CHAPTER SIX - DESIGNING FOR THE LAND

Introduction. I have worked in fifteen countries. This chapter describes work in four of these countries in which local people played important roles, but the land itself was the hero most in need of thoughtful and respectfully designed shaping and restoring.

Mackenzie River Highway Environmental Impact Study -1971. Working with Lombard North Planning, my most memorable experience in environmental impact evaluation was participating in the study of the proposed one-thousand-mile-long (1600km) highway along the Mackenzie River connecting Yellowknife, the capital of Canada's Northwest Territories on Great Slave Lake to Inuvik on the Arctic Ocean. We had two contracts. The first was to prepare an overview of the entire length of the proposed highway. The second was to study the upper third of the river corridor from Norman Wells past Fort Good Hope to Tuktoyaktuk on the Arctic Ocean. The mighty Mackenzie River is 6.5 km (4 miles) wide in places and becomes the only highway when it freezes during winter and trucks travel on deep ice. There is also limited barge traffic during summer. The river follows the eastern edge of the Mackenzie Mountains, the northern extension of the Rockies at 60-68 degrees north latitude. I was on the northeastern edge of the two great ranges extending south to Patagonia where we had traveled to 60 degrees south latitude in Patagonia.

Along the mighty Mackenzie the only widely separated settlements were associated with natural gas operations housing fly-in-fly-out technicians. The local population were Native Canadians living traditional subsistence livelihoods. These include the Shuta Got'ine, An Athapaskan-speaking group on the Mackenzie Mountain slopes and along the Mackenzie River in the areas of Good Hope, and Norman Wells. The Slavey, a main Dene sub-group, also live along the Mackenzie River. Interestingly, the Navaho people of the American Southwest are descendants of the Dene and refer to themselves by that name, which simply means "the people".

We surveyed this vast site by float planes, frequently landing on the river and staying in gas well camps. Float planes are noisy and cramped. Spiraling tightly while taking photos soon leads to motion sickness. Fortunately, the understanding bush pilot landed on the river occasionally, allowing my stomach to settle. The farther north we flew the more land turned to water with countless oval lakes formed over the permafrost (permanently frozen soi). A thick layer of moss and stunted black spruce insulates the soil, keeping it frozen during summer. Permafrost turns semi-liquid and very unstable when it melts, for example if this insulating organic cover is removed during highway construction. Engineers call areas of permafrost "ice rich soils." All road construction requires "ice-poor soil," the sand and gravel found in rivers and drumlin glacial formations. While these sources are commonly available they are also critical wildlife habitats. River gravel bars are critical resources for fish egg laying and gravel hillsides are critical habitats for bear and wolf denning. We were evaluating the possible biodiversity impacts of the road alignment suggested by the highway engineers. Suggested road alignment was directed from gravel source to gravel source to provide

needed ice-poor construction material. The engineers had aligned the future highway past what they thought to be a drumlin, an ice age gravel hill and excellent source of road gravel. Mr. Claude Muret, our aerial photo interpretation expert, identified this feature nots as a stable drumlin, but as an active “rock glacier.” This unstable hillside would constantly encroach on any highway cutting. The proposed alignment was then changed.

Completing our three days of float plane travel north, we landed in the hamlet of Tuktoyaktuk, an Inuvialuit word meaning "place resembling a caribou” and spent one night at the Mad Trapper Inn. Arriving late in the extended arctic summer daylight, I was able to enjoy seeing sunset over the arctic Ocean. Entering this cozy tavern, I was amazed to hear for the first time in high fidelity, Roberta Flack singing “Killing me softly with his song.” Hearing this hauntingly urban music in one of the most remote places in Noth America shocked me. The owner-bar tender, a young woman, told us she lived in Los Angeles, where she had access to the latest popular music, and worked up there for the summer season.

We were able to prove that this highway could not be built without serious environmental impact, and it has never been built, although there is now a road along the lower third of our route.

Moose Creek Dam Fairbanks, Alaska.

Figure 35. Photo of me posing beside super-sized plans for the vegetational renewal of Moose Creek Dam outside Fairbanks Alaska. We used big drawings for big projects in those days. Photo by Jones & Jones.

