2025 Western Toad Monitoring Program

Fall 2025

Summary Report

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2025 Western Toad Monitoring Program

BACKGROUND

Minnekhada Park Association (MPA) is a citizens-empowered organization, incorporated as a society in Victoria, B.C. In partnership with Metro Vancouver, MPA's mission is to preserve, protect and enhance the natural environment of Minnekhada Regional Park, while advocating respect, appreciation and enjoyment of the Park's natural and historic attributes as well as recreational resources. As part of this work, MPA develops and implements a variety of events and programs. This report summarizes the 3nd year of the "Trail Hoppers" program which monitors the park's Western Toad Population.

Minnekhada Regional Park contains a communal breeding site of the Western Toad (*Anaxyrus boreas*). Western Toads gather in large numbers at various stages of their life cycle which may give a misleading appearance of extreme abundance[1]. In actuality, these groupings can represent every single breeding adult or all young produced for the entire area that year[1]. During these mass congregations at breeding sites and during mass migration between breeding and foraging/over wintering areas, Western Toads are incredibly vulnerable to disturbance and mortality[1]. Western Toads are a species of interest from a conservation perspective and are both provincially listed Yellow[2] and federally listed as Special Concern under the Species at Risk Act[3].

While Western Toads have been observed and reported informally in Minnekhada Regional Park by both park users and environmental professionals for over a decade, formal monitoring had been sporadic and minimal prior to 2023 when the Trail Hoppers Program was initiated by MPA. A summary of MPA's Western Toad monitoring and conservation efforts are summarized in detail in the 2023 report and 2024 report. The reports include incidental observations, some formal monitoring conducted by the Coastal Partners and efforts to raise awareness about the toadlet population by Coastal Partners in partnership with Metro Vancouver

At Minnekhada Park, toadlets emerge from the marsh by the thousands during the summer, coinciding with hiking season and peak park usage. This leaves the toadlets vulnerable to being trampled by park users and subject to vehicle mortality, particularly on Quarry Road. There is less currently known about impacts to adult toads during their spring migration because their migration occurs in the evening, typically when the park is closed and they are not observed in the vast numbers that the toadlets are. Vehicle traffic in the area is likely low after dark offering the mature toads some protection against roadkill mortality. However, road-killed breeding age toads have been observed anecdotally on the lane leading to Minnekhada Lodge from Oliver Road. This lane experiences isolated high traffic before and after private events at the Lodge which occur in the evening when adult toads are on the move. There are also concerns

that vehicle traffic on Quarry Road may increase as the area develops in preparation for the opening of Widgeon Marsh Regional Park and the proposed expansion of Gilley's Quarry. That said, planned improvements and upgrades to Quarry Road may provide an opportunity for MPA to engage with decision makers to advocate for Western Toad conservation to be considered with the road design (toadlet underpass, fencing, etc.). As a result of these factors mature Western Toads were added to Trail Hoppers in its second year (2024) and were also monitored in 2025.

2025 marks the third year of the "Trail Hoppers" program and was made possible through financial support of the Metro Vancouver Regional Parks Foundation as part of the Fire Recovery fundraising campaign and with the organizational support of Metro Vancouver Regional Parks.

PURPOSE

The Western Toad population at Minnekhada is regionally significant. This is in large part because of the somewhat unique topography. Minnekhada Marsh is in a basin surrounded almost completely by forested, higher terrain on all sides. This provides an almost perfect system to support the Western Toad life cycle, which in turn greatly enhances the food web. Adults thrive in the surrounding rainforest environment and then return to the marsh to reproduce in late spring. Water, moving slowly through the marsh provides nutrients for tadpoles and toadlets. In turn, the mass emergence of toadlets, before and after their metamorphosis, provides a substantial food source for other local species. If the Western Toad does not continue to thrive, it is safe to say this will have a negative impact on other parts of this ecosystem.

Unfortunately for the Western Toad, this perfect home is also enjoyed by an increasing number of humans, and the toads must cross pathways and roads in order to complete their objectives. This results in a level of mortality, which had not previously been quantified. This is the primary purpose of this program;

To better understand the Western Toad life cycle at Minnekhada and, as much as possible, document the human caused impacts.

By understanding and quantifying this perhaps MPA can help to identify ways to mitigate the level of human-caused mortality. By continuing to monitor the toads annually MPA hopes to develop a long-term dataset which can be used to develop strategic initiatives that promote the conservation and preservation of the Western Toad population in the park.

In addition to the main objective there are a variety of additional questions the program seeks to address as follows:

- Where are the "hotspots" where high levels of human-caused mortality occur or are likely to occur?
- Are there specific pathways they follow, or do they more or less distribute randomly?
- Do these change over time?
- What are the environmental triggers for adult toads to begin their migration to the marsh and for toads/toadlets to migrate to the forest?
- What might be the impact of increased road traffic, specifically on Quarry Road adjacent to the marsh?
- What other species most benefit from these patterns?
- Are there invasive species present that pose a substantial threat?

MPA will continue to refine and adjust the program objectives as the dataset grows. Recommendations for mitigation efforts will be provided to decision makers based on the expansion of the dataset and the emerging trends.

METHODS

Adult Western Toad Monitoring:

Survey transects were established at Minnekhada Regional Park to identify where mature Western Toads cross major roads around the park (Figure 1). There are two transects in total: the first, located on Quarry Rd, spans approximately 1 km, while the second, on Oliver Rd, begins at the gate and ends at the Lodge, covering a length of about 1.4 km. The transects are in areas where road mortalities are possible. The limited survey locations ensure MPA can maximize its manpower and focus on areas of greatest concern. Adult toads will move within the Minnekhada trail system but given that most migration takes place after sunset (when the park is closed) there is limited concern for the toads on the walkable trail system within the park. The Lower marsh transect (Figure 2) was also monitored to infer about the number of toads successfully making it to the marsh.

