

# **RS Investigation on the Dynamic Water Quality Changes of Small Lakes Affected by Fishing in Taihu Drainage Area in China**

He Liansheng, Liu Hongliang, Xi Beidou, Zhu Yingbo

Department of Environmental Science and Engineering, Tsinghua University

hls02@mails.tsinghua.edu.cn

In this paper, 15 years' dynamic changes of water quality affected by fishing in Taohu Lake and Gehu of Taihu Lake drainage area in China, were investigated by remote sensing technique and field observation. Land satellite data of fifteen years and aero data about the water environment were arranged in the software Arcview to analysis. The general water resources types were divided into purse net area for breeding fish, fresh fish pool, bottomland used, inning farm and natural lake by remote sensing approach. The actual area of different using types and density of purse net in some period were calculated with GIS approach. For the purse net of breeding fish in lake bringing a lot of economical benefits in recent years, purse net area and natural lake area have been changed rapidly for about 15 years. There was no purse net area in 1980s. In 1994, the ratio of purse net area to total lake area was 15% in Gehu Lake, and 27% in Taohu Lake. However, the ration rapidly increased up to 78.8% in Gehu lake area, and up to 83.8% in Taohu lake in 1998. This ration greatly exceeds that of logical purse net area to total lake area, which should be less than 20%. Multi-spectral remote sensor can inspect and survey the dynamic change of purse net density at any time. So that the results may avoid false area data that are caused for the personal sake. Excessive density of purse net for breeding may cause aquatic plants decreasing greatly. This paper analyzed 15 year's occupied proportion change of the aquatic plants by remote sensing approach in Taohu and Gehu lakes. In 1980s, the proportion of aquatic plants occupied area to total lake area was more than 50% in Gehu lake, and was more than 75% in Taohu Lake. In the mid-1990s, a lot of aquatic plants were cut down. There were a few aquatic plants in Gehu natural lake area protected. In 1998, only about 5% proportion of aquatic plants occupied area existed in the middle of Taohu Lake. Most space of the lakes could be used as purse net for breeding fish. This case brought on that the utilized value of the lakes by way of drinking, tour and aquatic animals and plants resources declined greatly. Furthermore, the content of nitrogen and phosphorus in the lakes was increased due to the effect of purse net of breeding fish. Pollution and eutrophication in the local lakes tend to be serious. It is effective that water environment indicators such as the concentrations of suspended substances and chlorophyll-a can be obtained by the use of multi-spectral remote sensing technology being applied to Taihu Lake. However, the ability to inverse water environment under complex water quality or ecological conditions is limited with multi-spectral remote sensor owing to the wide wave band width. It could be a trend that hyper-spectral or super-spectral remote sensing technology is applied to complex water environment.