



307 State Street  
P.O. Box 1956  
Hamilton, Montana 58940  
Phone: 406-363-2353, Fax: 406-363-3015  
<http://www.geumconsulting.com>

TO: Jim Dunnigan, Montana Fish, Wildlife and Parks  
FROM: Amy Sacry and Jesse Wallace, Geum Environmental Consulting, Inc.  
DATE: January 15, 2019  
RE: Therriault Creek 2018 Maintenance Summary

---

This memo describes maintenance work completed in 2018 at the Therriault Creek Restoration Project Site under Montana Fish, Wildlife and Parks (FWP) Task Order 19-0010. Maintenance tasks were identified by Geum Environmental Consulting (Geum). Maintenance work was completed by Westslope Forest Management (Westslope). Weed control activities were not completed in 2018, but the weed control contractor for Task Order 19-0010 is Mountain Valley Plant Management (MVPMP).

## Site Observations

The Therriault Creek Restoration Project was evaluated by Geum on September 11, 2018. The purpose of the site evaluation was to document existing site conditions, identify revegetation treatment maintenance needs, and determine weed control needs. A detailed description of observations related to the overall condition of the site is provided in a separate document, *Therriault Creek Restoration Project – Five-year Vegetation Management Plan* (Geum, 2019). Observations related to revegetation treatment maintenance and weed control are summarized in this document.

## Maintenance Observations

Three types of maintenance were identified during the site evaluation:

- Riparian protection fence removal and relocation
- Riparian protection fence repair
- Browse protector maintenance

A brief description of the observations and maintenance work associated with each of these items is provided below.

### Riparian Protection Fence Removal and Relocation

The perimeter of the riparian protection fence installed at the Site in 2013 and re-built in 2014 was walked on September 11, 2018. The southern end of the fence had the most damage from wildlife. The fence appeared to block a movement corridor as sign of deer, elk, and black bear were observed along a well-defined path immediately north of the livestock fence that was used as the southern boundary of the fence. There were tears in the east and west sides of the fence in this location (Figure 1). In addition, a large section of fence was down near the southwest corner near the toe of the hill slope near a dense patch of reed canarygrass (Figure 2). Several deer were spooked from this area and it is likely

deer use the reed canarygrass for cover and forage resulting in deer pushing through the fence to access the area. In response to these observations, Geum determined that relocating the southern end of the fence closer to the Therriault Creek channel (approximately 200 feet north of the current location) would allow animals to move through the area better and relieve pressure on the fence in this area. Geum identified approximately 750 linear feet of fence to be removed and approximately 350 linear feet of the removed material to be re-used to construct a new section of fence closer to the Therriault Creek channel (Figure 17).



**Figure 1. Damage to the riparian protection fence at the southern end of the project where the fence was blocking a wildlife movement corridor.**



**Figure 2. Downed section of fence at toe of slope near dense infestation of reed canarygrass.**

### Riparian Protection Fence Repair

Several locations were identified where the riparian protection fence netting was sagging, ripped, or where deer had created holes underneath the fence (Figure 3). The locations where the fence crossed the channel have been entry points for deer in the past. Both of these crossings were evaluated and it did not appear that deer were entering the fence through those locations (Figure 4). In addition, a gate was left open in the southwest corner and the fence at this location was rolled up allowing easy access for deer to enter the Site (Figure 5). It is possible this was opened to allow deer inside the fence to leave. Relocating the fence netting from the outside of the livestock fence to the inside of the livestock fence was a work item in Task Order 19-0010 to prevent damage of the fence by livestock in adjacent

pastures. Geum did not observe any damage to the fence from cattle rubbing or pushing on the fence. Along most of the length of the fence the netting is located between the 10-foot t-posts and the livestock fence making removal of the netting difficult. In some locations the netting is already located inside of the livestock fence. Moving the fence inside the livestock fence would also make it more difficult to secure the fence to the ground as it would need to be cut to fit around wooden fence posts. For these reasons, Geum and FWP agreed that moving the netting to inside the livestock fence should not be done. The landowner replaced a section of riparian protection fence netting at the upstream livestock crossing with wire fencing presumably in response to livestock damaging the fence netting (Figure 6). Two solarization plots in the south end of the Site had been planted with dormant willow cuttings in 2014. Recycled fence netting had been placed around these plots to protect the cuttings from browse. In 2018, the netting had been damaged and the plots were dominated by reed canarygrass (Figure 7). Geum determined these fences should be removed. Geum recorded locations of fence repair needs and provided the locations of known repairs to the maintenance subcontractor. Specific maintenance tasks provided to the maintenance sub-contractor with instructions to address the repairs as follows:

- Patch larger rips and tears in the netting with zip ties, salvaged fence, and/or browse protector materials.
- Re-secure fencing to posts with zip ties, and straighten any damaged or leaning posts.
- Re-secure fence netting to the ground with ground staples.
- Repair holes under the fence with salvaged fence material and/or browse protector materials.
- Remove two small fences installed around solarization plots at the south end of the Site.

