

Hands-on Action Proposals to Enhance the Traditional Daiju Weir on the Yoshino River and Leverage Citizen Power

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ABSTRACT

Since 2001, we have participated in the process of developing alternatives for watershed management for the Yoshino River in Tokushima, Japan. The Japanese central government seeks to replace a 250-year old traditional rock weir on the river with a big movable-gate dam. A citizen anti-dam movement known as Mina-no-Kai (Everyone's Group) has so far succeeded in preventing construction of the new dam. After winning a citizen referendum against the dam three years ago, the citizen activists have been supporting a study of two issues – how to increase upriver soil water retention capacity by revitalizing neglected watershed forests, and how to preserve the traditional weir. They asked 12 scholars from different disciplines to participate in this research effort known as Vision 21. We have been assisting this expert panel as facilitators and have simultaneously conducted our own research. Since the Hong Kong Pacific Rim Conference, we have conducted site analysis around the old weir through observation mapping of human activity on the weir and interview surveys with local residents who live around the weir. These two research approaches have allowed us to not only understand the diversity of both activities and the physical characteristics of the weir, but also to understand the relationships between these activities and spaces. In fact, the diversity of spaces sustains activities that are dependent on the relationships between spaces as well. In this paper, we suggest some points that should be considered before undertaking any changes to the weir and propose hands-on projects that would stimulate citizen use and understanding of the weir. We also consider the meaning of hands-on projects in the context of the anti-dam movement.

CONTEXT OF OUR 8 CONSIDERATIONS AND HANDS-ON PLANS FOR THE DAIJU WEIR

In order to stimulate the long-term involvement of individual citizens in the improvement and care of Daiju Weir, we propose

tangible hands-on projects based on our study of its uses and spaces in this paper. First, however, we need to review the current political atmosphere surrounding Daiju Weir, because it will influence the outcome of all future projects.

Political background – Defeat in Tokushima Governor and City Mayoral Elections

After victories in the anti-dam citizens' referendum, the Tokushima City Council elections, the mayoral election, and finally the September 2002 Tokushima Prefectural Governor election, most citizens opposed to a big dam were optimistic and a sense developed that the Daiju Weir issue had been resolved. However, the new Tokushima Governor, who was backed strongly by the citizen activists, was unable to make tangible progress in assuring that the Daiju Weir would not be replaced with a movable-gate dam. While citizens who want to preserve the Daiju Weir as it is have been losing hope, the prefectural assembly has been active in promoting creation of the movable-gate dam. Furthermore, the mayor who was re-elected promising to oppose any kind of dam construction, including a movable-gate dam quit his post a year early in January 2004 and ran for election to the national House of Councilors in July as a representative of the ruling LDP party that supports construction of a movable-gate dam. Meanwhile in April, Masayoshi Himeno, the leader of Mina-no-Kai and the efforts to protect the Daiju Weir, also lost in a run for mayor. The political gains made by the energetic citizen movement in Tokushima up to September 2002 appear to have been erased. On the other hand, both the new governor and the newly elected mayor thought it necessary to declare publicly their opposition to a movable-gate dam and their support of preservation of the Daiju Weir. The new governor and mayor will have to deal with the friction between the popular desire to preserve the Daiju Weir and the forces that support the movable-gate dam. Still, the worries of the citizen activists are not small.

The citizens who have led the movement to preserve the Daiju Weir and find an alternative to creating a movable-gate dam have rediscovered and publicized the weir's attractions. At this point, their efforts to gain control over the destiny of the weir have been stopped at the ballot box, bringing them to a new starting point from which they must pursue tangible results on a smaller scale.

Proposals of the Vision 21 Expert Panel

In March 2004, the Tokushima City-sponsored Vision 21 report was published. The main topics are refurbishment proposals for the Daiju Weir and results of experiments testing the feasibility of a "green dam" that would reduce flood rates by increasing soil water retention.

