. Schroeder, S. J. Stiver. 2004. Conservation assessment of greater sagegrouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies. Cheyenne, WY. (July 22, 2004).
13. Doherty, K. E., D. E. Naugle, B. L. Walker, and J. M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. *J. Wildl. Manage.* 72(1): 187-195.
14. Holloran, M. J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming. PhD Dissertation, Univ. of Wyoming. Laramie, WY.
15. Knick, S. T. and J. W. Connelly (eds). 2011b. *Greater Sage-Grouse: Ecology and Conservation*

of a Landscape Species and Its Habitats. Studies in Avian Biol. Series, vol. 38. Univ. Calif. Press. Berkeley, CA.

- Walker, B.L., D.E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. *J. Wildl. Manage.* 71(8): 2644–2654.
- WildEarth Guardians' Shrinking Sagebrush Sea Report available at: http://www.wildearthguardians.org/support_docs/report_sagebrush-sea_10_08.pdf.

Graham's Penstemon

- Kreckel, Ken. Oil and Gas Potential, Available at: http://www.fws.gov/filedownloads/ftp_region6_upload/FOIA%20READING%20ROOM/FOIA%202008/penstemon%20grahamii/Emails%20%26%20comments/20060517%20Full%20Report%20Penstemon.pdf.
- Center for Native Ecosystems and Utah Native Plant Society comments submitted to U.S. Fish and Wildlife Service, May 2006, on the proposed Threatened listing of and designation of critical habitat for *Penstemon grahamii*. Available at: <http://stopextinction.org/images/topten/Graham%27s%20Penstemon%20-Rocky%20Mountain%20Wild%20%28Pollock%29%20-%20Attachment%202%20-%20Rocky%20Mountain%20Wild%20CNEUNPSreopenedcomments.pdf>.

Dunes Sagebrush Lizard:

- Taylor, P. 2011. ESA Rider Averted, but Some Species Remain in Cross Hairs. *New York Times*. July 29, 2011. Available at: <http://www.nytimes.com/gwire/2011/07/29/greenwire-esa-rider-averted-but-some-species-remain-in-c-75822.html>.
- U.S. Fish and Wildlife Service (FWS). 2010. Endangered and Threatened Wildlife and Plants; Endangered Status for Dunes Sagebrush Lizard, Proposed Rule. December 14, 2010. 75 FR 77801.
- Center for Biological Diversity (CBD). 2011. Press Release: New Mexico Congressman Relies on Misinformation to Halt Protection for Endangered Species. July 29, 2011. Available at: http://www.biologicaldiversity.org/news/press_releases/2011/pearce-07-29-2011.html.
- Laurencio, D., L. R. Laurencio, L. A. Fitzgerald. 2007. Geographic distribution and habitat suitability of the sand dune lizard (*Sceloporus arenicolus*) in Texas. Final report, Texas Coop. Wildlife Collections. Texas A&M University, Department of Wildlife and Fisheries Sciences. (Sept. 30, 2007).
- Sias, D. S., and H. L. Snell. 1998. The sand dune lizard *Sceloporus arenicolus* and oil and gas development in southeastern New Mexico. Final report of field studies 1995–1997, New Mexico Department of Game and Fish (Contract #80–516.6–01).
- WildEarth Guardians. 2008. Request for Emergency Listing of the Sand Dune Lizard (*Sceloporus arenicolus*) under the Endangered Species Act. WildEarth Guardians. Santa Fe, NM.

Wyoming Pocket Gopher:

- Wyoming pocket gopher was listed as a sensitive species in Region 2 (USDA Forest Service 2005, <http://www.fs.fed.us/r2/projects/scp/assessments/index.shtml>).
- Wyoming's Comprehensive Wildlife Conservation Strategy (Wyoming Game and Fish Department 2005).
- Genetics of the Wyoming pocket gopher, *Thomomys clusius*. FINAL REPORT Mar-2010, WGF D Agreement # 001021. David B. McDonald, Thomas L. Parchman, Dept. Zoology & Physiology, University of Wyoming, 1000 E University Ave Dept 3166, Laramie, WY 82071 dbmcd@uwyo.edu) (WYNDD, 2009 and 2010)(Hayden-Wing Associates LLC, 2010). See Reports Online at: <http://uwadmnweb.uwyo.edu/wyndd/info.asp?p=7531>
- WYNDD Conservation Status Assessment, 2006). Online at: <http://uwadmnweb.uwyo.edu/wyndd/info.asp?p=7531>
- Record of Decision (ROD) documents the Wyoming State Director's decision to approve the preferred alternative as described in the Atlantic Rim Natural Gas Field Development Project (ARNG) Final Environmental Impact Statement (FEIS).
- General References are available at: <http://stopextinction.org/images/topten/Wyoming%20Pocket%20Gopher%20-%20Biodiversity%20Conservation%20Alliance%20%28Short%29%20-%20Attachment%201%20General%20References.pdf>

