Three Gorges Tourism: Boom or Bust?

A study by

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April 2012

PROBE INTERNATIONAL EDITORS: PATRICIA ADAMS AND LISA PERYMAN
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FOREWORD
BY
PATRICIA ADAMS AND LISA PERYMAN
PROBE INTERNATIONAL

Did China’s Three Gorges Dam provide a lift to tourism, as trumpeted going into the vast project by its creators?

To complete the world’s largest hydropower project to date, the gargantuan Three Gorges Dam drowned out villages, towns, cities, biodiversity, wildlife, and sites of ancient historical and cultural value. But the undertaking was also expected to, among other benefits and triumphs, expand the region as a site of interest to visitors. It was said, tourists would be able to savour, in greater safety and comfort, China’s legendary Yangtze River along waters, once rushing and dangerous, now tamed by the dam’s 660-km-long reservoir. It was said hitherto dangerous scenic areas could now be accessed, even though the original view of the Yangtze’s famed steep bluffs had been reduced by the dam’s completion and many of its former wonders, lost.

Was it worth it?

A new study, and the first of its kind, looks at the effects of the Three Gorges Dam on sites of interest to tourists in the project’s reservoir area, describing changes to scenery, as well as documenting the impacts of a constantly rising and falling reservoir water level – at its uppermost of 175 metres above sea level, by comparison to its lowest level of 145 metres.

This unique monitor was produced by Professor Chen Guojie, a prominent scientist and longtime chronicler of the Three Gorges Dam’s impacts, at the Chinese Academy of Sciences’ Institute of Mountain Hazards and Environment, and two Chengdu-based researchers who are currently working at the Chengdu University of Information Technology and Tourism Planning and Design Institute of Sichuan Province, respectively.

Professor Chen and his researchers set out to investigate the economic impacts to tourism in the dam reservoir’s drawdown zone—the shoreline, or, in this case, riverbank margin that is alternately exposed to air and submerged when the dam reservoir drops to accommodate flood waters and rises to generate power. Between February 5 and February 19, 2011, they surveyed 22 public attractions when the reservoir water level was between 170 and 172 metres. The researchers made another trip to the reservoir area between July 22 and July 29, 2011, when the level was around 140 metres. The attractions surveyed included towns, villages, canyons and riverbank areas. The data collected forms the basis of this report and illustrates the benefits and losses, with hundreds of photographs taken in support of their findings.
For the most part, Professor Chen and his team of researchers found that the constant rise and fall of the dam’s reservoir have turned what should be inviting tourist landscapes gray and dull; killing essential, as well as scenic plant life and vegetation that cannot withstand the fluctuations; cycles that have also worn away riverfront areas and even buildings, causing soil erosion and, at worst, landslides, and the weakening of cliff faces. For example, in Lepingli, Zigui County, the birthplace of China’s famed poet Qu Yuan, a large landslide occurred as a result of fluctuating reservoir levels. Meanwhile, the flow of dead vegetation, human refuse and wastewater discharge from boats and restaurants into the reservoir, produces a mixing pool of pollutants that encourages bacteria, parasites and mosquitoes to breed, which, in turn, increases the threat of disease. Tourists drawn to the area to see for themselves China’s greatest engineering marvel and the world’s most giant dam, expecting to discover a Yangtze transformed and a more modern China, instead, are faced with landscapes robbed of their former vitality and unique flavour, overtaken by bland urban centers, factories and towering skyscrapers, and a once spectacular mountain-and-water tourist idyll, showcasing small rural Chinese towns, fishermen, birds and monkeys: gone.

The advantages of change are not ignored by Professor Chen and his team, either. Positive transformations are noted, along with recommendations for future growth. Projects currently underway to manage problems are observed.

