

**California Office
of Historic
Preservation**

**California Office of Historic Preservation:
Information Center Inventory Assessment
Final Report**

Submitted by:

**Farallon
Geographics**
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1.0 Introduction

This document provides CHRIS-wide recommendations for improving digitization throughout the CA OHP Information Centers and provides context for Farallon's assessments of each IC. A short summary of each IC visit is provided along with possible problems/areas of concern, and lessons learned from each IC are identified.

2.0 Project Goals

The primary goal of this project was to develop a budget for OHP to use as the basis to request funds for digitization of the full backlog of resources and reports at each of the 10 IC's and at OHP headquarters. The details of our work performed are outlined in detail in our Assessment Plan provided early in the project.

This project and report had two key deliverables:

The Cost Calculation Model

The first of these deliverables is a mathematical model for calculating costs. This model takes into account a long series of variables that are intended to be plugged in on an IC by IC basis. The output of the model is an estimated dollar cost for resolving the IC's backlog.

For a detailed description of the cost calculation model and the specific formulas that drive it, please see the Assessment Plan provided by Farallon.

Recommended Input Variables for Each IC

While the model alone is necessary to calculate costs, it does not provide cost estimates in the absence of IC-specific input values. Collection of recommended input values represented the bulk of effort necessary to complete this project.

Farallon collected input values to plug into the Cost Calculation Model for each IC with the use of a survey, direct observation of IC digitization workflows, and by assessing quality of existing digital data.

Again, the Assessment Plan provides a detailed accounting of Farallon's tactics for developing input values.

The following tasks were performed along with related deliverables:

Task 1: Inventory Assessment Plan

The Inventory Assessment Plan defines the Cost Calculation Model and the processes that Farallon used to populate the model with the recommended IC variables. It also defines a modified process for collecting OHP digitization costs and lays out a planned schedule for completion of the IC visits.

Task 2: IC Visits/Interviews

When the original RFP and proposal were developed, Task 2 was envisioned as an effort to collect relevant information via in-person visits at each IC.

However, on development of the Assessment Plan, it became clear that collecting the information necessary to calculate digitization costs can be (and should be) collected using a variety of methodologies, including:

- A survey for each IC
- Review of data within each IC's ICDB (or other digital inventory if ICDB was not implemented)
- An onsite review of backlog, digital data, and digitization workflow

The Assessment Plan provides the basis of understanding the IC assessment process – of which the IC visit was a significant part. Each IC's visit consisted of the following components:

1. Review questions and answers from the CHRIS IC Data Digitization Assessment survey to ensure the IC understood each question and answered them to the best of their abilities. Further, we provided opportunity for the IC staffers to revise their answers based on a more complete understanding of the survey questions.
2. Assess the size and character of the IC's day-to-day, digital and paper backlogs as they are defined in the Inventory Assessment Plan.
3. Collect sample information on the time it takes and methodologies in place to digitize records from the IC's backlog, including the time it takes to search for duplicate records.

One interesting and unexpected discovery in the course of the earlier IC visits was the intended meaning of the term "backlog" in the course of this project. Some of the IC's indicated that they have no backlog whatsoever while others indicated that they have a significant backlog.

We found that some IC's did not think of the reams of boxes in the back of their offices full of paper resource records and reports as backlog, and only characterized recently-provided records provided by consultants as part of active projects as their backlog.

We address our definition of backlog in some detail within the Assessment Plan, but it should be noted that our understanding of backlog does not include what is surely an ongoing and day-to-day data maintenance effort at every IC. The intent of this project is to estimate cost and effort to get all of that back office paper digitized appropriately, and not to address the ongoing and programmatic effort that will continue toward day-to-day data entry and maintenance. For this reason, Farallon addresses the day-to-day data at each IC only as it affects that IC's ability to process their backlog.

Task 3: OHP Assessment

To the extent possible, the OHP assessment mirrored the assessments of the IC's. However some marked differences in business needs and business practice convinced the project team that a modified model and assessment process was necessary.

Details of how the assessment process diverged in the case of OHP are documented in the Inventory Assessment Plan. However, at a high level, these three areas define the largest portion of the divergence:

1. In addition to maintaining a resource and report inventory, OHP is also concerned with processing requests for status evaluation. Each evaluation processing workflow defines, to some extent, similar formats for the resources and reports that undergo that processing. As such, we divided the cost calculations by processing workflow rather than by inventory of resource or report – which are the basic units within the ICDB.
2. Units of work are calculated in linear feet of paper rather than by or resource/report. So, for example, for an IC we may estimate that it take X number of minutes to process one report whereas at OHP we estimate that it takes Y minutes to process a linear foot of paper backlog.