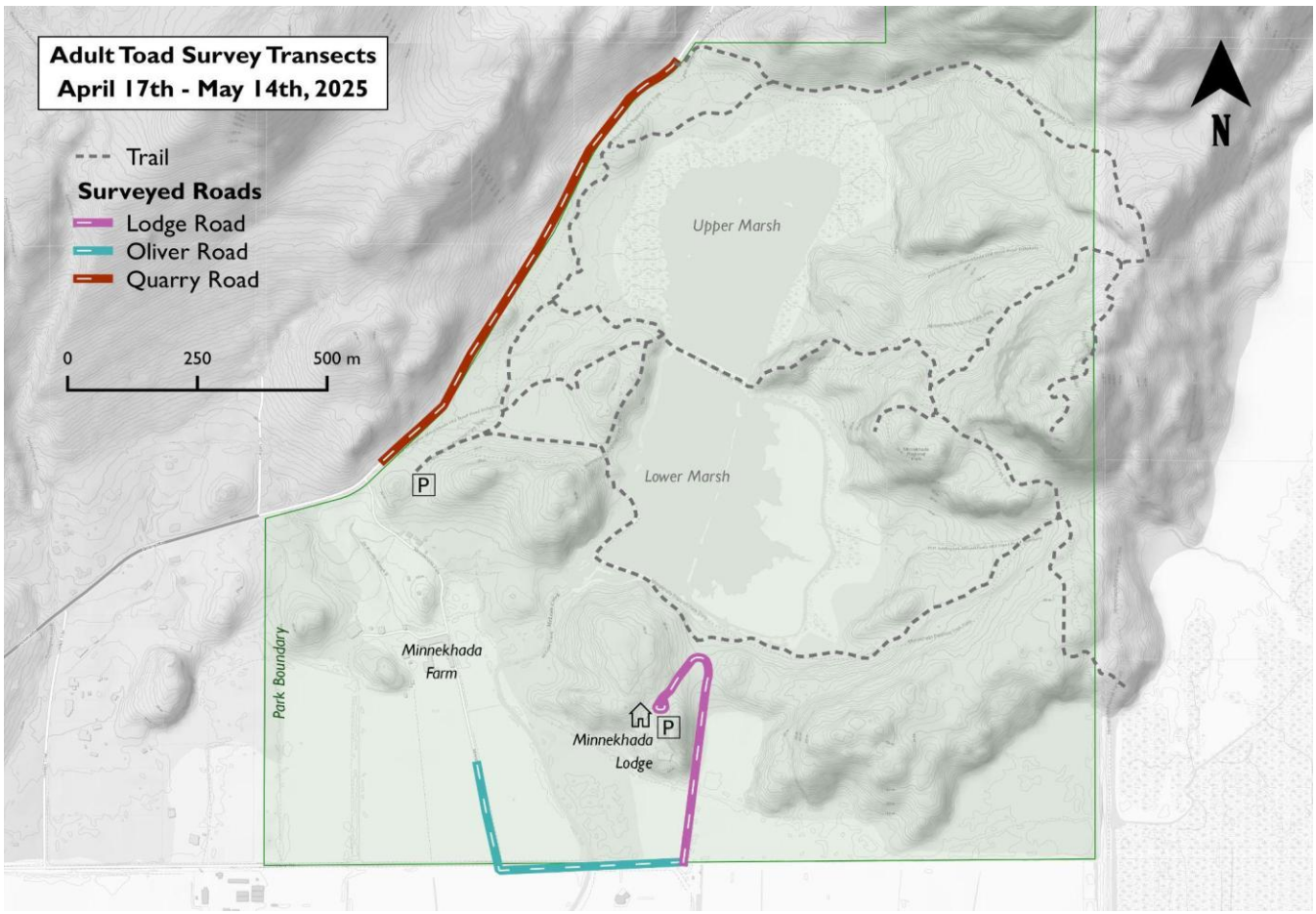
Adult Western Toad surveys were conducted during the 2-month migration period (April–May). Volunteers went out 1-3 times per week during the migration period trying to choose the days of the week with highest humidity. Monitoring took place over nine days, with efforts split between the transects. The coordinator waited until temperatures were at least 10 degrees Celsius at dusk to start surveying adult toads. Surveys started right at dusk and went until there was no more toad activity (usually 2-3 hours). The coordinator recorded the date, start, and end time, weather conditions, number of live toads seen per segment, and number of dead toads per segment and entered it into Avenza and later into excel sheet (appendix 2).

Ideally volunteers worked in groups of 3-5 for efficiency and safety purposes. In groups of five, two volunteers focused on looking at and counting toads on the left side of the road and, two focused on counting toads on the right side of the road and one volunteer looked out for incoming vehicles or wildlife. For surveys on Oliver Road groups of three were efficient as the road is not as wide or as high traffic. Vehicle speed is also limited. When a toad was found the exact location would be tagged on the Avenza

app by the coordinator and would be specified as dead or alive. Red points were used for dead toads. If possible, a photo was also taken. If the toad was in the middle of the road volunteers were instructed to carefully nudge the toad along to the side of the road.

Several maps were created showing the number of adult Western Toads were found crossing roads around Minnekhada.

Figure 1: Adult Western Toad Survey Transects



Western Toadlet Monitoring

Survey transects were established around Minnekhada Regional Park in 2023 to determine where the migration crosses trails within and around the park (Fig 1). The transects are roughly 1-1.5 km and follow the established trail system within the park as well as adjacent roads. The transects were then divided further into 25 m segments. Each segment was marked using GPS, and a geotagged map was created for reference. This map was loaded to an app called Avenza and used to navigate and follow the segments.

2025 was the first year of a new protocol when GPS mapping techniques were used for our toadlet and adult toad counts rather than physical measuring, which dramatically improved the efficiency of the counts, and reduced paper use/waste.

Surveys were conducted by volunteers throughout the migration period, from June 16th until July 11th. Surveys were conducted in the evening (5:00 pm – 8:00 pm) when the toadlets were most active. Volunteers were instructed to record the date, start and end time, weather conditions, number of live toadlets observed per segment, and number of dead toadlets observed per segment.

Volunteers worked in groups of at least two per transect. One volunteer focused on counting live toadlets, and the other counted dead toadlets. If more volunteers were available for a segment, each volunteer would be responsible for either the left, middle or right side of the path to count the live toadlets. Volunteers were given clickers to keep count of the toadlets per segment. At the end of each segment the coordinator would mark the location on the Avenza map and record the data on the app. The data included direction of travel of the toadlets, number of alive toadlets and number of dead toadlets. For higher concentrations, live toadlets count were recorded as a range (<10, 10-100, 100-500, 500-1000, >1000) , otherwise a definitive number when possible. Volunteers were asked to toss any dead toadlets to the side of the trail to avoid double counting the dead toadlets. All data was collected using Avenza and then transferred into an Excel spreadsheet (Appendix 1). Several maps showing the relative abundance of live and dead toadlets along the transects were created using the data collected over the migration period.

Figure 2: Minnekhada Regional Park's 12 surveyed trails, with dates surveyed during toadlet migration.

