teckcominco

Bruce J. Donald
Reclamation Manager

April 21, 2003

Mr. Thomas Kudloo, Chairperson
Nunavut Water Board
P.O. Box 119,
Gjoa Haven, N.W.T.
X0E 1J0

Dear Mr. Kudloo:

Re: <u>2002 Annual Report – Water Licence N4L2-0262</u>

Please find enclosed the report titled 'Garrow Lake Model – 2002 Summary Report' from AXYS Environmental Consulting Ltd. Originally you were sent a fax copy of this report.

If any questions arise from this report, please do not hesitate to contact myself at the number on this letter or John Knapp at Polaris (867-253-2201).

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Yours truly

Bruce Donald

Bruce Donald
Reclamation Manager
Environment and Corporate Affairs

Attachment

030421n4l2-0262 2002 annual report - 1LAE

Teck Cominco Ltd. / Environment and Corporate Affairs
Bag 2000 / Kimberley, British Columbia, Canada V1A 3E1 • Tel: 250-427-8405 • Fax: 250-427-8451 • Email: bruce.donald@teckcominco.com

AXYS | AXYS Environmental Consulting Ltd.

PO Box 2219, 2045 Mills Road West
Sidney, British Columbia, Canada. V8L 3S8

March 22, 2003

Mr. Bruce Donald
Teck Cominco Ltd.
Bag 2000,
Kimberley, B.C.
V1A 3E1

Dear Mr. Donald:

Re: Garrow Lake Model - 2002 Summary Report

REVIEW OF 2002 DATA

1.0 Physical Structure

No data was obtained in the summer of 2002 due to conditions on the lake. In addition, there were problems with the HydroLab CTD profiler in the March sampling so that the data are suspect. However, an additional CTD profile was obtained in May with a different and more accurate instrument which provided an indication of lake properties at the end of winter. Since this was the last data collected prior to mine closure and because of the reliability of this data, the following discussion is based on the May CTD data.

The conductivity and temperature profile data from the May sampling do not indicate any changes in the overall basic three-layer structure of the lake (figure 1). However, there were some differences between observations and predictions in the bottom and surface layers.

1.1 Bottom Layer:

Bottom water salinity continued to decrease as predicted but the actual salinities were considerably lower than predicted (figure 2). The much lower salinity in 2002 is likely a result of the different calibrations of the Hydrolab and the SeaBird instrument used in May. The May 2002 result is considered accurate. The present model had been modified in 1998 to account for the higher than expected salinities from 1996 to 1998. If the bottom layer salinities from 1996 (an accurate salinity was obtained in 1995) to 2000 are omitted and the original model used, the predicted salinity in 2002 at the end of winter would have been 64.9 ppt, much closer to the observed value of 63.5. Bottom layer salinity will stabilize and slowly start to increase now that tailings discharge has stopped.

The increase in salinity in the bottom few metres observed in the past few years was absent. Station 262-3 was moved in 2002 (to avoid recently placed tailing material and in order to sample the full depth of the lake). It would appear that the higher salinity water near the bottom observed in the past few years was associated with a relatively isolated pocket of water perhaps surrounded by tailing piles.

1.2 Surface Layer:

Surface layer salinity continued to increase as predicted. The observed value of 7.5 ppt was in close agreement with the model prediction (figure 3).

1.3 Halocline Thickness:

The surface mixed layer depth was 9 m in May 2002 while the bottom of the halocline was at 11.5 m (figure 4). The surface layer depth is close to the predicted value. However, the bottom of the halocline is almost 2.0 m shallower than predicted (even when the net lake level drawdown of 0.8 m is considered).

The present halocline thickness of 2.5 - 3 m is almost 6 m less than it was in 1990. Thinning of the halocline was predicted as mixing in the bottom layer (driven by the tailings plume) extends into the bottom of the halocline, slowly entraining lower halocline water. Despite the difference between the predicted and observed halocline thickness, we believe the halocline will continue intact and gradually broaden now that tailing placement has ceased.

2.0 Zinc and Lead Concentrations in the Surface Layer and Halocline

The metal data collected in 2000 gave low field blanks and good reproducibility and excellent agreement with the 3 m and 15 m reference samples.

2.1 Surface Layer

Lead concentrations were less than 0.01 ppm in agreement with expected values.

