

**IDAHO DEPARTMENT OF FISH AND GAME**

**Ed Schriever, Director**

**Project F18AF01195**

**Panhandle Forest Carnivores  
Cooperative Endangered Species Conservation**

**Final Performance Report**



**Performance Period**

August 13, 2018 through June 30, 2020

**Compiled and edited by:**

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August 2020  
Boise, Idaho

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## ESA TRADITIONAL SECTION 6 FINAL PERFORMANCE REPORT

**1. State:** Idaho

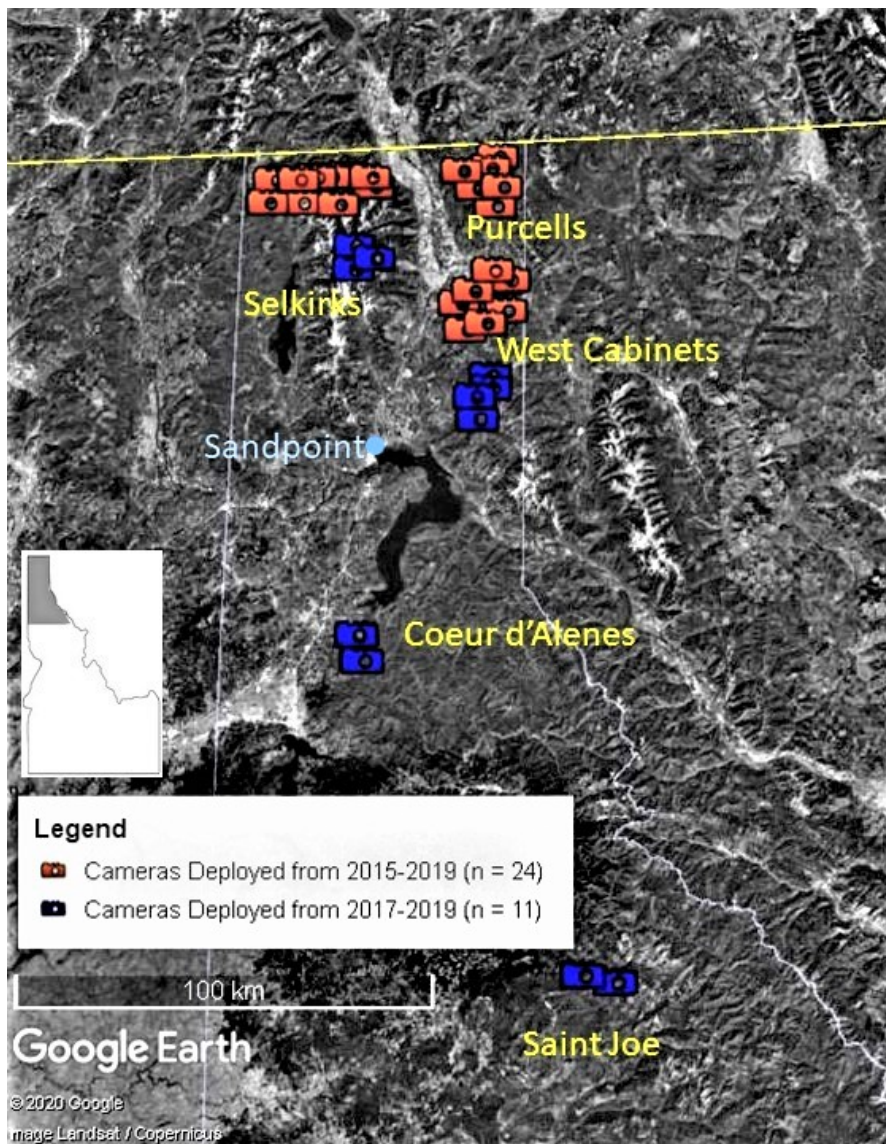
**Grant number:** F18AF01195

**Grant name:** Idaho Panhandle Forest Carnivores

**2. Report Period:** August 13, 2018 through June 30, 2020

**Report due date:** September 28, 2020

**3. Location of work:** Idaho Panhandle



**Figure 1.** Study area. Cameras were deployed in 2015 or 2017 across five mountain ranges in the Idaho Panhandle.

#### 4. Objectives

The Objectives of this grant are the following:

- 1) Visit and service 30 deployed cameras.
- 2) Process and summarize remote camera images collected from 2015-2019.
- 3) Produce 2 interim and 1 final report.

