NARRATIVE

Introduction
The University of Hawai‘i at Mānoa (UHM) Library, in collaboration with the Hawai‘i State Land Survey Division and the Hawai‘i State Archives, proposes to digitize approximately 1800 registered survey maps from a collection of slightly more than 3,000, and make them publicly accessible on the web. The earliest map in the collection is dated 1825, but the bulk are from the 1850’s to the 1970's.

It is estimated that the Hawaiian islands were settled by Polynesians between 300-750 AD. In 1778 Captain James Cook first arrived in Hawai‘i. In 1794 the first foreign ship entered Honolulu Harbor. Missionaries from the United States arrived in 1820. Perhaps because islands are finite geographic areas, land has always been an important issue in Hawaii. Until the 1840’s land ownership was reserved to the king. After foreigners settled in Hawaii, they pressed for implementation of fee simple ownership. Kauikeaouli (1813-1854), also known as Kamehameha III, proposed a land distribution act -now known as the Great Mahele - in the 1830s and enacted it in 1848. The mahele (literally, "division") was part of a number of significant societal changes that followed the death of Kamehameha the Great. In the first stage, the king divided up his lands among the highest-ranking ali‘i (chiefs), konohiki (land managers), and favored haole (foreigners). Many believe the political and social relationships that had been the foundation of Hawaiian culture were permanently altered, and the course of history changed with this act. During the kingdom and republic eras, major changes in cultural patterns and economic use of land were made that have ramifications to the present day. Within a few decades most of the land included in the mahele was sold or leased to foreigners. In 1893 a coup fomented by U.S. sugar interests resulted in the monarchy's overthrow and the establishment of a Republic of Hawai‘i. In 1898 the government of the new republic of Hawai‘i and the U.S. agreed on annexation, and in 1900 Hawai‘i became a U.S. territory. Hawaii became the 50th state in 1959.

Mahele
Although it did not technically redistribute land, the mahele allowed chiefs and later, commoners, to claim private title to land and called for the establishment of an arbitration committee to iron out disputes over ownership claims. The mahele provided a process for fee simple land ownership between the king and chiefs. As part of this process a land commission was organized to adjudicate and formalize claims to land by any individual who chose to register. Immediately, a need arose to identify, locate, and survey the kingdom. As Riley M. Moffat and Gary L. Fitzpatrick have stated, "The surveying and plat-making that were part of […] the mahele was essentially the first cartographically related activity that was conducted because of and for the use of the people living in Hawai‘i."  

Moffat and Fitzpatrick contend that surveying is a foundation for the western concept of private land ownership; and that the concepts and practices of surveying significantly influenced the transition from traditional Hawaiian land tenure to the foreign system of privately owned land.  

2 Op cit. p. 8
establishment of the Hawaiian Government Survey in 1870, the results of which became part of the Land Survey Division collection.

HISTORY AND SIGNIFICANCE OF REGISTERED SURVEY MAPS

Many of the maps in the Survey Division come out of the Land commission’s work during and just after the mahele and are of highly significant historical value. Moffat and Fitzpatrick note that the surveys drawn during the mahele "are deceptively simple, but they contain much information about the original tenure system used by the Hawaiian people." Some authors and researchers have argued that the mahele was the most pivotal factor in altering the political, economic, and social landscapes of Hawai‘i.

Government reports and books published in recent years have examined the unique circumstances surrounding the survey maps. Of particular note are: A brief account of the Hawaiian government survey, its objects, methods and results, by Prof. W. D. Alexander, published in 1889 "by order of the minister of the interior of the Hawaiian kingdom"; History of the Hawaiian government survey with notes on land matters in Hawaii by Curtis J. Lyons in the surveyor's report of 1902 and the body of work by Jon Chinen (a U.S. Bankruptcy Judge and noted expert on historical land use) spanning almost 50 years (Great Mahele: Hawaii's land division of 1848, published in 1958; Original land titles in Hawaii published in 1961; They cried for help: the Hawaiian land revolution of the 1840s & 1850s published in 2002). The survey maps have been, and continue to be a rich resource for factual documentation and investigative, analytical research.