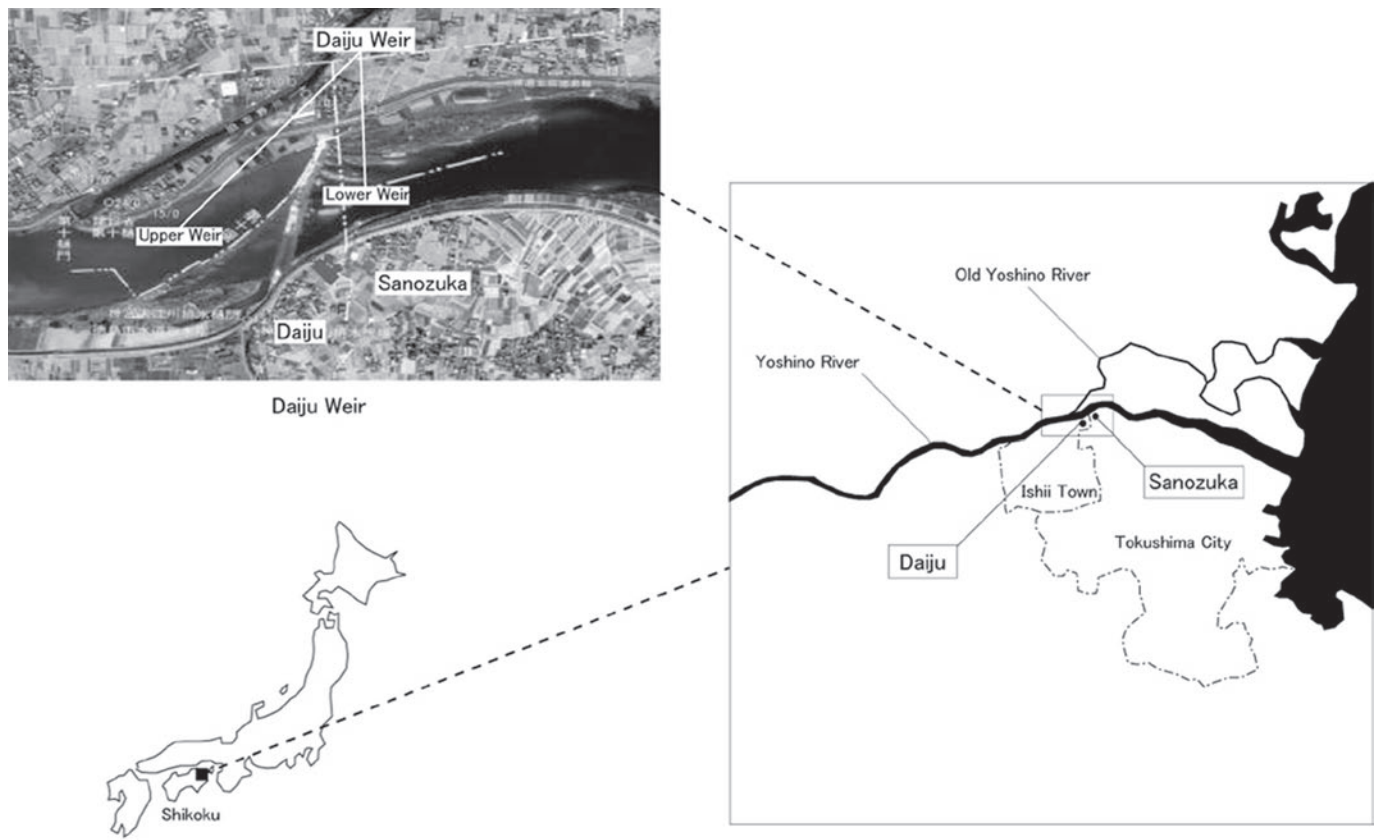


Figure 1. Location of Daiju Weir.

Three proposals were made for Daiju Weir refurbishment.

- Repair Proposal: ¥2.2 billion (repair of problem spots on the upper and lower weir, fish ladder improvements)
- Partial Renovation Proposal: ¥5.2 billion (renovation of the lower weir on the left (north) bank side, replace concrete on upper weir with 'aoishi' (blue) stones, fish ladder improvements)
- Complete Renovation Proposal: ¥7.2 billion (all of proposal 2 with the addition of right (south) bank side renovation, weir height reduction)

For the citizens, however, all three plans exceed their expectations in terms of both implementation costs and the degree of proposed changes.

According to the green dam research results, (1) the 24,000 metric tons of flood water estimated by the Ministry of Land, Infrastructure and Transport (MLIT), the number that is used as justification for building a movable-gate dam, is too large, and (2) the flood control function of forests could be improved through proper maintenance, including thinning, so that even the official number of 24,000 tons could be reduced by 20 ~ 30%. However, the actual action plan calls for thinning 60,000 ha, at a cost of ¥15 billion over 10 years.

These plans may seem expensive, but, considering the construction and 10 year running costs of a movable-gate dam

of hundreds of billions of yen, the value and importance of the Daiju Weir Preservation Proposals and green dam plans presented in the Vision 21 Report are relatively economical.

Furthermore, even with the new mayor, the Vision 21 proposals have been made official directives of Tokushima City and will be raised with the national and prefectural governments. The chance of developing a large-scale public process has increased. However, realization of these proposals will require cooperation from the national and prefecture governments, so it probably will not be easy for individual citizens to become involved. In addition, for most citizens the spatial and temporal scales of the Vision 21 proposals may seem too large to feel a connection to.

RESULTS OF USE OBSERVATION MAPPING AND INTERVIEW SURVEYS

Overview of our research results

We found that the Daiju Weir is used for a variety of activities directly and indirectly on a regular basis, including fishing and shellfish hunting, water-play, walking, and social activity. In addition, in waterside classroom programs children play in the water, swim, observe wildlife and birds, boat, fish, and gather and eat algae and wild grasses. Events, including weddings, concerts, and candle light illuminations have also been held on the weir.

	Activity	Summer	Fall	Winter	Spring	Total
Activities associated with water	fishing	42	31	4	60	137
	catching fish, crab, shrimp or shellfish by net, trap or hand	22	6	7	4	39
	swimming, bathing, water-play	29	1	0	38	68
	washing with flowing water	4	2	1	0	7
	drawing water to tank, pail, or bottle	0	3	0	0	3
	canoeing	0	0	0	3	3
	observing bottom of river, turning over stones	15	13	19	51	98
	throwing stones in the water	0	4	0	1	5
Activities associated with scenery	viewing	27	39	25	95	186
	taking photos or videos	12	14	5	36	67
Activities associated with riparian environment	mowing	0	1	0	0	1
	exploring bush or sandbar	0	0	0	3	3
Activities associated with rights	keeping watch on poaching	0	0	0	4	4
Activities associated with communication	chatting	8	6	5	101	120
	taking care of children	14	1	1	17	33
	meeting	3	4	8	10	25
Other activities	walking	44	26	20	22	112
	taking care of dog	6	8	5	10	29
	exercising	0	0	2	0	2
	resting	4	4	10	2	20
	reading	2	0	0	2	4
	writing poetry	0	0	0	1	1
	making a phone call	0	0	0	1	1
	playing	0	9	0	0	9
	peeing	1	0	0	2	3
	eating	7	4	0	0	11
	littering	0	0	1	0	1
	parking bicycle	0	2	1	0	3

Table 1. Classification and frequency of activities observed on the Daiju Weir.

