

Stone Tidal Weirs in Hainan Island, PRC

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ABSTRACT

Around Danzhou City at the northern coast of Hainan Island, PRC, stone tidal weirs are widely distributed. Local history says that immigrants from the southern part of Fujian Province in mainland China came to this area to build many stone tidal weirs during the Ming Dynasty. Each patrilineal lineage composed the construction unit of them. One stone tidal weir at the village of Wangzhai has the stone-circled catching trap at the tip of the stone wall, which looks similar to ones in the Penghu islands. On other stone tidal weirs at the village of Shenchong, there are openings between stone walls, which are usually closed by wooden sluice gates; when the openings are opened on the ebb, people set fishing nets just outside of the opened gates. Before the tide is out of stone tidal weirs completely, fishing nets are also used inside them. At night, fishermen light a fire on floats of fishing nets with coconut oil in order to drive fish into the nets. Although one stone tidal weir at the village of Changsha has been registered as a Historical and Cultural Site Protected at the Provincial Level by the Hainan Provincial People's Government, most stone tidal weirs in Hainan island have not been safeguarded properly by local people as well as by the government. Some weirs are abandoned, and others are transformed into fishing ports. As for the intangible aspect, villagers still remember 'Tide Song' in Hainanese, which narrates the dates of the spring tides and the commencement times of high tides according to lunar calendar. In former days, in addition, some families held special rituals during high tides so that a haul at stone tidal weirs might be good.

INTRODUCTION

The stone tidal weir is a large fixed fishing gear constructed by piling up rocks or coral limestone in a horseshoe, semi-circular, square, or linear shape from the intertidal zone towards the sea. Fish schools enter the stone weir during high tide, but they are trapped inside when the tide recedes, so the fish are easy to catch. The stone weir is considered a primitive fishing gear and method, relying solely on tidal changes, and is seen as an ancient fishing technique.

Research on stone tidal weirs in China has been primarily focused on Taiwan and Fujian Province, with no existing studies on stone weirs in other regions. Based on the current state of research, this paper presents the first study on stone tidal weirs in regions other than Taiwan or Fujian Province. The study focuses on the stone tidal weirs of Hainan Island. Drawing on fieldwork conducted in autumn 2021 on Hainan Island, this study provides insights into the conservation of Hainan's stone tidal weirs and their potential utilization as cultural resources for tourism.

Hainanese Stone Tidal Weirs

Hainan Island, located in the southern part of the East China Sea, north of the South China Sea, belongs administratively to Hainan Province in China. Stone tidal weirs are distributed on Hainan Island, Danzhou City. Danzhou City is situated in the northwest of Hainan Island, facing the Beibu Gulf, at approximately 109.5 degrees east longitude and 19.5 degrees north latitude. According to the local dialect known as Danzhou dialect, '冲(chong)' a pond surrounded by sandy beaches or reefs by the seaside, and when combined with '石(shi)' stone weirs. In the local dialect, however, '石冲(shi chong)' is also referred to as '冲篱(chongli)' or '鱼冲(yu chong)'. Unlike stone tidal weirs in other regions, the stone tidal weirs in Hainan Island do not have specific names or unique designations. In 2021, stone tidal weirs were surveyed in three villages in Danzhou City, Hainan Province, namely the villages of Wangzhai, Changsha, and Shenchong.

Village of Wangzhai

Four stone tidal weirs remain in Wangzhai. However, the practice of using these stone weirs for fishing activities has largely disappeared. During the 2021 survey, only two stone tidal weirs were identified. The first stone tidal weir is massive, with a total length of over 800 meters. The second stone weir is smaller, with a total length ranging from 200 to 300 meters. At the curved end of the second stone weir, there is a fishing area similar in the stone tidal weirs of the Penghu Islands.

Village of Changsha

Three stone weirs remain in the village of Changsha. Among them, one small-sized stone weir has already suffered significant collapse. Immediately adjacent to its west, however, the second stone weir has been completely preserved, and the village residents still use this stone weir for fishing activities. It is an extremely long stone weir, with a total length of approximately 1,000 meters and a height of around three to five meters. The third stone weir was designated as a ‘Historical and Cultural Site Protected at the Provincial Level’ by the Hainan Provincial People's Government on 24 November 2015, and the ‘Changsha Village Offshore Enclosure Site’ was established in October 2016. During the survey conducted in 2021, however, it was not possible to visually confirm the existence of this third stone weir. Even the nearby village residents have no information about this stone weir, and it cannot be ruled out that it has already completely collapsed due to the impact of wind and rain.

