



Basic Impact Analysis (BIA)

Construction of New Boundary Fence

Grasslands National Park

27 May 2016

1. PROJECT TITLE & LOCATION

Construction of New Boundary Fence

The installation or repair of 40.5 miles of boundary fence in several locations in the East and West Blocks of Grasslands National Park. Locations of fence repair/construction are shown in Figure 1 and Figure 2 below.

2. PROPONENT INFORMATION

3. PROPOSED PROJECT DATES Planned

commencement: 2016-06-01

Planned completion: 2017-12-31

4. INTERNAL PROJECT FILE #

SSFU-2016-002-GNP

5. PROJECT DESCRIPTION

The project is to replace 40.5 miles of fence along portions of the existing and newly acquired perimeter of Grasslands National Park, 20 miles in the West Block of the park and 20.5 miles in the East Block (Figure 1 and Figure 2). These fences are of various origins and conform to no standard, are of different construction types and materials, and are in various states of repair. A description of fence type by ¼ mile is included in the statement of work (Appendix A). Bison-standard perimeter fence specifications are also described in detail in the statement of work, but can be summarized as follows:

- *Post height is 58" (1.4732 m) above ground*
- *5 wires (top two wires and bottom wire barbless)*
- *Bottom wire 18" above ground, top wire 54" above ground*
- *Anchor posts minimum 5" (12.7 cm) diameter, placed every 1320' (402.3 m), at all direction changes, corners and gates*

This fencing standard was adopted in GNP's 2005 Bison Reintroduction Plan as the best option after careful consideration of cost, bison management and wildlife sensitivity. It has since been adopted as the standard for perimeter fence to clearly and consistently identify park boundaries for visitor safety, neighbour relations, and to accommodate the future expansion of bison grazing. Principles of the design include:

- Bison rarely jump fences higher than their nose, and tend not to challenge fences if adequate food and water are available (Saskatchewan Agriculture and Food 1998)
- Fences can present significant migration/movement challenges to antelope and deer

- The minimum distance of the bottom fence wire from the ground to accommodate antelope movement under the fence (under normal conditions) is 16-18' (Alberta Fish and Wildlife 1998)(Krausman 1996)
- Young or old deer may have difficulties jumping fences over 4.5' above ground

Fence construction will take place between May 1 2016 and Dec 31 2016 and be completed by a contractor. Salvage and disposal of existing fence, boundary surveys and demarcation, fence construction and materials are the responsibility of the contractor and will conform to criteria in the statement of work (Appendix A). The construction work is to drill and set or pound posts, affix wire and install gates as per specifications in the statement of work. The fence line will be 0.3 m to 1 m inside GNP's boundary. Deviations may be required due to rough terrain or to avoid impacts to valued components. All deviations will be done in consultation with the GNP project manager or delegate.

Materials used for construction are:

- 8' pressure treated, square/diamond sharpened posts, 5-7" in diameter (for use as anchor, brace and gate posts)
- 7' pressure treated, square/diamond sharpened posts, 4-5" in diameter (for use as fence posts)
- four point 12.5 gauge double strand barbed wire (950 lb. breaking strength)
- barbles double strand wire (950 lb breaking strength)
- 9 gauge smooth wire
- gate slats
- metal gate closing levers
- 16' metal swing gates and mounting hardware (if requested in advance)
- 2" barbed staples
- wire splicers
- anchor wire-hooks
- spikes

Equipment used for fence removal and construction include:

- tractors
- post-pounders
- augers
- pickup trucks
- all-terrain vehicles (ATVs)

The geographic scope of this analysis is limited to the fence and trails used to access the fence with a 5 meter (16.4 feet) buffer on each side. Temporal scope is May 1 to December 31, 2016. Valued components included in the analysis are water, soil and landforms, flora, fauna, species at risk, cultural resources, and public safety. No effects to air quality, paleontological resources, visitor experience or socio-economics are expected from this project.

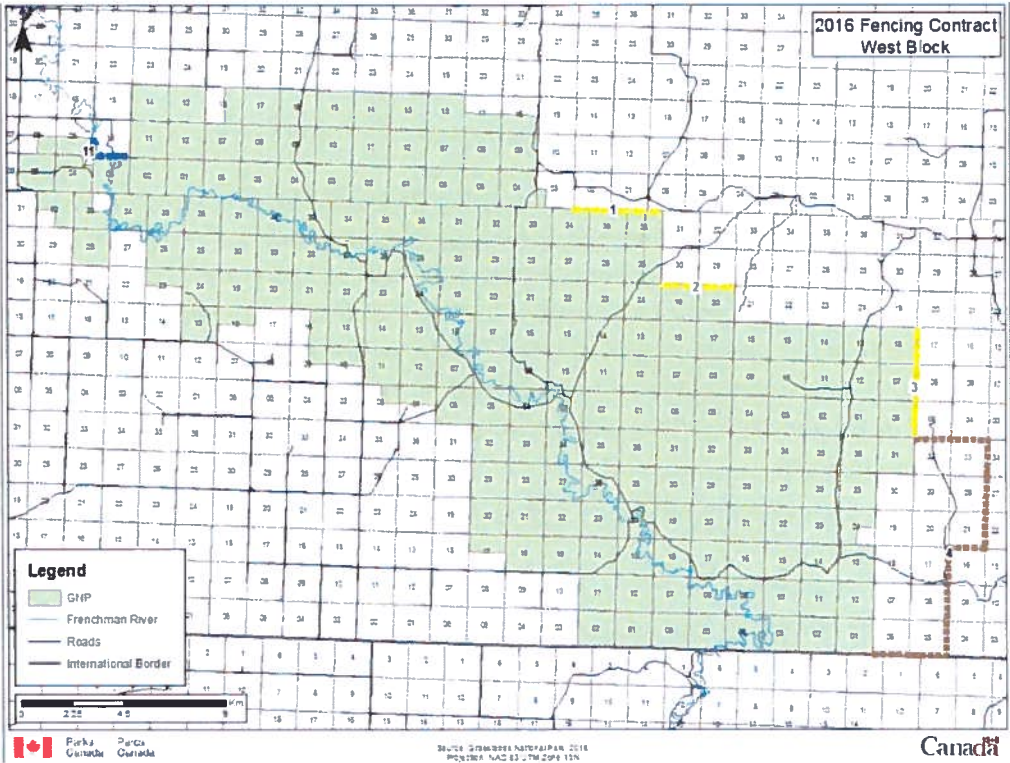


Figure 1: Location of fences for repair or replacement in the West Block of Grasslands National Park.

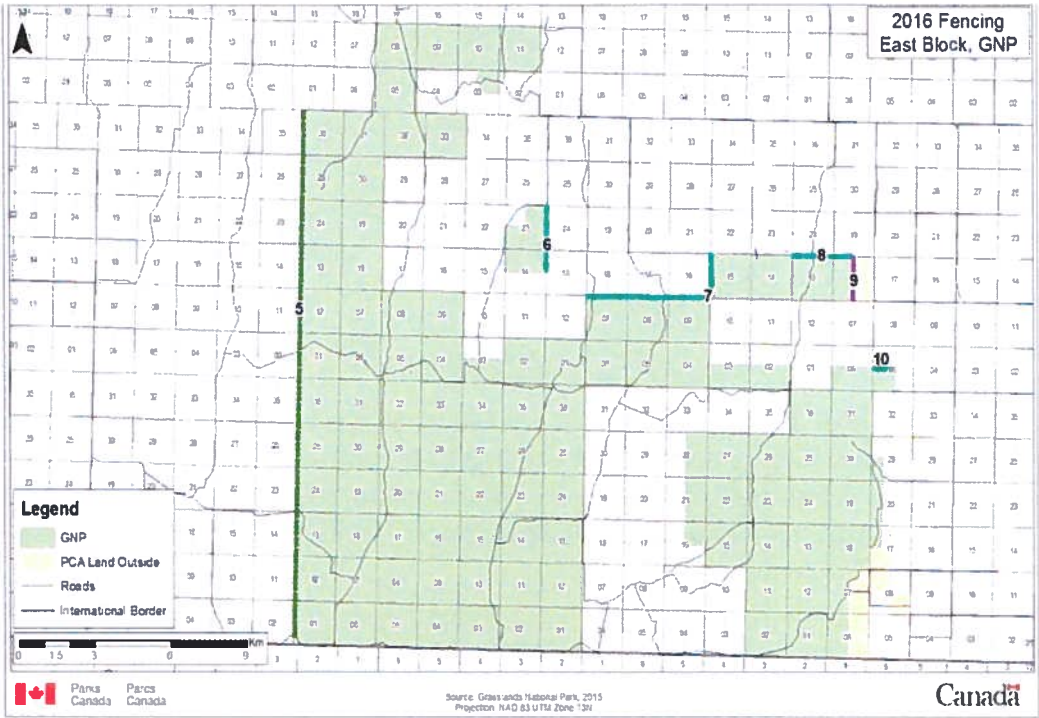


Figure 2: Locations of fences for repair or replacement in the East Block of Grasslands National Park.

6. VALUED COMPONENTS LIKELY TO BE AFFECTED

Valued components included in the analysis are water, soil and landforms, flora, fauna, species at risk, cultural resources, and public safety. No effects to air quality, paleontological resources, visitor experience or socio-economics are expected from this project.

Table 1: Valued components likely to be impacted by the project and will therefore be carried forward to the effects analysis section. Also the geographic area that should be assessed for each component and spatial scale.

Valued Component	Potential Impacts	Temporal Scale	Spatial Scale
Water	<p>Environmental contaminants such as fuel could enter riparian areas from vehicles and machinery via surface run-off from adjacent work areas or where vehicles and machinery cross watercourses.</p> <p>Ground disturbance from construction and vehicle use could lead to erosion causing sedimentation of adjacent riparian areas.</p> <p>Where fences cross streams, work on or near the bank may alter bank stability and lead to erosion. Fences crossing streams may cause debris to build up during high flow period and change flow dynamics.</p>	Effects associated with off-road vehicle use may occur during the removal and/or construction of fence (May –Dec 2016) as well as during seasonal checks and maintenance (on-going)	The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer.
Soils and Landforms	<p>Use of machinery and vehicles off-road can lead to:</p> <ul style="list-style-type: none">• soil compaction• ground cover disturbance• erosion• environmental contaminants from fuel/engine fluids• ignition of wildfires• creation of trails that remain visible for many years and may attract additional unauthorized usage <p>The installation of fence may concentrate wildlife and livestock movement along fence lines, creating trails that result in soil compaction and increased grazing pressure along the fence.</p>	<p>Effects associated with off-road vehicle use may occur during the removal and/or construction of fence (May –Dec 2016) as well as during seasonal checks and maintenance (on-going).</p> <p>Livestock following fence lines will continue to occur while domestic herds are used to achieve grazing management goals, and potential impacts will be dealt with on a case-by-case basis.</p>	The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer.
Flora	<p>Use of machinery and vehicles off-road can lead to:</p> <ul style="list-style-type: none">• disturbance of ground-cover• introduction and/or spread of weed species• removal of vegetation from installation of fence posts <p>changes to soil characteristics such as compaction and erosion that may lead to changes in plant community and/or structure</p>	Effects associated with off-road vehicle use may occur during the removal and/or construction of fence (May –Dec 2016) as well as during seasonal checks and maintenance (on-going).	<p>The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer.</p> <p>The introduction/spread of weeds has the potential to travel outside of project area, depending on the biology of the weed and the condition of the surrounding environment.</p>
Flora	<p>Fences act as barriers to wildlife migration and/or movement, particularly ungulates</p> <p>Fences provide additional perches that can increase predator pressure and brood parasitism on ground-nesting birds</p> <p>Use of vehicles off-road may cause:</p> <ul style="list-style-type: none">• destruction or harm to wildlife via collisions• the destruction of birds’ nests• sensory disturbance of wildlife, potentially resulting in displacement	Potential impacts to wildlife movement and additional perches exist for the life of the fence (long-term), while other impacts associated with off-road vehicles use are limited to the removal and construction of the fence, as well as during subsequent checks and maintenance.	<p>The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer.</p> <p>Sensory disturbances extend beyond the project area, depending on the disturbance, environmental conditions and the sensitivity of the species.</p>

Valued Component	Potential Impacts	Temporal Scale	Spatial Scale
Species at Risk	<p><u>Greater Sage Grouse</u> (Endangered) – 11 miles of fence are on EPO lands and roughly 20 miles fall within the geographic scope of Critical Habitat (CH). Potential impacts include:</p> <ul style="list-style-type: none"> • Vehicle traffic disrupts breeding activity, reducing peak male attendance, nest initiation rates, increases nest distance from lek and may result in lek abandonment (some studies show as few as 12 vehicles/day) • Fencelines create linear travel corridors and perches that increase predator foraging efficiency • Removal, reduction or degradation of sagebrush and surrounding habitat results in habitat loss, reduced food availability and nesting cover, and increased exposure to predation and inclement weather • Mortality of birds or nests from collisions with vehicles or machinery <p><u>Sprague's Pipit</u> (Threatened) – project falls within the geographic scope of CH, however existing infrastructure including fences are excluded from CH. Potential impacts include:</p> <ul style="list-style-type: none"> • Linear developments and off-road vehicles/machinery use facilitate the spread of exotic grass species which reduce habitat suitability for Sprague's pipits • Vehicles may run over nests • Displacement of individuals for prolonged periods may lead to nest failure <p><u>Swift Fox</u> (Threatened) – the project falls within the geographic scope of CH, however project activities are not likely to impact habitat quality. Potential impacts include:</p> <ul style="list-style-type: none"> • Mortality from collision with vehicles or machinery <p><u>McCown's Longspur</u> (Special Concern):</p> <ul style="list-style-type: none"> • vehicles may collide with nests during construction or maintenance. • Displacement of individuals for prolonged periods may lead to nest failure <p><u>Long-billed Curlew</u> (Special Concern):</p> <ul style="list-style-type: none"> • vehicles may collide with nests during construction or maintenance. • Displacement of individuals for prolonged periods may lead to nest failure <p><u>Northern Leopard Frog</u> (Special Concern) – vehicles may collide with frogs or disrupt breeding pools while working near permanent waterways.</p>	<p>Sensory and ground disturbances related to vehicle and machinery use are limited to the removal and construction of the fence, as well as during subsequent checks and maintenance.</p> <p>Impacts associated with the presence of infrastructure (fence and associated trails) are for the life of the infrastructure (long-term).</p>	<p>The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer.</p> <p>Sage-grouse: auditory disturbances within 3.2 km of lek critical habitat April 1 – May 30 (as required by the EPO)</p>
Cultural Resources	<ul style="list-style-type: none"> • Disturbance or destruction of surface archaeological resources from vehicle traffic and operation of machinery • Disturbance or destruction of sub-surface archaeological resources from post-installation and removal activities • Removal of surface vegetation increases the potential for soil erosion, which may expose and displace buried artifacts. 	<p>Impacts associated with the presence of infrastructure (fence and associated trails) are for the life of the infrastructure (long-term). Damage to cultural resources, once done, is irreversible.</p>	<p>The area of impact includes the trails used to access fences, the fence line plus a 5 meter buffer on either side of the fence, including animal trails that may develop along fence lines.</p>



7. EFFECTS ANALYSIS

Table 2 outlines potential adverse effects to the valued components identified in the previous section and whether these potential effects can be avoided, mitigated, or require further investigation. Compliance of the project with the Emergency Protection Order for the Greater Sage-Grouse (EPO, 2013) and with The Canada Fisheries Act (1985) is discussed further following the table. Figures showing critical habitat maps referenced in the table are found at the end of this section.

