Part I: Creating a Disaster Digital Archive in Real Time

Akihiro Shibayama, Andrew Gordon, Ryo Morimoto

Abstract: *This is Part I of a two-part special section, "Lessons for Disaster Digital Archives: The Making and Use of the Japan Disaster Digital Archive (JDA)" published to coincide with the 14th anniversary of the March 11th Triple Disaster in northeastern Japan. What happens to an archive and its formation, practices, and sustainability when original content is only "born-digital" and managed far away? What does preserving and remembering the past mean in the digital age? Who can participate in curating, circulating, and exhibiting those born-digital materials? What are some lessons and cautions when building a digital archive? Part I answers these questions with an autobiographical account of the JDA from two distinct but intertwined perspectives: that of the makers of JDA (written by Gordon and Morimoto) and that of our long-time collaborator and observer in Japan (Shibayama).*

Keywords: *digital archives, disaster, pedagogy, March 11, Tōhoku*

"Do Something": JDA's Inception

Ironically and sadly, fortuitous timing shaped the process by which faculty, students, and staff connected to the Reischauer Institute of Japanese Studies (hereafter, the Institute or RIJS) at Harvard University created a digital archive of 3.11, an immense tragedy that took nearly 20,000 lives and has left a harsh legacy of ongoing trauma and challenge. In 2011, the technology to enable real-time crisis archiving of online sources, websites in particular, was in its early days. But it was far enough advanced, and known widely enough, to make the decisions of many individuals and institutions to create digital archives of 3.11 inevitable.[1]

The Institute was one of those institutions. Because Harvard was 10,000 miles removed from the disaster, members of the RIJS—although deeply concerned and upset by the images and information we absorbed about the disaster—were not impacted by the challenges of rescue, evacuation and relief, or the disruptions of electric power, that faced people in Japan, both in Tohoku and beyond. The Institute was fortunate to have faculty, staff, graduate and undergraduate students—some with close personal connections to the disaster regions—who felt it was imperative to "do something." The Institute was fortunate as well to have financial reserves and the flexibility to use those funds with no significant bureaucratic obstacles to start a new project.

In March 2011, Gordon was the acting director of the RIJS. He is a historian of Japan, but had done no significant past research or writing focused on Tohoku, and had no experience with digital archives or indeed other digital projects beyond using the internet to discover research materials. The incoming regular director (from January 2012) was the late Theodore Bestor, an anthropologist who had written important work on Japanese fisheries, which gave him some acquaintance with coastal regions of Tohoku. In 2011, March 11 was a Friday, the day before Harvard's nine-day spring break, but on Monday, March 14, Gordon and Bestor gathered with other faculty and staff at the Institute to discuss what the "something" was that we should do, and one possibility we discussed, suggested by Bestor, was collecting and saving the many emails we were all receiving and sending.[2] We were fortunate as well to

1 An example of the fact that the year 2011 was a moment when such projects would inevitably be created is the fact that (as we later learned) a university-connected group in New Zealand built a digital archive of the Christ Church earthquake disaster, which occurred on February 22, 2011 (as well as an earthquake in 2010), with a similar structure to the JDA.

2 Gordon's recollection is that Professor Helen Hardacre, whose field

work with talented and dedicated undergraduate and graduate students and postdoc fellows and dedicated staff. That same week, one digital expert graduate student working on Japanese history, Konrad Lawson, and two Japanese undergraduate students who had not left campus during the break joined our discussions. One of the undergraduates, Yuki Yamashita, was a senior studying computer science. The other, Hiroko Kumaki, had just handed in her senior honors thesis in archaeology on March 9. She had grown up in Ishinomaki, a city near Sendai where the tsunami took over 3800 lives.[3] Between 2012 and 2014, post-doctoral fellows Molly Des Jardin (2012-13 and Nick Kapur (2012-14) managed the archive.[4] Morimoto, who later became a project manager between 2014 and 2018, began participating in the project in late 2011 as an outside student-researcher affiliate to explore the emerging ecology of disaster archives in and out of Japan as a part of his dissertation project.

