Richardson's Ground Squirrel Survey Results

April 2024

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Introduction

An online survey was conducted from December 15, 2023 to January 15, 2024 to evaluate on-farm Richardson's Ground Squirrel (RGS) and other burrowing rodent populations, damage, satisfaction with control products and recommended control strategies , factors that might contribute to variations in RGS populations, and gather information on local populations to illustrate effects of weather and climate factors on RGS populations. Area affected and damage severity was requested as it affected crops, pasture, rangeland and yards. Responses were mapped according to the location of the nearest town as indicated in survey responses. Mapping also allowed evaluation of local weather factors that might influence RGS populations.

174 respondents participated in the survey.

Dry, warm conditions are thought to contribute to RGS population increase. Mechanisms for this effect include disease outbreaks under cold, wet conditions when RGS are active. There is also evidence that warm temperatures experienced by RGS in the spring can speed emergence from overwintering (Mitchener 1983). Overwinter and spring precipitation and temperature (AAFC 2024a) and their relationships with RGS damage severity and acres affected were assessed. In addition, a good measure to address temperature and precipitation data and their interactions as they contribute to drought is the Palmer Drought Severity Index (PDSI). This measure incorporates temperature data and a physical water balance model to assess dryness (NCAR 2024). PDSI values and their relationships to RGS damage severity and acres affected are presented for April, May and June 2023 (AAFC 2024b).

Results

The results of the weather data analyses were not straightforward or informative for the periods examined. Regression analyses of PDSI and RGS severity did not indicate significant relationships of the factors for crops in March, April, May or June 2023 ($P > 0.05$ for all evaluations) (Figures 4-7). Similarly, the relationships of damage severity in pastures, range and yards and PDSI in these months were not significant ($P > 0.05$ for all evaluations). Evaluation of component factors of PDSI (precipitation and temperature) also yielded no informative trends ($P > 0.05$ for all evaluations) (Figures 8-14).

Relationships of damage severity in pastures, range and yards and precipitation or temperature in these months were not significant ($P > 0.05$ for all evaluations). Precipitation and maximum temperatures were relatively comparable or at least did not diverge strongly enough throughout Saskatchewan as RGS were stimulated to emerge from overwintering in April and begin mating and feeding in May. These differences did not influence differences in regional populations. We will conduct follow-up analyses as data are collected in the subsequent survey years.

Crop Systems

Almost half of respondents (48 per cent) indicated medium to high satisfaction with control associated with poisons and 84 per cent indicated they use this management tool for RGS (Figure 15). Comparable numbers of respondents indicated medium to high satisfaction with shooting to control RGS (52 per cent) and 92 per cent use shooting (Figure 16). Very low satisfaction with drowning as a control method was indicated in crop systems but most respondents (83 per cent)

did not use this technique (Figure 17). Trapping in crop systems was only moderately more popular (69 per cent did not use and 12 per cent expressed medium to high satisfaction) (Figure 18). Similarly low levels of satisfaction (five per cent) and use (81 per cent did not use) were indicated for the use of raptor platforms (Figure 19). Almost half of respondents (45 per cent) hadn't used increased vegetative height to control RGS and 11 per cent indicated satisfaction with the technique (Figure 20). More satisfaction was expressed for predator tolerance (20 per cent) and 75 per cent used this technique (Figure 21). Low satisfaction (five per cent) and moderate use of dogs (42 per cent) in crops was indicated (Figure 22).

Pastures

Poison baits were a popular choice (82 per cent use) and moderate satisfaction was expressed (44 per cent) (Figure 23). Shooting remains a popular choice (92 per cent engage in it) and 51 per cent respondents expressed satisfaction with it (Figure 24). Much like in crop systems, drowning is rarely used, and overall satisfaction is low (Figure 25). Moderately more respondents use trapping (31 per cent use) and 12 per cent indicated satisfaction (Figure 26). About 21 per cent of respondents used raptor platforms (Figure 27). Not surprisingly, vegetation height was a more popular choice (54 per cent use it) in pasture than in crops, where control of veg height is limited, but satisfaction was low (10 per cent) (Figure 28). Although tolerance for predators was greater in pastures (74 per cent use), satisfaction with this method was moderate (20 per cent) (Figure 29). Dogs were used by 43 per cent but satisfaction was very low (five per cent) (Figure 30).

Ranges

Not surprisingly, responses were comparable to those of pasture settings. Approximately 81 per cent use poisons and satisfaction was moderate (42 per cent) (Figure 31). Shooting was also common (96 per cent) and 52 per cent respondents expressed satisfaction (Figure 32). Drowning and trapping are rarely used and overall satisfaction was low (Figures 33 and 34). A moderate increase in adoption of raptor platforms was indicated with about 23 per cent using them (Figure 35). Vegetation height was used by 59 per cent of respondents, but satisfaction was low (7 per cent) (Figure 36). Although tolerance for predators was comparable to pastures (76 per cent use), satisfaction with this method remained moderate (20 per cent) (Figure 37). Dogs were more frequently used in pasture settings (46 per cent use) but satisfaction was low (seven per cent) (Figure 38).

Yards

Poison baits were a popular choice (78 per cent use) with moderate satisfaction indicated (49 per cent). Shooting was the most common technique (89 per cent use) but satisfaction remained moderate (53 per cent) (Figure 39). Drowning was not commonly used and satisfaction was low (Figure 40). Trapping was a more popular technique in yards than other settings (37 per cent use) but satisfaction was muted (15 per cent) (Figure 41). Few (18 per cent) used raptor platforms and satisfaction was relatively low (13 per cent) (Figure 42). Maintaining vegetation height was more commonly used in yards (77 per cent) and satisfaction was moderate (22 per cent) (Figure 43). Only about half of respondents (47 per cent) use dogs and satisfaction was low (five per cent) (Figure 44).

The composition of rodent populations indicated RGS as the dominant burrowing rodent pest in the province (Figure 45). However, numerous reports of thirteen-line ground squirrel and northern pocket gopher and minor occurrence of Franklin's ground squirrel were also included. Both badgers and coyotes were indicated as significant components of the predator communities by most respondents (Figure 46).

Conclusions

We were very pleased with the broad geographic distribution of respondents and the number of participants that submitted reports of low to no RGS. This makes for a more objective view of RGS populations and regional pressures.

Work needs to continue to assess effects of weather factors on RGS populations. Relatively low variability across the province in regional temperature and precipitation made determining their effects on RGS populations problematic. We anticipate continuing this survey for multiple years and gaining the ability to assess effects of these factors with more data.

This survey is an effective tool to evaluate RGS populations and trends in control tactics. Poisoning and shooting are the most common control methods in the settings we assessed. Satisfaction was moderate but still ranked highest among the methods queried. Addressing the use of specific products will be incorporated as a drop-down field in future surveys. Predator tolerance was more widely distributed than anticipated. Other integrated control techniques including the use of raptor platforms were infrequently used. Because these structures can be effective as part of an integrated control approach, we will endeavor to promote their use in future extension work.

Figure 1. Screenshot of the 2023 gopher survey.

RGS Survey Results

Clustering of acres affected (Figure 1) and damage severity (Figure 2) in southern and western regions was indicated.

Distribution of damage:

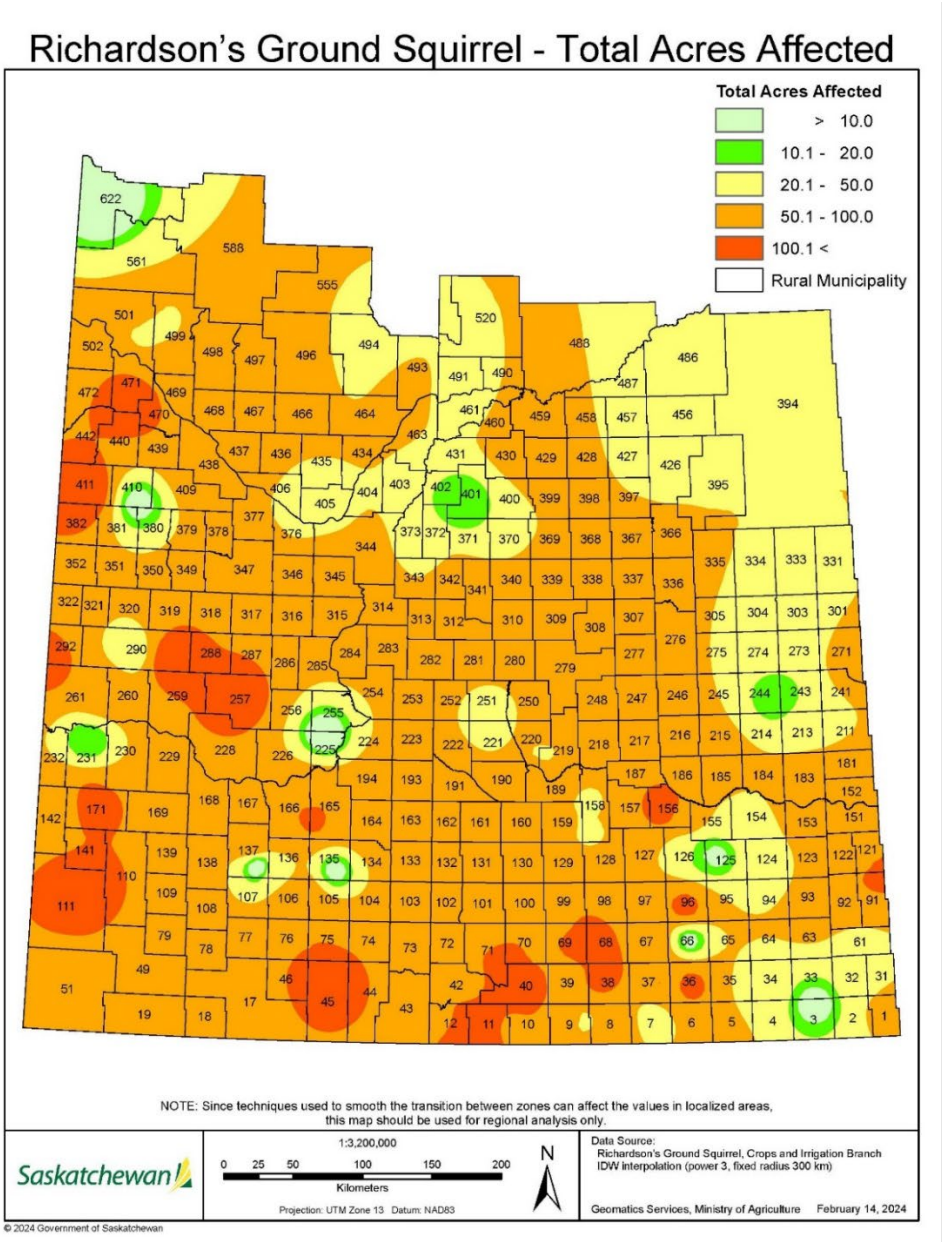

Figure 2. Distribution of total acres affected per respondent.

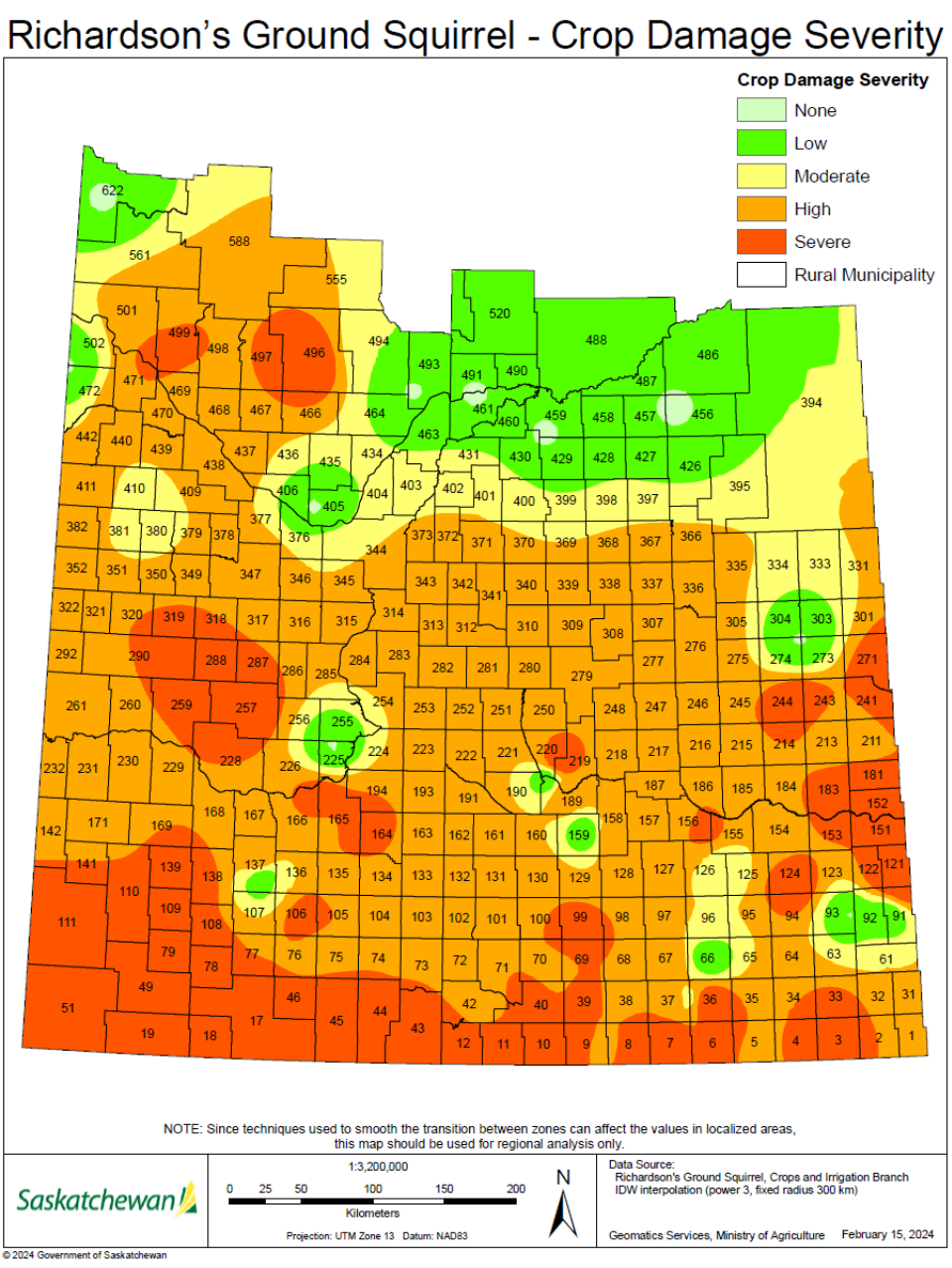

Figure 3. Distribution of damage severity per respondent.

