



The Basics of Audiovisual Preservation on a Shoestring Budget

Jimi Jones
Project Coordinator,
Audiovisual Self Assessment Program
University of Illinois at Urbana-Champaign



Why Preserve AV Media?

- AV materials are important parts of the cultural record
- They can provide intimate, immediate records of important events

- As audiovisual (AV) materials age and decay, their preservation becomes increasingly important
- Audiovisual materials are important parts of our historical record
- Audiovisual preservation is time-intensive, costly, and often requires a very specific skill set
- This class will explore and discuss ways of minimizing the costs (in time and money) of audiovisual preservation for institutions on a fixed budget
- As digital media become ubiquitous, it is clear that analog audiovisual materials will have to be digitized at some point in order to be accessible in the future. This is costly and time-intensive and often out of reach for smaller institutions. Taking care of materials can extend their lives and buy time until an institution can afford to digitize.



What Do We Mean by “Audiovisual?”

- Materials with images that move and may or may not have sound
- Recorded sound materials
- May be analog recordings or digital recordings
- Not still images



Moving Image Materials Commonly Found in Repositories

- Motion Picture Film (16mm and 8mm or Super 8mm)
- Cassette-based video formats like VHS, U-Matic, Betamax
- Open-reel video formats like 1" or 2" videotape
- Digital media like DVDs (commercially produced) or DVD-Rs (produced in-house or by consumers)

- Motion Picture Film (16mm and 8mm or Super 8mm)

- Cassette-based video formats like VHS, U-Matic, Betamax

- Open-reel video formats like 1" or 2" videotape

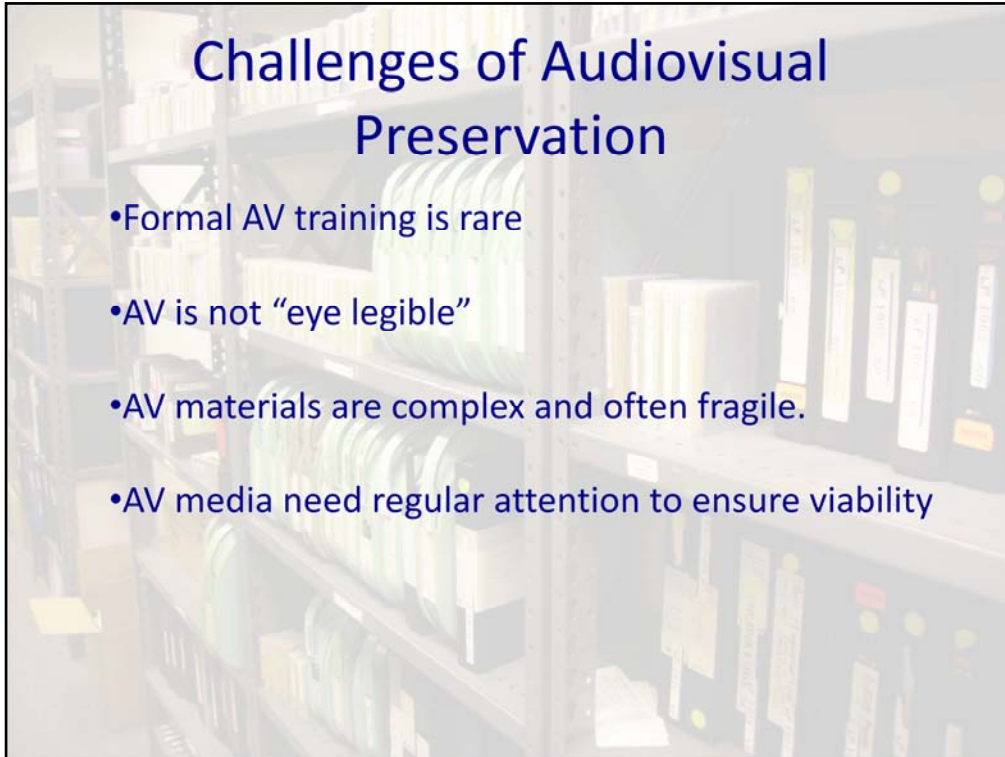
- Digital media like DVDs (commercially produced) or DVD-Rs (produced in-house or by consumers)



Sound Materials Commonly Found in Repositories

- Grooved discs like LPs and 78s
- Audiocassettes
- CDs (commercially produced) and CD-Rs (produced in-house or by consumers)
- ¼" open-reel audiotape

- Grooved discs like LPs and 78s
- Audiocassettes
- CDs (commercially produced) and CD-Rs (produced in-house or by consumers)
- ¼" open-reel audiotape



Challenges of Audiovisual Preservation

- Formal AV training is rare
- AV is not “eye legible”
- AV materials are complex and often fragile.
- AV media need regular attention to ensure viability

• Most collections managers have little to no formal training in the handling and care of AV media.

• Audiovisual media are technological, and not eye-legible (except film). This means that AV media require playback equipment to “decode” or play back the information encoded upon them.

• AV materials are complex and often fragile. For this reason, they need regular “checking on” to make sure they are still viable. It is not enough to put a videotape (for example) on a shelf and forget it. It will need to be regularly accessed to make sure it can still be played back.



Challenges of Audiovisual Preservation

- Obsolescence
- Limited support for formats by manufacturers
- Formats are dependent on the market
- These materials were not made or designed to last

•Audiovisual formats suffer from “media obsolescence,” which derives from short spans of production, and can make equipment and supplies harder and harder to find over time.

•Once AV formats become obsolete, they are not usually supported by their manufacturers – this leads to scarcity of playback equipment (more on that later) and repair materials.

•Formats are dependent on the market – once they stop being profitable, they are vanish into obscurity.