The reason for this divergence was driven by limitations in time available (from both OHP staff and Farallon) to define a meaningful estimated set resources.

3. OHP neither estimated, (nor did Farallon witness) the process of capturing spatial data related to resources or reports. As such, we have no basis upon which to define the time or money it will take to capture spatial data.

In section 3.11.5 of this document, Farallon outlines a recommended spatial data capture approach for OHP, and a very rough guess at effort necessary to use that approach to digitize records.

Task 4: Inventory Assessment and Recommendations Report

This document constitutes the Inventory Assessment and Recommendations Report.

3.0 IC Visit Summaries

3.1 NCIC

3.1.1 Overview

On June 26, 2014 Ryan Anderson from Farallon Geographics traveled to the North Central Information Center (NCIC) in Sacramento, California. Farallon's visit spanned from roughly 12:00pm to 1:30pm in which they spoke with NCIC Coordinator Nathan Hallam and CHRIS Coordinator Eric Allison.

The visit included an assessment of NCIC's current digital backlog, an assessment of NCIC digitization and GIS QC processes, and discussion about the effectiveness of different digitization strategies.

On June 27, 2014 a follow-up email was sent to Nathan asking for additional detail about NCIC's quality control process and estimated costs associated with digitization. As of July 11, 2014 this follow-up email has gone unanswered.

3.1.2 IC Resources

- One IC Coordinator – trained in how to use GIS software
- Currently 1 student intern. Average 2 student interns
- 3 computers available for digitization
- 1 large photocopier/scanner unit

3.1.3 Problems/Areas of Concern

Potential problems and areas of concern for NCIC include:

- 1.9% of NCIC's resource polygon geometries and 24% of NCIC's report polygon geometries were digitized by a third party and do not meet NCIC's current QC standards.
- The NCIC coordinator is new to the position and may not be aware of all the potential data in the IC including resources/reports in the NCIC backlog.
- NCIC did not provide Farallon with any documentation detailing their digitization process.
- NCIC has no documented QC process.
- NCIC only QCs data on export.

- Some metadata (Primary/Report Number, Title, Digitizer, and Date) is collected both on paper and in the ICDB system. While this only represents a minute or so per record the cumulative effect of this redundant work can have a significant impact on digitization.
- Only one person can edit GIS data at a time.

3.1.4 Lesson Learned

Lessons learned from NCIC include:

- In terms of accuracy, in-house digitization of geometry is preferable to third party geometry digitization.
- While only one person can currently edit GIS data in the same geodatabase, NCIC has found a way around this by creating multiple templates of the same geodatabase to be edited simultaneously and reconciled on a regular basis. This approach works well for IC's of modest means that have sufficient technical database knowledge to manage the periodic reconciliation.
- When possible NCIC asks clients to submit their GIS data in a digital format. This is a good idea because it offloads the work of digitizing to those submitting data. Recommendation #4.6 expands on this practice.

3.1.5 IC Recommendation

Farallon's recommendations specific to NCIC are as follows:

- Develop formal digital processing workflow documentation. This will help to standardize workflow process to ensure consistency and provide a basis to quickly train up new interns as they begin working at the center.
- NCIC seems well positioned to experiment with ceasing maintenance of USGS quad index maps. If the center (indeed, any center) can deprecate usage of those paper maps, that would result in a significant win both in terms of reduced overhead and improved data accuracy in GIS because more time can be spent on digitizing quality digital spatial data.

3.2 NWIC

3.2.1 Overview

On June 1, 2014 Ryan Anderson and Adam Lodge from Farallon Geographics traveled to the North Western Information Center (NWIC) in Rohnert Park, California.

Farallon's visit spanned from roughly 12:00pm to 2:30pm in which they spoke with NWIC Coordinator Bryan Much. The visit included an assessment of NWIC's current digital backlog, an assessment of their digitization and GIS QC processes, and discussion about the effectiveness of different digitization strategies.

As the only IC that utilizes an enterprise level geodatabase, NWIC gains much efficiency in workflow from use of more sophisticated technology.