Village of Shenchong

Three stone weirs remain in the village of Shenchong. Part of the stone wall of the first stone weir has been destroyed intentionally by nearby village residents to facilitate the entry and exit of fishing boats. Therefore, this stone weir primarily serves as a refuge for fishing boats during typhoons. Located northeast of the first stone weir, the second stone tidal weir is perfectly preserved, and its original form is fully intact. It is still being used by the local villagers for fishing activities. The third stone tidal weir is damaged but still usable for fishing, and neighboring villagers come to it during low tide.

The stone tidal weirs at the village of Shenchong are significantly different from those in other locations in Danzhou City. While they share the common feature of utilizing tidal variations to retain fish within the weirs, each stone tidal weir's stone walls have two openings. These openings are equipped with two wooden gates that regulate the speed of drainage during low tide. The gates consist of a large gate and a small gate, and depending on the drainage requirements, both gates can be opened simultaneously or only one. To prevent fish from escaping the stone weir during drainage, fishing nets are installed outside the gates to capture them. Inside the stone walls, there are artificial water pools or depressions excavated for the purpose of collecting fish. Before high tide, the villagers stack stones in these depressions. During high tide, when the fish enter the stone weir, many of them have a tendency to hide in the gaps between the stones or gather near the stones. These depressions serve to enhance fishing efficiency. Additionally, the villagers sometimes use fishing nets when fishing inside the stone weir, especially when the tide does not completely recede. Some fish species emit sounds, especially during spawning, and the villagers move the fishing nets towards the source of the sound. During nighttime fishing, the villagers light coconut oil-fueled lamps on the buoys of the fishing nets. The fish are attracted to the light and are led into the nets.

Tangible Aspect

According to the village residents, in Hainan Island, stone tidal weirs were privately owned by the clans that constructed them. Each branch of the clan would take turns in fishing and jointly repairing the stone tidal weirs. On any given day, only people belonging to the same branch were allowed to use the stone weirs. The usage rights for the stone tidal weirs would transfer between the different branches on a daily basis. Additionally, other village residents who did not belong to the clan could borrow the stone tidal weirs. By paying a suitable fee, these villagers would temporarily acquire the right to use the stone tidal weirs. Furthermore, some stone tidal weirs were not solely built by a single clan but rather through cooperation among several clans. As a result, these stone tidal weirs became co-owned by multiple clans. However, despite involving multiple branches from different clans, the fundamental process of transferring usage rights remained unchanged.

These transfers of usage rights not only helped maintain relationships within the clans but also fostered connections between different clans, while simultaneously preserving the relationship between each clan and the village. Additionally, the importance of stone tidal weir repairs surpassed the significance of usage rights. Stone tidal weirs were susceptible to destruction from typhoons and high waves, making regular maintenance essential. Stone tidal weirs brought stable fishing yields to the village, this provided a means for the villagers to obtain wealth and sustain their livelihoods. Therefore, the obligation to repair the stone tidal weirs was considered more significant than the usage

rights. As a result, the repair work for the stone tidal weirs was primarily led by the users themselves, with the respective clans overseeing the repair activities.

The stone tidal weirs in Hainan Island are similar to those in Fujian Province and the Penghu Islands. The basic structure consists of arc-shaped stone walls, but in Hainan Island, there are also stone tidal weirs with fishing compartments at the ends of the arcs, similar to those found in the Penghu Islands. Additionally, there are features in the stone tidal weirs of Hainan Island that resemble drainage outlets found in the stone tidal weirs at other regions of mainland China. The construction and management of stone tidal weirs seem to be quite similar in these regions. The construction and maintenance of stone tidal weirs require a large amount of labour. The ownership clans had exclusivity over the usage rights of the stone tidal weirs, which were primarily treated as private property. In other areas such as southern Fujian Province and the Penghu Islands, communal ownership was also observed. The stone tidal weirs at the village of Wufeng of Huian County in Fujian Province had an alternating system where different branches of the Song clan would take turns overseeing the fishing activities in the stone tidal weirs, and the catches were distributed fairly. The distribution of catches in Hainan Island is similar, with usage and distribution alternating among different branches of the family. All this gives a sense that stone tidal weirs in Fujian, Taiwan, and Hainan were privately owned. Furthermore, just like in Fujian Province and the Penghu Islands, it was possible to buy, mortgage, rent, or give away stone weirs in Hainan Island. This indicates that the stone tidal weirs had a certain immovable property nature as a source of productive activity.