In addition, since May 2011, Koko Howell has played an indispensable role as the primary collector and curator of JDA's website archive, which now preserves more than 100,000 items. She is responsible for over 90 percent of this collection. Her initial efforts were prompted when she noticed that the official websites of many local government offices in the coastal disaster zone were disabled, so that municipalities were using unofficial blogs to communicate with residents. This led her to begin cataloging and collecting those websites, which were later added to the archive.

While we struggled to figure out "something" as the compound disasters were still unfolding in Tohoku and born-digital materials were rapidly and haphazardly circulated, our discussion of preserving these materials expanded greatly in scope. Gordon, as a historian, was particularly concerned about both the volume and sustainability of digital materials. He later told Morimoto that he thought it was essential to try to preserve born-digital materials so that future historians could access the primary data and write about the disasters. For the foreseeable future, acting to create ways to prevent born-digital materials from becoming untraceable was, and remains, "something" we believe to be truly urgent.

What Might a Digital Archive Project at a Distance Look Like?

As a digital archive project of 3.11, JDA faced challenges of design and scope. First, the Institute was far from the disaster sites, making it hard to curate content on the ground. Our engagements with 3.11 relied heavily on what was available online or in emails among our colleagues, friends, and family in Japan. Moreover, the Institute lacked expertise in digital technologies and digital archiving. In contrast to various digital archive projects that began emerging in Japan around the same time (Shibayama et al., 2017; Shibayama and Boret 2019), these physical and technological limitations forced the Institute to develop pragmatic methods of archival curation, storage, and presentation of born-digital materials, and to build a network of links to similar projects. Our constrained choices made JDA a unique disaster digital archive which curates and stores born-digital materials and enables and facilitates the participation of global users. In so doing, JDA offered various organizations, projects, experts, and laypeople opportunities to network and cooperate virtually and in person.

Our initial discussions of "doing something" led to three institutional activities in response to 3.11. First and most immediate, fund-raising in the Harvard community for relief and recovery efforts in Tohoku; this led to the creation of a student-run organization, Harvard for Japan.[5] Second, events to mourn the loss of life and raise awareness of the scope and impact of the disaster; these evolved into summer projects

was modern and contemporary Japanese religion and Professor Susan Pharr, a Japan specialist in the field of comparative politics, joined him and Bestor at this first meeting, along with the Institute's Executive Director, Dr. Ted Gilman, and Assistant Director, Stacie Matsumoto and Kazuko Sakaguchi, the institute's librarian who managed our print-based Japan Documentation Center.

3 Lawson is now on the faculty of St. Andrews University. Yamashita worked for Google after graduating Kumaki, went on to complete a PhD in anthropology with a dissertation focused on the challenges of living in the shadow of radiation in post-disaster Fukushima. She is now on the faculty of Oberlin College.

4 Des Jardin subsequently served as Japanese librarian at the University of Pennsylvania. Kapur is now on the history faculty of Rutgers University in Camden.

5 https://web.archive.org/web/20171116183645/http://harvardforjapan.fas.harvard.edu/. A Video Recording from an event "Japan Disaster Response and Future Assessment, April 22, 2011." https://www.youtube.com/watch?v=5ZwnHv59bs4&feature=youtu.be.

in 2011, 2012 and 2013 in Minamisanriku, a coastal town devastated by the tsunami; Harvard faculty and students worked with local citizens on recovery plans. And third, gathering and preserving digital materials—emails, online media reports, photographs and websites- that were already flooding our inboxes and laptop screens; this activity resulted in the creation over time of the Japan Disasters Digital Archive (JDA).