Table 2: potential adverse effects to identified valued components.

Valued Component	Effects Analysis	Risk of Adverse Impacts after mitigations
Aquatic	<p>The fence crosses water in 15 locations. Of these, 4 are across the Frenchman, 4 are smaller waterways that are likely to have water year round and the remaining 7 are ephemeral.</p> <p>Adverse effects are not likely at the Frenchman sites, as the fence will not span the water. Mitigations will be required to prevent the construction and/or operation of the fence from impacting aquatic habitat where work is occurring near watercourses, and additional mitigations for fence construction that spans water.</p> <p>Ephemeral waterways in the project area do not offer fish habitat. It is unlikely that the 4 smaller year-round waterways provide fish habitat</p>	Low
Soils and Landforms	<p>The area is already disturbed due to existing fence line and associated trails created for construction and maintenance, however further ground disturbance, potential for erosion and potential for environmental contamination will result from pulling old posts and installing new fence.</p> <p>Where grazing is being managed by GNP, grazing strategies are developed to influence areas of grazing and intensity of grazing. Animals following fence lines may still occur.</p> <p>Wildfire may result from operating machinery in areas of tall, cured vegetation particularly during hot, dry, windy weather. Mitigations required to reduce the risk of wildfire ignition and spread.</p>	Low
Flora	<p>Previous disturbance exists in the area from the installation and maintenance of existing fence line, however new ground disturbances from the use of vehicles and machinery and the installation of fence posts, piling materials, must be mitigated to reduce the likelihood and severity of impact.</p>	Low
Fauna	<p>The existing fences may currently present barriers to wildlife movement where not conforming to wildlife-friendly practices, and already provide perches to predators or brood parasites. New fence will place bottom and top wires high enough and low enough, respectively, to allow movement of deer and antelope through the fence under normal circumstances. In some areas, new fence will be taller than existing fence, which may provide potential nest predators a better view/greater advantage.</p>	Low



Species at Risk – Sage Grouse	<p>SAGE GROUSE: The project occurs within the geographic extent of critical habitat for sage grouse (see <i>Figure 5</i> and <i>Figure 8</i>) as well as within lands protected under the Emergency Protection Order for the Greater Sage-Grouse (EPO, Environment Canada 2013, see). This project may impact functional attributes (limited noise disturbance, limited human presence and limited presence of artificial perches) required for critical habitat as defined by the Recovery Strategy (Environment Canada 2014). These impacts are considered temporary, lasting for the duration of the project. Additionally, this project has the potential for long-term impacts to critical habitat through the displacement of native prairie and silver sagebrush by introducing and/or spreading invasive species or by disturbing existing native ground cover. In addition to critical habitat, some areas of the project fall within the Emergency Protection Order for the Greater Sage-Grouse (authorized under SARA).</p> <p>Sensory disturbances can be avoided by not working within 3.2 km of a lek between April 1st and May 30th. The EPO prohibits vehicle use and noise on identified lands April 1st – May 30th between the hours of dusk and dawn (90 minutes before sunset to 90 minutes after sunrise) under section 4(1).</p> <p>The EPO prohibits building new fence (section 3(1)(c)) as well as limits fence replacement to the dimensions of the original fence (section 3(6)(a)). The dimensions of the new fence will be taller than the existing fence in some places to conform to bison-standard. EPO section 3(3)(a) allows the construction of fences that conform to standards outlined in Schedule 2 of the EPO.</p> <p>The EPO prohibits the destruction or moving of native plants and sagebrush under section 3(1)(a). Exception is made for installing fences to manage grazing animals under section 3(3)(a). The amount of disturbance to sagebrush and surrounding habitat is limited to the fenceline (post-pounding, use of vehicles and machinery). Vehicles may damage sagebrush and/or spread/introduce invasive species, but under standard mitigations for vehicle use off-road, adverse effects are not expected.</p>	Low
Species at Risk – Sprague’s Pipit	<p>PIPITS: The project occurs within the geographic extent of critical habitat for Sprague’s Pipit identified in Grasslands National Park’s Multi-species Action Plan (Parks Canada 2016) and may impact biophysical attributes (limited invasion of exotic grasses) required for critical habitat as defined in the Recovery Strategy (Environment Canada 2012). The recovery strategy excludes existing infrastructure from critical habitat and also excludes construction or repair of pasture fences required to improve or maintain critical habitat from activities likely to destroy critical habitat. The use of vehicles and machinery off-road may lead to accidental collision with individuals and/or nests. Mitigations to limit ground disturbance, to avoid the introduction or spread of exotic species and to avoid harming nests are required to prevent harm to individuals, nests or areas of critical habitat adjacent to the project area. The fence is excluded from critical habitat and the activity of fencing to manipulate grazing to create and maintain heterogeneity of vegetation structure on the landscape and for species conservation is supported by the recovery strategy.</p>	Low



Species at Risk - Other	<p>Swift Fox: Biophysical attributes of critical habitat will not be impacted by project activities. Though behaviourally cryptic, swift fox are relatively visible on the landscape and shelter in burrows and therefore harm to individuals and/or residences as a result of the project is unlikely. Standard mitigations for avoiding harm to wildlife apply.</p> <p>McCown's Longspur: As a species of special concern, McCown's longspurs do not have defined critical habitat protected under SARA. Important habitat exists in and around the project area defined in GNP's Multi-species action plan (see <i>Figure 6</i> and <i>Figure 7</i>). Fences will facilitate the application of prescribed grazing to the landscape, and be a net gain for longspurs who typically nest in moderately to heavily grazed areas. Standard mitigations are required to minimize potential disturbances to individuals and/or nests during construction phase and subsequent maintenance.</p> <p>Long-billed curlew: As a species of special concern, long-billed curlews do not have defined critical habitat protected under SARA. The project area (vehicle trails and fencelines) is not consistent with breeding habitat requirements, though the fence crosses through the geographic extent of important habitat defined in GNP's Multi-species action plan (see <i>Figure 6</i> and <i>Figure 7</i>). Breeding pairs of curlews tend to be obvious on the landscape due to their territorial behaviour. Standard mitigations are required to minimize potential disturbances to individuals and/or nests.</p> <p>Northern Leopard Frog: As a species of special concern, leopard frogs do not have defined critical habitat protected under SARA. The project area crosses through important habitat as identified by the GNP Multi-species Action Plan (see <i>Figure 6</i> and <i>Figure 7</i>). Because leopard frogs typically stay on or near the banks of summer habitat during the day, impacts are limited to those activities that occur on the stream banks or in the water of areas occupied by leopard frogs. Migration to/from wintering habitat to breeding habitat and foraging are nocturnal, though in rainy, overcast conditions frogs may be active during crepuscular times as well. Stream crossings and installation of fence posts in the banks of waterbodies where leopard frogs occur are activities that pose potential impacts to leopard frogs. Mitigations to avoid disturbing individuals during construction and best management practices for stream crossings are required.</p>	Low
Cultural Resources	<p>Thirty-one sites are within 50m of the fences to be repaired or replaced¹. Of these, the fence crosses or is immediately adjacent to 13 sites. These 13 sites are at high risk of disturbance/damage to cultural resources as a result of fencing activities. Mitigations to avoid damage to cultural resources during fence installation and subsequent maintenance are required.</p> <p>27km of the new fencing passes through areas which have not yet been surveyed for archaeological sites. Based on observed patterns of site distribution elsewhere in Grasslands, there is a high probability of encountering undocumented tipi ring sites on the high ridges between coulees along fence segments #1 and #4 (Fig. 5). Standard mitigations to minimize damage to cultural features during fence installation and subsequent maintenance are required.</p>	

¹ Documented archaeological site boundaries are approximate, and are based on visual observation of artifacts or cultural features. Thus, it is likely that the true site boundaries extend beyond what is visible on the ground surface.



EPO CONSIDERATIONS

11 miles of the proposed fence replacement cross lands identified by the EPO (Figure 3 and Figure 4). The dimensions of the replacement fence exceed those of the previous fence, which is prohibited as “installing or constructing a fence” under section 3(1)(c) of Schedule 1 of the EPO. However, this fence qualifies as “a fence to manage grazing animals” (specifically Bison) under Section 3(3), and therefore it’s construction is not prohibited on EPO lands, provided the sections crossing EPO land conform to the standards for a Bison fence set out in Schedule 2 of the EPO.

There is potential for the construction phase of this project to violate other prohibitions of the EPO if it results in:

- Killing sagebrush plants, native grasses, or native forbs
- Operating vehicles or machines that produce noise exceeding 45 dB(A) between 1.5 hours prior to sunset and 1.5 hours after sunrise from April 1 to May 30

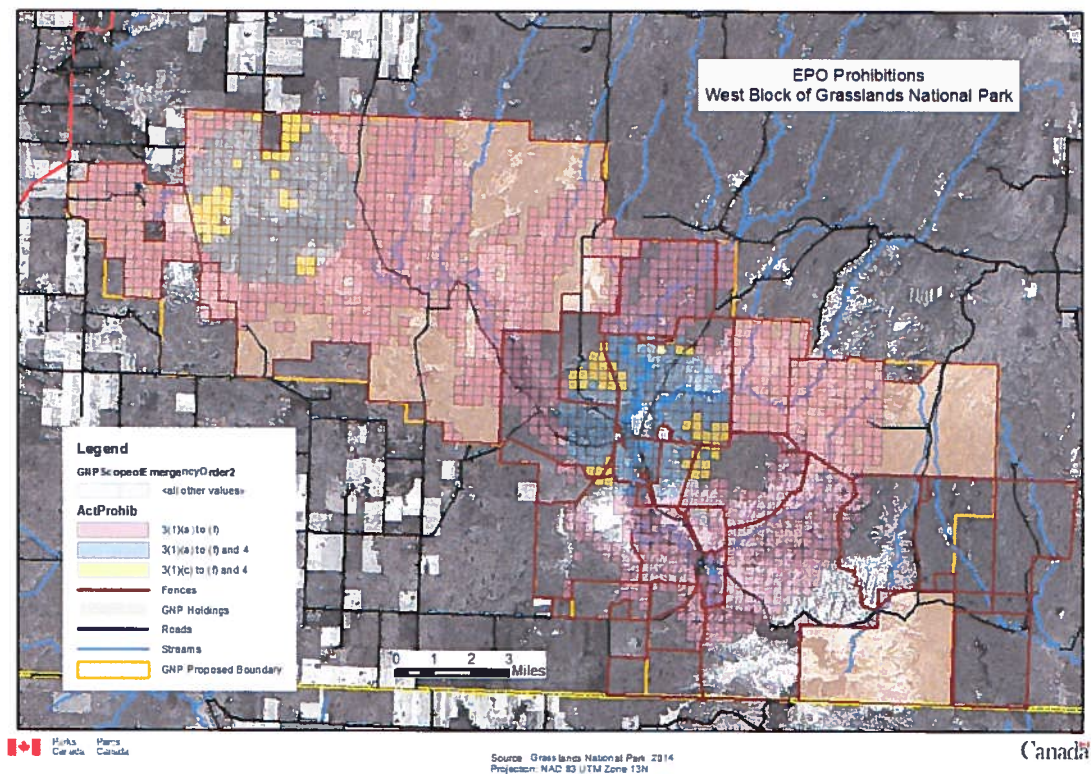


Figure 3: Extent and application in the West Block of the Emergency Protection Order for the Greater Sage-grouse. Note that GNP holdings layer has changed, though entire extent of EPO in this area is shown.

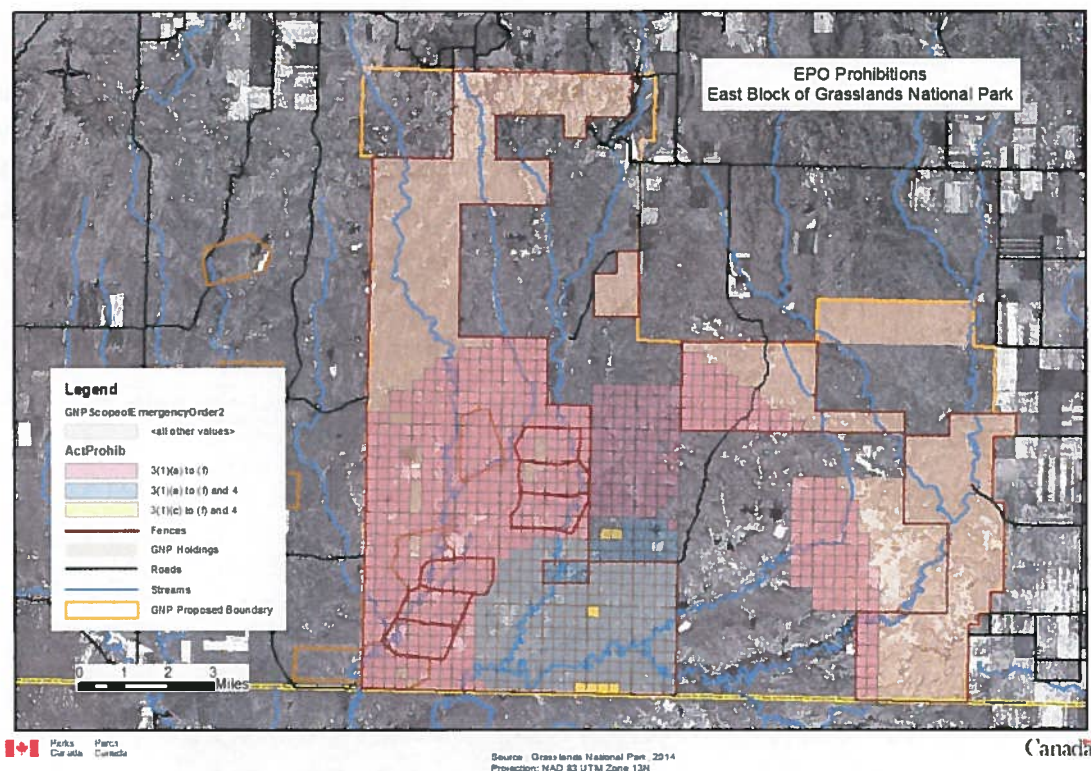


Figure 4: Extent and application in the East Block of the Emergency Protection Order for the Greater Sage-grouse. Note that GNP holdings layer has changed, though entire extent of EPO in this area is shown.

