Archaeology and cultural heritage in Fukushima today: four years since the Great East Japan Earthquake

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ABSTRACT

The author, himself a resident of Fukushima prefecture, reports the damages to cultural properties caused by the Great East Japan Earthquake and the subsequent Fukushima Daiichi Nuclear Power Plant disaster and works conducted to rescue them. The paper also reports the rescue excavations organised by the Agency of Cultural Affairs of the sites located in the areas designated for the relocation of devastated communities [Fukko (community restoration)-Hakkutsuchosa (excavation)]. The paper also covers problems that have emerged, some of which, including rescue works in radiation-contaminated areas, are extremely difficult to deal with.

KEYWORDS: Great East Japan Earthquake, community restoration excavation (*Fukko Hakkutsuchosa*), nuclear power plant disaster, radioactive contamination, rescue archaeology, Japan

Editor's Note

Kikuchi's report complements previously published reports on damages caused by the Great East Japan Earthquake and the Fukushima Daiichi Nuclear Power Station meltdown upon cultural heritage and rescue initiatives in their initial stages (Kaner 2011; Okamura, et al. 2013; Kaner and Kikuchi 2015), by reporting in detail how they have been implemented, their achievements and remaining problems. Readers may be interested in reading these reports in conjunction with Kikuchi's paper.

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Introduction

It has already been more than four years since the Great East Japan Earthquake that occurred on 11 March 2011. In addition to the earthquake and tsunami, Fukushima prefecture was affected by severe radioactive contamination due to the explosion of four nuclear reactors at the Fukushima Daiichi Nuclear Power Plant. The effects of this nuclear plant disaster remain a serious problem. While the damage caused by this multiple disaster has had a significant and direct effect on the archaeology and cultural heritage of the affected regions, the nature and full impact of the disaster have not yet been fully appreciated by archaeologists or cultural heritage management workers worldwide. Therefore, the author, himself a resident of Fukushima prefecture, reports here on the local situation and problems faced by archaeology and cultural resource management.

1. The damage

1.1 The earthquake

The epicentre of the earthquake (commonly called 'The Great East Japan Earthquake,' and officially the 'Tohoku-chiho Taiheiyo Oki Jishin' [2011 Earthquake off the Pacific Coast of Tōhoku]) was on the Pacific Ocean floor, offshore from Miyagi prefecture. It had a magnitude of 9.0, the largest yet recorded in Japan. While the tremor was felt over a wide area of the Japanese archipelago, the coastal area of the Tōhoku and Kantō regions experienced the most powerful tremors, causing much damage, liquefaction of earth and other destructive phenomena.

1.2 The tsunami

A huge tsunami hit the Pacific coast of the Tōhoku to Kantō regions after the earthquake. At some locations, the height of the tsunami waves reached ten metres or more. The deeply indented coastlines of the Sanriku coastal region of the Iwate and Miyagi prefectures enhanced the scale and force of tsunami waves which reached more than forty metres in some areas, thus exacerbating the damage. The tsunami also reached two to four kilometres inland in some coastal plains (e.g. Sendai municipality of Miyagi prefecture).

The tsunami caused far more numerous casualties than the collapse of buildings or other destruction caused by the tremors. Of the 18 500 dead and missing following the earthquake, more than 90% were victims of the tsunami.[1]

1.3 The nuclear power plant disaster

The Tokyo Electric Power Company (TEPCO) Fukushima Daiichi (No. 1) Nuclear Power Plant, located in the Futaba and Okuma townships in Fukushima prefecture, lost all power due to the earthquake and subsequent tsunami, and four out of its six nuclear reactors either exploded or caught fire between 12 and 16 March. A significant amount of radioactive substances were released into the atmosphere and the ocean, resulting in severe, widespread contamination of land and sea across a wide area of eastern Japan, with Fukushima prefecture at the centre.