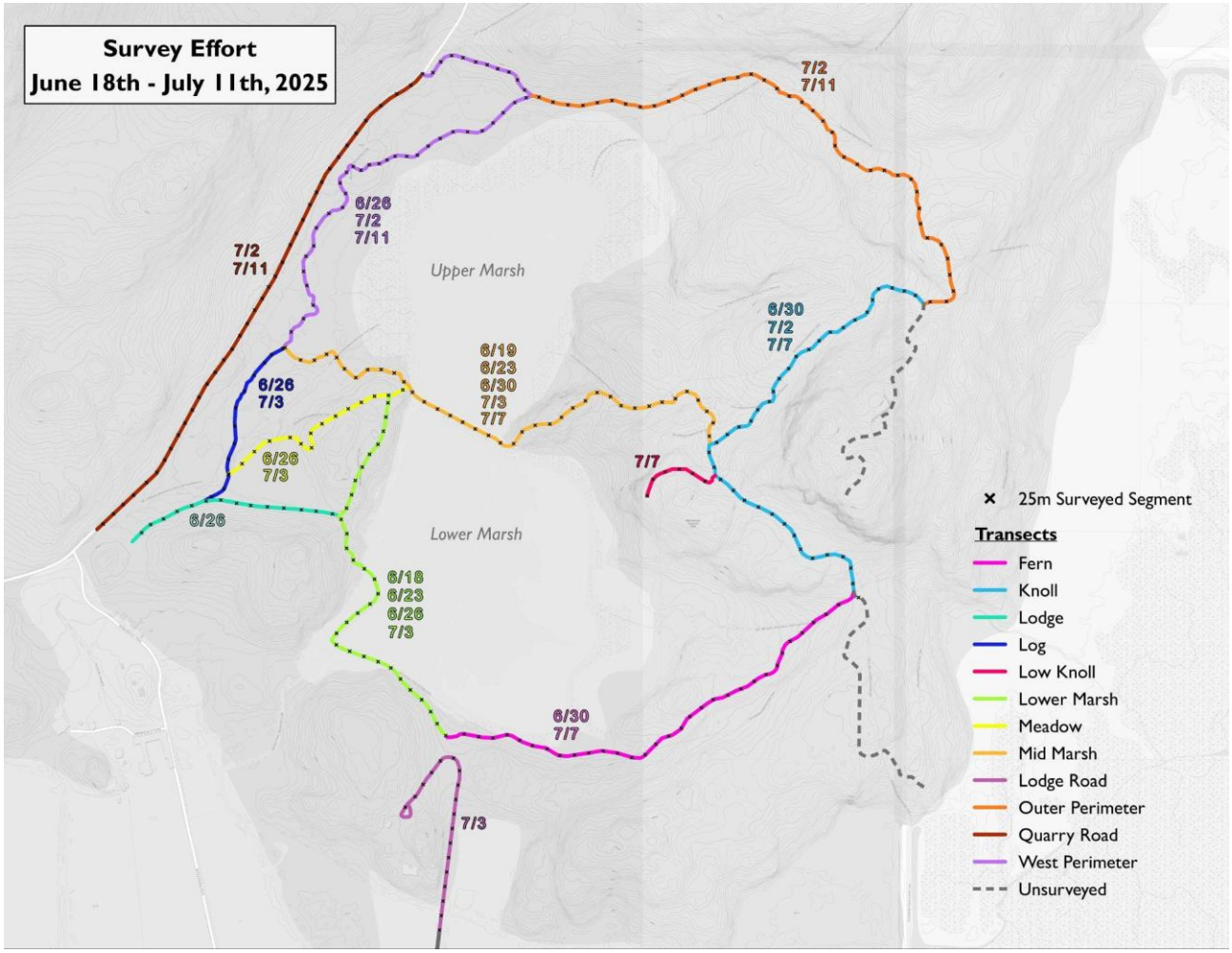


Figure 3: Photos of Mid marsh transect.

RESULTS:

Results for Adult Western Toad Monitoring:

During the three-week migration, 99 live and five dead adult Western Toads were recorded across the transects. Most toads were seen in the lower marsh area and along the lodge road. Fewer toads were found on Quarry Road compared to 2024, which may mean they used different routes or that the surveys did not match their movement times. Figures 8 and 9 show where and when the toads, both alive and dead, were observed. After the season, experts from the Fraser Valley Conservancy noted that the monitoring times may not have been ideal (i.e. should have been aimed for during or right after rainfall), and the schedule will be adjusted for 2026. At least one passerby on Quarry Road during a nighttime survey stopped to share that during or right after a rainfall, immediately following a dry spell, results in more roads on the road - and those conditions would be more ideal.

Dead toads were found only along the roads, suggesting that most deaths were caused by cars. During the surveys, it was noticed that drivers on Quarry Road often travelled much faster than was safe. On Oliver Road, only vehicles linked to Lodge events or park staff are allowed during toad migration. Data

from last year showed that more toads died on nights following days when Lodge events were held and migration conditions were good. This means toads were crossing the road at the same time people were arriving at or leaving events. Because the road is dark and narrow, drivers cannot easily see or avoid the toads, and eventgoers are unlikely to know to watch out for them.

Additional signage along the Lodge Road likely did also help and is appreciated.

Figure 4: Shows a map with all the Adult Western Toads surveyed between April and May 2025. Dead toads in red.

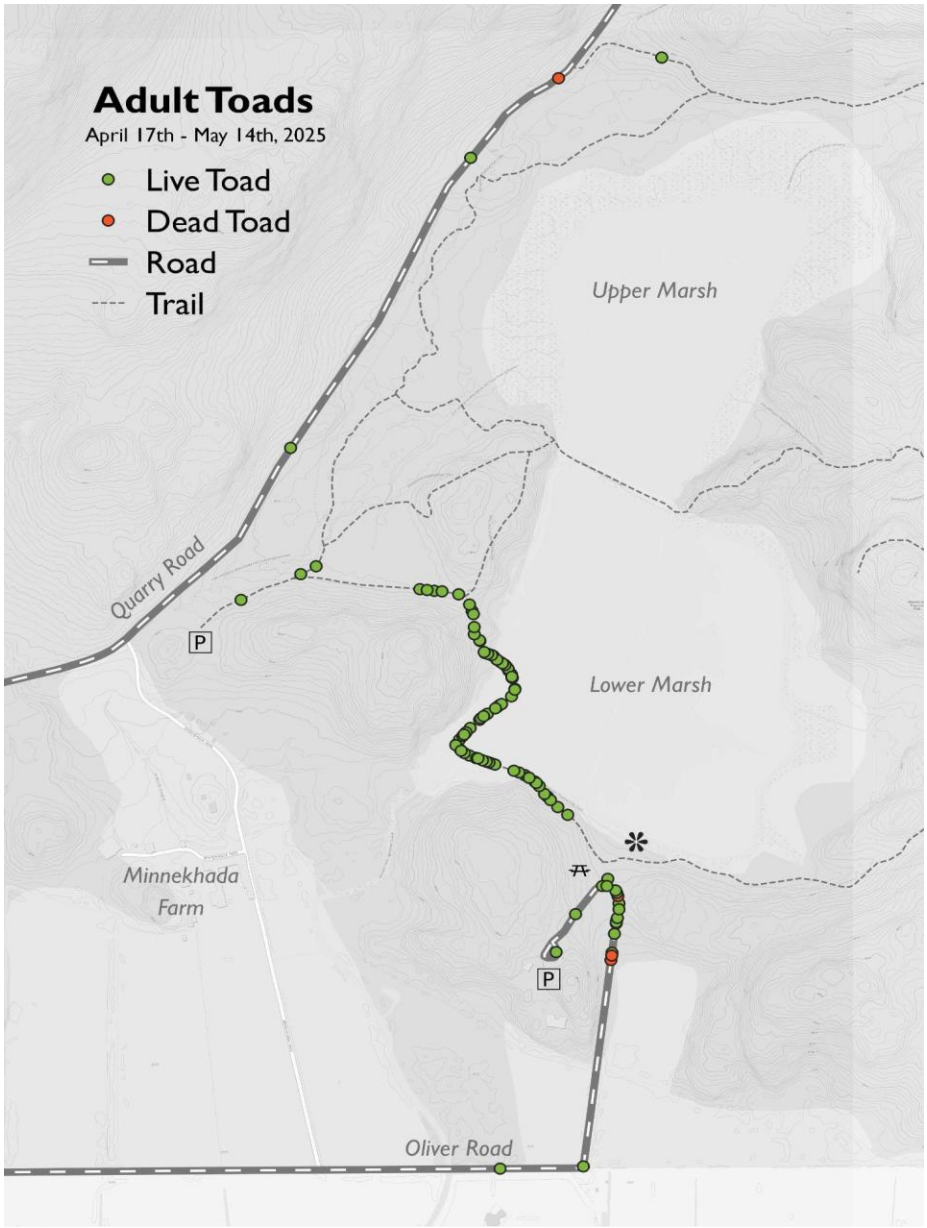


Figure 5: Shows a map with all the Adult Western Toads survey between April and May 2024. Dead toads in red.