3.2.2 IC Resources

- One IC Coordinator – Advanced knowledge of MS Access and GIS software
- Multiple computers available for digitization
- At least one computer available to perform record searches
- One large photocopier/scanner unit
- GIS data is stored in a versioned ArcGIS database, back ended with SQL Server
- The ICDB is stored in SQL Server and Front-Ended with MS Access forms that utilize ODBC links
- Multiple staff members trained on how to use GIS software

3.2.3 Problems/Areas of Concern

Potential problems and areas of concern for NWIC include:

- NWIC has a high degree of variability within their dataset making estimates for digitization time difficult.
- The IC recently discovered approximately 80 boxes of previously unknown resources/reports. This discovery calls into question whether there is additional unknown backlog for which our input variables do not account.
- Reportedly approximately 40% of report maps were identified to have at least some of the following problems:
 - symbology differing from area actually covered by report,
 - Locations represented using non-standard symbols (stars, flag pole, etc.),
 - Reports located in counties where parcel data was unavailable. This is an issue because in cases where there is no map available in the source report, APN is sometimes be used as the basis defining geographic location of a resource. In counties where GIS parcel data is unavailable, this is not possible.

3.2.4 Lesson Learned

Lessons learned from NWIC include:

- NWIC's enterprise-level geodatabase supports simultaneous multi-user editing. For a large IC with appropriate technical resources at its disposal, this makes sense because it allows for multiple technicians to simultaneously enter and edit data within the system. However, Farallon believes that NWIC is the only center for which such a sophisticated system will yield significant enough returns to be worthy of the investment.
- The NWIC Coordinator, on multiple occasions, made the point that there is a huge amount of variability in the time required to digitize different resource and report records. He was concerned that our cost calculation model does not sufficiently account for the variability.

3.2.5 IC Recommendation

- The best way to address the Coordinator's concerns about variability in time required to digitize resources is to enlarge the sample pool of resource and report digitization workflow. If so inclined, the Coordinator could time the data capture workflow for more statistically significant sample and improve the time (and therefore cost) variable values which are plugged into the cost calculation model.

3.3 SSJVIC

3.3.1 Overview

On July 7, 2014 Ryan Anderson from Farallon Geographics traveled to the Southern San Joaquin Valley Information Center (SSJVIC) in Bakersfield. Farallon's visit lasted from roughly 12:00pm to 2:30pm in which they spoke with SSJVIC Coordinator Celeste Thompson.

The visit included an assessment of SSJVIC's current digital backlog, an assessment of their digitization and GIS QC processes, and discussion about the effectiveness of different digitization strategies and a discussion about resources current available to the IC.

3.3.2 IC Resources

- One IC coordinator – self-taught in desktop GIS
- 0-4 student interns at any given time – some with self-taught desktop GIS skills
- 2-4 computers available for digitization

- One small desktop scanner

3.3.3 Problems/Areas of Concern

Potential problems and areas of concern for SSJVIC include:

- SSJVIC lacks professional GIS staff, training, and support.
- The scanner currently available at SSJVIC has a limited number of pages that it can scan at a time, increasing the time it takes to scan resources and reports whose number of pages exceeds the limits of the scanner. This results in an inefficient scanning process for resources or reports containing a large number of pages.
- SSJVIC employs student interns which can have higher turnover and require more ramp up time, and can be less invested in the final product. This *can* result in reduced efficiency and a lower quality product.
- 62% of SSJVIC's total resource geometry was digitized by a third party contractor and does not meet SSJVIC's current QC standards.

3.3.4 Lesson Learned

Lessons learned from SSJVIC include:

- It makes more sense for SSJVIC to prioritize digitization within those counties that get more record searches because that is where they derive their income.
- If the goal of geometry capture is to digitize the most accurate geometry possible, then digitizers should digitize geometry based on original source documents instead of USGS quads.

3.3.5 IC Recommendation

SSJVIC does not have any internal documentation for their digitization process, as such no documentation was provided to Farallon. Based on Farallon's assessment of SSJVIC's digitization process they would benefit from greater in house GIS expertise and more resources for scanning resource/report documentation.

3.4 NEIC

3.4.1 Overview

On July 8, 2014 Adam Lodge and Ryan Anderson from Farallon Geographics traveled to the North East Information Center (NEIC) in Chico. Farallon's visit was from roughly 12:00pm to 3:00pm in which they spoke to Assistant Coordinator Stacy Mikulovsky and other staff members.