During the spring break, the Institute began to discuss what a "disaster digital archive" developed at a distance might look like. Who would design and build it? What materials would it contain? Who would use it, for what purposes? The Institute had no significant in-house digital expertise or digital projects already underway, with one important exception. Professor Helen Hardacre had long been interested in the debates in Japan over the issue of constitutional revision, and she had realized that much of that debate took place on born-digital websites. In 2005 Hardacre began working with the Harvard University Library on a pioneering project to build a digital archive of websites focused on this issue.[6] She put Gordon in contact with Harvard library staff, who recommended he reach out to the Internet Archive (IA) (Gordon had never heard of this organization). Almost immediately, the Institute began working with IA to curate and expand its own collection of 3.11 related websites, which was already underway, and this became a core element of the JDA. Although Internet Archive is a non-profit organization, partners pay a fee to have IA preserve their materials. But for five years, given IA's commitment to real time crisis archiving, the organization kindly offered its services to the JDA free of charge. Since 2016, we have paid an annual fee of roughly ten thousand dollars for this valuable work (reflecting the amount of material archived). It was also in early April that we first learned of similar projects emerging in Japan, when Professor Yoshimi Shunya of the University of Tokyo wrote to inform Gordon about the 3.11 Marugoto Archive, a primarily grass-roots effort to build an archive of all manner of digital resources. Yoshimi suggested we work together. This was the start of the Institute's ongoing and fruitful collaboration with many individuals and organizations in Japan.

Also that spring, the Institute learned of a newly founded digital innovation lab at Harvard, MetaLAB and began discussing the concept and design of our archive with their staff. Over the summer, the Institute librarian at the time, Kazuko Sakaguchi, made a trip to Japan, and in Tohoku she met with a liaison group (*renraku kaigi*) of early stage disaster archiving projects. At about this time, thanks to contact from one of our graduate students, Konrad Lawson, the RIJS was fortunate to receive a collection of roughly 800,000 disaster-related tweets from Yoh Kawano at the organization Hypercities, based at UCLA. By early fall, MetaLAB had prepared a wireframe design of the archive. With JDA's basic concept in place, a small software development group connected to MetaLAB, called Zeega (since dissolved), began building the beta version of the JDA platform, and in October, Gordon made a trip to Japan (the first of six over the following eighteen months) to talk to potential partners.[7] Most valuable on that occasion was the chance to participate in a symposium on digital archives of 3.11 held on October 8, 2011 in Tono city, Iwate prefecture. Also of critical importance was his initial meeting with colleagues at Tohoku University, including Shibayama Akihiro (at the time, assistant professor).

Until the Institute decided to broaden the scope of the archive, in concept at least, beyond 3.11, its name was Great East Japan Earthquake Digital Archive, but the abbreviation was already JDA. The "D" stood for both "digital" and "disaster." A beta version of the archive was not ready until March 2012, the first anniversary of the disaster. But by the time of Gordon's fall 2011 visit to Japan, the basic features of the archive, including those which make it distinctive, were conceptually in place. At the most general level, the JDA's philosophy and the goal of its core features was to break down the distinction between archive creators and curators on the one hand and archive users on the other. The keyword

6 The current version of this project can be found at https://www.crjapan.org/.

7 For additional information on these developments, Eric Dinmore (2015), "Collecting, Curating, and Presenting "3–11" with Harvard's Digital Archive of Japan's 2011 Disasters" *Verge: Studies in Global Asia* Vol. 1, No. 2:pp. 37-41. https://www.jstor.org/stable/10.5749/vergstudglobasia.1.2.0037.

here was *participatory* archive.[8] In Japanese, there is a nice euphony to the two sides that we hoped to bring into a collaborative relationship: *tsukuru gawa* and *tsukau gawa*. A former JDA project manager and historian of Japan, Nick Kapur (2014), explains a participatory archive accordingly: it "puts the user at the very center of the archive's functioning, maintenance, and expansion, blurring the lines between content creators and consumers, past and present history, historian and historical subject, teacher and student, and so on." Setting participation as the heart and engine of the project, JDA, more than other related digital archive projects in Japan, sought to imagine its potential users and its uses.[9] We will come back to this topic in the next section.