This was my first major work in ecological restoration or “rewilding” as it is sometimes referred to today. Working for Jones & Jones at the time, our client was the Alaska Office of the US Army Corps of Engineers. Mr. David Walters and I developed plans (report recommendations and landscape “soft engineering” drawings) for the revegetation of the 11km (7 mile) long Moose Creek earthen dam north of Fairbanks Alaska. The clients expected us to plant spruce trees to “beautify” their project. Instead, I converted the vast heavy-handed engineering design into ecologically based forms. The long, high dam structure and alignment couldn’t be changed and large areas of

northern riparian vegetation, mostly birch and willow, both up and downstream, had to be cleared. Tree roots were not allowed to penetrate the structural planted dam. In response, I showed filled areas added to side slopes where trees could be established. Straight engineered groundwater interception channels downstream from the dam were repatterned to resemble and function like local stream meanders. The corridor of clay channel lining placed by the engineers upstream from the dam to prevent water seeping under the dam would naturally be repopulated by native *phragmites* reeds. I also showed how acres of cleared forest debris, rather than being burned, could form river debris islands downstream, gradually to be converted to soil. These ecologically based strategies would allow natural boreal forest regeneration to take over the work of restoration. A single birch tree can distribute millions of seeds each year. Our strategies could save on substantial construction costs. These techniques were learned from my previous work in Northern Canada's Mackenzie River district and from ecological publications from the University of Alaska. Our plan was formally accepted, and I called the project a success until recent Google Earth photos showed me that our plan had been completely ignored.

Homer Hydroelectric Impact Study – 1982. The mountains of the Kenai Peninsula rises 305m (1000') above Kachemak Bay across from Homer Alaska. Lake water from this elevation could drop through underground tunnels to a proposed Swiss style (underground) hydroelectric plant at sea level. Nothing would be visible other than the overhead transmission lines leading away. I headed the Jones & Jones study to assess the environmental impact of this proposal. Dr. Dennis Paulson, our consulting ecologist, was unavailable so I contacted Dr. Steven Herrero, University of Calgary wildlife ecologist, to be our wildlife expert. Steven and I had collaborated on previous Canadian conservation efforts including our successful protests to prevent a high-rise sky resort from being built at Lake Louise in Banff National Park. Stephen had become a world expert in management of wild bears. Kodiak bears were common in this area as evidenced by many fresh footprints we found during our study. This was more of a camping holiday than ecological study. A float plane from Homer flew us to a high perched lake, where we camped, well supplied with fresh-caught local prawns. After a few days the float plane returned (with more fresh prawns) to take us to the far end of the same small lake, which was inaccessible by land. The following day the plane, with a canoe attached to one float, transported us down to Kachemak Bay to explore the nearby shore to assess the impact of the proposed powerlines. We wanted to keep the area entirely wild, but our study showed environmental impact could be manageable. Fortunately, from our perspective, this hydrological project was abandoned for financial reasons, and I am happy to see on Google Earth that the area remains undeveloped to this day. However, such an example of low impact sustainable energy supply may be superior to new energy alternatives for remote cities like Homer.

Jiuzhaigou National Park, China - 2007. After completing our work for the Giant Panda Center in Dongkoucao (please see Chapter 7), I was invited by Mr. Andrew Scanlon, project manager on the giant panda project, and Park Director Zhang Xiăopm

to contribute to planning Director Zhang's main interest, Jiuzhaigou National Park, also in Sichuan Province, This is one of China's most beautiful and popular national parks containing amazing azure lakes and travertine cascades surrounded by high mountain peaks. It is in a Tibetan ethnic region with wonderful cultural architecture. Visitors in their thousands arrived at the park entry complex. Most arrived in scheduled tour pusses with about forty passengers each and followed their banner waving guide to queue for the park buses taking them into the park itself. This vacation travel was very expensive by local standards and tours were tightly scheduled, with little free time. One result was that visitors rushed past the new interpretive center without entering. I was asked how to encourage more attendance in this exhibit and administrative building. I sketched a dramatic Tibetan style gateway in front of the otherwise unattractive entry which was well- built but had little effect. The existing large entry area was an anachronistic Western style park with rose bushes, trim boxwood hedges and potted annual flowers. Why not reestablish a beautiful native temperate forest landscape here for visitors to learn about the local ecology while enjoying natural shade in the long queue lines? Central Asian temperate forests are home to so many popular ornamental plant species, such as *Rhododendron, Camelia, Azalea, Buddleia*, and many species of cherry, birch and pine. Such a carefully curated forested area would be attractive, informative and provide the shade needed. It could also screen the long lines of visitors from each other. In a national park the spectacular landscape and relatively intact biodiversity should be the heroes. Or was this only my imported Western ideal? In speaking to a class of Chinese university students, I complained that most visitors were preoccupied in turning their back to the amazing natural views of waterfalls and azure lakes to take "selfies" with their phones. They missed examining the unique landscapes they came to see and experience. One student replied that this was the same in the USA. Sadly, he was correct.