Target species are Canada lynx (*Lynx canadensis*) and wolverine (*Gulo gulo*).

#### 5. If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.

This project was designed as continued monitoring of areas where Canada lynx (*Lynx canadensis*) and wolverine (*Gulo gulo*) were detected between 2010 and 2014 during the Multi-species Baseline Initiative (MBI) project (U.S. Fish and Wildlife Service Wildlife and Sport Fish and Restoration Program Competitive State Wildlife Grant F12AP01101). This project has consisted of three Section 6 awards for which results are presented in this report. Collectively, the three awards have funded a continuous four-year deployment of an array of un-baited remote cameras. This report details the completion of the overall project including camera take down, processing of 2015-2019 camera images, and a summary of those images for the target species. The following summarizes how the activities of each award are related to each other:

**F15AS00167:** Idaho Panhandle Forest Carnivores

Performance Period: July 10, 2015-June 30, 2017

2015 activities: Deploy 24 un-baited remote cameras.

2016 activities: Service the 24 cameras by changing batteries and replacing memory cards.

**F17AS00230:** Idaho Panhandle Forest Carnivores,

Performance Period: August 1, 2017-June 30, 2019

2017 activities: Service the 24 cameras deployed in 2015 and deploy 11 additional cameras.

2018 activities: Service the 35 deployed cameras.

**F18AF01195 (this grant):** Idaho Panhandle Forest Carnivores

Performance Period: August 13, 2018-June 30, 2020

2018 activities: Begin processing remote camera images.

2019 activities: Collect all 35 deployed cameras. Continue processing remote camera images.

2020: Finalize review of remote camera images from 2015-2019 camera deployment.

#### 6. Describe how the objectives were met.

For the cameras deployed in 2015, we selected clusters of six to ten 5x5 km<sup>2</sup> cells which were either the same or adjacent cells to where Canada lynx or wolverine were detected during the 2010-14 period consisting of the MBI project (Lucid et al. 2016). For the cameras deployed in 2017 we either chose a cell cluster approximately 10 km south of the 2015

cluster (Selkirks and West Cabinet Mountains) or clustered around the most recent verified lynx detection in the mountain range (Coeur d’Alene’s and Saint Joe Mountains; Albrecht and Heusser 2009). We used ArcGIS 10.1 (Environmental Systems Research Institute, Redlands, CA) to generate a buffer around each road and hiking trail in the cell. We then generated a random point within this buffer for the camera location. This resulted in survey sites which were randomly located but biased to roads and hiking trails and, thus, suitable for passive detection of lynx (King et al. 2020, Weingarth et al. 2015). Although this is an effective deployment method for detection of lynx (King et al. 2020, Weingarth et al. 2015), we recognize this technique is less suited to detection of wolverine (e.g., Robinson et al. 2017).

We deployed a Reconyx® PC800 or PC900 remote camera within 100 meters of the randomly selected point. Road and trail condition varied and included open gravel roads, decommissioned and heavily vegetated road beds, and maintained hiking trails. To allow the capture of maximum viewshed on varying road/trail bed types, cameras were placed 1-3 meters above and perpendicular to road/trail bed. Camera height and distance from road or trail was dependent on condition of vegetation. Cameras were attached to trees with a cable locking system and programmed as described in Table 1. No attractant was used and cameras operated undetected by animals passing by.