Aquatic Habitat

The project area crosses watercourses at 15 locations (Table 2). At 4 of these locations the fence crosses the Frenchman River. At each Frenchman River crossing, the fence will not span the watercourse but will be braced on either side. At the other 11 locations, the fence crosses smaller watercourses, 4 of which are likely to contain flowing water year round depending on weather conditions (Rock Creek, Hellfire Creek, Horse Creek, and Breed Creek). At these crossings, the fence will span the watercourse with a post or brace on either bank, and if necessary wires will be anchored down using a bin anchor to maintain the correct height. Fish data is only available for Frenchman River and Rock Creek, however all watercourses with year-round flow have the potential to be fish bearing. The Canada Fisheries Act (1985) states that when conducting a project near water, it is the responsibility of the project manager to ensure it does not cause serious harm to fish, defined as “the death of fish or any permanent alteration to, or destruction of, fish habitat.” The project is not anticipated to cause serious harm to fish with the implementation of mitigations.

Impacts of fence

At Frenchman River fence crossings, the fence will not span the waterway and as such will not affect the normal flow dynamics of the watercourse. At those fence crossings that span Rock Creek, Hellfire Creek, Horse Creek, and Breed Creek, there is the potential for flow dynamics to be affected during flooding events if vegetation or other debris accumulate on the upstream side of the fence line.



Impacts of construction phase

At all fence crossings, there is the potential for sedimentation and erosion associated with equipment and vehicle operation when installing posts or braces on the banks of watercourses. At those fences that span smaller watercourses, there is a potential for disturbance of the streambed during installation of anchors, and to the bank and streambed if vehicles and equipment cross the watercourse other than at an established vehicle crossing. The Frenchman River is not crossable at any point other than established crossings, so no adverse effects from vehicle and equipment crossings are anticipated.

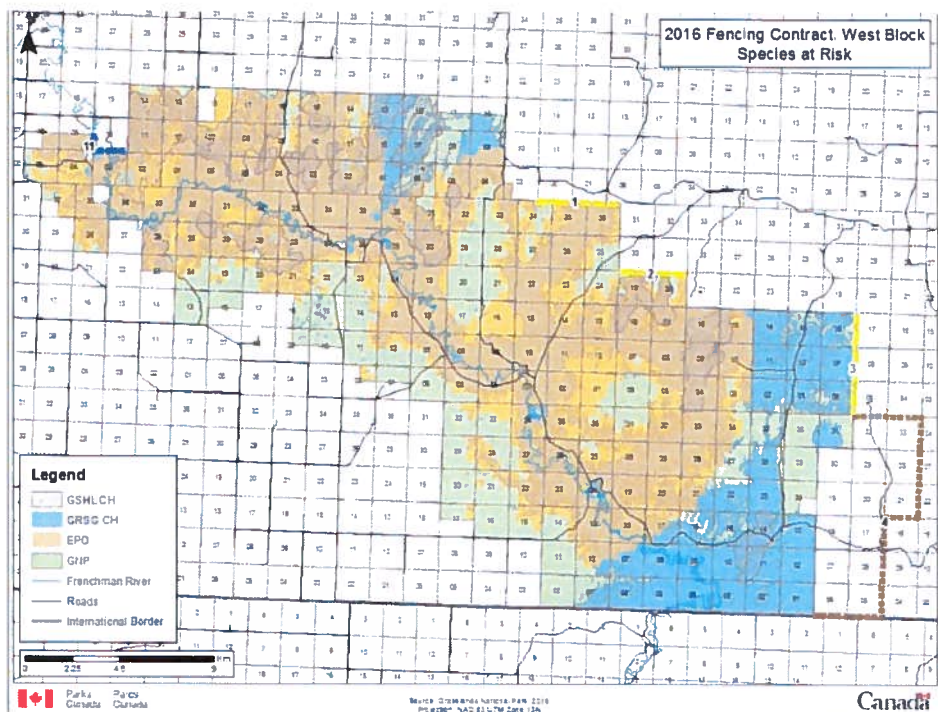


Figure 5: map of West Block showing fence to be replaced and the geographic extent of critical habitat for species with Endangered designation under SARA.

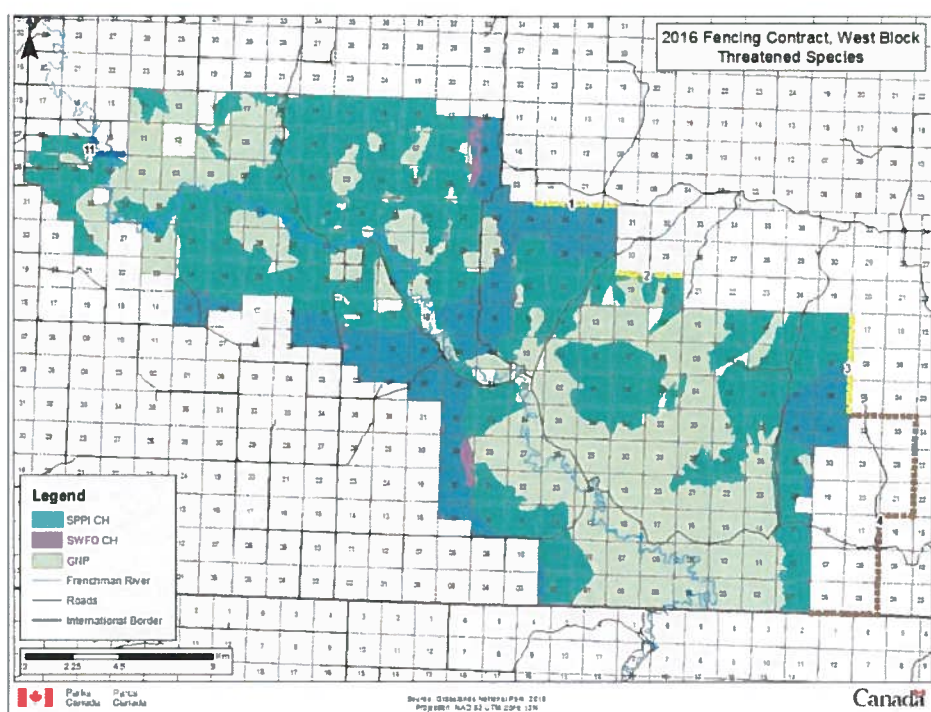


Figure 6: Map of West Block showing the location of fence replacement and the geographic extent of critical habitat for species with Threatened designation under SARA.

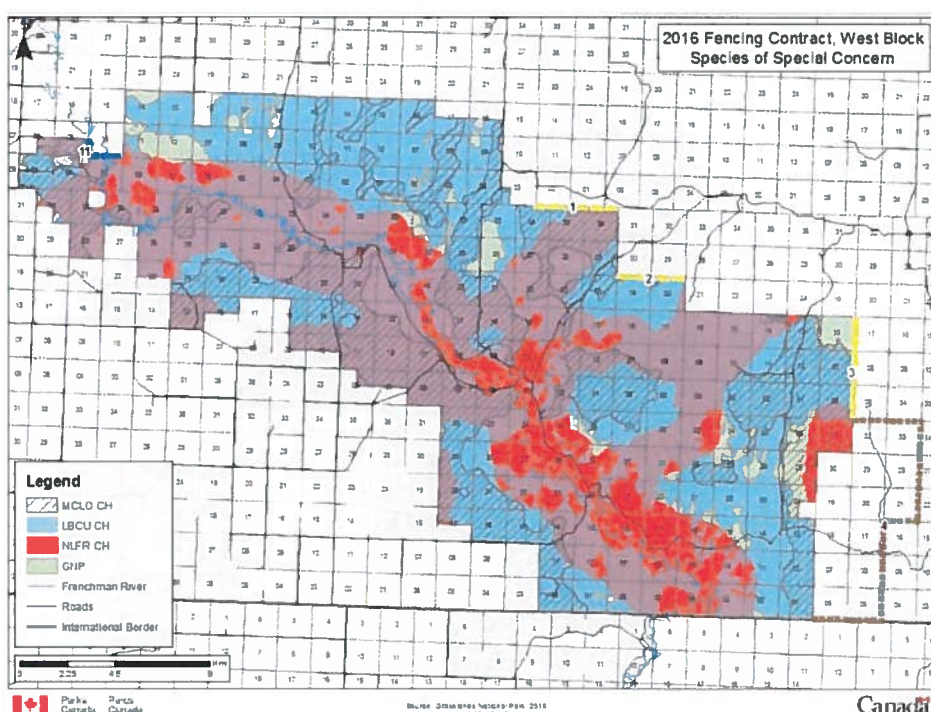


Figure 7: Map of West Block showing the location of fence replacement and the geographic extent of important habitat for species of special concern.

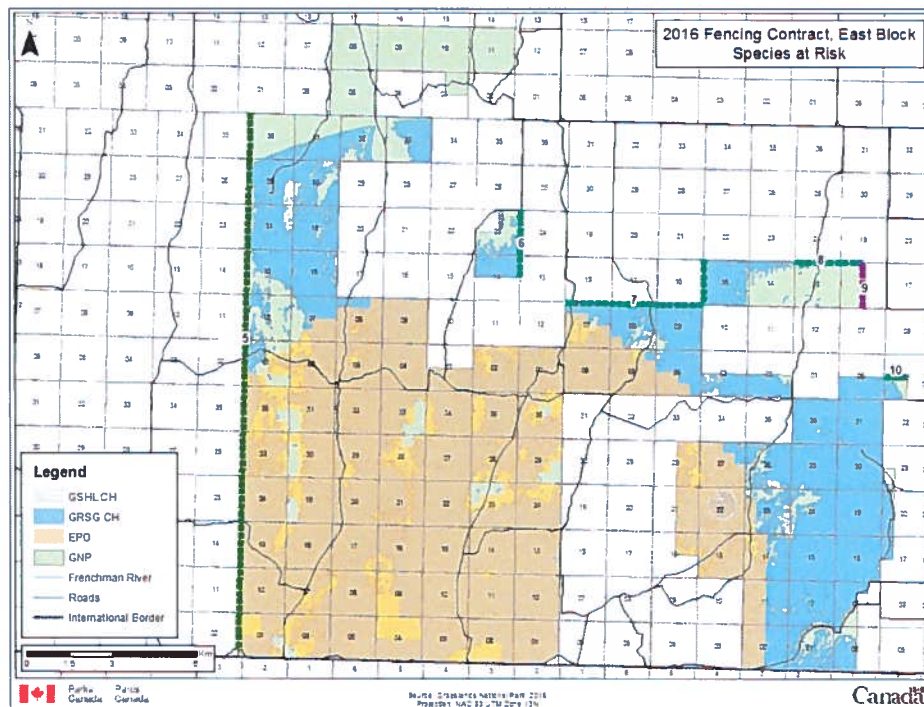


Figure 8: Map of East Block showing fence to be replaced and the geographic extent of critical habitat for species with Endangered designation under SARA

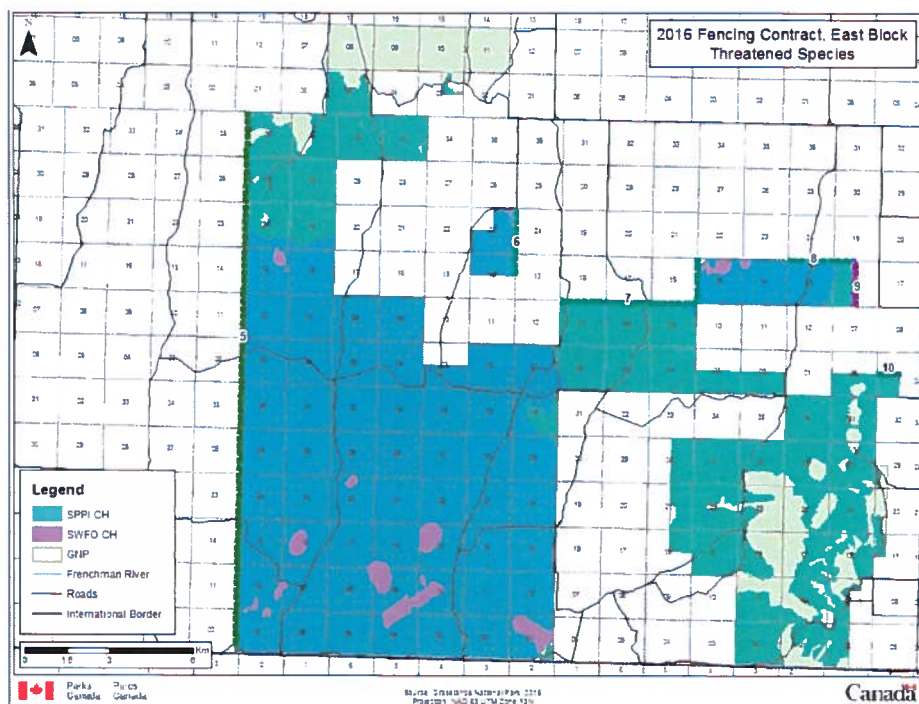


Figure 9: Map of East Block showing fence to be replaced and the geographic extent of critical habitat for species with Threatened designation under SARA

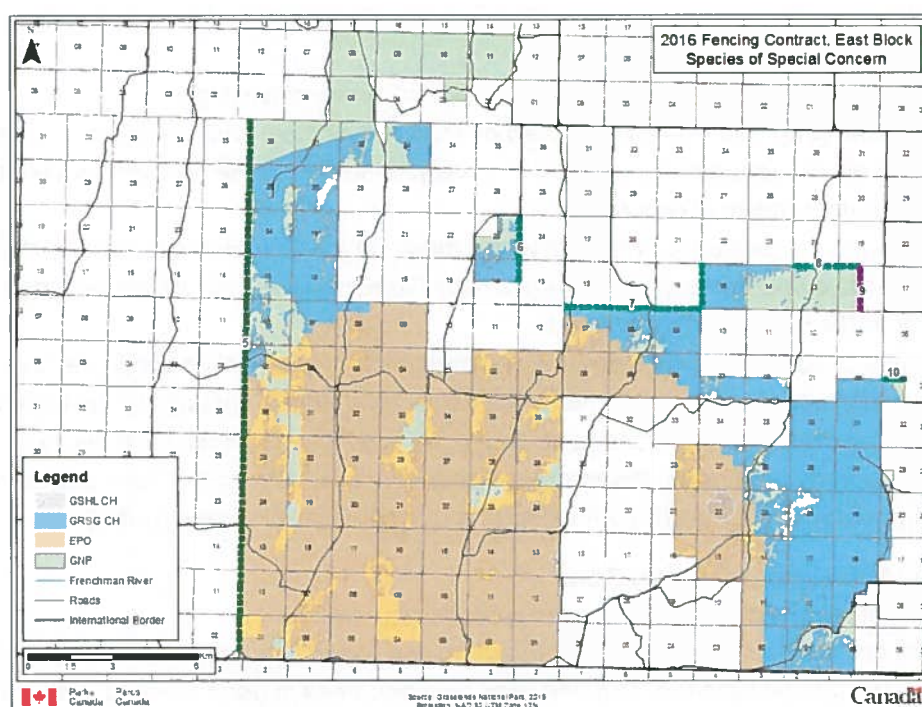


Figure 10: Map of East Block showing fence to be replaced and the geographic extent of important habitat for species with Special Concern designation under SARA

8. MITIGATION MEASURES

These mitigations have been designed for the construction phase of this project. Until best management practices are developed for fence maintenance and repair, these mitigations will also serve as interim mitigations for the operations phase (ie – maintenance and repair).