Scholars have noted that the mahele was enacted with little attention to the need for creation of documentation in the form of maps. Moffat and Fitzpatrick contend that "The lack of sufficient surveying capability had practical implications in the conduct of the mahele. Over a period of about five years, titles were conveyed for approximately 13,000 pieces of property, ranging in size from ahupua'a of more than 100,000 acres to kuleana of less than an acre and taro patches of less than one-tenth of an acre. Yet for none of these was there anything vaguely resembling a written description appropriate to the Western legal system that Hawai‘i would soon adopt. In fact, at the start of the mahele there was only one man in Hawai‘i who was a trained and experienced surveyor […]"

In 2003 students at the University of Hawaii Center for Hawaiian Studies began a project to examine documents related to ceded land in Hawaii, including survey maps. Their project is called the Kia‘i ‘Aina Ceded Lands Inventory Project. There is a potentially significant financial stake in this research, as well as their goal "to create a comprehensive culture-based
inventory”. To date there has been little made public about the progress of the project since it was announced and the web site (http://www.kiaiaina.org/) is not active. However, this is but one example of the importance of these maps within the local community. The registered survey maps are historical artifacts, but are also primary reference materials for a wide range of current inquiry.

The Land Survey Division

The mission of this state agency, within the Department of Accounting and General Services, is to provide field and office land survey assistance for state agencies, including Land Court and other government jurisdictions. Its responsibilities include:

- Prepare, furnish and maintain maps and descriptions of all public lands required by other State agencies for the issuance of Governor's Executive Orders, general leases, grants of easements as well as the sale of government lands or purchase of private lands for public purposes.
- Review shoreline maps prepared by private or government surveyors.
- Review and report all quiet title actions referred by the Department of the Attorney General.
- Furnish copies of all government subdivisions and boundary survey maps, copies of survey descriptions and other map products, including File Plan and Land Court maps to government agencies, private organizations or individuals.
- Perform field survey work to establish the boundaries of the various government parcels.
- Provide topographic and boundary surveys for schools and other public projects.
- Serve as an official depository of all Government Survey Registered Maps and other historic maps, field books, calculations and other survey information.

The Department of Accounting and General Services amendment and compilation of Chapter 3-40 of the Hawaii Administrative Rules (governing public use of the land survey division maps, descriptions, and records, and schedule of fees for services, maps, and other record data) officially defines the collection:

"Registered map no. ____" means official government survey maps and maps from private sources that have been assigned numbered designations indicating official acceptance as maps in the custody of the land survey division from 1871 to present.

And stipulates that:

(b) The use of maps, records, and other material in fragile condition shall be regulated at the discretion of the state land surveyor.
(c) All persons including land survey division staff members shall exercise all possible care to prevent damage to items being used.
HISTORY AND SCOPE OF THE PROJECT

As the source of authoritative surveys and maps, the registered map collection has been heavily used for over a hundred years. Repeated use has jeopardized the physical integrity of many maps, and the current crowded storage space available in the Survey Division does not allow for proper conservation treatment or preservation. *(See pages 1-3 in Other_Attachments.pdf)*

Assessment of Need

In October 2004 the University of Hawaii Library experienced a devastating flood that destroyed almost all of the Government Documents and Maps collections. Approximately 65 percent of the maps and all of its aerial photographs were destroyed. About 60,000 other maps — some going back to the 1500s — were salvaged and frozen in hopes they could be restored later. More than 9,000 remain frozen in storage, but conservation and treatment of the water logged and mud stained materials may take years. This event sensitized the custodians of unique collections of historic maps throughout the state to the significance of the oft-quoted adage "Lots of Copies Keep Stuff Safe".