The subcontractor was also instructed to make repairs to any additional locations they observed.



**Figure 3. Examples of riparian fence damage requiring maintenance. Hanging netting needs to be re-secured (left photo), and holes beneath the fence must be patched or stapled to the ground (right photo).**





**Figure 4. Condition of riparian protection fence at upstream (left photo) and downstream (right photo) stream crossings.**



**Figure 5. Open gate with fence rolled up near downstream end of Site.**



**Figure 6. Woven wire fencing installed by landowner on west side of livestock crossing at north end of riparian fence.**



**Figure 7. Small fences built around solarization plots that are no longer functioning.**

### Browse Protector Maintenance

Browse protectors were installed on all planted trees and shrubs in 2007 and 2010. Browse protectors were also installed on hundreds of residual shrubs from the original 2005 planting. Browse protectors have been removed, repaired, or expanded every year since 2008 as plants have out grown them. After installation of the riparian protection fence in 2013 and 2014, browse protectors were removed from all plants in the 2007 planting area. Some protectors have been removed from the 2010 planting area. All protectors on living shrubs and trees were left on plants outside of the riparian protection fence. Due to the extensive browse observed within the riparian protection fence in 2018, Geum determined that no additional browse protectors should be removed from living plants even within the fence. These protectors should be repaired and enlarged as needed. Photographs showing browse protector maintenance needs are provided in Figure 8. Geum recorded the approximate number of browse protectors to be removed and enlarged in each 2010 planting unit and provided the following instructions the maintenance crew:

- Remove browse protectors from all dead plants and re-use protectors for the following two tasks.
- Enlarge protectors around plants that have outgrown the protector.
- Install new protectors on shrubs outside of the riparian protection fence with no existing browse protection.





**Figure 8. Example of browse protectors that need to be expanded (top left photo), browse protector that needs to be removed from a dead shrub (top right photo), browse protector that needs to be removed and reinstalled (repaired) (left bottom photo), and browse protector that needs to be straightened and re-secured (right bottom photo).**

## Weed Control

Figure 15 shows the distribution of weeds at the Site in 2018. A few dense patches of common toadflax were observed near the upstream end of the Site. Cover and density of Canada thistle has increased greatly at the site since the last Site-wide herbicide application in 2015 and here are several large, dense infestations of Canada thistle at the Site (Figure 10 and Figure 11). Within the Site itself, cover of Canada thistle was low in 2015, with few to no mature plants remaining. The hayfield south of the Site was treated several times, but also missed in some years allowing the Canada thistle infestations in this area to persist. These infestations have never been controlled completely and were likely a major contributor to reinfestation of the Site. Dewatering of this area combined with heavy grazing has created significant disturbance allowing thistle infestations to expand and become denser (Figure 9). Dense patches mostly occur along the channel or expand out from the edges of the channel or expand towards the channel from the dense infestations in the hayfield to the south of channel. Canada thistle is well distributed within planting units, within natural willow expansion areas, and throughout areas consisting of dense sedges and willows.

Cover of reed canarygrass, an aggressive introduced graminoid, has also increased at the Site. The density of reed canarygrass in the very downstream portion of the Site has always been very high. It appears to have spread to this area through old irrigation ditches and several old swales and channels in

this area have allowed it to expand and dominate. In 2018, there were several new patches of reed canarygrass upstream of the large infestation (Figure 12). Reed canarygrass has always had much lower cover in the rest of the Site. It is primarily found on streambanks and in small patches away from the channel (Figure 13). Greater cover on both streambanks and areas further from the channel was observed in 2018 in response to the lack of Site-wide herbicide treatment in 2016 and 2017. Treating reed canarygrass along streambanks is difficult as it can lead to streambank instability. Continued treatment should focus on controlling the expansion from the downstream infestation and all clumps of reed canarygrass that can be effectively treated with herbicide throughout the rest of the Site (Figure 14).