Work Site Conditions/Staging/Laydown

1. All employees must attend a briefing with an Impact Assessment Officer (IAO) or Surveillance Officer (SO) before beginning work at the site review and explain the mitigations that are conditions of the project approvals.
2. Minimize ground disturbance by staging on existing hardened areas wherever possible.
3. Avoid or terminate working in wet conditions to minimize damage/rutting to the ground surface.
4. Avoid or terminate activities on site that attract or disturb wildlife. Vacate the area and stay away from the immediate location if wildlife display aggressive behaviour or persistent intrusion.
5. Control materials that might attract wildlife (e.g. petroleum products, human food and garbage).
6. Notify the SO immediately about dens, litters, nests, carcasses (road kills), wildlife activity or encounters on or around the site or crew accommodation. Other wildlife-related encounters are to be reported to SO within 24 hours.

Equipment Operations

7. Equipment movements and workers' private vehicles shall be restricted to the 'footprint' of the construction area.



8. *Ensure machinery arrives on site in a clean condition and is maintained free of fluid leaks, invasive species, noxious weeds and soils from off-site.*
9. *Equipment used will be of low bearing weight, especially in sensitive areas.*
10. *Existing roads and fireguard trails will be used by trucks and heavy machinery when accessing the site. Operation of vehicles and heavy machinery on open native prairie will be restricted to the fence line and the pre-determined access routes.*
11. *Operate machinery on land above the high water mark, on ice, or in another manner that minimizes disturbance to the banks and bed of any water body. Equipment will not be permitted to work in the streambed or in the adjacent riparian areas.*
12. *Limit machinery crossing (fording) a stream or watercourse to a one-time event (i.e., over and back), and only if no alternative crossing method is available. If repeated crossings of the watercourse are required, construct a temporary crossing structure in compliance with the Fisheries Act.*
13. *For fording equipment without a temporary crossing structure, use stream bank and bed protection methods (e.g., swamp mats, pads) if minor rutting is likely to occur during fording.*

Fuel Storage and Refueling/Emergency Plans

14. *All refueling will be done off site, or in a designated area.*
15. *Spill kits shall be provided at re-fuelling, lubrication, and repair locations that are capable of dealing with 110% of the largest potential spill and shall be maintained in good working order. Site staff shall be informed of the location of the spill response kit(s) and be trained in its use.*
16. *Hazardous or toxic products shall be stored no closer than 100 metres from streams, wetlands, water bodies or waterways.*
17. *Timely and effective action shall be taken to stop, contain and clean-up all spills as long as the site is safe to enter. The SO shall be notified immediately of any spill. In the event of a major spill, all other work shall be stopped and all personnel devoted to spill containment and clean-up.*
18. *The costs involved in a spill incident (the control, clean up, disposal of contaminants and site remediation to pre-spill conditions), shall be the responsibility of the proponent. The site will be inspected to ensure completion to the expected standard and to the satisfaction of Parks Canada.*
19. *A water tank, pump and hose will be onsite for suppression of fires. Any fires will be reported to the park fire duty officer at 306-298-2073 or to Parks Canada Dispatch at 1-877-852-3100.*

Site Clean Up/Waste Disposal

20. *Clean tools and equipment off-site to prevent the release of wash water that may contain deleterious substances.*
21. *Construction, trade, hazardous waste and domestic waste materials shall not be burned, buried or discarded at the construction site or elsewhere in Parks Canada protected heritage places. These wastes shall be contained and removed in a timely and approved manner and disposed at an appropriate waste landfill site located outside the Parks Canada protected heritage place.*
22. *Reclamation of any disturbed land shall occur after completion of the fence. This may include reseedling with native vegetation and covering the riverbank crossing with geotextile.*

Aquatic Habitat



21. *At fence crossings of Rock Creek, Hellfire Creek, Horse Creek, and Breed Creek, either breakaway wires or lifting wires should be used. Breakaway wires will detach from one side of the stream when the force behind them becomes sufficient, allowing debris accumulated during flooding events to continue downstream. Lifting wires can be lifted and placed on top of fence posts at the end of the grazing season, allowing water and debris to pass below during spring floods.*
22. *At all crossings, contractors should avoid using equipment on partially eroded or easily eroded parts of the bank, and divert the course of the fenceline if necessary. This will help avoid erosion leading to sedimentation.*
23. *Contractors should use established watercourse crossings on vehicle roads/ trails whenever practical. Where established crossings are so distant from the worksite as to be impractical, crossing watercourses with vehicles is permitted only in areas where no standing water is present and the stream bed is sufficiently dry that no disturbance to soil or vegetation below the high-water line will occur.*
24. *Where anchors are used to maintain the height of the wires where fences cross streams, anchors should be placed in firm ground above the average high-water line to prevent disturbance to the streambed. As this will result in a greater clearance between the lower wire and the water level, this will also reduce the likelihood of debris accumulating upstream of the fence.*

Additional Flora, Fauna, SARA and EPO Considerations

23. *If any individual or nest of a Species At Risk (as listed in Schedule 1 of the Species at Risk Act) or a nest of a migratory bird is encountered, work shall stop immediately and the SO notified. The SO will consult with species conservation management to determine when/where work can resume.*
24. *To avoid collisions with wildlife and nests, maximum vehicles speed off-road within the park is 40 km/h. Reduce speed appropriately under poor driving conditions.*
25. *Do not drive along the banks of any watercourse, except where fencing is being installed parallel to watercourse.*
26. *If a mass overland migration of amphibians or reptiles is observed within the project area, to avoid road kill no work is permitted in that area until the animals have finished moving through.*
27. *Replacement fence must conform to the specifications in the Statement of Work (Appendix A), which incorporates wildlife-friendly fencing techniques.*
28. *The replacement fence will conform to the standards for a Bison Fence set out in Schedule 2 of the EPO:*
 - *Fence posts will not be greater than 1.7 m in height,*
 - *The fence will have a maximum of 5 wires that are single, double, or triple stranded and parallel to the ground,*
 - *The top wire will be barless, and*
 - *The top two wires will be marked with flagging or reflectors that are spaced at intervals of not more than 1.5 m. ResCon staff will install fence markers as soon as is reasonably possible following construction of the fence.*
 - *Fence posts will be designed to deter perching by avian predators. ResCon staff have identified a cone-type deterrent that is being developed and is currently in the testing phase.*



Cone-type deterrents will be installed as soon as is reasonably possible following fence construction, provided the cone type deterrents are available to purchase at that time. In the event that this particular deterrent is not yet available for purchase at the time of construction, contractors will pound a 4-inch nail into the top of each fence post, with approximately 3 inches protruding from the top of the post, to act as a perch deterrent until cones are acquired.

27. *Avoiding the trampling of sagebrush plants when using machinery and operating vehicle.*
28. *Work and travel must not occur within a 3.2 km radius surrounding identified leks (see Figure 9 and Figure 10) from 90 minutes before sunset to 90 minutes after sunrise from April 1 to May 30. Outside of the April 1 – May 30 window, avoid travel to and from work site during crepuscular times to reduce likelihood of disturbing and/or collisions with wildlife.*
29. *Do not work or travel at night.*

Cultural Resources

The 13 identified archaeological sites at high risk of damage as a result of fencing and subsequent maintenance are: 13N779, 13N943 (Fig. 11); 13N6018, 13N6152, 13N6157, 13N6294, 13N6377, 13N6379; 13N6414 (Fig. 12); 13N5014, 13N5016, 193N (Fig. 13); 13N5385 (Fig. 14). Additionally, there is a high probability that unrecorded sites are present along the unsurveyed portions of fence segments 1 and 4.

An Archaeological Overview Assessment has been prepared, see Appendix B.

The following general and site-specific mitigations apply to this project:

General Mitigations

30. *The new fence should be routed at least 5m away from cultural features such as tipi rings and cairns, to avoid damage from heavy equipment and to protect surface features from displacement by cattle and/or bison walking the new fence line, and vehicles carrying out fence maintenance. Where the existing fence runs within 5m of these features, it should be re-routed so to provide the requisite 5m buffer.*
31. *Coordinates for the 13 high-risk sites will be provided to the contractor once work begins, to assist in locating the sites. Fencing equipment and vehicles will remain within 5m of the fence.*
32. *Fencing will not take place during wet periods, to reduce the potential for vehicles to churn up soft ground, damaging buried artifacts and disrupting ground cover. Damage to vegetation increases the potential for subsequent surface erosion which exposes and displaces buried artifacts.*
33. *Staging areas for fencing materials will be pre-selected in consultation with the PCA archaeologist,*
34. *Portions of the fence which pass through areas which have not yet been surveyed for the presence of archaeological sites must be surveyed by a professional archaeologist, with recording to Parks Canada standards. This survey may take place either before or after fence installation, but should be completed within a two year period.*

Site-specific mitigations:

In addition to the general mitigations listed above:



35. Sites 13N6443, 13N6444 and 13N6445 are located immediately west of fence segment #6 (Fig. 15). The fence must not be re-routed to the west in this area.
36. Site 13N927 is located immediately west of fence segment #11 (Fig. 16). The fence must not be re-routed to the west in this area.

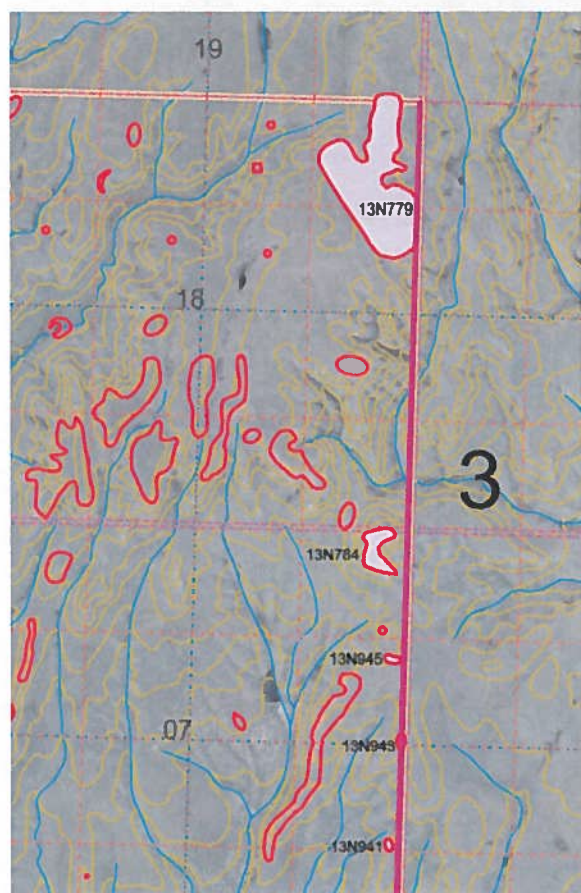


Fig. 11: Archaeological sites within 50m of fence segment #3.

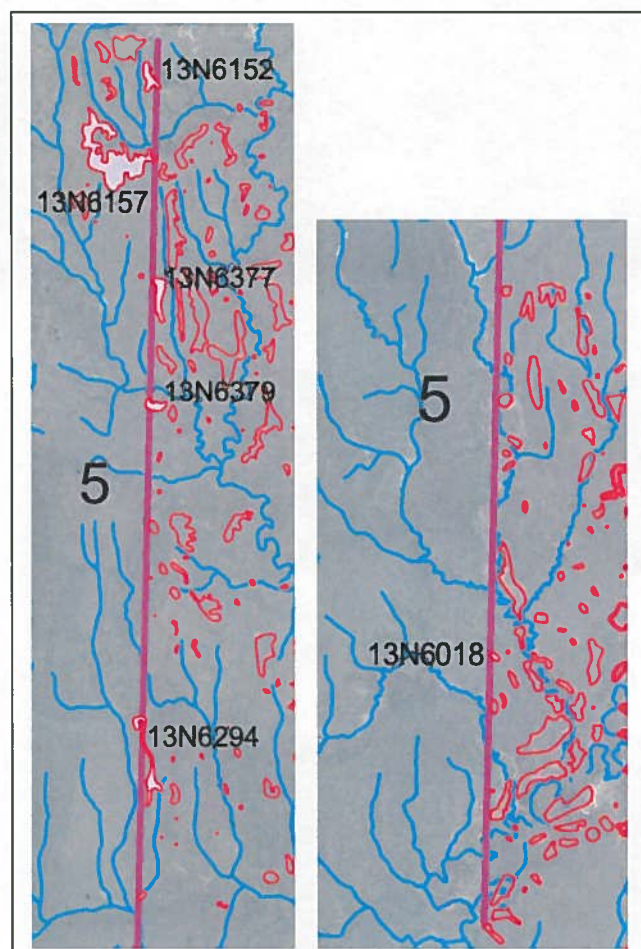


Fig. 12: Archaeological sites within 50m of fence segment #5. Left: north end of fence; right: south end.

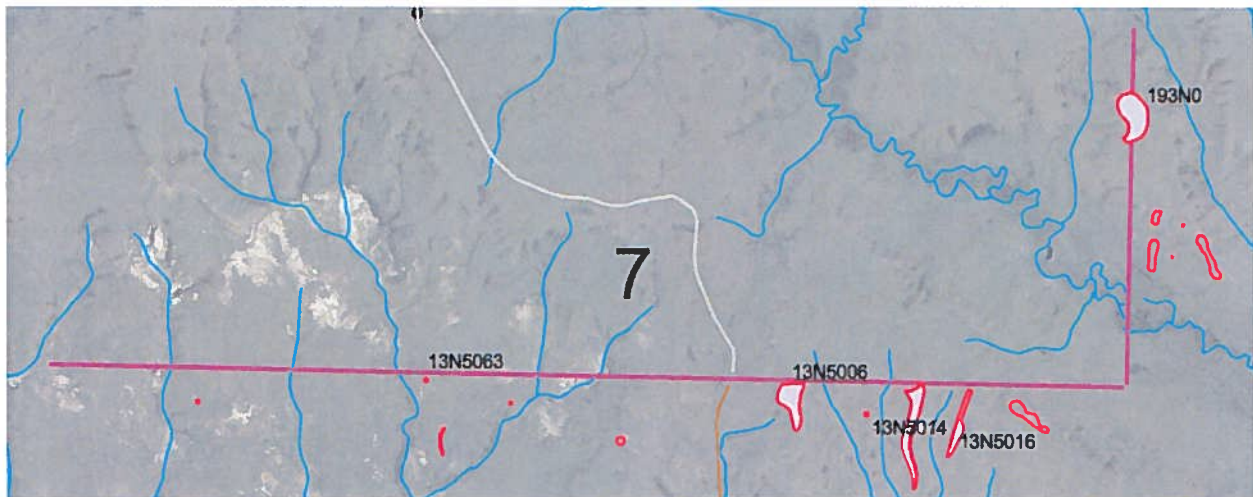


Fig. 13: Archaeological sites within 50m of fence segment #7.

