

Is there a Bullfrog decline in Ontario?

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Abstract

Evidence from a variety of sources, including commercial harvesters, Ministry of Natural Resources census data, and field studies, indicates that Bullfrogs in Ontario are less common now than they were in previous decades, and larger ones are particularly hard to find. Possible explanations for this decline include increased predator pressure, loss of wetland habitats, harvesting, and poaching. Sensitivity to low pH and contaminants may also be important. Natural population oscillations in response to other environmental factors may also occur, confounding the issue of whether the decline is temporary or potentially terminal. Carefully selected long-term studies are needed to determine what is happening to Bullfrog populations in Ontario.

Résumé

Des témoignages provenant de diverses sources, dont les exploitants commerciaux, les données de recensement du ministère des Ressources naturelles et les études de terrain, indiquent que les Ouaouarons de l'Ontario sont moins nombreux que durant les dernières décennies et qu'il est particulièrement difficile d'en trouver de grande taille. Parmi les explications possibles de cette baisse, on trouve une pression de prédation accrue, la perte d'habitats humides, l'exploitation commerciale et le braconnage. La sensibilité aux milieux caractérisés par un bas pH et aux contaminants peut également constituer un motif important de déclin. Il s'agit peut-être de fluctuations naturelles de la population liées par d'autres facteurs écologiques, ce qui nous empêche pour l'instant de conclure si cette baisse est provisoire ou le signe d'une extirpation possible de l'espèce. Des études à long terme portant sur des sujets soigneusement déterminés devront être réalisées afin de permettre de juger du sort des effectifs de l'espèce en Ontario.

Introduction

As with all examples of potential amphibian decline, there are two questions:

- (1) Is there any convincing evidence of a Bullfrog decline in Ontario?
- (2) If so, what are the possible causes of the decline?

Evidence of a decline

(1) *Summary of a statement from a native harvester:* His people have hunted Bullfrogs in the region south of Peterborough for the past several hundred years, probably much longer. He and others have hunted Bullfrogs for the past several decades. Just 15–20 years ago, he and his friends could fill their freezers and still have a few hundred kilograms to sell in Toronto. Ten years ago, they had trouble filling their freezers. Five years ago, they quit hunting to allow recovery for a couple of years. They have not noticed any recovery.

(2) *Summary of a statement from a commercial harvester:* He has been a serious harvester for the last 15 years in the Belleville area, although he harvested intermittently for the 15 years prior to that. He has noticed oscillations in both size and number over the years but now is finding it harder and harder to find the larger individuals.

(3) *Statement from cottager:* She remembers the roar of Bullfrogs from the summers of her youth 30 years ago in the Kawartha Lakes, and now there is silence. (There are many such memories; the obvious, midsummer breeding season makes these memories more reliable than most.)

(4) *Ministry of Natural Resources data:* Bullfrogs were censused in Carleton Place district in 1977 and again in 1984–85. Populations apparently declined from 20% to 80% per location during that period.

(5) *Nogies Creek Site:* E.J. Crossman reports that Bullfrogs are much less common at the Nogies Creek site now than when he did extensive mark and recapture work in 1977–80. A new and detailed monitoring effort would be worth initiating at that site.

(6) *Algonquin Park:* In 1987, L. Shirose and R. Brooks captured 75 male Bullfrogs of a chorusing population in Algonquin Park. Male snout-vent length ranged from 90 to 130 mm, with a mean of 105 mm. That corresponds to a mean weight of about 110 g, which is not particularly large for a chorusing Bullfrog: adults of 300 g should be common in a chorusing population. The other data Shirose and Brooks have from their 1985–87 study indicate slower growth rate and greater age at first

reproduction by Bullfrogs in the Algonquin Park population than by more southerly populations, but there is as yet no clear evidence of decline. Like the Nogies Creek population, it is now a population worth following.

(7) *Our 1990–91 data on size of chorusing males:*

During the summer of 1991, we captured, weighed, and released all chorusing male Bullfrogs on single night visits at three sites in the Kawartha Lakes region: one was Nogies Creek, the second was a large beaver pond, and the third was a piece of Pigeon River. All provided a similar profile, in turn similar to the Algonquin Park data. The Pigeon River profile is what one might predict of a harvested population (Fig. 1).

The Pigeon River population was harvested until several years ago, definitely ceasing prior to 1989. The chorusing males at that site were captured and weighed in 1990 as well, and we predicted that we would notice an increase in size of chorusing males in 1991. Such an increase did not occur (Fig. 2).

We weighed all chorusing males on a single night visit to a fourth population, near Lake Opinicon, with quite different results: the males were much larger. Smaller males the size of those chorusing at the other sites were also missing: either they were silent or eliminated from the chorus, or they were still immature, implying that the other three populations were stunted. The differences are striking enough to warrant further exploration (Fig. 3).

