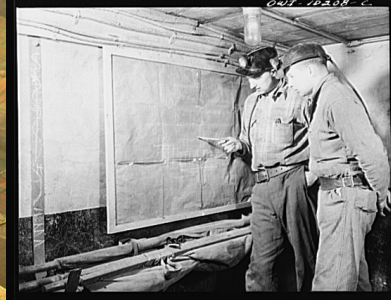


# Preserving, Processing and Providing Access to Coal Mine Maps at the University of Pittsburgh



**IMCC Benchmarking Workshop on Mine Mapping  
February 15 and 16, 2012**

Amy Baker Williams, Conservator  
Jeanann Haas, Head, Special Collections and Preservation  
Debra Rougeux, Cataloger  
University of Pittsburgh

Jeanann...

Thank you so much for inviting us to be here and participate in this workshop. Amy, Debbie, and I will be talking about the CONSOL Energy, Inc. Mine Maps and Records Collection at the University of Pittsburgh. Amy and I will focus our discussion on the conservation of the hardback maps while Debbie will address the organization and access issues for the CONSOL collection as a whole.

## Hardback Mine Maps

1850 - 1940s



Maps rolled inside of other maps



The hardback maps present the most challenging preservation issues within the CONSOL Collection because of their large dimensions; some maps are nearly 25 feet long. Unfortunately, due to the use, size, age and brittleness of the paper and cloth of many of these hardbacks, unrolling them now for viewing causes them to split and break into pieces, limiting current use and jeopardizing future availability.

CONSOL's original inventory listed 500 maps, but we continue to find additional maps. This is a picture of a roll of maps, which was very heavy to lift off of the shelf, that had a total of 14 maps rolled inside of it. Now, some of these maps we discovered do not have mining on them, they might be topography maps or street maps... we even found some architectural drawings rolled with a maps...

So we now estimate that we have over 800 underground mining maps in the hardback collection.....

So the collection of mine maps is growing as we find new maps, but also decreasing as we sort out the non-mine maps....

*To date we have 803 maps listed in our index.*

## Creating a Preservation Plan for the Hardback Maps

- Upgrade the storage conditions for the maps
- Execute various conservation treatments to stabilize maps in preparation for scanning.
- Create cataloging records and finding aids to render maps accessible.

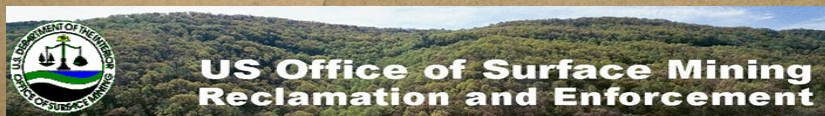


We stabilize maps for optimal scanning – not to make the maps exhibit quality.

Along with Debbie's efforts, the survey work that Amy does in accounting for the hardback maps has also contributed to increased use of the hardback materials prior to digitization. Researchers request to see the hardbacks before or even during treatment and we do our best to accommodate these requests.

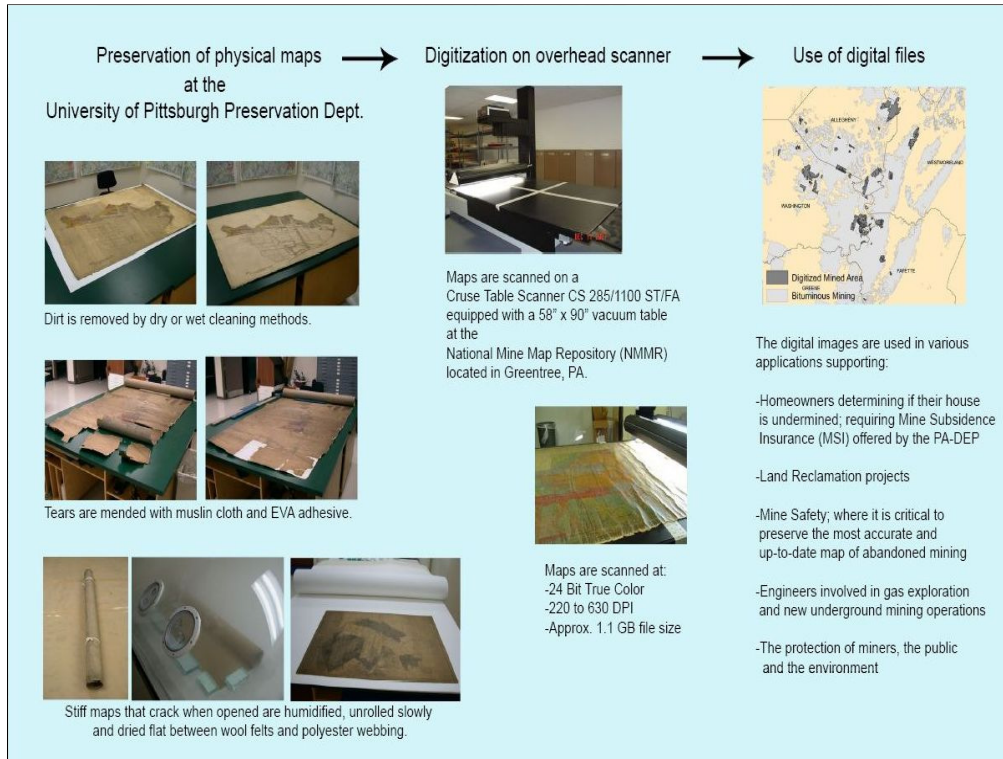


## Partnerships



Pittsburgh is very proud of this collaboration and initiative and is extremely grateful for the support of our partners. This collaboration is not only monetary in support but also in work efforts to transport to digitize the maps.