To make the archive participatory, JDA is built with features that enable users to contribute content such as websites or their own photos. JDA offers a bookmarklet that enables users to submit to the JDA the URL of websites not already part of the archive, adding metadata such as keywords, a description, and a geolocation. JDA staff then submits these to IA, for inclusion in the archive and for long-term preservation. Unlike many other digital archives, it is possible for JDA users to add their own keyword tags to existing items in the archive (although this feature is hardly ever used). For a time, users could add translations (into any language) of individual tweets in the archive, but this function was never used, and we eventually eliminated it. JDA also allows its users to write their own experience of the disaster (in any language) and submit these "testimonials" to the archive. At present (2025), there are just over 1150 such narratives contributed by archive users, mostly in English or Japanese (the most recent is from 2022). They speak from several positions, writing in Japanese or English for the most part: Japanese people living in the disaster area or elsewhere; foreign residents in Japan, especially school children later asked to contribute testimonials as class projects; people living outside Japan at the time and since, offering remote observations.

Probably the most important participatory feature is the ability of archive users to create their own customized collections focused on topics of interest to them. A collection consists of a small subset of the archive contents, as well as digital materials such as photographs or websites that a user adds to the archive themself. Most contain anywhere from 10 to 30 items, although there is no upper limit. Collections can be used as presentations, with the creator able to annotate particular items, add explanatory text slides, and divide a collection into subtopics. Users can make their collections public, in which case they become part of the archive and are available for other users to consult. At present, the archive includes over 760 public user-created collections.

Other keywords and concepts in place at that time, and since, were *geolocation* as a means of discovering information, and a *networked* archive structure, which gave users access to contents of many digital archive projects as if they were part of a single archive.

The robust *geolocation* of about half of the contents of the archive, allowing users to search for items with a map is a rare feature, and the huge number of items (over 500,000) displayed on the map is a unique aspect. It proved a major technological challenge to design a searchable map that could examine this many items and identify those which fit the search term parameters at the speed to which online users are accustomed. But once we figured this out, thanks to staff at Harvard's Center for Geographic Analysis and one talented graduate student who was working on a similar function for his own research focused on millions of geolocated tweets concerning American politics, it became possible for users to search across all our partner archives to locate items in particular cities or even smaller areas, related to topics of their interest. Users are able to open and view individual items from the map, and they can easily add those items to a collection they are building. In recent years, we have made it possible for users to search the JDA map on mobile phones or tablets, which allows on-site discovery, teaching, and research for those in the areas impacted by the disaster (Gerster et al. 2022a).

8 n his book, *A Theory of Assembly*, Kyle Parry discusses how JDA's unique participatory features allow multiscalar media assembly (2022, 74-79).

9 For a Japanese article that covers some of this history: https://www.jstage.jst.go.jp/article/jsda/2/4/2_347/_pdf.

The third key feature of the archive, unusual although not unique, is its *networked* structure. The JDA only owns and itself stores a small portion of the full archive (presently stored with AWS), essentially only the tweets and the testimonials. The rest of the archive contents are held by one or another of our partner archives, and linked by an API (Application Programming Interface). This networked structure has significant value as a discovery tool. When a user inputs a search term or terms, the archive search engine consults the metadata provided by our partners and pulls in links to items held either by the JDA itself or more often held by our partners. The user experience is that of searching a single vast collection (the original holder of each item is always identified, and a user can easily view that item on the partner's website).[10] The main downside of this structure is that maintaining robust connections with our partner archives is challenging for both technological and institutional reasons. When JDA upgrades its security settings, if the partner does not raise its security to the same level, access is cut off (for example, switching the URL protocol from http to https). Similarly, as has happened in several cases, if a partner institution shuts down its archive, the connection of course is lost.