The University of Hawaii at Manoa, Hamilton Library Information Technology Division met internally with the Government Documents and Maps department and members of the campus Geography department as well as with Survey Division and State Archives staff in early spring 2006. The Assistant University Librarian for Library IT had lofty goals: "While I am envisioning a multi-year grant for over $100,000, it is doubtful that we could work with the entire collection under this project. I am looking to this group to help scope the project." A number of potential sub-collections were identified as potential candidates. *(See pages 4-5 in Other_Attachments.pdf)*

In May 2006 a preliminary preservation assessment was made of the maps located at the Survey Division *(See pages 6-8 in Other_Attachments.pdf)*. The assessment found that the maps are "generally in good condition and suitable for scanning", but noted that there are many that are very fragile and large number which are tightly rolled.

Audience, needs and benefits

The Survey Division staff, other professional surveyors, land researchers, academics, writers and researchers in the fields of Hawaiian history and culture as well as the general public use the collection. During the past several decades, cartographic historians have become more interested in the cultural and social aspects of map making. Issues such as the role of mapmaking in the appropriation of the lands of indigenous people, or the connection of cartography to military endeavors are areas of inquiry that involve study of the survey maps. Researchers view maps as a medium for communication and documentation of changing cultural and social practices. Providing wider access to the registered maps will

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7 More information is available in the article "Library maps returning to view" By Loren Moreno, in the Monday, January 8, 2007 online edition of the Honolulu Advertiser

An example of the damage to maps and the results of intensive conservation work are included in the Tuesday, September 20, 2005 issue of the online edition of the Honolulu Star bulletin -
provide opportunities for in-depth and creative investigation of the maps themselves and in their broader cultural context. As part of the scanning workflow, the maps will be moved to the State Archives where appropriate climatic and storage conditions will enhance their long-term preservation.

Hawai‘i State Archives
A division within the same Department (Accounting and General Services) as the Survey Division, the Hawai‘i State Archive preserves and makes accessible the historic records of state government and partners with state agencies to manage their active and inactive records. The Archives began serving the public in 1906 with a mission to collect, preserve and make available to the public Hawai‘i government records of permanent value. The records date from the monarchy to the current legislative session, and include private collections of individuals and organizations, photographs, maps, and artifacts.

As part of an effort to expand services to the public, the Archives has started digitizing paper records and indexes and preparing them for Internet access. The Archives plans to have some of the following records available on their website (http://www.hawaii.gov/dags/archives/digital-collections) by late 2007.

- Land Index, 1830-1900. Index of letters and documents written to and from the Hawaiian government by those seeking lands for sale or lease and other land transactions.
- Photograph Collection. A sample selection of photographs from the Archives collections.
- World War I Service Records, 1915-1921. Index of army and navy service records of Hawaiian residents who served in World War I.

These collections, especially the Land Index will complement the survey maps and can most likely be cross-referenced in the future. The proposed project will help the State Archives define and refine their in-house digitization procedures as well as provide a model for an outsourced option.

Project Plan
Xerographic or diazo copies have been made by the Survey Division of many of the maps over the years, however they lack the color-coding that is important to researchers today. The Survey Division currently provides copies, for a fee, if a map is stable enough to be run through a scanner. The maps in the part of the collection proposed to be scanned in this project have already been scanned once, but only in 2-bit black and white at 400dpi resolution. Since they have been scanned once, all partners agree that these should be strong enough to withstand another scan. This project proposes to scan the maps in full color at 600dpi resolution to provide the color coding information and detail that could only previously be seen by going in person to the Survey Division. In addition the maps will be identified with metadata including date, surveyor name, geographic location, caption information, scale, numerical identifiers (registered map #, plat #) and other information from the map title area - usually the lower right corner of the item (See pages 11-13 in Other Attachments.pdf). JPEG2000 images will be created from the master TIF scanned images in order to insure maximum compatibility with other and future GIS systems at the University and the State level (See BSLW email and quality control procedures on pages 9-10
Fully describing the maps will greatly enhance the public’s access to this significant collection. Researchers will be able to study a high resolution digital surrogate and use the metadata to make decisions about the need to consult the original.