We deployed 24 cameras in 2015 and 16 cameras in 2017. Three of the cameras deployed in 2015 were missing (likely stolen) and two failed completely and had no data available. Therefore, although we deployed 40 cameras total, we report on only the 35 from which data are available. Hereafter, we refer only to the 35 cameras from which data are available (2015 deployment = 24 cameras, 2017 deployment = 11 cameras).

|                      |                       |
|----------------------|-----------------------|
| Motion Sensor        | On                    |
| Sensitivity          | High                  |
| Pictures per Trigger | 3                     |
| Interval             | Rapidfire             |
| Quiet Period         | None                  |
| Time Lapse           | Daily picture at 12pm |
| Resolution           | 3.1 MP                |
| Night Mode           | Balanced              |
| Illuminator          | On                    |

**Table 1.** Settings for Reconyx® PC800 and PC900 deployed along roads and hiking trails

We visited and serviced cameras once each year between July and October. Prior to fall 2019, ‘servicing’ a camera entailed an annual visit to collect images and replace memory cards and batteries. During the fall of 2019, ‘servicing’ a camera entailed removing the camera and associated hardware from deployment.

We downloaded images and used Timelapse 2.0 (<http://saul.cpsc.ucalgary.ca/timelapse/>) software to process images. We viewed each image individually and used the software to

classify the species present in each image. We defined a ‘detection’ as a series of images of the same animal with  $\leq 10$  minutes separating each image. If multiple individuals were present in a single image we considered that image to be two ‘detections’ of the species. Multiple lynx individuals were only detected when kittens were present in images. We did not make a specific effort to use pelage color and animal size to differentiate individuals in photographs. With the exception of small kittens, we did not make a specific effort to differentiate juvenile from adult lynx. We defined camera failures as time periods where the camera was not working or when the lens was obscured by snow or tree branches. We considered a ‘trap day’ a 24 hour period from midnight to midnight. We considered the number of days between the first day of deployment and the day the camera was removed to be ‘possible trap days’. We considered all days for which the camera was working properly to be ‘actual trap days’.

### **Wolverine Detections-**

We detected a single wolverine 2 times in the Purcell Mountains at camera 1293.

### **Lynx Detections-**

*Purcell Mountains*-We detected lynx 248 times at 6 cameras in the Purcell Mountains. This is inclusive of six detections of lynx kittens in the Purcell Mountains (Table 2, Figure 2, and Figure 3).

| <b>Camera ID</b> | <b>Detection Date</b> | <b># Kittens</b> | <b># Adults</b> |
|------------------|-----------------------|------------------|-----------------|
| R1292            | 2-Nov-15              | 2                | 1               |
| R1292            | 31-Jul-17             | 1                | 1               |
| R1293            | 14-Oct-17             | 2                | 0               |
| R1293            | 27-Sep-19             | 1                | 0               |

**Table 2.** Summary of lynx kitten detections from 2015-2019 and adults detected in same image.





**Figure 2.** Lynx kitten detection images from cameras R1292 and R1293.

*Selkirk Mountains*-We detected lynx 50 times at 10 cameras in the northern Selkirk Mountain cluster which was deployed in 2015. We did not detect lynx on the 3 cameras deployed in the southern Selkirk Mountain cluster which were deployed in 2017 (Table 2, Figure 2).

*West Cabinet Mountains*-We detected lynx 56 times at 8 cameras in the northern West Cabinet Mountains cluster which was deployed in 2015. We did not detect lynx on the 4 southern West Cabinet cameras which were deployed in 2017 (Table 2, Figure 2).