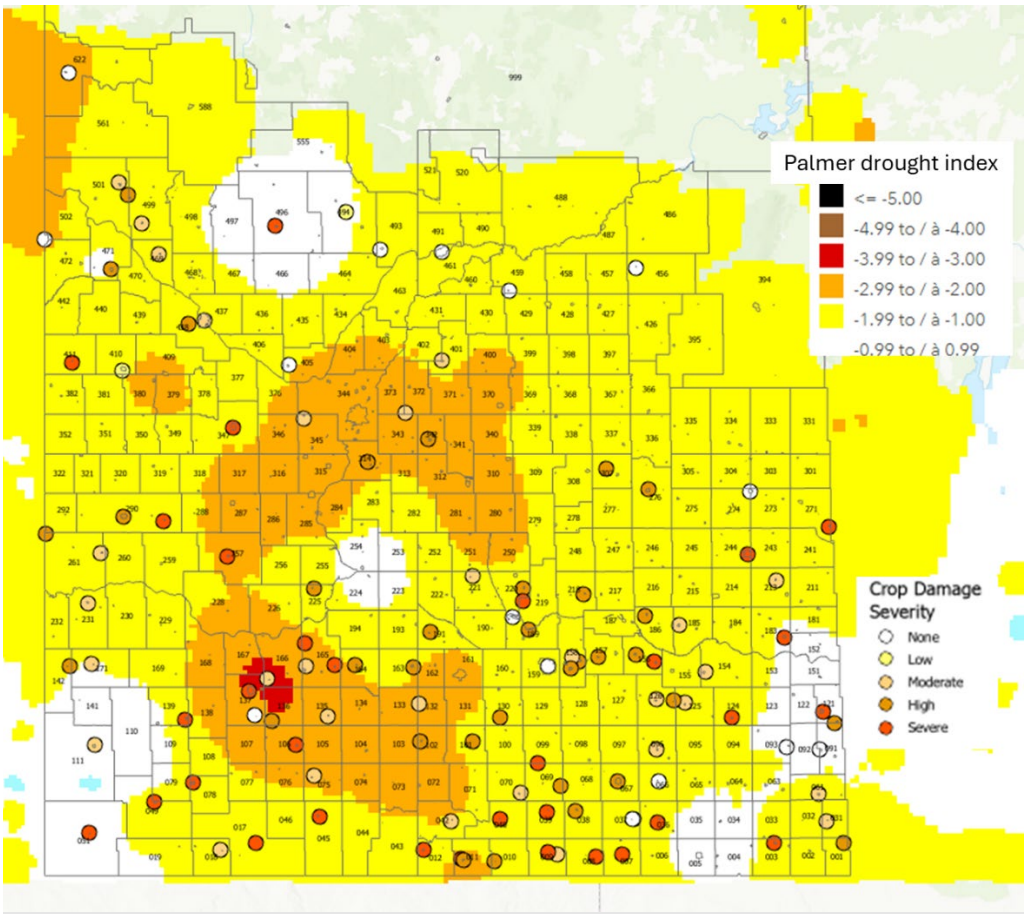

Figure 4. Richardson's ground squirrel damage severity to crops (2023 season) and drought conditions March 2023.

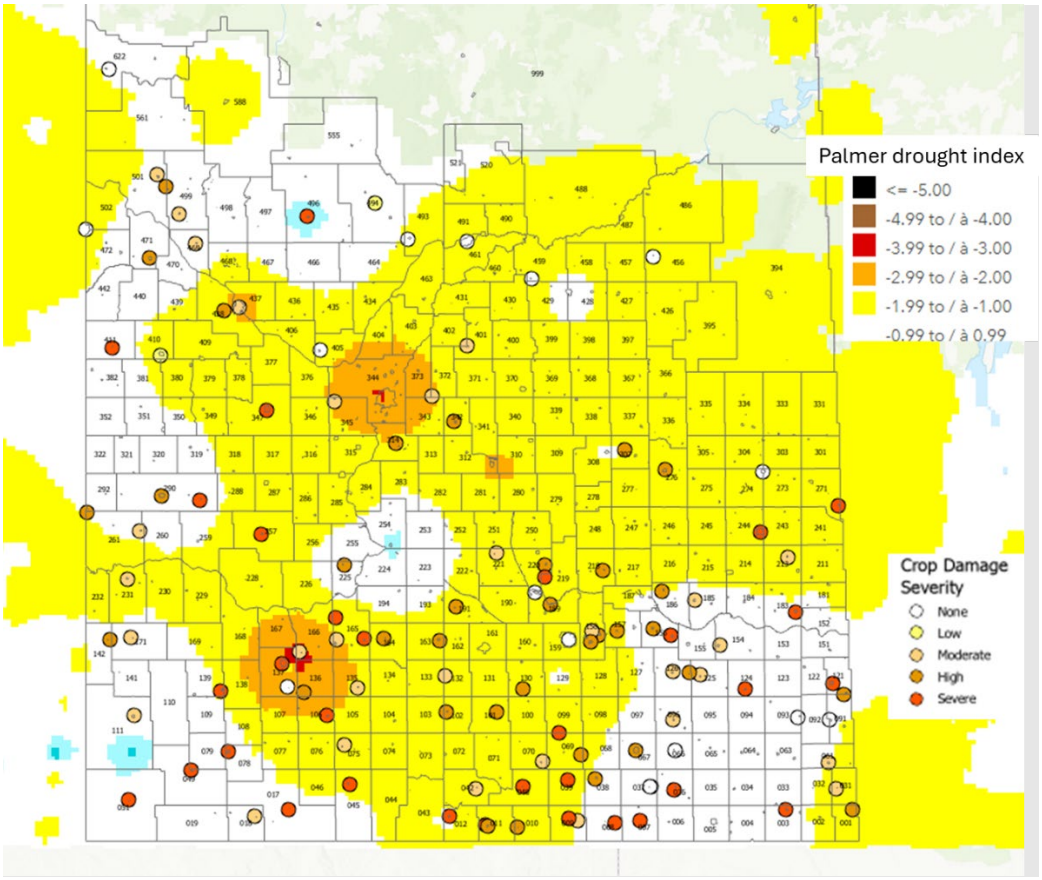

Figure 5. Richardson's ground squirrel damage severity to crops (2023 season) and drought conditions April 2023.

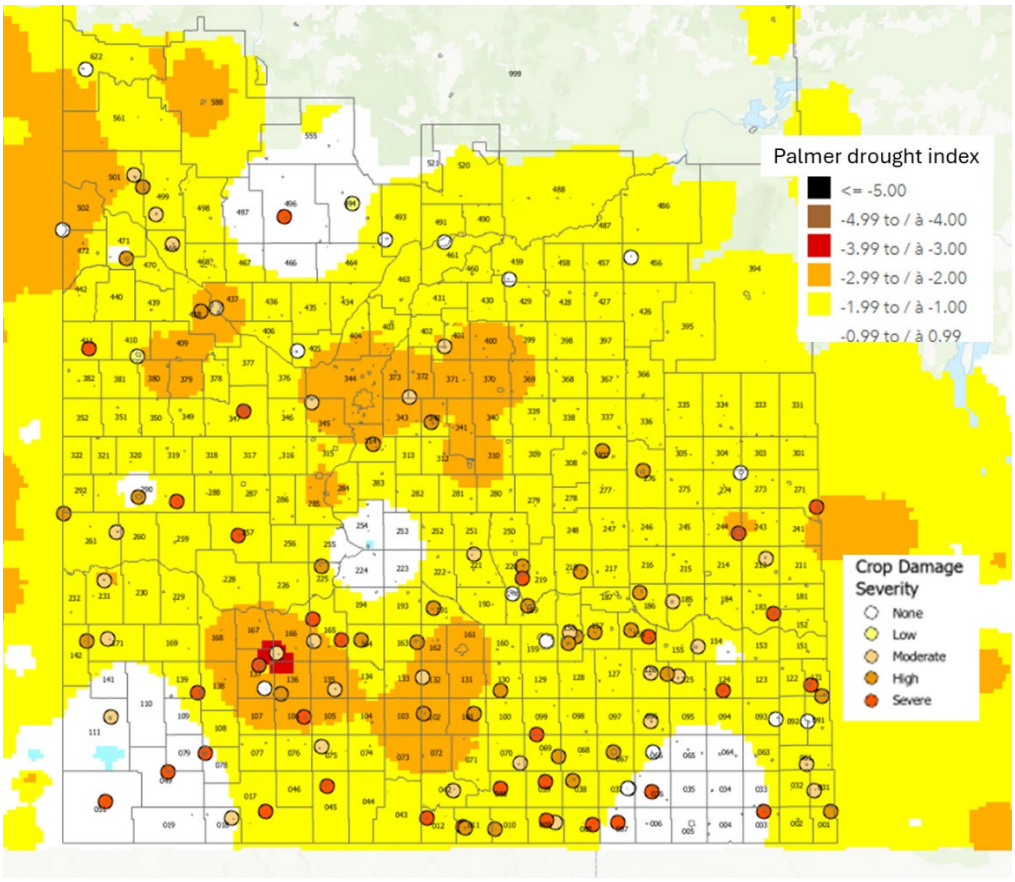

Figure 6. Richardson's ground squirrel damage severity to crops (2023 season) and drought conditions May 2023.

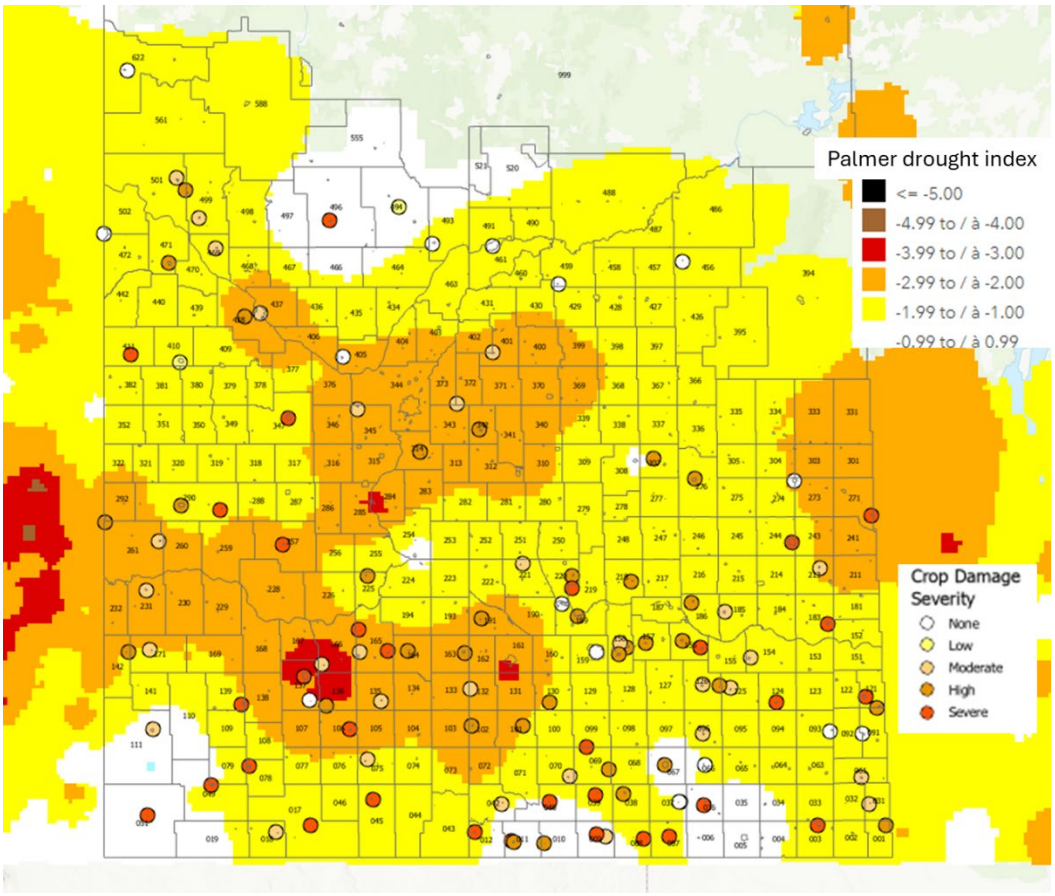

Figure 7. Richardson's ground squirrel damage severity to crops (2023 season) and drought conditions June 2023.

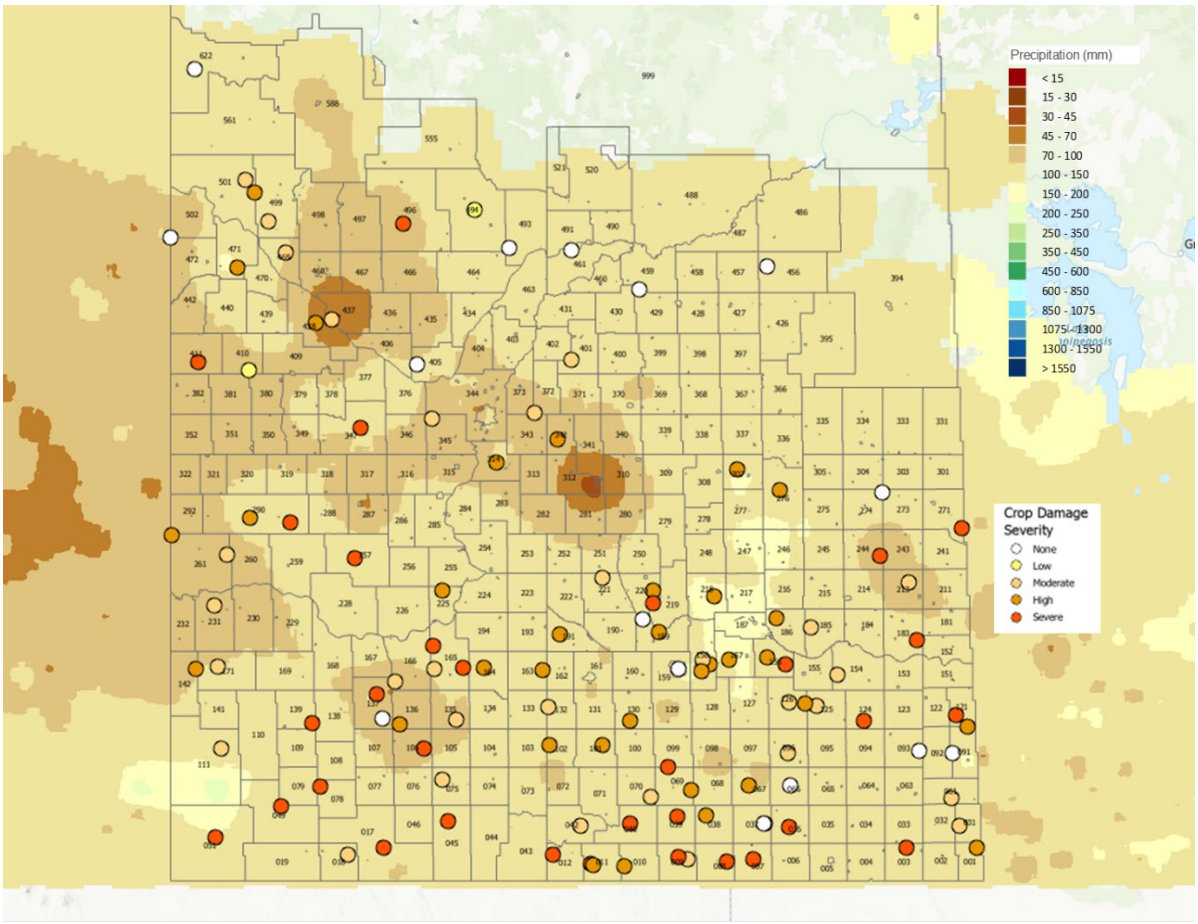

Figure 8. Richardson's ground squirrel damage severity and total precipitation (mm) April 2023.

