

# Flambeau River Monitoring at the Flambeau Mine: Macroinvertebrates and Endangered Species

## A Summary of the Parejko Macroinvertebrate Report<sup>1</sup> Provided by Wisconsin Resources Protection Council – June 2009

Flambeau Mining Company (FMC), a subsidiary of Kennecott Minerals of Salt Lake City, Utah constructed an open pit copper sulfide mine on the banks of the Flambeau River near Ladysmith, Wisconsin in the mid 1990s. The river formed the western boundary of the project area, and the pit itself was constructed to within 150 feet of the river. The Flambeau Mine was operational for four years. It ceased production in 1997 and has since been partially reclaimed.

Between 1991 and 2008, FMC carried out a series of studies to determine if the Flambeau Mine might be impacting the Flambeau River ecosystem. River sediment, crayfish and walleye were tested upstream and downstream of the mine site for metal content. In addition, surveys were done to track the kinds of insects, worms, leeches and clams (macroinvertebrates) living along the river bottom.

Dr. Ken Parejko, Professor Emeritus, Department of Biology, University of Wisconsin-Stout, did an independent analysis of FMC's river monitoring data for the Wisconsin Resources Protection Council (WRPC). He generated four separate reports dealing with the company's sediment, macroinvertebrate, crayfish and walleye studies. The present summary outlines his findings with regard to FMC's macroinvertebrate study; separate summaries are provided for his other reports. To view any or all of the Parejko reports in their entirety, please go to the WRPC web page: [www.wrpc.net](http://www.wrpc.net).

**Flambeau River Macroinvertebrates:** Dr. Parejko's Macroinvertebrate Report covers a wide spectrum of issues:

1. First of all Parejko explains **what macroinvertebrates are and why it is important to monitor them**. He states:

*The bottom sediments of lakes, streams and ponds are inhabited by a complex community of organisms without backbones called macroinvertebrates. While immature stages of insects are the most commonly encountered [individuals], macroinvertebrates include many other kinds of organisms, such as ... flatworms, leeches, clams, etc. ...*

*Potentially toxic materials in the surface water or sediment of rivers, whether natural or [due to the impact of man], not only affect the macroinvertebrate population, but since many of these species are food for organisms higher on the trophic pyramid, by **bioaccumulating** these potential toxins the macroinvertebrates directly affect species perhaps of more interest to humans, such as the fish community, or other vertebrates such as birds which prey on the invertebrates.*<sup>2</sup>

2. While Flambeau Mining Company was required to monitor macroinvertebrates in the Flambeau River as a condition for receiving its mine permit, Parejko concludes that the **studies performed by the company between 1991 and 1998 and again in 2004 and 2006 were flawed**. He explains:

**Changes in sampling site location, as well as changes in sampling methodology** ... seriously detract from the usefulness of baseline data [collected in 1987-1988]. In terms of the former, Flambeau Mining Company eliminated and/or changed the locations of some of its macroinvertebrate sampling sites when transitioning from baseline to follow-up studies. ... [In addition] macroinvertebrate sampling done in the Flambeau River from 1991 onward used a different sampling procedure than that used for baseline studies ... there were also inconsistencies from year to year in the follow-up surveys ... To assess long-term trends in macroinvertebrate populations, sampling methods must be the same from year to year. FMC, however, failed to do this, making interpretation of the resultant data difficult.<sup>3</sup>

3. Parejko also cites what he calls "inconsistencies"<sup>4</sup> in how FMC reported its data and an **"unacceptable number of reporting errors"**<sup>5</sup> in the FMC reports. He states the following:

*... nearly 50% of [data] cells show [reporting discrepancies] ... This level of reporting inaccuracy is unacceptable, and along with the other reporting issues mentioned above casts a shadow of a doubt over the*

overall reliability of the macroinvertebrate data and therefore our ability to make reliable inferences about the status of the macroinvertebrates in the Flambeau River.<sup>5</sup>

4. Despite FMC's poor study design, Parejko's review of the data still suggests that the Flambeau Mine might be having an impact on the Flambeau River. While the results are not catastrophic, according to Parejko they appear to be real. As he states: *Plecopterans [stoneflies] ... show evidence of declines in the Flambeau River downstream from the Flambeau Mine site over the course of sampling [both in how many kinds and how many individuals were encountered] ... The number of Gastropoda taxa [kinds of mollusks encountered] also decreased at both downstream sampling sites...*<sup>6</sup>
5. Parejko includes a comprehensive list of recommendations in his report for how to improve FMC's monitoring program at the Flambeau Mine site, and how to design better monitoring programs in the future.<sup>7</sup>

**Endangered species in the Flambeau River:** Parejko notes the following:

*Several species of Wisconsin endangered or threatened species of invertebrates were found in the Flambeau River in the vicinity of the mine site in May/June 1991, after mine permits had been issued ... but prior to the commencement of mining. [This] discovery of endangered species by DNR divers who were working on an unrelated project resulted in a lawsuit filed by the Lac Courte Oreilles Ojibwe and Sierra Club in July 1991. This issue was deemed serious enough by the courts that a temporary injunction on mine construction was handed down. ...*

*As a result of [additional] survey work [done by the DNR in 1991] ... a number of Wisconsin endangered or threatened species were confirmed to exist in the vicinity of the mine site, including the following: the purple wartyback mussel, the bullhead mussel, and three species of dragonflies. ...*

*It appears that beyond the DNR survey of the Flambeau River, FMC was not asked to, nor did they, undertake additional monitoring to ascertain the location and/or populations trends of these species near the mine. ... The lack of appropriate close monitoring of any endangered or threatened species in ecosystems potentially impacted by mining activities should be viewed as a significant shortcoming of efforts to protect these ecosystems.*<sup>8</sup>

**Summary:** Parejko provides the following summary of his findings:

*Due to a lack of baseline data, flaws in FMC's study design and inconsistencies in the reporting of data, it is not possible to ascertain.....whether or not the Flambeau Mine has had....an impact on macroinvertebrate biota in the Flambeau River.*

*In addition, the lack of follow-up studies on the fate of endangered species identified in and around the Flambeau River prior to mining is unacceptable.*

*There is enough evidence however to suggest that there were declines in some macroinvertebrate species downstream from the mine during the course of its operation ... While it is not possible to identify the Flambeau Mine itself as the cause of these changes, or a significant cause of several, it is also not possible to say with any reasonable certainty that the Flambeau Mine did not play a part, however slight or however significant, in these observed changes.*

*Exactly what the changes in the macroinvertebrate communities have been, and how long they might last, is difficult to say unless the river continues to be carefully monitored and study design issues are resolved. To have a better understanding of possible effects visavis any future mining projects in Wisconsin, the biomonitoring protocols should be improved with consideration of the recommendations noted herein, including especially the reliability of the data as reported and the inclusion of studies to evaluate the fate of any threatened or endangered species identified at the project site.*<sup>9</sup>

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#### References:

1. Flambeau River Monitoring at the Flambeau Mine. Rusk County, Wisconsin: 2. Macroinvertebrates – Analysis, Comments and Recommendations. Ken Parejko, Ph.D., Professor Emeritus, University of Wisconsin-Stout, April 10, 2009. To view the complete report, go to [www.wrpc.net](http://www.wrpc.net)
2. *ibid*, p. 2
3. *ibid*, pp. 4,5,6
4. *ibid*, p. 8
5. *ibid*, p. 9
6. *ibid*, p. 18
7. *ibid*, pp. 19-24
8. *ibid*, p. 10
9. *ibid*, pp. 24-25