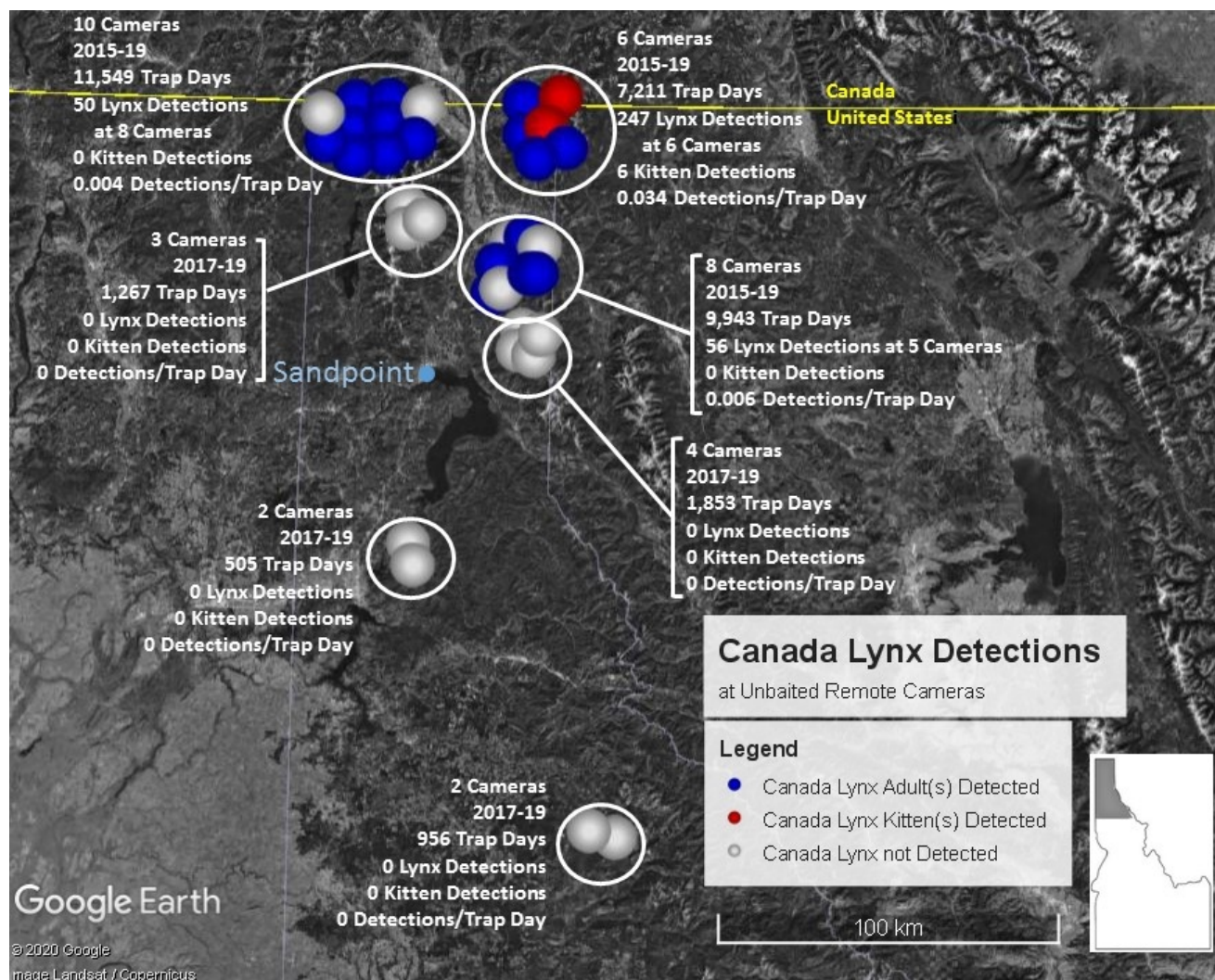
*Couer d'Alene and Saint Joe Mountains*-We did not detect lynx in these mountain ranges.