In the past thirteen years, projects such as the Japan Red Cross disaster archive and Urayasu city archive have been discontinued, indicating that the sustainability of the disaster archiving community is a general challenge for any digital archiving project. This challenge is closely tied to the question of scalability and growth for a project like JDA that relies specifically on networking as its foundation and core value. We will now turn to the account by Akihiro Shibayama at the International Research Institute for Disaster Science (IRIDeS) who will discuss how JDA grew in relation to the overall context of disaster digital projects in Japan.

How does a Disaster Digital Archive Grow?

3.11 of course profoundly impacted Tohoku University, located in the western part of Sendai city, Miyagi prefecture. Immediately after the disaster, with people in the region dealing with grave material, economic, and emotional damage, the university was not ready to conduct research, nor did it have the appropriate infrastructure to immediately launch an archival project. When Tohoku University learned about JDA's early efforts, Shibayama began to see the potential for an outside effort for disaster archiving to connect local archiving initiatives to broader collective projects to preserve and disseminate disaster memories and records. Here, he offers the perspective of the disaster-stricken university on JDA's assistive role in shaping the consortium of 3.11 disaster digital archives in Japan and developing the associated legal and bureaucratic frameworks.

JDA's presence in the ecology of the 3.11 disaster archive began taking shape as early as late March 2011. Less than a month after 3.11, JDA collaborated with the National Diet Library (NDL), SaveMLAK [Museums, Libraries, Archives, Kominkan], the Internet Archive, the Library of Congress, and others to launch the "2011 Great East Japan Earthquake Archive Project." NDL's initial cooperation with JDA focused on web curation; NDL provided the URLs of websites of local governments and other public organizations in the affected areas, as well as private-sector websites, and JDA had the Internet Archive preserve these. One month after 3.11, Shibayama witnessed corporate responses such as Yahoo! Japan's "Great East Japan Earthquake Photo Archiving Project" and Google's "Kioku (memories) for the Future" launch. Although these archives were not intended for long-term preservation of records of 3.11, they were the first crowdsourced digital archive efforts of 3.11 in Japan, illustrating the changing landscape of disaster archiving in the digital age.

These private and academic responses to 3.11 meshed with official bureaucratic responses in Japan. In late March, the Japanese government initiated "The Reconstruction Design Council in

10 The Digital Archive, Hybrid Infrastructure for National Archive of the Great East Japan Earthquake and Innovative Knowledge Utilization or Hinagiku (launched in March 2013), by the National Diet Library has the similar structure, which Akihiro Shibayama et al. (2017) characterizes as a "cross-platform search type."

response to the Great East Japan Earthquake[11]," and on May 10, 2011, the Council announced its Seven Principles for The Reconstruction Framework/*Fukkō Kousō Nana Gensoku*.[12] Principle 1 of the Framework states that "…we shall record the disaster for eternity… and we shall have the disaster scientifically analyzed by a broad range of scholars to draw lessons that will be shared with the world and passed down to posterity."[13]

In response to the new Framework, in June 2011, the Basic Act on Disaster Management/*Saigai Taisaku Kihonhō* was partially revised.[14] Article 7, Article 46, Article 47-2, and Article 47-3, etc., stated that "In order to raise the public's awareness of disaster prevention, it is the responsibility of local residents to create a digital archive of the disaster, and to ensure that the disaster prevention measures taken by local residents are in line with the basic principles of the Act." It is important to highlight that the government's focus on local residents coincided with a grassroots effort by Sendai Mediatheque, a lifelong learning facility in Sendai City, Miyagi Prefecture, which launched the "Center for Remembering March 11." This citizen-centered effort seeks to collect records of the disaster and provide support for video recording and editing.