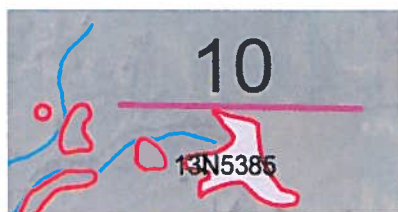


Fig. 14: Archaeological sites with high potential for damage from fencing in location #10.

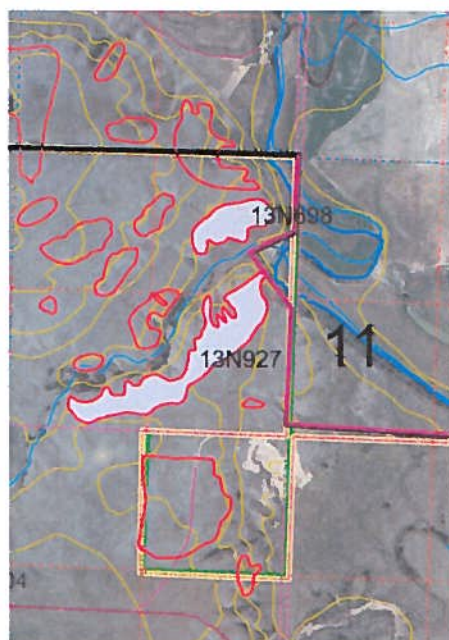


Fig. 16: Archaeological sites within 50m of fence segment #11.

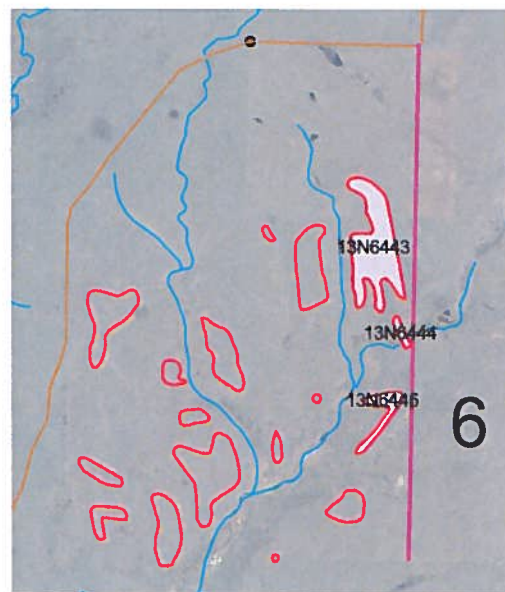


Fig. 15: Archaeological sites within 50m of fence segment #6.



9. PUBLIC/STAKEHOLDER ENGAGEMENT & ABORIGINAL CONSULTATION

9 a) Indicate whether public/stakeholder engagement was undertaken in relation to potential adverse effects of the proposed project:

✓ No

☐ Yes (describe the process to involve relevant parties and indicate how comments were taken into consideration).

9 b) Indicate whether Aboriginal consultation was undertaken in relation to potential adverse effects of the proposed project:

✓ No

☐ Yes (describe the process to involve relevant parties and how the results were taken into consideration).

10. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Aquatic habitat, soil and landforms, flora, fauna (including protected species)

This project is replacing and repairing existing fence to meet Grasslands' National Park's (GNP) bison-boundary standards for fence (see Appendix A). While the fence is a long-term linear anthropogenic structure on the landscape, no new linear disturbances or vertical structures are being created. Replacing the existing fence with bison-boundary standard fence may increase the overall height of the fence in some areas. However it will bring all newly acquired boundary fence up to wildlife-friendly and EPO fence standards, which will reduce the fence's current potential impact on wildlife and species at risk. Repairing and replacing this fence will allow GNP to apply prescribed grazing for conservation purposes, a net gain for wildlife. With the mitigations in place, no significant adverse impacts to valued components are expected.

Cultural Resources

If all mitigations are applied, then the impacts will have been reduced to an acceptable degree from a cultural resource management point of view.

11. SURVEILLANCE

Document whether surveillance (also referred to as compliance monitoring or site inspection) will be required while the project is underway, to verify that required mitigation measures are implemented. (There are templates for documenting surveillance on the [EA intranet tools & guidance page](#)).

☐ Surveillance is not required

✓ Surveillance is required (provide details such as the proposed schedule and the focus of inspections)

The project manager and/or the surveillance officer will perform periodic, unannounced checks on work to ensure that conditions of the contract and EIA are being met.

12. FOLLOW-UP MONITORING

Follow-up monitoring is:

☐ not required



☐ required by legislation or policy (indicate basis of requirement – e.g. required by the *Species at Risk Act*; *Fisheries Act*, or the [Parks Canada Cultural Resource Management Policy](#))

✓ required to evaluate effectiveness of mitigation measures and/or assess restoration success

Until such time as a Best Management Practice exists to guide fence installation, repair and maintenance activities, this EIA will require crews engaging in maintenance of this fence to observe and report any of the following to Grasslands National Park’s Resource Conservation Manager and/or Asset Manager:

- Invasive species (such as those weeds identified on SK’s noxious weed list and species targeted for exclusion and control in GNP such as Crested Wheatgrass)
- Wildlife or signs of wildlife being caught in the fence
- Damaged or missing perch deterrents or fence markers

13. SARA NOTIFICATION

This project is compliant with SARA regulations and orders issued under the authority of SARA.

Notification is:

- ✓ not required
- ☐ required under the *Species at Risk Act* (outline the nature of and response to any notification).

14. EXPERTS CONSULTED

Include Parks Canada experts. Add as many entries as necessary for the project.

Department/Agency/Institution: Indigenous Affairs and Cultural Heritage Directorate Parks Canada Government of Canada	Date of Request: YYYY-MM-DD 2016-05-15
Expert's Name & Contact Information: Sharon Thompson sharon.thomson@pc.gc.ca Tel: (204) 983-1214 Cel: (204) 290-6035 TTY: (204) 983-0031 145 McDermot Ave., Winnipeg, Canada R3B 0R9	Title: Archaeologist
Expertise Requested: Indicate the discipline or subject area of expertise.	
Response: Summarize the expert's response to the request (append correspondence as required and add to attachment list (Section 17)). Sharon’s effects analysis and mitigations for cultural resources have been incorporated directly into the BIA.	

15. DECISION

Taking into account implementation of mitigation measures outlined in the analysis, the project is:

- ✓ not likely to cause significant adverse environmental effects.
- ☐ likely to cause significant adverse environmental effects.

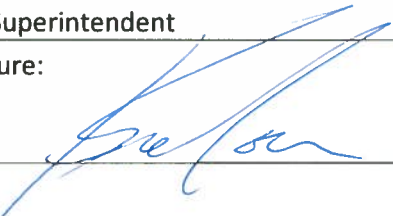


FOR SARA REQUIREMENTS:

- ✓ There are no residual adverse effects to species at risk and therefore the SARA-Compliant Authorization Decision Tool was not required

16. RECOMMENDATION AND APPROVAL

(Add additional blocks as required)

Prepared by: EIA author (name & position): Krista Cairns, Environmental Assessment Officer and Nathan Young, Resource Conservation Officer	Date: YYYY-MM-DD 2016-05-27
Recommended by: Functional manager of the project (name): Duane Hanson	Date: YYYY-MM-DD 2016-05-27
Approved by: Name & position: Kevin Moore SSFU Superintendent	Date: YYYY-MM-DD 2016-05-27
Signature: 	

18. REFERENCES

- Saskatchewan Agriculture and Food. 1998. *Bison Production, Economic and Production Information for Saskatchewan Producers*. Sustainable Production Branch, 3085 Albert Street, Regina, SK, S4S 0B1.
- Emergency Order for the Protection of the Greater Sage-Grouse, P.C. 2013-1245, 18 November, 2013, SOR/13-202, Supplement to the Canada Gazette, Part II, vol. 147, no. 25, December 4, 2013.
- Environment Canada. 2013. *Amended Recovery Strategy for the Greater Sage-Grouse (Centrocercus urophasianus urophasianus) in Canada [Proposed]*. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vi + 49 pp.
- COSEWIC. 2010. *COSEWIC status appraisal summary on the Long-billed Curlew Numenius americanus in Canada*. Committee on the Status of Endangered Wildlife in Canada. Ottawa. iv pp.
- Environment Canada. 2012. *Amended Recovery Strategy for the Sprague's Pipit (Anthus spragueii) in Canada*. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. vi+ 44 pp.
- Parks Canada Agency. 2010a. *Grasslands National Park of Canada management plan 2010*. Parks Canada Agency, Ottawa. viii + 67pp.



Parks Canada Agency. 2016. Multi-species Action Plan for Grasslands National Park of Canada [Proposed]. Species at Risk Act Action Plan Series. Parks Canada Agency, Ottawa. iv + 57 pp.

Environment Canada 2015. Action plan for Multiple Species at Risk in Southwestern Saskatchewan: South of the Divide [Proposed]. Species at Risk Act Action Plan Series. Environment Canada, Ottawa. x + 127 pp.

Appendix A

Statement of Work for the Construction of Boundary Fence Grasslands National Park - Parks Canada Agency

General Specifications:

1.0 General

These specifications address the construction of fences to be built along permanent boundaries of Grasslands National Park (GNP). Such fences will be built on Parks Canada land, owned and maintained by Parks Canada, and be built between park-owned lands and: private landowners, provincial pastures and, along the United States/Canada International Boundary.

As part Grasslands National Park's commitment to the environment integrity of the park and surrounding area, new fences will be built in such a manner as to facilitate wildlife movements, while addressing the containment considerations associated with grazing management and the re-introduce the plains bison.

*Specific environmental protection issues associated with the construction of fences on Parks Canada lands are addressed in the attached, generic environmental assessment (**Annex I**). Site specific amendments may be made to the environmental assessment to ensure protection of cultural and natural resource. Mitigations identified in the environmental assessment must be adhered to, or other measures employed after consultation with the Parks Canada project officer.*

2.0 Scope of Work

2.1 Location

The location of the fence to be salvaged and new fence constructed. There is approx. 39.25 miles of boundary fence to be built with a few minor deviations to avoid terrain or water runs. All deviations will be discussed and will be on Parks Canada property unless approved by neighbour and Parks Canada contract officer. See Appendix 1 for land descriptions, locations and maps.

2.2 Optional Site Visit

As identified in the Tender Package documents an optional site visit for is available for prospective bidders in order to submit a bid. Parks Canada staff will have met with landowners adjacent to the

park to discuss: fence construction; construction time table; access; storing and staging of materials/equipment, and any special considerations that might arise.

2.3 Salvage

Contractor will be responsible for the salvaging of the existing fence. Disposal of the salvaged materials are the responsibility of the contractor. If neighbour requests salvage, all materials are to be moved to a suitable location on their property. All materials must be removed from Parks Canada property.

2.4 - Survey

Fence line demarcation. Contactor will be responsible for boundary surveying and demarcation. The fence line shall be surveyed inside GNP boundary by 0.3 to 1 meter. In the event the line is beside a road allowance, the road allowance will be left with the neighbouring property and the line shall be demarked 0.3 to 1 meter inside GNP property.

Rough terrain may warrant constructing the fence outside of the designated line. This would only be done in consultation with the GNP Representative.

2.5 Fence Construction - General

*The work is to drill and set or pound posts, affix wire and install gates as per approved specifications outlined in the following details, using the listed materials provided by the contractor and in accordance with attached **Annex II – VII**. All of neighbours cross fences shall be tied into and braced. All materials including gate latches, bin anchors, and fence stays to be provided by contractor.*

3.0 Materials

Materials used for construction of fence to be supplied by the contractor include:

- 8' pressure treated, square/diamond sharpened posts, 5-7" in diameter (for use as anchor, brace and gate posts)
- 7' pressure treated, square/diamond sharpened posts, 4-5" in diameter (for use as fence posts)
- four point 12.5 gauge double strand barbed wire (950 lb. breaking strength)
- barbless double strand wire (950 lb breaking strength)

- 9 gauge smooth wire
- gate slats
- metal gate closing levers
- 16' metal swing gates and mounting hardware (if requested in advance)
- 2" barbed staples
- wire splicers
- anchor wire-hooks
- spikes

4.0 Construction

4.1 Posts

4.1.1 Anchor Posts and Brace Posts

Anchor and brace post sets shall be used approximately every 1320 feet (ie. one wire length), at all changes in direction, corners and at all gates. Posts for anchors shall be a minimum of 5" in diameter.

Like line posts, anchor and brace posts shall be placed into the soil to a depth which leaves 58" above the ground.

Cross bracing shall be used between all anchor and brace posts. Cross braces shall be cut to fit from 7' cull posts and cross wired with barbed wire.

4.1.2 Line Posts

Spacing for line posts shall be 16' 6". Where obstacles (ie. rock piles) interfere with these spacing, posts may be situated closer or farther apart.

The posts shall be placed into the soil to a depth which leaves between 58" above the ground.

4.2 Gates

4.2.1 Wire Gates

All wire gates shall be constructed using 6 wires of double strand barbed wire and independently mounted with gate fasteners. There will be one wire gate constructed per half mile of fence. The location will be predetermined and marked by GNP

4.2.2 Metal Gates

There may be metal gates required by GNP. Contractors will determine a price for metal gates and place them where designated by GNP. There is not expected to be many metal gates

4.3 Wire

4.3.1 Spacing

The 5 wires shall be spaced at 18" from the ground, then every 9". This will result in wires at 18", 27", 36", 45" and 54" above the ground. The top two wires are to be smooth barbless as well as the bottom wire.

4.3.2 Attachment to Posts

The wire is to be attached to the posts with 2" barbed staples. The staples shall be securely driven into the posts across the grain of the post at an angle of approximately 45 degrees (from vertical) to a depth which will allow free movement of the wire within the staple.