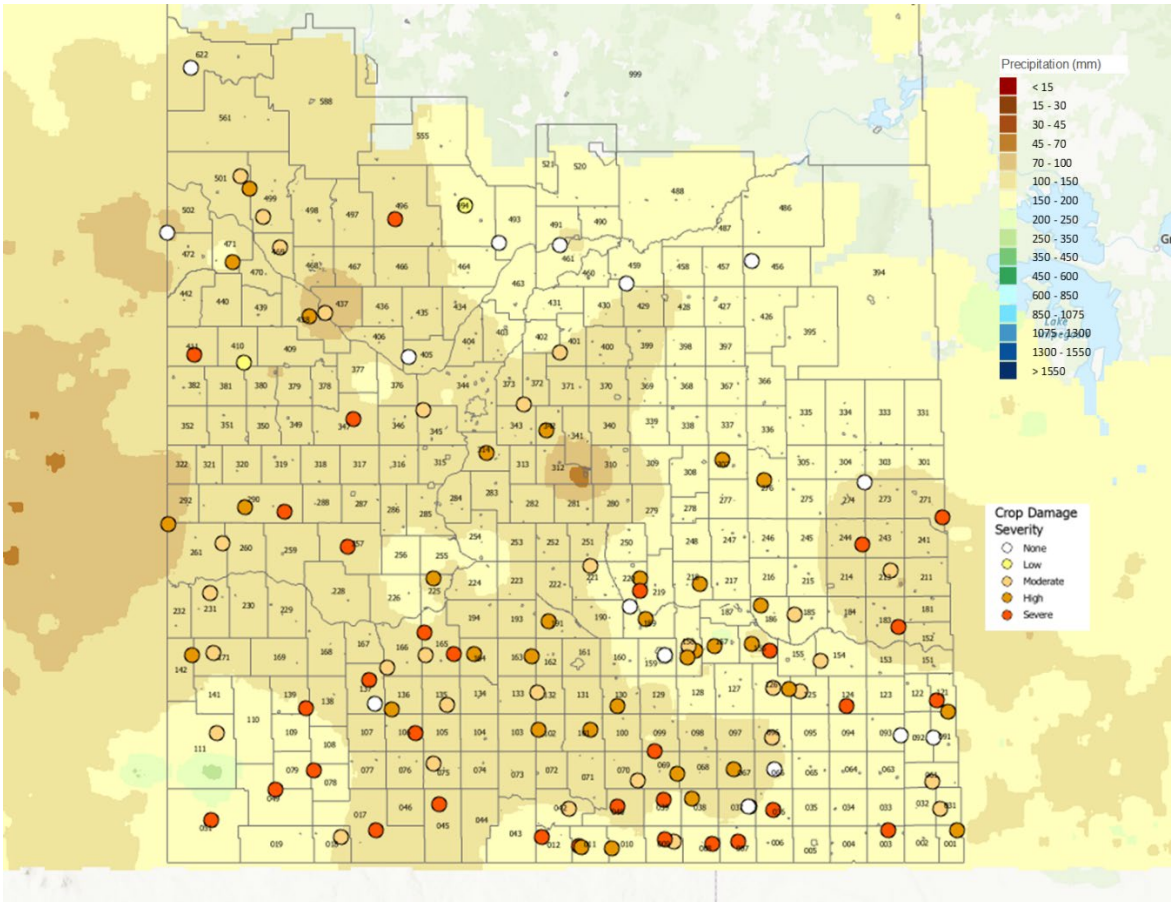

Figure 9. Richardson's ground squirrel damage severity and total precipitation (mm) May 2023.

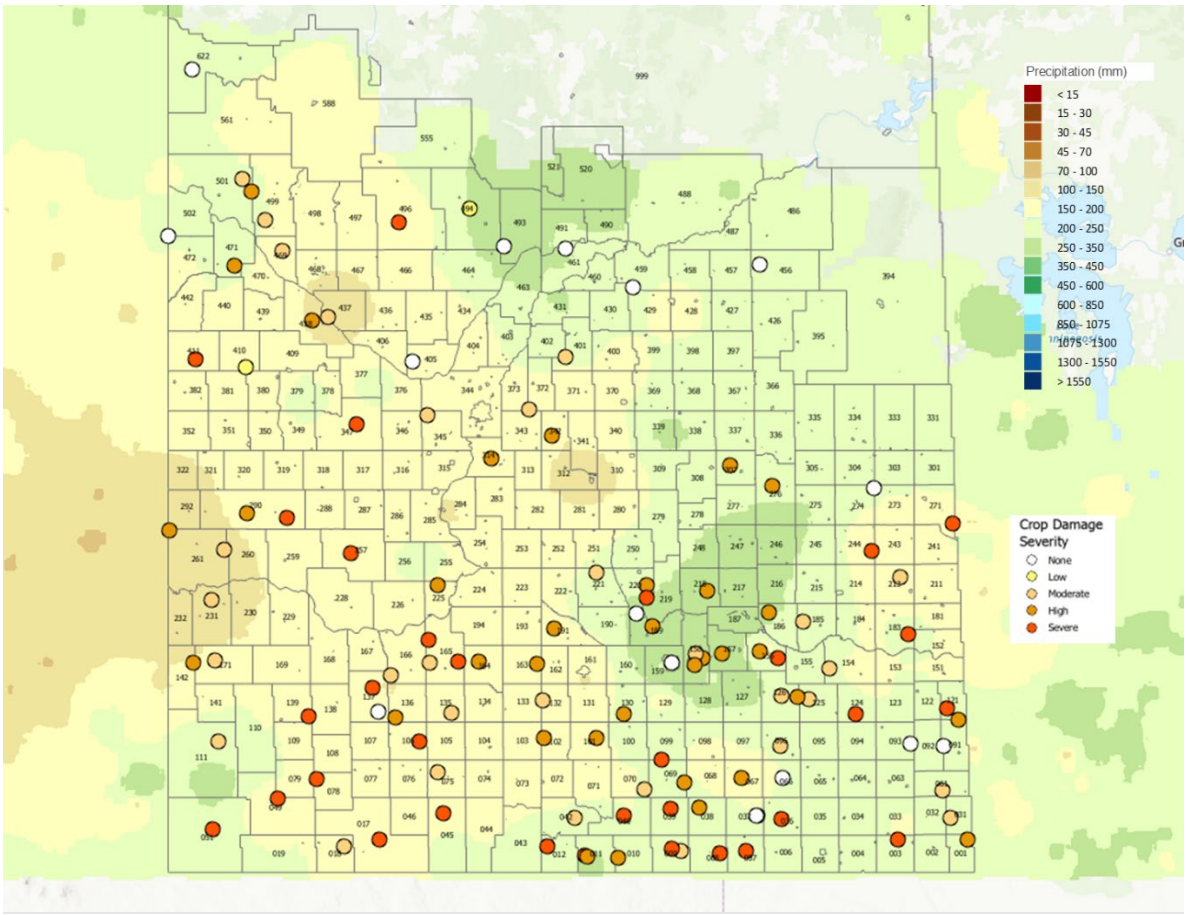

Figure 10. Richardson's ground squirrel damage severity to crops (2023 season) and total precipitation (mm) June 2023.

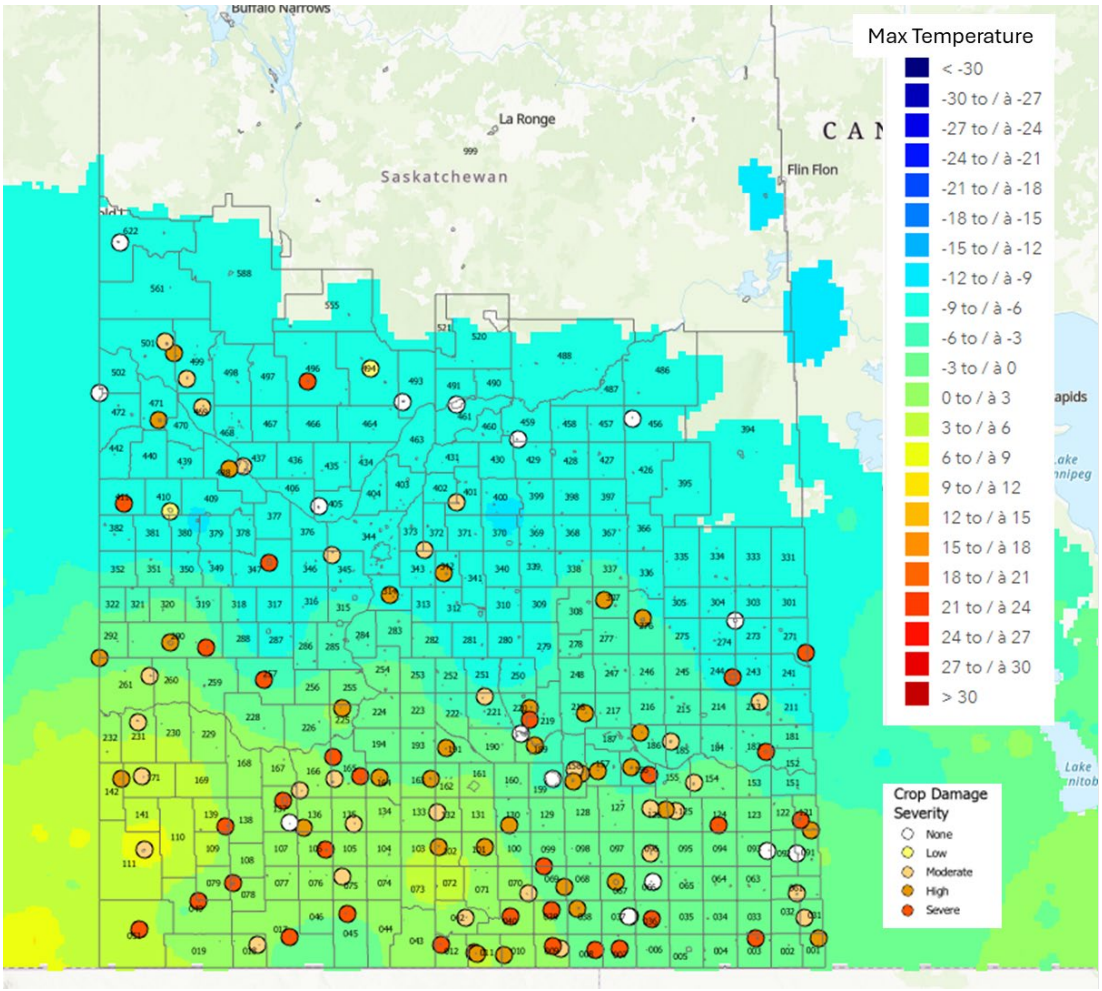

Figure 11. Richardson's ground squirrel damage severity to crops (2023 season) and maximum temperature (C) February 2023.

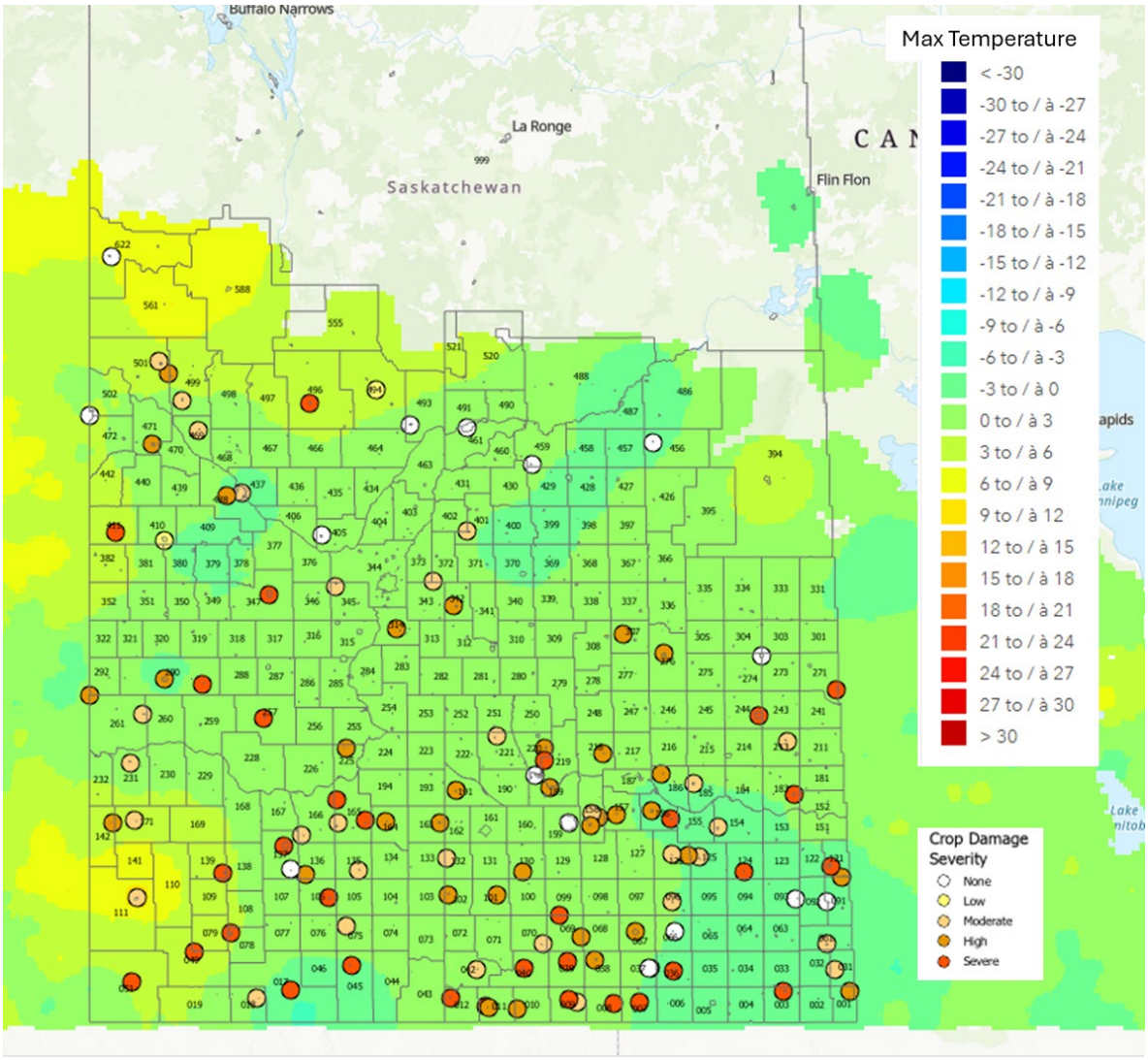

Figure 12. Richardson's ground squirrel damage severity to crops (2023 season) and maximum temperature (C) March 2023.

