RECLAMATION
IN ALBERTA'S FOOTHILLS

WHEN A WELL IS NO LONGER ECONOMICALLY PRODUCTIVE, IT IS ABANDONED AND THE LAND IS RETURNED TO A SUSTAINABLE LANDSCAPE THROUGH THE PROCESS OF RECLAMATION.

IT TAKES APPROXIMATELY FIVE YEARS TO FULLY RECLAIM THE LAND – FROM CAPPING THE WELL AND REMOVING EQUIPMENT, TO REPLACING THE SOIL AND REPLANTING NATIVE VEGETATION.

RECLAMATION
IN ALBERTA'S FOOTHILLS

A GOVERNMENT RECLAMATION CERTIFICATE IS ISSUED WHEN THE WORK MEETS LANDOWNER APPROVAL AND REGULATORY REQUIREMENTS.

Shell's Decommissioning, Abandonment and Reclamation team, or DAR, proactively manages the decommissioning, environmental assessment and remediation of our assets to meet the expectations of our regulators and our community.

We restore sites with native vegetation, trees and shrubs so that they match the surrounding areas, sustain the land use and truly reduce our footprint.

Photo provided by Sinclair Imagery Inc.

STAGES OF OIL AND GAS DEVELOPMENT

IDENTIFICATION OF THE RESOURCE
- Data from geological surveys
- Identification of conceptual play
- Geological compilation

ACQUIRE TENURE
- Consultation
- Call for nominations and bids
- Environmental assessment
- Regulatory and development license

COMMERCIAL DEVELOPMENT AND PRODUCTION
- Vertical wells
- Multi-well pads
- Gathering pipelines
- Facilities

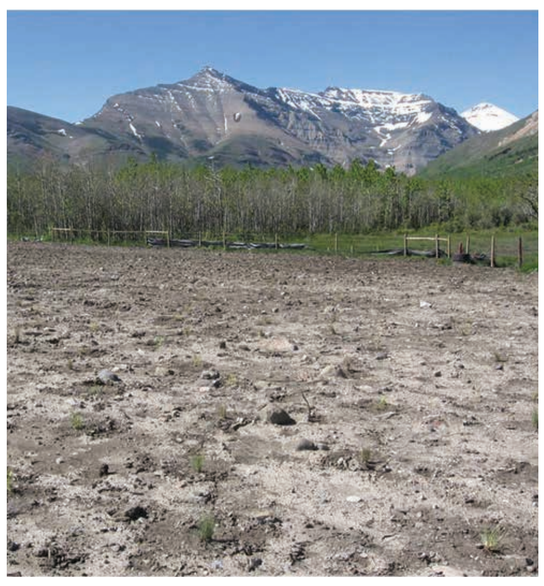
ASSET RETIREMENT AND RECLAMATION
- Prepare hole for abandonment
- Removal of infrastructure
- Remediate and reclaim

WATERTON 9

RECLAMATION THAT FITS THE NEEDS OF SHELL'S NEIGHBORS

ORIGINALLY, SHELL PROPOSED TO RECLAIM THE WATERTON 9 SITE TO ITS PRE-DISTURBANCE ENVIRONMENT OF, PREDOMINANTLY, ASPEN TREES.

However Alberta Environment and Sustainable Resource Development (AESRD) indicated the site should be reclaimed to grassland to meet the range improvement objectives of the Integrated Resource Plan.



LIFECYCLE:

- Spudded September 1959
- Abandoned September 1978

REMEDIATION TIME:

- 3 years

RECLAMATION STRATEGY:

- Recontoured and reseeded with native seed mix including junegrass, western wheatgrass, rough fescue, green needlegrass and awned wheatgrass
- 14,000 plugs of rough fescue and Parry's oatgrass were also transplanted on the lease

CURRENT STATUS:

- Reclamation certification application submitted to AESRD in December 2012

BURNT TIMBER 15

A RECLAMATION CERTIFICATE IS ISSUED

ALBERTA'S ENVIRONMENTAL PROTECTION AND ENHANCEMENT ACT REQUIRES INDUSTRY TO CONSERVE AND RECLAIM SITES THAT ARE NO LONGER ECONOMICALLY PRODUCTIVE.

Operators must apply for a reclamation certificate from the Alberta Energy Regulator (AER), which includes a complete assessment of soils and groundwater. If contamination is present, the site is remediated to meet Alberta Environment criteria and a report detailing how the contaminants were remediated is submitted in the application and to the landowner. If AER standards are met, the operator is issued a reclamation certificate.

WELL LIFECYCLE:

- Spudded 1977
- Abandoned 2005

REMEDIATION TIME:

- 1 year

REMEDIATION STRATEGY:

- Bio-remediated drilling sump soils on site

RECLAMATION STRATEGY:

- Total natural recovery of vegetation
- Grizzly bear habitat enhancement, such as bearberry planting

CURRENT STATUS:

- Reclamation certificate awarded in 2011

LIMESTONE CREEK

RECLAIMING SHELL ACCESS ROADS

SHELL DOESN'T JUST RECLAIM THE SITE OF AN ABANDONED WELL; WE ALSO RECLAIM THE SITE'S ACCESS ROAD TO ENSURE WE MINIMIZE OUR FOOTPRINT.