But, as Professor Chen and his research team have found, there is little doubt that the drawdown zone created by the dam’s operation has taken a toll on the project’s massive reservoir shoreline. By documenting what the populations living around the reservoir already know, there can be no denying that immediate attention and remedial efforts to protect the biota, the population, and the economy of the Three Gorges reservoir area will now be needed.
The impact of a rising and falling Three Gorges Dam reservoir level on tourist landscapes

By Professor Chen Guojie, Bao Wen, and Mai Ling in Chengdu, China
Translated by Benjamin Zivan and Mu Lan
Edited by Lisa Peryman
Probe International
April 2012

1. Changes to the Natural River Bluff Scenery

The Three Gorges portion of the lower Yangtze River is a unique corridor of changing river scenery that runs between two cities in central and southwestern China. Framed by limestone bluffs, sculpted by time, the Yangtze’s river sides famously ranged from sheer inclines to massive mountains, to long sloping riverbanks. This Three Gorges bluff landscape is now reduced, and submerged in parts, by an enormous reservoir lake created by the Three Gorges Dam, located near the mouth of the lowest of the Three Gorges at Sandouping, the middle stretch of the Xiling Gorge, about 40 km upstream of Yichang city, at the west of China’s Hubei Province, where the middle and upper reaches of the Yangtze River are divided. The reservoir’s artificial lake extends nearly 600 km upstream to the city of Chongqing in southwest China, the economic centre of the upstream Yangtze area.

(a) Industrial districts
The Three Gorges Dam Construction Fund was, in part, created to help resettle river populations displaced by the dam, many of whom found themselves moving on up (literally) to newly sprung or expanding urban centres along the sides of the Yangtze, in the reservoir area. The project fund was also reserved to promote business development in the region, which was expected, in turn, to help drive the reservoir area’s economic growth and provide mass employment for resettled and increasingly urban communities. That plan, however, ran into problems when the fund was depleted early on, leaving local governments and business operators without money for development and jobless migrants coping with a reduced standard of living. Industrial districts emerged as a way to
stimulate growth. Each of the 25 county-level divisions in the Three Gorges reservoir area developed its own industrial belt close to the Yangtze’s riverbanks. These industrial zones have since helped political administrations throughout the region to establish policies for sustainable development—for instance, the replacement of old factories with less polluting alternatives, provide employment and generate tax revenue for economic vitality. Examples include: Wushan Industrial Park District, Yunyang Industrial Park District, Fuling Industrial Park District in Lidu New Zone, Fengdu Shuitianping Industrial Park District, and Zhenjiang Fine Chemical Industrial Park District.

(b) Cities and towns
Rapid urbanization and resettlement occurred in certain locations, such as urban Chongqing, Wanzhou, Fuling, Fengjie, Yunyang, Kaixian, Fengdu, Changshou, Wushan, Zigui, Guizhou, Zhongxian, Shibaozhai, and the ancient hometown of Wang Zhaojun (a historical figure celebrated for her great beauty), among others. Densely populated areas in the process of rapid development, such as these, produce high levels of solid waste, industrial and residential runoff, and serious atmospheric pollution. These issues have become the most pressing ecological problems for the margin of land along the riverbanks in what is called the drawdown zone—the margin of the shoreline or, in this case, riverbank that is either exposed to air when the reservoir is lowered to 145 metres above sea level to accommodate incoming floodwaters, or submerged when the reservoir is raised to 175 metres to generate power. Exposure to air has a major impact on the plant and animal life found in these locations, which transition from an aquatic to a terrestrial environment. These issues have become the main focus of ecological remediation programs in the reservoir region.

Taking Wanzhou, a mountainous city known as the gateway to East Sichuan, as an example, construction in this area along both sides of the Yangtze River is in full swing. The city has become the centre of dynamic economic growth in Wanzhou (District) and the surrounding area (Image 1). Likewise, a growing awareness of Shibaozhai, a scenic fortress attraction in Zhongxian
The cliff sides reveal a sad, white sparseness and serve as a reminder of the tremendous difference in visual impact inundation has caused.

(c) Changes to the landscape: from peninsulas to islands
Many tourist attractions in the Three Gorges reservoir area were completely flooded when the dam reservoir was filled. Some, such as Baidicheng (Image 4, aka the White King City) and Shibaozhai (Image 5), were only partially flooded by the rising reservoir level. These two well-known tourist attractions become islands when the water level is at its highest, and peninsulas, when lowered. Bridges and a ferry, in the case of Baidicheng, provide a connection to the mainland, for the convenience of tourists.

