Research Journal of Applied Sciences 9 (1): 44-47, 2014
ISSN: 1815-932X

Water Quality of Iskandar Malaysia

[1]A.C. Er, [2]S.T. Chong, [1]M.N. Abd. Rahim and [1]R. Katiman
[1]School of Social, Development and Environmental Studies,
[2]School of Psychology and Human Development,
Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia,
43600 UKM Bangi, Selangor Darul Ehsan, Malaysia

Abstract: Iskandar Malaysia, a new Southern development corridor established on 30 July, 2006 in the state of Johor, Malaysia is one of the catalyst developments to help in the development and growth of the Malaysian economy. Iskandar Malaysia is approximately three times the size of Singapore. One of the primary goals of Iskandar Malaysia is the development of a strong and sustainable metropolis. The aim of this study is to evaluate the impact of Iskandar Malaysia on the river basins within this area for the period 2000-2009. This timeline allows for a pre and post evaluation of Iskandar Malaysia as it was established in 2006. The research methodology adopted was trend analysis. The findings on the eight river basins in Iskandar Malaysia indicated that one was classified as clean, three as slightly polluted and the remaining four as polluted. Trend analysis for the above period did not show any changes in terms of classification with the exception of the Johor River Basin which improved from slightly polluted to clean. A pre and post evaluation on the immediate implementation of Iskandar Malaysia did not result in the overall deterioration of river basin water quality.

Key words: Iskandar Malaysia, river basin, water quality index, trend analysis, development

INTRODUCTION

Iskandar Malaysia is located at the southern-most tip of peninsular Malaysia with a geographical size of 2,217 km^2 which is approximately three times the size of the island of Singapore. Iskandar Malaysia was established on 30 July, 2006 and plays the role as one of the major catalysts in the development and growth of the Malaysian economy. South Johor where Iskandar Malaysia is located has played an important historical and strategic role in the development of Malaysia and its surrounding regions, namely Singapore, Indonesia and at a further distance, China and India. Johor Bahru, the capital city of the state of Johor and its surrounding areas has evolved into the second most important economic conurbation, after the Kuala Lumpur Conurbation in Malaysia. In 2005, Iskandar Malaysia has a population of 1.4 million and is projected to grow to 3 million in the 2025 (Khazanah Nasional, 2006). Figure 1 highlights the location of Iskandar Malaysia.

Determining water quality helps in addressing the threats to the waters (Agafitei *et al*., 2008). In addition, water quality is one of the core conditions for existence of the flora and fauna communities (Merdanic *et al*., 2007). Thus, water pollution is a result of the direct or indirect modification of its normal composition (Ungureanu, 2009). The primary objective of monitoring water quality is to measure the impact of human intervention via industrial, agricultural and transportation activities (Vasile *et al*., 2007).

Malaysia has eight river basins, namely, Johor, Skudai, Pulai, Kim-Kim, Tebrau, Segget and Danga which were monitored by the Department of Environment (DOE). A river basin is a natural network of waterways and is an important water resource.

The rivers in the river basin are a source of water and sediments from a geomorphological perspective. From an ecological perspective, nutrients, sediments and pollutants in a river can affect the ecological processes. The aim of this study is to evaluate the impact of the development of Iskandar Malaysia on the river basins within this area. The timeline for this study is from 2000 to 2009. As Iskandar Malaysia was established in 2006, the selection of this timeline is to allow a pre and post evaluation of Iskandar Malaysia with regard to water quality.

Corresponding Author: A.C. Er, Faculty of Social Sciences and Humanities, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor Darul Ehsan, Malaysia