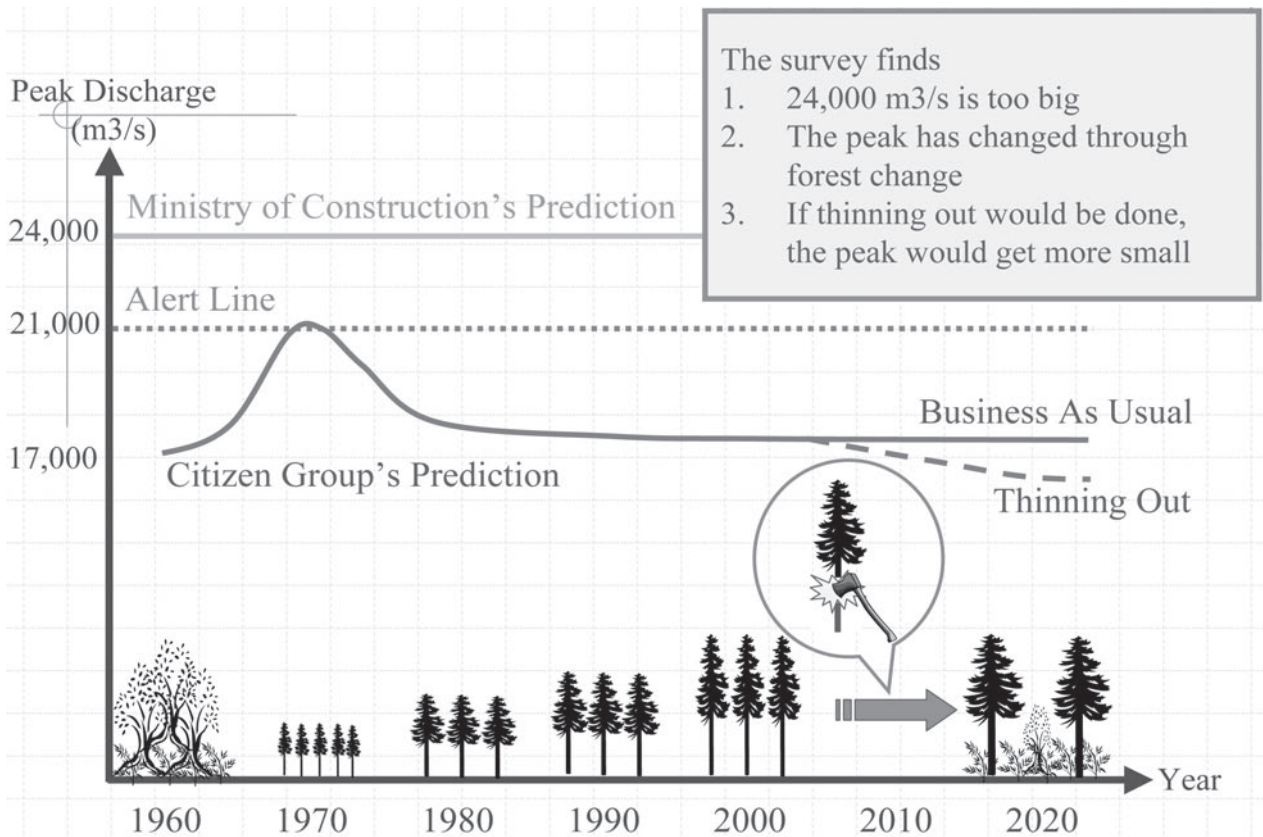


Figure 2. Vision 21 Report: Green Dam Survey Conclusion.