Past efforts to scan historic maps in the state have been small scale and relied on in-house equipment and personnel. Therefore very few maps have been scanned. As the flood-damaged maps at the University of Hawaii Library are unfrozen and treated they are being digitally photographed, but there is no system to make this information available to the public. The Hawai‘i State Archives, Survey Division, Hawaiian Historical Society, Bishop Museum, and the University of Hawaii (among many other agencies and institutions with holdings of historic maps) want to make more cartographic/geographic information available through digitization. However, all these agencies face the same issues: lack of money, equipment, staff, space and time to undertake new digitization initiatives.

This project will explore whether it is feasible to undertake a large scanning project using outsourced labor to jumpstart the process. It isn't certain that this is the best solution to the identified needs and problems, however it has not proved sustainable for each institution to separately fund and maintain hardware, equipment and staff with expertise to perform all the functions to create digital collections. This project will involve just three State agencies that have already worked together. Keeping the project small should minimize the coordination burden but provide a range of experiences to evaluate. UHM library and State Archives staff will serve as the technical leads and liaison with the scanning vendor.

It is the intent of the Survey Division to transfer the Registered Maps to the Hawaii State Archives as soon as practical. The project will help develop and delineate procedures for the transfer of historic maps from the Survey Division to the Archives, a safer environment dedicated to preservation of historic materials. The State Archives as an institution and it's staff are better equipped to assist researchers with this type of historic material than is the working offices of the Survey Division. There will be immediate benefits of searchability of the maps through the creation of metadata in a standard format. One product of this project will be JPEG2000 images that can be utilized in GIS systems such as ESRI's ArcIMS/ArcView system. The University of Hawaii Library has just hired a GIS Librarian to work on rebuilding, improving and enhancing the role of the Map Collection by using information technology solutions. Flood reconstruction plans include creation of a GIS lab in the Government Documents/Maps collection when the ground floor is rebuilt (estimated completion date 2009). The digital files of the scanned survey maps will be available to geographers at the University of Hawaii and other state agencies, as well as the GIS librarian, to import and use for their own research.

Beyond the immediate practical benefits the project will be the creation of a tangible starting place for wider contact and coordination between state agencies and cultural heritage institutions that have cartographic and geographic information to share. Project participants will make get in touch with relevant councils, committees and institutions by demonstrating the project as frequently as possible. Additional financial and logistical support is usually

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8 See email correspondence from Backstage Library Works
offered only after some appreciable product demonstrates promise and usefulness. If the proposed outsourced approach becomes a viable alternative to the current fragmented efforts, then in the future most agencies in Hawaii may be able to focus more sharply on the conservation and preservation treatment of maps in order to make it possible for them to be scanned. The eventual goal would be to achieve statewide participation in, support and funding for a digital map repository.

**Digital Map Collections within the State**

While there is no comprehensive collection of digital cartographic and geographic images, there is some material in various formats and locations. Digital images (black & white, relatively low resolution tiff images) are accessible via the Survey Division website, but can only be located by the map number (See page 14 in Other_Attachments.pdf). Kamehameha Schools has implemented a GIS system to maintain land information, such as location, zoning regulations, who is leasing which area, and other business information relating to the Bishop Estate investments. Unfortunately their system is not available to the general public.

The Statewide GIS project (http://www.hawaii.gov/dbedt/gis/) a unit of the Dept. of Business, Economic Development and Tourism is oriented toward datasets and modern maps. However their 2006 draft Strategic Plan indicates they want to collaborate on digitization efforts.  

The Hawaii Geographic Information Coordinating Council as reported in the September 2004 Executive Board Minutes passed a resolution on developing a "Hawaii historic map preservation and dissemination project".

Riley Moffat, Professor of Geography at BYU Hawaii gave a presentation at GISMAP 04 on historic maps of Hawaii. The presentation raised awareness and interest in preserving maps of Hawaii. Ken Schmidt, Royce Jones and Karen Kemp met with David Rumsey (www.davidrumsey.com) at the 2004 ESRI User Conference in San Diego. [...] Craig will help the Board understand the many issues involved by giving a tour of the Kamehameha Schools map scanning operations. [...] The Board agreed the first focus of this effort will be maps of Hawaii.

Motion: Craig Clouet will coordinate the formation of an HIGICC committee for preservation and dissemination of historic maps of Hawaii.

