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Oil and Gas Development Transforming North American Landscapes

Accelerated drilling activity is transforming significant portions of North America's natural landscapes. University of Montana scientists recently released the first broad-scale evaluation of oil and gas industry impacts on landscapes across the U.S. and Canada, including Alberta.

Alberta Wilderness Association (AWA) is renewing its call for development limits in sensitive forest and grassland ecosystems and for expanded protected areas networks.

Published in the prestigious journal *Science* on April 24, 2015, "[Ecosystem services lost to oil and gas in North America](#)" concludes that oil and gas development creates significant vegetation loss across broad swaths of North America.

The authors examined an expansive area from the south coast of Texas to northern Alberta. University of Montana lead author Brady Allred states: "When we look at this continental scale picture, we see impacts and degradation that are missed when focusing only at a local scale [and] we see how present policies may potentially compromise future ecosystem integrity over vast areas."

Biomass accumulation has been reduced significantly by the oil and gas industry. Net primary production - which is the amount of carbon fixed by plants and accumulated as biomass - is a fundamental ecosystem service forming the basis for all life, including human food production, biodiversity, and wildlife habitat. Oil and gas activity is removing large amounts of vegetation to construct well pads, roads, pipelines and processing facilities. From 2000 to 2012 the scientists' estimates reveal that oil and gas development removed approximately 5 million animal unit months (the amount of forage needed for one animal for 1 month) of rangeland vegetation, more than half of the annual available grazing on public lands managed by the US Bureau of Land Management.

Fragmentation and habitat loss disrupt wildlife migration, increase wildlife mortality, alter wildlife behavior and assist non-native and harmful invasive plant species. University of Montana co-author Dave Naugle says: "We've known about the impacts of oil and gas development for years, but we now have scientific data from a broad regional scale that tells us we need to act now to balance these competing land uses."

Water is being significantly impacted. The study summary notes: "Nearly half of wells drilled are in extreme or high-water-stress regions. High volume hydraulic fracturing uses 2 million to 13 million gallons of water per well, intensifying competition among agriculture, aquatic ecosystems and municipalities for water resources." Carolyn Campbell, AWA conservation specialist, says: "Water use by Alberta's oil, gas and oil sands industries is poorly monitored in many areas, without managing cumulative impacts to groundwater, streams, wetlands and threatened native fish."

Co-author Julia Haggerty of Montana State University emphasizes the need for "a policy framework that





quantifies and weighs major tradeoffs at large scales because current policy does not address both assessment and future mitigation adequately.”

University of Montana co-author Steve Running warns: “We must have policies that ensure reclamation of this land after production has ended. Otherwise, by 2050, tens of millions of acres of land will be permanently degraded.”

New drilling technologies have enabled a massive expansion of oil and gas development with 50,000 new wells drilled per year recently in central North America.

AWA has raised many of the same concerns outlined in this study regarding expanding oil and gas developments in Southeastern Alberta, Milk River Ridge, Swan Hills, Little Smoky-Red Rock-Prairie Creek and Oil Sands areas. The impacts are already acutely demonstrated by vanishing populations of Caribou and Greater Sage-grouse, but the larger issues of vegetation loss and stress on freshwater ecosystems have also been highlighted.

Cumulative effects continue to be ignored by Alberta's policy-makers and regulators alike and there are no triggers or limits established for land disturbance in most areas of Alberta.

Cliff Wallis, AWA Secretary-Treasurer, noted: "We need better protection for Alberta's endangered forests and grasslands or our grandchildren may never have a chance to see sage grouse or caribou in the province."

The complete article can be found at:

<http://www.sciencemag.org/content/348/6233/401.full>

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