Conclusion

No matter the source, the result is the same. Bullfrogs are less common now than they were in previous decades, and larger ones are particularly hard to find. Despite probable oscillations, the overall trend in southern Ontario is decline. To understand what is happening in these populations, long-term studies are necessary.

Assuming the decline is real, what are its causes?

(1) *The native harvester:* “We haven’t changed our practices in the last few hundred years. We have always been sensitive to the numbers of animals, and do not overhunt. The frogs have disappeared because the Ministry of Natural Resources keeps stocking the lakes with fish that are predators of the frogs.”

(2) *The commercial harvester:* “I haven’t changed my methods. I don’t break the law. I’d be crazy to take everything. The frogs are going because their habitats are being destroyed by cottagers.”

(3) *A poacher one of us met one day:* “I know it’s not legal, but a couple of times a summer my buddies and I go up around Nogies Creek and north of Stony Lake and grab a pile of the big ones. Nothing better than frog legs on the barbeque.”

Increased predator pressure, loss of wetland habitats, harvesting, and poaching are obvious factors that will result in Bullfrog decline. Can they account for all of the observed decline? Like some other ranids, Bullfrogs are also likely to be sensitive, especially as embryos and tadpoles, to low pH and contaminants, such as low levels of pesticides. We do not know at present how important such sensitivity may be in affecting Bullfrog growth, reproduction, or survival. However, as with all other

examples of amphibian decline, there are clearly a number of interacting factors contributing to the apparent decline of Bullfrogs in south-central Ontario. Natural population oscillations in response to other environmental factors no doubt also occur, confounding the issue of whether the observed decline is temporary and not unusual or in fact unusual and potentially terminal. Once again, only carefully selected long-term studies will answer the many questions.