In August 2011, the Great East Japan Earthquake Recovery Task Force of the Japanese government proposed "Basic Policy for Recovery from the Great East Japan Earthquake/*Higashinihon Daishinsai karano Fukkō Kihon Keikaku*"[15] to formalize disaster archiving as an integral part of disaster recovery and reconstruction. Act 5. 6. ii states: "We will establish a system for the collection, preservation, and dissemination of records and lessons learned from the earthquake, tsunami, and nuclear disasters… We will also establish a system for the centralized preservation and utilization of these records that is accessible to everyone, both in Japan and abroad, and disseminate this information widely both in Japan and abroad…" With the establishment of the link between disaster recovery/reconstruction and disaster archiving, the collection of disaster records began in earnest, and the construction of a disaster digital archive in Japan began to move forward. Importantly, JDA played a leading role in efforts to build a globally accessible disaster archive. On August 29, less than six months after 3.11, JDA and the National Diet Library concluded an "Agreement on the Joint Project for Digital Archive of the Great East Japan Earthquake[16]" formalizing their earlier collaboration.

Tohoku University began initial discussions of its own disaster digital archive as early as April 2011. After repeated consultations with the Ministry of Education, Culture, Sports, Science and Technology, the Japan Science and Technology Agency, the National Diet Library, and others, in September 2011, it announced the launching of the Great East Japan Earthquake Digital Archive Project "Michinoku Shinrokuden/みちのく震録伝."[17] The adaptation of the regional placename "Michinoku"—the term used in the past to designate northeastern Japan in relation to central Japan—to the project signaled Tohoku University's long-term commitment not only to lead the regional recovery and reconstruction process but also to become the top international institution of disaster studies (Imamura et al. 2012). Indeed, this commitment to disaster studies predated 3.11, and provided a foundation for post 3.11 endeavors.

Already in 2007, the university had established an interdisciplinary research team consisting of 19 fields related to disaster mitigation, the "Tohoku University Disaster Science Research Center" (headquarters: Tohoku University Center for Northeast Asian Studies). At that time, there was a 99% probability that a major earthquake off the coast of Miyagi Prefecture would occur within 30 years. To prepare for this earthquake, researchers from various fields at Tohoku University, including those in science, engineering, geoscience, psychology, information science, economics, medicine, and history, gathered to promote practical research on disaster mitigation through a collaborative approach connecting the

11 https://www.cas.go.jp/jp/fukkou/english/index.html.
12 https://www.cas.go.jp/jp/fukkou/english/pdf/7principles.pdf.
13 It is interesting to note that the presence of historian Takashi Mikuriya as a vice-chairman in the council impacted the Framework's emphasis on the recording of 3.11 similarly to the way historian Andrew Gordon initiated the JDA project overseas. https://www.cas.go.jp/jp/fukkou/english/pdf/members.pdf.
14 https://www.japaneselawtranslation.go.jp/ja/laws/view/4171.
15 https://www.reconstruction.go.jp/topics/110811kaitei.pdf. See also, Shibayama (2022).
16 http://wayback.archive-it.org/2438/20111117224205/http://www.ndl.go.jp/jp/news/fy2011/__icsFiles/afieldfile/2011/09/02/pr20110902.pdf.
17 https://www.shinrokuden.irides.tohoku.ac.jp/.

humanities and sciences (*bunri yūgō*). The coordinator at that time was Arata Hirakawa (history), who later became the first director of the International Research Institute of Disaster Science (IRIDeS).

Following the Great East Japan Earthquake in 2011, more faculty members joined the Disaster Science Research Center, dedicating themselves to recovery efforts. One year after the disaster, Tohoku University established IRIDeS. As discussed below, under the leadership of Director Hirakawa and Deputy Director Fumihiko Imamura (tsunami engineering), the Michinoku Shinrokuden project, dedicated to archiving information on the 3.11 disasters, was positioned as one of IRIDeS' core projects.

The first contact between JDA and Tohoku University was made in early August 2011 via the Northeast Asian Studies and Exchange Network, though at that time, Tohoku University missed the opportunity to fully engage with JDA. Shibayama remembers that the university was too busy trying to coordinate domestically and construct its own system, and overseas collaboration was not front of mind. The situation was similar with many entities in the disaster-affected areas.