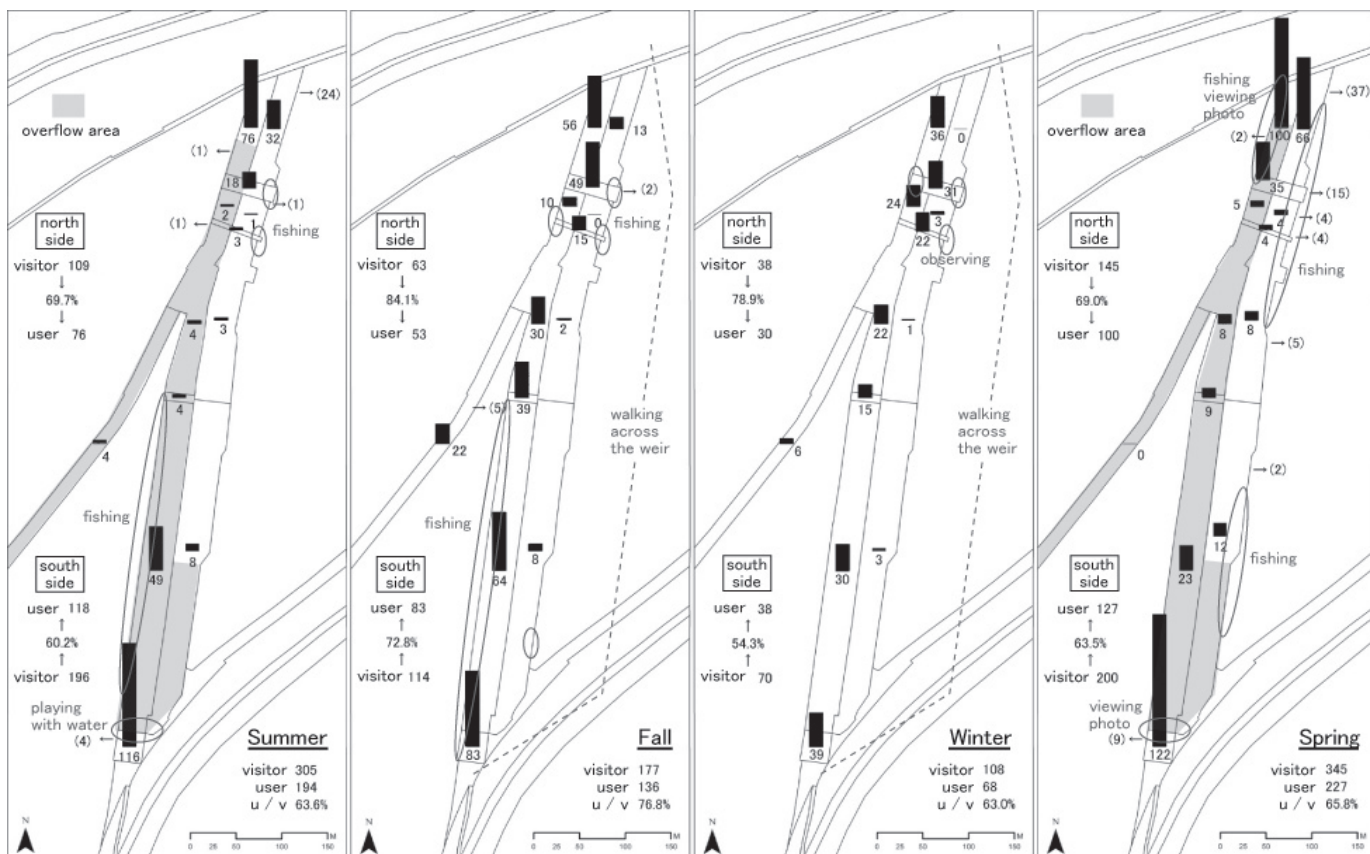


Figure 3. Maps showing numbers of visitors including those who did not enter the weir and of users who entered and used the weir.

We found 4 clear spatial use characteristics through our use observation research and analysis of the Daiju Weir on the Yoshino River.

- Through the accumulation of many years of patchwork repairs, the weir has become a mosaic structure of various types of interconnected spaces.
- With changes in the season and the amount of water flowing over the weir, even more variety of spaces is created within that mosaic structure.

On-site observations were executed on one week day and one weekend day in each season.

The weir is subdivided into 12 plots according to the difference of the spatial features. The numbers of those who used these plots are shown by bar charts and digits under them. Digits in parentheses show the numbers of those who moved from the plots to the adjacent water areas. Areas where typical activities were observed are shown by ovals.

- Each space that results from the combination of weir overflow condition and weir spatial structure has its own types of uses that correspond to the characteristics of the space.
- The low water embankment, the sand bars, the shallows and other areas near the weir, which change with the water level,

are connected spaces that also allow for a variety of uses and activities.

The tangible hands-on activities pursued by local people were even more diverse up to 30 years ago. Community groups conducted maintenance (weir mending, grass burning), and individuals used the weir area as a source of livelihood (cattle grazing, fishing, ferrying, trade, riverbed gravel dredging). In 1965, though, all management of the river was put under national jurisdiction, and all such uses became “illegal activities” and have mostly disappeared since.¹

Eight Considerations for the Daiju Weir

Based on what we learned during our research, we are making eight suggestions about issues that should be considered in order to preserve the good points of the Daiju Weir before any physical changes are implemented.

1) Access to the weir from both banks

At present, about 60% of the people who visit Daiju Weir go onto the weir itself. Among these people are not only fishers and others with clear purposes, but also many people who come for the view, to walk and to observe the weir and its surroundings.