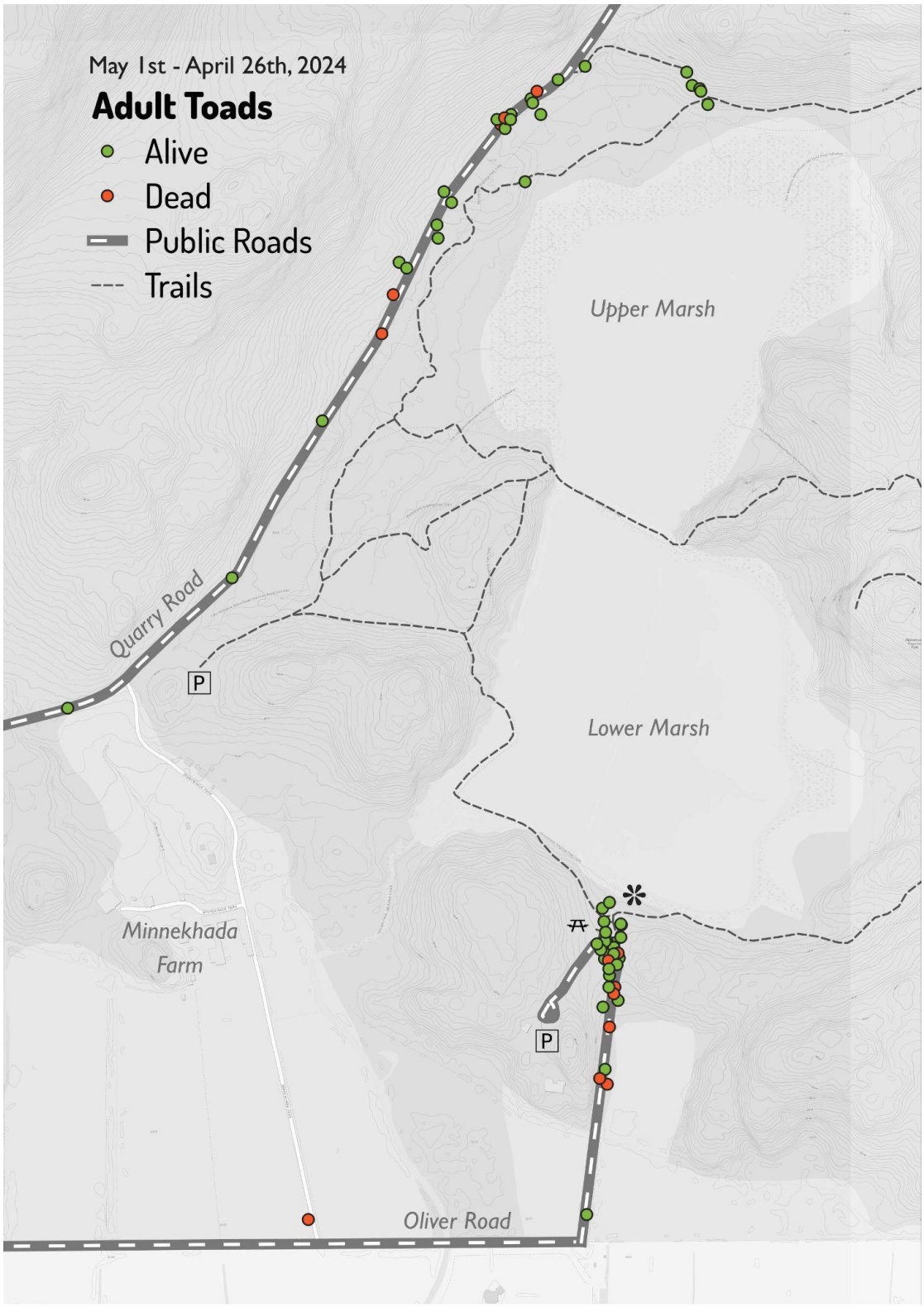


Figure 6: Shows a map with all the Adult Western Toads surveyed on Quarry Road Transect in 2024 and 2025.

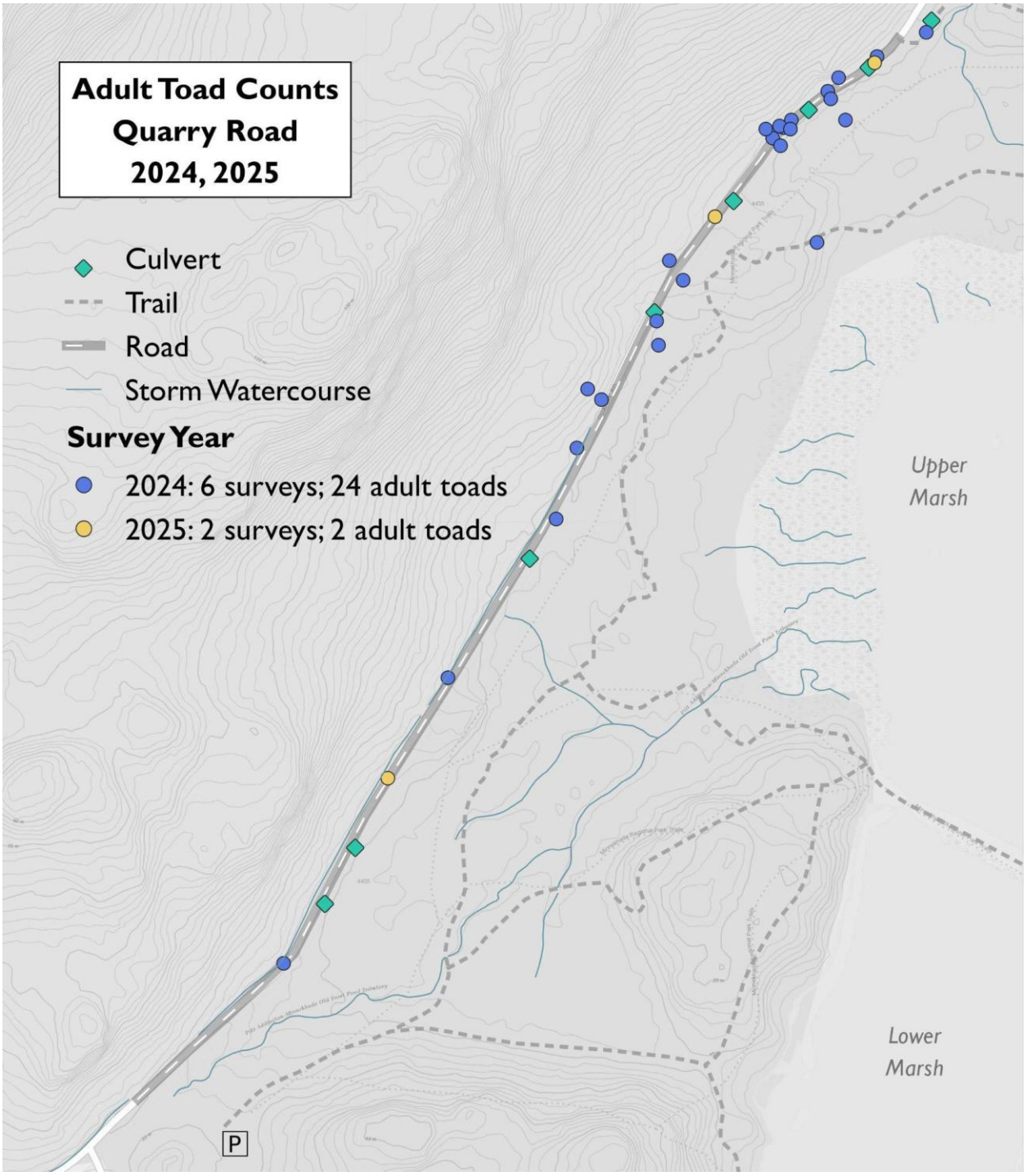


Figure 7: Shows a map with all the Adult Western Toads surveyed on Oliver / Lodge Road Transects in 2024 and 2025.

