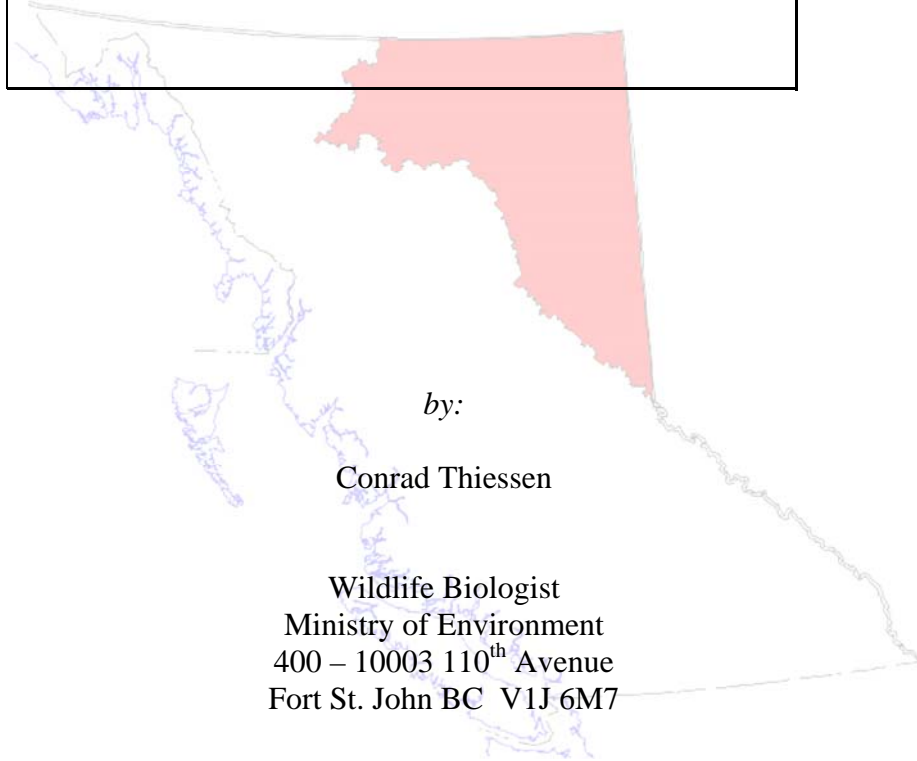# Agriculture Zone Winter Replicate Count 2007/08

*by:*

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## BRITISH COLUMBIA

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# Executive Summary

The winter of 2006/2007 was more severe than average in terms of snow depths, temperatures, and a delayed spring. The severe winter coincided with the liberalization of hunting regulations for mule deer in the agricultural area of the Peace Region by the Ministry of Environment. In order to quantify the immediate effects of these two factors on ungulate populations and to monitor changes in ungulate populations over time, four survey blocks that had been counted for a mule deer survey in 2005 were identified to re-survey in 2007 and beyond. The four blocks are in management unit 7-33. The count focussed on number and classification by age and sex of elk, mule deer, white-tailed deer and moose, and recorded observations of incidental species (primarily coyotes and sharp-tailed grouse) and damage to stored hay. The number of individuals observed for mule deer and moose was lower in 2007 (mule deer: 333, moose: 100) than 2005 (mule deer: 661, moose: 130), however there were more elk and white-tailed deer observed in 2007 (elk: 136, white-tailed deer: 82) than in 2005 (elk: 45, white-tailed deer: 47). For all species, except moose, the ratio of young per 100 females was higher in 2005 than in 2007. The ratio of moose calves per 100 cows was not different between 2005 and 2007. The ratio of adult males to adult females in the population varied by species and no clear pattern was evident.

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# 1   Introduction

## 1.1  Background

The winter of 2006/2007 was more severe than average in terms of snow depths, temperatures, and a delayed spring. Coincident with the severe winter, hunting regulations for mule deer in the agricultural area of the Peace Region were liberalized by the Ministry of Environment. In order to quantify the immediate effects of the winter and change in hunting regulations on ungulate population numbers and demographics, as well as to monitor future changes, four survey blocks that had been counted for a mule deer survey in 2005 were identified to re-survey in 2007 and beyond. Annual funding for wildlife surveys is uncertain, so the survey was designed to be inexpensive and feasibly conducted in a single day.

## 1.2  Objectives

The objectives of the project were to:

1. Conduct an inexpensive survey to index change in ungulate populations in the main agricultural area of the Peace Region following the severe winter of 2006/07
2. Design survey methodology and define area that could be used annually to track changes in ungulate populations in the agricultural area of the Peace Region

# 2   Methods

## 2.1  Study Area

Block boundaries were chosen based on blocks delineated for the winter 2005/06 mule deer count in the agricultural area of the Peace Region. Each block is half of a township and the boundaries follow surveyed road allowances, which are often visible from the air as roads, fence lines, or linear features through forest. Blocks were chosen to represent land north (1 block) and south (2 blocks) of the Peace River, and to include a portion of the banks of the Peace River (1 block).