Kentucky Arrow Darter

- Ahern, M.M., M. Hendryx, J. Conley, E. Fedorko, A. Ducatman, and K.J. Zullig. 2011. The association between mountaintop mining and birth defects among live births in central Appalachia, 1996–2003. *Environmental Research* 2011. In Press. doi:10.1016/j.envres.2011.05.019.
- Bernhardt, E.S. and M.A. Palmer. 2011. The environmental cost of mountaintop mining valley fill operations for aquatic ecosystems of the Central Appalachians. *Annals of the New York Academy of Sciences* 1223: 39–57. Available at: http://www.palmerlab.umd.edu/Bernhardt_and_Palmer_2011.pdf.
- Etnier, D.A. and W.C. Starnes. 1993. *The Fishes of Tennessee*. The University of Tennessee Press, Knoxville, Tennessee. 681 pp.
- Herrig, J. and P. Shute. 2002. Chapter 23: aquatic animals and their habitats. Southern Region, USDA Forest Service and Tennessee Valley Authority. 45 pp. In: Wear, David N.; Greis, John G., eds. 2002. Southern forest resource assessment. Gen. Tech. Rep. SRS–53. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 635 pp. Available at: www.srs.fs.usda.gov/sustain/report/pdf/chapter_23e.pdf.
- Hitt, N.P. and M. Hendryx. 2010. Ecological integrity of streams related to human cancer mortality rates. *EcoHealth* 2010. DOI: 10.1007/s10393-010-0297-y.

- Kentucky State Nature Preserves Commission. 2005. Rare and extirpated biota of Kentucky. (pdf file available at: www.naturepreserves.ky.gov). 19 pp.
- Meyer, J.L., D.L. Strayer, J.B. Wallace, et al. 2007. The contribution of headwater streams to biodiversity in river networks. *J. Am. Water Resour. Assoc.* 43: 86–103.
- Petranka, J.W. 1998. *Salamanders of the United States and Canada*. Smithsonian Institution Press. Washington D.C. 587 pp.
- Rabeni, C.F. 1992. Habitat evaluation in a watershed context. In *Fisheries Management and Watershed Development*. R.H. Stroud (ed.). Symposium 13, American Fisheries Society, Bethesda, MD, p. 57–67.
- U.S. Environmental Protection Agency (EPA). 2009. Memo to U.S. Army Corps of Engineers Huntington District. Permit Number 199800436–3 Mingo Logan Coal Company Spruce Number One Surface Mine. September 3, 2009. Available at: <http://wvgazette.com/static/coal%20tattoo/sprucesept2009letter.pdf>.
- U.S. Fish and Wildlife Service (FWS). 2010. Species Assessment and Listing Priority Assignment Form. *Etheostoma sagitta spilatum* Gilbert. Available at: http://ecos.fws.gov/docs/candidate/assessments/2010/r4/E0BF_V01.pdf.
- U.S. Government Accountability Office (GAO). 2009. Surface Coal Mining: Characteristics of Mining in Mountainous Areas of Kentucky and West Virginia. GAO 10–21. December 2009. Available at: <http://www.gao.gov/new.items/d1021.pdf>.
- Wallace, J.T.; Webster, J.R.; Lowe, R.L. 1992. High gradient streams of the Appalachians. In: *Biodiversity of the Southeastern United States, aquatic communities*. New York: John Wiley: 133–191.
- Ward, K., Jr. 2011. House set to vote on Rep. Nick Rahall's 'race to the bottom' EPA water pollution legislation. July 13, 2011. Available at: <http://blogs.wvgazette.com/coalattoo/2011/07/13/house-set-to-vote-on-rep-nick-rahalls-race-to-the-bottom-epa-water-pollutionlegislation/>.