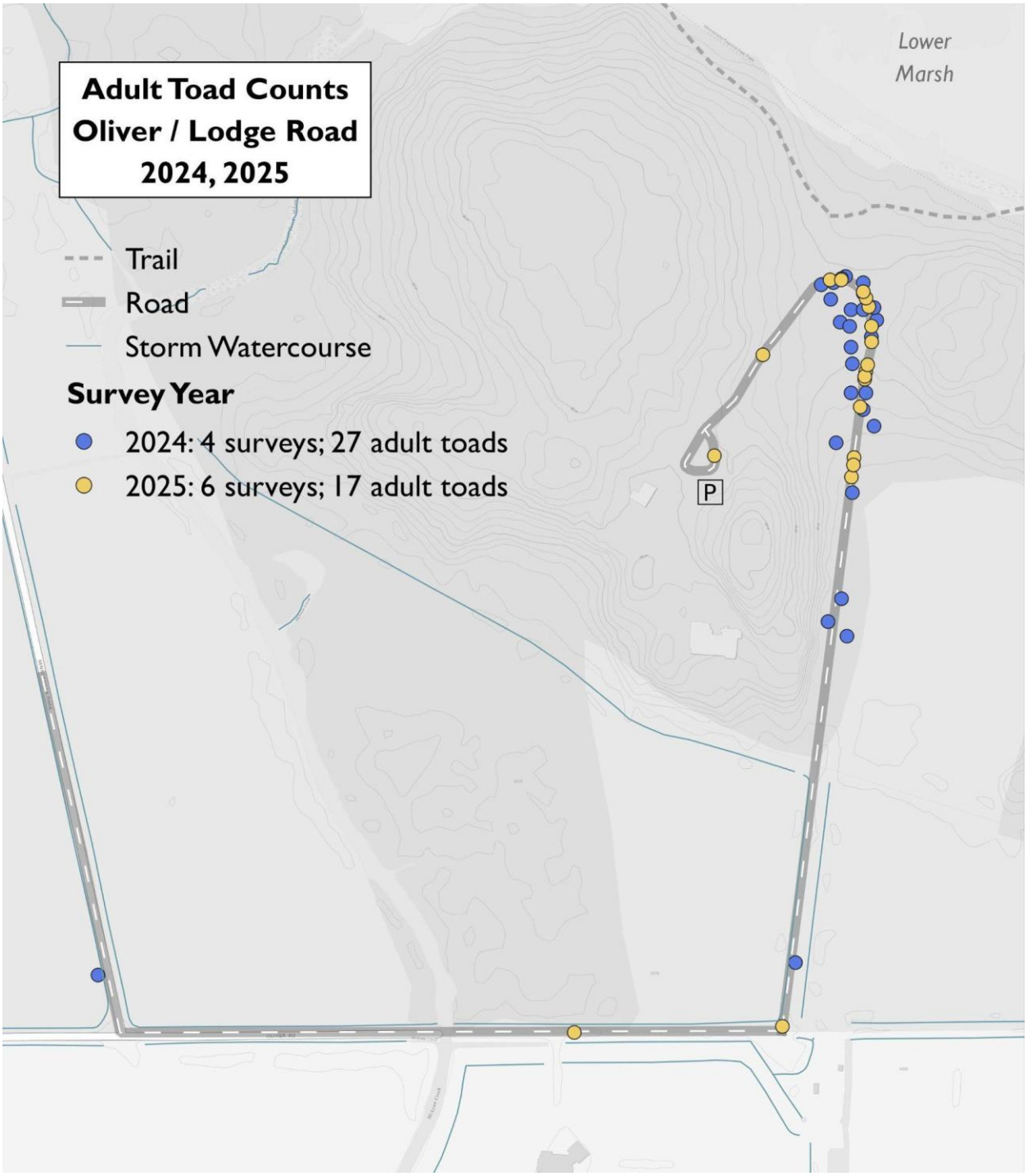


Figure 8: Shows a map of all the adult Western Toads surveyed on the Quarry Road transect. With each survey date shown on a different map. 2025.

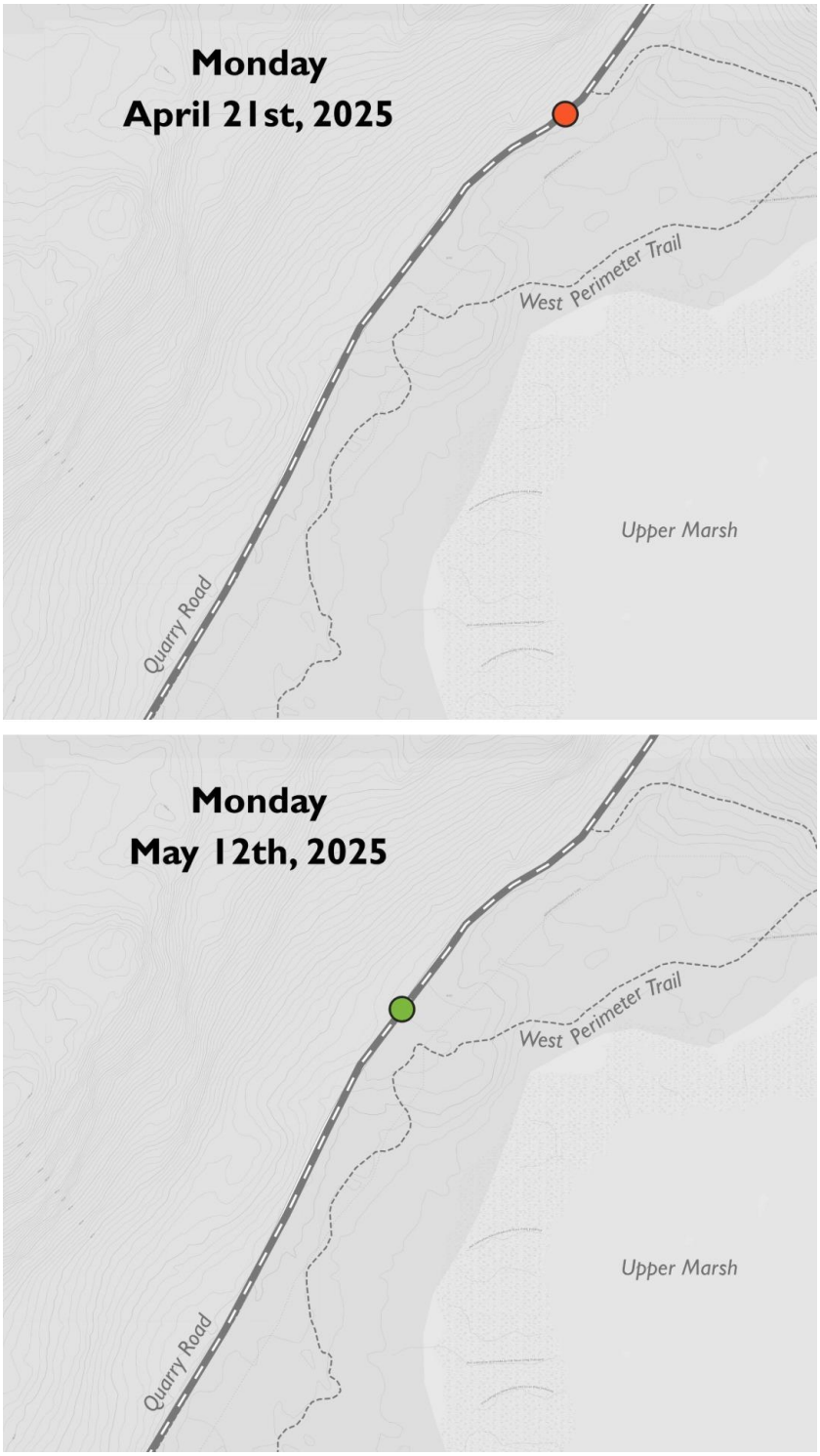
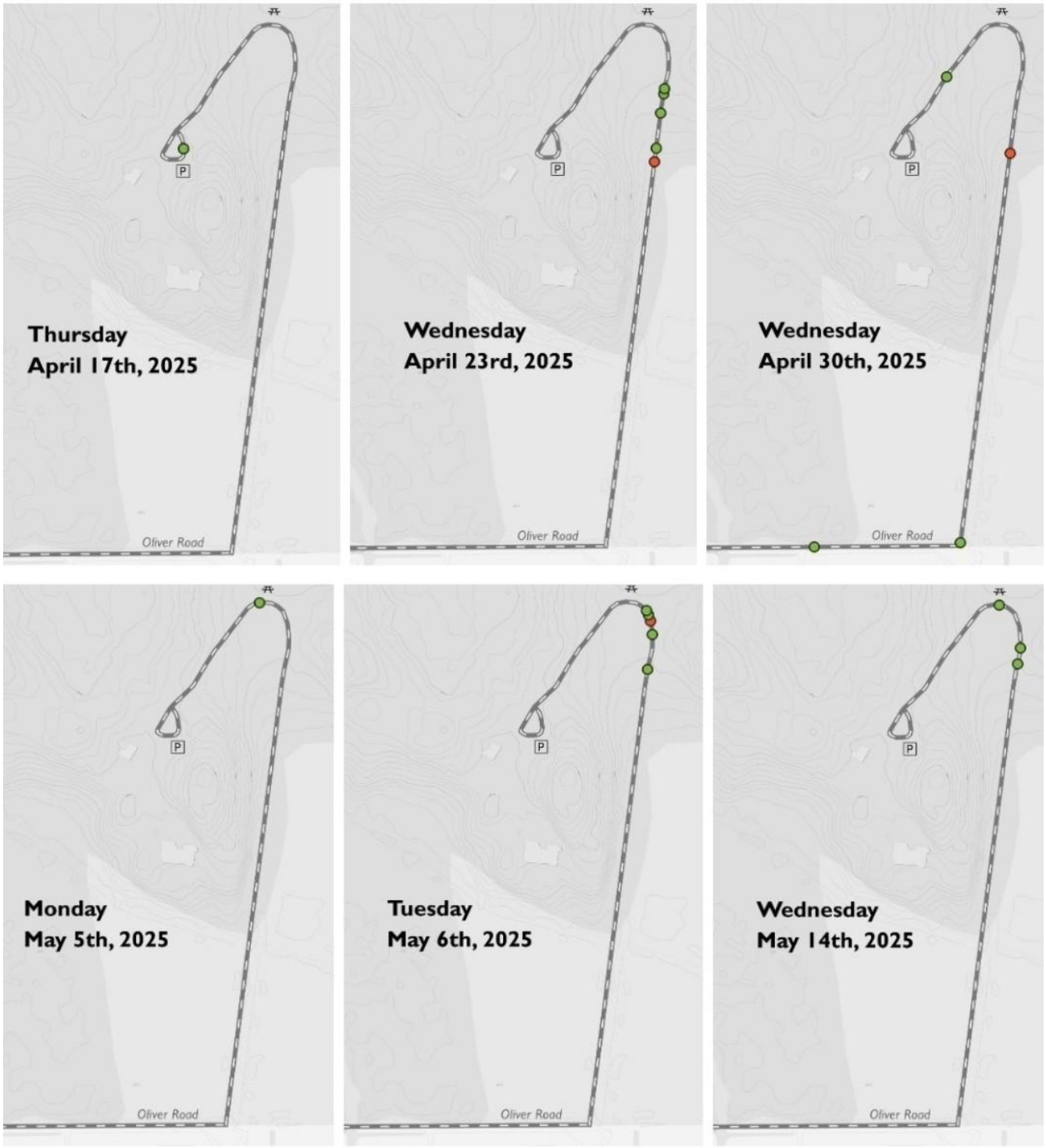