Table 1. Damaged designated cultural resources in Fukushima prefecture by category

Category		Nationally designated	Prefecture designated	Municipality designated	Total
National treasures	Buildings	1			91
Important cultural properties	Buildings	12	24	54	
	Paintings	0	1	1	2
	Sculptures	5	15	33	53
	Crafts	0	1	1	2
	Archaeological resources	2	4	12	18
	Tangible folk cultural properties	1	1	7	9
	Historic sites	19	12	34	65
	Historical sites and scenic beauties	1	3	3	7
	Scenic beauty	2	0	0	2
	Scenic beauties and natural monuments	0	2	0	2
	Natural monuments	3	3	2	8
Important preservation districts for groups of traditional buildings		1			Buidings total
Designated cultural properties	Designated tangible cultural properties	35			127
Subtotal		82	66	147	
Sum total		148			
Overall total		295			

The radiation contamination of the coastal region of Fukushima prefecture was so serious that many or all residents of two cities, six towns, and three villages there had to be evacuated under the direction of the national government. As of today, the residents of five towns and two villages, including Futaba and Okuma townships, have not been allowed to reoccupy their houses. Some residents of other nearby regions also voluntarily evacuated their homes out of fear of radioactive contamination. As of July 2015, as many as 110 000 citizens of Fukushima prefecture have evacuated to areas both inside and outside the region.[2]

2. Damage to historical sites and cultural assets and responses for restoration

2.1 Characteristics of the earthquake's damage to cultural assets

Historical sites and cultural assets located in Fukushima prefecture were severely damaged by the earthquake and tsunami. Information concerning the damage has been gathered and compiled by respective governments of the prefecture, cities, towns and villages. Characteristics of the damage are evaluated by focusing on published information on the destruction of selected designated cultural resources (Tanno 2013) (Table 1).

The figure shows that buildings were the most damaged (127 cases; 43%), followed by historical and archaeological sites (65 cases; 22%) and wooden statues and carvings (53

Photograph 1. Komine Castle

cases; 18%). These three categories together totalled more than 80% of the destruction. In contrast, damage to paintings, craftworks and ancient remains was comparatively low. It is clear that the devastation of buildings and larger cultural assets was the greatest (Photograph 1: Damage to Komine Castle).

The tsunami caused significant damage to museums and cultural assets in Iwate and Miyagi prefectures, with the destruction of the Rikuzentakata City Museum in Iwate as a notable example. While widespread damage to cultural resources was reported in Fukushima prefecture, none affected the museums, fortunately.

The damage to cultural assets in Fukushima prefecture is variously related to the nuclear power plant disaster. One unsolved problem is that many were contaminated by radioactivity. Moreover, many cultural resources were left behind in the designated hazard area, radiating 20 km from the nuclear power plant (where residents cannot

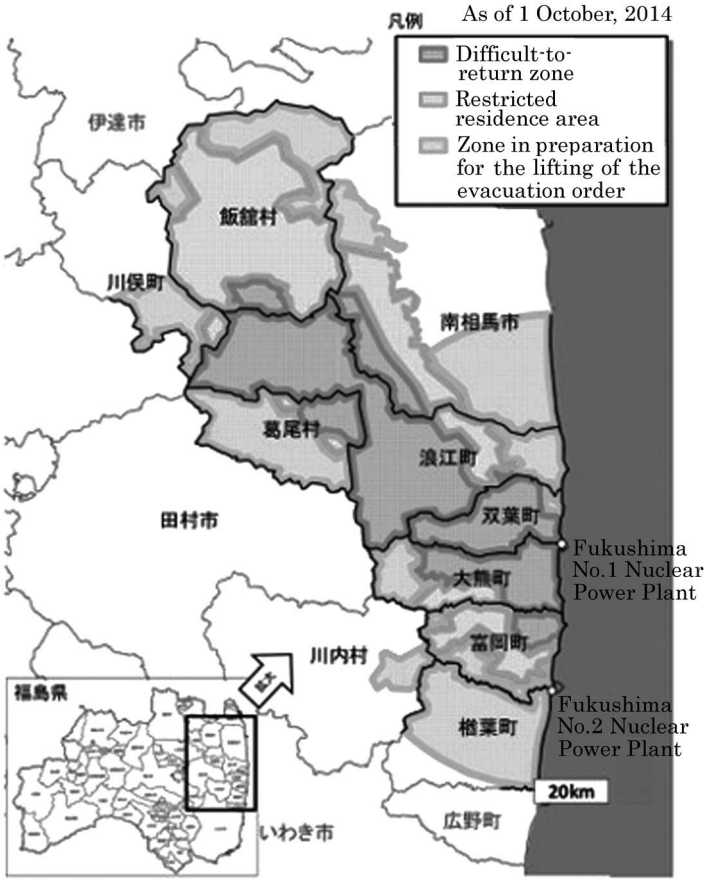

Figure 1. Schematised map of evacuation oder areas

return), and in the so-called planned evacuation zone extending to the west (Figure 1: Current Evacuation Zone). Problems in salvaging cultural assets caused by the nuclear accident are discussed further below.