(d) Changes to the landscape aesthetic
Qutang Gorge is the shortest and most majestic of the Three Gorges. Located upstream of the Three Gorges Dam, it runs 8 km between Baidicheng in Fengjie County to the west and Daxi of Wushan County in the east. On its way to Fengjie, the Qutang Gorge reaches a very narrow pass at Kuimen, the western entrance to the Three Gorges. Here, the cliffs either side of the gorge measure less than 100 metres across and cut dramatically in a sheer sweep skyward, as though carved by a knife. Before the construction of the Three Gorges Dam, a description of the once intoxicating scenery provided by Qutang at Kuimen would have listed a skyline, rushing water, tall waves and steep mountains (Image 6). A description today might simply read: subdued. Though not without beauty, at times when the level of the dam’s reservoir lake is raised, the mountain peaks at Kuimen, either side of the gorge, dwindle remarkably in height, losing much of their former awe. The cliff sides, when exposed by the lowering of the dam reservoir, reveal a sad white sparseness and serve as a reminder of the tremendous difference in visual impact inundation has caused (Image 7).

A more devastating decline has occurred at White Crane Ridge, located in the upper Three Gorges reservoir area, north of Fuling District in the middle of Chongqing.
Municipality. White Crane Ridge is a massive sandstone reef famous as a marker of the Yangtze River’s flow for 1,200 years. So-called because of the white cranes that used to gather on it, the reef, which would emerge every winter when the river level dropped, bears the carved images of fish and notations locals inscribed to mark water level changes from one year to another. The only remaining, ancient hydrological station in the world—deemed by UNESCO to be “the world’s only completely preserved ancient hydrological observatory” (Image 8)—the 1,600-metre long and 15-metre wide site reveals a river tide history dating back to China’s Tang Dynasty in 763 to the early 20th century. Since being submerged by the Three Gorges Dam, this reef is now preserved as an underwater museum built about 40 metres below the surface of the Yangtze. Although visitors can descend through an underwater passageway to observe the archeological treasure through glass portholes, the site has ceased its function as a hydrological observatory, now that the museum’s above-ground portion has been covered over by cement columns that descend into the water to strengthen the building against reservoir fluctuations (Image 9). Meanwhile, inside, the thick, glass viewing portholes that line the museum’s underwater viewing corridor prevent a full appreciation of the preserved inscriptions, and the severe, institutional character of the corridor itself hinders what enjoyment there is, often causing visitors to feel depressed instead of inspired (Image 10).

2. The Drawdown Zone

(a) Arable land
Before the damming of the Yangtze, arable land close to the banks of the river was considered very valuable agriculturally as the soil here was relatively porous and fertile. It should be noted, this land was often cultivated by the most vulnerable farmers in the region. Since being transformed into the dam reservoir’s drawdown zone, this land is now beset by environmental problems. Rapid soil erosion is the most prominent and has led to other natural disasters, such as landslides. In addition, the changed soil releases large amounts of nitrogen and phosphorous into the water, which can cause eutrophication—an excess in nutrients that often leads to algal blooms, and a problem for marine habitats. (Images 11-12).
(b) Parkland and green spaces
For the most part, this refers to land cultivated for fruit orchards and forest land. The drawdown zone has since turned these green spaces into sloping fields that, on a positive note, proffer a relatively high potential for wetland cultivation. It would be possible to plant a variety of economically viable trees, shrubs, herbs and other vegetation in these areas, and a major portion could also serve as a protective green barrier and a ‘floating forest’ landscape.

(c) Floodplains
The natural floodplain of the Three Gorges region is low-lying and flat. While most of it was submerged by the dam reservoir, the portions that are at relatively higher elevations are now frequently exposed and, in the dry of summer, become mere bands of bare mud. These areas are, nevertheless, readily accessible to riverbank dwellers, who use the exposed land for crop cultivation, where possible, or as inlets for washing laundry. The ecosystem is very unstable in these former floodplain zones and is the focus of ecological remediation programs which prohibit temporary or permanent structures (with the exception of transportation facilities), dumping, and illegal digging and filling, for example.