Figure 9: Shows a map of all the adult Western Toads survey on the Oliver Rd transect. With each survey date shown on a different map. 2025.



KEY SUMMARY OBSERVATIONS AND INCIDENTS

Adult Western Toads:

1. Determining when adult toads will start to migrate is challenging, however it does seem to be tied to warming over the evening hours and humidity, like after or during a rain event.

2. As experienced in the past, a significant migration can happen on one evening followed by many days of low activity. That makes it challenging difficult to plan if availability of MPA or volunteers is limited.

3. Adult toads may be attracted to warm surfaces at night. This was evidenced by adult toads congregating on the asphalt surface of Lodge Road, moving off and then being seen again on the road a few minutes later.

4. Active breeding pairs were witnessed this year.

5. Adult toads continue to walk the trails of Minnekhada on summer nights after this breeding cycle is complete.

6. The variation in size and colour is quite stunning.

Western Toadlet Monitoring:

Monitoring was conducted over nine days during a three-week period. All 11 transects were monitored at least once during the season. Where time and resources allowed transects were surveyed twice. Raw data is included in Appendix 1.

In 2025, there was a significant increase in the number of toadlets emerging from the marsh compared to 2024 (Figure 3 & 4). In comparison to 2023 similar numbers were seen at the lower marsh, however 2025 showed greater numbers throughout the rest of the park. Anecdotal evidence from other breeding sites and informal discussions with other toadlet monitors suggests a pattern in which years of high migration numbers are often followed by years with significantly lower numbers, alternating between the two. The similar trends from 2023 and 2025 support this pattern. It is also possible that the timing of the monitoring events did not align well with the migration resulting in underestimated counts in 2024.

Similar to past years, we identified the Mid marsh transect, Lower marsh transect and Quarry Road transect as hotspots for toadlet migration (Figure 5). The highest toadlet mortality in the park was seen to occur along the Mid-marsh transect and Lower-marsh transect, which is to be expected as they are some one of most used trails in the park (Figure 6). Two other spots of high mortality were Quarry Road and Lodge Road and mortality in these areas followed along tire tracks.

Figure 10: Total number of Western Toadlets counted in 2025, per 25 metre segment.

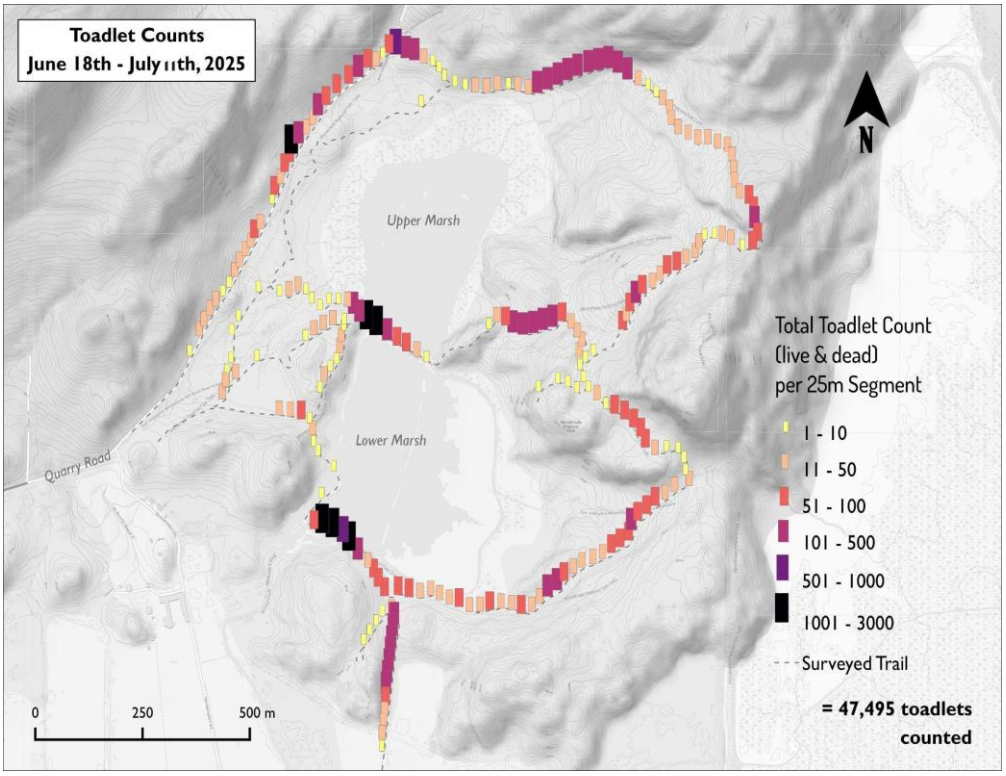


Figure 11: Map comparing total number of Western Toadlets surveyed between 2023, 2024 and 2025.