Here is an overview of the project workflow...

The collection of maps belongs to the Archives. We preserve the physical maps here at the Preservation Dept. After the maps are stabilized they are transported to the scanning facility...

The physical maps return back to the Archives... The digital files are used for various reasons

And ultimately they are used for the protection of miners, the public and the environment.....



Amy, Ashley, Tech 2, 5 student techs, Debbie archivist, Csilla and Wendy consultants,

*In 2012 we will have a consultant from Texas who is an expert on oversized maps...*

# Project Statistics

as of 2-09-2012

717 - Total maps surveyed  
452 - Dry Cleaned  
143 - Humidified & Flattened  
182 - Mended  
81 - Tape Removed  
35 - Re-lined  
438 - Digitized



The project started in 2006, but the actual conservation work began in June 2007. Research on how to best preserve these maps was going on as early as 2004...with literature reviews and consulting with my counterpart at Penn State University.

Beginning lots of basic treatment, dry cleaning, then got into more advanced mending, adhesive removal, re-lining...

Pitt has experimented and developed more advanced conservation treatments which have been integrated into the overall workflow; it is likely that potential treatments and solutions will be developed for the majority of maps that were once thought impossible to treat in-house.



## Project Overview

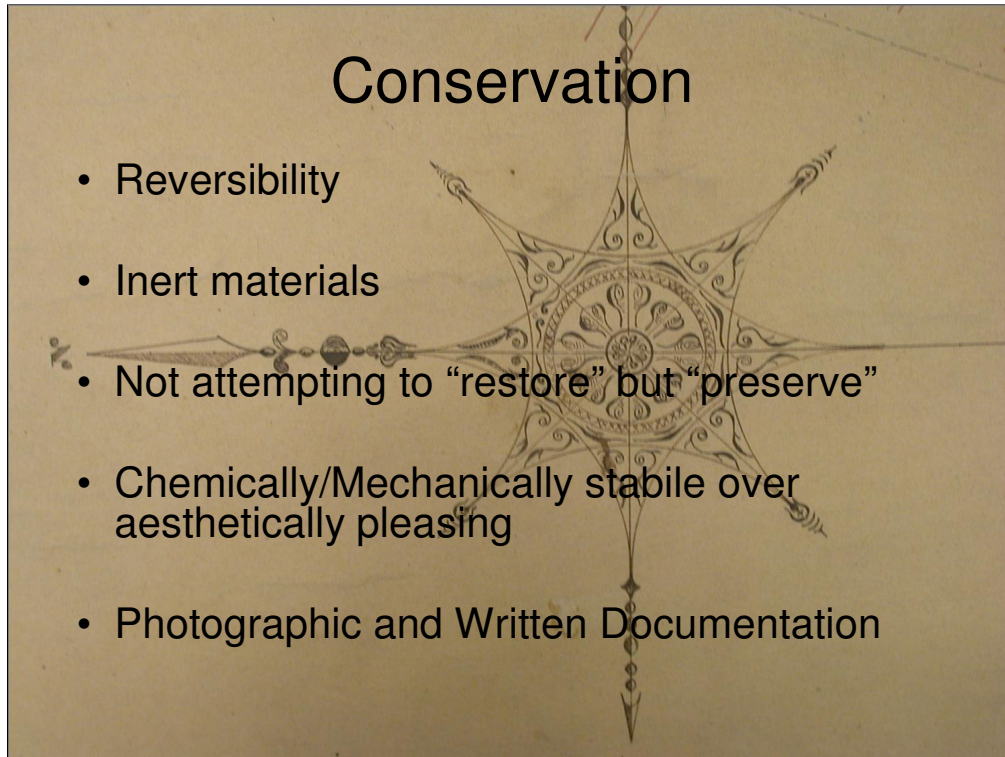
Collection:	800 mining maps (estimate)
Funds:	Applied for and received 4 grants University of Pittsburgh shared cost Gift money from CONSOL Energy
Personnel:	Principal Investigator (10%) Project Archivist (5%) Consultant Conservator 2 Conservation Technicians (2011-2012) <del>1-8</del> Student Assistants
Time:	In 4 years cataloged, surveyed & stabilized over 400 maps



We're in our 4<sup>th</sup> year of the project, and we estimate we have 800 maps of underground mining (*from the hardback collection*) at the University of Pittsburgh Archives

With the personnel and funds we've managed to catalog, survey and stabilize over 400 maps in 4 years...

Thank you for your kind attention. I will now turn it over to Amy to talk to you in more detail about the conservation work.