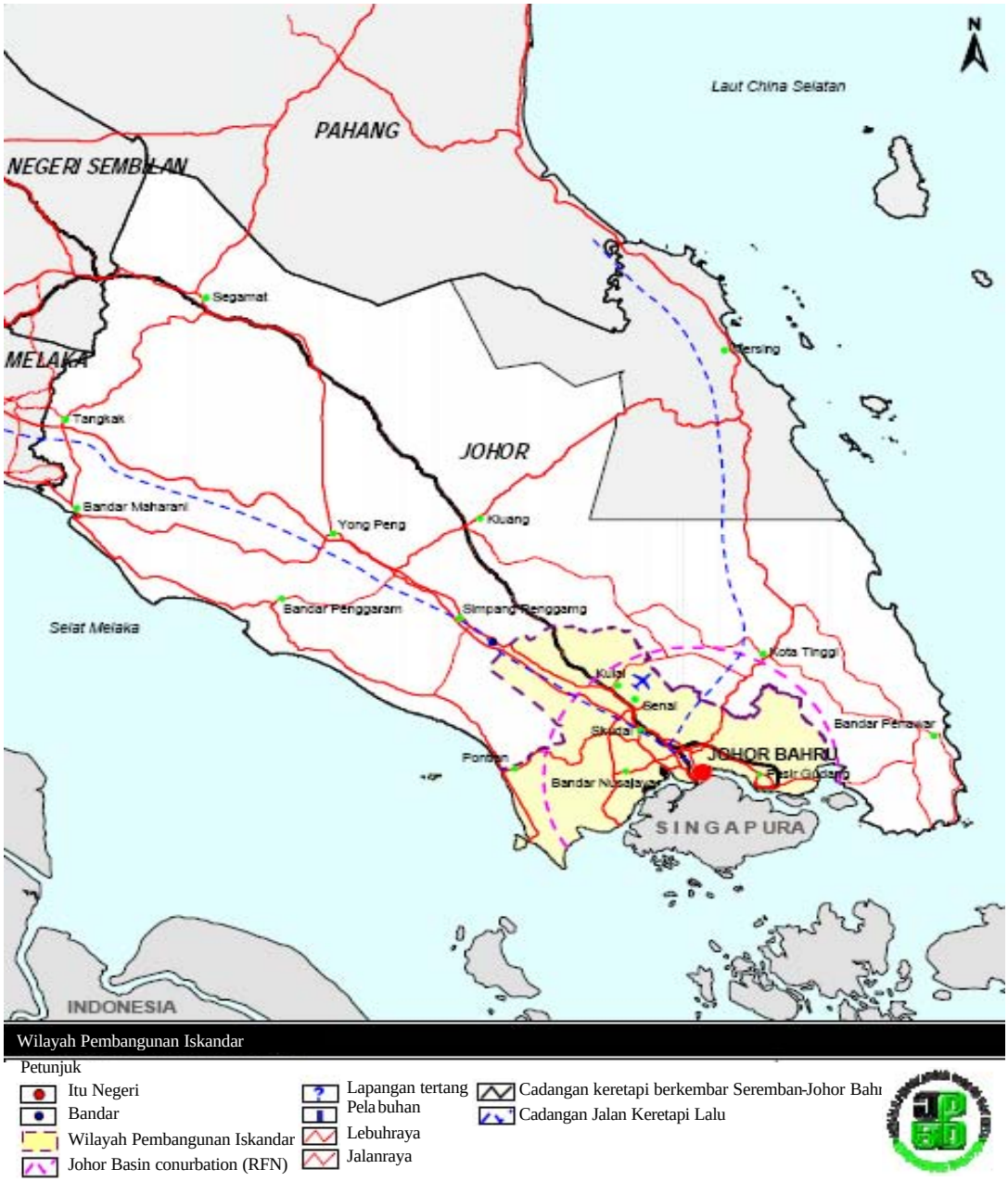

Fig. 1: Location of Iskandar Malaysia (Town and Country Planning Department)

MATERIALS AND METHODS

The main research method is secondary data analysis. Secondary data for water quality were collected from the Malaysia Environmental Quality Reports 2001-2009 pertaining to Water Quality Index (WQI) and river status. The Water Quality Index (WQI) was derived using Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Ammoniacal Nitrogen (NH_3-N), Suspended Solids (SS) and pH. The overall WQI for river basin is calculated by averaging WQI from all sampling stations in each river basin. WQI with an index range of 81-100 is classified as Clean (C) whereas WQI with an index range of 60-80 is classified as Slightly Polluted (SP). Lastly, WQI with an index range of 0-59 is classified as Polluted (P) (DOE, 2008). Trend analysis was utilized to determine improvement, deterioration or no changes in water quality. In addition, relevant secondary data were also gathered to complement and supplement the trend analysis.

Table 1: Trend analysis of overall WQI for River basins in Iskandar Malaysia

River basin	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Johor	76 (SP)	78 (SP)	81 (C)	80 (SP)	81 (C)	81 (C)	80 (SP)	82 (C)	84 (C)	84 (C)
Skudai	-	-	68 (SP)	70 (SP)	65 (SP)	64 (SP)	63 (SP)	78 (SP)	69 (SP)	64 (SP)
Pulai	-	-	-	-	-	74 (SP)	68 (SP)	77 (SP)	76 (SP)	73 (SP)
Kim-Kim	-	-	-	-	-	71 (SP)	75 (SP)	68 (SP)	67 (SP)	75 (SP)
Tebrau	-	-	72 (SP)	77 (SP)	58 (P)	57 (P)	57 (P)	59 (P)	59 (P)	56 (P)
Segget	51 (P)	44 (P)	46 (P)	54 (P)	50 (P)	47 (P)	50 (P)	49 (P)	52 (P)	50 (P)
Danga	59 (P)	51 (P)	52 (P)	52 (P)	55 (P)	52 (P)	51 (P)	53 (P)	52 (P)	52 (P)
Pasir Gudang	-	-	45 (P)	47 (P)	40 (P)	43 (P)	42 (P)	40 (P)	44 (P)	46 (P)