**Figure 9. Dense infestation of Canada thistle in hayfield east of the Site (thistle infestation is white band in middle of photo).**





**Figure 10. Canada thistle infestations in the upstream portion of Site.**





**Figure 11. Canada thistle infestations in the downstream portion of the Site.**



**Figure 12. Expansion of reed canarygrass from large infestation at the downstream end of the Site. Reed canarygrass is the lighter yellow colored vegetation in the photograph.**



**Figure 13. Reed canarygrass along streambanks at the Site.**



**Figure 14. Isolated clumps of reed canarygrass at downstream (southwest) end of Site.**



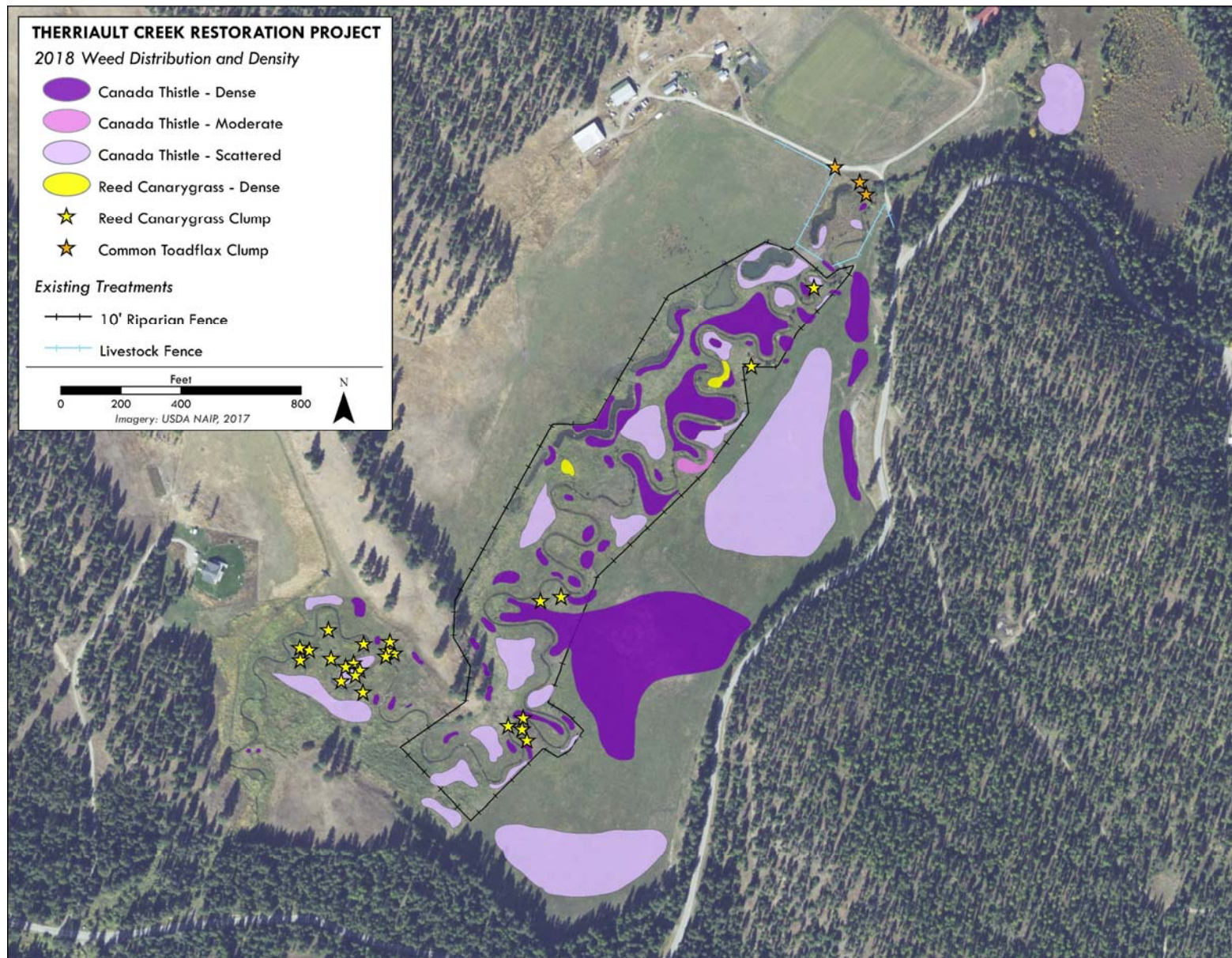


Figure 15. Weed species and densities mapped at the Site in 2018.