Flying from the regional capital of Chengdu to Jiuzhaigou National Park required landing at Jiuhuang Airport on the Tibetan plateau with an elevation of 3,448 m (11,312 ft). Oxygen masks are provided to arriving passengers when needed. The drive down to the park entrance at elevation1,990 m (6,529 ft) takes about 1.5 hours by car. This is a beautiful drive with only one billboard posted along the way. I was invited to give a talk at a tourism conference hosted by the park as an "expert in national parks." During this presentation in front of a room filled with important Chinese officials, I recommended the highways leading to Jiuzhaigou National Park be officially designated as National Scenic Highways. I suggested the revenue gained for high quality tourism would be far greater than earned by billboards, which would not come to the government in any case. I was pleased to see nods of agreement in the front several rows occupied by the most important officials. I assume nothing came of this initiative but wonder at how close I may have come to having an important effect on Chinese national open space management policy.

Although I made four visits and produced many creative ideas, few were realized. The only recommendation followed was to close the well-used back gateway which

channeled visitors staying in the town past many staff areas. This was hardly a proper entry experience to a national park. While all my recommendations and supporting sketches were carefully reviewed by Park Director Zhang Xiăopm, this was the only recommendation implemented. I mention this work, and the takin wildlife study that follows, as examples of projects where the impact of the experience was largely to my benefit rather than to the park users. I enjoyed enormously these opportunities to study and experience the Central Asian temperate forest myself. Also, my introduction to Chinese Tibetans and their modern-day culture was notably rewarding.