The Wealth of AV Formats

ANALOG VIDEOTAPE FORMATS

Year *	Tape Width	Cassette/ Open Reel	Use **	Obsolescence Rating ***	Originating Company	Comments ****
1956	2"	OR	P	CE	Ampex	2" Quad
1962	2"	OR	IE	CE	Ampex	First popular helical
1963	2"	OR	IE	Ext	Sony	2" Helical
1964	1"	OR	IE	Ext	Sony	
1965	1"	OR	IE	CE	Ampex	SMPT E Type A
1965	1"	OR	IE	Ext	PI	Precision Instruments
1965	1/2"	OR	IE	CE	Sony	CV-First low cost VTR
1968	1"	OR	IE	EXT	JVC	
1968	1/2"	OR	IE	Ext	Sony	
1969	1/2"	OR	IE	End		EIAJ-1
1969	1/4"	OR	IE	Ext	Akai	Small portable
1970	1/2"	C	IE	Ext	Phillips	First Cassette VTR
1971	3/4"	C	IE	T	Sony	3/4" U-Matic
1972	1/2"	C	C	Ext	Cartravision	Consumer VTR
1972	1/2"	C	IE	Ext	Sony	V-Cord
1973	2"	OR	IE	Ext	JVC	2" Helical
1975	1"	OR	P & IE	End	Bosch	SMPT E B
1975	1/2"	C	C	CE	Sony	Betamax-First consumer
1976	1"	OR	IE	Ext	Sony	
1976	1"	OR	P & IE	CE	Ampex	SMPT E A with Slo-Mo
1976	1/2"	C	C	ok	JVC	VHS
1978	1"	OR	P	End	Ampex/Sony	SMPT E C
1983	1/2"	C	P & IE	Ext	Parasonic	SMPT E M
1984	1/2"	C	P & IE	Ext	Sony	Betacam
1984	8 mm	C	IE & C	Ext		8 mm (.315")
1986	1/2"	C	P & IE	End	Parasonic	M-II
1987	1/2"	C	P & IE	T	Sony	Betacam-SP
1987	1/2"	C	IE & C	ok	JVC	S-VHS
1988	1/2"	C	P & IE	Ext	Sony	ED-Beta
1989	8 mm	C	IE & C	T		Hi-8 (.315")

- This graph shows some of the videotape formats used in the US over the past century. Bear in mind this is only video and only the formats used here in the States. This should illustrate the problems faced by institutions that collect these materials – most of the formats are incompatible with one another and require their own playback equipment.

The Wealth of AV Formats



- This detail of the tape room in WILL (which we will see today) shows several different formats on shelves.



Challenges of Audiovisual Preservation

- Playback equipment must be preserved alongside the media
- Without playback equipment, a media collection can become inaccessible

• Playback equipment must be preserved alongside the media. This can be costly and often requires very technical know-how.

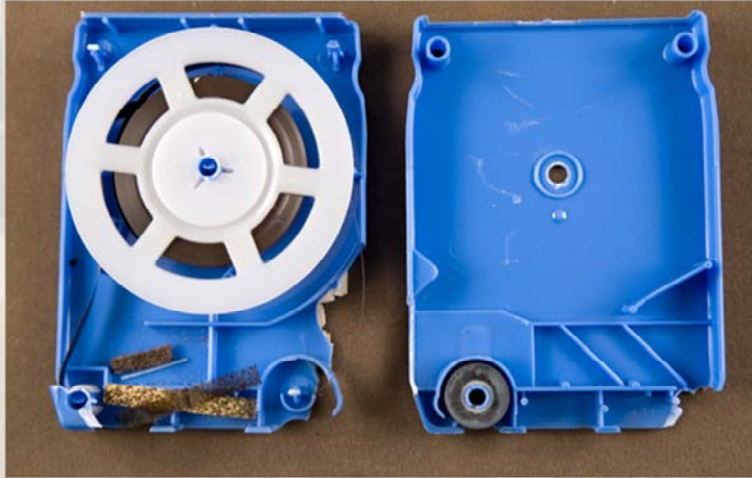
• Without playback equipment, a media collection can become inaccessible and effectively valueless to its repository

What if You Don't Preserve Equipment?

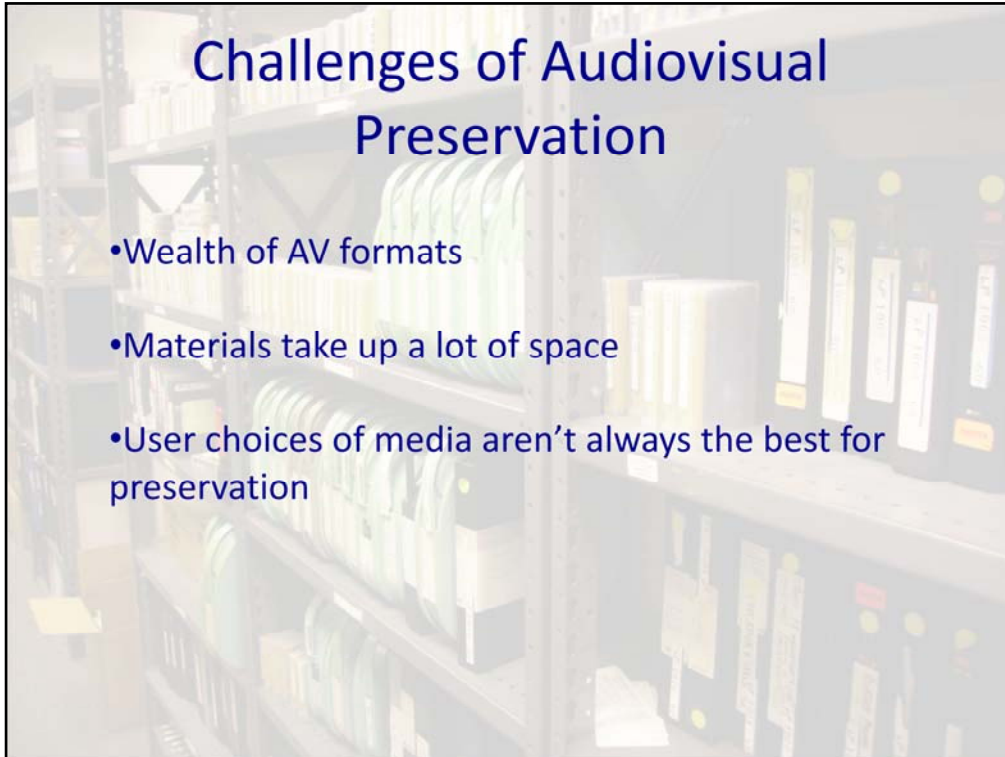


- Improperly maintained playback equipment leads to damage to materials – damage that may be irreparable.

AV Materials are Often not Designed to Last



- This detail of the guts of an 8-track tape shows the deterioration of the sponge (lower left) that supports the tape itself as the cartridge is being played back. This sponge dries out over time and falls apart, leading to faulty playback and contamination of the tape itself with the sponge material.