Mean zinc concentrations in the surface layer in 2002 were 0.25 ppm, about 0.01 ppm lower than predicted (figure 5). Concentrations have been very slowly decreasing since 1997 in agreement with the trend predicted by the model. This decreasing trend is expected to continue and accelerate now that mining operations have ceased. The present model continues to provide a conservative estimate of zinc concentrations in the surface layer.

2.2 Halocline

The maximum concentration of zinc in the halocline was about 0.1 ppm higher than the predicted value (figure 6). Variations in the maximum in Zn value in the last several years partly reflect analytical variability as indicated by results for the reference samples (which have been variable and generally low). The results from this years' analysis of the reference samples were in agreement with the accepted value so that this data is considered to be a reliable estimate of the present halocline maximum.

2.3 Bottom Layer

Zn concentrations in the bottom layer were essentially unchanged from the previous year at about 0.5 ppm. These values were confirmed in the May sampling. Sampling in May also indicated that most of the Zn is dissolved (finer than 0.2 microns) and not particulate.

3.0 Sulphide Concentrations in the Bottom Layer

Sulphide measurements in 2002 were essentially unchanged from 2001 (Figure 7).

4.0 Siphoning from the Surface Layer

Siphoning removed approximately 5.048 Mm^3 from the upper few metres between July 26 and October 2. Zinc levels as expected were lowest while the lake was at least partially ice covered in July and through most of August (less than 0.07 ppm). Concentrations were highest after the lake cleared of ice in September. Maximum Zn concentrations in the siphon discharge were 0.18 ppm. Although no summer sampling was possible on the lake, the siphon data for September likely reflects end of summer conditions in the surface layer.

The lake level at the end of siphoning in 2002 (1006.86) was 0.8 m lower than at the end of siphoning in 2001 (1007.56). This is about 1.1 m above the original lake level.

5.0 Summary

SNP observations in 2002 indicated that surface layer zinc concentrations were essentially unchanged and about 0.01 ppm less than model predictions. The current zinc model therefore continues to provide a conservative estimate of surface layer zinc concentrations. High levels in the halocline continue. Maximum zinc concentrations in the halocline were slightly higher than predicted.

As predicted, bottom layer salinity continued to decrease and surface layer salinity to increase and the strong halocline remained. The accelerated thinning of the halocline observed in previous years continued in 2002. The present halocline thickness of 2.5 - 3 m is about 2 m less than predicted. However, despite these differences, the physical data do confirm the model predictions of lake stability. It is our opinion that the halocline will remain intact and slowly start to broaden now that mine operations have ceased.

Siphoning from July 26 to October 2 reduced the lake level by about 0.8 m compared to the end of summer 2001. Zinc concentrations in the siphon discharge did not exceed 0.18 ppm.

The 2002 SNP sulphide data are unchanged from the previous year.

If you have any comments or questions, please let me know.

Sincerely,
AXYS Environmental Consulting Ltd.