Tan Riffleshell

- Buchanan, A.C. 1993. The status of the Curtis Pearlymussel, *Epioblasma florentina curtisii*, in Missouri. Final Report to US Fish and Wildlife Service. Great Lakes Regional Office, USFWS, Twin Cities, Minnesota.
- Haag, W.R., and M.L. Warren. 1998. Role of ecological factors and reproductive strategies in structuring freshwater mussel communities. *Canadian Journal of Fisheries and Aquatic Science* 55:297–306.
- Turgeon, D.D., J.F. Quinn, A.E. Bogan, E.V. Coan, F.G. Hochberg, W.G. Lyons, P.M. Mikkelsen, R.J. Neves, C.F.E. Roper, G. Rosenberg, B. Roth, A. Scheltema, F.G. Thompson, M. Vecchione, and J.D. Williams. 1998. Common and scientific names of aquatic invertebrates from the United States and Canada: mollusks. 2nd edition. Special Publications 26. American Fisheries Society, Bethesda, Maryland.
- Rogers, S.O., R.T. Watson, and R.J. Neves. 2001. Life history and population biology of the endangered tan riffleshell (*Epioblasma florentina walkerii*) (Bivalvia: Unionidae). *Journal of the North American Benthological Society*. 20(4): 585–594.
- FWS, Tan Riffleshell, http://www.fws.gov/ecos/ajax/docs/life_histories/F010.html.
- Wild South, Tan Riffleshell Mussel, <http://www.wildsouth.org/index.php/species-spotlight/30-tan-riffleshell-mussel>.

Whooping Crane:

- International Crane Foundation, <http://www.savingcranes.org/whoopingcrane.html>.
- "Keystone XL Pipeline Would Threaten Highly Endangered Whooping Cranes," Society for Conservation Biology, Press Release, August 24, 2011.
- Nebraska Wildlife Federation Comments on the Keystone XL Draft Supplemental Environmental Impact Statement, June 6, 2011, 6 pgs.
- U.S. Geological Survey. 2010. The Whooping Crane: Return from the Brink of Extinction. Available online at http://whoopers.usgs.gov/publications/CraneInfoSheet_4pp.pdf. Accessed October 5, 2011.
- International Crane Foundation. 2011. Historic Whooping Crane Numbers. Baraboo, WI. Available online at <http://www.savingcranes.org/whooping-crane.html>. Accessed October 7, 2011.

Polar Bear (CBD):

- Amstrup, S.C. 2003. Polar bear *Ursus maritimus*. Pp. 587–610 In: *Wild Mammals of North America Biology Management, and Conservation* (Feldhamer, G.A., B.C. Thompson, and J.A. Chapman (eds.)). The Johns Hopkins University Press, Baltimore, Maryland, USA.
- Center for Biological Diversity, Petition to List the Polar Bear (2005) available at http://www.biologicaldiversity.org/species/mammals/polar_bear/pdfs/15976_7338.pdf
- Final Rule, Determination of Threatened Status for the Polar Bear (*Ursus maritimus*) Throughout Its Range, 73 Fed. Reg. 28212 (May 15, 2008).
- Final Rule, Designation of Critical Habitat for the Polar Bear (*Ursus maritimus*) in the United States, 75 Fed. Reg. 76086 (Dec. 7, 2010)
- Amstrup, S. C., E. T. DeWeaver, D. C. Douglas, B. G. Marcot, G. M. Durner, C. M. Bitz, and D. A. Bailey. 2010. Greenhouse gas mitigation can reduce sea-ice loss and increase polar bear persistence. *Nature* 468:955–960.
- For detailed information about oil and gas impacts to polar bears, including impacts to bears from contact with oil, see Center for Biological Diversity, Petition to List the Polar Bear (2005), available at http://www.biologicaldiversity.org/species/mammals/polar_bear/pdfs/15976_7338.pdf.

This report has been developed by



In partnership with



ROCKY MOUNTAIN WILD



Endangered Species Coalition • 240.353.2765 • www.stopextinction.org