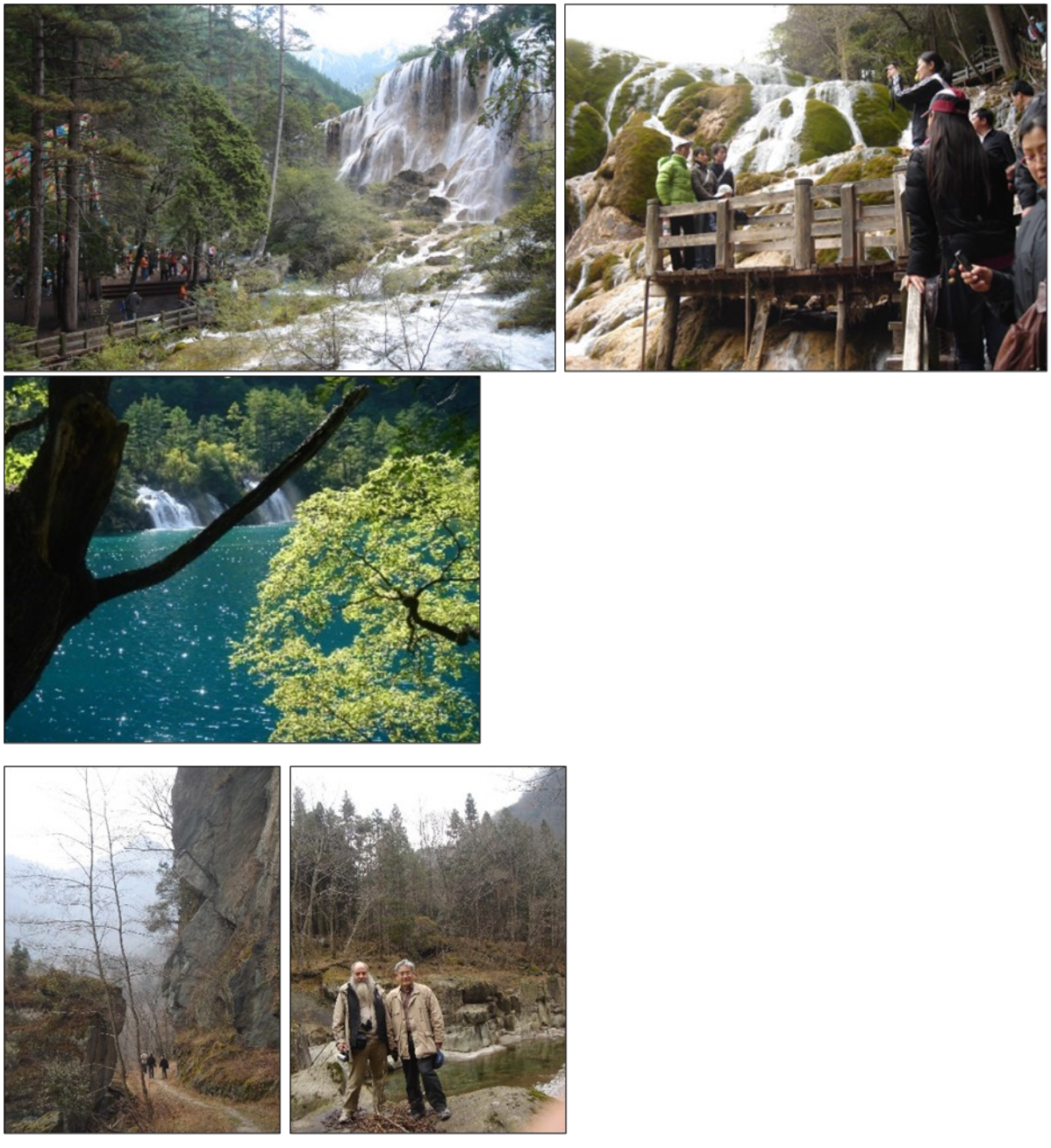

Figure 36. Top row: natural travertine dam and cascade, a rare geology I also later found in Afghanistan. Tourists queuing to have their photos taken in front of the scenic attraction rather than observing it

themselves. Centre: clear, azure travertine lakes surrounded by Asian temperate forest. Bottom row: Tangjiahe National Nature Reserve and early spring site photo with Mr. Keith H. J. Kuo, landscape architect from Taiwan.

Tangjiahe National Nature Reserve¸ China - 2008. I was invited, together with Mr. Keith H. J. Kuo, Architect, Landscape Architect and Planner with EDG International of Taiwan and previous head of Tiawan National Parks, to develop a master plan for Tangjiahe National Nature Reserve in the Min Mountains along the northern border of Sichuan, China. This was one of the last refuges of the Sichuan or golden takin. These are relic ice age beasts phylogenetically midway between North American mountain goats and arctic musk oxen. In summer takin disperse into surrounding mountain slopes. In winter they concentrate in large herds in the narrow 'Y' shaped valley. This winter refuge is essential to their survival. The Chinese government, keen to increase nature tourism to replace jobs lost to reduced logging, planned to convert this fragile valley into a tourist park. They insisted, despite our objections, that we locate the main park accommodation within the narrow valley rather than outside it.

Keith and I discovered through our own exploration that takins, like zebras in the Serengeti, take little note of people in vehicles, but immediately take fright from people on foot. We designed the tourist centre as a walled enclosure containing tourists, who were to be guided through the park in narrated tour buses. Takin were to be attracted to roadsides by the provision of browse forage plants grown and distributed by local farmers. This would be a highly managed facility, part free-range zoo and part nature park.

I completed our strategic plan report with Keith's review, and we both returned to present our plan to park authorities. We gave our presentation through translators. Then, after a long afternoon of speeches in Mandarin without translation, we were dismissed. Later Keith, who spoke Mandarin, told me our recommendations had been discarded. We were what Keith called "trophy experts", foreigners brought in for show and then ignored. There is hope for the takin. High tourist season is during summer when they are dispersed on the high slopes. While this outcome remains vexing, I did see and learn firsthand about these amazing beasts, the landscape supporting them and the misguided policies threatening them.

Band-e-Amir National Park Visitor Facilities Zone Physical Development Plan - 2011. On my first visit to Afghanistan with UNEP in 2009 (please see Chapter 8) I saw an unexpected familiar face in the hotel bar, Mr. David Lawson. David was the Northern Territories client when I worked on the Territory Wildlife Park planning in Darwin, Australia in 1998. He was now Head of Mission for the Wildlife Conservation Society (WCS), the international conservation arm of the Bronx Zoo. WCS had charge of development and management of Band-e Amir National Park, Afghanistan's first and only national park at the time. They were also doing endangered wildlife research in the high Wakhan Corridor in Northeast Afghanistan.