2.2 Rescue activities for damaged cultural assets

Rescue activities for earthquake-damaged cultural assets in Fukushima prefecture have been carried out in various ways.

Official rescue activities of cultural resources organised by the local governments in Fukushima prefecture began in the early summer of 2011. The activities had to be initiated only when the preservation and restoration of the residents' lives, property and infrastructure had been prioritised. They were limited to rescuing the items owned by local governments or those designated as cultural assets by the respective governments. Privately owned items not designated as cultural assets were excluded. The activities were basically organised by each local government, and relevant information was not sufficiently shared between them. Furthermore, some governments had employed untrained archaeologists or historians as cultural resource management staff. In such areas, it was extremely difficult to organise rescue activities locally. Despite such problems, the actions have managed to preserve and restore a significant number of damaged and rare cultural resources.

On the other hand, most rescue activities conducted right after the disaster were organised on a voluntary basis. Coincidentally, university researchers, museum staff

Photograph 2. Rescue activity in Kunimi

and history enthusiasts formed the 'Fukushima Historical Record Preservation Network' (also known as 'Fukushima Historical Record Net') in November 2010. The group began its various rescue activities within one month of the earthquake. As a volunteer organisation, Fukushima Historical Record Net has few restrictions and good mobility. It actively engaged in various rescue activities regardless of the asset's owner or whether or not the item was legally designated as such. This was especially crucial during the early post-disaster period when the governments could not take sufficient action (Photograph 2: Warehouse Rescue). Volunteer groups for the preservation of cultural resources such as Fukushima Historical Record Net have been founded since the Kobe earthquake in 1995. They have now been formed in 22 prefectures across Japan, playing a significant role in cultural heritage protection and preservation activities. Many more such organisations will be formed in the future. However, voluntary group activities are ultimately limited in that they can only act for those cultural assets for which they have information access. Thus, a significant amount of cultural resources likely were and are being destroyed or sold without the knowledge of these groups. Furthermore, the 'Council for the Rescue of Cultural Assets Damaged in the 2011 Earthquake off the Pacific Coast of Tōhoku' (hereafter 'Rescue Council') was established at the national level to conduct various cultural heritage rescue activities, with a particular focus on those in tsunami-damaged museums in the coastal areas. Their salvage activities were extended to cover non-designated assets. This was ground-breaking as far as government-organised activities are concerned (Okada *et al.* 2012, 2013). However, due to widespread radioactive contamination in Fukushima prefecture, initiation of activities organised by the Rescue Council were delayed for about a year after the disaster.

3. Cultural asset rescue activities in the evacuated areas in Fukushima

3.1 Events leading to the start of rescue activities

Rescue projects for cultural resources located in the areas from which all residents were evacuated (hereafter evacuated areas) due to the nuclear disaster had to be organised differently from the regions described above. First was the concern for the radioactive contamination of cultural assets themselves. Potential danger caused by the rise of crime also had to be considered. Most storage facilities were left untouched since the disaster due to unrestored electricity and water supply. Furthermore, it was expected that entry into many evacuated areas would remain restricted for a substantially long period of time. Therefore, since 2012, it was thought that leaving cultural resources in the evacuated areas any longer would be a significant problem, regardless of whether or not they were damaged.

A majority of cultural resources contaminated by radioactivity in the evacuated areas were immobile items such as historical sites and buildings. Not surprisingly, these were all located outdoors. On the other hand, it became clear that most cultural assets stored indoors (i.e. portable assets) were not subject to severe radioactive contamination. This finding led to the initiation of this project, with rescue activities focused on those uncontaminated portable cultural resources.

There are four public museums in the evacuated areas: the Futaba Town Museum of History and Folklore, Okuma Town Folklore Museum, Tomioka Town Art and Media Centre, and Naraha Town Historical Material Museum. There are also storage facilities housing artefacts excavated by local governments, privately owned works of art and historical documents. However, there was no database listing cultural assets left in the evacuated areas. Their total number was unknown before the project began and it remains unknown.

3.2 Cultural asset rescue activities

The Cultural Asset Rescue Project in the evacuated areas began in 2012. The 'Fukushima Damaged Cultural Asset Rescue Headquarters' (hereafter 'Rescue Headquarters') was jointly founded in May of that year by the Fukushima Prefectural Board of Education, local governments, the Fukushima Museum, Fukushima University and other relevant organisations. The Rescue Headquarters' primary objective is salvaging cultural resources in evacuated regions. Activity began in earnest from August 2012 with the support of the Rescue Council.