DOE (2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010

RESULTS AND DISCUSSION

Table 1 highlights the overall WQI for river basins in Iskandar Malaysia. Trend analysis of overall WQI reveals that the Johor River Basin has improved from slightly polluted to clean with a general increase in WQI. The Skudai, Pulai and Kim-Kim River Basins are classified as slightly polluted. The river basin water quality for Skudai has remained as slightly polluted for the period 2002 to 2009. Data were unavailable for 2000 and 2001 as no monitoring was carried out. Likewise, data were unavailable for the period 2001 to 2004 as the Pulai and Kim-Kim River Basins were not monitored. However, for the period 2005 to 2009 both the Pulai and Kim-Kim River Basins were classified as slightly polluted.

On the other hand, the Tebrau, Segget, Danga and Pasir Gudang River Basins are classified as polluted for the period 2000-2009. The Pasir Gudang River Basin is the most polluted as the overall WQI is the lowest among the polluted river basins. This is mainly due to the fact that the Pasir Gudang River Basin is an industrial estate with many factories located within. Sungai Segget, flowing within Johor Bahru's city centre is concrete-lined into drainage channels without riparian vegetation. In addition, Sungai Segget is also covered and does not provide any aesthetic value for Johor Bahru's built environment. Another contributory factor to the pollution of the four river basins is due to the rapid urban developments. On an overall basis, there are not much changes in the pre and post implementation of Iskandar Malaysia for the period 2000-2009 in terms of river basin water quality. The exception is Johor River Basin which shows an improvement.

CONCLUSION

Of the eight river basins in Iskandar Malaysia, the Johor River Basin is classified as clean whereas Skudai, Pulai and Kim-Kim River Basins are classified as slightly polluted with the remaining four, namely Tebrau, Segget, Danga and Pasir Gudang River Basins being classified as polluted. Pre and post evaluation of river basin water quality for each of the river basin for the period 2000-2009 did not show any changes in terms of classification with the exception of the Johor River Basin which improved from slightly polluted to clean. Thus, the immediate implementation of Iskandar Malaysia did not result in the overall deterioration of river basin water quality. Regardless of pre and post evaluation, the four polluted river basins are a major cause of concern.

ACKNOWLEDGEMENTS

This research is being funded by the Research University Grant (UKM-GUP-JKKBG-08-05-019) and Research University Operational Grant (UKM-OUP-2012-017) led by Prof. Dr. Abd. Rahim Md. Nor, the Publication Stimulus Grant (UKM-DLP-2012-030) led by Associate Professor Dr. Er Ah Choy and the Research University Operational Grant (UKM-DPP-2013-070) led by Dr. Halimaton Saadiah Binti Hashim.

REFERENCES

Agafitei, A., M. Macoveanu, M. Agafitei, V. Gabor and O. Comisu, 2008. Contributions to the study of water quality of the Izvoru Muntelui-Bicaz storage lake. J. Environ. Prot. Ecol., 9: 26-32.

DOE, 2002. Malaysia environmental quality report 2001. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2003. Malaysia environmental quality report 2002. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2004. Malaysia environmental quality report 2003. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2005. Malaysia environmental quality report 2004. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2006. Malaysia environmental quality report 2005. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2007. Malaysia environmental quality report 2006. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2008. Malaysia environmental quality report 2007. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2009. Malaysia environmental quality report 2008. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

DOE, 2010. Malaysia environmental quality report 2009. Department of Environment, Ministry of Natural Resources and Environment, Putrajaya, Malaysia.

Khazanah Nasional, 2006. Comprehensive Development Plan for South Johor Economic Region, 2006-2025. Khazanah Nasional, Kuala Lumpur, Malaysia.

Merdanic, H., H. Smaihodzic, D. Ferhatovic and Z. Osmanovic, 2007. Indicating water quality by MOSS 1. J. Environ. Prot. Ecol., 8: 520-525.

Ungureanu, L., 2009. A dynamic model of water pollution. J. Environ. Prot. Ecol., 10: 23-31.

Vasile, G., J. Petre, L. Cruceru, M. Nicolau, M. Mitrita, V. Iancu and F. Vosniakos, 2007. Evolution of physicochemical quality of the Danube delta aquatic ecosystem state in the period May-October in 2003-2005. J. Environ. Prot. Ecol., 8: 739-747.