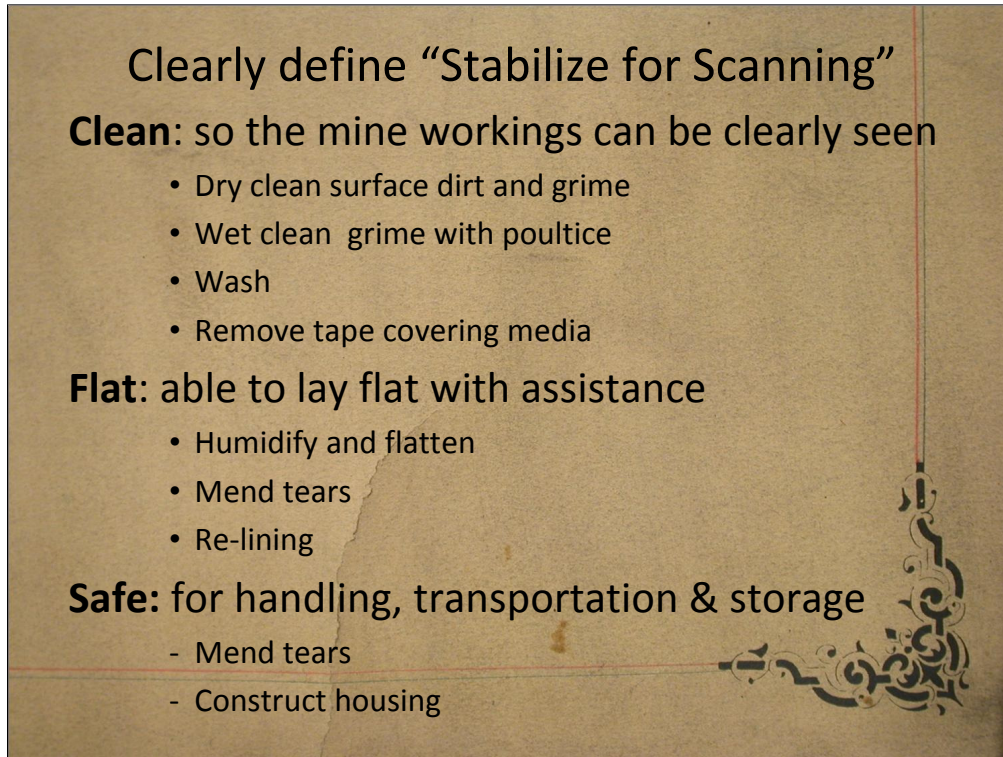
Amy 15 minutes...

As Jeanann mentioned, I am the project conservator. I received my conservation degree from the University of Texas, and I have been working in book and paper conservation for 9 years now.

What is conservation?? ...preserving cultural heritage ethically and responsibly... cultural heritage might be a painting, a sculpture, an historic building or a map.... How is conservation different from “just fixing it.” Conservation of cultural property abides by a code of ethics...

Conservation ethics include reversibility – anything we do to an object can be undone. We only use inert materials for repair. We do not add anything that is harmful or will contribute to the items degradation. We are not attempting to restore the item to it’s original glory, but rather preserve the information as it exists. Chemical and mechanical stability trumps aesthetics, this is not fine art restoration...we are not putting things on exhibit...

And finally, we must document what we did to the object, what chemicals were used, how long did treatment take – what did the object look like before and after treatment...



Our goal is to stabilize the maps for this particular scanning set-up. At the very beginning of the project we had an initial meeting with everyone involved and over the years we’ve come up with the following...

The maps have to be cleaned “to a point where the mine workings can be clearly seen by the scanner.”

The map needs to be able to lay flat (on it’s own or with assistance) and safe.... for handling and transport

Jeanann mentioned background info on the hardbacks... I’ll talk about surveying and treatment...

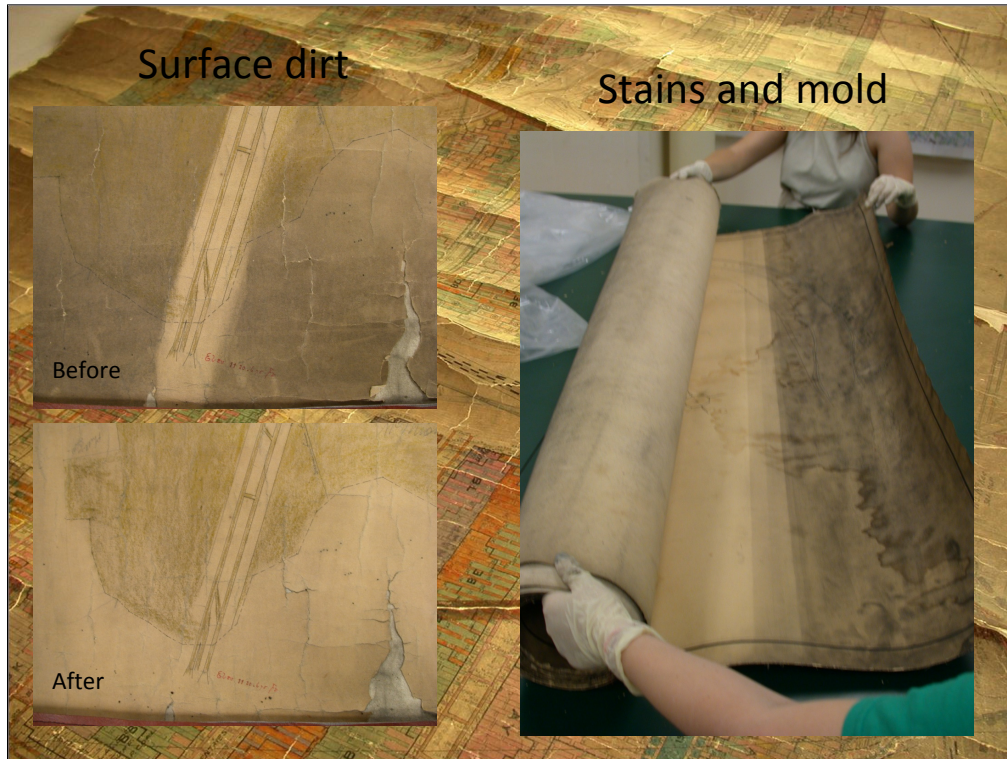




In the hardback collection, some common damages we see.... Are maps that can not unroll safely..