(d) Urban areas in the drawdown zone
Urban areas close to the reservoir area’s drawdown zone, with a minimum of plant life, now host extreme environmental pollution including high levels of runoff, exposed stone and floating garbage. These barren and unattractive drawdown margins, that run either side of the Yangtze, obviously do nothing to enhance the scenery for tourists, or residents.

(e) The difficulty of using the drawdown zone
Some parts of the Three Gorges drawdown zone are very difficult to make use of, in particular, land which is too steep, gravelly, or barren to cultivate (Images 13-14). The value derived from use of these parts is quite low. In addition, these areas are the most ecologically unsound because of their steep slopes and vulnerability to soil erosion and massive landslides, avalanches and other geological disasters.
3. Construction

The Three Gorges Dam reservoir region faces a number of fundamental obstacles to development: a fragile environment, a scarcity of land relative to population size, overcrowding and a low ecological capacity. Along with the rapid emergence of cities in close proximity to the Yangtze River, the type of architecture built close to the river, in the drawdown zone (which must take into account the area’s steep slopes) is diverse in range and quality and profoundly alters the continuity of the landscape. Within the vicinity of the drawdown zone lies every kind of construction, unplanned in nature, leaving the landscape visibly haphazard.

(a) Bridges
Bridges are an important part of the reservoir area’s transportation infrastructure. Not only do they reduce the travel costs of local residents, but they also serve as independent elements of interest and beauty, actually enhancing the riverbank landscape (Image 15).

(b) Ports and harbours
Ports and harbours are the most common elements of the reservoir area’s transportation infrastructure. They play a significant role in urban development and tourism, the flow of goods, as well as population movement, and have become representative of the architectural landscape often found in the drawdown zone. On the one hand, the construction of ports and harbours has served to promote land development. On the other, they exert an even greater pressure on the ecology in these areas. It should be noted that ports and harbours in the reservoir region, by comparison to ports and harbours in other regions, are unique in their abilities to cope with changes in dam reservoir levels (Images 16-20).

4. Managing the Drawdown Zone's Impact

(a) The Shibaozhai model
Shibaozhai, located in Zhongxian County on the north bank of the Yangtze River is one example of how to preserve a tourist attraction from water level fluctuations. Featuring a 12-storey tower built atop Yuyin Mountain in the Wanli...
Period of the Ming Dynasty, the building once served as a stockade and remains one of few existing wooden structures built in China. As part of a policy to preserve it, a cofferdam project was undertaken to protect the base of the site from the Three Gorges Dam reservoir’s highest water level which, in effect, now renders the attraction a lone miniature landscape in the middle of the Yangtze—drawing comparisons to a giant bonsai surrounded by water. (Image 21).

(b) City dike reinforcement model
In some densely populated areas located alongside the Yangtze, particularly those on the edges of cities and ports, flood management mostly consists of sloping dikes made of concrete and stone, which serve to strengthen and reinforce the banks of the Yangtze (Images 22-26). Dike reinforcement, however, has led to a grayed landscape robbed of colour in the drawdown zone, which also prevents the possibility of environmental remediation of this land in the future. Meanwhile, the original bends in the river, its shallows, and wetlands vanished because of the gray concrete and stone dikes constructed along the reservoir shore. With concrete reinforcing the riverbanks, wildflowers, plants, marshes, frogs and dragonflies have disappeared. All of these changes have had detrimental effects, including the death of once vibrant bay and riverside areas. The Yangtze, in these parts, is also not as safe as people can now easily fall in and the water is more prone to contamination, thus further diminishing the scenic value of the landscape.