| Camera ID    | Mountain Range | Lat   | Long    | Camera Deployed | Camera Retrieved | Possible Trap Days | Actual Trap Days | Actual/<br>Possible Trap Days | Juv. Lynx Det. | All Lynx Det. | Lynx Detection to Actual Trap Day Ratio |
|--------------|----------------|-------|---------|-----------------|------------------|--------------------|------------------|-------------------------------|----------------|---------------|---|
| R84          | Selkirks       | 48.93 | -116.93 | 29-Oct-15       | 21-Aug-19        | 1392               | 1110             | 80%                           | 0              | 1             | 0.001                                   |
| R85          | Selkirks       | 48.97 | -116.93 | 29-Oct-15       | 21-Aug-19        | 1392               | 1052             | 76%                           | 0              | 0             | 0.000                                   |
| R96          | Selkirks       | 48.93 | -116.85 | 21-Oct-15       | 31-Jul-19        | 1379               | 1201             | 87%                           | 0              | 12            | 0.010                                   |
| R97          | Selkirks       | 48.98 | -116.84 | 21-Oct-15       | 31-Jul-19        | 1379               | 1286             | 93%                           | 0              | 2             | 0.002                                   |
| R113         | Selkirks       | 48.97 | -116.80 | 22-Oct-15       | 31-Jul-19        | 1378               | 1026             | 74%                           | 0              | 23            | 0.022                                   |
| R114         | Selkirks       | 48.98 | -116.82 | 21-Oct-15       | 11-Jul-19        | 1359               | 1140             | 84%                           | 0              | 5             | 0.004                                   |
| R129         | Selkirks       | 48.93 | -116.74 | 27-Oct-15       | 17-Aug-19        | 1390               | 1047             | 75%                           | 0              | 4             | 0.004                                   |
| R130         | Selkirks       | 48.99 | -116.73 | 22-Oct-15       | 31-Jul-19        | 1378               | 1025             | 74%                           | 0              | 1             | 0.001                                   |
| R141         | Selkirks       | 48.93 | -116.64 | 27-Oct-15       | 22-Aug-19        | 1395               | 1395             | 100%                          | 0              | 2             | 0.001                                   |
| R142         | Selkirks       | 48.99 | -116.69 | 27-Oct-15       | 20-Aug-19        | 1393               | 1267             | 91%                           | 0              | 0             | 0.000                                   |
| <b>Total</b> |                |       |         |                 |                  | <b>13835</b>       | <b>11549</b>     | <b>83%</b>                    | <b>0</b>       | <b>50</b>     | <b>0.004</b>                            |
| R135         | Selkirks       | 48.67 | -116.64 | 16-Oct-17       | 14-Aug-19        | 667                | 382              | 57%                           | 0              | 0             | 0.000                                   |
| R136         | Selkirks       | 48.73 | -116.64 | 16-Oct-17       | 6-Aug-19         | 659                | 463              | 70%                           | 0              | 0             | 0.000                                   |
| R148         | Selkirks       | 48.69 | -116.57 | 16-Oct-17       | 6-Aug-19         | 659                | 422              | 64%                           | 0              | 0             | 0.000                                   |
| <b>Total</b> |                |       |         |                 |                  | <b>1985</b>        | <b>1267</b>      | <b>64%</b>                    | <b>0</b>       | <b>0</b>      | <b>0.000</b>                            |
| R1200        | Purcells       | 48.93 | -116.17 | 7-Nov-15        | 6-Aug-19         | 1368               | 1267             | 93%                           | 0              | 1             | 0.001                                   |
| R1246        | Purcells       | 48.94 | -116.10 | 26-Aug-15       | 26-Jun-19        | 1400               | 1400             | 100%                          | 0              | 48            | 0.034                                   |
| R1247        | Purcells       | 48.99 | -116.10 | 26-Aug-15       | 26-Jun-19        | 1400               | 955              | 68%                           | 0              | 49            | 0.051                                   |
| R1291        | Purcells       | 48.91 | -116.05 | 26-Aug-15       | 27-Jul-19        | 1431               | 730              | 51%                           | 0              | 27            | 0.037                                   |
| R1292        | Purcells       | 48.94 | -116.05 | 26-Aug-15       | 8-Sep-18         | 1109               | 1370             | 124%                          | 3              | 71            | 0.052                                   |
| R1293        | Purcells       | 49.00 | -116.06 | 26-Aug-15       | 3-Oct-19         | 1499               | 1489             | 99%                           | 3              | 44            | 0.030                                   |
| <b>Total</b> |                |       |         |                 |                  | <b>8207</b>        | <b>7211</b>      | <b>88%</b>                    | <b>6</b>       | <b>247</b>    | <b>0.034</b>                            |
| R1235        | Cabinets       | 48.40 | -116.09 | 17-Aug-17       | 8-Aug-19         | 721                | 683              | 95%                           | 0              | 0             | 0.000                                   |
| R1188        | Cabinets       | 48.38 | -116.16 | 17-Aug-17       | 1-Aug-19         | 714                | 226              | 32%                           | 0              | 0             | 0.000                                   |
| R1189        | Cabinets       | 48.41 | -116.16 | 7-Aug-17        | 1-Aug-19         | 724                | 223              | 31%                           | 0              | 0             | 0.000                                   |



