

台灣，高雄市愛河生命活化的沿革

**The Revitalization of Love River Kaohsiung ,Taiwan**

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## Data of Kaohsiung City

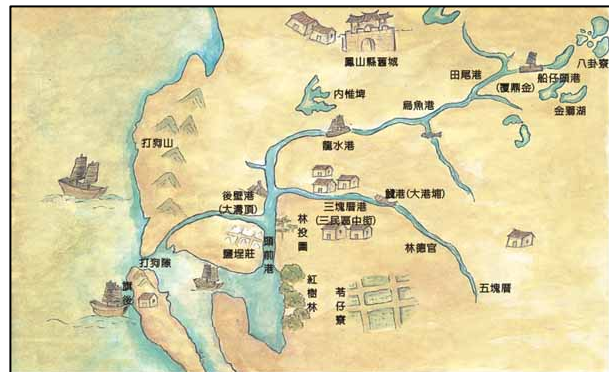
- Population : 1.52 million
- Area : 178k m<sup>2</sup>
- Annual rainfall volume : 1,780mm( Jun the highest rainfall of 398mm)



## I. Origin of Love River

### ■ Before 1895

Love River was transformed from shallow sea, low-lying land, swamp, and then the tangled waterway of the river showed up. The map drawn by the Dutchmen in 17 century had illustrated Love River, but the river had not been named yet. The Chinese called a section of a river “Gang,” which means a port, in Ching Dynasty. The Gang from upstream the downstream were Chuan-zi-tou Gang, Tien-wei Gang, Long-shuei Gang, and Yen-cheng Gang.



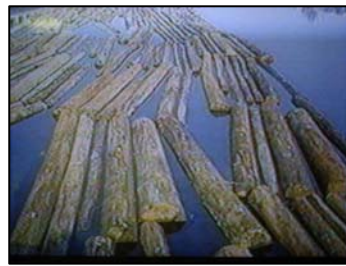
### ■ 1895-1947

The former name of Kaohsiung is Takau. Since Love River had not had a formal name then, it was named Takau River. In 1920, “Takau” was renamed as “Takao(高雄)”. In 1935, the Port of Kaohsiung was built. In order to ship the

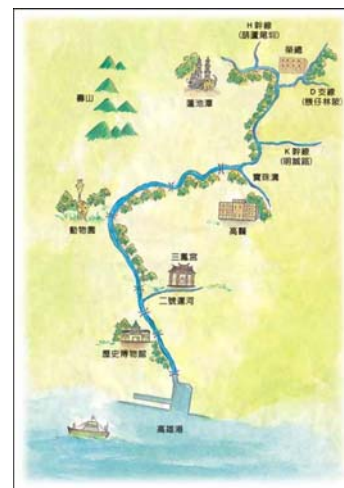
logs to the downstream and to cooperate with the reclamation plan of Yen-cheng District, the river was dredged and expanded 73~128 meter in width and 3.6 meter in depth. The river became “Kaohsiung Canal”, the ship canal for industrial use, and was thus formally named Kaohsiung River. This was the first time that the river had a formal name.

■ 1948-1952

In 1948, there was a “Love River Cruise Company” opened near Jhong-Jheng Bridge. The shop sign was destroyed by a Typhoon and only “Love River” of the sign was left. Later on a reporter who accounted the event of a couple committing suicide by jumping into the river mistook “Love River” as the name of the river. Since then, the name “Love River” was continuously used. In 1952, the port was completely dredged. The inner and outer ports both met the international standard, and the ocean shipping and transportation developed expansively.



Love River is the spring of life of Kaohsiung. It is originated from Bagualiao pool in Kaohsiung County. The total length of Love River is 12 Km, and 10.5 Km were in Kaohsiung City. The river goes through Zuo-ying, San-ming, Gu-shan, Yen-cheng, Cian-jin, and Ling-ya districts, and finally it comes to the First Port of Kaohsiung. The width of the river is 130 meter in the outfall and decreases progressively to the 14 meter in the upstream. The origin is an irrigation ditch, and the river basin is about 5600 hectares.



The water of Love River comes from the origin and the tide of the sea. It is a typical tide-affected river. There are many species of fish in Love River, and the river was also one important channel for transportation and irrigation in Ching Dynasty.