**Figure 2.1** Location of study area within British Columbia and the Peace Region 7B for the 2007/08 agriculture zone ungulate winter replicate count.
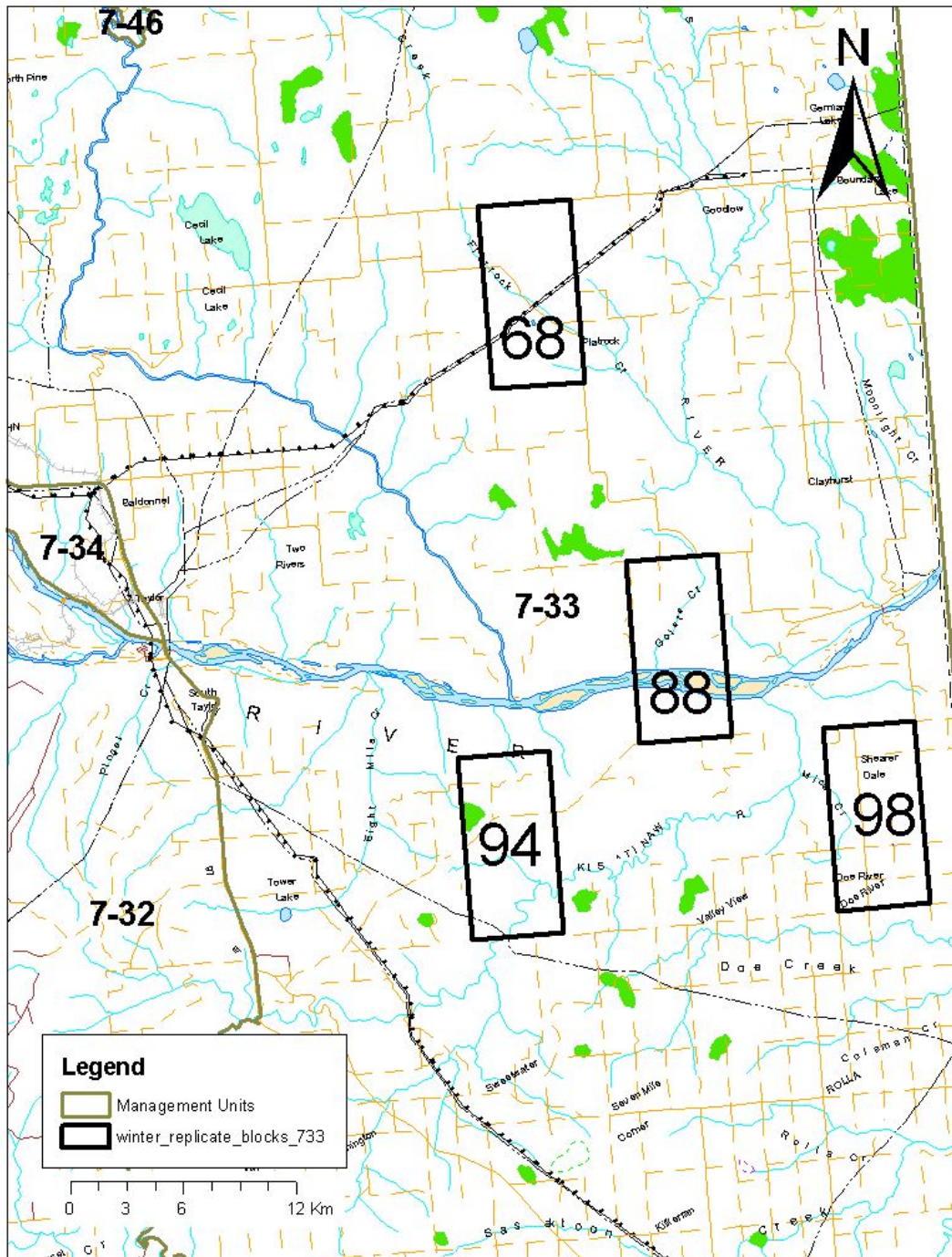
**Figure 2.2** Location of the four blocks surveyed in 2005 and 2007 for the ungulate winter replicate counts.

## *2.2 Inventory*

Flights were conducted with three observers and one pilot in a Bell 206B Jet Ranger helicopter. The forward observer also acted as navigator and recorded flight lines on a Garmin GPSmap 60Cx hand held GPS unit. Survey blocks and satellite image maps were viewed digitally on a laptop computer during the flights with the tracks plotted in OziExplorer in real time. One observer in the rear acted as data recorder (data sheet included in Appendix A). All individuals were responsible for spotting animals, including the pilot.

On average 10 passes were made over each block, requiring observers on either side of the helicopter to view a transect approximately 225 meters wide from the helicopter. The helicopter flew at approximately 80 km/h, except when circling to count and classify a group. Large, snow-covered fields were not flown where adequate visibility allowed the observers to rule out the presence of ungulates from a large distance.

During the inventory all species (elk, mule deer, moose, white-tailed deer, coyote, and wolf) and features (hay bales) were counted. All ungulates were classified as young of year (YOY), antlerless adult (AA), males were classified as yearling males (YM), and mature males (MM). Hay stacks were classified as damaged when ungulate tracks were present around bales and any damage was seen, and undamaged.