Paul Erickson

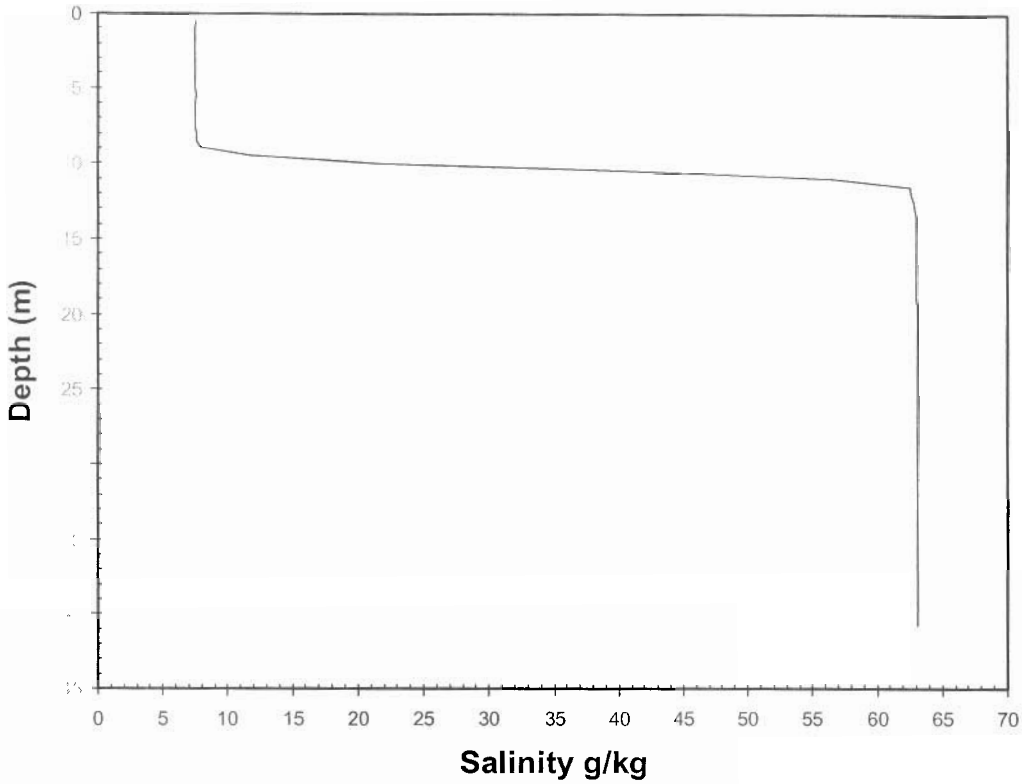

Figure 1: Salinity-Depth Profile Garrow Lake May 13, 2002.

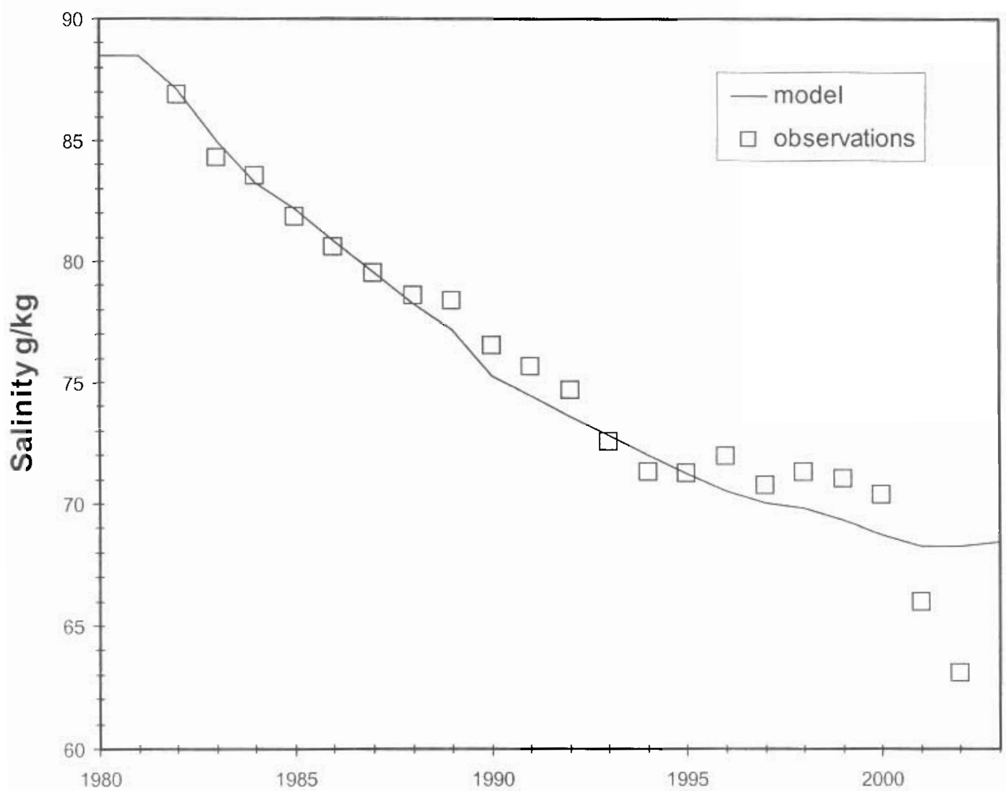

Figure 2: Predicted and Observed Garrow Lake Bottom Layer Salinity.