As mentioned above, various parties in the affected regions first became aware of JDA when the National Research Institute for Earth Science and Disaster Resilience in Tsukuba organized a symposium on "Recording and Utilizing the Great East Japan Earthquake: The Aim of the 311 Marugoto Archives" on October 8, 2011, in Tono City, Iwate Prefecture. The symposium was broadcast live on the Internet with approximately 150 participants, and local governments, municipalities, and organizations discussed the significance of disaster archiving and the dissemination of the records to the world.[18] Andrew Gordon from Harvard, along with Yoshio Hata from Kansai Gakuin University, Shunya Yoshimi from Tokyo University, and Fumihiko Imamura from IRIDeS, joined a panel discussing the possibility of sharing Japan's disaster experience with the world.

A few days after the symposium, Gordon, representing JDA, met Tohoku University officials for discussions at Tohoku University. This October meeting was critical in shaping our nearly 15 year collaboration on the technology, infrastructures, and practices of disaster digital archiving. Some notable items we discussed were: the development of an Application Programming Interface (API), cooperation on Japanese and English texts, and joint organization of conferences and educational workshops. The collaboration between JDA and Tohoku University first materialized in January 2012, when the two groups co-hosted with the Ministry of Internal Affairs and Communications and the NDL an International Joint Symposium on the Great East Japan Earthquake Archive, "The Frontiers of the Great East Japan Earthquake Archive and Challenges for Transcending Borders and Generations."[19] With support from the Japan Foundation, JDA held a two-day workshop following the symposium in which dozens of organizations in Japan shared the progress and future vision of each organization, user interface, API collaboration, management, and other issues.

To deepen the discussion, just six months later, in July 2012, Tohoku University and JDA co-organized an "International Summer Conference on the Great East Japan Earthquake Archives – Considering International Collaboration of Earthquake Disaster Archives."[20] This conference was an important milestone for the development of JDA. Gordon, along with Lori Donovan from the Internet Archive, debuted JDA's prototype with a demonstration session, titled "Spontaneous Event Archiving of the Internet: The Example of the Great Eastern Japan Disaster." The JDA prototype and its demonstration of the curation of real-time digital content was stimulating for the workshop participants, and a closed workshop followed on the second day focused on API collaboration, copyright and privacy issues, and challenges surrounding long-term preservation.

As a long-time participant and observer of 3.11 digital archiving, Shibayama sees these two events as the formative moment for each organization's disaster digital archive. The workshops also led to the creation of "Guidelines for the Construction and

18 http://311archives.jp/?module=blog&eid=15856&blk_id=14202.

19 http://www.dcrc.tohoku.ac.jp/surveys/20110311/docs/20120111_report.pdf.

20 https://www.soumu.go.jp/menu_news/s-news/01ryutsu02_02000033.html. See also, https://www.tohoku.ac.jp/japanese/newimg/pressimg/tohokuuniv-press20120628_01.pdf.

Operation of Digital Archives Related to the Earthquake Disaster" by the Ministry of Internal Affairs and Communications, released later in March 2013. There is no doubt that JDA functioned as a dynamic hub connecting the diverse and sometimes competing Japanese domestic disaster archiving efforts to imagine how to disseminate disaster records worldwide.

JDA moved forward to make API connections with each organization in turn, but several problems arose: it took time to negotiate with each organization, there were issues with mapping metadata for API collaboration, and not all the organizations had IT experts. The parties faced issues that required negotiation in Japanese, but the JDA software team, contracted by the Reischauer Institute, could not speak or read Japanese, so discussions were time-consuming.

As a result, Michinoku Shinrokuden and JDA devised a tripartite collaboration structure (Fig 1). First, Michinoku Shinrokuden took responsibility for negotiations in Japan with each partner organization and provided technical support to them. Second, instead of devising direct API linkages between each organization's archive system and JDA, the tripartite structure positioned Michinoku Shinrokuden as a relay base, collecting metadata from each organization and linking all of them to JDA through a single API. With this structure, we were able to establish API links connecting JDA, via Michinoku, with the disaster digital archives created by Japan Red Cross Society and Tagajo City in Miyagi Prefecture in 2017, Urayasu City in Chiba Prefecture in 2018, and Iwate and Miyagi Prefectures in 2020.

