Where Have All the Frogs Gone?

The following case narrative is based on a true story.

“Did you hear the one about why the red-legged frogs crossed the road? Well, probably not, because they never made it to the other side! With the addition of a new highway within its habitat, a rare species of frog is ending up as roadkill all too frequently, a new study in Canada finds. This species is already endangered due to habitat loss, introduced predators like the bullfrog, climate change and other factors. If you add the threat of cars on the highway whizzing along, it may just contribute to their decline, researchers speculate.”
(adapted from Globe and Mail, 2010)

“They should never have put that highway in there,” Eagle Heights resident, Joan Wright, said in an interview with Globe environment reporter, Justin Wood. “If I could wave a magic wand, I would ask them to actually tear those houses down and rip up that highway completely – or better yet, leave the land the way it was so the frogs could live in peace.”

Ms. Wright, 47, an artist and carpenter, as well as local conservation activist, has been pushing the government to protect the frogs and their habitat located near the community of Eagle Heights. The expanded highway to the community also leads to a nearby ski resort.

The frogs’ wetland habitat has numerous little ponds separated by ancient volcanic lava rock and trees, Ms. Wright explained. “During spring and fall migration, the frogs move between their wetlands and their forested habitats.”

Ribbit, Ribbit, Croak

The northern red-legged frog (Rana aurora) is listed under the federal Species at Risk Act (SARA), is “Identified Wildlife” in BC and is subject to limited protections and prohibitions under the BC Wildlife Act. Habitat for this species may also be governed under provincial and federal regulations including the Fish Protection Act and federal Fisheries Act as well as regional and local municipal bylaws.

The new residential development and the highway were built right through the area.

“Of course,” she said, “the frogs are naturally still trying to get from the ponds to the forest or back. Now they have to cross backyards and a major highway – with disastrous consequences.”
The Situation

The species at the center of the controversy is the northern red-legged frog (Rana aurora). The northern red-legged frog is distributed from Baja, California to southwestern British Columbia. In BC, it is found on Vancouver Island, the Gulf Islands, the lower Fraser Valley and the mainland coast of the Strait of Georgia.

Last year, during their first spring at their new house, they were amazed at the noise coming from the wetland area just beyond their backyard. The area was filled with lots of small ponds. Later in the spring, they noticed brown frogs with flashes of red showing as they hopped from the wetland, across their yard, over the road and into the forest area beyond. Spence and Amy wondered, “What is that all about? Weird, huh?”

Little did they know that the area was known by conservation biologists to have habitat for northern red-legged frogs, a species at risk. Because of this, a number of things had been done before the highway was upgraded and the Singing Woods development could start. Scientific studies and an environmental assessment were done. Plans were drawn up to accommodate the frogs’ habitat with input by government transportation experts, the Singing Woods developer, environmental specialists and with community consultation. By the time Spence and Amy moved into their new house, everyone thought that any possible issues had been resolved and that the frog population was protected. (See Exhibit B: Map of Area, p. 30)

A new residential development, Singing Woods, is located at the edge of Eagle Heights along the road to the Pine Tree ski resort. The development was named “Singing Woods” in part because of the chorus of frogs and other wildlife sounds heard in the spring.

Spence Holly recently moved into the neighbourhood along with his sister, Amy, and their parents. Spence and Amy are keen skiers and snowboarders, and urged the family to move when the opportunity arose for their mom to be an accountant at the local mountain ski resort. Amy especially wanted to be nearby so she could volunteer at summer ski camps offered by the “Canadian Cowboys,” while Spence wanted to work part-time at the resort to help pay for his snowboarding.

This endangered red-legged frog ended up as roadkill. (Photo: Josh Malt, BC Ministry of Forests, Lands and Natural Resource Operations)
What Happened

During the construction planning for Singing Woods and the highway upgrade, the developer and the government’s Ministry of Transportation all agreed to minimize the effect on northern red-legged frog habitat. They determined that a portion of the highway upgrade would be relocated, and new houses would not be built within 30 metres of the closest wetlands. Approximately 1,500 northern red-legged frogs were captured and moved to adjacent wetlands by environmental specialists. The Ministry of Transportation built 11 underpasses to help frogs reach the other side of the road safely. Large culverts or passageways of one, two and three metres in diameter were put under the highway. Contractors then put up fencing to direct frogs to the safest passage along their migration route.

Families moved into their new homes in Singing Woods. The highway upgrade meant increased speed and number of cars using the highway to get to Pine Tree ski resort for a day or weekend of outdoor activity.

Unfortunately, things weren’t so good for the frogs.

Many of the northern red-legged frogs in the Singing Woods wetlands didn’t use the new underpasses — they climbed over the fences and onto the road. Up to 50% of frogs that tried to cross the road were killed. They were especially vulnerable due to their small size, slow and erratic movements, and because they migrated during darkness, making them very hard to see. Efforts to find a solution were substantially increased after concerned community residents noticed the large number of squashed frogs on the road.