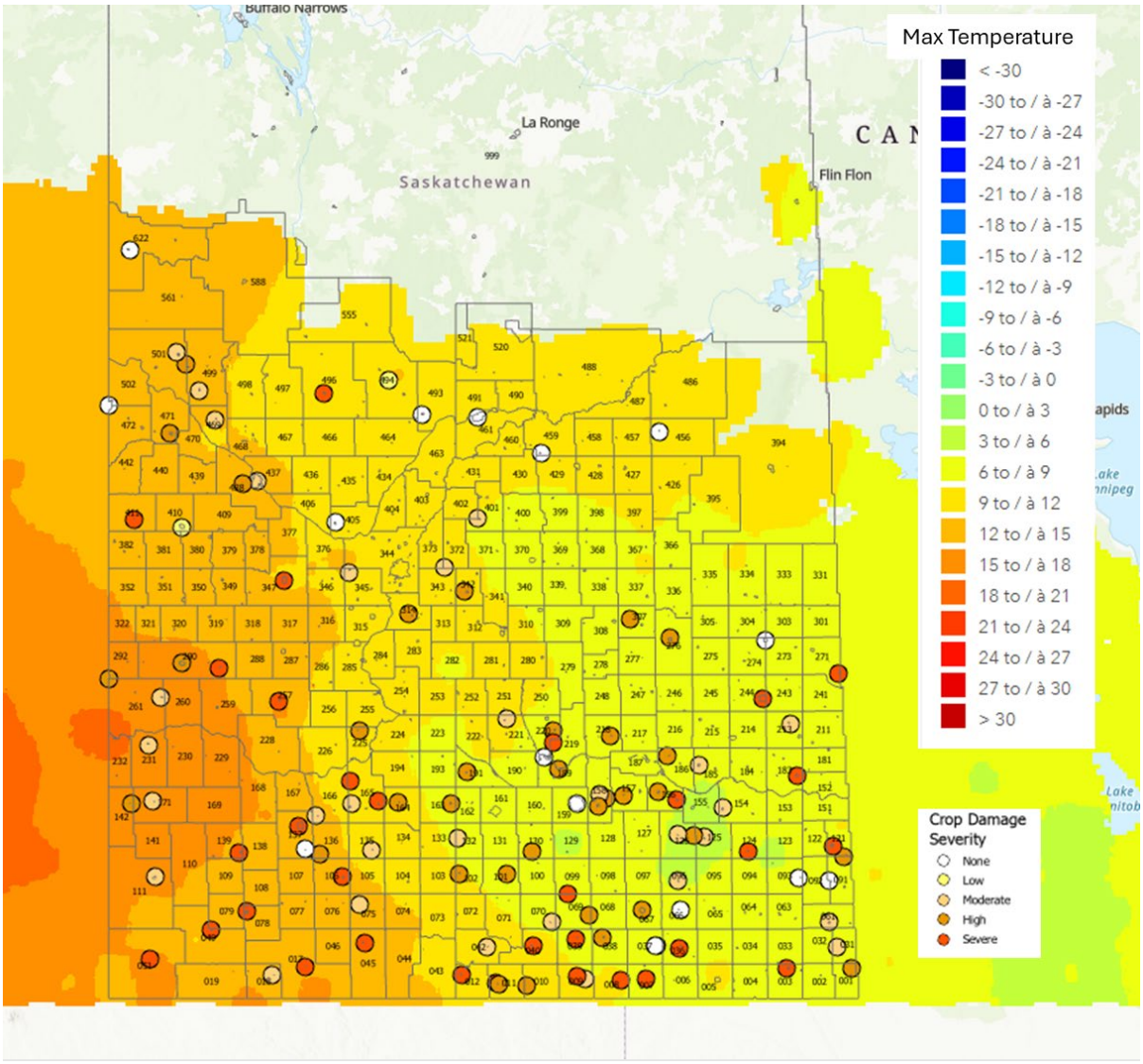

Figure 13. Richardson's ground squirrel damage severity to crops (2023 season) and maximum temperature (C) April 2023.

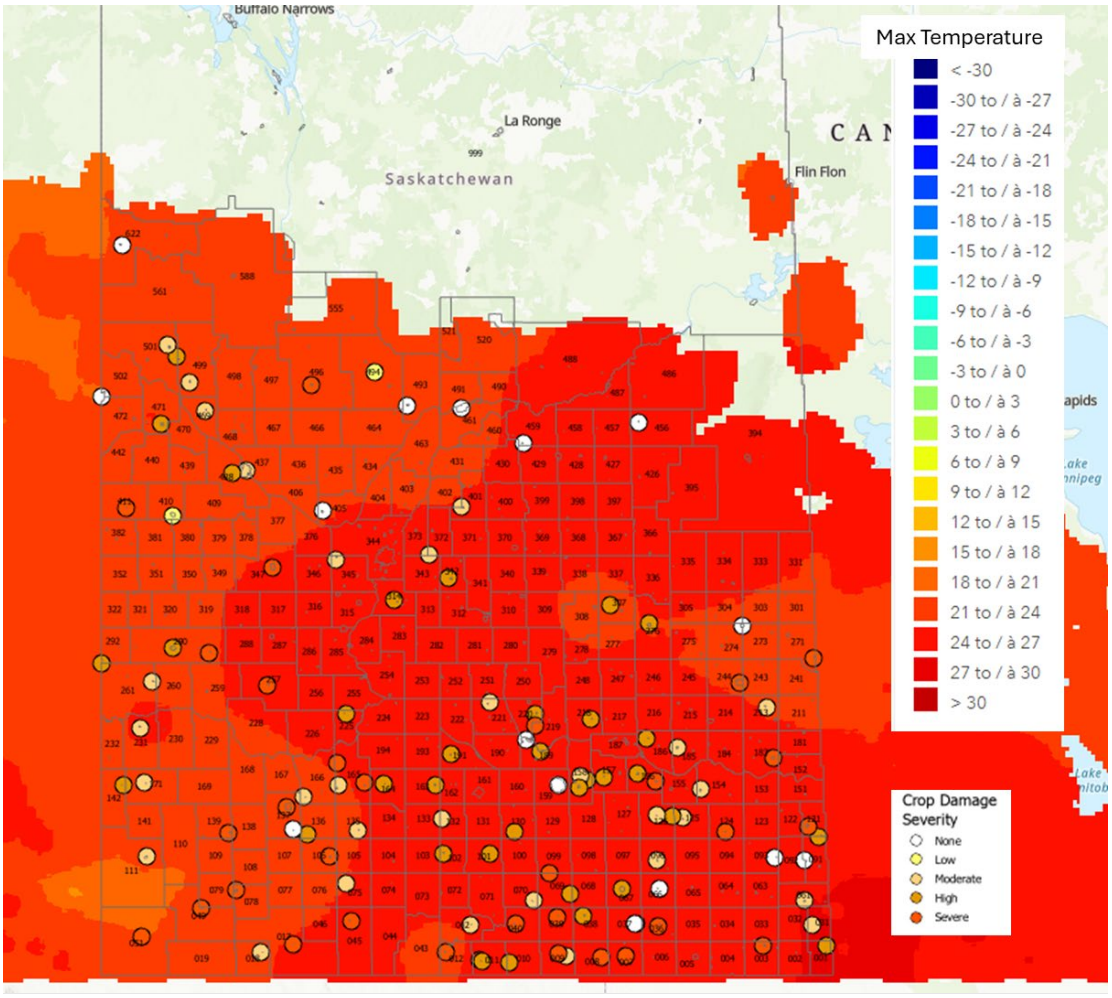

Figure 14. Richardson's ground squirrel damage severity and maximum temperature (C) May 2023.

Satisfaction with control techniques

Those with reported damage to crops:

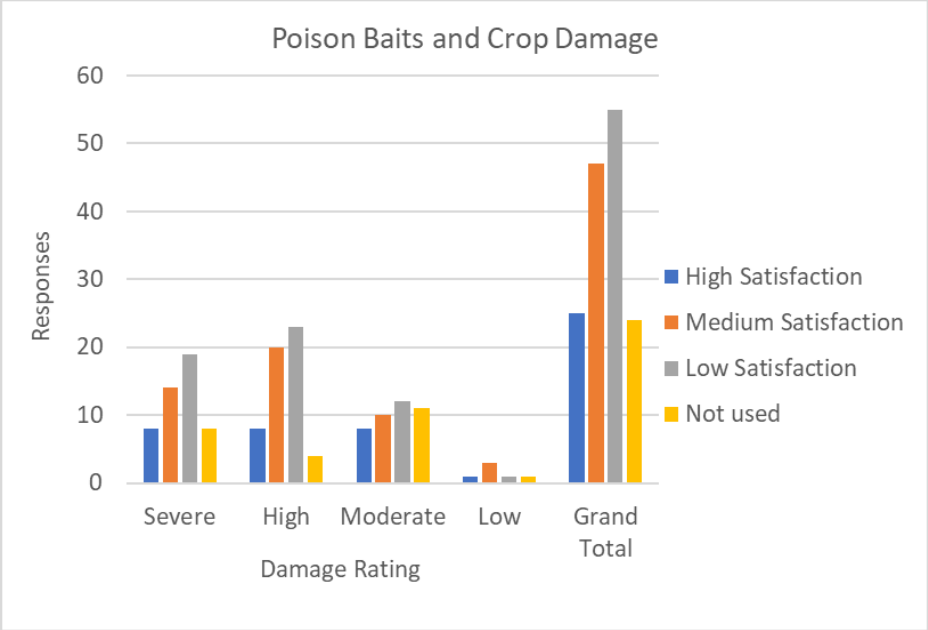

Figure 15. Satisfaction with poison baits to control Richardson's ground squirrel in crops.

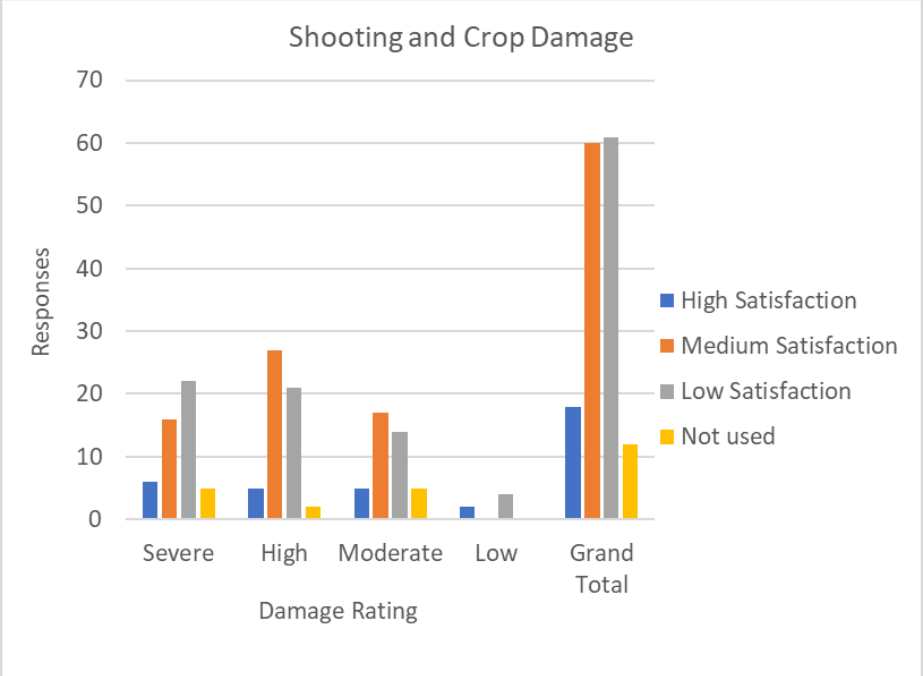

Figure 16. Satisfaction with shooting to control Richardson's ground squirrel in crops.

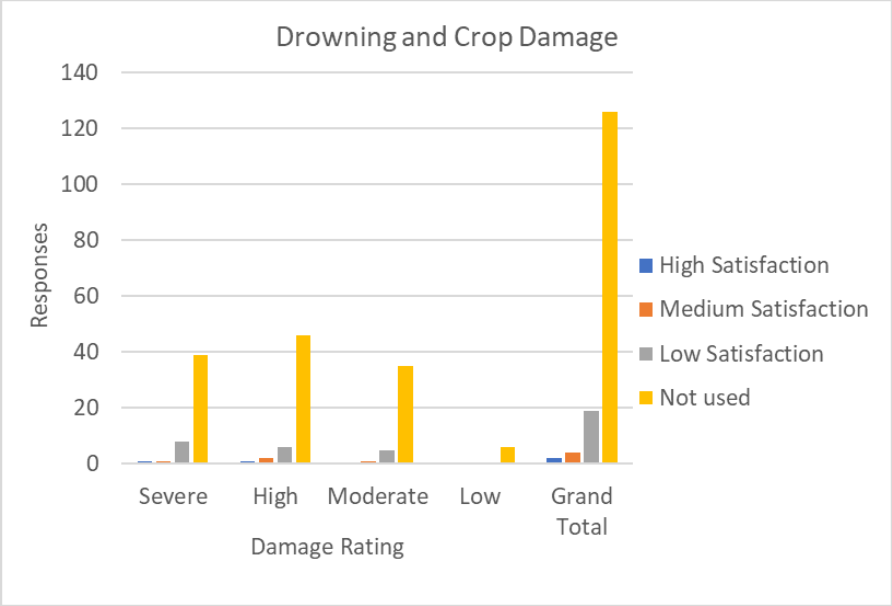

Figure 17. Satisfaction with drowning to control Richardson's ground squirrel in crops.