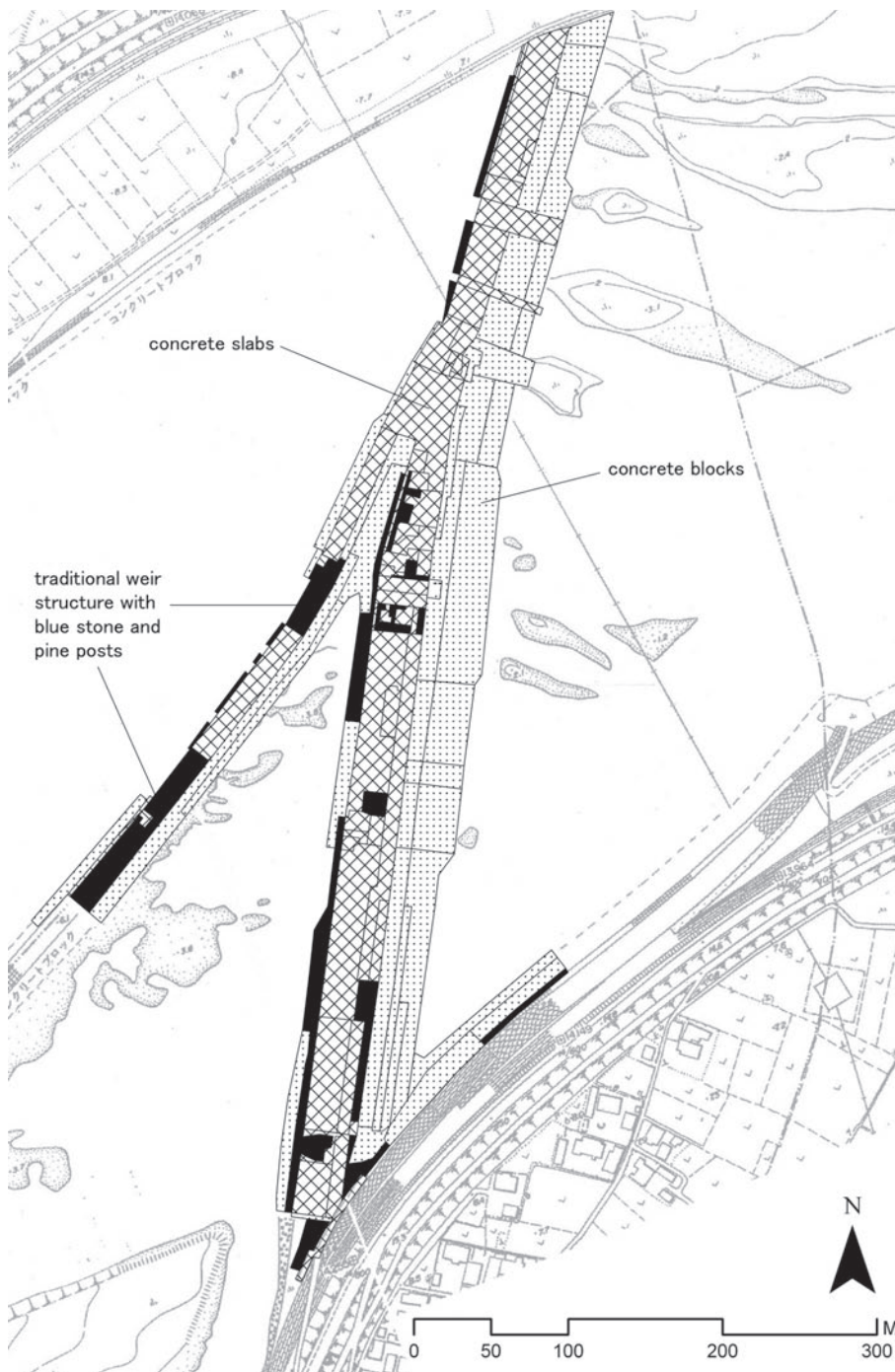


Figure 4: Patchworks of the Daiju Weir as the result of different techniques and materials of repairs.

Out on the weir, which is about 1 kilometer across, people can stand in the middle of a large river with water all around and encompassing mountains in the distance. This unique open space allows visitors to experience dynamic aspects of nature within the city limits. Considering the rapid disappearance of such spaces as rural areas around cities become urbanized, maintenance of access for people who want to walk, take in the view and otherwise enjoy the scenery should be considered carefully before implementing any spatial reforms.

2) Ease of movement

Several aspects of the weir make it easy to walk on. The maximum level change is 0.5 m at the fish ladders, but elsewhere there are few abrupt level changes. Flat or slightly sloped broad slabs connect most of the length of the weir with few bumps or gaps, and it is easy to see how to get to most other parts of the weir from a distance.

The reinforcing concrete blocks, however, depending on size and shape, can either provide paths or block a person's progress to parts of the weir. Sand has accumulated between the 1-ton concrete hexapod (6-legged) blocks over time making it possible for people to move across them (Figure 6). In contrast the 2-ton hexapod concrete blocks have not accumulated sand and have significant gaps that make passage difficult. In some places, they are so high that they even block the view (Figure 7). In contrast, the tops of some tetrapod concrete blocks and square concrete blocks are set close to the water level, effectively creating stepping stones and allowing passage across the water (Figure 8).

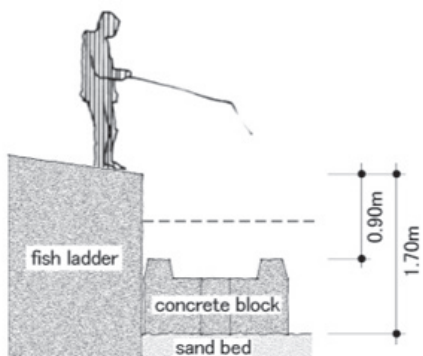
When water is overflowing, the weir becomes very slippery, making walking across sloped faces of the slabs difficult. At these times the level concrete framework for the slabs is important as a relatively easy to walk path, even when it is wet (Figure 9).

3) Water proximity

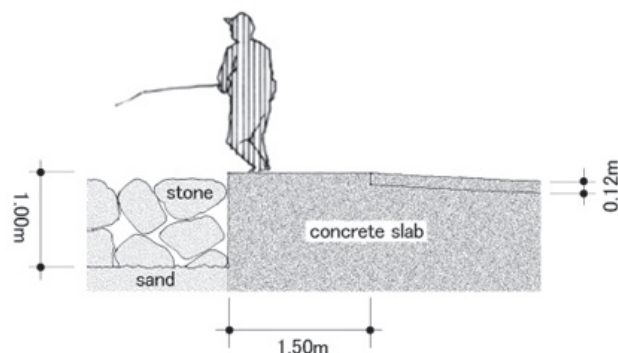
Various aspects of the weir structure make it easier for people to get closer to the water, including the water that comes right up to the top of the weir, the gentle slope to the edge of the water, and the reinforcing concrete blocks that reduce the depth of the water in places.

4) Access from the weir into the water

In addition to the proximity of the water, other aspects that make it easy to actually enter the water area include the proximity of the water, the gentle slope, and the presence of reinforcing concrete blocks and water breaking rocks. From spring through