In the past when these brittle map had to be accessed, it was “broken” open in order to view the content. That was the only way to get to that information!!



Other common ailments include surface dirt, also water damage, stains and mold...





Lots of maps were previously repaired with different kinds of tape...

Tape on the front, on the back, over the ink, tape with mine working drawn over it

So we have a collection of maps, with numerous types of damage... how do we quantify this damage, propose treatment and set-up a workflow??

# In-house database

## Geography tab

The screenshot displays a software window titled "Mine Map Sheet Input Form : Form". At the top, there are several input fields: "Local\_Sheet\_ID" (27-A-10), "Sheet\_Name" (Eureka Waverly), "xsl #" (104), and "Sheet\_Date". Below these are "Map\_Type" (Underground Mi), "Shelf Location" (10-1), "Current Location" (Pres felts), and "Status" (to be treated). A tabbed interface is shown with "Geography" selected. Under the "Geography" tab, there are two sub-forms: "Input\_Municipality\_Tab/Table\_form" and "Input\_Quad\_Tab/Table\_form". The "Input\_Municipality\_Tab" has fields for "Local\_Sheet\_ID" (27-A-10), "County" (Washington), and "Municipality" (Nottingham Twp). The "Input\_Quad\_Tab" has fields for "Local\_Sheet\_ID" (27-A-10) and "Quad" (Hackett). At the bottom of the window, there are record navigation controls showing "Record: 1 of 1" for both sub-forms and "Record: 32 of 159" for the main form.

For cataloging and surveying we created a database based on a template supplied by the PA-DEP.

The template from DEP included fields such as mine operator and geographic location.

This image shows the geography tab, which records the county, municipality and quad where the mine is located.

The first question when we unroll a map is "is this in PA?" and "does this have mining on it." We have a few maps from Kentucky, Ohio, Indiana... lots of West Virginia maps...

So we want to make sure it is in PA...

# In-house Database

## Condition Tab

Mine Map Sheet Input Form : Form

Local\_Sheet\_ID: 27-A-10 Sheet\_Name: Eureka Waverly xsl # 104 Sheet\_Date:

Map\_Type: Underground Mi Shelf Location: 10-1 Current Location: Pres felts Status: to be treated

General Scanning Geography Geology Physical Mine **Condition** Treatment H K Sheet

Local\_Sheet\_ID: 27-A-10 Survey\_date: 2/5/2008

Able to unroll without damage?  Losses: 0 Condition comments

Surface Dirt: 1 Tears: 2 Stains: 0 dirt L edge

Brittle: 1 Creases: 2 Tape: 0

Treatment proposed: Humidity and Flatten

Record: 1 of 1

Record: 32 of 159

All treatments complete date:

We added tabs to the database template for surveying, tracking, location and conservation treatment information.

This is the condition tab which we use to do our initial condition survey. Using the tab show here, we rate each map on a scale of 0 to 4 for each type of damage and then propose an appropriate treatment....







After doing a condition survey of a few maps, it was obvious that each map had a good bit of dirt and coal dust as you see in this picture...

Every single map we have surveyed so far contains some amount of dirt...



The first treatment we do is dry cleaning. We use a few tools to clean the maps depending on the kind of dirt. Most often we use soot sponges to clean the surface dirt off the front of the maps... a soot sponge is a vulcanized rubber sponge, used to clean up soot...comes from the fire restoration industry. They work wonderfully, we use a lot of them.





## Wet Cleaning



- Laponite gel
- Methylcellulose
- Water
- Detergents
- Calcium Hydroxide

Dry cleaning only cleans surface dirt. Dirt, grime, and grease within the paper substrate has to be released aqueously...via wet cleaning...

We can use a laponite gel to remove grime or we can wash maps with a “detergent” mixture that doesn’t affect the inks on the map, but removes dirt, oils, grime...

We don’t use laundry detergent like Tide... detergent just means it’s a partially polar, partially non-polar surfactant... we use a conservation detergent commonly used in textile conservation called Orvus paste.

Wet cleaning of this map took 15 hours



For the backs of the maps, we use a backpack vacuum with a HEPA filter to clean the canvas. The nozzle works great for the canvas backing, we're able to get a lot of surface dirt out.

The vacuum is too harsh for the front of the map, which is paper...





Another ailment we have to remedy.... is old tape repairs stuck to the maps

This is filament tape... clear tape with strings in it...

Please never put tape on the front of a map, over mining....especially over inks and drawings.... Tape is nasty stuff, and over the years all that adhesive migrates into the paper and discolors and degrades the area...