Intangible Aspect

Since the Ming Dynasty, three main religious beliefs have coexisted in Hainan Island: Mazu worship, Xifu Ren worship, and Shuiwei Shengniang worship. Among them, the Shuiwei Shengniang worship and Xifu Ren worship originated in Hainan Island, while Mazu worship entered Hainan Island with the immigrants from southern Fujian and has become the mainstream belief on the island today.

Near each stone tidal weir in Danzhou City, Hainan Island, there are traces of religious rituals. According to the villagers, local people participate in formal ceremonies for Xi Furen, Mazu, and Shuiwei Shengniang. They also conduct clan-based ritual activities by building ritual platforms near the stone tidal weirs. In addition to the worship of these three major deities, however, many fishing communities also worship other deities. For example, villagers who worship ‘Ganling Zhenjun’, ‘Lingying Zhenjun’, or ‘Ganying Dijun’ go out to the sea on holidays, wedding days, and full moon days to conduct incense-burning ceremonies, praying for a bountiful catch in the stone weirs and seeking the blessings of these deities. According to the memories of villagers in the village of Changsha, they used to conduct ceremonies for ‘Ganling Zhenjun’ during high tide, praying for abundant tides and the entry of many fish and crustaceans into the stone tidal weirs. However, with the development of modern fisheries and the emergence of industrial zones, the stone tidal weirs are no longer the means of livelihood for most fishing communities. Many have become factory workers or have chosen modern fisheries, so there are now fewer villagers who conduct ritual activities specifically for praying for a bountiful catch in the stone weirs.

According to the villagers at the village of Shenchong, they have a ‘Tide Song’ that has been passed down through generations, which describes the laws of tides related to the stone tidal weirs. Although there is no written record of the song, most of the villagers still remember it through oral tradition. Through this song, the villagers grasp the high tides of the spring tide and gather manpower earlier to increase the fishing efficiency in the stone tidal weirs. According to the villagers at the village of Shenchong, they have a ‘Tide Song’ that has passed down through generations, which describes the laws of tides related to the stone tidal weirs. Although there is no written record of the song, most of the villagers still remember it through oral tradition. Through this song, the villagers grasp the high tides of the spring tide and gather manpower earlier to increase the fishing efficiency in the stone tidal weirs.

The ‘Tide Song’ is recorded as the following content in modern Chinese:

大正月初七二十一、将门出虎子；二月初四与十九、蟾宫玉兔走；三月初一又十六、龙女会柳毅；四月初二十五二十九、银蛇走三周；同间切星五月十二二十五、天马行空来往独；六月初

十二十三、苏武牧羊不知年；七月初八二十二、悟空闹天河；八月初五与十九、雄鸡一唱天地久；九月初二又十六、杨戬纵天狗；十月初一十四二十七、八戒娶妻；效十一月十二二十五、弥勒走失金飞鼠；十二月初九二十四、牛郎会织女甘

The English translation of the ‘Tide Song’ is:

‘In January, there are two spring tides, on 7 January and 21 January, with high tides starting from three AM to five AM. In February, there are two spring tides as well, on 4 February and 19 February, with high tides starting from five AM to seven AM. In March, there are two spring tides on 1 March and 16 March, with high tides starting from seven AM to nine AM. In April, there are three spring tides on 2 April, 15 April, and 29 April, with high tides starting from nine AM to 11 AM. In May, there are two spring tides on 12 May and 25 May, with high tides starting from 11 AM to one PM. In June, there are two spring tides on 10 June and 23 June, with high tides starting from one PM to three PM. In July, there are two spring tides on 8 July and 22 July, with high tides starting from three PM to five PM. In August, there are two spring tides on 5 August and 19 August, with high tides starting from five PM to seven PM. In September, there are two spring tides on 2 September and 16 September, with high tides starting from seven PM to nine PM. In October, there are three spring tides on 1 October, 14 October, and 27 October, with high tides starting from nine PM to 11 PM. In November, there are two spring tides on 12 November and 25 November, with high tides starting from nine PM to 11 PM. In December, there are two spring tides on 9 December and 24 December, with high tides starting from one AM to three AM.’