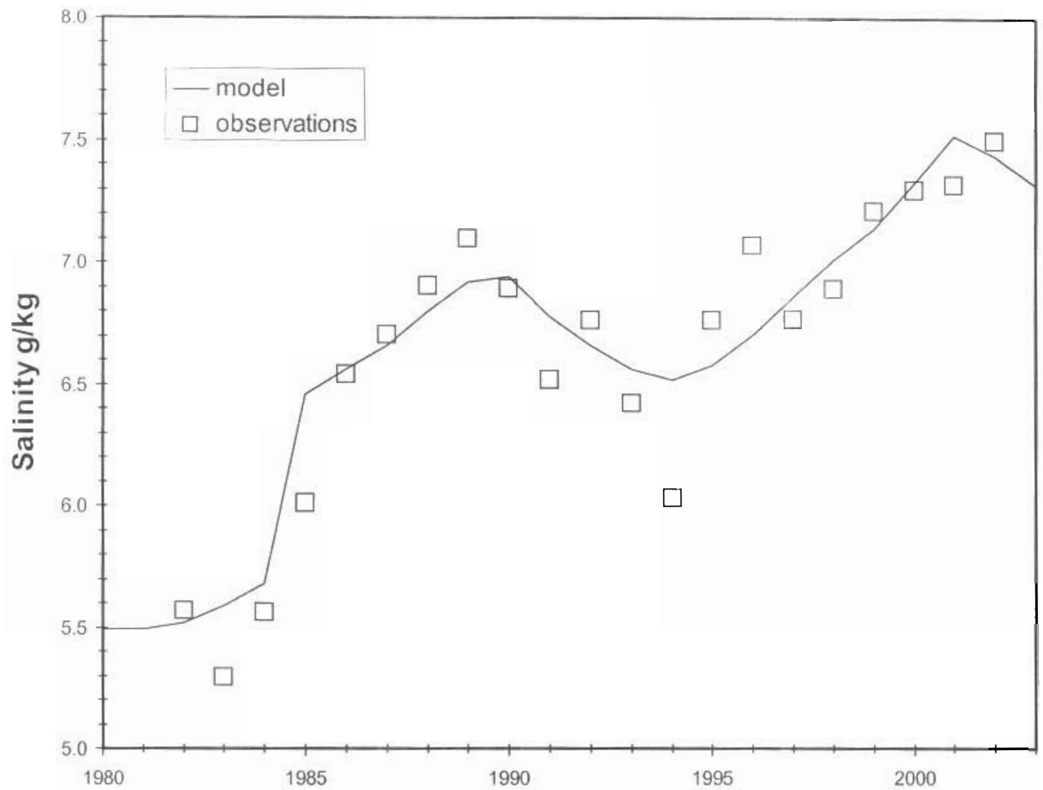

Figure 3: Predicted and Observed Garrow Lake Surface Layer Salinity.

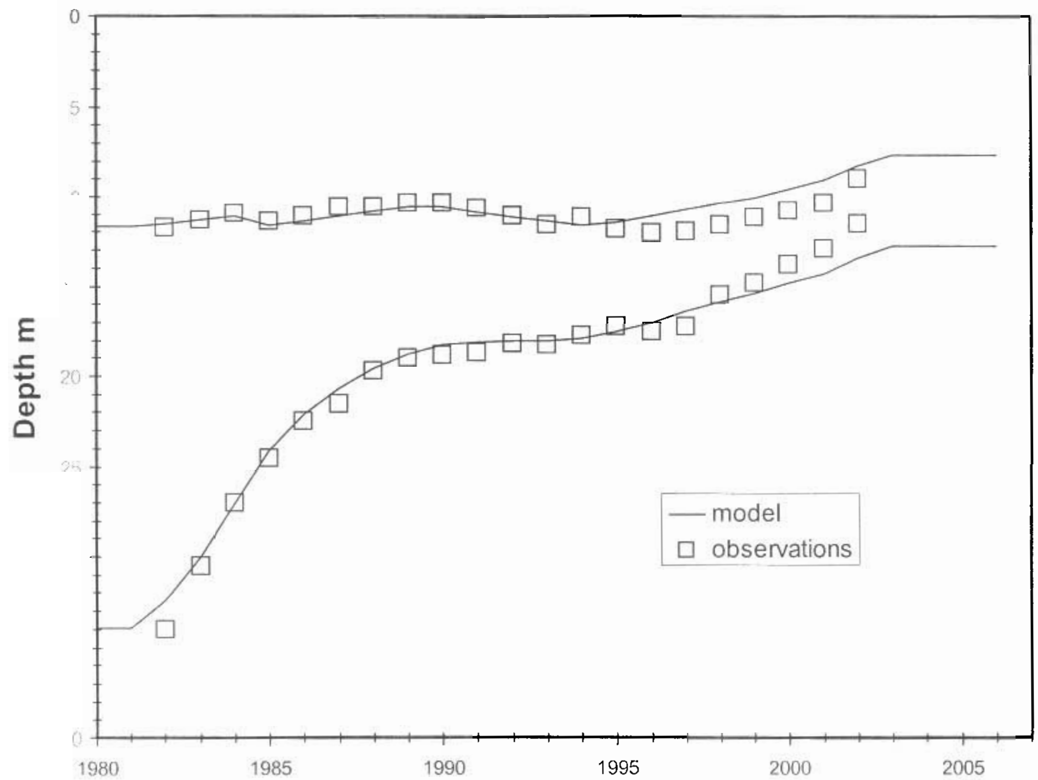

Figure 4: Predicted and Observed Depths of the Surface Mixed Layer and the Bottom of the Halocline in Garrow Lake.