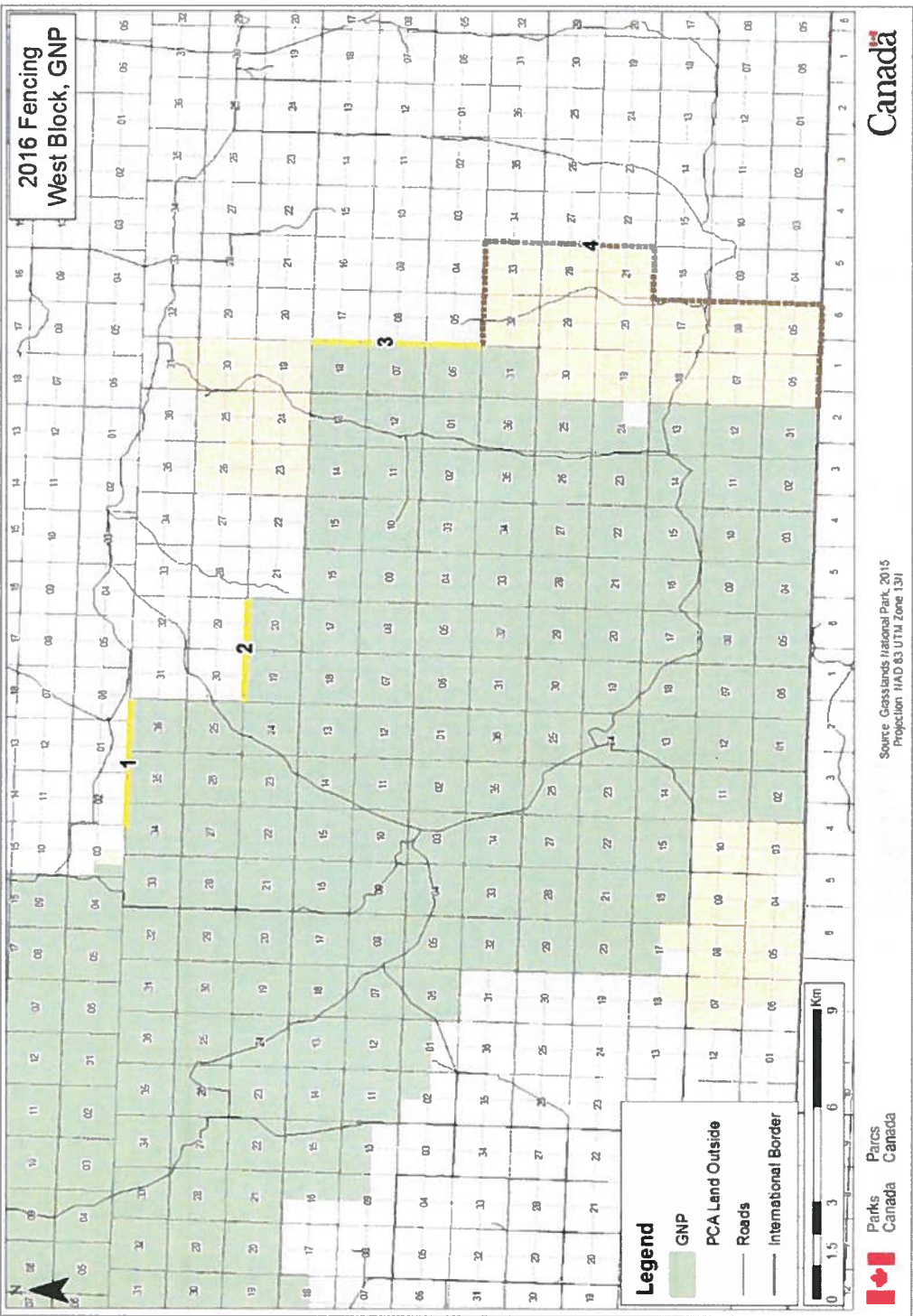
Each wire at all anchor post locations shall be wrapped around the post at least once and tied off. Wire is to be stapled to Canada's side of the posts.

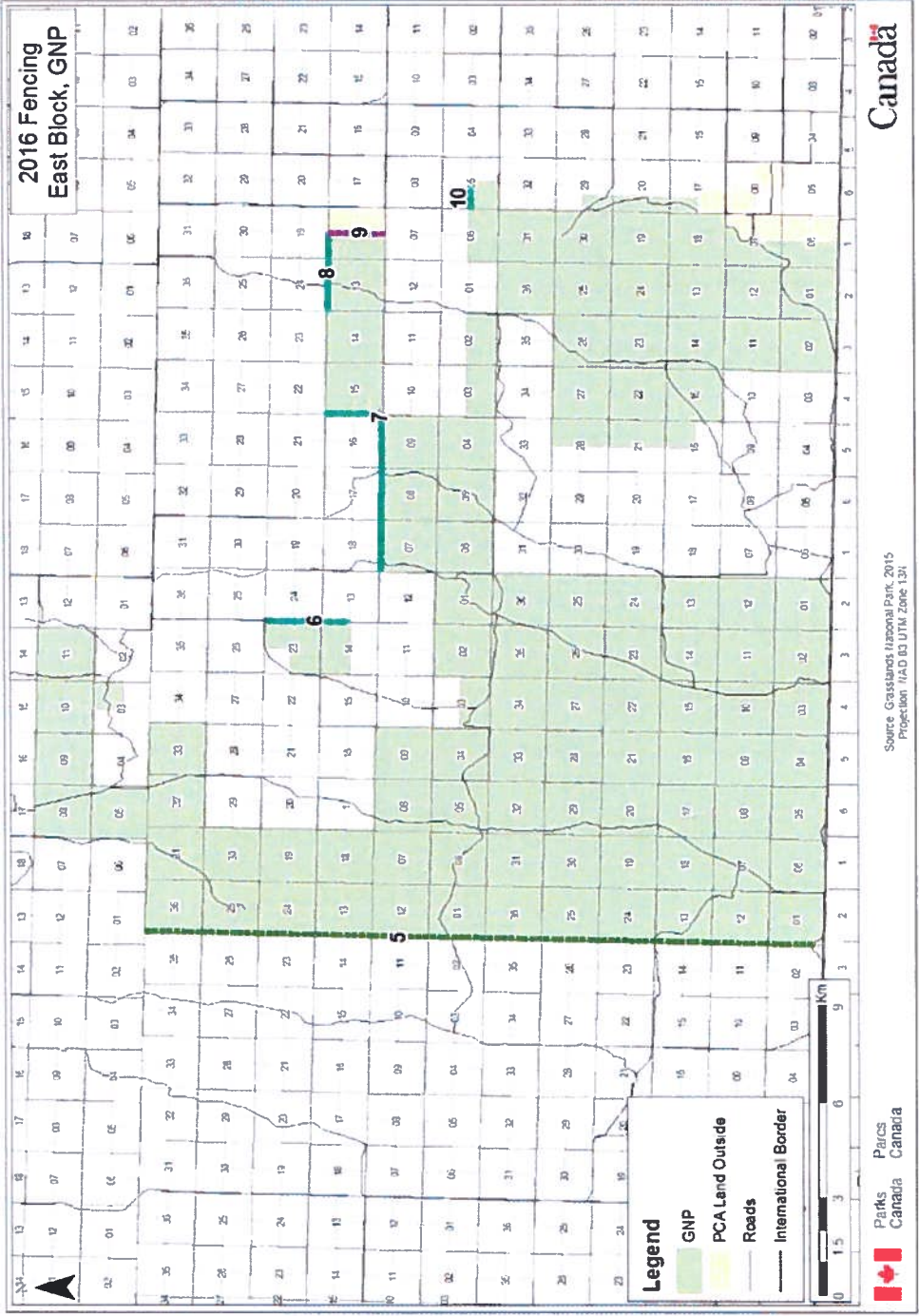
4.3.3 Wire Tension

Wire tension shall be such as to allow for a maximum of 3" side pull deflection. Double strand wire is required to be over tightened initially, before stapling, in order to remove a portion of the natural stretch of the wire.

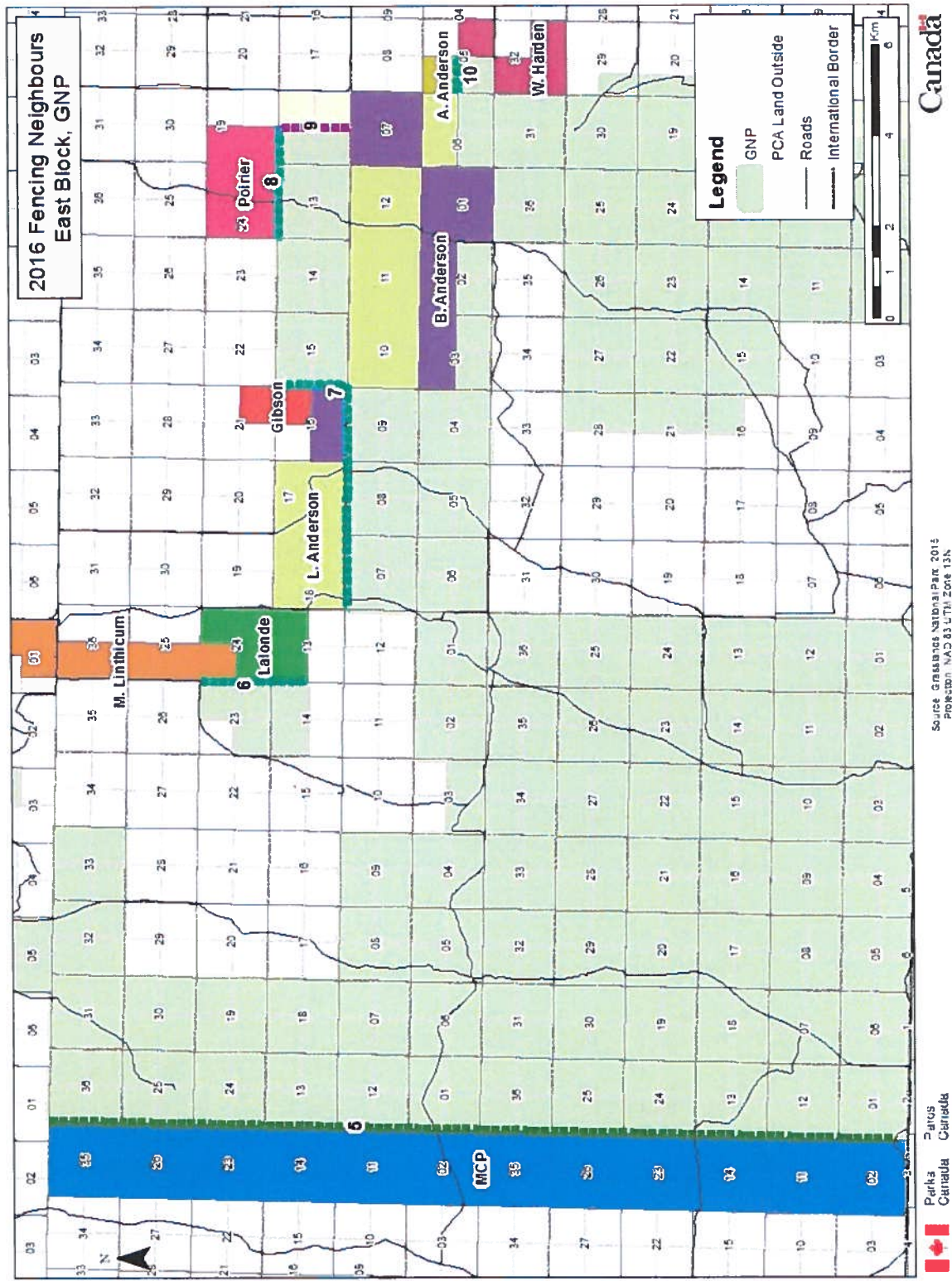
4.4 Screw/Bin Anchors

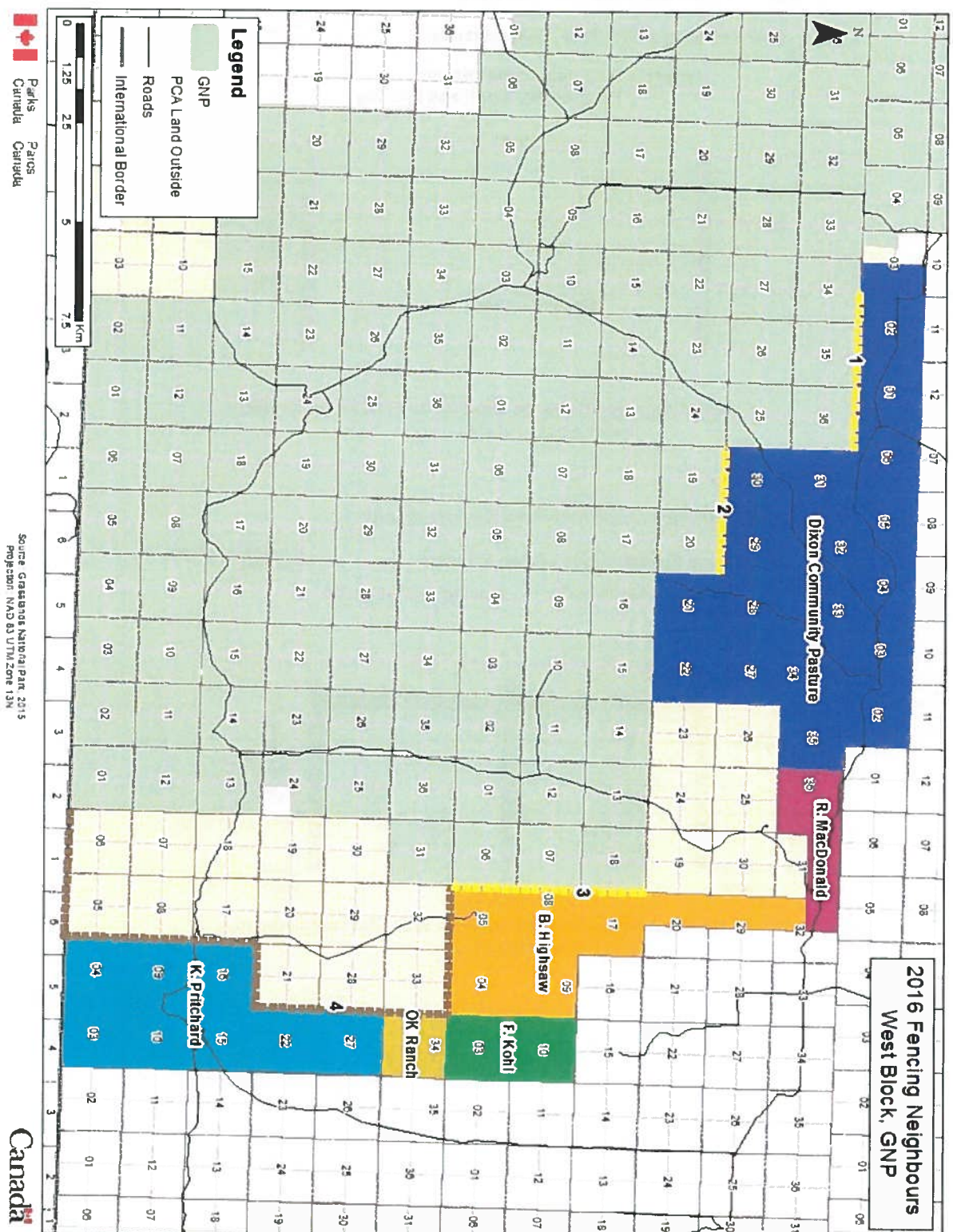
Screw or bin anchors shall be installed where the topography dictates they would be beneficial to the long term integrity of the fence (ie. where tight wire may lift posts out of the ground). This includes places where: anchor/brace posts are situated, corners, at fence ends/gates, one or more posts are lower than on those either side, where brace posts are situated in lower spots, or where the angle of a fence changes 10 degrees or more.