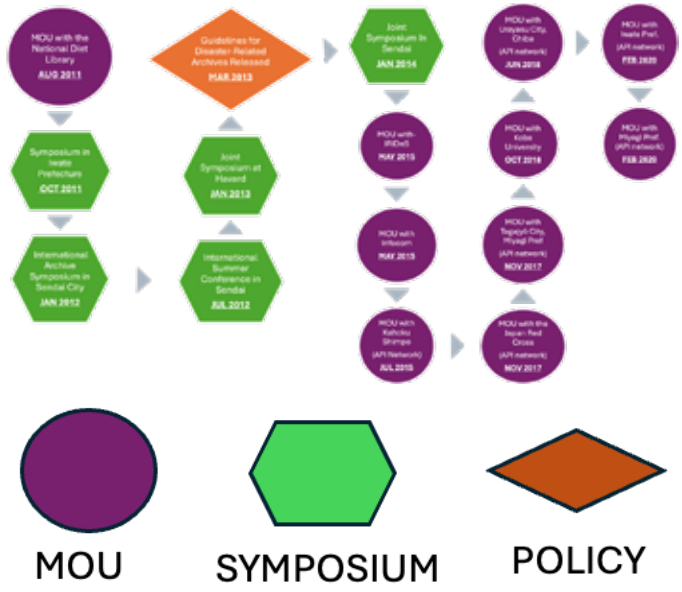

Fig 1. A Diagram of the Timeline of Major Steps in Digital Archive Network Creation.

Looking back at the evolution of JDA-Michinoku relations, Shibayama feels fortunate that JDA created a distant disaster archive in collaboration with Japanese partners. JDA's presence within the ecology of disaster archives in Japan enabled not only movement towards the standardization of technical aspects of digital archiving, such as data and metadata structures, API collaborations, and more, but also facilitated the dissemination of archival contents mainly in Japanese outside of Japan. Furthermore, unlike IRIDeS, which was located at the disaster site and, as a result, overwhelmed with requests simply to collect and curate data to prevent its loss, JDA's distance allowed it to focus on the use of the archive, which remains a huge challenge for many of the disaster digital archives in Japan. Participatory features such as geolocation, annotation, keyword tagging, and collection building distinguish JDA from most digital archives in Japan and make JDA exemplary. IRIDeS has benefited from JDA in educating the next generation of disaster researchers. In Part II we turn to the uses of the JDA in both education and research.

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About the Authors:

Andrew Gordon *is the Lee and Juliet Folger Fund Professor of History at Harvard University. His most recent book, Fabricating Consumers, examines the making of the modern consumer in Japan. He is currently working with colleagues in Japan and the United States to create a digital archive of the March 11, 2011 triple disasters.*

Ryo Morimoto *is a first-generation college graduate and scholar from Japan and an Assistant Professor of Anthropology at Princeton University. His scholarly work addresses the planetary impacts of our past and present engagements with nuclear things. He is the author of Nuclear Ghost: Atomic Livelihoods in Fukushima’s Gray Zone. He is currently researching the U.S.-Japan transnational history of disaster robots and an ethnography of decommissioning robots in coastal Fukushima. Ryo is a facilitator of the Native undergraduate student-led project Nuclear Princeton.*

Akihiro Shibayama *is associate professor of Disaster Culture and Archive Studies at the Disaster Humanities and Social Science Division of Tōhoku University in Sendai Japan. His research analyzes and tests methods to organize and classify various records of natural hazard-induced disasters such as storms and floods; develop metadata schemas to deal with general natural hazard induced disasters, and clarify techniques for automatic classification, categorization and organization of large quantities of materials on natural hazards.*