The visit included an assessment of NEIC's digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit, and Farallon's own set of queries against the NEIC's IC database.

3.4.2 IC Resources

- One IC coordinator
- One assistant IC coordinator – trained in desktop GIS
- Three student interns at time of visit
- Three computers available for digitizing
- One large photocopier/scanner unit
- This IC has had a fair amount of success partnering with local agencies to digitize data

3.4.3 Problems/Areas of Concern

Potential problems and areas of concern for NEIC include:

- Farallon discovered a large unreported paper backlog when visiting NEIC. This backlog comprised approximately 60 boxes and included data from both OHP and CalFire.
- It was observed that it takes at least 15 minutes to check whether a paper backlog record was already recorded in the ICDB. The perception of NEIC staff was that this time checking for "duplicates" is not part of the cost of digitizing backlog. Checking for duplicates is necessary to determine whether a resource from the backlog needs to be digitize or not. Therefore, all records and reports must be checked against the digital inventory.

3.4.4 Lesson Learned

Lessons learned from NEIC include:

- Partnering with local institutions is a good and creative way to fund digitization efforts.

3.4.5 IC Recommendation

No specific recommendations for NEIC.

3.5 CCallC

3.5.1 Overview

On July 16, 2014 Ryan Anderson from Farallon Geographics traveled to the Central California Information Center in Turlock. Farallon's visit was from roughly 11:00pm to 3:00pm in which he spoke to CallC Coordinator Elizabeth Greathouse and other staff members.

The visit included an assessment of CCallC's digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit, and Farallon's own set of queries against the CCallC's IC database.

3.5.2 IC Resources

- One IC coordinator
- Two student interns at time of visit.
- Three machines available for digitizing
- One desktop scanner

3.5.3 Problems/Areas of Concern

Potential problems and areas of concern for CCallC include:

- CCallC employs student interns which can have higher turnover and require more ramp up time, and can be less invested in the final product.
- CCallC is still processing new records both digitally and on paper. This redundant work is necessary because record searches are still performed on paper.
- The feeding tray on the CCallC scanner prevents it from being able to scan larger sized documents (i.e. maps, diagrams, appendices, etc.).

3.5.4 Lesson Learned

No specific lessons learned to report.

3.5.5 IC Recommendation

CCallC should define a pathway to using its digital inventory as the basis of record searches so that redundant paper and digital processing can be eliminated.

CCallIC would benefit most from have more staff with GIS experience, a more modern/larger scanner or outsourcing their scanning work to a third party.

3.6 SCCIC

3.6.1 Overview

On July 21, 2014 Ryan Anderson from Farallon Geographics traveled to the South Central Coastal Information Center in Fullerton. Farallon's visit lasted from roughly 11:00pm to 3:00pm in which they spoke to IC Coordinator Stacy St. James and other staff members.

The visit included an assessment of SCCIC's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit, and Farallon's own set of queries against the SCCIC's IC database.

3.6.2 IC Resources

SCCIC is staffed by one IC coordinator and 4-5 other staff members. A majority of the staff members are full time employees of the IC and at least two have experience with desktop GIS software.

3.6.3 Problems/Areas of Concern

Potential problems and areas of concern for SBCIC include:

- SCCIC anticipates receiving resource/report records for the ongoing Survey LA project. This will represent a large increase in the backlog to add into the database which will of course also mean significant resources to process them.
- SCCIC has a backlog of naval records from the Channel Islands that has not been processed. The IC has been in contact with the Navy to obtain GIS data for these records.

3.6.4 Lesson Learned

Lessons learned from SCCIC include:

- SCCIC provided third party digitizers with photocopies of the maps from their source material to make digitizing geometry more accurate.

3.6.5 IC Recommendation

- The work of incorporating Survey LA data into their IC database can be reduced if the City of LA can provide the data in a single, consistent data structure that can be migrated into the ICDB using automated means.

3.7 SBCIC

3.7.1 Overview

On July 22, 2014 Ryan Anderson from Farallon Geographics traveled to the San Bernardino County Information Center in San Bernardino. Farallon's visit was from 11:00am to 3:00pm in which they spoke to IC Staff member Robin Laska.

The visit included an assessment of SBCIC's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit, and Farallon's own set of queries against the SBCIC's IC database.