This 720 square kilometer National Park, established in 1987, features a high plains ecosystem at about 3000m (10,000ft) elevation. The focus of this semi-arid rolling landscape is a stunning system of six interconnected travertine lakes. These were formed when groundwater moves through calcium-rich soil creating super-saturated water, depositing travertine (hard limestone) when this water evaporates. These deposits build up over time creating natural dikes, some as high as ten meters (30ft) or more. These formations are rare. I had experienced another one when working with Andrew Scanlon at Jiuzhaigou National Park in Sichuan, China. Other examples are found in Türkiye, Croatia, and Iran. Yellowstone National Park's Mammoth Hot Springs is a fine example of these formations.

I first visited Band-e-Amir with Andrew Scanlon in 2009 and in 2011 was invited by WCS to design the park's visitor accommodation zone as part of the WCS Band-e Amir National Park Management Plan being developed by Canadian naturalist Dr. Chris Shank and published in 2016.Here is a quote from Chris in the introduction to this report.

"Band-e-Amir lakes, with their crystal-clear, azure water separated by travertine dams and surrounded by spectacular red cliffs, comprise one of the world's most uniquely beautiful natural landscapes."

Figure 37. Upper left: Band-e Kaybulant, the main tourist area. Upper right and middle row: lakes Band-e Myanaband and Band-e Zulfigar. Lower photos: two views of the massive travertine dike containing Band-e Kaybulant.

Figure 38. Upper row: spring flowering plants of these arid grasslands. Left to right: fox tail lily (*Eremurus* sp.), ground orchid, miniature aeroid, like a tiny skunk cabbage, with small matchbox to show scale, primrose (*Primula* sp.), cherry-like low shrub (*Prunus* sp.). Wild crocuses are also found here. Centre left: Dr. Habiba Sarabi, Honorable Governor of Bamiyan Provence giving a speech at the park. I briefly worked with her designing a new central park for the new government center in Bamiyan town. Center right: A broad coalition of national armed forces were guarding Afghanistan against the Taliban in those days. Band-e Amir National Park was guarded by a small force of Malaysians, who also provided a medical team to improve local community health. This soldier asked to have his photo taken with me. Lower: a large Afghan family sharing a meal next to construction equipment before proper accommodations were provided. Su7sh unregulated use destroyed local vegetation.

During this month-long mission I stayed with David Lawson in the WCS guest house when in Kabul and shared a small village house in Band-e Amir with Mr. David Bradford, a congenial and lanky South African who headed the WCS field team training park rangers and interacting with the leaders of the several local villages.

A national park (IUCN Category 2) is not considered a wilderness and is managed to provide for human visitation and its supporting infrastructure if these developments do not interfere with the park's conservation values. However, local villages are not encouraged. Most private property has been removed from national parks in the USA. Band-e Amir had long been a popular tourist attraction not only for its unique beauty but also its purported healing waters. There was a tradition that women unable to bare children or with related problems could be healed by complete immersion in this water in front of the old shrine. Afghans, being desert people, rarely know how to swim. Unfortunately, this sometimes resulted in women having a rope tied around their waste before being bodily thrown into the fridged water. I was told one woman nearly drown because her wet clothing became tangled with unwater travertine outcrops. She was revived by the Malaysian military nurses assigned to the local villages.

Local villagers traditionally arranged their shabby bazaar (shops and food outlets), essential income generators, next to the lake front area most accessible to tourists. Unregulated camping and parking have destroyed the local vegetation. This was offensive to Western aesthetics and conservation values. The WCS management plan required these shops to be relocated some three-hundred meters away from the lake shore in an inconspicuous valley where they would not detract from the stunning natural

landscape. This location was not clearly visible to arriving tourists. This narrow valley was also prone to flash flooding. Naturally, local merchants resented this interruption in their traditional ways and incomes. Nevertheless, the bazaar was moved to the indicated location, and an initial toilet block had been installed before I arrived. WCS staff fenced off much of the popular lakefront area and successfully restored native plantings. Working with the WCS team, my job was to design culturally appropriate and profitable visitor accommodations concepts which did not compromise the ageless beauty of this fragile landscape.

