

# GREAT LAKES INDIAN FISH AND WILDLIFE COMMISSION

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## • MEMBER TRIBES •

### MICHIGAN

Bay Mills Community  
Keweenaw Bay Community  
Lac Vieux Desert Band

### WISCONSIN

Bad River Band  
Lac Courte Oreilles Band  
Lac du Flambeau Band  
Red Cliff Band  
St. Croix Chippewa  
Sokaogon Chippewa

### MINNESOTA

Fond du Lac Band  
Mille Lacs Band

February 21, 2013

## Notes and Methods Used in Development of Vulnerable Stream Analysis - (see attached map, Figure 1)

### Background:

The Great Lakes Indian Fish and Wildlife Commission (GLIFWC) is an organization exercising delegated authority from 11 federally recognized Ojibwe (or Chippewa) tribes in Wisconsin, Michigan and Minnesota.<sup>1</sup> Those tribes have reserved hunting, fishing and gathering rights in territories ceded in various treaties with the United States. GLIFWC's mission is to assist its member tribes in the conservation and management of natural resources and to protect habitats and ecosystems that support those resources. The Bad River watershed has its headwaters in the Penokee Range and is located within the territory ceded by the Treaty of 1842.

Amendment 9 to AB1/SB1 was offered in both the House and Senate on February 5, 2013. That amendment specifies that streams and lakes could be filled and the fill mitigated under certain conditions. Based on the conditions specified in the amendment, GLIFWC staff posed the question of what streams and lakes in the Bad River watershed could be filled under the proposed legislation.

To answer this question, staff conducted spatial analysis using a Geographic Information System (GIS), spatial modeling routines and spatial data sets available for the geographic area. The conditions that were modeled were those specified in the amendments to AB1/SB1. They would allow a stream or lake to be filled except when the stream or lakes fits the following conditions:

1. A perennial stream, if the drainage area of the portion of the stream upstream from the farthest downstream point of the navigable water activity is more than 2 square miles. In this subdivision, "perennial stream" means a stream that has a continuous flow every day of every year in which there is average precipitation.
2. A navigable water, other than a stream, that is more than 2 acres in area every day of every

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<sup>1</sup> GLIFWC member tribes are: in Wisconsin -- the Bad River Band of the Lake Superior Tribe of Chippewa Indians, Lac du Flambeau Band of Lake Superior Chippewa Indians, Lac Courte Oreilles Band of Lake Superior Chippewa Indians, St. Croix Chippewa Indians of Wisconsin, Sokaogon Chippewa Community of the Mole Lake Band, and Red Cliff Band of Lake Superior Chippewa Indians; in Minnesota -- Fond du Lac Chippewa Tribe, and Mille Lacs Band of Chippewa Indians; and in Michigan -- Bay Mills Indian Community, Keweenaw Bay Indian Community, and Lac Vieux Desert Band of Lake Superior Chippewa Indians.

year in which there is average precipitation and that is not a freeze-out pond, as defined in s. 29.001 (29).

3. A class I, class II, or class III trout stream.

### **Assumptions:**

For the analysis all mapped streams (streams available through WDNR surface water data viewer) were assumed to be perennial. It is unlikely that this assumption introduced significant error to the analysis since on-the-ground experience in the Bad River watershed indicates that streams with > 2 square miles of basin are usually perennial. All mapped lakes were assumed to not be freeze-out ponds because few if any of the mapped lakes are freeze-out ponds. Final determination of freeze-out status would require on-the-ground verification. If any mapped lakes are freeze-out ponds they would be susceptible to filling under the legislation, yet are indicated as protected in our analysis. Because of these two assumption in the analysis, the number of waterbodies that are estimated to be susceptible to filling may be a slight underestimate.

### **Methods:**

The GIS analysis within the Bad River watershed involved multiple modeling steps in a GIS framework. For streams and lakes the steps consist of:

#### Streams:

- Map the elevation (topography) of the land surface in the GIS using a Digital Elevation model (DEM obtained from a DNR web site).
- Overlay, in the GIS, a line network that represents all the mapped streams and rivers (Mapped Streams obtained from a DNR web site).
- Use hydrologic modeling software on the topography to simulate the falling of rain on the landscape, the flow of that water and where the water accumulated. This "flow accumulation" identifies where stream channels are because the accumulation of water into streams is determined by the topography. The modeling software keeps track of how much water has accumulated at each point on the landscape by determining how much area is uphill of every point.
- Select all the points on the landscape that have > 2 square miles uphill from them. These points represent the points on the landscape where the water flow accumulation comes from a drainage area of > 2 square miles. We can tell the area above every point because the magnitude of the "flow accumulation" value indicates the area above a point.
- The points selected represent the stream and river segments that would not be fillable because they have a drainage area of > 2 square miles ("protected streams").
- In the GIS, subtract the "protected streams" from the "mapped streams". The results are the mapped streams that could be potentially filled under the proposed legislation ("potentially filled streams").
- Overlay in the GIS a line network representing the Class I, II, and III trout streams. (Trout Streams obtained from a DNR web site).
- Subtract the trout streams from the "potentially filled streams" and add the trout streams

- to the "protected streams."
- For mapping purposes, color "protected streams" blue and color the "potentially filled streams" red.
- Sum up the length of the "potentially filled streams" line segments that have been coded red.

Lakes:

- Map, in the GIS, the polygons that represent the mapped lakes in the watershed (Wisc. lakes obtained from DNR web site).
- Select the polygons that are > 2 acres, color them blue.
- Selected the polygons that are < 2 acres, color them red.

**Results:**

The results of the analysis were mapped to produce a figure showing the streams and lakes that could be filled under the proposed legislation (Figure 1). The length of mapped stream segments that could be filled, given the proposed legislation, is presented as Table 1.

Table 1. Miles of stream segment that could be filled under the proposed legislation.

Area of analysis:	Miles of vulnerable stream segments (mapped in red)
Iron County Forest land in lease option area (green on map)	4.3
Iron County Forest lands in Bad River watershed	103.8

**Notes:**

The analysis conducted did not examine the area of wetlands potentially filled. Thousands of acres of wetlands occur in the area. A separate analysis would need to be conducted to determine the acres of wetlands that could be filled under recently modified wetland law and the proposed legislation. This analysis also does not address potential impacts to streams or lakes that are not filled by mine waste but which may have waste piled near the shore. Those potential impacts, which are known to include sedimentation and flow and chemistry changes, would need to be evaluated through detailed site specific impact analysis.

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