Photo provided by Sinclair Imagery Inc.

WELL LIFECYCLE:

- Spudded August 1997
- Abandoned 2011

REMEDIATION TIME:

- No remediation on site required

RECLAMATION STRATEGY:

- Recontoured and reclaimed in 2012
- Transplanted naturally recovered trees and shrubs from the lease edges, log decks and ditches to the reclaimed area
- Natural recovery of grasses and other vegetation

CURRENT STATUS:

- Continue monitoring until vegetation is established

BEARBERRY

THE PLANT THAT WAS

THE BEARBERRY DEMONSTRATION GAS PLANT WAS BUILT TO DEVELOP EXPERTISE IN THE MANAGEMENT OF ELEMENTAL SULPHUR IN GAS STREAMS.

Since its brief operation, Shell has used this expertise worldwide. In 1993, the wells were suspended and the plant site reclaimed, which included the removal of facilities, ground water testing and re-contouring of the site back to a natural grazing lease.

WELL LIFECYCLE:

- Plant constructed in 1989 – 1991
- Operated from February 1991 to May 1992
- Dismantled 1993 – 1994
- Monitored site environment 1994 – 2006
- Dismantled connecting wells and pipelines 2010

REMEDIATION TIME:

- No soils or groundwater remediation required

RECLAMATION STRATEGY

- Recontoured and reclaimed in 2001

CURRENT STATUS:

- The site has been assessed, and a reclamation certificate application will be submitted at the end of 2013

MONTANE ELK
PROJECT

THE MONTANE ELK PROJECT IS A RESEARCH PROGRAM THAT EXAMINES THE BEHAVIOURS OF ELK, WOLVES, BEARS AND COUGARS AND THE EFFECT OF HUMAN ACTIVITY ON THIS WILDLIFE IN SOUTHWEST ALBERTA.

The project takes a collaborative approach, uniting partners from academia, government, environmental non-government organizations and other industries. Program partners include the Natural Sciences and Engineering Research Council of Canada (NSERC), Alberta Environment and Sustainable Resource Development (AESRD), Parks Canada, Alberta Tourism, Parks and Recreation and the Alberta Conservation Association. Shell Canada is the primary corporate funder.

A large volume of research has been produced throughout the lifespan of the program, which has given Shell Canada new methods for mitigating the ecological effects of energy development on the environment.

Photo provided by Sinclair Imagery Inc.

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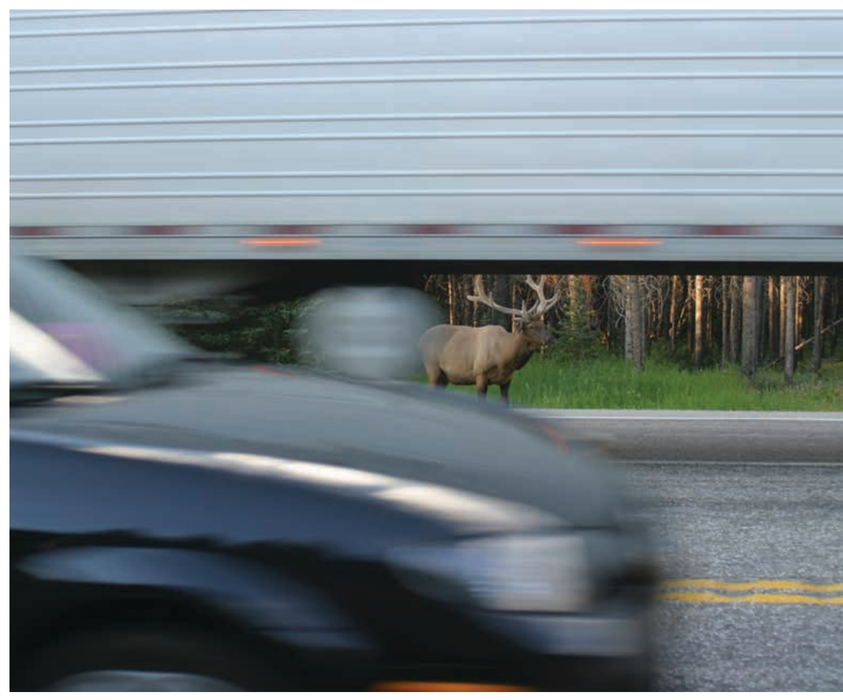


Postdoctoral student Simone Ciuti investigated the effect of human disturbances on elk behaviour in southwest Alberta.

Findings: The effects of human disturbances in a human-dominated landscape exceed those of habitat and natural predators. For example, road traffic volumes of at least one vehicle every two hours induced elk to switch into a more alert behaviour, decreasing feeding time.

Recommendation: Better road and traffic management.

Implementation: Shell Canada developed integrated Land Management Systems to promote the sharing of roads with ranching and timber-harvesting industries to decrease traffic volumes.