# 3  <u>Results</u>

The survey took place on December 7 and 8 of 2007. During this period snow depths were above long-term normals and temperatures fluctuated around the monthly normals. All blocks had complete snow cover for the duration of the survey. On December 7 the temperature was approximately -22 °C and on December 8 the temperature was -17 °C. The average time spent searching in each of the blocks was 101 minutes (block 68 = 76 minutes, block 88 = 130 minutes, block 94 = 62 minutes, block 98 = 135 minutes). Flight tracks were recorded and mapped on aerial photos for each block (Figure 3.1, 3.2, 3.3, and 3.4).
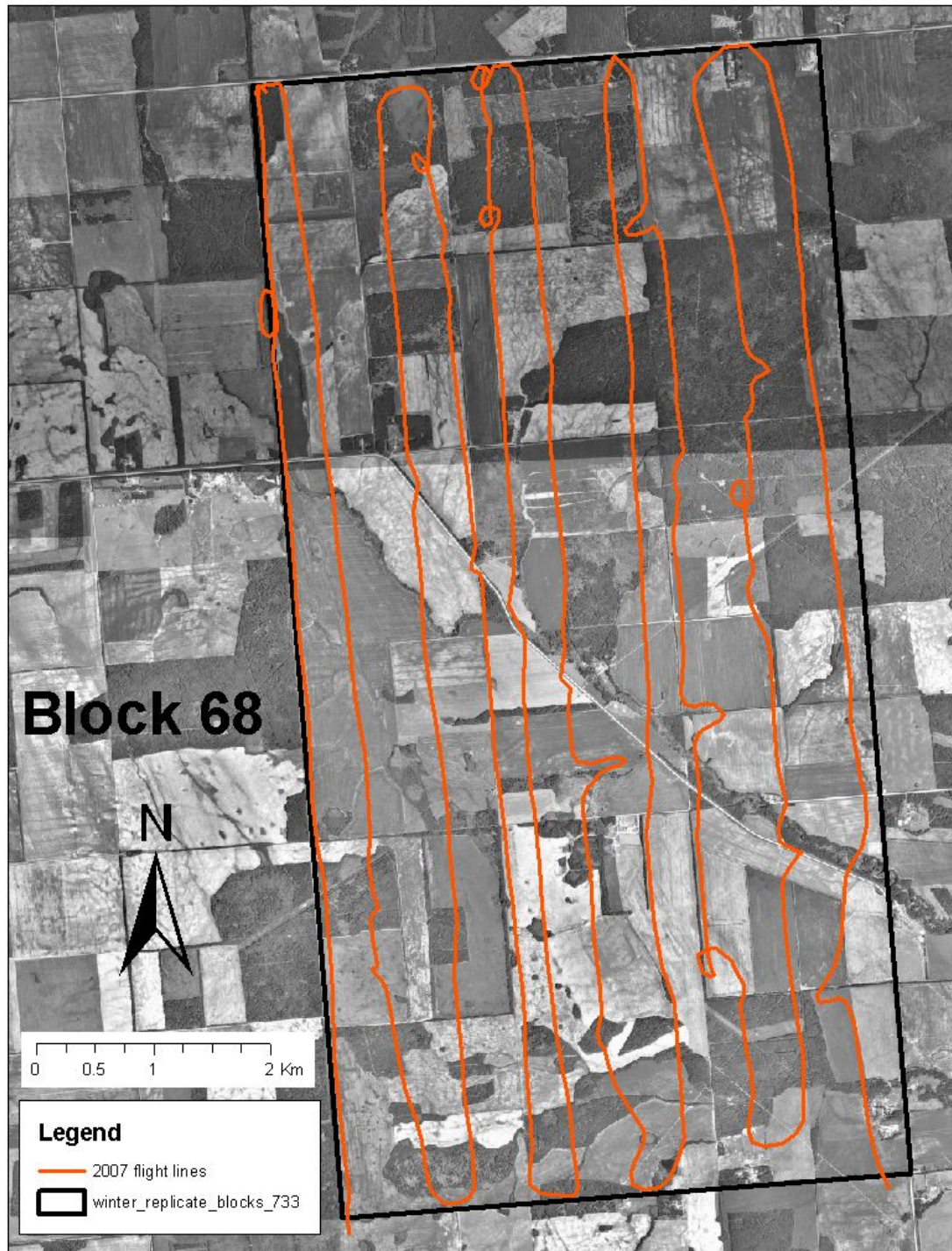
**Figure 3.1** Block 68 of the winter ungulate replicate count that was surveyed in 2005 and 2007. Orange lines are the flight path from the 2007 survey.
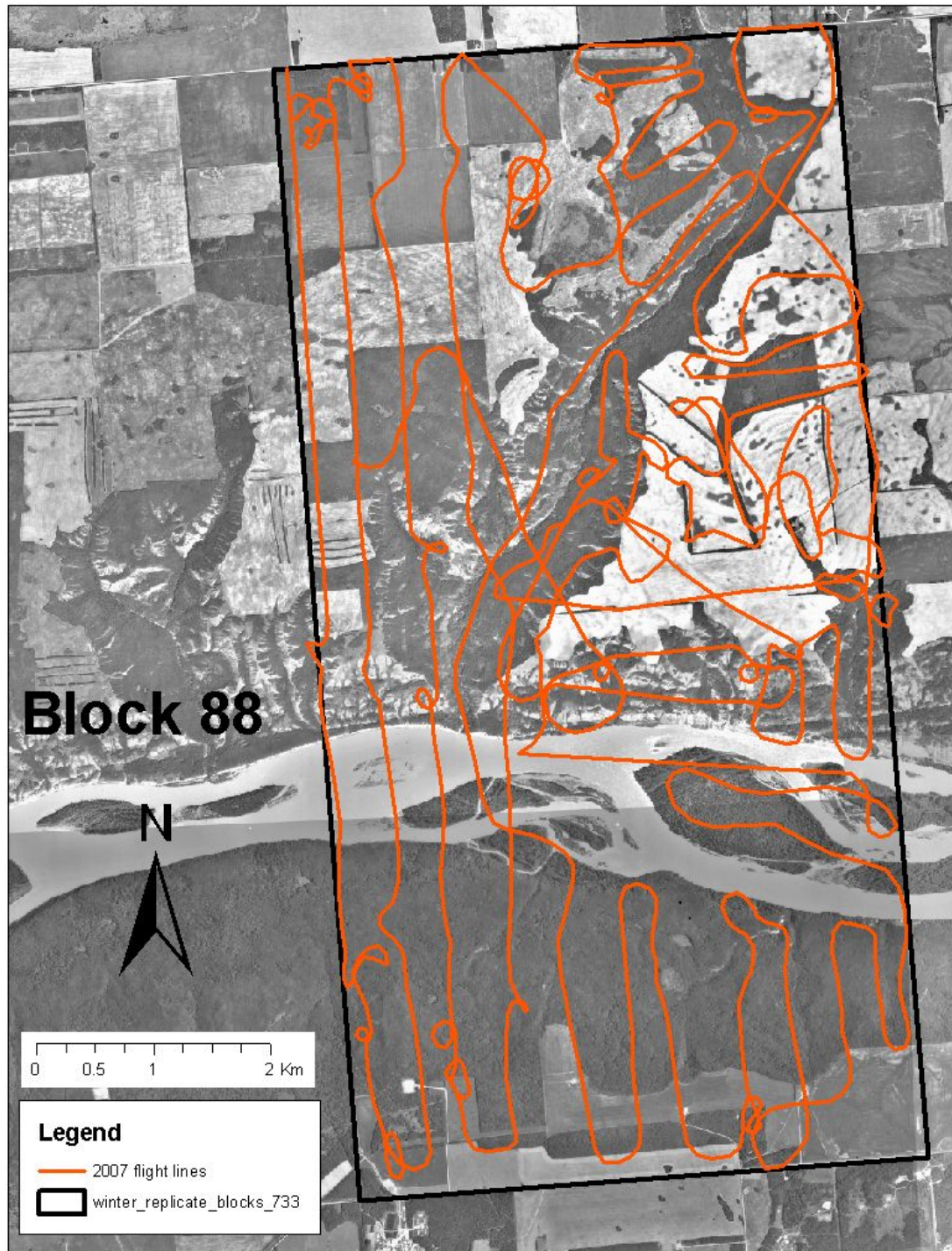
**Figure 3.2** Block 88 of the winter ungulate replicate count that was