## Completed Maintenance

Maintenance work was completed between November 13<sup>th</sup> and 16<sup>th</sup>, 2018, by Westslope Forest Management, Inc. of Frenchtown, Montana (Westslope). Table 1 summarizes Geum's initial estimate of maintenance work to be completed in 2018 and the actual work completed by Westslope. Figure 17 shows the locations of completed maintenance work. A brief description of completed maintenance tasks is included below.

**Table 1. Summary of estimated and completed maintenance quantities.**

Task	Unit	Estimated Quantity	Completed Quantity
Riparian protection fence removal	Linear feet	750	800
Riparian protection fence installation	Linear feet	350	350
Riparian protection fence repair	Linear feet	NA <sup>1</sup>	136
Browse protector maintenance	Each	486	302
Trash disposal	Lump sum	1	1

<sup>1</sup> Specific fence repair locations were provided to subcontractor, but total quantity of repairs was not estimated.

### Riparian Protection Fence Removal and Reinstallation

A total of 800 feet of riparian protection fence was removed and a total of 350 feet was relocated (Table 1). Approximately 780 linear feet of existing riparian fence was removed from the south end of the Site. The netting and 10-foot t-posts removed from this area were used to reinstall approximately 350 linear feet of new riparian fence in the location shown on Figure 17. Newly installed fence was tied into existing riparian fence to re-establish a full enclosure. Riparian fence was also removed from two solarization plots at the downstream end of the project. The exact length of fence is unknown but because removing these areas did not require removal of 10-foot t-posts an additional 20 feet of fence removal was recorded.

### Riparian Protection Fence Repair

A total of 136 linear feet of riparian protection fence was repaired in 2018 (Table 1). Repair of the existing riparian fence included patching small holes and tears in the fence netting, straightening bent or damaged fence posts, re-securing fence netting to existing fence posts, re-securing fence netting to the ground, and patching holes under the fence. Salvaged fence netting and browse protector materials were used to patch holes and rips in and under the fence (Figure 16). Plastic zip ties were used to attach patches and re-secure netting to fence posts. Metal ground staples (18-inch) were used to re-secure fence netting to the ground. The repair locations identified by Geum are shown on Figure 17. Additional damage was located and repaired by Westslope during maintenance work. Fence repairs were measured in linear feet.





**Figure 16. Examples of riparian protection fence repairs: re-securing netting with zip ties (left photo) and using salvaged browse protector materials to patch fence holes (right photo).**

### Browse Protector Maintenance

A total of 170 browse protectors were removed and 132 enlarged or installed for a total of 302 browse protectors maintained in 2018 (Table 1 and Table 2). Browse protector maintenance included removing browse protectors (netting and posts) from dead shrubs, enlarging existing browse protectors around shrubs that had outgrown original browse protectors, and installing new browse protectors on shrubs without browse protection. Removed browse protectors were used to enlarge other protectors or install protectors on plants with no protection. Westslope ran out of browse protector materials resulting in the lower number of protectors expanded and installed and estimated. The maintenance crew also ran into issues with wooden stakes having rotted and not being able to recycle them. If browse protector repair and maintenance is done in fall 2019, new wooden stakes will be required. FWP has a stockpile of previously removed browse protector nets in Libby, Montana that can be delivered to the site for maintenance work as needed. Table 2 summarizes the actual number of browse protectors removed and enlarged/installed within each 2010 planting unit.

**Table 2. Summary of browse protector maintenance completed by planting unit in 2018**

<b>2010 Planting Unit ID</b>	<b>Browse Protectors Removed</b>	<b>Browse Protectors Enlarged/Installed</b>
<b>1</b>	0	0
<b>2</b>	0	0
<b>3</b>	0	0
<b>4</b>	3	2
<b>6</b>	0	0
<b>7</b>	3	2
<b>9</b>	0	0
<b>10</b>	0	0
<b>11</b>	18	11
<b>12</b>	26	11
<b>13</b>	30	11
<b>14</b>	24	13
<b>15</b>	6	1
<b>16</b>	4	1
<b>17</b>	16	14
<b>18</b>	23	34
<b>19</b>	5	9
<b>20</b>	4	19
<b>21</b>	3	1
<b>22</b>	1	1
<b>23</b>	2	0
<b>24</b>	2	2
<b>Sub-total</b>	<b>170</b>	<b>132</b>
<b>Total Browse Protectors Maintained</b>		<b>302</b>

## Trash Disposal

Geum asked Westlope to dispose of materials that could not be reused at the Site. This task included time and mileage for loading and transporting non-reusable materials to the county landfill in Eureka, Montana.