3.7.2 IC Resources

- One IC Staff Member– has experience creating GIS data with AutoCAD
- One computer – not running GIS or database software at time of visit
- One photocopier/scanner unit that is shared with the San Bernardino County Museum

3.7.3 Problems/Areas of Concern

Potential problems and areas of concern for SBCIC include:

- With only one permanent staff member SBCIC is too understaffed to be able to effectively digitize all of their data in house.
- SBCIC was not running GIS software at the time of Farallon's visit and did not have ICDB installed.
- The staff has no experience with ArcGIS software used in the ICDB system.

3.7.4 Lesson Learned

No lessons learned to report from this IC.

3.7.5 IC Recommendation

SBCIC provided Farallon with process documentation for their current resource/report workflow, which is not digital. Based on current staffing and resources at SBCIC they would benefit greatly from third party assistance for any part of their digitization efforts.

3.8 EIC

3.8.1 Overview

On July 23, 2014 Ryan Anderson from Farallon Geographics traveled to the Eastern Information Center (EIC) in Riverside. Farallon's visit was from 11:00am to 2:00pm in which they spoke to EIC Coordinator Matthew Hall, Gaby Adame and other staff members.

The visit included an assessment of EIC's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit, and Farallon's own set of queries against the EIC's IC database.

3.8.2 IC Resources

- One IC coordinator - trained in desktop GIS
- One staff member - trained in desktop GIS
- Three student interns at time of visit.
- 4-5 computers available for digitization/record searches
- One desktop scanner

3.8.3 Problems/Areas of Concern

- The assistant IC coordinator recently found previously unknown resources/reports while cleaning the IC. This indicates that there may be other unknown paper backlog that is not accounted for in our cost model variables.
- EIC has no documented QC process for digitized records.

3.8.4 Lesson Learned

No lessons learned to report from this IC.

3.8.5 IC Recommendation

EIC does not have process documentation covering their digitization efforts, as such Farallon has not received any process documentation from EIC. From Farallon's assessment of EIC's digitization process they IC could benefit greatly from more streamlined workflows for digitizing data including having one person perform one and only one digitization task.

3.9 CCIC

3.9.1 Overview

On August 21, 2014 Ryan Anderson from Farallon Geographics visited the Central Coast Information Center in Santa Barbara. Farallon's visit was from 11:00am to 3:00pm in which he spoke with Assistant Coordinator Jessika Akmenkalns and other IC staff.

The visit included an assessment of CCIC's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit. At the time of the visit CCIC's data had not yet been transferred to the ICDB system so any digitization observations are based on their current digitization process and averages from other ICs.

3.9.2 IC Resources

- One IC Coordinator
- One Assistant coordinator – trained in desktop GIS
- One student intern at time of visit.
- Four computers available for digitization
- One desktop scanner

3.9.3 Problems/Issues of Concern

- The assistant IC coordinator changes frequently, usually assigned to a current post-doc
- Licensing costs for ArcGIS may be increasing in the future due to the GIS license manager moving out of the department

3.9.4 Lesson Learned

- The last part item of the CCIC digitization process is to plot the geometry on the quads.
- Any paper resource records/reports submitted first scanned then the remaining digitization takes place.
- CCIC current has a contract in place with OHP to QC of their reports.

3.9.5 IC Recommendation

CCIC provided Farallon very limited process document outlining their digitization process. At the time of Farallon's visit CCIC was not running the

ICDB system. While Farallon did observe their current digitization process we have no recommendation for this IC at this time.

3.10 SCIC

3.10.1 Overview

On August 22, 2014 Ryan Anderson from Farallon Geographics visited the South Coast Information Center in San Diego. Farallon's visit was from 11:00am to 3:00pm in which they spoke with IC Coordinator Jaime Lennox.

The visit included an assessment of SCIC's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit. At the time of the visit SCIC's data had not yet been transferred to the ICDB system so any digitization observations are based on their current digitization process and averages from other ICs.

3.10.2 IC Resources

- One IC coordinator – trained in desktop GIS
- Four full time employees – two trained in desktop GIS software
- One scanner/photocopier unit

3.10.3 Problems/Areas of Concern

- SCIC's data had not yet been transferred to the ICDB system at the time of Farallon's visit.
- SCIC did not provide Farallon with any process documentation.

3.10.4 Lesson Learned

SCIC has an FTP site setup for resource/report submittal from clients cutting out one step of the digitization process.