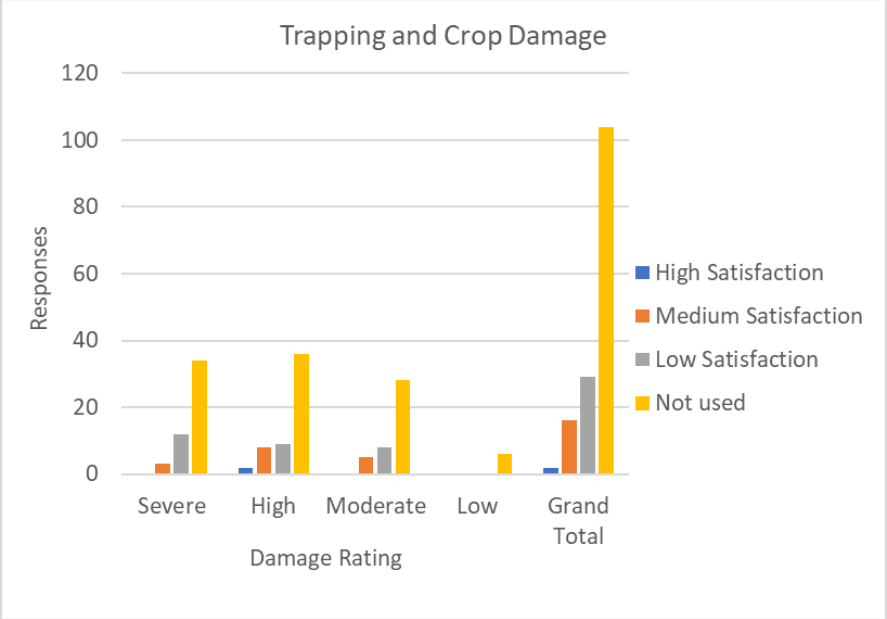

Figure 18. Satisfaction with trapping to control Richardson's ground squirrel in crops.

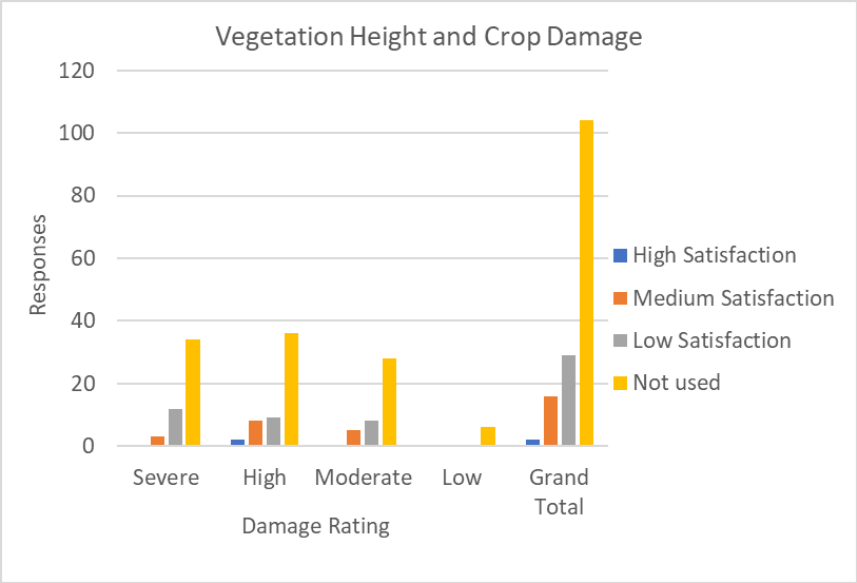

Figure 19. Satisfaction with vegetation height to control Richardson's ground squirrel in crops.

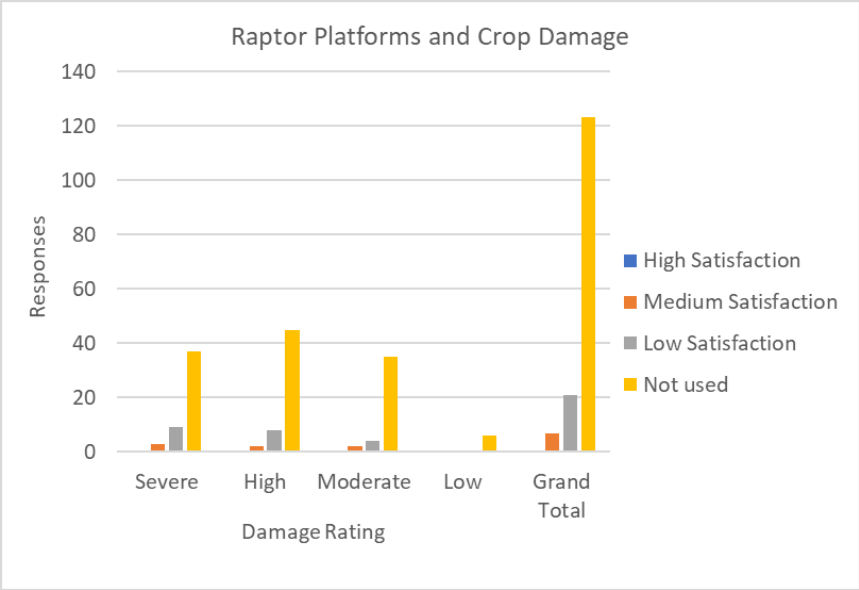

Figure 20. Satisfaction with raptor platforms to control Richardson's ground squirrel in crops.

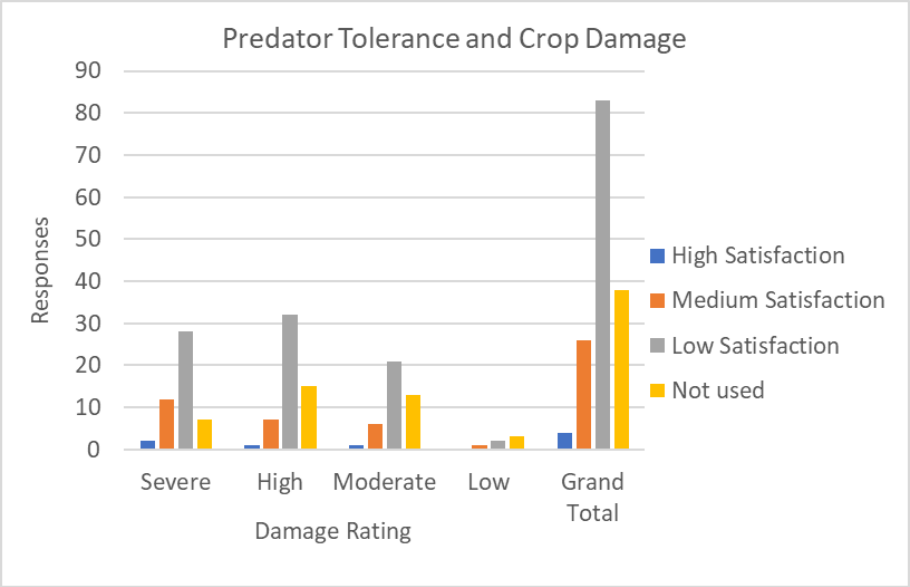

Figure 21. Satisfaction with predator tolerance to control Richardson's ground squirrel in crops.

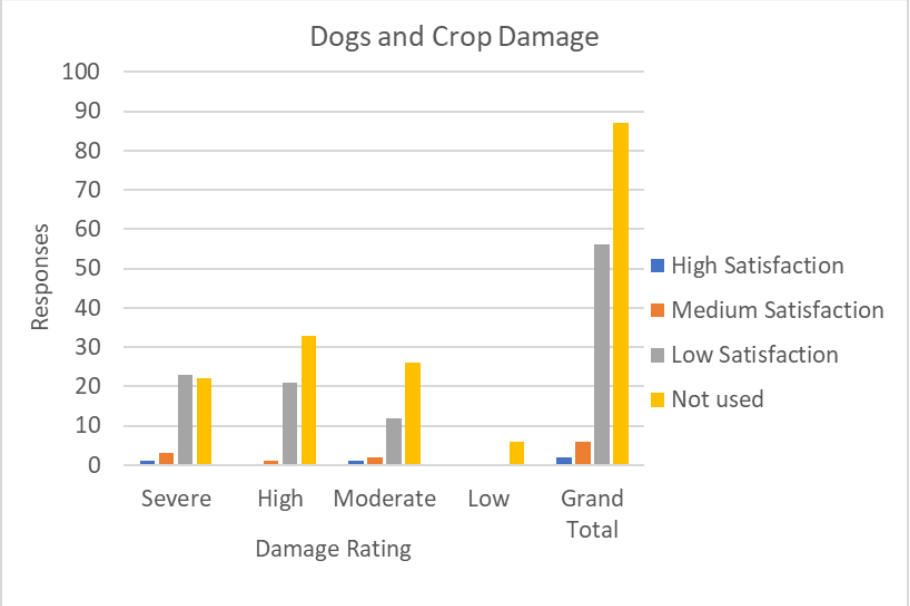

Figure 22. Satisfaction with dogs to control Richardson's ground squirrel in crops.

Those with reported damage to pastures:

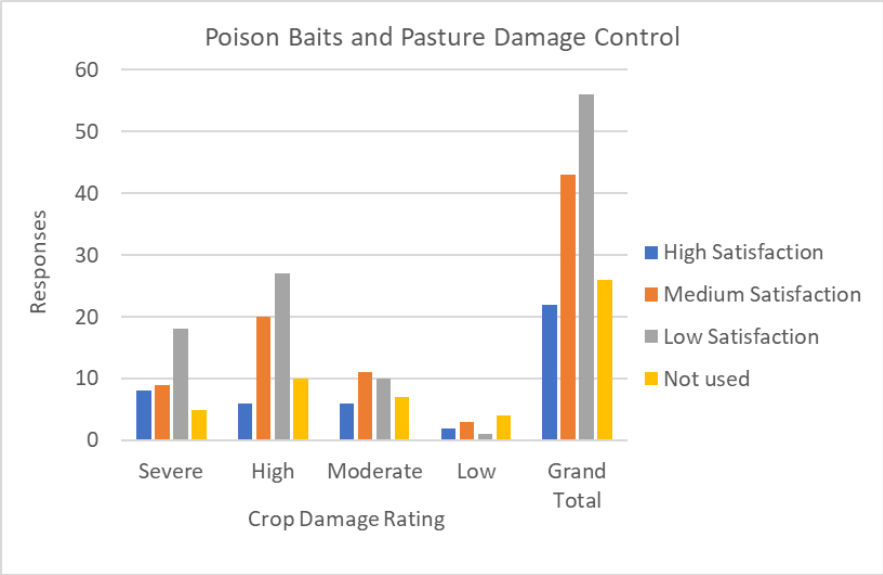

Figure 23. Satisfaction with poison to control Richardson's ground squirrel in pastures.

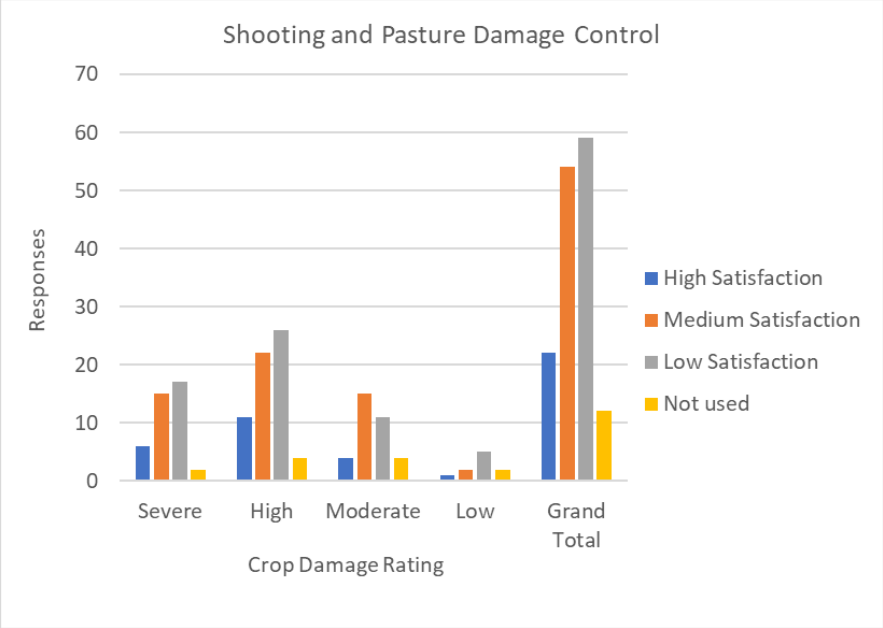

Figure 24. Satisfaction with shooting to control Richardson's ground squirrel in pastures.

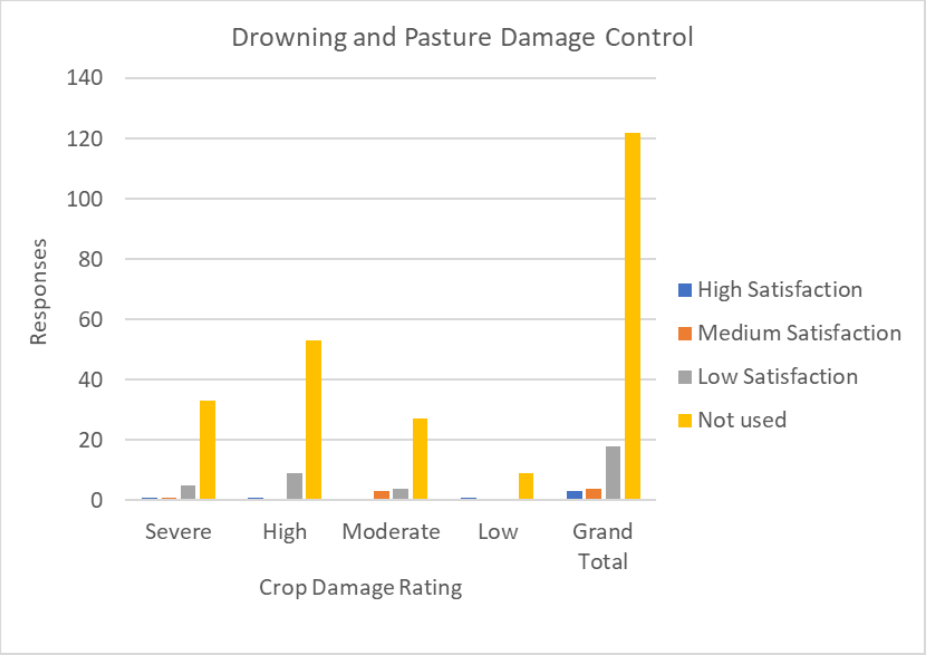

Figure 25. Satisfaction with drowning to control Richardson's ground squirrel in pastures.