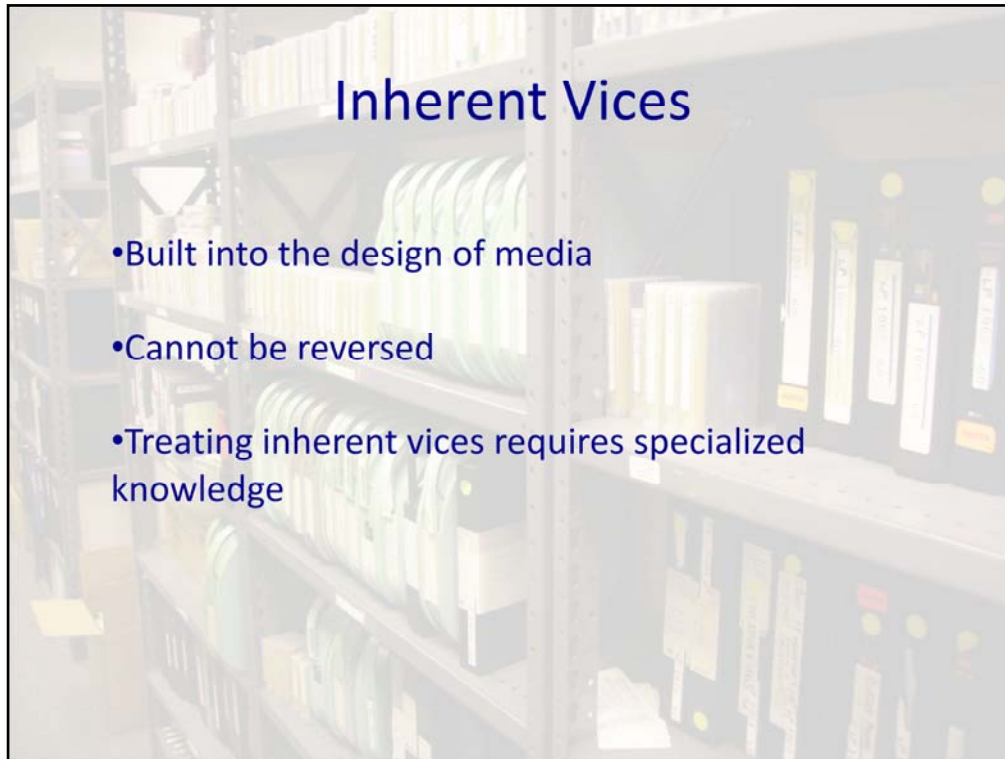
Challenges of Audiovisual Preservation

- Wealth of AV formats
- Materials take up a lot of space
- User choices of media aren't always the best for preservation

•Short production runs, proprietary formulas and designs, market issues, and experimentation have led to a wealth of formats that are incompatible with each other and with each other's playback equipment.

•These various kinds of formats are space-consuming and often have very different storage/preservation needs

•Users choose whatever formats make sense to them at the time of use, for reasons such as portability, ease of use, and low cost, which can lead to a dizzying array of formats being donated to collecting institutions



•Inherent vices are flaws unintentionally built into the media themselves and often cause the breakdown of the media – even under fairly normal storage conditions. One example of inherent vice is “acetate breakdown” or “vinegar syndrome.” This is the characteristic breakdown of films made with an acetate plastic base. This syndrome happens because of the nature of the acetate plastic and how it ages. It can be slowed but not reversed. It kind of “comes with the territory” of acetate-based film.

•Inherent vices themselves cannot be reversed and usually cause damage that cannot be reversed, but the damage can usually be slowed.

•The collections manager or preservation professional must be well-versed in the inherent vices in the formats in their collections so that they can anticipate and deal with damage to these materials.

Inherent Vice – Nitrate Decay



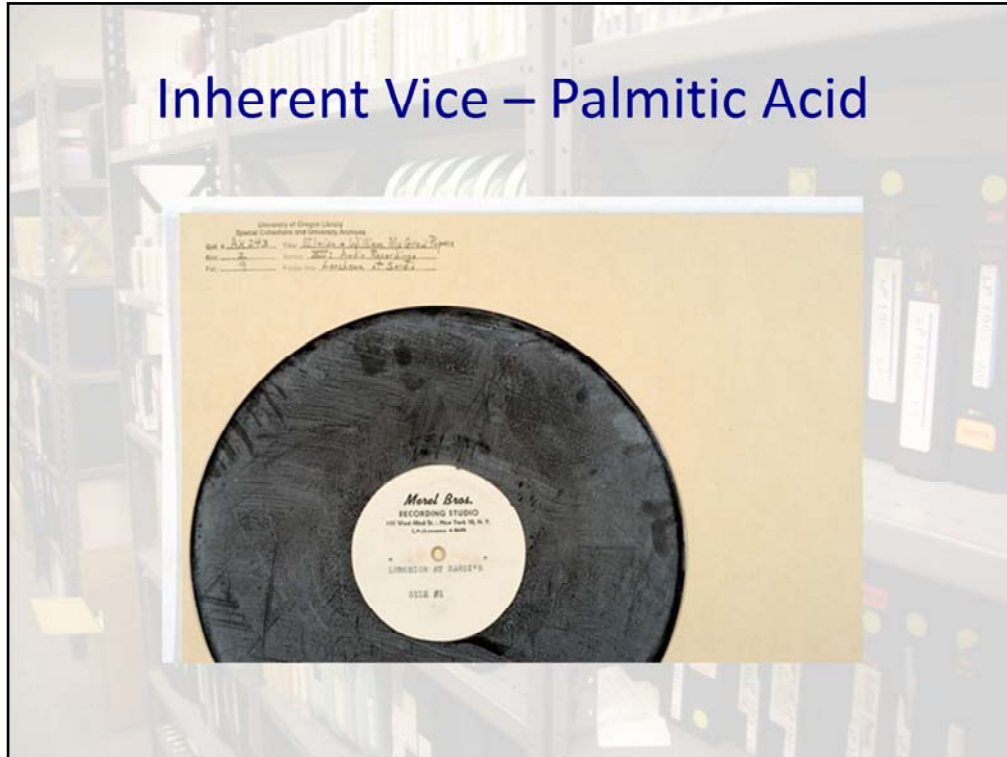
- This is a nitrate film in a late stage of nitrate breakdown. This illustrates how some kinds of AV media were not necessarily built to last.

Inherent Vice – Acetate Decay (Vinegar Syndrome)



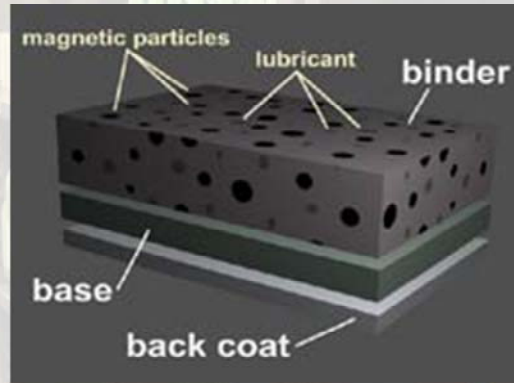
- This is an acetate-based film suffering from vinegar syndrome – another inherent vice.