surveyed in 2005 and 2007. Orange lines are the flight path from the 2007 survey.
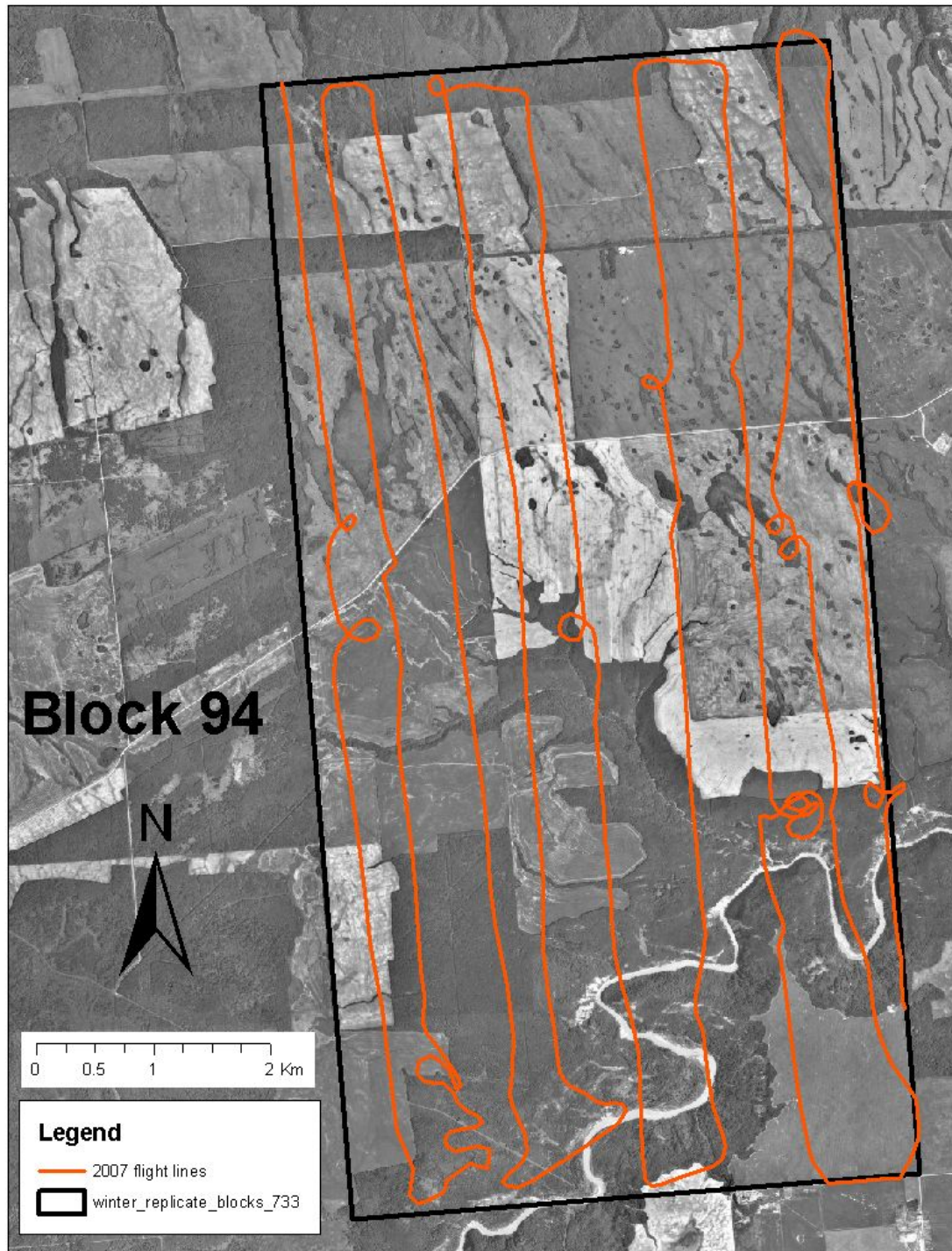
**Figure 3.3** Block 94 of the winter ungulate replicate count that was surveyed in 2005 and 2007. Orange lines are the flight path from the 2007 survey.
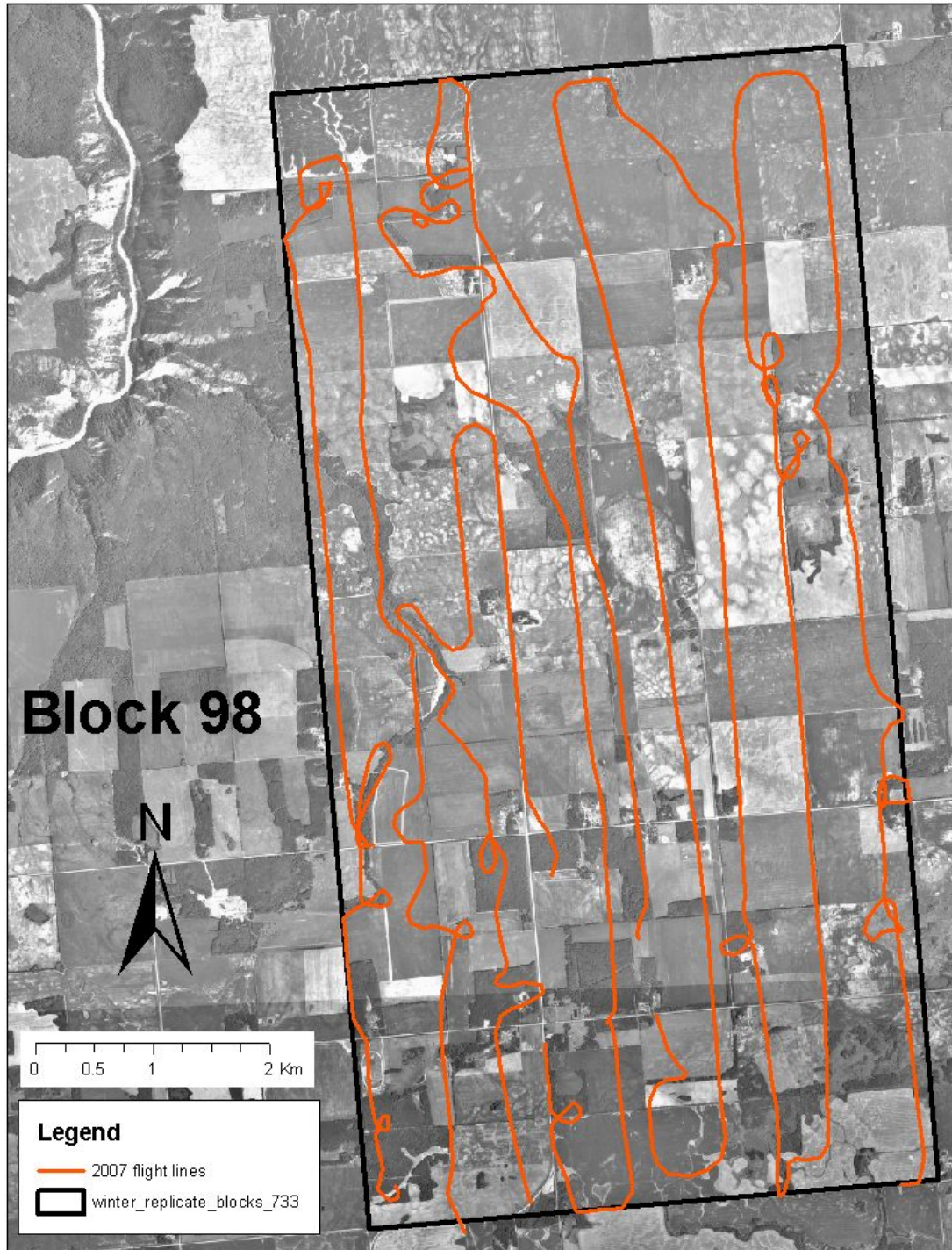
**Figure 3.4** Block 98 of the winter ungulate replicate count that was surveyed in 2005 and 2007. Orange lines are the flight path from the 2007 survey.