Nothing tangible has yet come of that resolution. However, Professor Moffat is interested in being included in the project discussions and may be able to contribute material from BYU.  

(See page 15 in Other_Attachments.pdf)

**Experience with Digital Conversion Projects**

The proposed project builds on an existing base of knowledge and experience. The University of Hawaiʻi at Mānoa Library has a long history of involvement with digitization projects, beginning in 1991 when the library received a 2-year Title II-C federal grant for a pilot project to create a digitized database using the Trust Territory Archives Photo Collection. This first foray into digitization supplied the library with "ground floor" experience and knowledge of the early development of standards for image formats and quality, the management issues of

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9 "3.6: Participate in collaborative effort to scan and rectify historical data including aerial photography and maps." See: http://www.hawaii.gov/dbedt/gis/data/gis_strategic_plan_2006.pdf  
10 www.higicc.org/text/minutes/minutes_040930.doc
running an in-house conversion project, and what end-users looked for when using online image collections. Over the years the library has developed significant expertise in working with vendors offering digitization services and managing grant funds.

In Fall 1998, three areas of the Special Collections were awarded an Institute of Museum and Library Services (IMLS) grant to fund a two-year project to begin developing a digital library of Hawaiian and Pacific Islands materials. The experiences and project management findings from this project were presented at the March 2000 IMLS-sponsored Web-Wise Conference in Washington, D.C. and subsequently published in the online journal *First Monday*, http://www.firstmonday.org/issues/issue5_6/index.html.

**Benefit to Community, Advancement of Library Field**

This project will establish a system that will give the University of Hawaii at Manoa library the ability to easily disseminate geographic information over the Internet and the expertise to take a leadership role in promoting the development of a statewide system. The GIS Librarian and other staff in the Government Documents/Maps and Information Technology (IT) departments of the UHM Library will use this project to make contact with, and capitalize on the interest expressed by representatives of committees and councils formed to promote geographic information use.

The University of Hawaii Library and Information Studies program will take part through the use of student interns, site visits and presentations. An ongoing cooperative internship program with the Library and Information Studies Program library school with the Library IT department provides opportunities to participate in a range of digitization projects including research and direct experience with issues relating to creation of a digital library; experience with making image and other files available for use on WWW; HTML encoding and design and indexing. (See: http://www.hawaii.edu/slis/courses/690/690-dns-speccoll.htm)

The grant participants will explore how the digitized survey maps might be used to complement the Waihona Land Commission database created and distributed by Waihona 'Aina Corporation (http://www.waihona.com/). The company, founded in 1996, provides "archaic Hawaiian land use documents in digitized form." UHM Library subscribes to the Waihona database for use by researchers and students within the Hawaiian/Pacific collection. Possible linkages with the State Department of Land and Natural Resources (DLNR) Historic Preservation Division (HPD) database will also be investigated. The DLNR inventory of historic properties expands at the rate of approximately 1000 new sites per year. Records on the properties are included in over 3,500 archaeological reports in the HPD Library. According to their web site (http://www.state.hi.us/dlnr/hpd/hpinventory.htm) the division is in the process of computerizing their inventory to make it accessible via the "State's Geographic Information System."

**BUDGET**

See the attached budget form for details. Budget categories include salaries, fringe benefit costs, outsource vendor contracts, and content management software system purchase expenses (See pages 16-22 in Other_Accomments.pdf). The budget includes estimated costs for hard drive backup media as well as a processing workstation and portable projector for the
Technical Specialist that will remain onsite at the State Archives at the end of the project (See pages 23-26 in Other_Attachments.pdf). The quote from Backstage Library Works (See pages 27-31 in Other_Attachments.pdf) is based on several educated assumptions extrapolated from the preliminary collection analysis about the condition and composition of the maps that will be scanned. If a greater number of maps are easier to scan than expected, project participants will identify other maps that could be scanned by the vendor during the time allocated onsite.