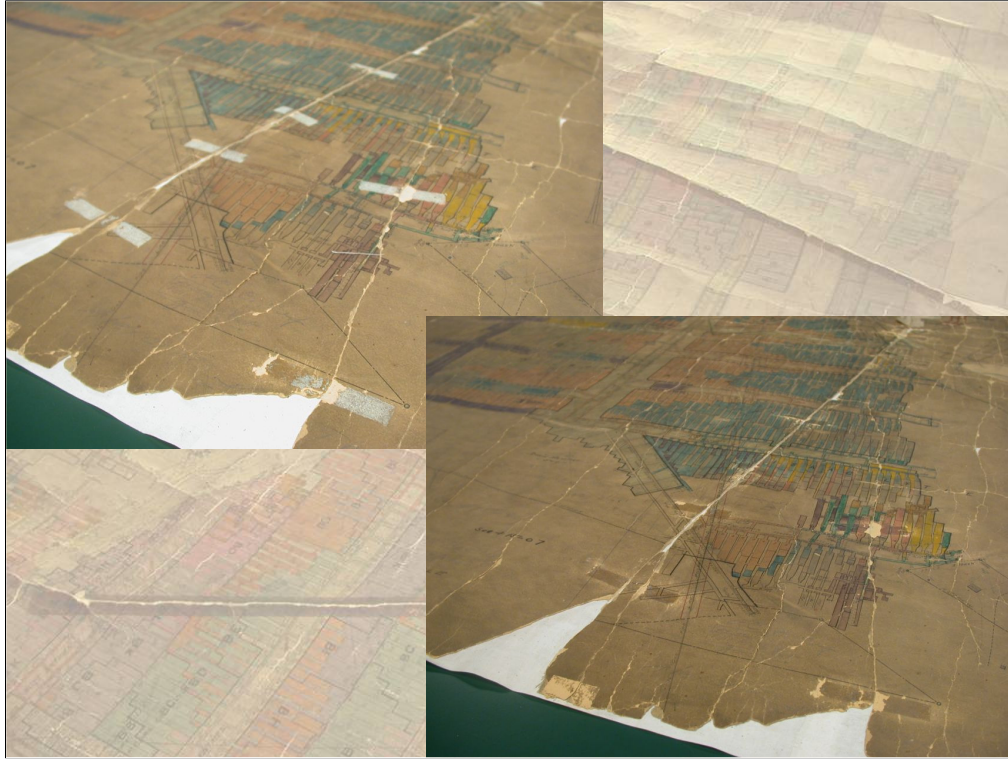
Tape has 2 parts – a carrier and an adhesive... the carrier is the paper or plastic top, the adhesive the tacky part...

In conservation we deal with these 2 parts separately. We do tape removal and then adhesive reduction...

So for tape removal, we can remove the carrier mechanically, with heat, methylcellulose or humidity

We reduce the adhesive.... Mechanically... can use some light solvents, we don't have a fume hood so we can't do heavy work with solvents...

What is methylcellulose??? It's a modified cellulose, it's not harmful.... Used in milkshakes, shampoo, and "movie slime" If you've seen Ghostbusters...Ectoplasm is just methylcellulose dyed green....



Here's a nice example of adhesive reduction... In the top picture those white areas are remaining residue.

We reduced the adhesive using a rubber cement eraser and this is the result, so now we can see the mine workings that the white adhesive was covering up...



## Maps that can not be unrolled safely

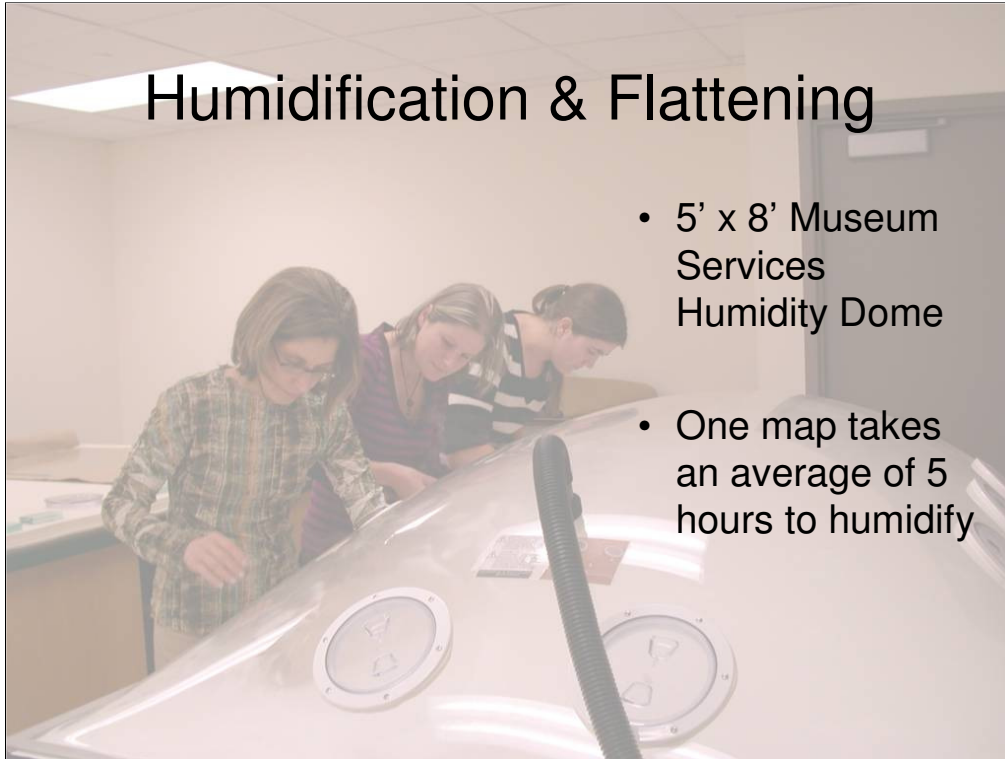


Another common problem.... Maps that can not unroll safely, without breaking...