## *3.1 Elk*

More than three times as many elk were observed in the four counted blocks in 2007 (n = 136) than were observed in 2005 (n = 45). The ratio of calves per 100 cows was higher in 2005 (55.6 calves:100 cows) than the 2007 observation (35.3 calves:100 cows). The ratio of bulls:100 cows followed the same pattern, with a higher ratio in 2005 (94.4 bulls:100 cows) than 2007 (24.7 bulls:100 cows), however, the actual number of bulls observed was slightly higher in 2007 (n = 21) than 2005 (n = 17).

**Table 3.1** Comparison of classified counts of elk for four survey blocks during the 2005 and 2007 surveys. YOY = young of year, AA = antlerless adult, YM = yearling male, MM = mature male.

| Block # | Year | YOY | AA | YM | MM | Block Totals |
|---|---|---|---|---|---|---|
| **68** | 2005 | 0 | 0 | 0 | 0 | 0 |
|  | 2007 | 0 | 0 | 0 | 0 | 0 |
| **88** | 2005 | 4 | 10 | 2 | 10 | 26 |
|  | 2007 | 26 | 65 | 8 | 10 | 109 |
| **94** | 2005 | 6 | 8 | 5 | 0 | 19 |
|  | 2007 | 4 | 20 | 1 | 1 | 26 |
| **98** | 2005 | 0 | 0 | 0 | 0 | 0 |
|  | 2007 | 0 | 0 | 0 | 1 | 1 |
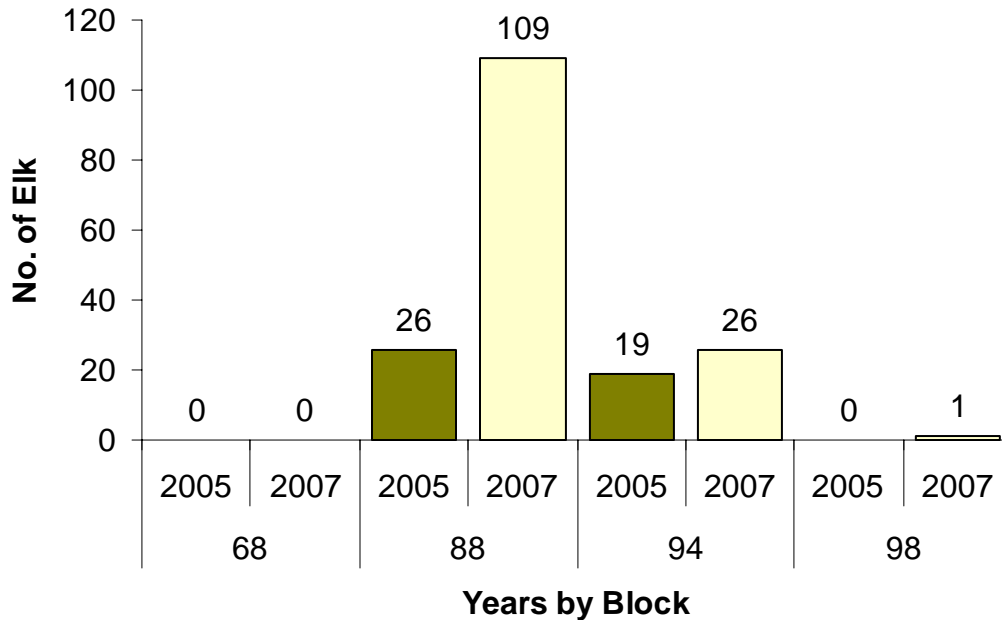


**Figure 3.5** Number of elk observed in each block in the 2005 and 2007 surveys

## *3.2 Mule Deer*

Half as many mule deer were observed in the four counted blocks in 2007 (n = 333) as in 2005 (n = 661). In 2005 we observed 51.4 fawns per 100 does, and 46.2 fawns per 100 does in 2007. The largest difference between years was observed in yearling males, where 54 were counted in 2005 and only 16 were observed in 2007. The overall ratio of bucks per 100 does increased from 2005 (27.3 bucks:100 does) to 2007 (34.8 bucks:100 does).