[illegible]



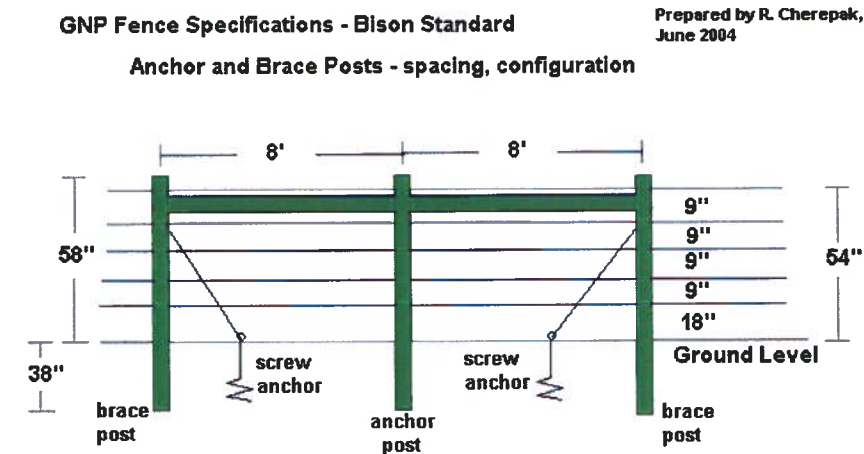


Annex II - General Fence Specifications



Note: numeric values are accurate and reflect requirement,
drawing not to scale

Annex III - Anchor and Brace Post Specifications



Note: numeric values are accurate and reflect requirement,
drawing not to scale



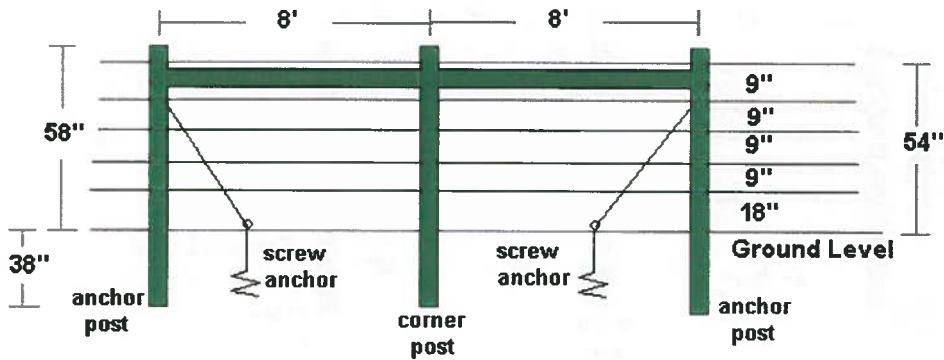
Annex IV - Corner Post Specifications (Side View)

GNP Fence Specifications - Bison Standard

Prepared by R. Cherepak,
June 2004

Corner Posts - anchors, spacing and configuration

side view
see next page for top view



Note: numeric values are accurate and reflect requirement,
drawing not to scale

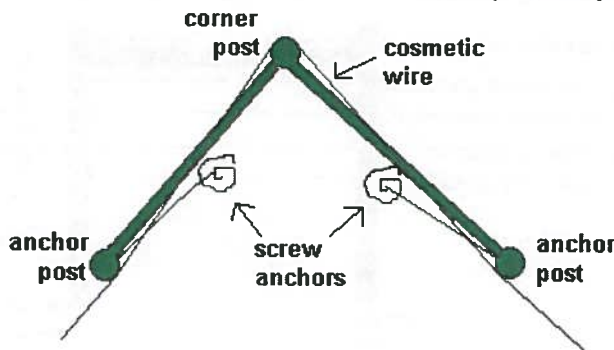
Annex V - Corner Post Specifications (Top View)

GNP Fence Specifications - Bison Standard

Prepared by R. Cherepak,
June 2004

Corner Posts - anchors, spacing and configurator

top view
see previous page for side view



Note: numeric values are accurate and reflect requirement,
drawing not to scale

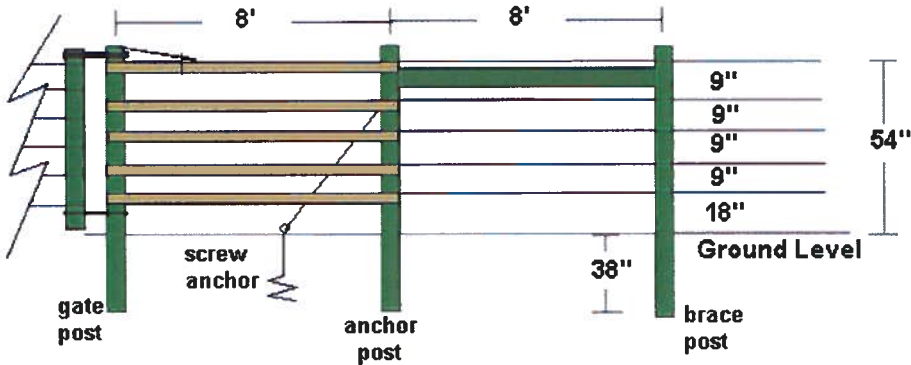


Annex VI - End of Fence at Wire Gate

GNP Fence Specifications - Bison Standard

Prepared by R. Cherepak,
June 2004

End of Fence at Wire Gate - rails, spacing and anchors



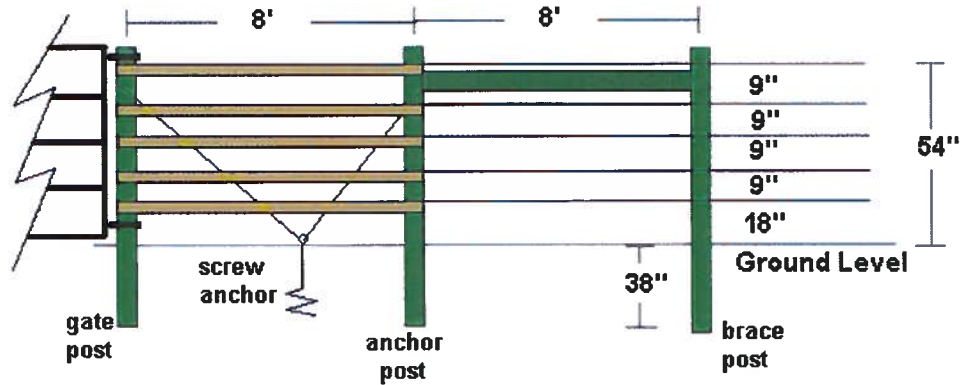
Note: numeric values are accurate and reflect requirement,
drawing not to scale

Annex VII - End of Fence at Metal Gate

GNP Fence Specifications - Bison Standard

Prepared by R. Cherepak,
June 2004

End of Fence at Metal Gate - rails, spacing and anchors



Note: numeric values are accurate and reflect requirement,
drawing not to scale





Appendix B

Archaeological Overview Assessment of Boundary Fence Construction in the East and West Blocks of Grasslands National Park

Sharon Thomson

Archaeologist, Parks Canada Agency

April, 2016

1.0 Introduction

The South Saskatchewan Field Unit plans to replace 40.5 miles of fence along portions of the existing and newly acquired perimeter of Grasslands National Park in the West and East blocks of the park. This Archaeological Overview Assessment will evaluate the archaeological potential of the project area and the risk of impact to cultural resources. Where potential impacts are identified, mitigations will be provided.

The AOA is based upon information contained in archaeological site files and the Dossier archaeology database maintained by Terrestrial Archaeology, Winnipeg. It is important to note that documented archaeological site boundaries are approximate, and are based on visual observation of artifacts or cultural features on the ground surface at time of survey. Thus, it is possible (even likely) that the areal extent of buried cultural resources at any given site extend beyond what was visible at that time. For this reason, sites within 50m of the new fence have been examined in this overview assessment.

2.0 Previous Archaeological Work

Grasslands National Park has made a longstanding commitment to ongoing archaeological surveys as new lands are acquired. This is in recognition that an up-to-date inventory is necessary if the park is to achieve its mandated responsibilities of protecting and presenting to Canadians the cultural resources within its boundaries.

Major archaeological surveys were conducted in the park throughout the 1990s. Since then, funding has been curtailed and archaeological investigations have focused increasingly on impact assessments for development projects and infrastructure improvements. Nevertheless, the SSFU continues to fund small-scale survey projects in most years.

Most of the archaeological survey in the areas covered by this project was conducted from 1991-1994.

3.0 Mechanisms of Impact

Equipment used for fence removal and construction include:





- tractors
- post-pounders
- augers
- pickup trucks
- all-terrain vehicles (ATVs)

The area of impact includes the prairie trails used to access fences, the fence line itself, and a 5m buffer on either side of the fence.

Expected impacts include:

- *Disturbance or destruction of surface archaeological resources from vehicle traffic and operation of machinery, both during fence installation and during subsequent maintenance activities*
- *Development of animal trails along the fence line, which creates erosion and increased exposure/displacement of archaeological resources*
- *Disturbance or destruction of sub-surface archaeological resources from new post installation and removal of old posts*
- *Removal of surface vegetation. This increases the potential for soil erosion, which may expose and displace buried artifacts.*

It is important to note that the impacts associated with infrastructure (fences and associated trails) are for the life of the infrastructure (long-term). Damage to cultural resources, once done, is irreversible.

4.0 Assessment of Impact to Archaeological Resources

The following summary information is keyed to the fence segments illustrated in Figures 1 and 2, which are taken from the draft Basic Impact Assessment prepared for the project.

A total of 31 sites are within 50m of the fence line. Of these, 13 sites have high potential for disturbance/damage to cultural resources. In addition, 27km of the new fencing passes through areas which have not yet been surveyed for archaeological sites. Based on observed patterns of site distribution elsewhere in Grasslands, there is a high probability of encountering undocumented tipi ring sites on the high ridges between coulees along fence segments #1 and #4.

Segment 1: N boundary NE-34-2-11, 35-2-11 and 36-2-11





This portion of the park (Fig. 1) has not yet been surveyed for archaeological sites, so quantitative data on which to base an overview assessment is not available. However, there is a high probability of encountering undocumented tipi ring sites on the high ridges between coulees draining to Breed Creek.

2. N boundary 19-2-10 and 20-2-10

One site (13N1529, Fig. 3), consisting of a single cairn, is within 50m of the fence line. Given the presence of just a single feature and absence of observed artifacts on the surface, the probability that buried cultural resources extend as far as the fence is low. Impact to this site from fencing activities is unlikely.

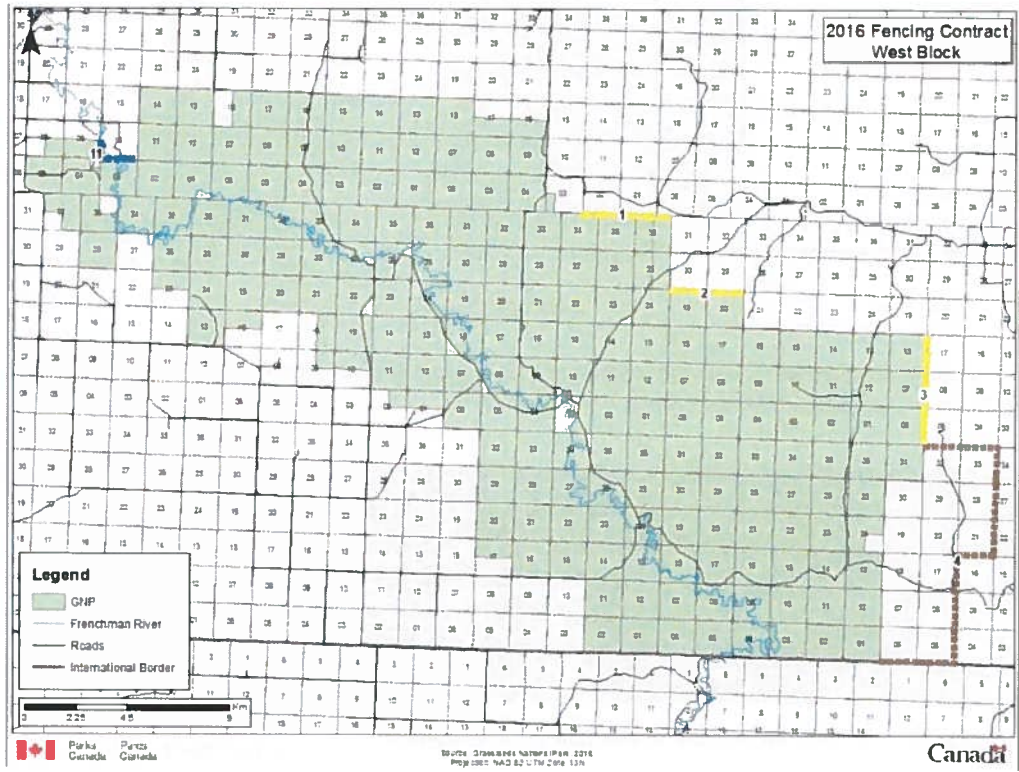


Figure 1: Location of fences for repair or replacement in the West Block of Grasslands National Park (from BIA, "Construction of New Boundary Fence, Grasslands NP").





Figure 2: Location of fences for re pair or replacement in the East Block of Grasslands National Park (from BIA, “Construction of New Boundary Fence, Grasslands NP”).

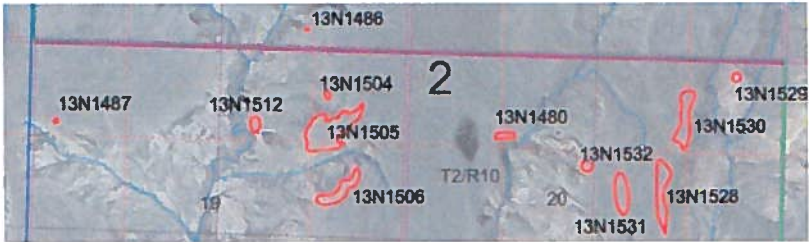


Fig. 3: Archaeological site 13N1529, upper right, within 50m of fence segment #2.

3. NE corner of 18-2-9 to SE corner of 06-2-9

Four sites are within 50m of the fence (Fig. 4). Of these, two are at high risk of impact. These are:

13N779: This is a very large site with more than 50 tipi rings and other related features, which extends at least as far as the fence line and probably beyond.

13N943: A small site with three tip rings and a drive lane segment. The fence runs across the site.

One site (**13N945**) has moderate potential for impact. It consists of three cairns and three tipi rings. Features and artifacts visible on the surface are present close to the fence line.





One site (**13N784**) is at low risk. Recorded cultural resources consist of a single tip ring, a cairn and a gunflint spread over a fairly wide area about 50m west of the fence. Given the apparently dispersed nature of the resources, the likelihood that undocumented cultural resources will be damaged by fencing activities is low.

4. Beginning at NW corner 32-1-9, heading east, south and west to end at SW corner of 06-1-9

This portion of the park has not yet been surveyed for archaeological sites, so data on which to base an overview assessment is not available. However, there is a high probability of encountering undocumented tipi rings and other features associated with precontact use of the area on the high ridges between coulees, and lithic scatters in the Frenchman River valley. The general mitigations outlined in section 5.0 of this report apply to fencing activities on segment #4.