Inherent Vice – Palmitic Acid



- This is a lacquer disc that shows deposits of palmitic acid. This acid slowly rises out of the disc – it is used as part of the plasticizer of the disc but over time rises out of the disc leaving the disc more brittle.

Inherent Vice – Binder Hydrolysis (Sticky Shed Syndrome)



- I don't have a good image of this but sticky shed syndrome is an inherent vice that strikes magnetic video and audio tape. In this syndrome the binder layer of magnetic tape which binds the recording layer to the transport layer (the tape itself) takes on moisture and starts to break down. This can cause the tape to become unplayable and can leave deposits on the playback equipment which can gum up and damage that equipment.

Why Do We Want to Preserve the Originals?

- Helps us avoid choosing the wrong format
- Often the best way to ensure image/sound quality
- Originals may have value as artifacts in and of themselves.
- Advances in digitization technology

•Keeping originals helps us to avoid being trapped in a corner: if we continually throw out the old in favor of the new, we run the risk of making an error and being saddled with a format we have no use for.

•Preserving originals is often still the best way to preserve all of the image and/or sound information encoded upon the carrier – reformatting to analog or compressed digital formats can cause information loss in the copy.

•Originals may have value as artifacts in and of themselves.

•As digitization technology advances, we may want to return to our originals and redigitize using newer technologies for better image and/or sound reproduction.



Assessing Your Users' Needs

- Can help us settle on an access format
- Helps decide whether we need to digitize right away or not

•Before we settle on an access format, we want to make sure it's what our users are using. Access copies are media copies that your patrons can use in lieu of the original materials so as to save the originals from wear and tear.

•Knowing what formats or delivery systems your patrons prefer can help you to avoid costly guesswork. Choosing the wrong format would leave you with a large expense and a lot of media that your users won't or can't use (think Betamax here).

•You can decide, based on your patrons' needs, whether it is feasible to digitize your materials and deliver them online or offer a more traditional "in house viewing" environment. If you choose an "in house" situation, you may decide to put off digitization until you can afford it – possibly indefinitely.



Migration and AV Preservation

- Migration: moving audiovisual information from one format to another
- Migration, and AV preservation, must be an **active** process.
- Audiovisual materials must be continually checked on over their lifespan to ensure that they are still viable.

•For many AV preservation professionals, “migration” is a key concept in AV preservation. Because analog formats decay over time (sometimes quite rapidly) and digital formats evolve so quickly, migration of audiovisual information from one format to another becomes key.

•Migration, and AV preservation, must be an **active** process. There is no **end point** in audiovisual preservation – no “put it on the shelf and forget it” format to copy or digitize to. AV preservation must be an ongoing part of an institution’s workflow.

•Audiovisual materials must be continually checked on over their lifespan to ensure that they are still viable.



A Few Quick and Easy Storage Tips For AV Materials

- “40 / 40”
- Avoid temperature and RH variances
- Variances can age materials worse than prolonged extremes
- Avoid external walls/attics/basements

•While the different media types (videotapes, films, audiotapes, etc) have different needs, it is commonly accepted that 40 degrees Fahrenheit and 40% relative humidity is pretty good for most of the formats. If you don't have cold storage and have to keep all of your areas in a controlled environment, think “40/40.”

•Temperature and relative humidity can age your materials, but it is **variances** in temperature and humidity that **really** damage materials. These variances can cause media materials to shrink and contract and warp. For this reason, it is best to keep your materials in interior rooms (away from outer walls). You can extend your AV materials' lives significantly simply by bringing them up from the basement, down from the attic, or in from the garage or pole barn. These areas tend to have great variances in temperature and humidity because of the seasons and are very bad choices for storing AV materials (including playback equipment).

A Few Quick and Easy Storage Tips For AV Materials

- Store your materials on metal shelves
- Giving ventilation to your materials can help also.
- Fire suppression and monitoring
- Storing materials high can help prevent water damage

•Store your materials on metal shelves if possible instead of wooden shelves can help as well. Wood shelves often have finishes that can be damaging to materials stored on them. The woods themselves can offgas as well. Metal shelving obviates this risk.

•Giving ventilation to your materials can help also. Inherent vices, particularly in motion picture film, often generate gases that will speed up decay as those gases build up. Allowing air to move over and through your materials can help dissipate those gases and give life to collections. Vented film cans can allow air exchange over film, which can slow its decay. The NFPF's *Film Preservation Guide* discusses vented film cans and how to use them.



Procuring Playback Equipment

- University Surplus
- Film/Communications/Art departments
- Television/Radio stations
- eBay
- Collector's Groups
- Estate Sales

•Store your materials on metal shelves if possible instead of wooden shelves can help as well. Wood shelves often have finishes that can be damaging to materials stored on them. The woods themselves can offgas as well. Metal shelving obviates this risk.

•Giving ventilation to your materials can help also. Inherent vices, particularly in motion picture film, often generate gases that will speed up decay as those gases build up. Allowing air to move over and through your materials can help dissipate those gases and give life to collections. Vented film cans can allow air exchange over film, which can slow its decay. The NFPF's *Film Preservation Guide* discusses vented film cans and how to use them.



Learn to Tend Your Playback Equipment

- Work with collectors' groups
- Procure maintenance manuals (www.samswebsite.com)
- Get to know the people or department that donated or sold the equipment to you

The cheapest way to maintain your equipment is to tend to it yourself. There are ways to learn how to do this:

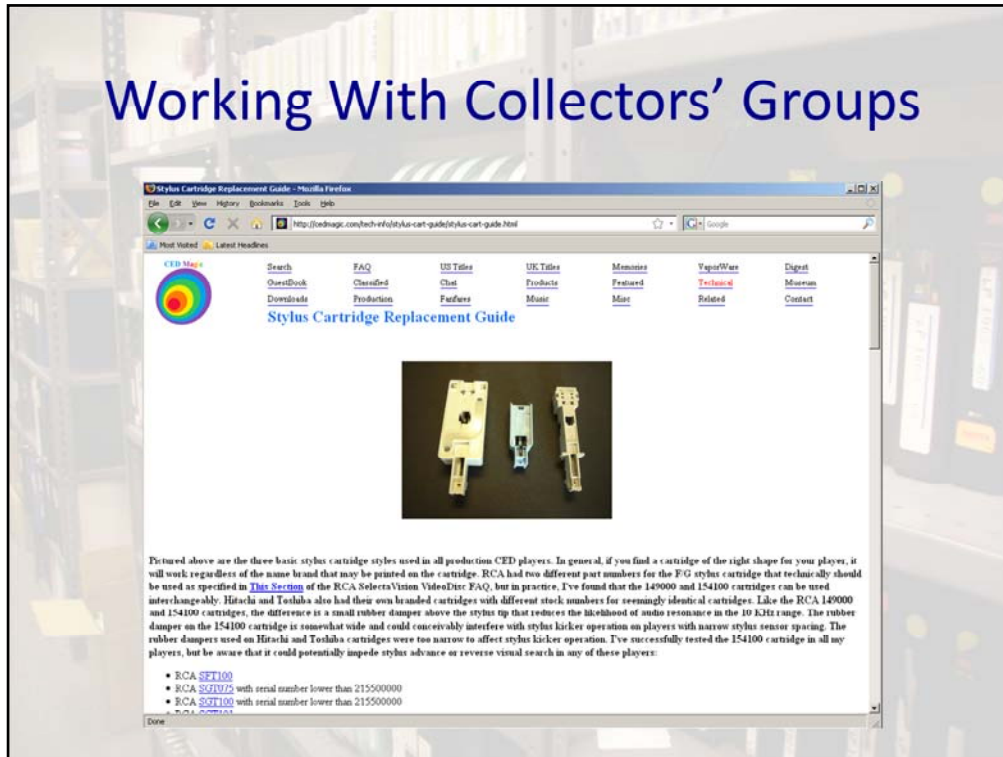
- Working with collectors' groups to learn more about the format or equipment in question
- Procuring maintenance manuals in order to learn about troubleshooting and basic maintenance yourself
- Getting to know the people or department that donated or sold the equipment to you

Working With Collectors' Groups

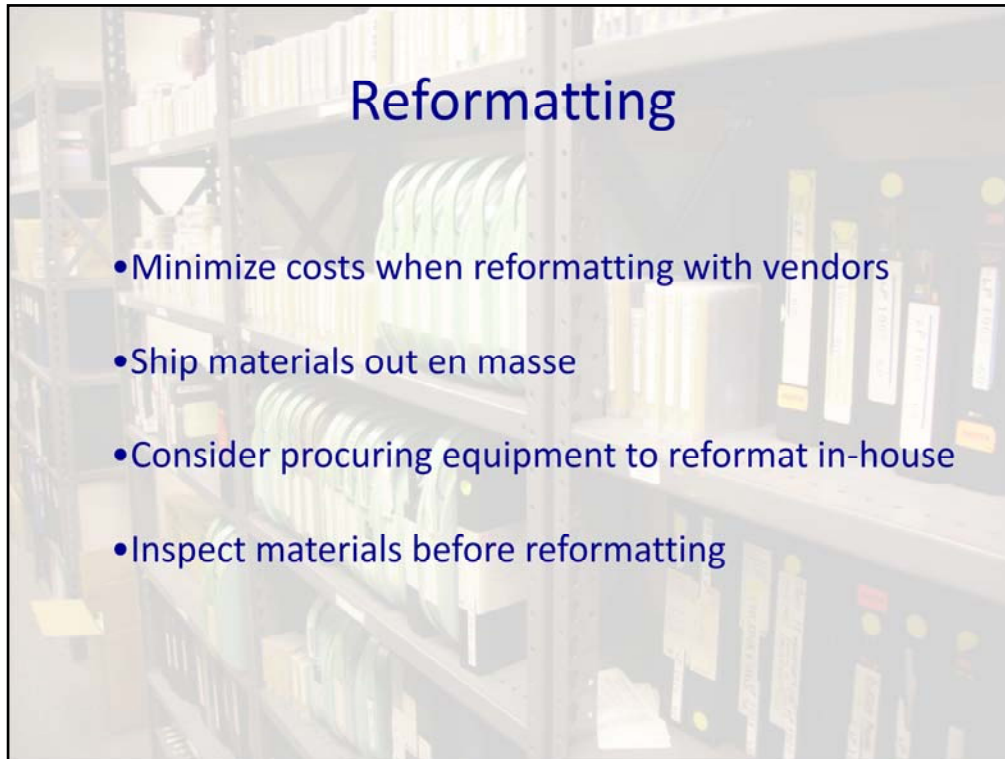


If you don't have the manuals for your equipment (and most institutions will not), there are resources for finding them or for finding out about the format or equipment in question. If you don't want to pay for a manual, you can try contacting collecting groups online. These are hobbyists who collect various kinds of media. They are often great resources for finding out esoteric information about a medium. For example, www.cedmagic.com is a website for collectors of Videodiscs, a fairly obscure form of video that was produced in the first half of the 1980s. This website is an example of the amazing wealth of information that collecting groups can provide. I've posed several questions to this group's web forum and have always gotten my questions answered in a timely fashion. I've also been able to find parts and repair services for my videodisc player.

Working With Collectors' Groups



If you don't have the manuals for your equipment (and most institutions will not), there are resources for finding them or for finding out about the format or equipment in question. If you don't want to pay for a manual, you can try contacting collecting groups online. These are hobbyists who collect various kinds of media. They are often great resources for finding out esoteric information about a medium. For example, www.cedmagic.com is a website for collectors of Videodiscs, a fairly obscure form of video that was produced in the first half of the 1980s. This website is an example of the amazing wealth of information that collecting groups can provide. I've posed several questions to this group's web forum and have always gotten my questions answered in a timely fashion. I've also been able to find parts and repair services for my videodisc player.



• When it comes to reformatting, it is often difficult to keep it cheap. When you have to send something out to an outside facility to duplicate or digitize it, you have to pay shipping (which can be considerable, depending on the size of the order), a setup fee (usually a set rate for them to turn on their machines), and usually a per hour or, in the case of film, per foot, rate. This can really add up. One way to try to mitigate the cost of reformatting is to try to do as much as possible in-house.

• There are services and products that are designed to help institutions reformat their materials in-house. I'll talk about a couple of them to give you an idea of what's out there. I should note that I am not in the employ of these companies, and I do not endorse their products. Before deciding on any product or service, I recommend talking with the company and finding out if they will be able to meet your needs and your budget.

• Playing back an item for any reason introduces the risk of damage. This includes reformatting. Items and equipment must be inspected before playback.

MovieSnipers For Reformatting Film



- One piece of equipment that I find interesting is called the Movie Sniper unit by a company called MovieStuff. The people at MovieStuff take 16mm and 8mm movie projectors and retrofit them so that you can make very high quality film to video transfers on them. You can also have them rigged to digitize your film, but this requires a computer and some video capture software. They run around one thousand to five thousand dollars apiece, depending on the bells and whistles you get on them, but for an institution that has a lot of film, this can be a reasonable expense. Regularly transferring film can cost quite a bit of money. The up-front cost of them is a lot, but the savings in the long run can be great, and you don't have to expose your film materials to the rigors of shipping.