The maps have been stored in rolls and as they age the paper, the adhesive, the canvas all become brittle... so when you try to unroll them they might crack every 6 inches or so...

In order to safely unroll them we humidify and flatten them....

## Humidification & Flattening



- 5' x 8' Museum Services Humidity Dome
- One map takes an average of 5 hours to humidify

We humidify maps in a Museum Services humidity dome, purchased by the PA-DEP which measures 5 x 8 feet. On average one map will take 5 hrs to humidify one map...



Here is a map at the beginning of humidification.





Here is the same map almost completely unrolled.



Immediately following humidification the map is placed in a sandwich of wool felts and polyester webbing.

Acrylic sheets and then heavy weights are placed on top of the felts and the maps dry overnight...

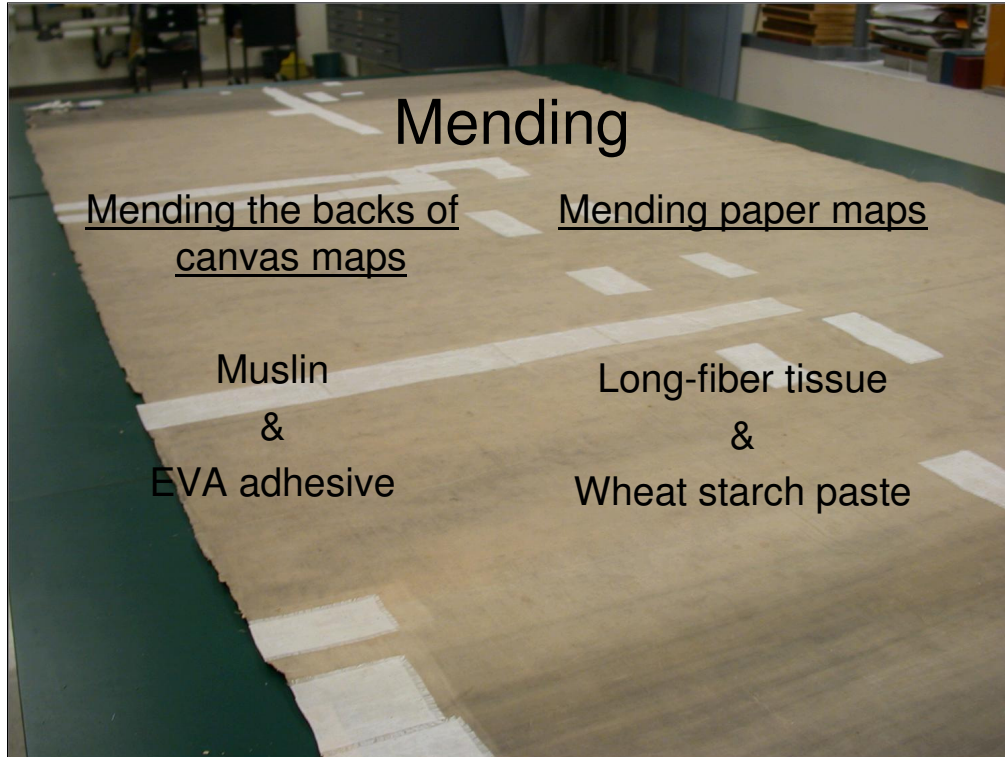
When we have to humidify a map that is 20 or 30 feet long, we take up a lot of space in lab so we try to do these on Friday....

*so the map can hog up all the space over the weekend when no one is here...*



After flattening the map, if there are tears or holes in the map we mend the tears before scanning....





We do 2 kinds of mending...

If we are repairing tears on the back canvas of the map we use muslin or linen and an EVA adhesive... regular Elmer's glue is PVA, polyvinyl acetate... EVA is ethylene vinyl acetate, similar but dries clear and is flexible.... And when we need maps to roll, we need that flexibility...

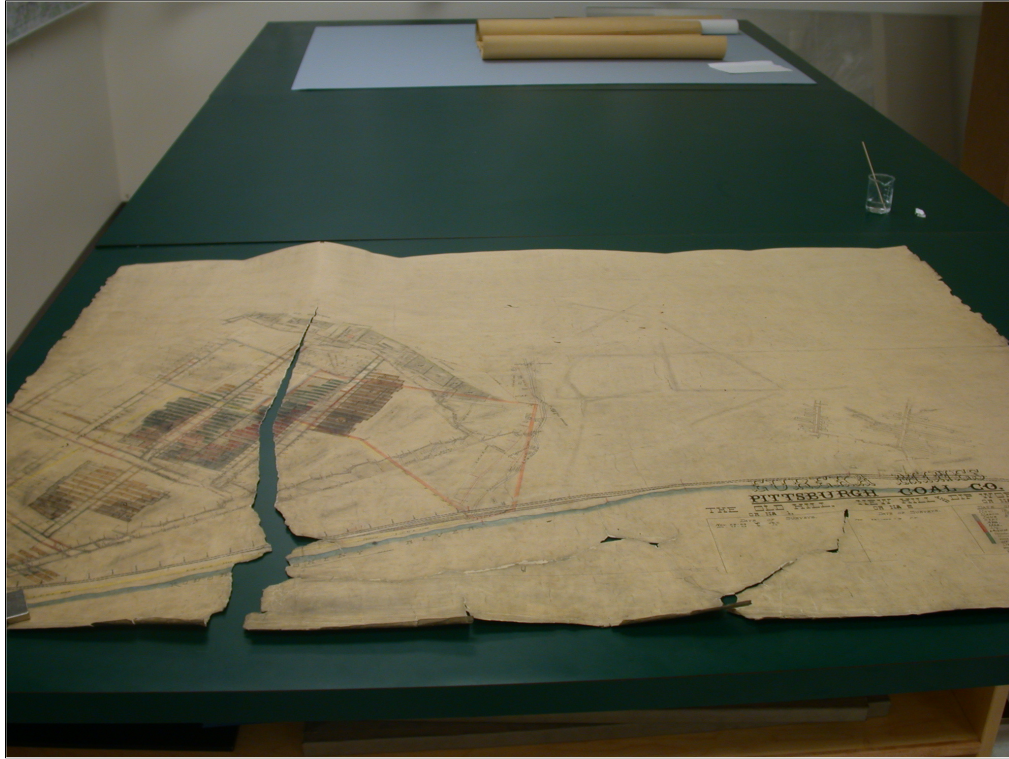
Paintings conservators use EVA to re-line the backs of paintings...