3.10.5 IC Recommendation

SCIC did not provide Farallon with any process documentation detailing their digitization practices. At the time of Farallon's visit SCIC was not running the ICDB system. While Farallon did observe their current digitization process we have no recommendation for this IC at this time.

3.11 OHP

3.11.1 Overview

Farallon visited the OHP Information Management Unit on July 15, 2014. Farallon's visit was from 11:00am to 3:00pm in which we spoke with CHRIS Coordinator Eric Allison and Information Manager Joseph McDole.

The visit included an assessment of OHP's current digitization process, an inspection of their day-to-day record backlog, their paper backlog, and an inspection of the backlog to determine its approximate size and composition.

The following summarizes information gathered from this visit along with information gathered from a survey taken prior to Farallon's visit.

3.11.2 IC Resources

- One OHP coordinator – trained in desktop GIS
- 2-5 student interns
- 6 computers available for digitization
- One large photocopier/scanner

3.11.3 Problems/Areas of Concern

- OHP has not digitized any of their GIS data.
- OHP has no official QC process.
- Must manage OHP evaluation processes as well as digitize resource records/reports.
- OHP has to manage and distribute resources/reports to the ICs

3.11.4 Lesson Learned

- Both OHP evaluation process and resource/report type inform the format of the resource/report. Resource/report format, in turn, affect the time required to process a resource/report. For this reason Farallon has divided OHP resource/reports first by evaluation process then by resource/report type in order to reduce variability within the cost calculation model inputs for OHP.

3.11.5 IC Recommendation

OHP should not try to digitize GIS data for resources and/or reports. Instead of budgeting for GIS digitization workflows, OHP should consider how to best synchronize the records in OTIS (or its successor) with records stored within the various ICs' local ICDB and GIS databases.

This recommendation is justified by the fact that, unlike the IC's, OHP does not have an inherent business need to have ready access to large scale digital geospatial representations of resources and reports. It currently meets OHP needs to simply geocode point geometries of resource and/or report data based on available address or parcel data to support one-off requests for maps at a statewide scale.

This recommendation is partially driven by the assumption that all resource and report records will make their way into an ICDB over time. However, even if the validity of this assumption changes over time, the fundamental recommendation here is that neither OHP nor any given IC digitize records that are already sufficiently digitized somewhere else. This duplicative data entry creates problems not only in terms of wasted effort, but also calls into question the accuracy of the data if/when the inevitable discrepancies between differing versions of digitized data are exposed.

4.0 IC Wide Recommendations

Farallon has compiled the following recommendations based on their visits to each of the ICs, review of each ICs ICDB database, and review of Phase One and Two of OHP's Modernization and Sustainability Plan. Our intent with these recommendations is to improve the cost-effectiveness of data capture workflows.

4.1 Task Oriented Workflows – Particularly Document Scanning

OHP already recommends processing resources/reports in batches. To further increase efficiency Farallon recommends that each IC implement separate workflows for each part of the digitization process (ICDB, Scanning, and GIS data entry) that can be performed repetitively by IC staff. Defining task oriented workflows will increase efficiency of digitization by limiting distractions and allowing staff to improve their workflow over time.

One example of a task-oriented workflow that we recommend is dedicated scanning of report and resource documents. If those documents are scanned and the resulting files are properly indexed in a file system, then the rest of data capture process will benefit from being able to access source data as digital files. In short, those doing the digitizing will not have to get up from their desks to go retrieve source material.

Further, there are contractors who specialize in the rapid and cheap conversion of paper documents into files. There may be opportunity to reduce costs, both in terms of the scanning process, and in terms of the time necessary to extract specific attributes from the documents by isolating this task within the digitization workflow and prioritizing it.

4.2 Garner Funding From Local Partners

With most of their revenue coming from record searches, most ICs are not directly compensated for their digitization efforts. One prominent exception to

this is NEIC. By partnering with the local National Forests, NEIC was able to fund digitization of some of their backlog. IC's should be constantly looking for local partners that would be willing to fund the IC's digitization efforts.

4.3 Re-Evaluate GIS Data Standards

The document titled "CHRIS Data Conversion and Verification Process Standards" defines a standard process for GIS data entry and validation that aims to "represent the locations as submitted to the CHRIS".

Generally, standards specify the intended use of data that is collected, and tie those use cases to requirements for data accuracy and quality necessary to satisfy that use case.