- An example of AV equipment repurposed for preservation

- More information can be found at <http://www.moviestuff.tv/index.html>

The SAMMA System For Reformatting Cassette-based Videotapes

SAMMA Inputs and Outputs



Tape Formats Supported

- Betacam, SP, SX, Digital Betacam
- U-matic small and large cassettes
- VHS, S-VHS, MII, D3

Output Formats

- Video Tape, LTO Tape, DLT Tape
- SDI, Embedded audio or AES
- MPEG-2, H.264, IMX files
- Motion JPEG 2000 (lossless)
- Windows Media, QuickTime

SAMMA
SYSTEMS

•For video, there is a new product being developed by Media Matters, which is a media preservation consultant, called SAMMA. This stands for System for the Automated Migration of Media Assets. This is an interesting product. SAMMA is a robotic system that you load with tapes and it methodically takes each tape and reformats it for you. It can check with tapes are damaged and you can. Basically the SAMMA system is a bank of various kinds of video playback equipment that you can customize based on what kinds of material you have in your collections. Media Matters leases the product to you at a cost that, according to their website, averages \$35 to \$75 per hour of material. They also offer training on how to use the system, as well as basic training on how to work with the various magnetic media in your collection. This cost may still be outside the range of many small institutions, but it's worth discussion here if only to note that there are organizations out there who recognize the need for quality products to assist AV migration.

•More information can be found at http://www.sammasystems.com/samma_samma.html/



Think Collaboration

- Try to cut costs by working with other institutions
- Consider working and thinking as “consortia”

• Reformatting is costly, whether you send it out to a professional or you procure the equipment to do it yourself. One way to help mitigate some of the costs of reformatting is to collaborate with other institutions. For example, when you send off an order of 8mm film to be transferred to DVD, see if any of your colleagues at other nearby institutions have film they need transferred. In this way you can share the shipping costs and the setup fees.

• Consider going in on a SAMMA rental together with other institutions. There may also be ways of purchasing equipment together with other institutions or departments within your institution. Alternatively, you may be able to “buy time” on another institution’s equipment. Admittedly, there are many hurdles to overcome with this kind of “consortial thinking,” but it’s worth considering. Working together and avoiding “silo mentalities” is one of the best ways to mitigate costs for all.



Learn From the Pros

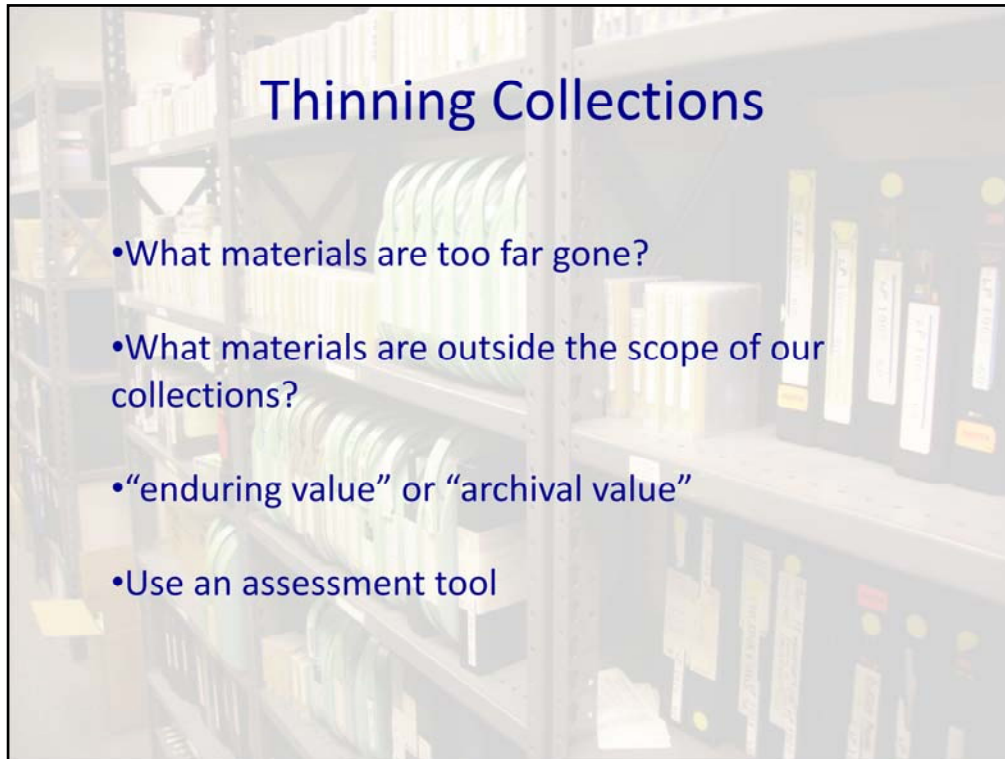
- Association of Moving Image Archivists (AMIA)
- Association of Recorded Sound Collections (ARSC)
- Society of American Archivists (SAA)

• Listservs, which are email lists that people can access to ask questions, get advice, and have conversations, are an excellent way to get your questions answered by the pros and stay on top of current events and issues in the audiovisual preservation world. There are a few I would recommend. They are free to join. The following list is in no particular order:

• First is the listserv of the Association of Moving Image Archivists (AMIA). Subscription information can be found at: <http://www.amianet.org/participate/listserv.php>

• Next is the Association of Recorded Sound Collections (ARSC). Subscription information can be found at: <http://www.arsc-audio.org/arsclist.html>

• Another good resource is the Society of American Archivists (SAA). Their list can be found at: <http://www.archivists.org/listservs/>