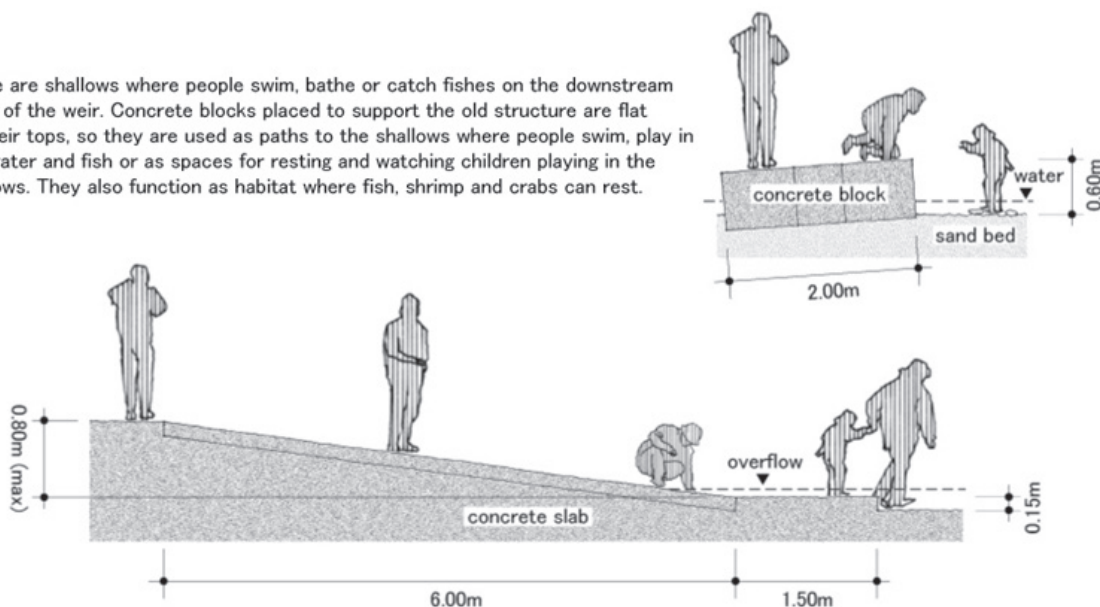


The side walls of fish ladders are frequently used for fishing. The concrete blocks placed for supporting the ladders are used as steps by people moving for those who move from the ladders to the sandbanks.

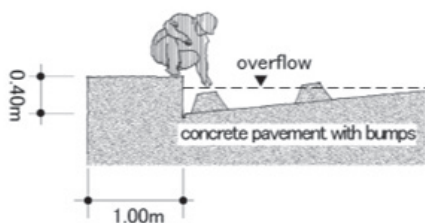


The flat and wide edges of concrete slabs function as circulation systems, which enable people to move across the weir and approach to water.

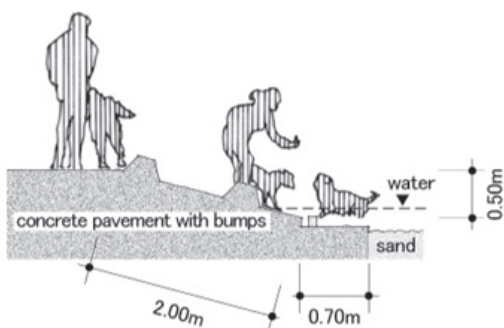
There are shallows where people swim, bathe or catch fishes on the downstream sides of the weir. Concrete blocks placed to support the old structure are used as paths to the shallows where people swim, play in the water and fish or as spaces for resting and watching children playing in the shallows. They also function as habitat where fish, shrimp and crabs can rest.



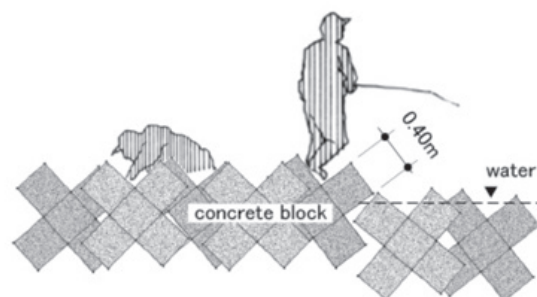
The gentle slope of the concrete slabs gives people access to shallow water flowing over the weir. Not only are passive activities such as viewing and touching the water possible, but children also actively play in the flow and slide down the slab in it.



Irregular flows of water are caused by the sunken concrete pavement. People use these flows for washing.



Dogs waded through the gentle slopes of concrete pavements.



Even the concrete blocks create places for a variety of activities related to water. Sand and stones accumulate between the smallest blocks, allowing people to walk on them. Some people spend the entire day catching eels and crabs between these blocks.

Figure 5. Detail sections of the weir, describing the delicate relationships between activities and spaces.