(c) The impact on natural landscapes
The vast majority of land in the reservoir region’s drawdown zone remains undeveloped and in its natural state. These landscapes on either side of the Yangtze include natural rock formations, rock cliffs, uneven sandstone sloping banks, wild areas as well as man-made harbours and makeshift docks, mostly unplanned in their construction (Images 27-29). When the dam reservoir is lowered, barren stretches of land become visible, which not only degrade the scenic panorama but also degrade the natural environment. At relatively low altitudes, the drawdown zone on either side of the river is submerged for longer and, after a significant drop in the reservoir water level, the exposed bare rock appears visibly rubbed raw and
irritated, as though the river’s sides were under attack from “psoriasis.” The overall effect is completely at odds with the surrounding landscape.

5. Types of Environment

The artificial rising and falling of the reservoir level differs greatly from the original flow and rhythm of the Yangtze before damming. As a result, changes to the environment have severely diminished or altogether wiped out native vegetation in the drawdown zone, leaving two major environmental consequences to the Three Gorges region.

(a) In the gorges
Gorges throughout the reservoir region bear a permanent watermark from the standing reservoir water, which is visible when the reservoir level is lowered. This presents a major impact on the scenic landscape tourists see by boat (Images 30-32). As the slopes of gorges are relatively steep, trash, weeds and other pollutants tend to flow away with the water when the reservoir level drops. Although this damages vegetative systems, the harmful effect of the drawdown on these relatively stable sloped cliff sides is relatively less.

(b) In the valleys
The drawdown zones in the valleys throughout the reservoir region feature gentler soil slopes (Image 33). But with the rising and falling water level of the reservoir, a constant threat is produced: soil erosion, a problem that could result in the collapse of the reservoir’s banks in these parts. Another threat is caused by seasonal changes to water levels: in winter, the growth of vegetation is inhibited when water levels are high, but in summer, when water levels are low, pollutants in the water become embedded in the underlying sediment. These pollutants, which have soaked for around half a year at a high water level, produce quite a stench when exposed in drier weather. They also promote the breeding of bacteria, parasites, and mosquitoes, which can even lead to disease. These pests can also remain a problem the entire year long, further diminishing water and air quality overall.

The artificial rising and falling of the reservoir level differs greatly from the original flow and rhythm of the Yangtze before damming.
6. Changes to the Scenic Landscape

(a) Forests
The drawdown zone, exposed by the rising and falling reservoir, is the most ecologically fragile and threatened in the entire riverbank area. Vegetation in this zone is sparse and the ecosystem degraded, which does nothing to promote a scenic, vibrant landscape for tourists. In the Three Gorges area, the drawdown zone exposes 30 metres of riverbank slope that was once suitable for vegetation, but now is bereft of signs of life. And though projects to promote reforestation and protect the forest ecology above the drawdown zone have gradually improved the forest ecology, they have also highlighted the stark contrast with the gray or grubby looking barren strip of land revealed when the reservoir level is lowered (Image 34).

(b) Tourist landscapes: the impact on scenic value
The effect of the Three Gorges Dam on the reservoir region’s drawdown zone—the sightline of tourists traveling the Three Gorges area by boat—has not been given sufficient attention, nor have there been studies undertaken to assess how changes to this zone have impacted tourism in the area. Given that China’s Three Gorges is a world-class gorge landscape, visible environmental impacts are of crucial concern to the tourism industry. For example, as a result of seasonal water level fluctuations—the high water mark in the flood season and the low water mark in the dry season—as well as changes to the riverbed caused by rapids, vegetation in areas near the reservoir’s drawdown zone have been negatively affected. Wind damage has also exacerbated the problem of poor plant growth and contributed to a deterioration of the waterfront landscape. The fluctuating water levels have also turned the drawdown district into a mixing zone for various pollutants, further contributing to a deterioration of the riverside scenery (Images 35-42). Whether scenic waterfronts, like Qu Yuan’s old residence across from the Three Gorges Dam, or Wang Zhaojun’s ancient hometown, the Little Three Gorges in Wushan, the scenic district of Shibaozhai in Zhongxian County, or the scenic waterfront landscape districts of any other coastal city in the reservoir area, their drawdown zones are all gray from dead vegetation and the never-ending changes to the Yangtze’s riverside slopes. These are all factors that severely impact the aesthetic value of the landscape, and thus tourism.
7. Threats to the Environment and Public Safety