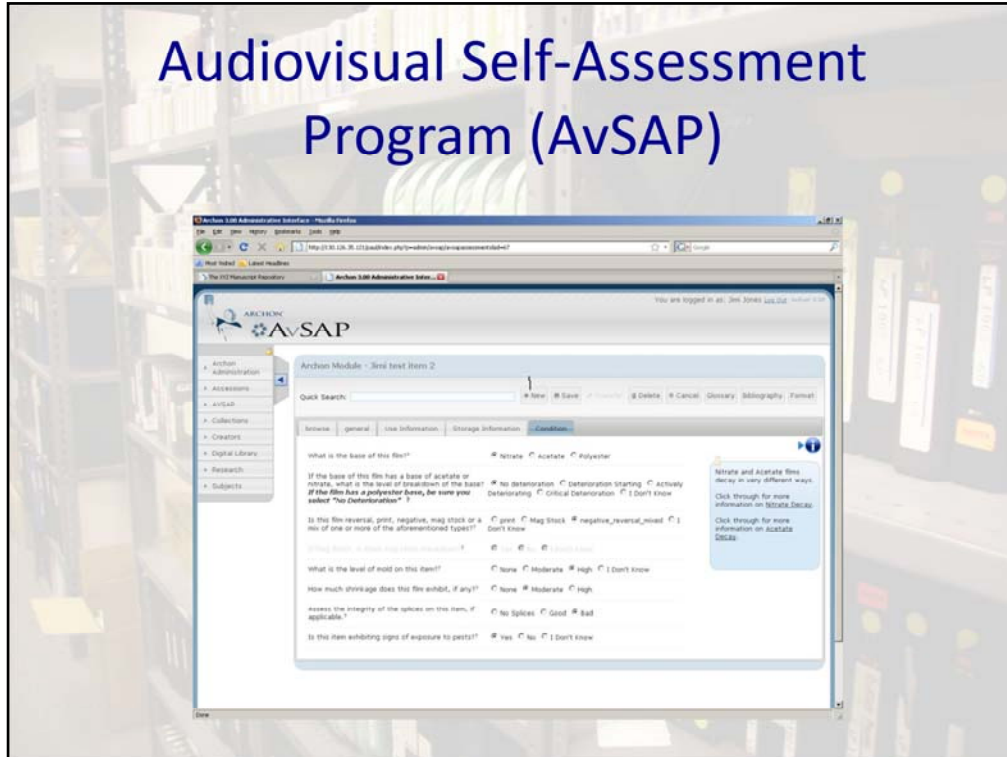
As much as we don't like to do it, we sometimes have to thin out (“weed”) our collections. Applying some basic rules to our materials can help us to make our collections smaller, which can help to maximize our preservation budget.

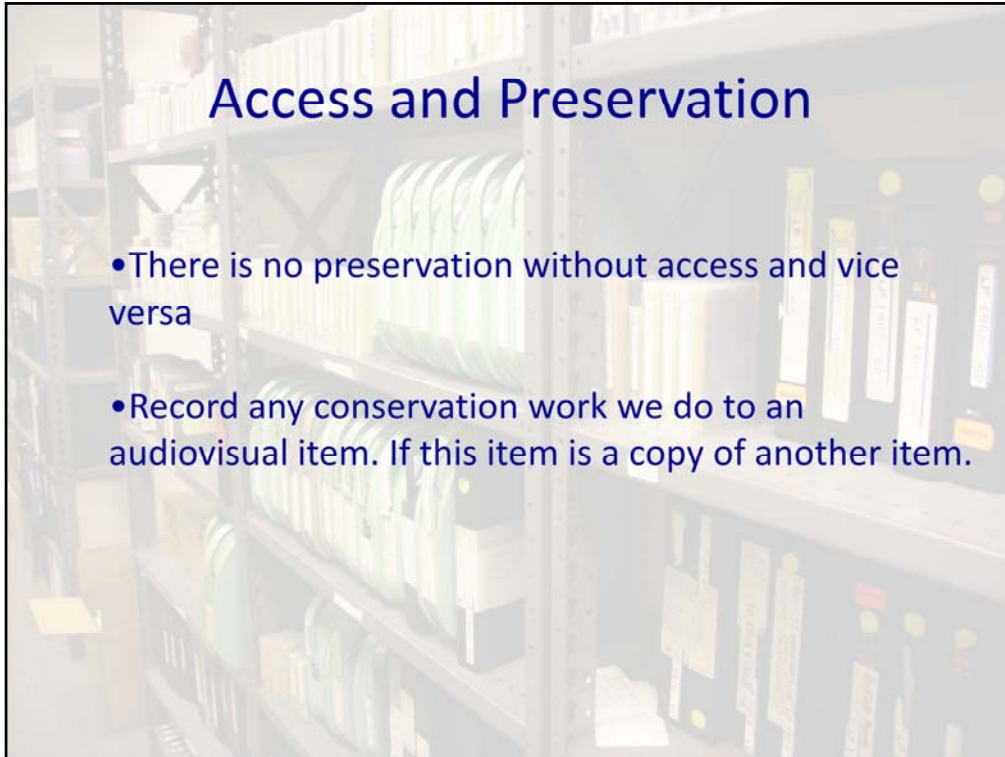
Consider the policies that guide your collecting. Does your institution have a mission statement? A collection development policy? If so, consider which items do not fit into that policy. For example, if you are an institution devoted solely to collecting Abraham Lincoln-related materials, perhaps that 16mm film about the Sahara would do better in another institution. Also, consider audiovisual media when designing or updating a collecting policy. This can help guide your future decisions (or your successors') and can also help to justify those decisions.

Consider applying value concepts like “archival value” or “enduring value” to your materials. Items that score low on your “value index” might get pushed lower in the “preservation queue” than other materials. There are many different texts that seek to explain what is meant by “value” with regard to materials in archives and libraries, and it is beyond the scope of this class to list them all. I recommend the Society of American Archivists' glossary page (found at <http://www.archivists.org/glossary/index.asp>) as a good resource for learning what concepts of “value” mean to archivists. That said, it is ultimately up to the collection manager to decide what items/collections have the greatest value to their repository and users.

These tools guide the user through assessments of materials at either the collection- or item-level (depending on the tool) and will assign “risk scores” to each item or collection assessed. These scores can be ranked, which can give the user a prioritized preservation list. This list can be used to decide the order in which materials need to get preservation or reformatting work.

Audiovisual Self-Assessment Program (AvSAP)





• One oft-overlooked issue when dealing with audiovisual preservation is **access**. Specifically, we're talking about the cataloging/description of items in an institution. Audiovisual materials are not made simply to sit on a shelf. They are meant to be viewed and/or listened to by people. Making sure that your materials are well-described can allow us to find them and make them available to our users. Without a good catalog record or finding aid, an item or an entire collection can be overlooked and allowed to decay.

• While we're talking about cataloging, it is important to record any conservation work we do to an audiovisual item. If this item is a copy of another item, if it is an original, if it has had any kind of sound or color manipulation done to it (which is usually not done in archives or libraries but does sometimes happen) – this kind of information should be recorded. If an item has been sent out to have work done to it, we should record where and when that work was done.



A Few Words About Digitization

- Save analog originals
- **All AV materials will have to be digitized at some point.**
- Digitization involves playing back originals at least once
- Maintain playback equipment

• First, digitization doesn't mean you no longer need your originals. As I noted earlier in this class, there may be cause to return to your original materials for a number of reasons.

• More and more users expect materials to be delivered online. For this reason, analog materials, if they are to be usable in the future, will have to be digitized at some point.

• Digitization of an item will involve playing it back at least once. This is another reason to try to preserve the analog originals in your collections.

• The fact that digitization involves playback is another reason to maintain playback equipment alongside your collections – that is, if you plan to digitize materials in-house.