If we are repairing a paper map we use long-fiber tissue and wheat starch paste... Wheat starch paste, similar to wall paper paste. It is reversible in water, and as long as you prepare it with distilled water... you're not adding any harmful elements to the object....

Long-fibered tissue is also known as Japanese tissue because it's made from one of 3 Japanese trees (Kozo, mitsumata or gamphi) The tissue is remarkably strong due to the long fibers and is used widely in the conservation of books and paper...



Here is a map that is torn and we mending the canvas back with muslin patches



Here is a paper map that was torn.





Here is the same map after we mending with long-fiber tissue and paste....

Mending can take five minutes if the map has one tear, or up to 10 hours if there are lots of tears...



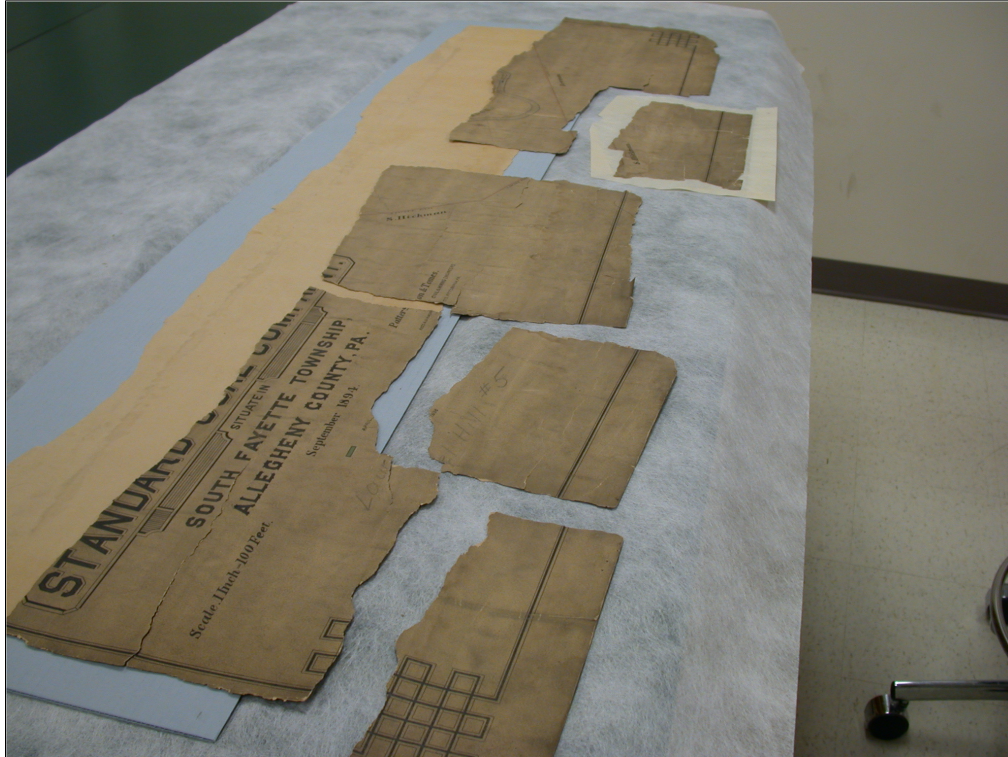
Sometimes the maps are so torn and brittle they are in many pieces...and we are challenged to put them back together like a puzzle...

In cases like this, we re-line the map completely.



The first step in re-lining, is washing the map and removing the old backing





When we remove the backing there is nothing to keep those pieces together so they separate as you see in this picture....



Next, we apply small bridge mends on the front, just enough to keep the pieces aligned...



We attach the rest of the map....