Unfortunately, the standards document neither defines use cases nor a testable metric that defines acceptable data accuracy or quality. Therefore, the accuracy and quality metrics are unclear, and the business needs that would drive the need for any specific level of data accuracy or quality are also unclear.

While it was outside of our scope to understand or document business cases driving data standards, we observed following use cases in the course of our work:

- Geographic indexing of resources and reports for use in record searches
- Creation of paper maps that identify resource and report locations

If the driver is only to support geographic indexing (as was historically done using USGS topo maps), then the standard for accuracy can be quite lax, and the time and effort necessary to digitize those data to an acceptable level can be reduced significantly.

If the driver also includes creation of maps at scales larger than 1:24K (the same scale as the USGS maps), then the effort is significantly larger.

It seems that the current digitization effort assumes that a gold-plated data solution is required... and maybe it is. But we advise that OHP more deeply consider and document the business drivers that justify the need for GIS data that is more accurate than what is currently available on the USGS topo maps. If they find that lower accuracy data can meet the business need, then there may be significant cost savings to be had.

4.4 Only Maintain Digital Geometries

An important rule of data management is to not manage the same data more than once. Whenever you have duplicative data management practices, not

only does it double the time that is required to manage the data, it also creates opportunity for inconsistencies that call all of your data into question.

Most IC's that captures GIS data also identify locations of resources and reports on hand-draw USGS topo maps. This practice equates to duplicative data management.

Farallon recommends that, as USGS maps are fully captured within GIS, that the paper maps and any associated Mylar overlays be retired. As a replacement, IC's can do record searches with ArcGIS and/or an easier tool such as Google Earth or a custom-built web application. Further, simple custom maps can be printed for the customers based on their specific needs.

Maintaining geometry on paper USGS quads can be time consuming and inaccurate. By maintaining geometry data entirely in the GIS the ICs reduce processing for resources and reports. Additionally, ICs without computers dedicated to client record searches can increase their income by charging for IC staff to perform record searches.

4.6 Implement Method for Digital Data Submission

Looking forward, more and more municipalities and consultants will have the ability to submit their report and resource data (including geodata) in a digital format. OHP should leverage this capability by making it possible for to receive new information in digital formats that require a minimum possible amount of processing. This will increase the speed at which new resources and reports are integrated into the inventory, and minimize costs to get them there.

Looking way ahead, it should be possible for contributors to submit data for inclusion in the inventory online using a web-based application that validates the quality and accuracy of the data on an automated basis before requiring a human to further assess its suitability.

In the short term, however, the IC's can, at a minimum, publish the ICDB's GIS data and attribute schema as the preferred data format for submitted spatial data. That will allow GIS data digitized outside of the IC's to be quickly and easily included into the GIS portion of the ICDB database.

4.7 Reduce Sources of Data Submission

Currently, ICs receive data from both directly from submitters and from OHP. And, in many cases, submitters are providing these new resources and reports to both the IC and to OHP. In the long run, these paper records are pushed through the appropriate process(es) at OHP, and then physically sent to the IC. The IC, in turn, is forced to wade through these records only to find that they were already entered into the inventory when the submitter gave it to them.

While it was beyond Farallon's purview to scrutinize the business needs that drive *why* the same records have to be submitted at both the IC and OHP levels, this duplicative submission process results in a lot of time spent at IC's researching OHP-provided records only to find that the data is already in the digital inventory. Some IC's estimate that 60% of the records provided by OHP already exist within their digital inventories. In short, a lot of time gets spent accomplishing nothing from the perspective of enhancing the IC's inventory.

Our recommendation is to find a way that submitters can provide their records at a single point of entry. In theory, all resources and reports should be inventoried at the IC, and those that require processing at the OHP level should be flagged and made available there without the need to send it back to the IC.

4.8 Continue to Refine Cost Calculation Input Variables

We strongly feel that the most valuable deliverable provided in this project was the cost calculation model, and not the input variable values that we developed as the result of our assessments.

Farallon made the most of our budget and time constraints to visit each IC and make a fact-based variable values. However, we acknowledge that our input values are based on a very limited observed sample of digitization workflows.

We recommend that IC's continue to improve the inputs to the cost calculation model by timing a more statistically significant sample of digitization workflows, and then average that larger sample input improved input variables for use in the model.

The cost of digitization goes beyond what it takes to scan documents, draw geometries, and key in attributes. The bulk of the time is in researching and understanding the source data.