Figure 1
Weight of chorusing male Bullfrogs at three locations

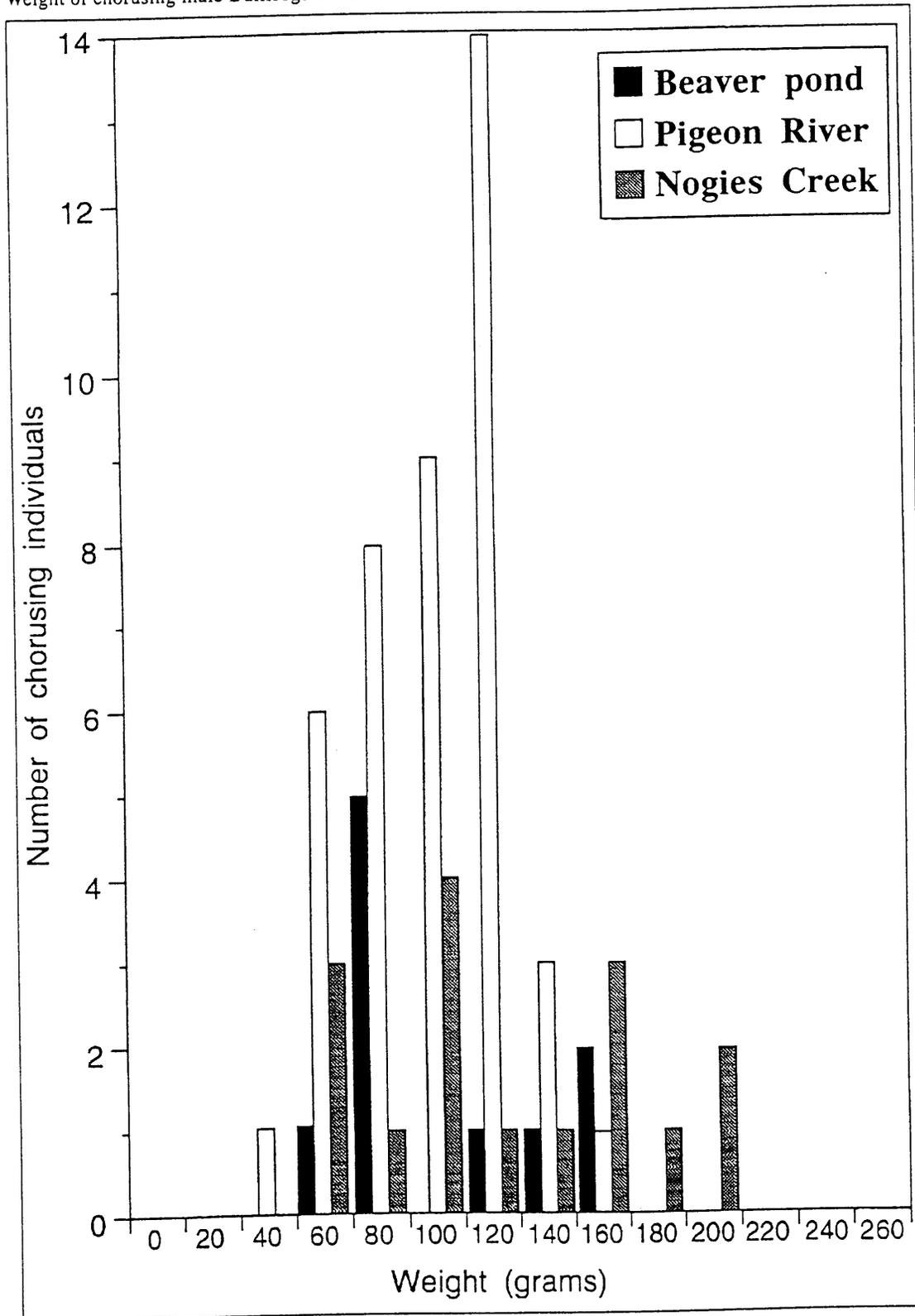


Figure 2
Weight of chorusing male Bullfrogs at Pigeon River in 1990 and 1991

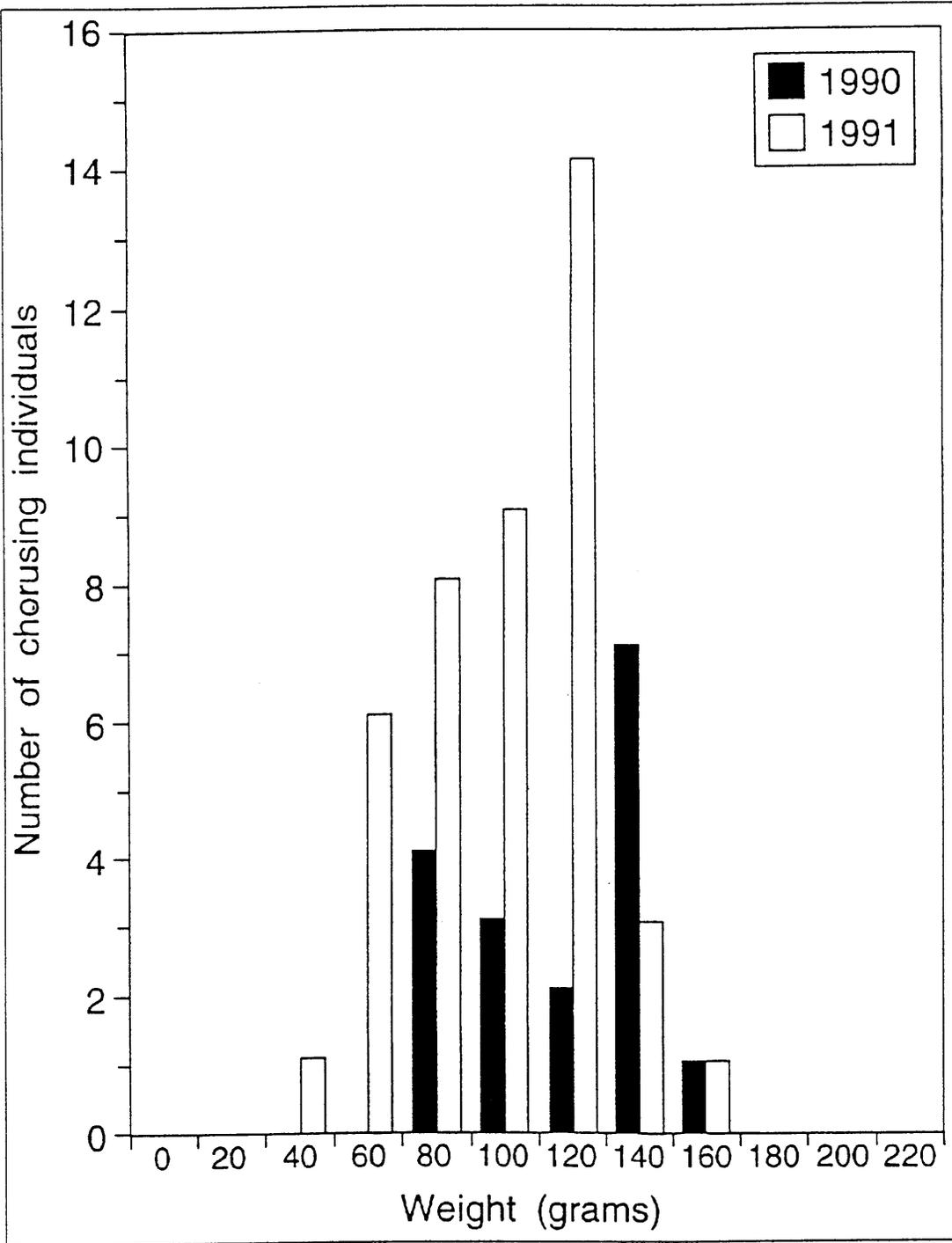


Figure 3
Weight of chorusing male Bullfrogs from Pigeon River and the Opinicon area