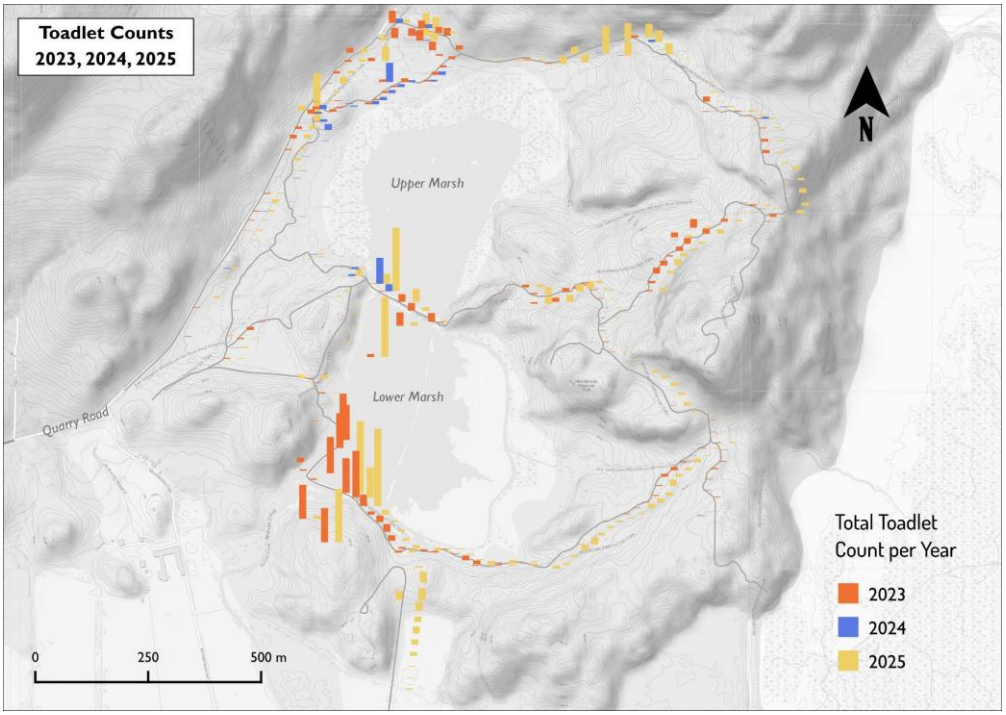


Figure 12: Shows a heat map of the live Western Toadlets surveyed between June 16th and July 11th in 2025.

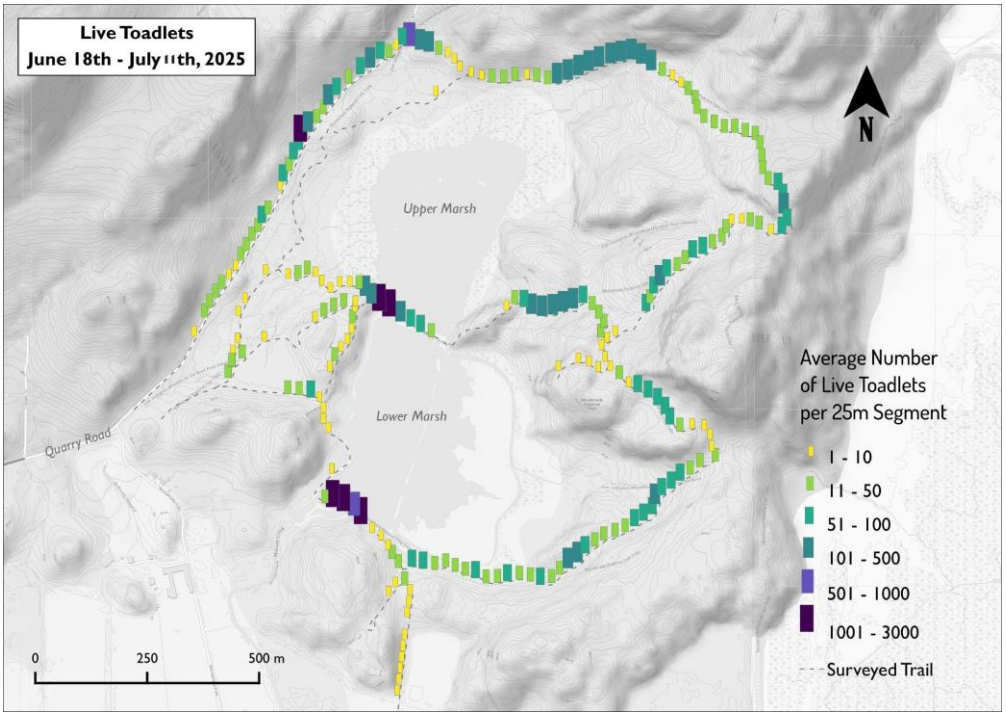
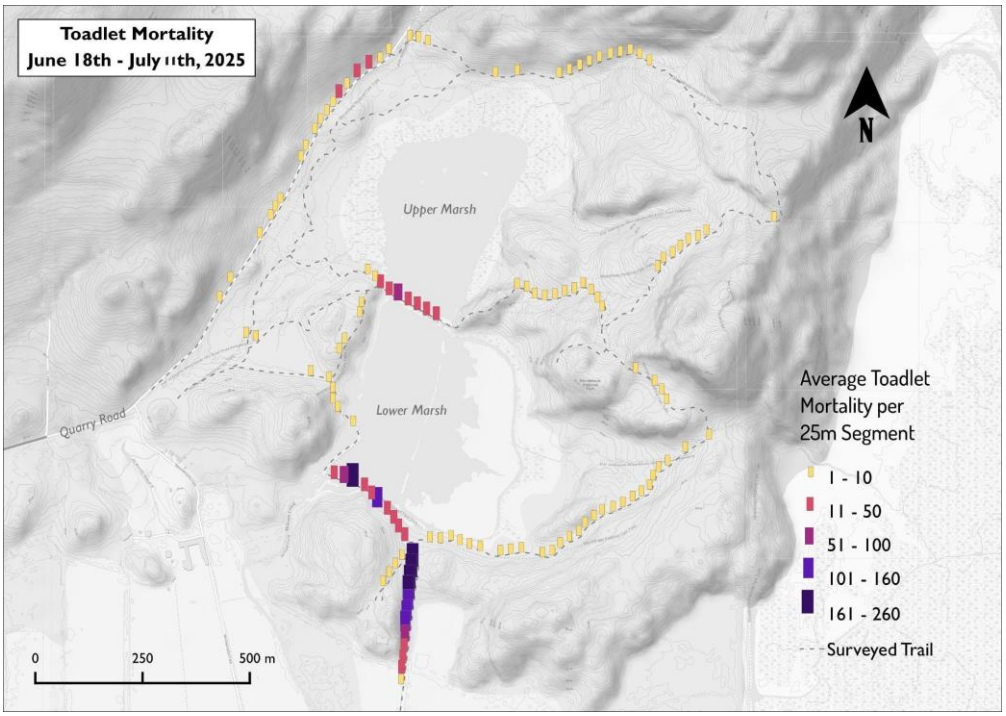


Figure 13: Heat map of the average dead Western Toadlets count of each segment surveyed between June 16th and July 11th in 2025.



KEY SUMMARY OBSERVATIONS AND INCIDENTS

1. Main congregations of toadlets in the two main hotspots happened in the 2nd and third week of June with total counts around 15,000.
2. In the initial stages of emergence, many toadlets had not fully metamorphosed and tended to mass together, perhaps to help regulate body temperature.
3. During this early stage there was a high level of mortality along the lower marsh area. At least some of this appeared to have been caused by bicycle traffic.
4. Subsequent trail closure by MV staff was of great benefit to the populations.
5. By the fourth week of June and the first week of July many toadlets had started to disperse.
6. On July 3, approximately 1,400 dead toadlets were counted on the Lodge Road as shown on the above map. With the current configuration, this situation would have been next to impossible to avoid.
7. As toadlets dispersed away from the marsh they tended to stay in groups of dozens to hundreds as witnessed in several locations during counts.
8. Counts of the outer perimeter in the second week of July found around 7,000 toadlets just along trails. This may indicate two things:

    - Toadlets do appear to use existing trails.
    - The vast majority of the emerged toadlets likely made it this far.