Staffing (Please see the attached resumes in TextResponses.pdf )
Project Director/Metadata, Martha Chantiny – 7% for 12 months
Technical Specialist/Quality Control (temp hire) – 100% for 12 months
Preservation Librarian, Lynn Davis - 1% for the equivalent of approximately 6 months
GIS Librarian, Salim Mohammed - 2% for 12 months
Partners - direct involvement will vary and the cost will be absorbed by their respective agencies:
   Susan Shaner, Archives Administrator
   Reid K. Siarot, State Land Surveyor

The Project Director, Martha Chantiny, will have general oversight of the project. She has been a leader on several digitization projects. She will liaise with the funding agency, hire and work with Archives staff to supervise the temporary specialist and library interns and work with contractors. Ms. Chantiny, will work with staff at the Survey Division, State Archives, onsite vendor and Specialist to develop procedural guidelines for the project and will work with vendors and UHM Library IT staff to ensure content integrity. There will be close coordination with the forthcoming Library institutional repository.

The Preservation Librarian will assess the condition of the materials, and note areas of concern. The GIS Librarian will contact the constituencies identified in this proposal and others that are revealed through the process of scheduling consultations and presentations.

The Specialist, TBD, is responsible for monitoring production and reviewing metadata for accuracy. Will liaise with the vendor(s), coordinate upload of image files. Will perform quality control on the digital images and the metadata. Will prepare, monitor, and document project schedules. Will document the process flow of materials. In collaboration with Project Director, will prepare project reports. Will establish a web site that will document policies and procedures and publish documentation on website. Will provide technical support and do demonstrations of the project at presentations. (Please see the draft job description in TextResponses.pdf )

History of Grant Funding at the University of Hawaii Library
• IMLS - "Project To Create and Expand Digital Databases for Three Collections in the University of Hawai‘i at Mānoa Libraries" - $120,000.
• SEED (Student Equity, Excellence & Diversity) – The Annexation of Hawai‘i: a Collection of Documents on the Word Wide Web - $3,500, February 2002
• HCH (Hawai‘i Committee for the Humanities) – Digitization for Preservation of an Important Hawaiian Language Newspaper – Ka Nupepa Kuokoa - $5,000, September 1999

• SEED (Student Equity, Excellence & Diversity) -- microcomputers to access Hawaiian Newspapers on the web, for distance education Hawaiian language courses on Kaua‘i and Maui - $7,635.00 for 3 requests coordinated by UHM, January 1999

• SEED (Student Equity, Excellence & Diversity) -- Digitizing Hawaiian Language Newspapers on the World Wide Web, Phase II - $2,270.00, November 1997

• SEED (Student Equity, Excellence & Diversity) -- Digitizing Hawaiian Language Newspapers on the World Wide Web, Phase I - $7,188.00, February 1997


EVALUATION

Production statistics (number of maps scanned, transferred, encoded with metadata) per week will be kept and analyzed to determine if the outsource model is efficient and appropriate to the scope of the project. If possible comparisons with "hand scanning" using other equipment will be made with the product from the vendor. Goals and objectives that will be confirmed include: all proposed, or more maps are scanned; adequate and accurate metadata descriptions of the material is entered and accessible to users on the Internet. Positive outcomes include: participants agree that the resulting product meets their needs; post-presentation evaluations are positive; buy-in from at least one additional council, committee or agency is achieved.

The project will use existing standards and best practices for digital image quality and formats. Evidence for this will be obtained by asking geographic specialists, including the GIS Librarian, to test the JPEG2000 images with other geographic information system software.

Decisions, experiences and policies will be shared with other libraries and cultural institutions as part of the outreach effort. The effectiveness with the user community will be evaluated by hit count and by surveys of Survey Division and State Archives staff to determine if service is affected positively (faster turnaround, greater patron satisfaction).

CONCLUSION

The Library is well prepared to undertake coordination of a multi-partner digital conversion project and has the expertise necessary to continue the development of an expanded system in future phases. Highly skilled Library staff has led and participated in numerous digital conversion projects. The experience in managing the administrative and technical aspects of digitization initiatives and the combined GIS, preservation and technical expertise of staff in the partner agencies will guide and inform proposed project.