The ‘Tide Song’ was originally passed down orally among the local villagers in Hainan, who spoke the Hainan dialect. With the influence of urban civilization in modern China, there is now a written version of the Chaozhou song in Standard Mandarin. Hainanese belongs to the Min Nan language group, and the formation of the Hainan dialect is directly related to the large-scale migration of people from Fujian to Hainan. According to Fu Yuchuan’s ‘Ancient Migration and Hainan Dialect’, it is believed that Hainanese evolved and developed from a certain dialect brought by the dominant number of Fujian immigrants, and later underwent further changes influenced by other local dialects. Similarly, Taiwanese Hokkien is also a variant of Min Nan language, which has been influenced by the significant influx of Fujian immigrants.

CONCLUSIONS

The outstanding difference stone tidal weirs in Hainan Island is the conversion of stone tidal weirs into fish ponds. While cases of such conversion, like those observed in the Hawaiian Islands, are known, some argue this should be viewed as a common development trend for stone tidal weirs to become fish farming areas (Nishimura 1981). Similar observed exist for Hong Kong Island.

In the past, stone tidal weirs were used as a means of fishing activity in coastal areas, but they faced damage and destruction. In traditional societies, the repair of broken stone tidal weirs was commonly done by the community at the clan level. However, as the fishing catch in stone tidal weirs has decreased, such communal work has diminished. Rapid coastal development at a national scale has led to the abandonment and disappearance of stone tidal weirs, without thorough investigation, causing them to rapidly vanish worldwide. Furthermore, the impacts of recent ocean climate changes, such as sea-level rise and destructive storms, have become the greatest threats to stone tidal weirs. The situation is similar for stone weirs in Hainan Island.

In the Penghu Islands located in the Taiwan Strait, conservation efforts are underway for stone tidal weirs as cultural heritage. Extensive surveys are continuously conducted, and the results and statistical data are being compiled into a database. Additionally, conservation of stone tidal weirs is supported, considering its direct connection to marine resource conservation. Restoration activities for stone weirs are sponsored, and linked to cultural and ecological tourism (Lee 2017). In Hainan Island it is necessary to transform the historical and cultural value of stone weirs into practical tourism value. With the development of tourism, the establishment of an economic foundation through the maintenance and conservation of stone tidal weirs becomes possible, thereby increasing awareness for the protection of marine resources.

However, the following principles are essential. First of all, the use of stone tidal weirs must adhere to the fundamental principles of cultural heritage preservation. So development activities that would damage stone weirs as cultural assets are not allowed. Secondly, based on the *UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage*, not only the stone tidal weirs themselves but also the coastal landscapes where stone tidal weirs exist are maritime cultural landscapes or seascape and should be protected. It is not possible to isolate stone tidal weirs from their surrounding environment, and while ensuring the integrity of the archaeological site without interfering with the stone tidal weir remains, the good condition and integrity of the ecological environment around the stone weir site must be ensured. Improving the surrounding ecological environment in conjunction with stone weirs is necessary to maximize the preservation of their historical and cultural value. Thirdly, in terms of tourism, ‘experience’ is the keyword. The development of stone weirs as a tourism resource should go beyond mere observation or listening to guide explanations. It should involve excavating the essence of stone tidal weir culture, assimilating tourists into the stone tidal weir experience, enhancing the level of tourist participation, and increasing the attractiveness of stone tidal weirs as a tourism resource. Tourists can have unique experiences by participating in fishing activities and restoration work at stone tidal weirs, gaining special experiences not available in their daily lives. Many tourists seek distinctive experiences. Finally, while utilizing stone weirs as a tourism resource, it is necessary to protect the marine resources in the surrounding sea areas for the conservation of stone tidal weirs. Collaborating with local governments, marine protected areas should be established for the release of fish and shellfish larvae into these protected areas. This would open the path for the revival of stone tidal weirs as traditional fishing and allow tourists to actively participate in fishing activities. Stone tidal weirs in Hainan Island should transcend traditional fishing and be passed down to the next generation as cultural or tourism resources.

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