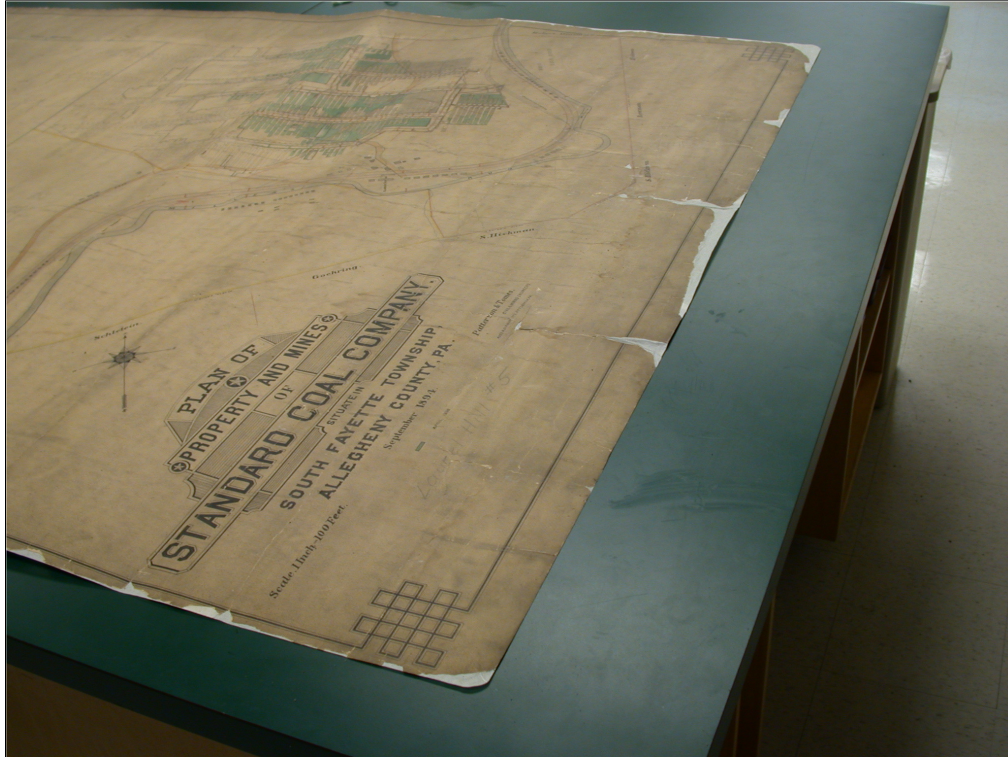


We re-line the section with long-fiber tissue....this is the back of a map, students applying tissue to back...





And then we remove the bridge mends.... We just use a little water, remember everything we do is reversible...



Finally, we trim the edges of the tissue....

And the map is stable, aligned and ready to be transported and scanned....

Recently we've been tailoring our re-lining process, and if we keep the map wet we can re-line without using bridge mends... a wet map is kind of like clay, you can mold it back together before re-linigng..

## Housing



Once the maps are ready for scanning we roll them in plastic, and use velcro ties to secure the map.... The maps are transported outside so we want to protect from rain/snow, etc...

Maps that can not roll, we sandwich between boards and cover in plastic..

Some maps need to be rolled on large 12" diameter tubes, because if we tried to roll them tighter they would break.



## Transport



After the maps have been stabilized the Pa-DEP drives to the preservation department to pick them up, about once a month....

Depending on how many students we have, the kind of conservation work the maps need and the vehicle that is available we send anywhere from 5 to 25 maps per month...

I think we have 8 maps in the back here... you can see a few large diameter rolls, and a flat map on top...





After the maps return from scanning, we roll them for final storage in the archives...

...we roll the maps with muslin cloth on the inside and mylar on the outside to protect from dust and water... some collections roll maps in archival tubes or tyvek to protect them...

And our hope is that the physical maps will not have to be used and patrons can access the information they need from the scanned digital file...

I'll turn it over to Debbie who will talk about the Use of the collection...



Good morning. My name is Debbie Rougeux and I am an archivist and cataloger at the University of Pittsburgh's Archives Service Center, part of the University Library System.

ULS began receiving mine maps from CONSOL in 1991; bulk of materials arrived in 2004. We acquired the records of Consolidation Coal Company from the Hadley Museum in 2011, courtesy of CONSOL Energy.

I became responsible for processing and providing reference service for the collection in June 2005. My first real exposure to mine mapping was at the 2005 Benchmarking Workshop held here, where I met James Welsh of PADEP California's District Office. Everything I know about reading mine maps I learned from him and he and others at his office have been very instrumental in assisting me with processing the collection.

As you can see, our collection consists of various types of materials:



Before processing the collection, I needed to organize it in some manner, since when the project began the maps and other materials were just sitting in boxes, hampers and pallets, in no particular order. However, a student assistant had done an inventory, so we at least knew what was in each container/pallet. Anyone who is interested in the methodology used in organizing the collection, please read the article I wrote about processing the collection. The link is given on the handout.

Next we had to decide how to make information about the collection accessible. After discussions with CDO, we opted to take a two prong approach. Information about each map, technical drawing, etc. would be recorded in an MS Access database modeled on one being used by PADEP when our project began, since this would give us item level information for these materials. This database is currently only accessible in ASC, for staff use only.

#### Demo Database

In addition to the database, we also created a collection guide that provides Folder/Roll level descriptions for maps and drawings, but near item level descriptions for all other types of materials in the collection. These collection guides are available to anyone on the Web.

#### Demo Collection Guides

Collection materials can be used in the ASC Reading Room, which is open to the





If you are interested in using anything in the collection, please contact me prior to any visit . This will give me a chance to make sure we have the items you need, pull them and get them ready for your use. My contact information and these links are also on the handout we distributed.





On behalf of Jeanann, Amy and myself, I would like to thank you for your attention, and we look forward to seeing many of you later at the tour of our facilities.