OVERALL CONCLUSIONS AND NEXT STEPS:

This year's surveys, combined with data from previous years, have expanded understanding of the Western Toad population at Minnekhada Regional Park. While annual data has not stayed uniformly consistent, toadlet migration timing naturally varies based on a variety of environmental factors. The use of Avenza greatly improved efficiency and opened new opportunities. MPA will endeavor to educate the public on the use of Avenza, with the intention to expand citizen science contributions in future years, possibly including other species.

Adult toad mortality was low this year, but the data also showed that adult migration can be highly variable and unpredictable. Based on the limited observations and feedback from local experts, it is likely that the Quarry Road surveys were poorly timed. This suggests that toads may still have crossed the road but were simply not seen. Because mature, breeding-age toads have high conservation value, even low mortality can have long-term impacts on the population. Although temporary measures such as trail closures, signage, and patrolling can help reduce risks, the unpredictable nature of adult and toadlet migration limits their effectiveness. Permanent, long-term solutions are likely the best way to protect the Western Toad population at Minnekhada.

The toadlet surveys highlighted the Mid-marsh transect, Lower-Marsh transect and Quarry Road as key hotspots of toad migration, abundance and mortality. It is important to highlight that Metro Vancouver made the decision to close the Lower marsh trail mid-June. This decision coincided with a bike trail seen on the trail leaving a large trail of dead toadlets, despite bikes not being permitted on the trail. Two surveys conducted before the closure documented 1,463 dead toadlets, while two surveys afterward recorded only 118. This clear decrease demonstrates the effectiveness of trail closures in reducing mortality. As mentioned, there was also significant mortality on the Lodge Road and although not documented directly, likely on Quarry Road as well.

Another important issue is the handling of toads and toadlets. This year, a video of a child picking up toadlets went viral on Instagram, raising concerns that more visitors might come specifically to do the same. It is essential that no one, including MPA volunteers and the public, touch live toads. Western Toads are a species of special concern and can only be handled legally with a permit. They also have very sensitive skin and absorb oxygen through it, so any residue on hands or clothing, such as lotion, sweat, bug spray, or sunscreen, can harm them. In addition, Western Toads are toxic and may pose risks to pets and people who handle them.

Lastly, MPA continues to learn from local experts and similar projects across the province. In 2025, the team reviewed a variety of related initiatives and consulted directly with the Fraser Valley Conservancy to learn more about their Western Toad conservation work at Ryder Lake. Lessons learned by others have helped inform MPA's approach and the following recommendations.

Recommended next steps are as follows:

- Continue toad and toadlet monitoring to grow existing data set.
    - Adjust monitoring timing as advised by local experts.
- Increase utilization of the Avenza Geomapping app for count teams. Potentially expand to allow for incidental "citizen science" reporting for trained volunteers.
    - Prepare a how-to guide and training session.
- Continue to engage park users and promote the Trail Hoppers program via pop-up "Nature Tables" alongside breeding surveys and volunteer opportunities.
    - Investigate new ways to connect with Minnekhada Lodge user groups to ensure adult toads are protected when events coincide with migration.
- Explore new technologies and survey methods such as use of wildlife cameras.
- Share findings and explore opportunities to collaborate with other local conservation and naturalist groups such as Coastal Partners in Conservation, Fraser Valley Conservancy and the Burke Mountain Naturalists.
- Engage Metro Vancouver, City of Coquitlam and other stakeholders/decision makers to collaborate on Western Toad conservation with particular focus on future upgrades to Quarry Road and mitigation measures within the park (culverts, bridges, fencing, trail closures, signage) where data supports it.
- Continue a long-term multi-year analysis of the toadlet and toad data post-2025 season.
- Explore breeding surveys by land and water (non-motorized watercraft).
- Continue to research other toad/toadlet programs to better understand best practices (example Cumberland).

MPA has also prepared the following recommendations for consideration by Metro Vancouver and hopes to work collaboratively to implement these in 2026 and beyond as feasible

- Plan annual seasonal trail closures to restrict access to known hotspots during peak emergence and migration. According to the Fraser Valley Conservancy, this is the most effective option.
- Explore temporary structures that can protect toadlets during peak migration, such as raised platforms, boardwalks, or fencing.
- Consider permanent structures designed to protect toadlets, including boardwalks, underpasses, or culverts.

- Advocate for amphibian crossing structures or other protective features on Quarry Road as part of upcoming road improvement projects
- Plan and budget for amphibian crossing structures or other protective features on the Lodge Road as part of future improvements or maintenance projects
- Maintain and strengthen existing Western Toad and toadlet signage and public education efforts, including social media campaigns.
- Increase awareness of Western Toads and toadlets among Lodge event attendees. Consider placing signage in bathrooms, the parking lot, and other common areas to inform visitors who may be unfamiliar with the area. It is not reasonable to expect a wedding guest who has never been to Minnekhada to watch for toads after an event. Additional strategies should be explored to better reach and educate these types of visitors.

ACKNOWLEDGMENTS:

This work would not have been possible without the support of our volunteers! A total of 37 volunteers contributed 150 hours over 17 organized count events for 2025.

Steve Smith	Eileen Fast	Jason Partridge
Julie Kanya	Samuel Lee	Laurel Brown
Kirk Miles	Leila Jaakkola	Santana Grant
Suzanne Rice	James Peters	Benjamin Grant
Christine Thurlow	Sheri Ray	Mohammad Khosravi
Giselle Bonney	Kelsey Fonda	Pam Hirakata
Victoria Dupont	Abigail Lleber	Shannon Gnocato
Hannah Cockerman	Judy Smith	Nicholas Hipsey
Lux Gorjao	Emma Crawford	Corbin Lawrence
Rachel Harper	Janet Mou Pataky	Linda Lawrence
Niki Laghaie	Ella Mou Pataky	Natasha Dawson

Danielle Bosma Torin Kelly Sierra Monastersky

Janine Mackenzie

In addition to volunteering during the surveys we would also like to recognize Giselle Bonney for her tireless work mapping the 2023 to 2025 data. We are so fortunate to have someone with her skills as part of our volunteer team. These maps are an invaluable resource to help us understand the data and a tool to share it with the public in an easy to understand visual format.

REFERENCES

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2. https://www.env.gov.bc.ca/wld/documents/westerntoad.pdf
3. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/management-plans/western-toad-2020.html
4. https://www.minnekhada.ca/wp-content/uploads/sites/22/2023/06/Copy-of-Western-Toad-Summary-Report_2015-16-Aimee-Mitchell.pdf

Appendix 2: Raw Data for Adult Western Toad Monitoring 2025.

Survey Date	Start Time	End Time	# of Volunteers	Temperature	Rain	Wind	Cloud cover	Live toads	Dead toads	Data location
April 17	19:45	21:55	6	17	no	no	no	5	0	Apr 17.kmz
April 21	20:15	21:35	5	10	no	no	some	2	1	Apr 21.1.kmz / Apr 21.2.kmz
April 23	20:20	21:50	4	14	no	no	no	3	1	Apr 23 1.kmz
April 30	20:30	22:10	5	14	no	no	clear	13	1	Apr 30.kmz / Apr 30 Oliver road. kmz
May 5	20:30	22:08	4	14	no	no	clear	17	0	May 5.kml
May 6	20:40	22:24	4	17	no	no	heavy	35	2	May 6.kmz
May 12	20:35	22:25	5	13	no	no	some	11	0	May 12.kmz
May 14	20:30	22:08	3	13	no	no	some	13	0	May 14.kmz