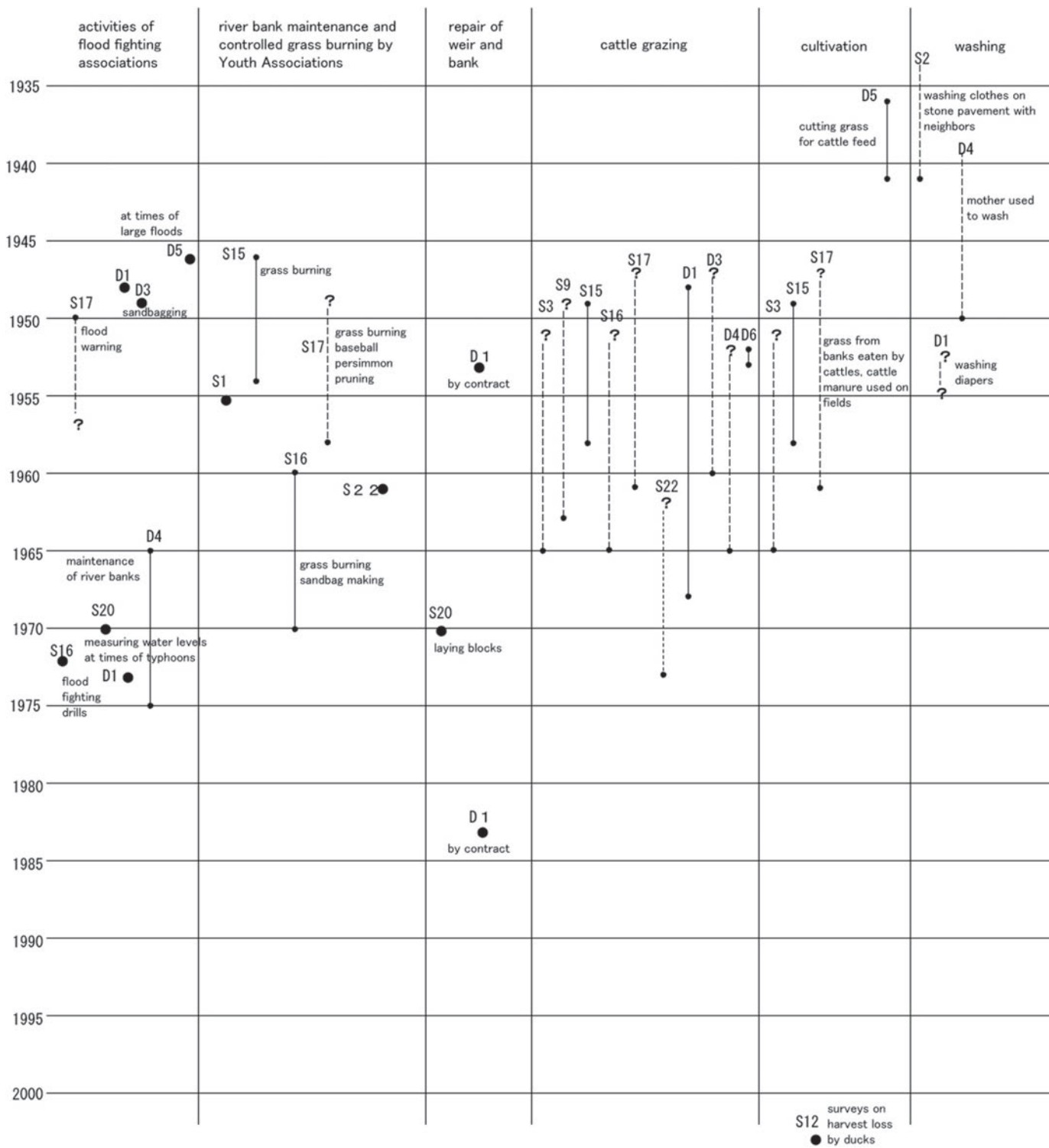


Figure 6. Activities of maintenance and livelihood by local people around the weir area.



Figure 7. 1-ton concrete blocks.



Figure 8. 2-ton concrete blocks.



Figure 9. Stepping stones of concrete blocks.



Figure 10. Walking path of the level concrete framework.

summer in particular, the shallows on the left bank downriver side have a high rate of water-play and shellfish hunting, while the lower weir downriver square concrete blocks, tetrapod concrete blocks, fish ladder side walls and the concrete blocks just below these, provide entry points and footholds in the water. Underwater observation using snorkeling gear and other activities involving direct water contact are abundant in warm weather and interaction with the water is also important for the previously mentioned waterside classrooms and other events.

5) Relation to surrounding spaces

The various uses of the weir are made possible through the support of the surrounding spaces. For example, fishers usually choose spots on the weir because of the proximity to adjacent water areas. Different types of fishing occur in the freshwater above the dam, in the downriver right bank deep

tidal water area, and in the shallows of the downriver left bank. Water-play and shellfish hunting are not limited to just the weir itself, but occur often up and down river. Furthermore, activities such as taking in the view and photography, include the wide water surface and the river sandbars, reed patches and other surrounding spaces, not to mention the mountains and the sky that complete the visible environment. If these surrounding spaces change, we expect that the use of the weir will be influenced.

6) Animal and plant life

Fishing, shellfish gathering, underwater observation and similar activities are frequent, and the presence of aquatic organisms is one important factor in many uses, for example, during water-play. People catch and gather a variety of fish and shellfish, including trout, black bass, perch, mullet, goby, eels, crabs, crawfish and clams. Although relatively infrequent, we also observed activities related to non-aquatic life, such as bird watching, insect collecting and wild grass gathering. Changes to the natural habitat of the weir area would affect these uses.

As mentioned above, the approachability of the water and the relationships of the weir to the surrounding spaces are very important in making such activities possible here. In addition, the gaps between concrete blocks and flood breaks are important in allowing for some types of fishing and hunting crabs and crawfish.

7) The appeals and the danger of the weir when it overflows

In our research we found that water overflowing the top of the weir created one of the most immediate opportunities for users to touch the river water, but we must also mention the danger posed by strong flows. When a drowning occurred in August 2003, according to the MLIT public record of the nearby Daiju Sluice, the water level was only 20 cm higher than at the time of our May observations.

8) The value of processes

The Daiju Weir is a space that has developed over a long time. The traditional weir-building technique used aoishi stones fixed in place by vertical pine posts, while modern techniques used a variety of shapes of concrete, including both slabs poured on site and pre-manufactured units, to make patchwork repairs. Finally, erosion, accumulation and water flow are among the natural processes that have shaped the Daiju Weir. In this research, however, we were unable to identify a sense of historical value regarding the dam among visitors. In fact, our observations revealed that the upper weir, where the aoishi stones and pine posts used in the traditional techniques are still visible, was used infrequently. Access to this area is not obvious and probably not well known among users.

PROPOSALS FOR HANDS-ON PROJECTS

Value of hands-on projects

In order to implement the large-scale process of reevaluating plans to convert the Daiju Weir into a movable-gate dam, first individual citizens need to participate in small-scale processes that allow them to feel their personal and collective strengths and realize results through their own efforts. Given the current situation, small-scale processes with hands-on efforts that produce tangible results should increase confidence and experience and lay the groundwork to make approaching larger challenges possible.

Furthermore, on the spatial scale, at present, the largest reform proposed for Daiju Weir is the MLIT plan for a movable-gate dam. However, the Vision 21 Committee is proposing to reduce the height of the top of the weir by 1 meter to increase the amount of water flowing over the weir and increase the amount of fish swimming upstream. Though smaller in scale, this plan would also lead to significant changes to the rich mosaic space structure that allows for the current diversity of uses. Recreating a place that affords such variety would be difficult even using what we learned in this research. Accordingly, before implementing spatial reform of the current weir, thorough consideration should be given to the formation processes and elements that make each space, as well as to the intricate relationships between the spatial forms and their uses.