(a) Environmental Pollution
As the transition zone between the aqueous and terrestrial environments, the drawdown zone is prone to pollution from both above and below. Due to the effects of wind and fluctuating reservoir water levels, aqueous pollutants, as well as litter, can migrate to both sides of a riverbank in a drawdown zone. When water levels are low, dead vegetation might be burned off in an attempt to tidy and beautify the surrounding area but this further exacerbates existing pollution problems. At the same time, some of the nutrients from the water will enter the lower part of the drawdown zone’s soil, leading to eutrophication. As the Three Gorges reservoir area is densely populated, vast amounts of garbage and waste, in addition to industrial and sewage runoff, enters the reservoir after passing through the drawdown zone, and pollutes the water (Images 43-46).

(b) Soil erosion
The mountainous cliff sides throughout the Three Gorges reservoir region are responsible for a remarkably steep terrain—74% of the land area proffers a slope of 15 degrees or more. These steep slopes and the substantial height difference between the peaks of the mountains and cliffs and the river valley below, both aggravate erosion. Unfortunately, areas with steep slopes erode more easily when impacted by rainfall and water level fluctuations. This, in turn, kills off the protective vegetation along the slope surface of the drawdown zone and destroys the underlying soil structure. In the absence of protective vegetation, the process of soil erosion is quickened by rainfall and surface runoff. As soil in the drawdown zone is composed primarily of purple earth and limestone, the quality of its structure and stability are poor to begin with. Because the original vegetation has been unable to adapt to rapid changes in the habitat brought about by the Three Gorges Dam, vegetative coverage of the area has dropped sharply. Frequent changes to the dam reservoir’s water level, in addition to the effects of seasonal change, leaves most of the drawdown zone barren in summer. Runoff created by summer rains has also contributed to the overall erosion of soil slopes in the Three Gorges reservoir area. Waves from the flow of water also sap the soil of its stability, only adding to the problem (Image 47).
(c) Destruction of Plant Diversity and Ecosystems
Sensitive to flooding and unable to adapt, native plants and animal life in the drawdown zone, have gradually disappeared. Organisms natural to the water environment are also dwindling in numbers due to the seasonal bareness in the drawdown zone. Because plant life throughout the drawdown zone has diminished dramatically as a result of the Three Gorges Dam, the stability of the region’s overall ecosystem has been undermined and its vulnerability to harm has increased (Images 48-54). Compared with pre-flooding plant life, the diversity of plant life species in the drawdown zone has dropped sharply.

(d) Geological Disasters
The topography of the drawdown zone is, for the most part, steep and the cliffs that run alongside the river are unstable. This, when combined with overcrowding of the reservoir’s riverside areas and an increase in human activity in these parts, has turned the reservoir region into one of the most disaster-prone environments in China. After the Three Gorges Dam reservoir began operating, the periodic submersion of cliff faces caused the proportion of water to rock in the cliff composition to increase sharply. As a result, cliff structures have been weakened and this has induced collapses, landslides, as well as rocky mudflows, all of which pose a serious threat to the lives and property of people living along the sides of the reservoir. In Leping Village, located half a dozen kilometres upstream from the west entrance of Xiling Gorge in Zigui County—famous as the hometown of China’s legendary poet Qu Yuan, born in 340 BC—a large-scale mountain landslide occurred. Records do not show rainfall or human activity as a factor preceding this event, which leads us to speculate that the cause of this landslide is related to the flooding of the Three Gorges reservoir.