|              |          |       |         |           |           |              |             |            |          |           |              |
|--------------|----------|-------|---------|-----------|-----------|--------------|-------------|------------|----------|-----------|--------------|
| R1234        | Cabinets | 48.40 | -116.11 | 17-Aug-17 | 8-Aug-19  | 721          | 721         | 100%       | 0        | 0         | 0.000        |
| <b>Total</b> |          |       |         |           |           | <b>2880</b>  | <b>1853</b> | <b>64%</b> | <b>0</b> | <b>0</b>  | <b>0.000</b> |
| R1144        | Cabinets | 48.52 | -116.25 | 25-Aug-15 | 4-Oct-19  | 1501         | 891         | 59%        | 0        | 0         | 0.000        |
| R1146        | Cabinets | 48.58 | -116.27 | 24-Aug-15 | 8-Aug-19  | 1445         | 1120        | 78%        | 0        | 38        | 0.034        |
| R1191        | Cabinets | 48.53 | -116.18 | 27-Aug-15 | 25-Sep-19 | 1490         | 1155        | 78%        | 0        | 8         | 0.007        |
| R1194        | Cabinets | 48.65 | -116.16 | 2-Sep-15  | 2-Jul-19  | 1399         | 1299        | 93%        | 0        | 1         | 0.001        |
| R1192        | Cabinets | 48.56 | -116.14 | 2-Sep-15  | 26-Sep-19 | 1485         | 1375        | 93%        | 0        | 1         | 0.001        |
| R1237        | Cabinets | 48.56 | -116.11 | 28-Oct-15 | 26-Sep-19 | 1429         | 1429        | 100%       | 0        | 8         | 0.006        |
| R1238        | Cabinets | 48.63 | -116.10 | 6-Nov-15  | 5-Sep-19  | 1399         | 1399        | 100%       | 0        | 0         | 0.000        |
| R1239        | Cabinets | 48.62 | -116.12 | 6-Nov-15  | 5-Sep-19  | 1399         | 1275        | 91%        | 0        | 0         | 0.000        |
| <b>Total</b> |          |       |         |           |           | <b>11547</b> | <b>9943</b> | <b>86%</b> | <b>0</b> | <b>56</b> | <b>0.006</b> |
| R919         | CDA      | 47.78 | -116.57 | 3-Aug-17  | 14-May-19 | 649          | 415         | 64%        | 0        | 0         | 0.000        |
| R884         | CDA      | 47.84 | -116.59 | 3-Aug-17  | 14-May-19 | 649          | 90          | 14%        | 0        | 0         | 0.000        |
| <b>Total</b> |          |       |         |           |           | <b>1298</b>  | <b>505</b>  | <b>39%</b> | <b>0</b> | <b>0</b>  | <b>0.000</b> |
| R1388        | Joe      | 47.08 | -115.76 | 7-Aug-17  | 20-Jun-19 | 682          | 282         | 41%        | 0        | 0         | 0.000        |
| R1340        | Joe      | 47.10 | -115.86 | 7-Aug-17  | 20-Jun-19 | 682          | 674         | 99%        | 0        | 0         | 0.000        |
| <b>Total</b> |          |       |         |           |           | <b>1364</b>  | <b>956</b>  | <b>70%</b> | <b>0</b> | <b>0</b>  | <b>0.000</b> |

**Table 3.** Canada lynx detections at individual cameras summarized by mountain range. Detections in the Selkirk and West Cabinet Mountains are broken down into northern and southern clusters which were deployed in 2015 and 2017 respectively.



**Figure 3.** Canada lynx detections at un-baited remote cameras.

**7. Discuss differences between work anticipated in grant proposal and grant agreement, and that actually carried out with Federal Aid grant funds.**

Due to an unanticipated excess of personnel resources we were able to visit 10 additional camera sites than originally proposed.

**8. List any publications or in-house reports resulting from this work.**

Idaho Department of Fish and Game. 2019. Panhandle Forest Carnivores project F18AF01195. Interim Report. Boise, Idaho.

**Acknowledgements**

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