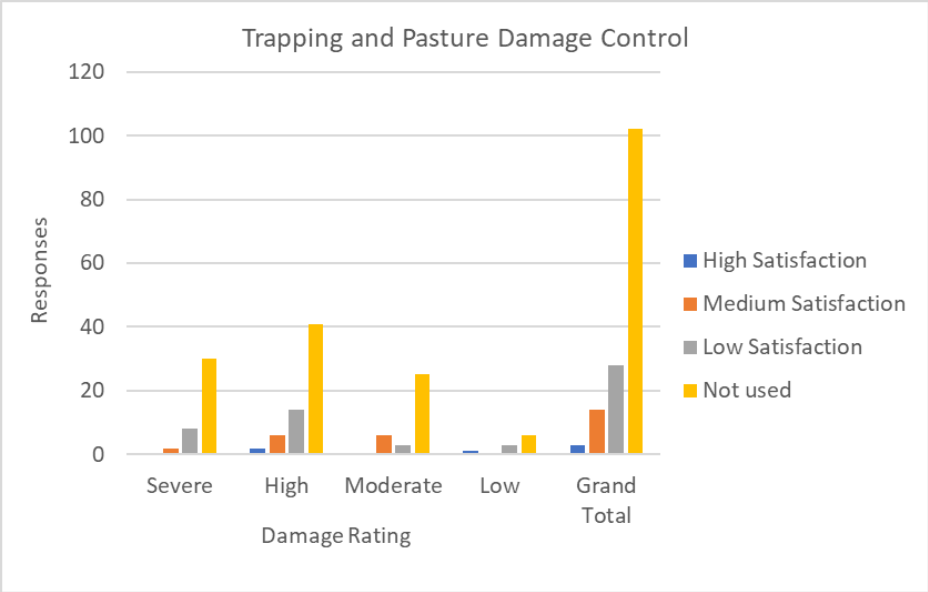

Figure 26. Satisfaction with trapping to control Richardson's ground squirrel in pastures.

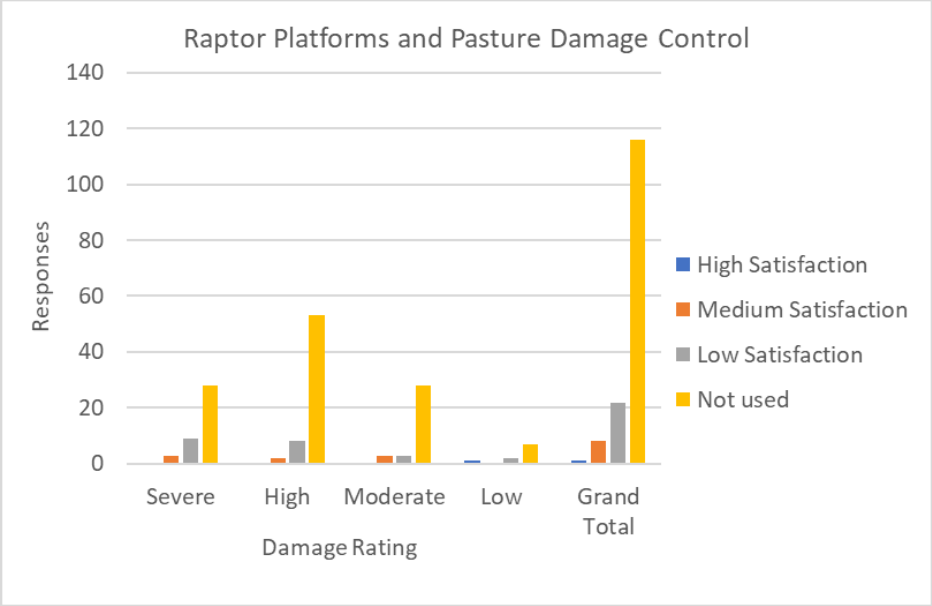

Figure 27. Satisfaction with raptor platforms to control Richardson's ground squirrel in pastures.

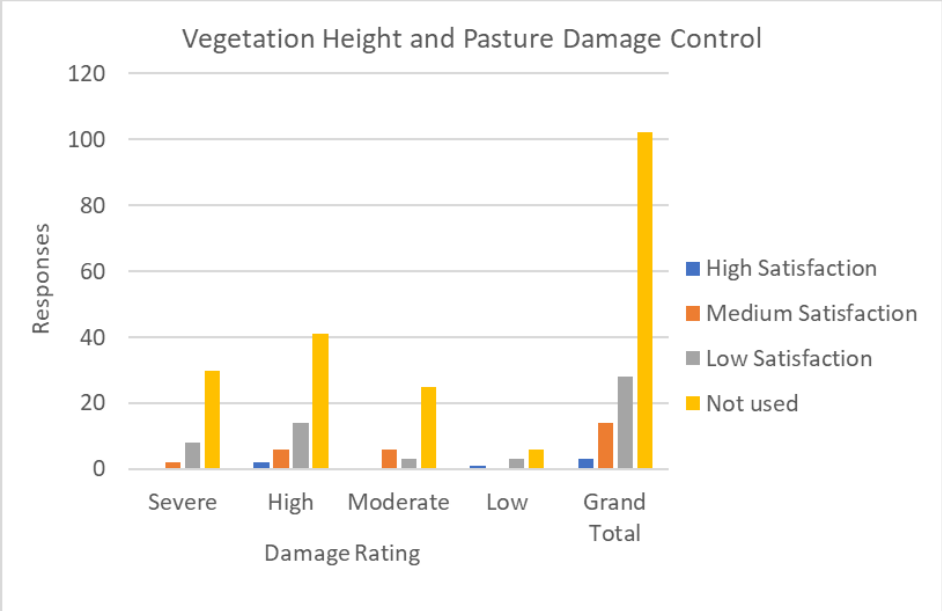

Figure 28. Satisfaction with vegetation height to control Richardson's ground squirrel in pastures.

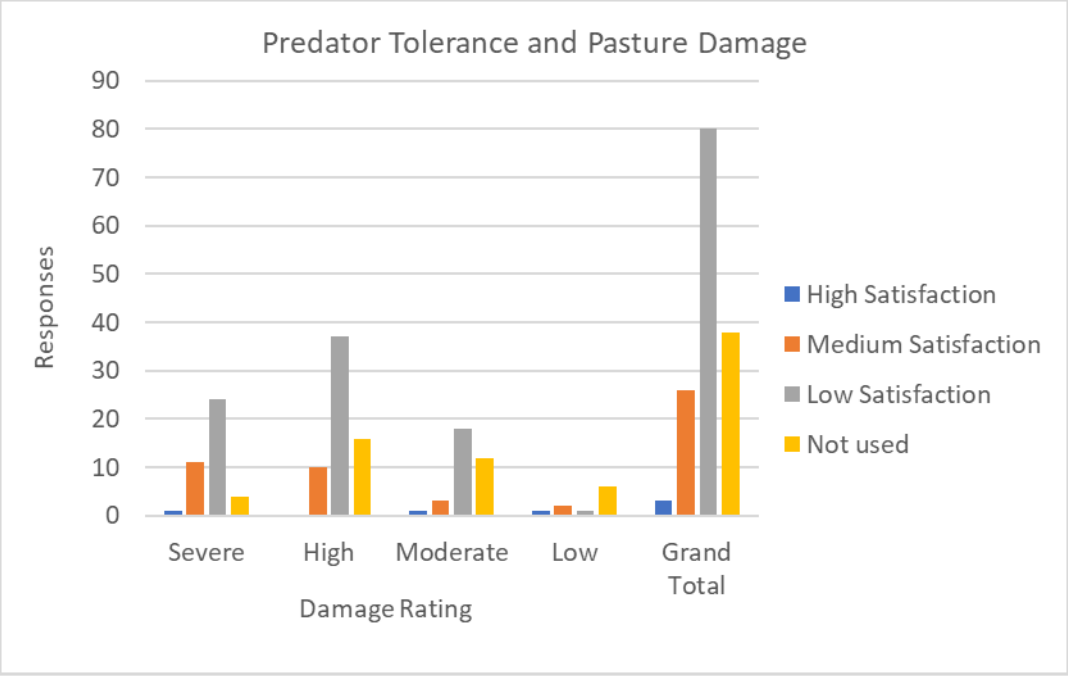

Figure 29. Satisfaction with predator tolerance to control Richardson's ground squirrel in pastures.

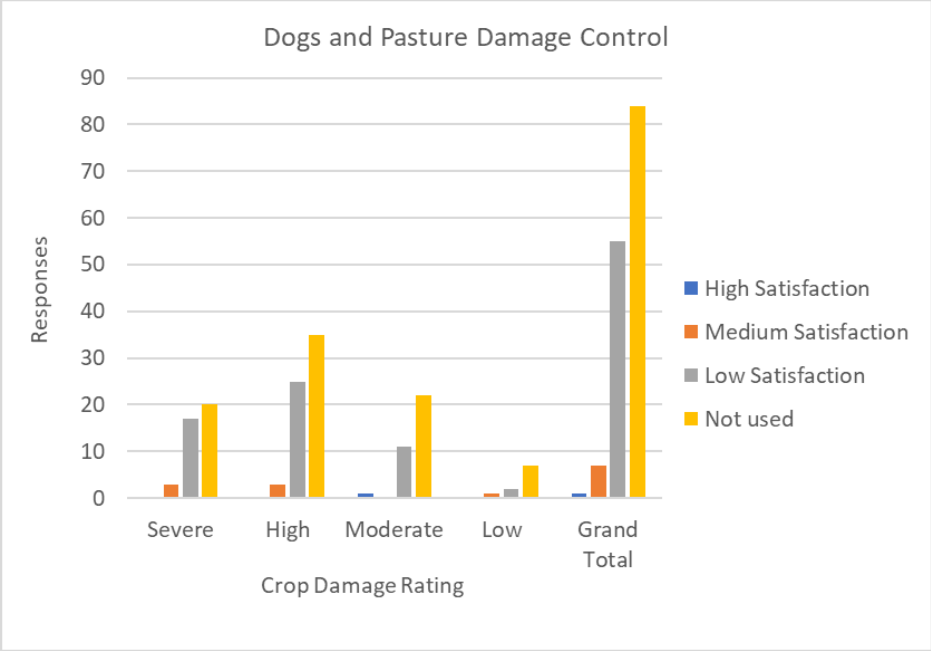

Figure 30. Satisfaction with dogs to control Richardson's ground squirrel in pastures.

Those with reported damage to rangeland:

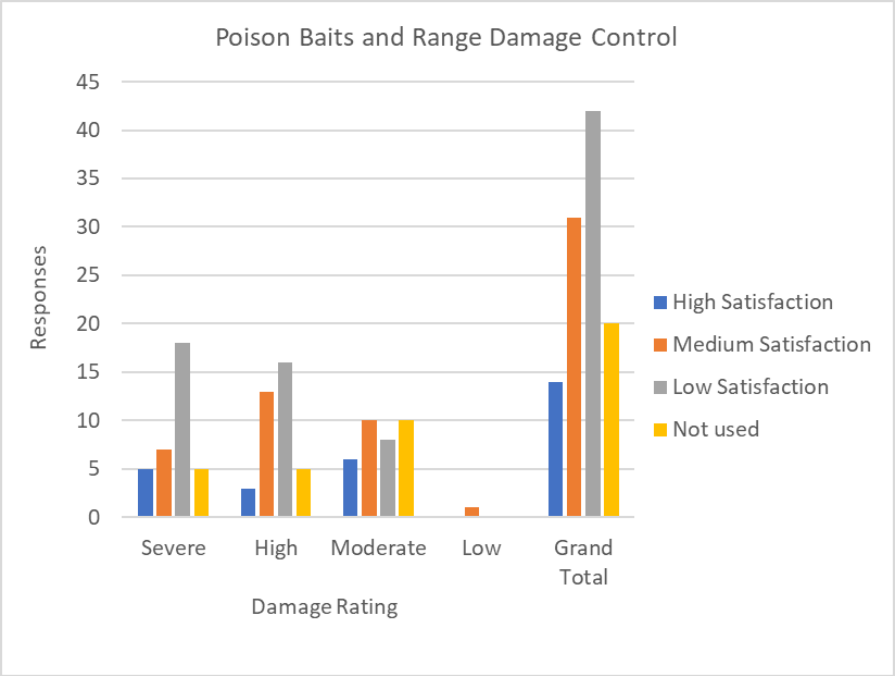

Figure 31. Satisfaction with poison to control Richardson's ground squirrel in rangeland.

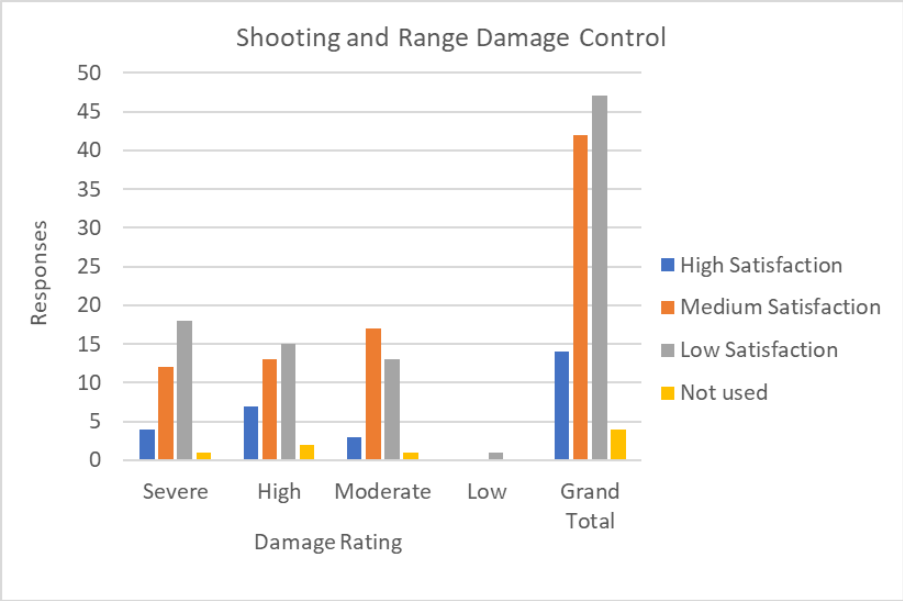

Figure 32. Satisfaction with shooting to control Richardson's ground squirrel in rangeland.