## ■ Contribution of Love River

1. Transport: In Ching Dynasty, Love River was the way communicating Kaohsiung Plain and Ci-hou Port. During the Japanese reign, the river was dredged to be the canal.
2. Irrigation: One of the sources for irrigation of the Love River basin.
3. Salt industry: In Ching Dynasty, the citizens drew the water of Love River to the saltern to produce salt. The present Yen-cheng District was the field for making salt by insolation.
4. Log shipping: After Taiwan was back to Chinese reign, the logs were one of the major imports.
5. Drainage: Love River goes through the tensely-populated Kaohsiung downtown, and became the natural drainage way.
6. Recreation: In early years, Love River was beautiful and quiet. It was a great place for recreation.



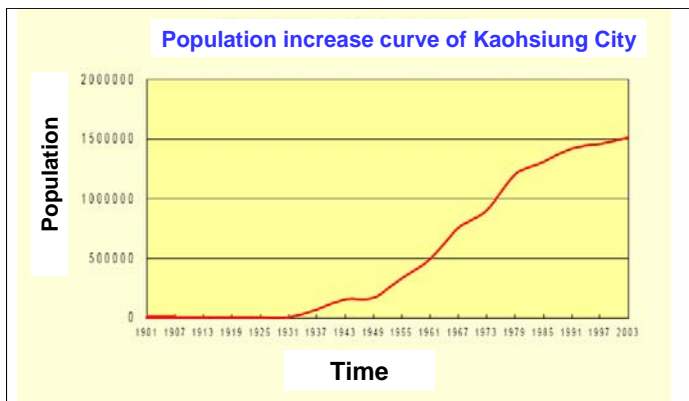
## II. Plan of Sewerage Systems

### (I) pollution

In accord with the Central Economic Development Plan in 1953 and the Ten Constructions Plan in 1970, there were plenty of factories established. The industry developed prosperously and Love River was gradually polluted. In 1968, the government tried to rescue Love River by dredging, but failed. In 1971, Love River's death was announced.

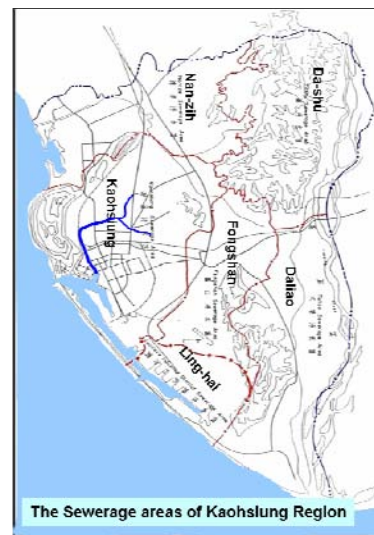


Love River was seriously polluted in 1964. The river was so stinky that the dragon boat racing, which had always been held in Love River actually, was transferred to the Lotus Pond in 1972. The rapid economic development and urbanization made population grow fast too. The increased industrial and household waste water ruined the water quality of Love River.



## (II) Origin of the Plan

1. The Export Processing Zones were established in the 60s. The government noticed the pollution of Love River and the Port of Kaohsiung and tried to understand and control the problem.
2. Since 1963, every mayor of Kaohsiung City paid great attention to the pollutions of Love River, but no one had ever succeeded to save the river.
3. In 1966, the Provincial Government completed the preliminary plan of the sewerage systems of Kaohsiung region. The Kaohsiung region, including entire Kaohsiung city and part of Kaohsiung county was divided into six sewerage areas. Love River was belonged to Kaohsiung Sewerage Area.
4. In 1968, the plan was approved by the expert sent by WHO. In 1972, the sewerage system of Love River Basin of Kaohsiung Sewerage Area was carefully programmed.
5. The sewerage systems of Kaohsiung adopted separate systems for storm water



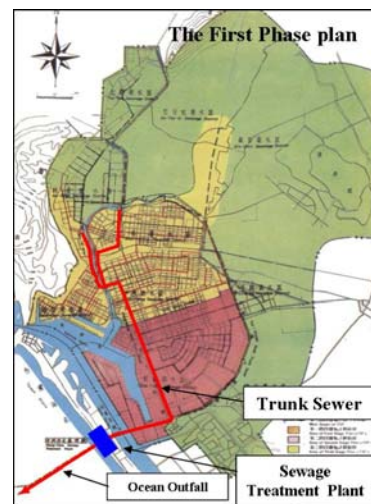
and sewage water.

