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OCRF Harborton Mortality Assessment Summary
Northwest Ecological Research Institute (NERI)
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In support of efforts funded by the Oregon Wildlife Foundation (OWF) to assess the *Rana aurora* (Northern red-legged frog) migration across Highway 30 to Portland General Electric's (PGE) Harborton Wetland, a grant from the Oregon Conservation Recreation Fund to perform mortality surveys was granted to NERI. The purpose of gathering mortality data was to better gauge the mortality rates on Highway 30 on the migratory frog population breeding in the Harborton Wetland.

Data from the Harborton Frog Shuttle (HFS) combined with egg mass data collected by PGE indicate that the bulk of the migration generally occurs in the first few hours after sunset when the HFS operates (Table 1). Conditions in 2022 were atypical compared to previous years. During the 2021-2022 migration season, 266 frogs were assisted down by the HFS, only 42 of which were female. 174 egg masses were found indicating that many frogs traveled unassisted and unobserved, likely during rain events occurring after midnight. Previous years had more females assisted down relative to the number of egg masses. The general understanding is that each female frog will lay one egg mass.

Table 1: Number of red-legged frog females assisted down by the Harborton Frog Shuttle, number of egg masses found at Harborton Wetland, and the ratio. The greater the ratio the more frogs made the migration across Highway 30 unassisted. The ratio for 2022 is substantially greater than past years highlighted in yellow.

Year	# female RAAU down	# egg masses @ Harborton	Ratio RAAU females to # egg masses
2018	121	158	1.31
2019	90	194	2.16
2020	798	1392	1.74
2021	271	435	1.61
2022	42	174	4.14

Roadkill surveys were performed on Highway 30 spanning 6.5 kilometers from Linnton to NW Burlington Dr. at random times twice a month beginning March 2021. GPS points of roadkill of all species were lumped into hotspots above wetlands, namely Harborton Wetland and Burlington Wildlife Area. Nine surveys were performed during Winter 2022. Surveys were targeted to occur during conditions of likely frog migration (>7.2C [45F] and wet pavement) and

were focused at the two hotspot locations which are only three kilometers apart. Despite many similarities between the sites the frog migratory activity observed varied greatly between the sites on any given night (Table 2).

Table 2: Data collected during Winter 2022 mortality assessment with the number of frogs transported by the Harborton Frog Shuttle. Note that 6 January 2022 was the busiest night of the year for the HFS and few frogs were observed 3km away at Burlington.

Date	Roadkill at Burlington	Roadkill at Harborton	# HFS transported
1/6/22	9	4	181
1/18/22	0	0	0
1/20/22	3	3	3
1/30/22	4	0	3
2/14/22	2	10	0
2/20/22	13	67	0
2/28/22	34	45	20
3/1/22	23	40	1

Unlike random surveys, the mortality study surveys observed carcasses during periods of high frog movement. During this time, 71% of corpses were inside of traffic lanes. Outside of these times, only 32% of corpses were inside the white lanes. Preliminary conclusions are that frog movement can be predicted effectively and that corpses are quickly destroyed by active traffic with the assumption that corpses found inside the white lines were very recently killed.

Corpses were tracked over the course of hours to days after the surveys in an attempt to determine a rate of decomposition. No rate of disappearance was able to be determined with some bodies remaining as initially observed for days and others disappearing within 2 hours. The variation of individual size, traffic volume, weather, and scavengers precludes a statistical determination of the time it takes for roadkill to decompose.

To estimate mortality, rates of successful frog crossings would need to be determined. However, the 2022 frog breeding season was unpredictable with several mass movements occurring in the early morning hours (rather than a few hours after sunset as has previously been typical).

Without a statistical determination of a mortality rate, the above observations help move the processes forward to improve the plight of the region's frogs. A working group advocating for a highway undercrossing at Harborton has been established. A group working with Portland Parks has been investigating the possibilities of improving pond habitat within Forest Park on the upslope side of Highway 30 reducing the number of frogs which have to cross the highway. Both groups aim to reduce future mortality rates.