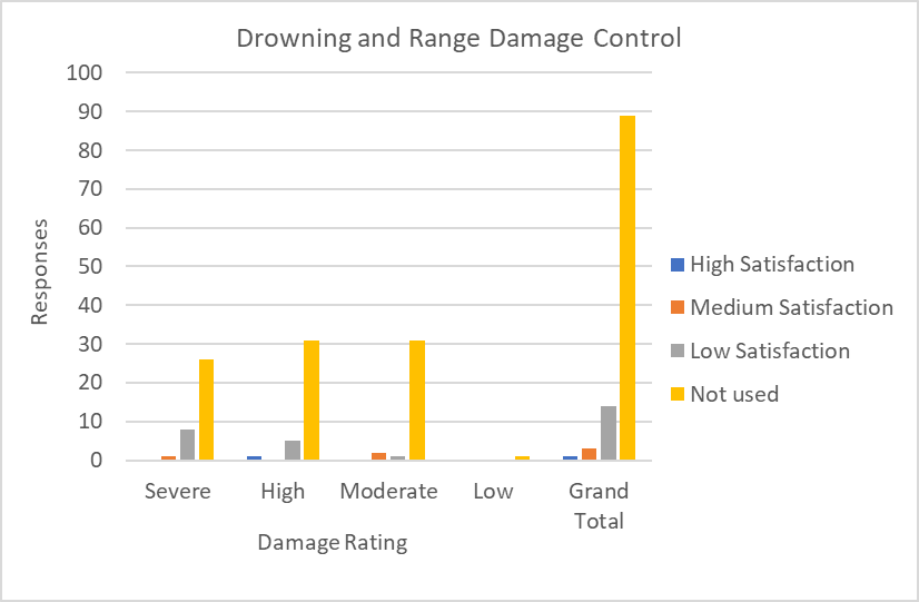

Figure 33. Satisfaction with drowning to control Richardson's ground squirrel in rangeland.

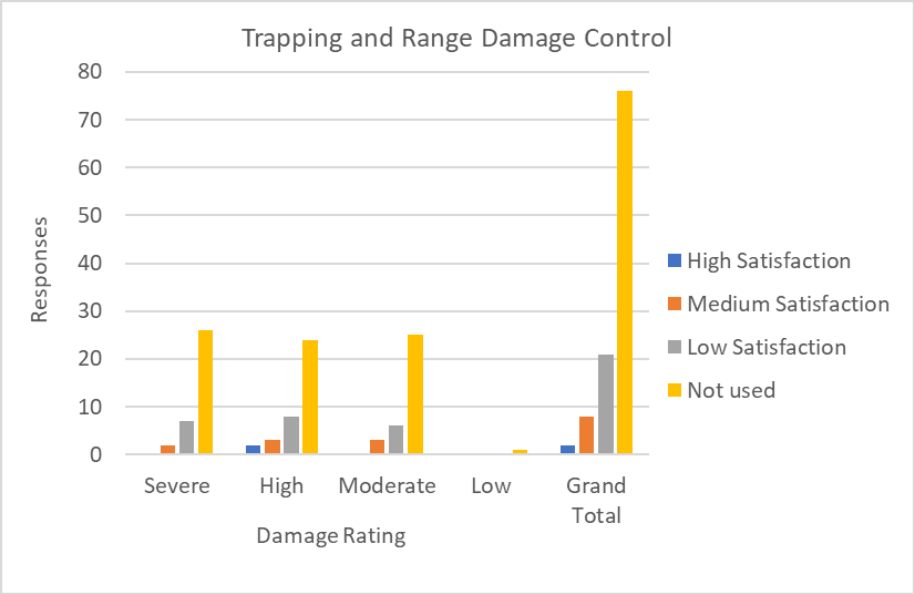

Figure 34. Satisfaction with trapping to control Richardson's ground squirrel in rangeland.

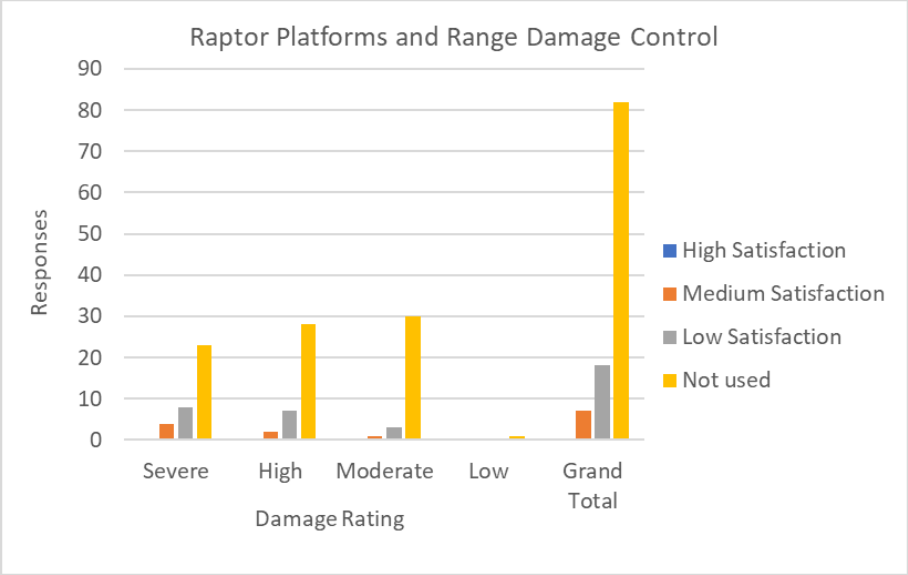

Figure 35. Satisfaction with trapping to control Richardson's ground squirrel in rangeland.

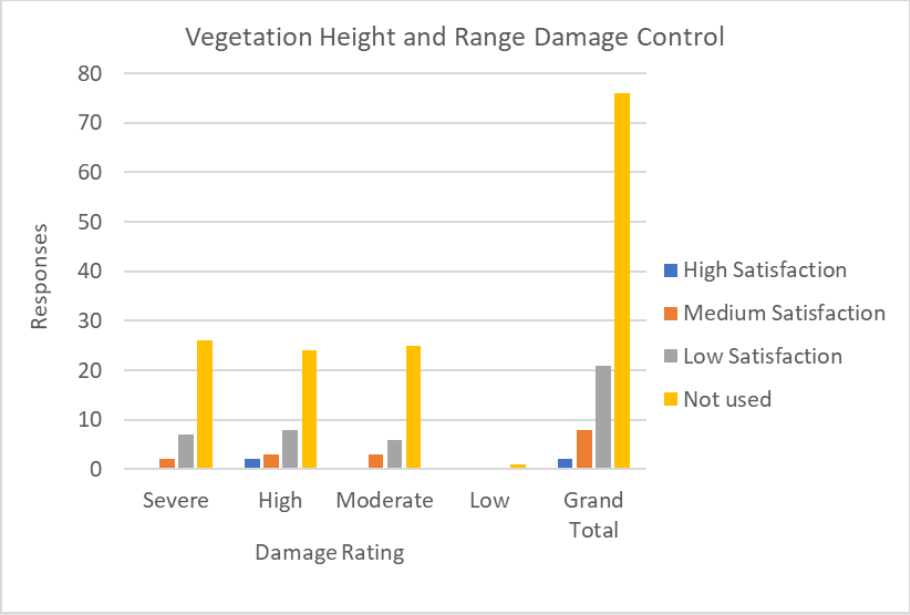

Figure 36. Satisfaction with vegetation height to control Richardson's ground squirrel in rangeland.

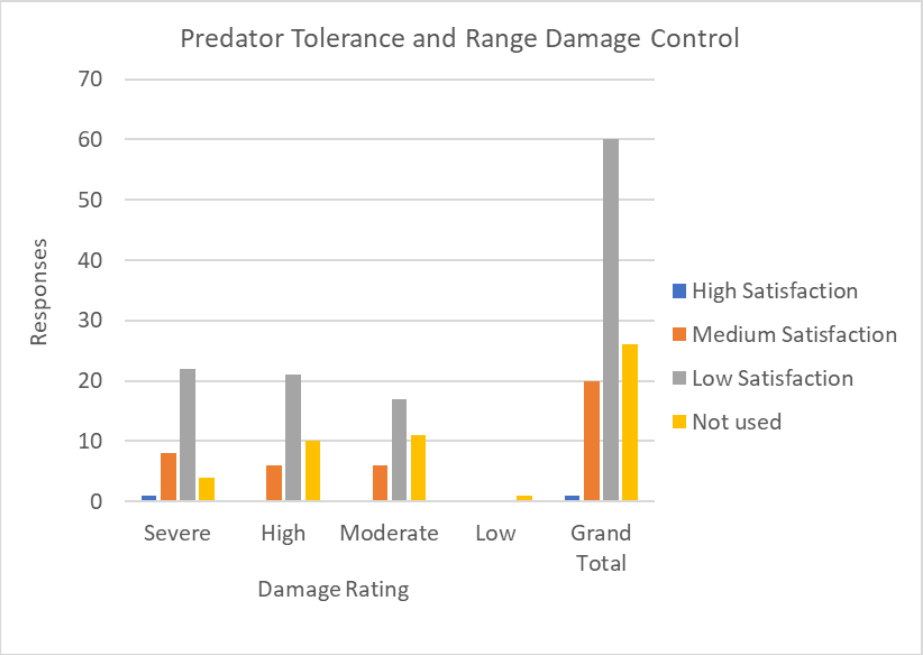

Figure 37. Satisfaction with predator tolerance to control Richardson's ground squirrel in rangeland.

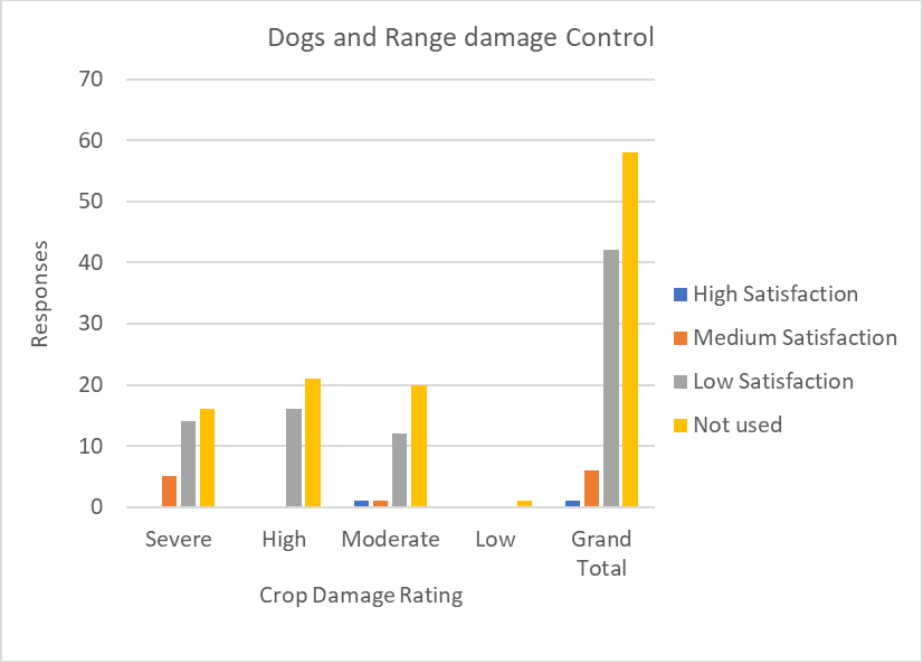

Figure 38. Satisfaction with dogs to control Richardson's ground squirrel in rangeland.

Those with reported damage to yards:

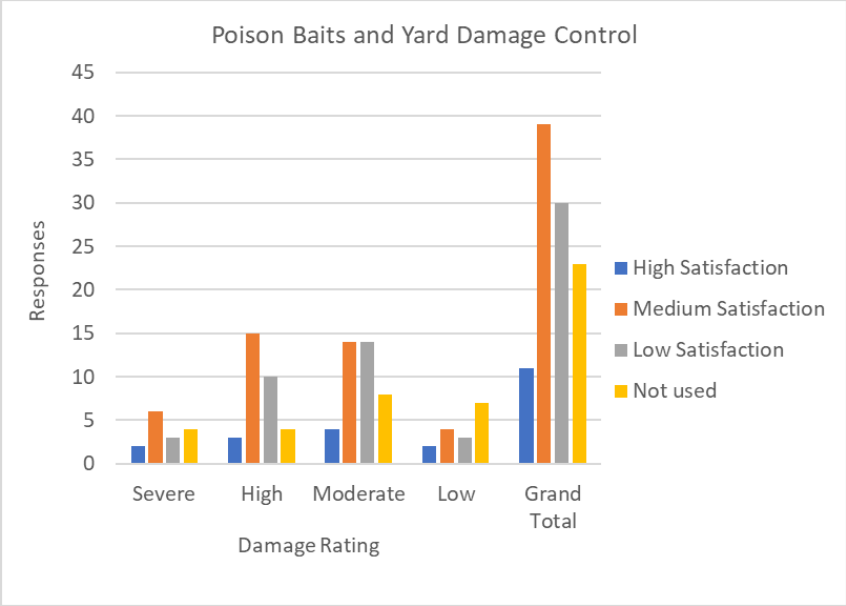

Figure 39. Satisfaction with poison to control Richardson's ground squirrel in yards.

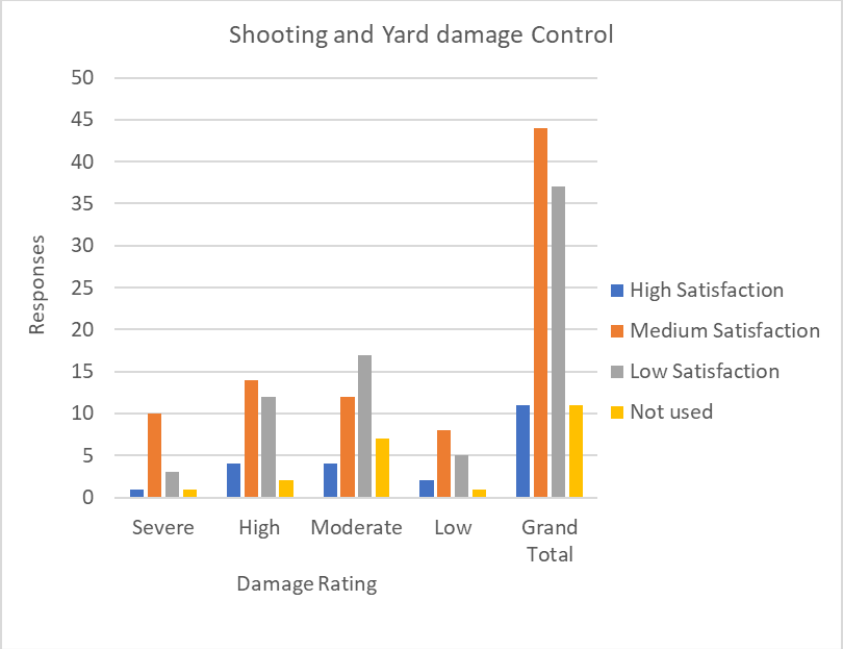

Figure 40. Satisfaction with shooting to control Richardson's ground squirrel in yards.