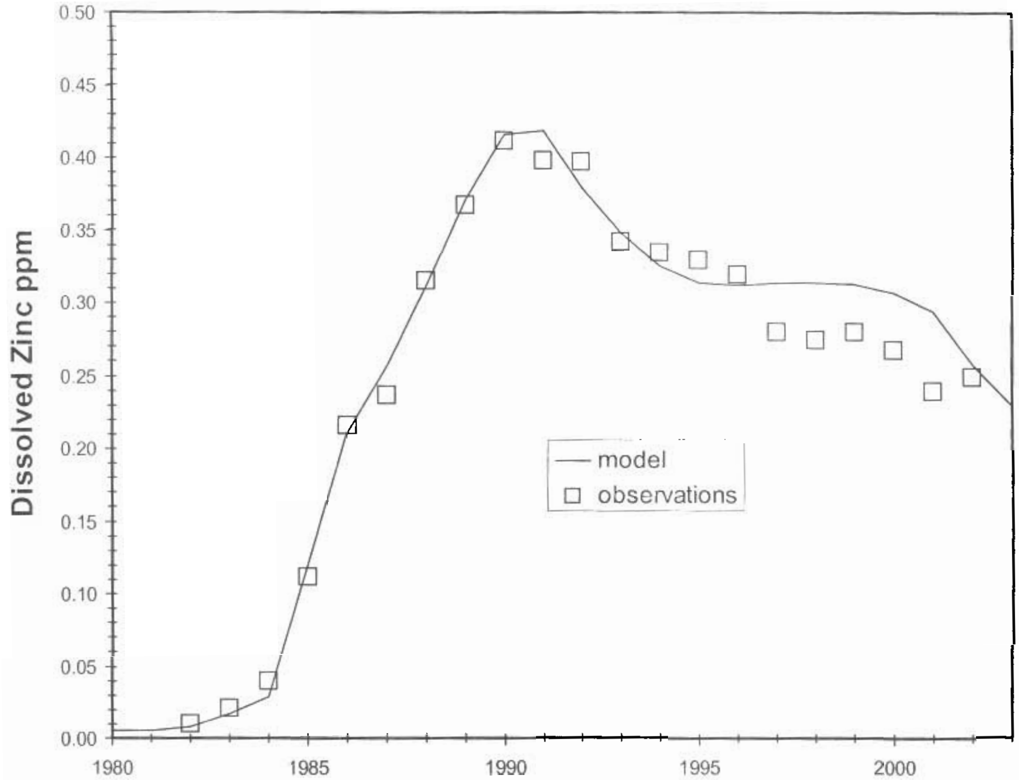

Figure 5: Predicted and Observed Zinc Concentrations
in the Surface Layer of Garrow Lake.