In addition, we must look at how past spatial formation processes have been transformed in the present. The majority of use now is for leisure activities. We observed few activities related to occupational fishing, farming or other livelihoods and we saw no instance of repairs or other activities directly related to the spatial formation process. Changes in local relationships to the river must be made clear, including the transformation of maintenance practices, in order to develop a new form for future maintenance.

Hands-on project details

Based on our eight considerations for the Daiju Weir, we are proposing some hands-on projects that could realize tangible results through the cooperation of local people. Our goal for these projects is, in addition to increasing the appeal of Daiju Weir and allowing more people to enjoy it, invigorating the activity of the people who live in the area around the weir, the citizen activist group that seeks to preserve it and the people of the towns upriver who are also concerned about the Yoshino River.

These proposals are meant to provide food for thought for the local residents and activist citizens who could accept them, reject them, or use them as starting points for developing

their own plans. We hope that, at least, these projects will encourage proactive discussions about the future of the Daiju Weir. If there is interest, we may facilitate the organization of workshops to develop citizen ideas about the weir.

1) Promote upriver forest management and use the thinned wood materials to build simple structures using traditional techniques at the Daiju Weir to promote access.

Using wood from thinned forests upriver, build and place handrails, slopes, steps and decks, so that even when water overflowing the weir is high, visitors will still be able to enter the weir space and enjoy the scenery, the flow of water and wildlife observation. The wood structures should be connected without the use of nails, so that during floods they break apart and do not hinder water flow. Ropes would connect the parts so that they would not wash away. In addition to providing access, this project would recreate traditional river structure techniques.

In the same manner, thinned wood materials would be used to make footholds and handrails in large gaps between the 2-ton concrete blocks and elsewhere. In some places, the space between the 2-ton concrete blocks should be filled with gravel or sand. This would also improve habitat for aquatic organisms. At present the gaps between the 1-ton concrete blocks have accumulated gravel and sand naturally providing egg-laying places for *ayu* trout.

2) Create a map that shows the highlights, history and recreation spots of the Daiju Weir.

Create a map that shows the easiest routes and provides advice about walking on the weir, the best locations for water-play, fishing, underwater observation and other activities, as well as dangerous spots, with variations dependent on the level of weir overflow. This map should be put on an information board made from upriver thinned wood and could also be provided as a pamphlet for weir visitors.

3) Eco-tours to understand and appreciate the history and attractions of Daiju Weir

The fact that access to the upper weir is limited suggests that there is potential value in creating new sightseeing programs such as eco-tours that promote understanding and interest in the Daiju Weir. The citizen activist group and local residents could organize visiting the upper weir where *aoishi* stones and pine posts are used in the traditional weir-making technique. Visits could be made on foot when the weir is not overflowing, and by boat when the water level is high. In addition, the few surviving rock weir engineers could be asked to teach the weir building technique. Tour participants could do actual upper weir mending and, as is a traditional custom in Japan, write or inscribe their names on the undersides of the rocks to further enhance and record their personal connections to the weir.

4) The taste of the Yoshino River

A community restaurant operated in partnership between the citizen activist group, local residents and the fishing coop could serve fish and shellfish caught in the water around the Daiju Weir. Dishes could include *somen* noodles in *sanabori* broth, trout rice porridge, clam soup, deep fried crawfish, vinegared *ugui* fish and grilled eel. This community restaurant could begin by running for special events or seasonally. We imagine that dining on the water, literally and figuratively, would be quite popular. This idea enjoys significant precedence in Japan, where the custom of putting dining porches over waterways to provide relief from the summer heat goes back centuries.

5) Vegetation management at Daiju Weir

Some plants growing on the weir, such as the *akame* willow and wild roses, actually damage the stone structure with their roots. In the past, flooding often removed these plants, but at present, most flooding has been suppressed, so it is necessary to clear these plants by artificial means. In theory, this is now the responsibility of the national government, but, in fact, the only vegetation management to be conducted in years was by concerned citizens who undertook clandestine midnight tree removal. If the government would legally entrust vegetation management to local residents and the citizen activist group, weir preservation could become a partnership between the national government and locals and other concerned citizens.

CONCLUSION

With these proposals we have completed one stage of our research. Conducting further use observation and space research on similar river structures could be valuable for allowing comparison with the results of this research. Not only would such a comparison be academically interesting, it would also provide additional feedback to the groups and individuals concerned with the future of the Daiju Weir. Ultimately, the fate of this place, which has become a focal point in the battle against environmental degradation in Japan, depends largely on them.

Long-term preservation of the Daiju Weir will require changes in the policies of the national government, so continued political activism and pressure are necessary to continue to postpone the creation of a movable-gate dam. Lack of immediate large-scale successes, however, could be offset by small-scale hands-on projects with tangible results that would maximize the effectiveness of the collective strength of the citizens. These results could energize not only local residents and activists, but also upriver citizens who are concerned about the possibility of new dams in their neighborhoods.

The complex mosaic of spaces of the Daiju Weir that allows a great variety of activities is the result of centuries of natural

and human processes. Understanding and promotion of the continued evolution of these processes on the local level is a key to saving this unique natural and artificial place for future generations.

ENDNOTES

¹ For example, at times of flood, repair of leaks in the embankment was the responsibility of the local flood prevention organization (membership overlapped with the youth group). Area people organized themselves, and conducted regular maintenance of the embankments and management of the river. Furthermore, local people, who benefited from the opportunity to earn extra cash for their labor, also handled weir mending.