**Table 3.2** Comparison of classified counts of mule deer for four survey blocks during the 2005 and 2007 surveys. YOY = young of year, AA = antlerless adult, YM = yearling male, MM = mature male.

| Block # | Year | YOY | AA | YM | MM | Totals |
|---|---|---|---|---|---|---|
|  | 2005 | 26 | 47 | 9 | 8 | 90 |
| **68** | 2007 | 9 | 20 | 2 | 5 | 36 |
|  | 2005 | 146 | 280 | 30 | 27 | 483 |
| **88** | 2007 | 45 | 107 | 8 | 31 | 191 |
|  | 2005 | 1 | 10 | 10 | 4 | 25 |
| **94** | 2007 | 4 | 8 | 1 | 1 | 14 |
|  | 2005 | 17 | 33 | 5 | 8 | 63 |
| **98** | 2007 | 27 | 49 | 5 | 11 | 92 |
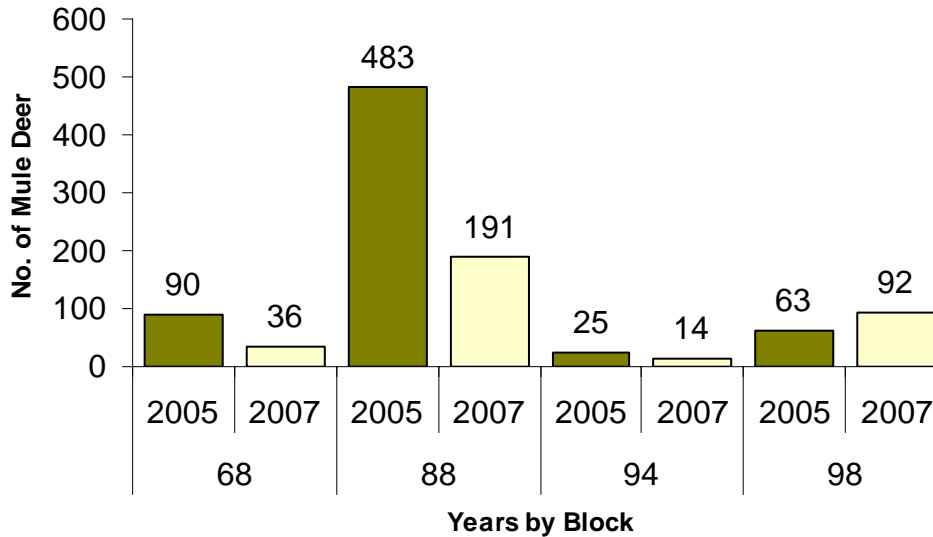


**Figure 3.6** Number of mule deer observed in each block in the 2005 and 2007 surveys.

## 3.3 White-tailed Deer

More white-tailed deer were observed in 2007 (n = 82) than 2005 (n = 47) when all blocks were combined. The ratio of fawns per 100 does was higher in 2005 (62.5 fawns:100 does) than in 2007 (43.8 fawns:100 does). Similarly, there were more bucks per 100 does observed in 2005 (33.3 bucks:100 does) than in 2007 (27.1 bucks:100 does).

**Table 3.3** Comparison of classified counts of white-tailed deer for four survey blocks during the 2005 and 2007 surveys. YOY = young of year, AA = antlerless adult, YM = yearling male, MM = mature male.

| Block # | Year | YOY | AA | YM | MM | Block Totals |
|---------|------|-----|----|----|----|--------------|
| | 2005 | 13 | 22 | 5 | 2 | 42 |
| 68 | 2007 | 10 | 30 | 1 | 3 | 44 |
| | 2005 | 1 | 1 | 1 | 0 | 3 |
| 88 | 2007 | 1 | 3 | 2 | 1 | 7 |
| | 2005 | 0 | 0 | 0 | 0 | 0 |
| 94 | 2007 | 0 | 2 | 1 | 1 | 4 |
| | 2005 | 1 | 1 | 0 | 0 | 2 |
| 98 | 2007 | 10 | 13 | 1 | 3 | 27 |



**Figure 3.7** Number of white-tailed deer observed in each block in the 2005 and 2007 surveys.

## *3.4  Moose*

In all blocks combined, fewer moose (n = 100) were observed in 2007 than in 2005 (n = 130). The ratio of calves per 100 cows was similar between 2005 (34.2 calves:100 cows) and 2007 (36.2 calves:100 cows), however, the number of bulls per 100 cows was 3.5 times greater in 2005 (30.4 bulls:100 cows) than in 2007 (8.7 bulls:100 cows). The difference in bulls between years was most noticeable for yearling males that decreased from 22 observations in 2005 to only 1 in 2007, while there were more mature males observed in 2007 (n = 5) than in 2005 (n = 2).

**Table 3.4** Comparison of classified counts of moose for four survey blocks during the 2005 and 2007 surveys. YOY = young of year, AA = antlerless adult, YM = yearling male, MM = mature male.

| Block # | Year | YOY | AA | YM | MM | Totals |
|---------|------|-----|----|----|----|--------|
|         | 2005 | 15  | 29 | 10 | 1  | 55     |
| **68**  | 2007 | 5   | 11 | 0  | 1  | 17     |
|         | 2005 | 7   | 34 | 10 | 1  | 52     |
| **88**  | 2007 | 7   | 21 | 1  | 3  | 32     |
|         | 2005 | 4   | 9  | 1  | 0  | 14     |
| **94**  | 2007 | 5   | 16 | 0  | 1  | 22     |
|         | 2005 | 1   | 7  | 1  | 0  | 9      |
| **98**  | 2007 | 8   | 21 | 0  | 0  | 29     |



**Figure 3.8** Number of moose observed in each block in the 2005 and 2007 surveys.

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## *3.5  Incidental Species*

In addition to ungulates, a number of other species were observed and recorded. Coyotes were observed in all blocks: 5 coyotes in block 68, 8 in block 88, 3 in block 94, and 5 in block 98. One goshawk was observed in block 88. Sharp-tailed grouse were observed in three of the four blocks: 2 in block 68, 6 in block 88, and 3 in block 98.