THE MONTANE ELK PROJECT WON A 2013 EMERALD SHARED FOOTPRINTS AWARD. ALBERTA'S EMERALD FOUNDATION ANNUALLY RECOGNIZES EXTRAORDINARY ACHIEVEMENTS ALBERTANS MAKE IN PROTECTING, ENHANCING AND SUSTAINING THE ENVIRONMENT.

GLENBOW RANCH
& FOOTHILLS FESCUE RESEARCH INSTITUTE

ON DECEMBER 17, 2012, THE GLENBOW RANCH PARK FOUNDATION ANNOUNCED A $230,000 PARTNERSHIP WITH SHELL CANADA THAT WILL LAUNCH ADVANCED RESEARCH ON LAND RECLAMATION PRACTICES USING NATIVE GRASSES, INCLUDING FESCUE.

Creation of the Foothills Fescue Research Institute will allow the Foundation to build a greenhouse and research facility while expanding both existing research and education programs at the Glenbow Ranch Provincial Park located between Calgary and Cochrane along the Bow River in southern Alberta.


Glenbow Ranch Foothills Fescue grassland.

A UNIQUE COMPONENT OF FESCUE GRASSLAND IS ITS ABNORMALLY DEEP ROOTS. GROWING AS MUCH AS 120 CM DEEP, THE ROOTS PROVIDE PROTECTION AGAINST DROUGHT, EROSION AND OTHER NATURAL HAZARDS.

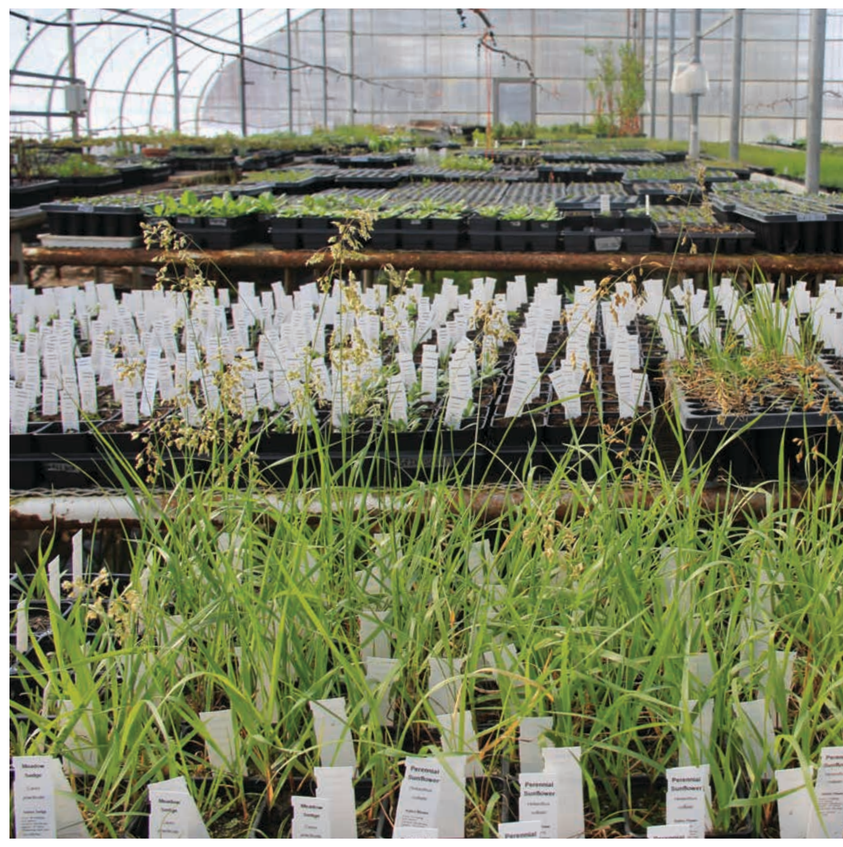
WHY FESCUE?

- Grasslands in Alberta have been identified as a heavily endangered ecosystem.
- Shell recognizes the importance of this native prairie and of improving our operations to preserve this sensitive landscape.
- Research underway by the Foothills Rescue Research Institute into reclamation methods can help mitigate the industrial effects to fescue grassland; this research is valuable to all industry working in Alberta's grasslands.
- Fescue grasslands have also been identified in recent years as important in the capture and storage of carbon.

WHO DO WE CONSULT?

OVER THE YEARS, WE'VE TAKEN ENVIRONMENTAL GROUPS, FIRST NATIONS AND COMMUNITY MEMBERS TO OUR ACTIVE RECLAMATION SITES TO SHARE OUR WORK AND SEEK FEEDBACK.

We've built strong partnerships with Alberta Environment and Sustainable Resource Development, Grumpy's Greenhouse in Pincher Creek and, more recently, Steve Tannas, a reclamation specialist who owns a local native seed and shrub greenhouse in the Watervalley area.



Foothills rough fescue growing at Easter Slopes Rangelands Seeds Greenhouse.

Members of the Canadian Land Reclamation Association tour Shell's Burnt Timber 15 with the AESRD in the fall of 2012. The site was reclaimed using natural recovery techniques in 2007 and is upheld as an example of natural recovery and biodiversity.