**1 Introduction**

1.1巢湖现状

Present situation of Chao Lake

巢湖位于安徽省中部，长江北岸，流域面积达 1．35 万平方公里。流域地形以丘陵、平原为主.巢湖流域河网密集，环湖河流成向心状分布，湖泊、 水库、 渠塘及水田等广泛分布。随着巢湖流域人口和工农业生产的快速增长，需水量和污水排放量增大，相应地增加了入湖污染量。农业活动、 土地利用等造成巢湖水体氮、 磷等营养负荷加重，湖泊生态恶化，非点源污染问题较为突出。

Chao Lake is located in the central **Anhui Province, at north bank of the Yangtze River, whose basin area comes up to 13500 square kilometers.** [Watershed](http://cn.bing.com/dict/clientsentence?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E6%B5%81%E5%9F%9F%E5%9C%B0%E5%BD%A2" \t "_blank) [topography](http://cn.bing.com/dict/clientsentence?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E6%B5%81%E5%9F%9F%E5%9C%B0%E5%BD%A2" \t "_blank) mainlyconsists of hills and plains. The key rivers surrounding the Chao Lake where the densities of river net are high take on centripetal selection distribution, what’s more, lakes, reservoirs and paddy fields are widely dispersed. With the rapid growth of population and industrial production around Chao Lake catchment, water demand and wastewater discharge increase gradually, correspondingly rendering more sewage to be drained to lakes. Agricultural activities and unreasonable land use give birth to weight the load of [nitrogen](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E6%B0%AE%E7%A3%B7%E9%87%8F" \t "_blank) and [phosphorus](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E6%B0%AE%E7%A3%B7%E9%87%8F" \t "_blank) concentrations in water, inevitably, accelerating the lake ecosystem’s deterioration. Especially, non-[point](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82) [source](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82" \t "_blank) [pollution](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82" \t "_blank) problem [is more](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82" \t "_blank) [prominent](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82" \t "_blank)[.](http://cn.bing.com/dict/clientsearch?mkt=zh-CN&setLang=zh&form=BDVEHC&ClientVer=BDDTV3.5.0.4311&q=%E9%9D%9E%E7%82%B9%E6%BA%90%E6%B1%A1%E6%9F%93%E9%97%AE%E9%A2%98%E8%BE%83%E4%B8%BA%E7%AA%81%E5%87%BA%E3%80%82" \t "_blank)

1.2 Previous research

## 20 世纪 90 年代， 巢湖流域非点源污染及由此引起的巢湖生态环境问题逐渐引起人们关注。张之源，王培华等根据 1986 年 － 1995 年近 10 年的巢湖水质监测数据， 得出非点源 TN 负荷平均占总量的 49% ，TP 占 40% ，同时探讨了污染物的湖内空间分布。该阶段对巢湖流域的非点源污染来源、 特征及管理控制等问题未作出系统研究，属于初步调查阶段。王宗志等在上述研究基础上利用模糊聚类方法分析巢湖流域几种污染物的主要来源，进而得到11种土地利用方式与营养物输出浓度间的对应关系。

The potential impact of no-point source pollution on Chao Lake ecosystem raises widely concern in the early 1990s, Zhang Zhi Yuan and Wang Pei Hua reported that no-point source on the average of TN load account for 49% of the total, and TP is about 40%, meanwhile, discussing the spatial distribution of pollutants in water according to the monitoring data of Chao Hu from 1986 to 1985. However, the initial research phase did not involve the major source of no-point source pollution, effects of different management scenarios on the lake and administrative console problems. Wang Zong Zhi exploited fuzzy clustering method to analyze the major source of several pollutants in the Chao Hu basin, thereby gaining the relationship between eleven land use patterns and nutrient outputs. Here, we focus on the need for solving the problem about linking different domains influencing pollutants input and also forecasting and evaluating the effects of different management scenarios on lakes.

1.3Outline of our model

在我们的论文中，我们首先将巢湖流域内的土地分为8种类型，建立输出系数模型，求出各个类型土地N、P的负荷，分析巢湖水质问题；然后，结合气象学、其他水系影响等因素，对巢湖赤潮发生进行预测；最后，建立基于层次分析法的评价模型，建立六个评价级别，利用搜集数据，对巢湖做出评价。

**2 Problem Restatement and Analysis**

**2.1Problem Restatement**

首先，题目告诉我们，湖泊提供的商品和服务是由于气象、水文地理、营养物质负荷以及其他注入湖泊等因素之间相互作用的产物。而且还说明，水文地理和营养物质负荷是受到社会经济的影响，例如人类居住、抽引水、土地管理等。然后题目要求，建立合适的模型，将不同的领域联系起来，并且要求对湖泊进行评价和预测。