## Weed Control

Figure 15 shows weed control needs identified during Geum's site evaluation on September 11, 2018. This guidance was provided to the herbicide applicator, Mountain Valley Plant Management (MVPM). MVPM visited the site in early October, 2018. At this time there had not been sufficient fall moisture for Canada thistle to grow so fall treatment would not have been effective. No weed control was completed in 2018. Weed control is planned for spring/summer 2019.



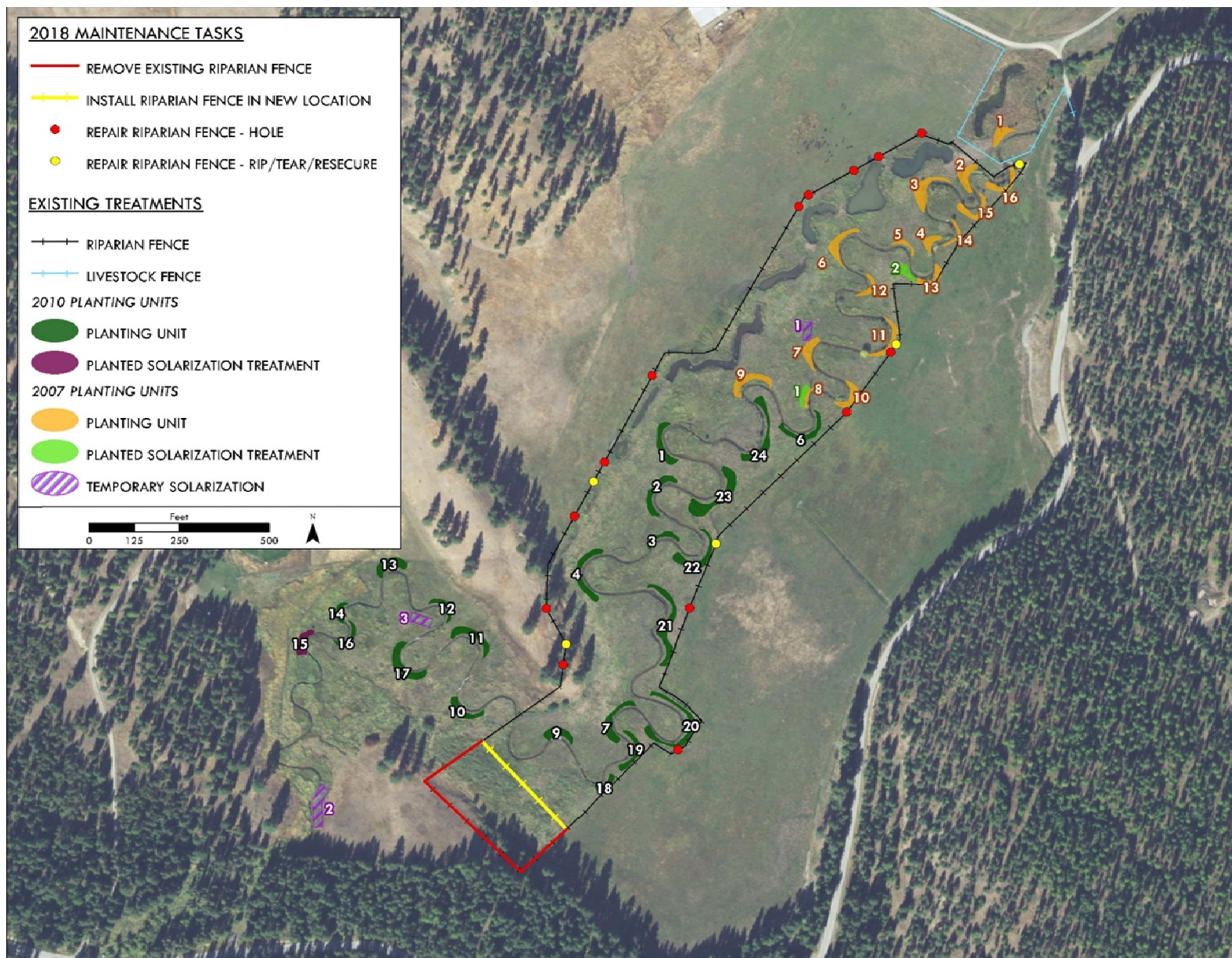


Figure 17. Maintenance locations identified at the project site in 2018.