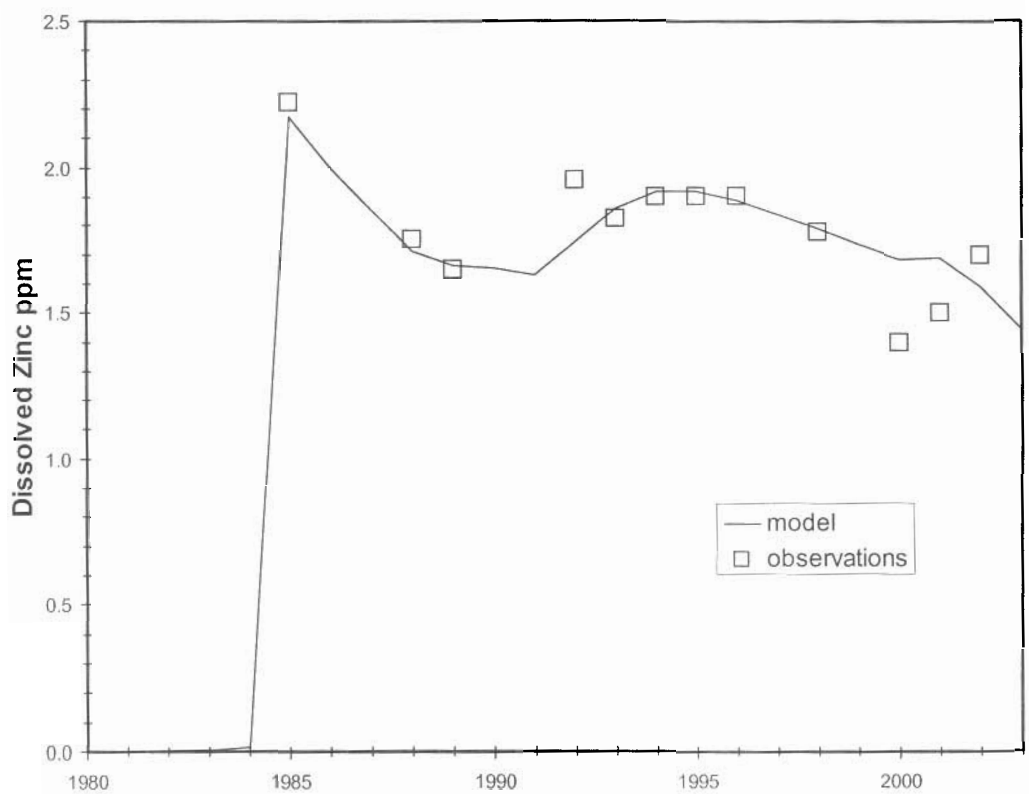

Figure 6: Predicted and Observed Maximum Zinc Concentrations
in the Garrow Lake Halocline.

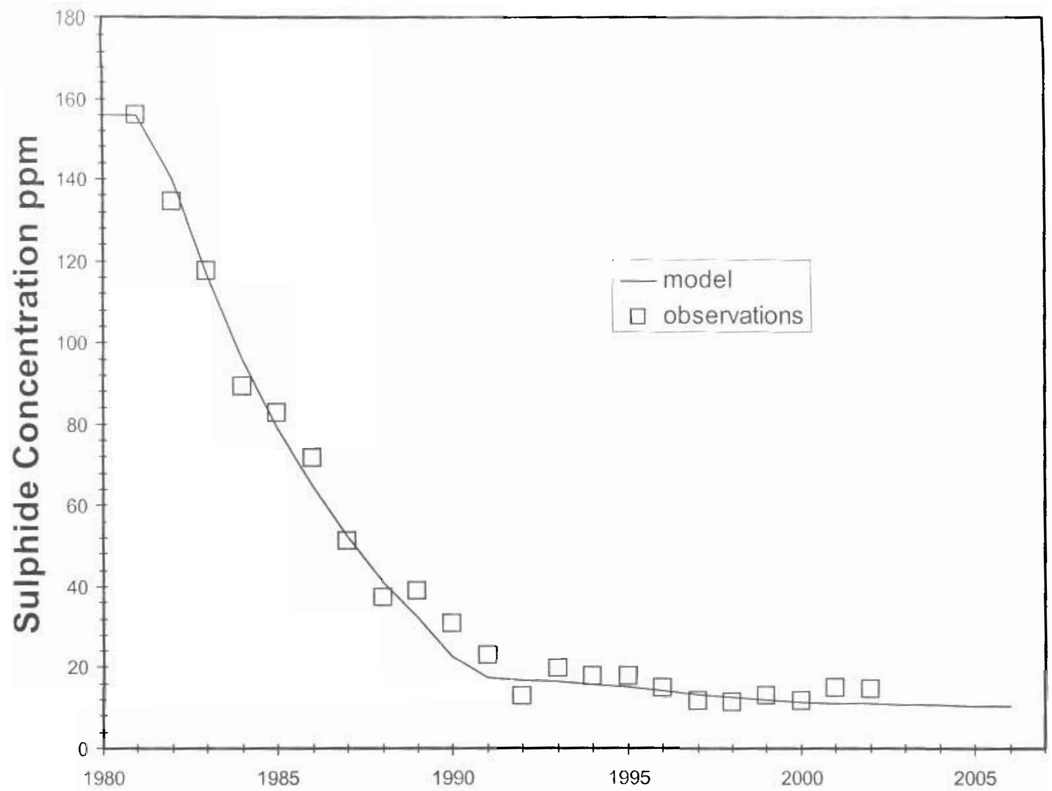

Figure 7: Predicted and Observed Concentrations of Sulphide in the Bottom Layer of Garrow Lake.