This project initially attempted to retrieve cultural assets displayed and stored in museums in Futaba, Okuma and Tomioka by following the procedure as follows. First, the radioactive contamination of each cultural resource was evaluated, and those measuring 1300 cpm or less of contamination (a safety standard set by the Rescue Headquarters)[3] were brought to a temporary storage facility outside the evacuated areas in Soma, where the contamination was measured again. Only the assets below the designated contamination level were moved to a temporary storage and restoration facility in Shirakawa established with funds from the Agency for Cultural Affairs. Necessary restoration works were conducted there.

The amount of radiation measured in museums conducting the rescue works was around 0.15 μSv/h. This amount of radiation is medically estimated to have no harmful effect on the human body. However, to gain access to the museums, those individuals involved in the rescue works had to pass through the areas where the reading exceeded 20 μSv/h. Therefore, protective clothing was worn upon entering the evacuated areas and removed on arrival at the museums to prevent the introduction of radioactive substances (Photograph 3: Protective Clothing). Working time was kept to five hours per day. When

Photograph 3. Protective clothing

Photograph 4. Rescue activity in Futaba

the day's work was completed, workers once again put on protective clothing and left the museum. They then had their contamination level measured at screening facilities situated right outside the evacuated areas before finishing their work day.

Affected museums, storage facilities and premises housing cultural assets in the evacuated areas were visited approximately 50 times by October 2013, and about 4000

Photograph 5. Storage facility in Shirakawa

boxes of artefacts were salvaged. The core body of workers comprised members of the Fukushima prefectural and local education boards, and various other organisations affiliated to the Rescue Headquarters. Aided by members of the Tokyo National Research Institute for Cultural Properties and the Tokyo National Museum, rescue activities were performed by as many as 700 people (Photograph 4: Work Scene). The number also includes student volunteers from Fukushima University who offered assistance outside the evacuated areas. Most of the rescued cultural resources from these three museums are now placed in storage facilities (Photograph 5: Storage Facility).

3.3 Outcomes and problems

The Cultural Asset Rescue Project was initiated by salvaging all cultural assets left in the evacuated areas, regardless of ownership and designated status. The project managed to almost thoroughly accomplish its objective, and in terms of scale, it is globally unprecedented.

However, the following problems remain.

1. The cultural assets whose radiation contamination exceeded several designated safety levels could not be removed.
2. A large number of cultural resources still remain across the evacuated areas, but the restoration and storage facility in Shirakawa is already nearly full.
3. The temporary archival facility is normally unmanned and only functions in a storage capacity. Furthermore, it is located nearly 100 km from proper museums, so the

artefacts are generally not on display.

4. The whereabouts of remaining privately stored cultural assets are poorly known and the entire picture of rescued materials and the project's conclusion cannot yet be clarified.

In other words, considering these problems, these activities and storage conditions are only temporary measures that cannot solve the fundamental problems facing cultural heritage preservation in evacuated regions.

4. Restoration excavations (*Fukko Hakkutsu-chosa*)

4.1 Outline of restoration excavations

Since the Great East Japan Earthquake, numerous rescue excavations are being carried out prior to development activity related to regional restoration (such as building new residences in high elevation areas and extending highways) in the region, focusing on the coasts of Iwate, Miyagi, and Fukushima. These are called 'restoration excavations (*Fukko chosa*).' However, it is impossible for the members of regional local governments or excavation foundations to conduct all the necessary rescue excavations by themselves. Therefore, since the beginning of FY 2012, members of local governments and foundations outside the earthquake affected region were dispatched to affected areas across Iwate, Miyagi and Fukushima prefectures for periods ranging from six months to a year under orders of the Agency for Cultural Affairs, and they have begun offering their support in excavations and related work. Approximately 60 people were dispatched to affected areas during FY 2013, and they have been playing a significant role in these efforts.[4]

An established legal framework and protocols within Japanese institutions for cultural asset preservation ensure that a rescue excavation is conducted whenever an archaeological site is to be developed, regardless of whether the land is public or private. Fearing delays in restoration work resulting from rescue excavations, many mass media sources expressed their disapproval for a while after restoration excavations began, stating that 'archaeology is a burden on restoration.' However, with local prefectural boards of education and local governments taking the lead in government efforts to minimize the destruction of archaeological sites, while ensuring that development work is not delayed, opposition among developers and the general public towards restoration excavations has been minimal (Photograph 6: Rescue excavations prior to the moving of tsunami-devastated communities). Furthermore, significant archaeological results are also being yielded by restoration excavations, including sites that could enrich regional history. For example, the Sakuraba IV site located in Hirono in Fukushima prefecture may be an ancient *ekiya* (facilities built along post roads in ancient Japan) or the

Photograph 6. Kamishibusa-Harada site

Niidatate castle ruin in Miyagi prefecture, which dates back to the Middle Ages.