8. The Resettlement of Displaced River Populations: A Growing Problem

The problems associated with the Three Gorges Dam resettlement are not the primary focus of this report, but any investigation of the stresses on the reservoir region’s drawdown zone is closely related to the relocation of displaced river populations. Many of the migrants who
originally relied on agriculture are not like the urban migrants. With their farmland lost to the reservoir and opportunities for work in industry limited, many of those who have settled on higher ground can only find work in the tourism industry and related sectors such as services, food and beverage, hospitality, transportation, and souvenirs. Coupled with the relative scarcity of local resources and necessities (especially vegetables and grain), the majority of these rural migrants rely on imported goods. Their cost of living is high, and so is the pressure to survive. The land available to house and provide a livelihood for the vast number of migrants is of poor quality and lacks proper irrigation facilities. Meanwhile, the poor quality of resettlement housing will not solve their destitution in the short term. The conflicts over land among migrants and host communities are legion, and have seriously hampered the development of the reservoir district’s agricultural industry and dampened improvements in migrants’ incomes. Because rural migrants are limited in the ways they can generate income, their quality of life has experienced a steady decline.

In the town of Maoping—located a few kilometers west of Three Gorges Dam on the high southern shore of the Yangtze River—a manager at the Qu Yuan Birthplace Scenic District said the proportion of migrants from the area who had returned since being relocated, and now lived in purchased real estate, was extremely high. These frequent return migrations further exacerbate tensions between the land and people, in addition to inflating the price of real estate.

In Kaixian County, the government even encourages industries designed to lure migrants back, as well as help them purchase homes. These incentives are in place to help meet the official “magnificent objective” of increasing the county’s population from around 200,000 currently to 500,000 by 2020.

The migration “reflux” problem refers to the phenomenon of migrants returning to their original homes—a pattern that constitutes a secondary kind of migration. A number of reasons are cited for their return: the poor conditions of resettlement locations; the failure of the resettlement...
authority to fulfill promises made based on misleading reports that encouraged their migration; difficulties experienced in leaving their homelands; shady government management of some migrant land, and an incompatibility with their new circumstances. It should be noted that the term “reflux” does not mean that they are “returning” to a place of belonging. Migrants’ residency permits authorize them only to live in the areas to which they were resettled. As such, returning migrants often find themselves without a legal place of residence. They are not counted by local government administrations because their hukou (or household registration) lists them as legally residing in the areas to which they were resettled, often in remote provinces, which leads to a plethora of new social problems.

**Conclusion**

The drawdown zone created by the operational fluctuations of the Three Gorges Dam has had a profound effect on the project's massive reservoir shoreline. Little attention was given to the ecological, economic, social and public safety consequences of the disturbances to this ecozone and to the human land use patterns that have evolved there over centuries. As with so many of the other problems that have emerged with the construction of the Three Gorges Dam, the problems highlighted in this study call for immediate attention and remedial efforts to reduce their impact on the biota, the population, and the economy of the Three Gorges reservoir area.
ENDNOTES

1 In 1992, the Chinese government implemented a tax on all electricity bills to raise money to pay for the Three Gorges Dam. In July of 1992, the State Administration for Commodity Prices issued a document which imposed an increase of .003 cents for every kilowatt-hour of electricity consumed nationwide for the Three Gorges Construction Fund. At that time, the State Planning Commission, the State Department of Energy, and the State Administration for Commodity Prices stated that .003 cents could only be used for the construction of the Three Gorges Dam. However, by 1994 and 1996, the fee rose to .004 cents and .007 cents respectively. Currently, Shanghai, Jiangsu Province, and Zhejiang Province have the highest levy at 1.5 cents for every kilowatt-hour consumed, with Anhui, Hunan, and Hubei provinces right behind at 1.3 cents. Although the increase seems very small, when multiplied by a population of 1.4 billion, the amount is sizable.

2 In surface water hydrology and civil engineering, drawdown refers to the lowering of the water level in a man-made reservoir or tank.

3 To protect the riverbank, and prevent soil erosion.

4 The product of eroded purple sandstone and purple shale, named after its colour, found mainly in the subtropical region of China and in the Sichuan Basin, in particular.
**Image 1**: Wanzhou's rapid development on both sides of the Yangtze.

**Image 2**: A small town's rapid development along the Yangtze river, opposite the Shibaozhai tourist spot.
Image 3: Skyscraper construction along the river’s edge in Fuling.

Image 4: A view of Baidicheng from Kuimen.
Image 5: Shibaozhai when the water level is high.

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