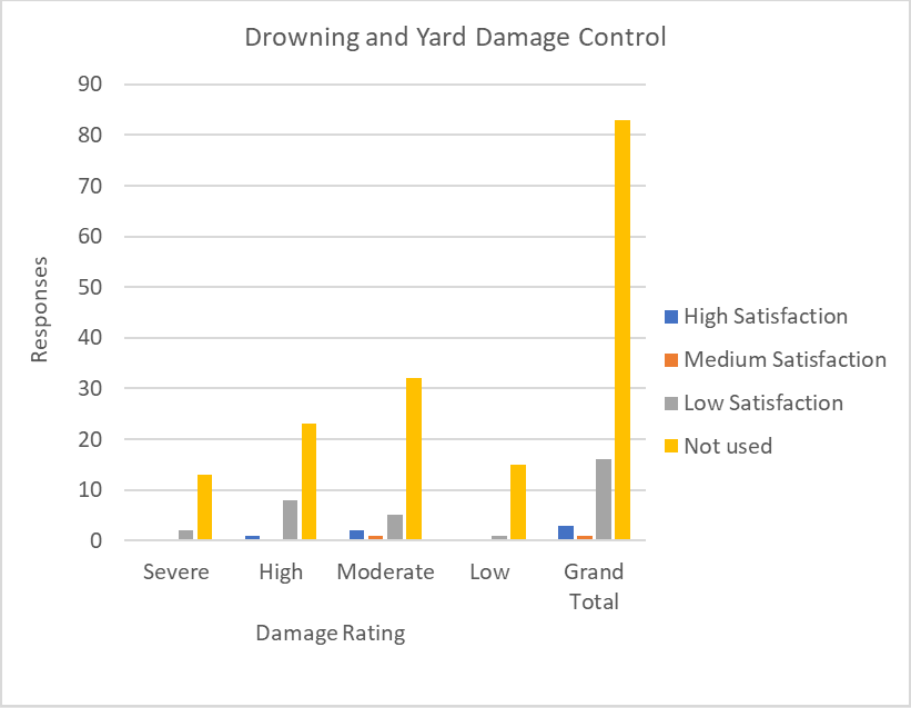

Figure 41. Satisfaction with drowning to control Richardson's ground squirrel in yards.

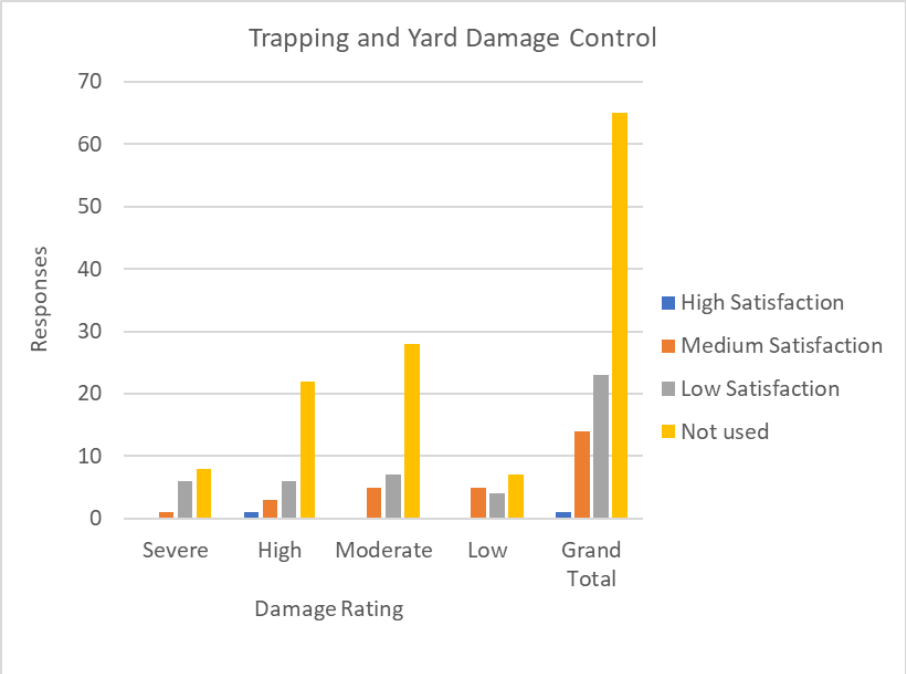

Figure 42. Satisfaction with trapping to control Richardson's ground squirrel in yards.

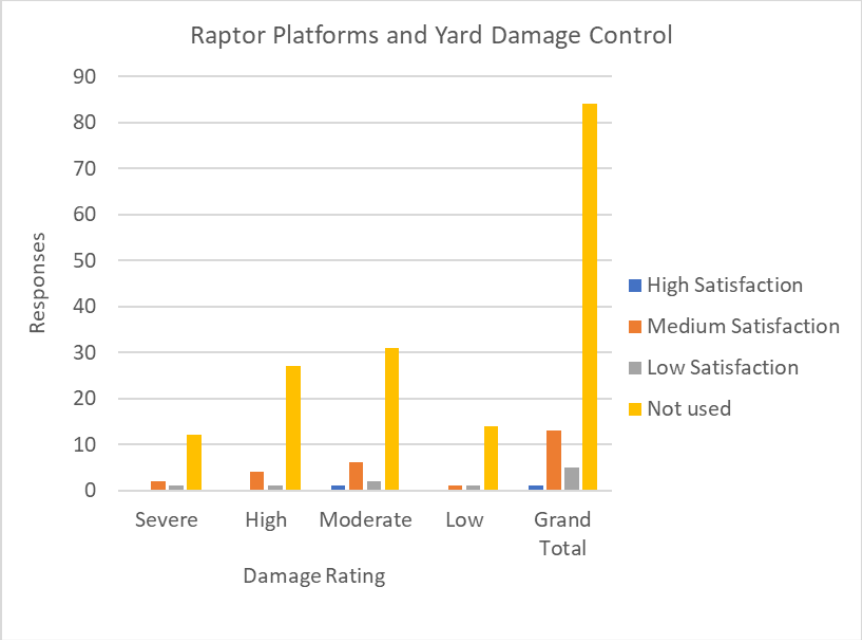

Figure 43. Satisfaction with raptor platforms to control Richardson's ground squirrel in yards.

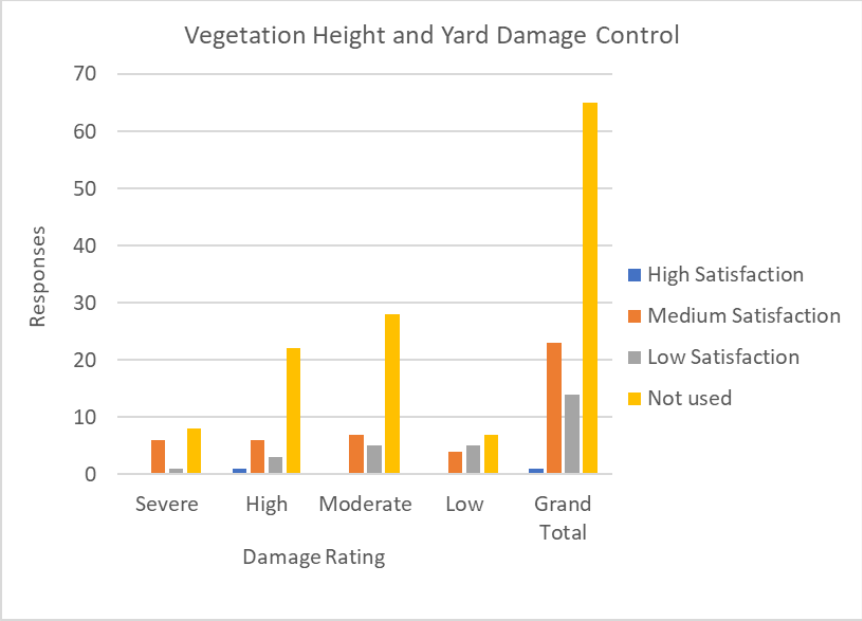

Figure 44. Satisfaction with vegetation height to control Richardson's ground squirrel in yards.

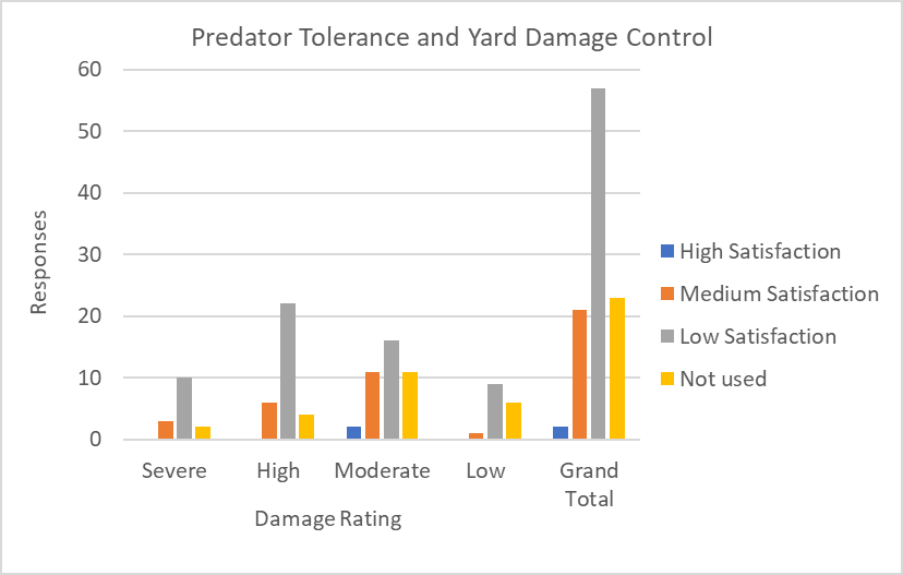

Figure 45. Satisfaction with predator tolerance to control Richardson's ground squirrel in yards.

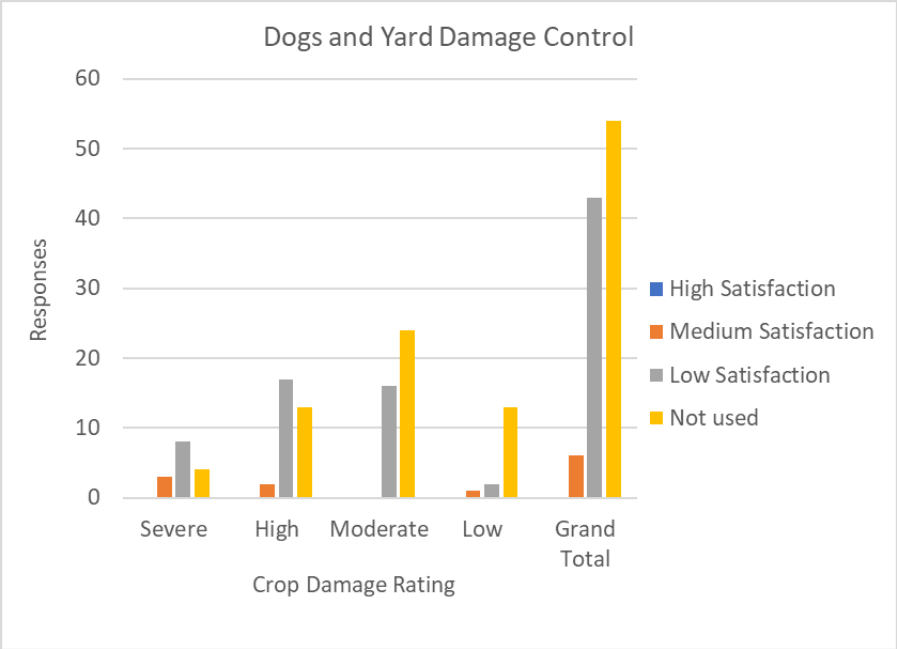

Figure 46. Satisfaction with dogs to control Richardson's ground squirrel in yards.

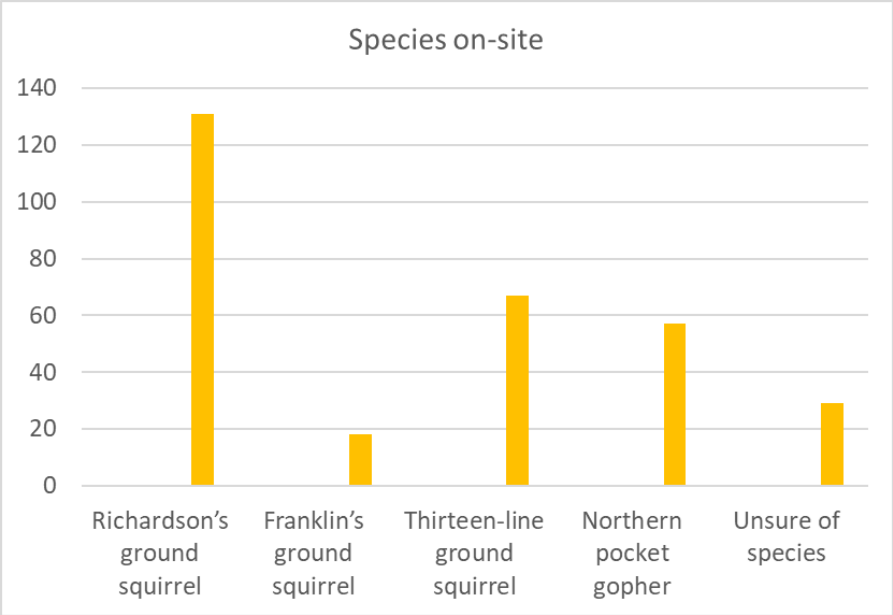

Figure 47. Burrowing rodent species on each respondent site

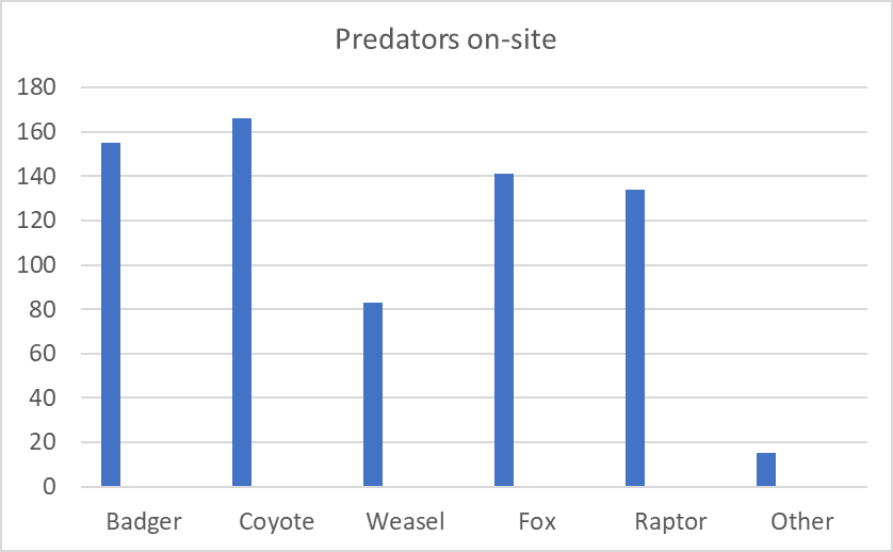

Figure 48. Predator species on each respondent site

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