# 4  <u>Discussion</u>

The combination of a severe winter of 2006/07 and liberalized hunting seasons in the fall of 2007 likely resulted in a reduction in the populations of mule deer and moose. Mule deer does declined by close to half and there was a third as many yearling males observed in 2007 as in 2005, however, the mid-winter fawn survival did not appear to differ between years. Mature male mule deer appeared to fare well through the winter, as the ratio of bucks to does was higher in 2007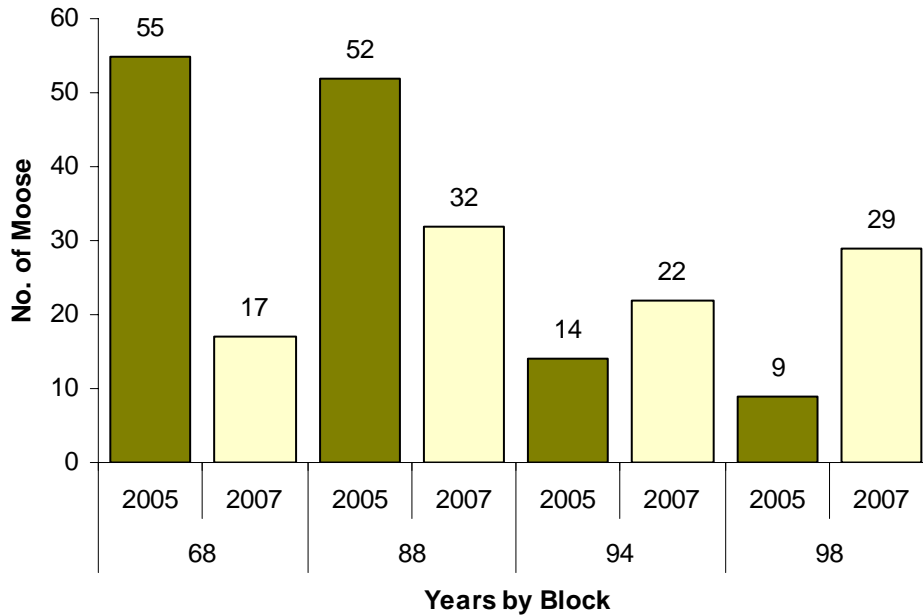 than 2005. The change in the buck:doe ratio was primarily due to the decline in does, as there was no significant change in the number of mature males observed between years. Overall numbers of moose were lower in 2007, however, in two of the four blocks surveyed more moose were actually observed in 2007 than 2005. The segment of the population of moose that appeared most affected by the winter was the yearling males, which accounted for almost the entire reduction in numbers between years.

White-tailed deer numbers did not appear to be negatively affected by the winter, as nearly twice as many white-tails were observed in 2007 as in 2005. Exactly twice as many antlerless adults were observed in 2007, and four times as many mature males.

Elk move large distances between feeding areas in different years making it difficult to interpret the results of the count for this species. By surveying only a small number of sample blocks, it is unlikely that an accurate estimate of change, both to population numbers and demographics for elk, could be attained.

The blocks delineated for this comparison should be surveyed on an annual basis to develop an inexpensive index of demographic and population change for ungulates in the agricultural area of the Peace Region.

# 5  <u>Acknowledgements</u>

# 6  <u>Appendices</u>

**Appendix 1**.  Data sheet used for winter ungulate replicate count in the Peace Agriculture Zone in December 2007.

**Ag Zone Monitoring Blocks**

Pilot:_____
FL:_____

Block #:_____          start:_____          RL:_____
day:_____/month:_____/year:20___          stop:_____          RR (rec):_____

Cloud Cover (/10):_____          Temp (°C):_____          Wind (kph):_____
Days since snow:_____          Snow Depth: (cm):_____          Snow cover (%):_____
Comments:_____

| OBS# | SPP. | YOY | Antlerless Adult | Yearling Male | Mature Male |
|------|------|-----|------------------|---------------|-------------|
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
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|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
|      |      |     |                  |               |             |
| Total |     |     |                  |               |             |

Hay Stackyards

| OBS# | storage method (#) | | damage | fenced | Notes: |
|------|--------|----------|--------|--------|--------|
|      | stacked | unstacked | Y/N | Y/N |       |
|      |        |          |        |        |        |
|      |        |          |        |        |        |
|      |        |          |        |        |        |
|      |        |          |        |        |        |
|      |        |          |        |        |        |
|      |        |          |        |        |        |
|      |        |          |        |        |        |

Appendix 2. UTM coordinates for the corners of each surveyed block.

| Block # | NW Corner | NE Corner | SE Corner | SW Corner |
|---------|-----------|-----------|-----------|-----------|
| 68 | 6246284 N 662405 E | 6246473 N 667277 E | 6236758 N 667635 E | 6236591 N 662775 E |
| 88 | 6227130 N 669509 E | 6227324 N 674322 E | 6217682 N 674728 E | 6217510 N 669835 E |
| 94 | 6217118 N 660106 E | 6217302 N 664970 E | 6207632 N 665368 E | 6207399 N 660481 E |
| 98 | 6217936 N 679622 E | 6218067 N 684441 E | 6208358 N 684878 E | 6208151 N 679990 E |