6. After the discussion between the City Government and Provincial Government in 1977, they decided to adopt the “Plan of Sewerage System” which can completely solve the pollution.
7. Coordinating with the pollution control of Love River, the first phase of the Sewerage System Plan was to construct the main trunks, outfall to the sea, and interception facilities which can divert the household and industrial wastewater into the sewerage system.

### (III) The First Phase

#### ■ Item

1. Sewer: About 24.4 meter of the main trunk and sewer pipes
2. Pump Stations: 2
3. Sewage Treatment Plant : 1 (built on a 12.6-hectare reclamation land, with treated volume of 400,000CMD)
4. Outfall to the Sea : 1 (1.8m Inner diameter, 3Km in length.)
5. Sewage interception stations : 11



## ■ Progress

1. In 1977, the Provincial government was in charge of the construction of the main trunk in Cheng-gong Rd.
2. In 1979, the project was transferred to Kaoshiung City Government because Kaohsiung has turned into municipality directly under the jurisdiction of the Central Government
3. The First Phase was completed in 1986.
4. The facilities starts their formally operations in February 1987.
5. Outlay : NT\$ 3.77 billion(US\$ 98.80 million)
6. Treated sewage volume :
  - (1) The first phase: 400,000CMD
  - (2) Present : 750,000CMD
  - (3) Max volume planned: 1,000,000CMD



## (IV) The Second Phase

### ■ Items and Progress

1. 127 km of main trunk, sewers and networks of branch sewers.
2. 1 sewage lift station, 2 interception stations, investigation and maintenance of 22 km sewer pipe.
3. Plan of secondary-level treatment facilities for the construction of Central District Sewage Treatment Plant.
4. The treated sewage volume was expanded from 400,000CMD to 750,000CMD.
5. The schedule of the project is from 1990 to 2001.
6. Outlay : NT\$17.5 billion(US\$ 60.80 million)

## (V) The Third Phase

### ■ Items and Progress

1. 320km sewer pipes, interception facilities of Dock No. 5, Kai-syuan and Sing-wang interception stations.
2. The facilities renewal of the Sewage Treatment Plant, including repairs of the old facilities, installation of new chlorinated disinfection basin and seawater electrolysis facilities. Discharging pump station, power supply system, and process piping.
3. schedule: 2001 to 2007.
4. Outlay : NT\$ 13.06 billion (US\$390.75 million)
5. Presently, the household connection rate is 47.87%, and it is expected to be 50.70% by the end of 2007, which means 50% completion of the household connection project.



## III. Pollution Control of Love River

### ■ Strategy and implement of the pollution control

1. Calculating the river self-purification capacity for the load of the pollution and the rate of interception.
2. Choosing the location and method of pollution-abatement by according to the priority and policies.
3. Simultaneously, the household connection of the branch rivers were developed to improve the community environment and to increase the stability of river water quality during raining season.
4. The household connection of the downstream were done with highest priority.
5. The household connection gradually replaced the interception facilities. The river turned back to its natural appearance step by step.
6. The increasing household connection rate and interception facilities prevent pollutants from flowing into the river.

### ■ Overview of the implement

1. In early period, the urbanization could not coordinate with the urban sewerage



system. The improvement was inefficient.

2. Cooperated with the 1st phase of sewerage system project, there were 11 interception stations which can defend the tides and prevent the pollutants from flowing into Love River.
3. During the dry season, November to April of the next year, of Kaohsiung, the sewage was intercepted and diverted into sewerage system. During the rainy season, May to October, the wastewater was partly discharged into the river according to the condition of rainfall.
4. Repairing the river embankment and the waterway to make the river maintain the ability of self-purification during the sunny day and the function of flood control.

#### ■ Main items

1. Water Quality Improvement: To construct the tide-proof interception facilities.
2. Riverbank renewal: from the outfall of the river to the K branch of upstream, about 14 km in total.
3. Waterway cleaning: Cleaning out the floating waste and the sludge deposited in the bottom of the river.
4. Greening: landscaping and greening to the newly-developed lands after the renewal of river embankment.
5. Outlay : NT\$1.39 billion (US\$ 37 million)
6. The above-mentioned were all completed in 1986.