Currently, restoration excavations are on track to be completed by FY 2015. However, considering the expansion and delay of restoration work, as well as the necessity of publishing reports on all excavations, it is difficult to imagine that restoration will be completely finished by then. Although no formal decision has been communicated, the initial plans have been modified; therefore, the author expects that restoration excavations may continue after FY 2015 as well.

4.2 Restoration surveys in Fukushima prefecture

While restoration excavations in Fukushima prefecture are similar to those conducted in other prefectures, they were severely affected by the nuclear accident. In other words, excavations are currently not being carried out in the evacuated areas mentioned above out of concern for the effects of radiation on the health of surveyors and workers. Therefore, restoration excavations are being carried out only outside of evacuated regions. Furthermore, even during excavations conducted outside of evacuated regions, surveys of historical sites with comparatively high levels of radiation are conducted while managing the levels of radiation exposure through, for example, such protective methods as the use of radiation dosimeters by excavators.

On the other hand, development plans are gradually being implemented, even in the evacuated areas. The ‘interim storage facility’ that will store a large amount of contaminated top soil removed from residential and cultivated land within Fukushima

prefecture are also planned to be constructed in Futaba and Okuma.[5] Therefore, the most pressing concern is how to treat the sites located in these areas. The facility is expected to be quite large, so the destruction of some archaeological sites located within the designated areas is innevitable. A significant dilemma therefore exists between managing people's health and preserving archaeological sites when it comes to development plans and related responses to archaeological sites in evacuated areas, and it is thus difficult for regional and local governments to make their own decisions. It is believed that the investigations by concerned central governmental agencies of the situation and potential problems are still in progress, and we have to keep our careful attention on what decision will be taken about the matter in the future.

Conclusion

This paper reviewed the current state of archaeology and cultural heritages in Fukushima prefecture after the Great East Japan Earthquake. Even though more than four years have passed since the disaster, many problems still exist, and affected areas are a long way from full restoration. The author would like make these conditions known to archaeologists across the world, and hopes that they will visit the disaster-stricken areas in Fukushima if they ever have the opportunity to come to Japan.

Since the current adopted rescue methods cannot fundamentally solve the problems regarding cultural assets left behind in evacuated areas, the author believes that these assets should be comprehensively stored, restored, decontaminated, and displayed. In addition to planning sufficient preservation and utilization, it is crucial that the Japanese government establishes an 'Earthquake Disaster Museum' (provisional name) that disseminate information on the current state of Fukushima to the world.[6] The author strongly hopes that people working in related fields worldwide will raise their voices in support.

Although there have been no significant problems up until now with restoration excavations, it appears that those who are involved in them and are performing a wide range of duties (such as coordination with development and excavation) with limited human resources are growing increasingly fatigued. It is the earnest hope of the author that better excavation and preservation methods will be invented through comparison with relevant examples throughout the world and that this on-going gigantic project of huge importance will be heading to a better direction.

Notes

1. National Police Agency website: http://www.npa.go.jp/archive/keibi/syouten/syouten281/

pdf/p02.pdf (last accessed 27 July 2015)

2. Fukushima Prefecture website: http://www.pref.fukushima.lg.jp/site/portal/shinsai-higaijokyo.html (last accessed 27 July 2015)
3. From 16 September 2011, the Japanese government and local governments of evacuated regions defined the upper limit of radioactive contamination for personal property that residents could take out of evacuated areas without decontaminating them as 13 000 cpm. The Rescue Headquarters set the upper limit for contamination of extracted cultural assets as 1300 cpm. As one-tenth of the number above, this is a very strict standard.
4. Agency for Cultural Affairs website: http://www.bunka.go.jp/earthquake/tsuchi_maizo/ (last accessed 27 July 2015)
5. Ministry of the Environment website: http://josen.env.go.jp/chukanchozou/l (last accessed 27 July 2015)
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