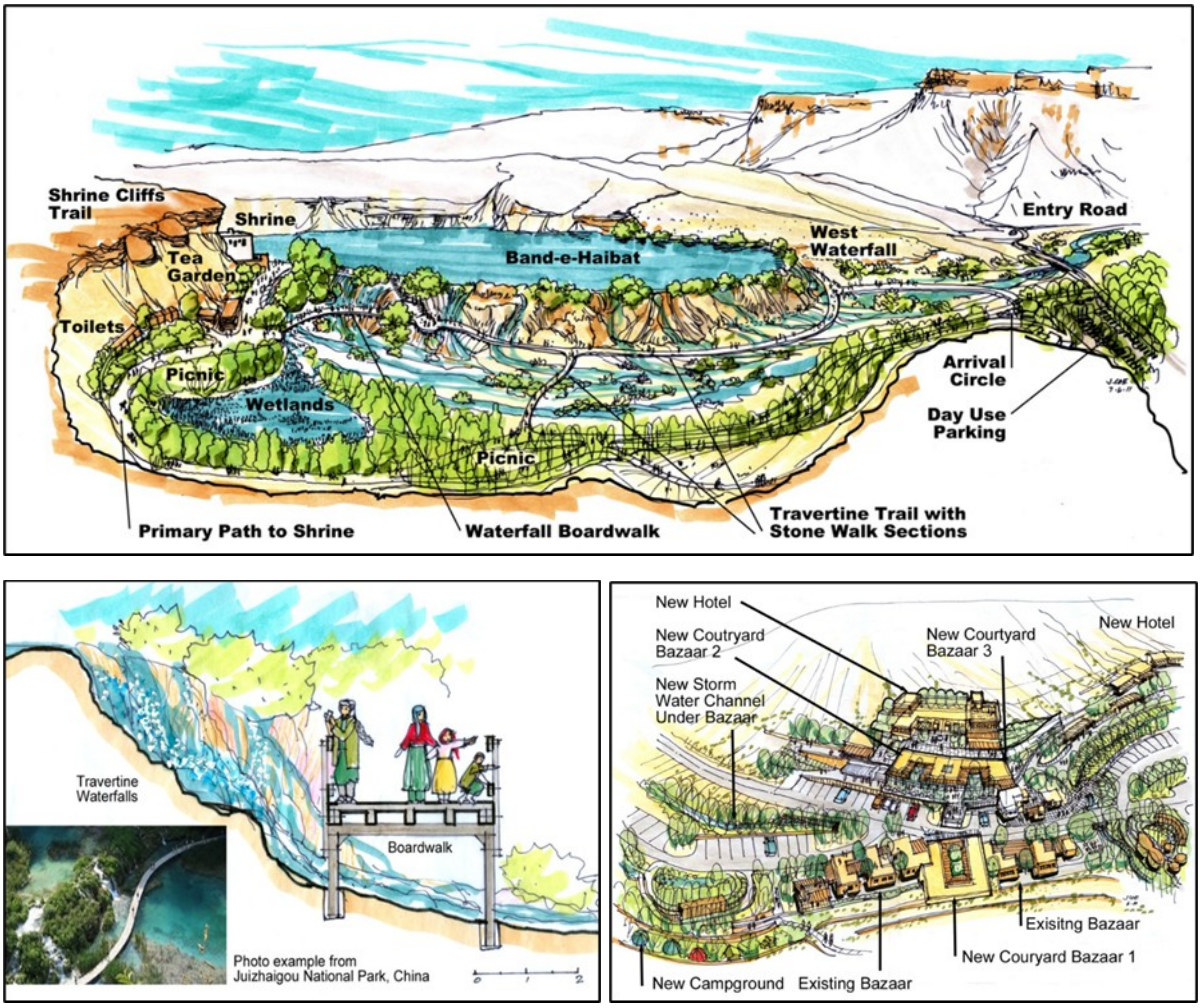

Figure 39. These are a few of my drawings illustrating our development concepts. Upper drawing: this panoramic view shows the previously cluttered commercial area restored to a natural travertine wetland traversed by a boardwalk system detailed in the lower left image. Lower right: my concept for a dense bazaar with guest accommodation and parking. Other plans included a family camping area with privacy screen walls and innovative toilet and shower facilities.

My plans were accepted, and some initial work accomplished. Wondering what the situation is like after Taliban take over, I checked updated Google Earth images. The new bazaar I helped to plan was partly developed, but without WCS or government control the makeshift bazaar has also returned to its original position. Taliban no longer

permit women to enter national parks, claiming their place is in their homes. Low barriers created by WCS appear to protect the fragile replanted lakeside areas. Since those days I have stayed in touch with naturalist Chris Shank. I visited him at his home outside Calgary Alberta in 2012.

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