5. NW corner 36-2-6 to SW corner 01-1-6

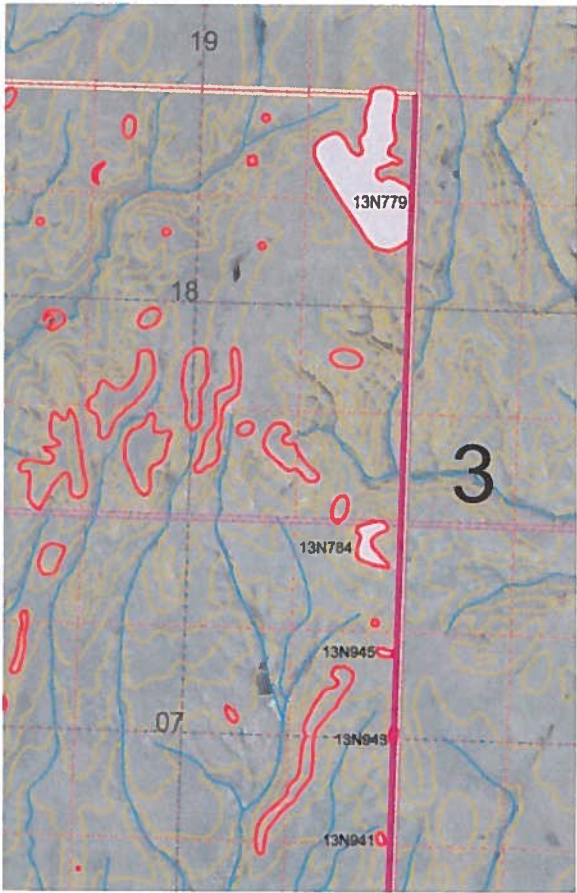


Fig. 4: Archaeological sites in proximity of fence segment #3.



Fifteen sites are within 50m of this 12 mile section of fence (Fig. 5). Of these, seven sites have high potential for damage from fencing activities and maintenance: **13N6018**: Seven tipi rings and associated lithic scatter (fire-cracked rock, stone flakes). The fence crosses this site.

13N6152: 16 tipi rings and three cairns. The fence goes through the site.

13N6157: More than 100 features, including 59 tipi rings and 31 cairns. The fence crosses the east end of the site.

13N6377: 16 tipi rings, three hearths and a cairn on the crest of the ridge. The fence meets the site at its north end.

13N6379: 11 tipi rings tightly clustered on the north edge of a bluff. The fence line crosses the middle of the site, and appears to go through or very close to a tipi ring.

13N6294: Very large site with 50 tipi rings, two hearths and five cairns. A small scatter of stone flakes was noted. A bison rubbing stone is at the south end of the site. The fence crosses the site at its north end. The fence passes through or very near two tipi rings.

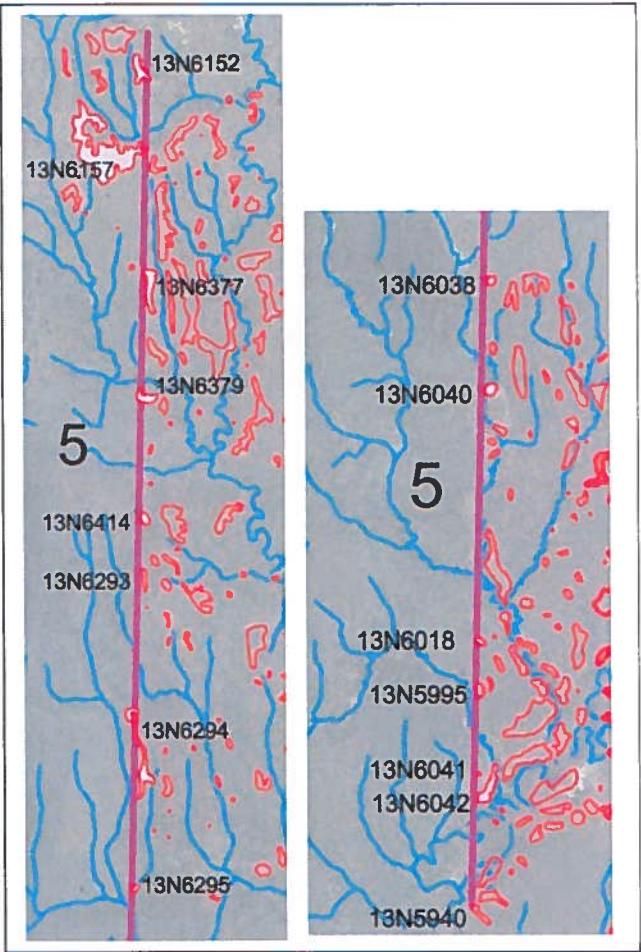


Fig. 5: Archaeological sites within 50m of fence segment #5. Left: north end; right: south end.

13N6414: Five tipi rings clustered at the crest of a knob of high ground. White earthenware fragments inside one of the tipi rings have been exposed by a worn animal track, and strongly suggest the site is protohistoric or early historic in age.

Four sites are at moderate risk of impact:

13N5995: Artifacts are visible in a blow out near the existing fence, and may extend to the fence line below the surface.

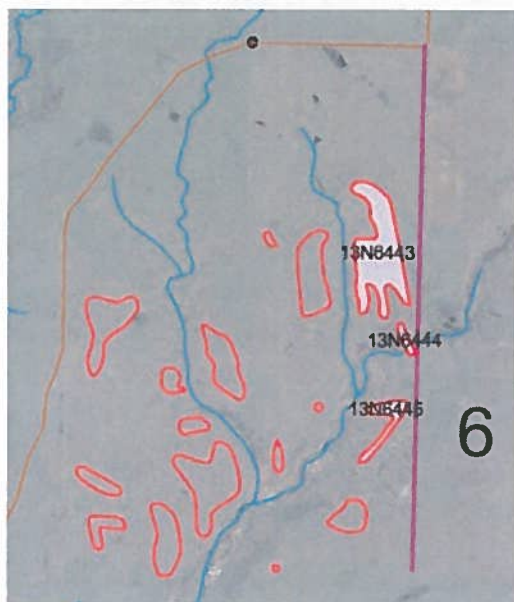
13N6042: Large site, with artifacts visible in eroded patches within 30m of fence. Rich and varied artifact assemblage with diagnostic tools that indicate the site may be as much as 4,000 years old. Hearths are present.





13N6293: A bison drive lane segment running along the crest of the ridge, coincident with the fence line.

13N6295: Buried artifacts may be present at the fence line.



Four sites (**13N5940**, **13N6038**, **13N6040**, **13N6041**) are small, and the likelihood that they extend to the fence is low. Thus, they are judged to be at low risk of impact.

6. NW corner 24-2-6 to N ½ 13-2-6

Three sites are within 50m of this 1.5 mi segment of fence (Fig. 6):

13N6443: 36 tipi rings and a cairn on the west side of the fence. Site is within 38m of the fence at its south end.

13N6444: The fence runs east of the recorded features, all historic.

13N6445: 12 tipi rings, two cairns. Existing fence is slightly east of recorded site.

Fig. 6: Archaeological sites within 50m of fence segment #6.

None of the sites appears to extend right up to the fence line, and the probability of impact therefore appears low. However, their nearness to the fence makes it important that the fence NOT be re-routed to the west through this area, to avoid impact to the sites.

7. NW corner 07-2-5 to NE corner 09-2-5, then north to NW corner 15-2-5

Five sites are within 50m of this 4 mile section of fence (Fig. 7). Three are at high risk of impact, as follows:

13N5014: 21 tipi rings. This site was only delineated as far as the north fence line, which represents the park boundary. However, the ridge on which the features are spread continues north, so the site may actually extend beyond the fence for an undocumented distance.



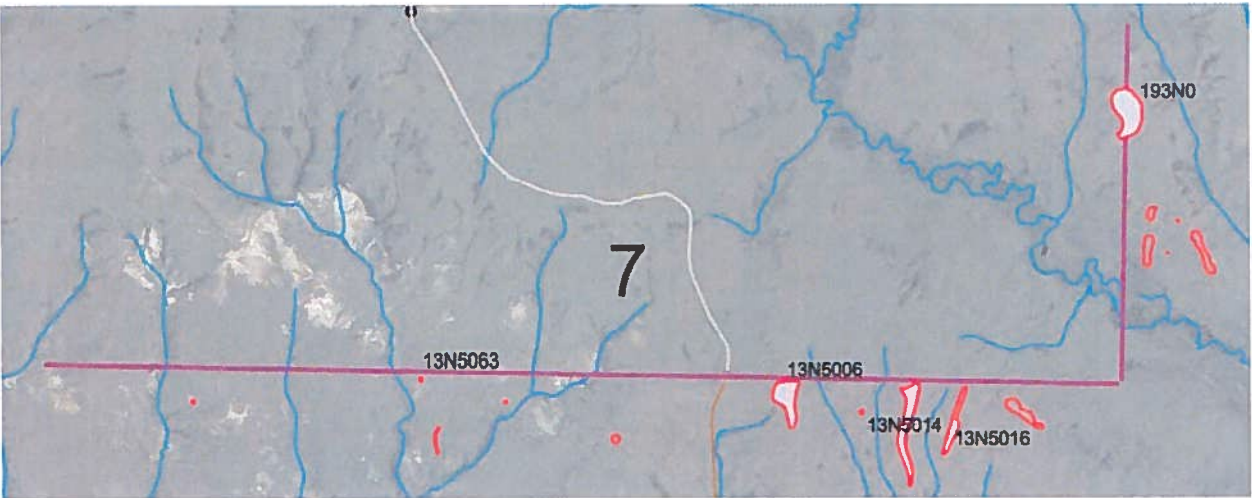


Fig. 7: Archaeological sites with potential for damage from fencing on segment #7.

13N5016: 13 tipi rings. The site was only delineated as far as the north fence line (park boundary). However, the ridge on which the features are spread continues north, so the site may extend beyond the fence for an unspecified distance.

193N: More than 50 tipi rings, of which ~20 are within the park and 30+ are outside (west of) the park boundary. Many features are visible near the fence. The fence goes right through the site.

One site is at moderate risk of impact:

13N5006 contains six tipi rings. The visible extent of the site doesn't appear to extend right up to the E-W fence, but there is some potential for buried artifacts at the fence line.

One site is at low risk of impact:

13N5063 is marked by a small exposure of flakes in eroded patches near the fence line on the ridge top. While the presence of buried artifacts at the fence line cannot be ruled out, surface indications suggest that they are scattered only sparsely across the site.

8. SW corner 24-2-5 to SE corner of SW 19-2-4

The overall probability of damage to sites along this fence segment is low. No sites have been recorded within 50m of the fence.

9. SE corner of SW 19-2-4 to SE corner of SW 18-2-4





The overall probability of damage to sites along this fence segment is low. No sites have been recorded within 50m of the fence.

10. N side of SW 05-2-4

One site (13N5385, Fig. 8) is within 50m of this fence segment. The potential for impact is high. Site 13N5385 consists of two tipi rings and an abundant scatter of artifacts. Fragments of precontact ceramics, a relative rarity in the park, were found on the ground surface. Additional fragments are almost certainly still present on site. Artifacts are visible within 15m of the existing fence line. The presence of ceramics and so many artifacts in conjunction with habitation features is notable.

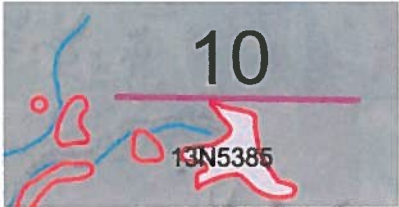


Fig. 8: Archaeological site 13N5385, at risk of damage from fencing on segment #10.

11. SE-09-3-13 and N side 03-3-13

There are two sites within 50m of this fence segment, which deviates from the actual boundary in order to avoid crossing the Frenchman River (Fig. 9). One site is at moderate risk of damage from fencing activities:

13N927: This site is marked by four widely-spaced tipi rings, at least five cairns and an extensive, continuous lithic scatter including flakes and cores, cobble tools and fire-cracked rock. The site extends for the length of the bluff on the south side of a coulee. The fence appears to be routed at the base of the bluff on which the site is located, but climbs to a higher elevation on the east side of the site. Any re-routing of the fence westward may cause impact to the site.

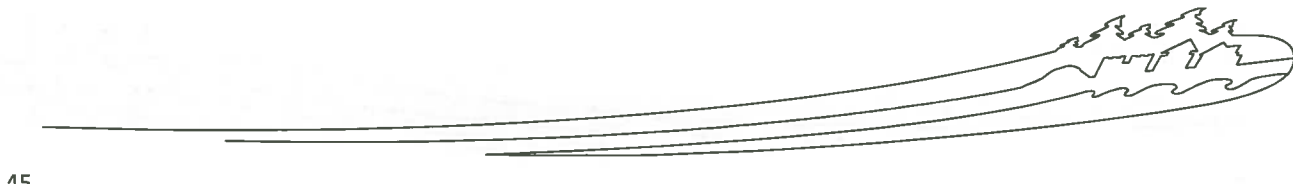
One site is at low risk of damage:

13N698: Thirteen tipi rings, two cairns and an extensive lithic scatter containing fire-cracked rock, flakes and stone tools. Some flakes are of Knife River Flint, which does not occur in local outcrops and must have been transported a considerable distance from its source in North Dakota. The site is positioned on the terrace above the valley bottom, i.e., it is at a higher elevation than the fence. Provided the fence does not deviate from its current course, the site is therefore unlikely to be impacted by fencing activities.



Fig. 9: Archaeological sites within 50m of fence segment #11.

5.0 Mitigations





A review of available site information indicates that 31 archaeological sites are located within 50m of the fences to be replaced. In addition, three fence segments cross lands which have not yet been examined for cultural sites, but the archaeological potential of these areas is high. The following general and site-specific mitigations aimed at minimizing damage to cultural features during fence installation and subsequent maintenance apply to this project:

General Mitigations

- 1. The fence should be routed at least 5m away from cultural features such as tipi rings and cairns, to avoid damage from heavy equipment and to protect surface features from displacement by cattle and/or bison walking the new fence line, and vehicles carrying out fence maintenance. Where the existing fence runs within 5m of these features, it should be re-routed to provide the requisite 5m buffer.*
- 2. Fencing equipment and vehicles will remain within 5m of the fence.*
- 3. Fencing will not take place during wet periods, to reduce the potential for vehicles to churn up soft ground, damaging buried artifacts and disrupting ground cover. Damage to vegetation increases the potential for subsequent surface erosion which exposes and displaces buried artifacts.*
- 4. Staging areas for fencing materials will be pre-selected in consultation with the PCA archaeologist,*
- 5. Portions of the fence which pass through areas which have not yet been surveyed for the presence of archaeological sites must be surveyed by a professional archaeologist, with recording to Parks Canada standards. This survey may take place after fence installation, but should be completed within a two year period.*
- 6. Coordinates for the 13 high-risk sites will be provided to the contractor once work begins, to ensure that adequate attention is given to these most vulnerable sites as fencing proceeds.*

Site-specific mitigations:

In addition to the general mitigations listed above:

- 7. Sites 13N6443, 13N6444 and 13N6445 are located immediately west of fence segment #6 (Fig. 6). The fence must not be re-routed to the west in this area.*
- 8. Site 13N927 is located immediately west of fence segment #11 (Fig. 9). The fence must not be re-routed to the west in this area.*