A reassessment by an amphibian specialist then showed that the abundance of habitat with large red-legged frog populations that occurred in the area had not been documented properly in the original environmental plans. Also, the underpasses were not being used by the frogs. Rather, the Environment Ministry reported that “apparently coyotes, American mink, short-tailed weasels, snowshoe hares, raccoons, squirrels and ducklings all use the underpasses more than frogs.”

Sadly, many amphibians are killed by vehicles while attempting to cross roads and highways. (Photo: Barb Beasley, http://splatfrog_tunnel.blogspot.ca)

Red-legged frogs and other amphibians were able to climb up mesh fences. (Photo: Barb Beasley, http://splatfrog_tunnel.blogspot.ca)
ACTIVITY 1

“Which species are going to be affected by the road or proposed development?” Other questions are much more difficult. For instance, “Will road kill cause a population decline?”

Also, very little work has been done to test whether passageways under roads are used by amphibian species occurring in BC. Ms. Bird noted that in the case of new developments and highways, proactive planning should be completed to avoid important habitats, such as wetlands and surrounding areas, rather than assuming that passageways will suffice as connectors.

There are two theories to explain why the frogs do not use the passageways more often. The passageways may be too cold for frogs, as they do not like sudden changes of temperature, or maybe they are too dry, so the frogs avoid them.

Don Temper, chief environmental officer with the Ministry of Transportation, said the ministry was looking for ways to save the frogs, based on the best advice it could find.

“It is very much a learning experience,” Mr. Temper said in an interview. “It’s hard to figure out what frogs are thinking, and a lot is speculation, but we are talking to amphibian experts...we’re trying to figure it out.”

A noted amphibian expert, Brenda Bird, noted, “it is well accepted that roads have direct and indirect effects on frogs and other amphibians.” She explained that to understand situations at a particular site, there are all sorts of questions that need to be answered. Many are relatively easy, such as,

A salamander climbs a barrier constructed to lead amphibians to an underpass. (Photo: Barb Beasley, http://splatfrogtunnel.blogspot.ca)
Taking Action

Spence and Amy were upset at seeing all the frogs squashed nearby their house. So they decided that they would like to do something to directly help the frogs until a long-term solution was found.

They joined with a community organization called Project Splat! They worked with other volunteers and amphibian specialists to monitor northern red-legged frog habitat. Also, they helped erect temporary fencing that directed the frogs to buckets. Safe in the buckets, the frogs could then be gently taken across the road during their annual migrations. Their crew of volunteers saved some 167 frogs and seven newts from ending up as roadkill over seven nights. But, the organizers of Project Splat! recognized that carrying the frogs across the road was only a temporary solution to a complex problem.

Looking Back

Everyone involved has come away with a new understanding that one of the challenges in protecting amphibians, especially frogs, is that their habitats are part of extremely complex ecosystems. Consequently, initiatives to protect frog habitat require effective laws that have a collaborative, multi-disciplinary approach – utilizing expertise from numerous fields including biology, ecology, hydrology, land-use planning and engineering.

Don Temper of the Ministry of Transportation said the residential development project followed “best practices” recommended by many experts. Special attention was paid to planning, materials, workmanship, location and construction. All environmental protection measures required by the federal and provincial regulators were implemented, but the efforts still receive mixed reviews.

And unfortunately, the frogs are still roadkill.
1) What do you see as the important issues or big ideas in this case narrative? Discuss with your group and decide on the significant issues raised. List them in order of importance.

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2) Who are the main stakeholders or players in this case? Write a short description of each, including the underlying values these stakeholders may have based on their actions.

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3) What are the main issues that the stakeholders agree or disagree on?

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4) Based on the information presented in the case narrative, how would you describe the situation for Spence and Amy – are they doing the right thing? What other actions might they take?

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5) The information in the case narrative indicates that the developer and Ministry of Transportation “did everything right.” What were the best practices that were implemented?

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6) In your view, to what extent can the situation with the frogs be turned around? Who needs to be involved? What actions should be taken?

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7) Would these actions have been necessary if BC had an endangered species law that legally required actions to protect species at risk?

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8) Based on the data in the case, if you worked for the Ministry of Transportation what questions would need to be answered before a road or housing development goes into an area that has known habitat for a species at risk like the northern red-legged frog? List the questions, or make a mind map of questions or issues that need to be addressed.

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Formulate possible solutions to avoid putting populations of amphibian species at risk. Also, determine ways to research the information required to analyze the proposed solution.

<table>
<thead>
<tr>
<th>Possible solutions you have identified</th>
<th>Questions that may need to be answered in order to evaluate this solution</th>
<th>Some ways to answer questions</th>
</tr>
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</table>
| Example solution: Move the road to a different location to avoid frog migration route(s) | • Type of amphibian species present  
• Migration routes currently used  
• Current plans for road development and other options available | • Identify species through field sampling data collection  
• Identify habitat suitable for frogs  
• Observe frogs at migration  
• Contact organizations such as BC Frogwatch for species information |