#### ■ Flood control– drainage system & automatic flood supervision system

1. Construction of drainage ditches, storm sewers and drainage open channel by according to the planned municipal storm sewer system.
2. The drainage system of Love River including Ding-jin, Ao-zih-di, Gang-shan-zih drainage area, Nei-wei and old downtown drainage area.
3. Establishing the water gates, pump stations, and automatic flood supervision system.
4. Efficiently handle the water level of Love River, Canal No. 2 and K branch by grasping real-time information. The quality of the flood-controlling facilities and the efficiency of emergency solution were upgraded.



### ■ Solid Effects

1. The water quality has been improved and the stinky smell vanished.
2. Love River was one announced to be the dead river without ecology in 1971, but in 1987 there were 5~6 species of fish found in the river. Now, there are even more than 50 species.
3. The sewage interception rate (sum of rate of interception and household connection) of the water accessible area of Love River reaches 99%. The water quality was greatly improved and became steady.
4. The household connection rate of Love River basin is more than 50%, which is the highest increasing rate all over the country.

### ■ Landscapes Improvement

In 1998, the Construction and Planning Agency of Ministry of the Interior promoted the plan, “New Appearance of the Towns.” The plan included roads improvement of the First Dock, Shao-chuan-tao Park, Lighting arrangement of the 3 bridges over Love River, and water-accessible parks along Love River. These projects thoroughly

No.	Place
1	Shao-chuan-tao Park
2	Kaohsiung Bridge
3	Jhongjheng Bridge
4	CI Shan Bridge
5	Jian Guo Bridge
6	Jiou Ru Bridge
7	Zhih Ping Bridge
8	Bo-Ai Bridge



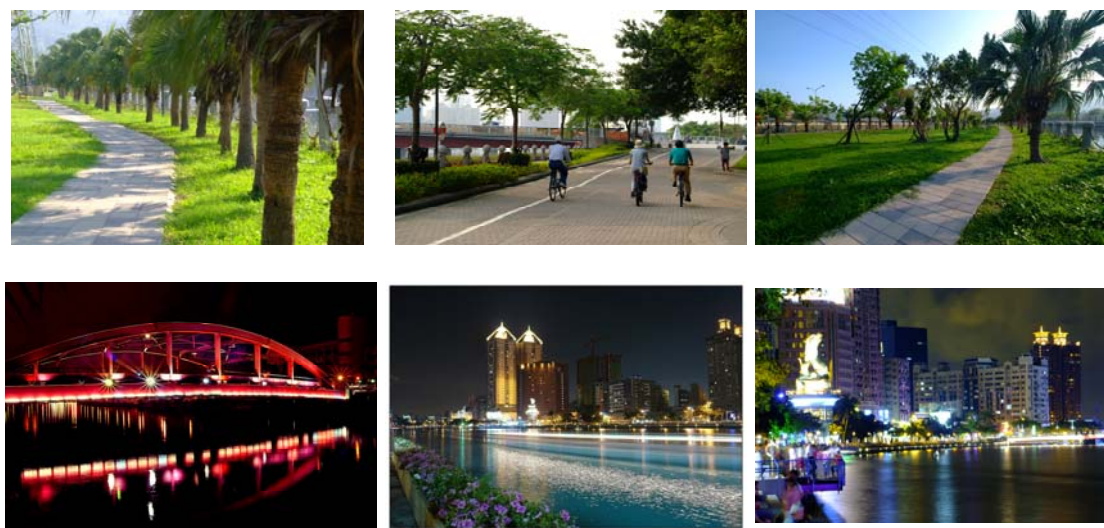
connected and revealed the landscapes and ecology of the river.

Parts of the river banks adopted Nature-working Method to provide more chances to the citizens to get close to the river and nature.

■ Before



■ Present



The dragon boat racing went back to Love River. More and more sports and recreation are taken place along Love River.



#### **IV. Conclusion**

1. The success of Love River's revitalization is attributed to the all the mayors' attentions efforts to the problem since the 60s.
2. The plan were divided into many projects. Integrated with the construction of the sewerage systems, the Love River revitalization was successful, cost-saving, and efficient.
3. Coordinated with the urban development, the plan was done step by step. Therefore the effects are better and solider.
4. The plan is still on the way, and we expect to complete the sewerage system of the whole city as soon as possible.
5. After the revitalization and transformation, Love river becomes a river with good water quality, no stinky smell, and beautiful greening and landscapes. It is now a popular place for sight-seeing, recreation, and even having a cup of coffee.