A Few Words About Digitization

- Compression discards information that cannot be recovered
- Uncompressed files are large and unwieldy
- Uncompressed for masters; compressed for access
- Beware of proprietary formats

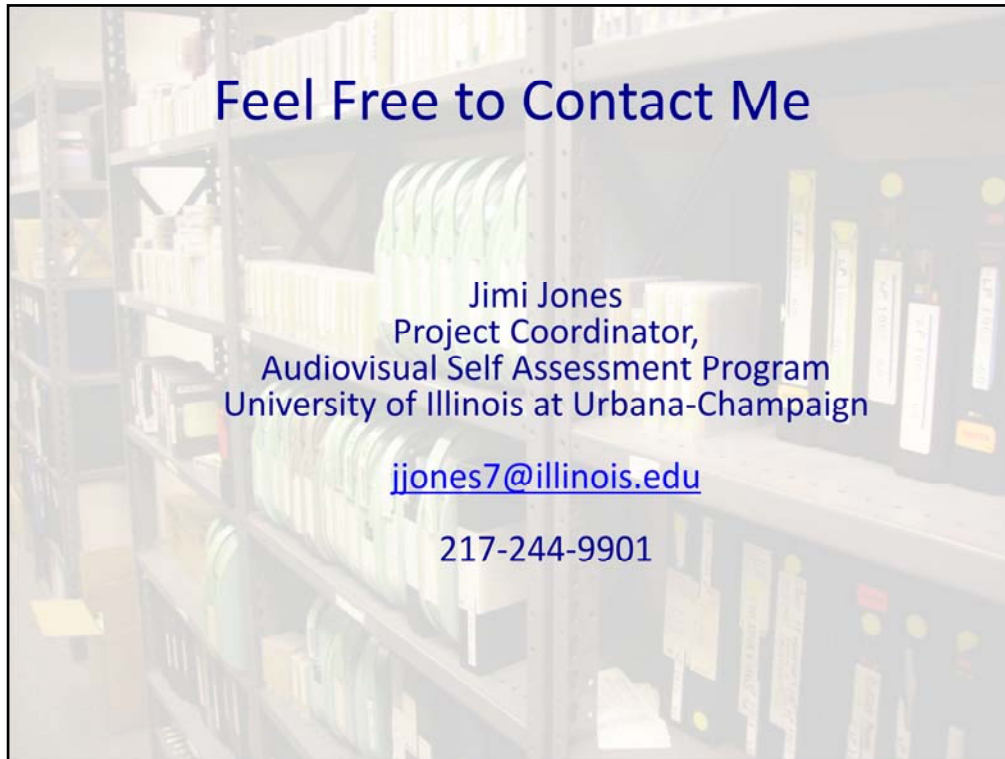
When you digitize materials it is imperative to use **uncompressed** digital formats as much as possible for your preservation masters. Compression is a way of making files smaller by removing information. Once information is removed, it cannot be recovered. The best way to assure the most information in your digital surrogates is to limit the amount of compression used in the digitization process. The downside of using uncompressed formats is that the file size (especially for moving image digitization) can become very large very fast. Ultimately it becomes a tradeoff for institutions: If access is your prime imperative and data storage space is a premium, you may have to use more compression in order to make the files smaller and more easily deliverable online. This is a decision that only your institution can make. If you find that you must use compressed formats like mp3 for delivering your sound materials (for example), then by all means use those formats. Just know that you are using formats that may not accurately represent the original materials. For this reason you will probably want to return to your originals and redigitize them in the future with less compression once your space needs are less of an issue.



•It is important to let people know about the audiovisual materials in your collections. To this end, consider how you can use your materials in outreach programming. Consider organizing viewings of the materials in your collections (provided, of course, that you have the rights to do so). Are there community events that you can take part in with your materials? Events like Home Movie Day (www.homemovieday.com) are great opportunities to get some exposure for your materials.

•If you do have digitized materials, consider creating web exhibits using those items or collections. Getting the word out about your audiovisual collections can often help increase donations, both of materials and funding.

•AV materials are wonderful research and teaching tools, and they shouldn't be allowed to simply deteriorate. There probably isn't any "correct" approach that applies to every institution. There are factors that will influence your decision making about how to handle your AV media, and those factors will be different for different institutions, but I believe that the list of tips and tactics I've given today can be tailored for your institution. Taking care of your audiovisual materials may take some innovative thinking and it may take some collaboration with other institutions, but it's nothing that we as collections managers can't handle.



- It is important to let people know about the audiovisual materials in your collections. To this end, consider how you can use your materials in outreach programming. Consider organizing viewings of the materials in your collections (provided, of course, that you have the rights to do so). Are there community events that you can take part in with your materials? Events like Home Movie Day (www.homemovieday.com) are great opportunities to get some exposure for your materials.

- If you do have digitized materials, consider creating web exhibits using those items or collections. Getting the word out about your audiovisual collections can often help increase donations, both of materials and funding.

- AV materials are wonderful research and teaching tools, and they shouldn't be allowed to simply deteriorate. There probably isn't any "correct" approach that applies to every institution. There are factors that will influence your decision making about how to handle your AV media, and those factors will be different for different institutions, but I believe that the list of tips and tactics I've given today can be tailored for your institution. Taking care of your audiovisual materials may take some innovative thinking and it may take some collaboration with other institutions, but it's nothing that we as collections managers can't handle.



For More Information

American Institute for Conservation of Historic and Artistic Works. "Caring for Your Home Videotape." <http://aic.stanford.edu/library/online/brochures/video.html>. (accessed on January 17, 2008).

Association of Moving Image Archivists. <http://www.amianet.org/> (accessed on January 29, 2008).

Byers, F.R. "Care and Handling of CDs and DVDs: A Guide for Librarians and Archivists." <http://www.clir.org/pubs/abstract/pub121abst.html> (accessed on June 12, 2008).

Kodak. "Handling of Processed Film." http://www.kodak.com/US/en/motion/support/technical/storage_handling.ihtml?id=0.1.4.15.12.14&lc=en (accessed on June 12, 2008).



For More Information

Library of Congress. "Cylinder, Disc, and Tape Care in a Nutshell." <http://www.loc.gov/preserv/care/record.html>. (accessed on March 10, 2007).

MovieStuff. "MovieStuff Telecine Equipment." <http://www.moviesstuff.tv/index.html>. (accessed on January 25, 2008).

National Film Preservation Foundation. <http://www.filmpreservation.org/>. (accessed on January 25, 2008).

Paton, Christopher Ann. "Preservation Re-Recording of Audio Recordings in Archives: Problems, Priorities, Technologies, and Recommendations." *American Archivist* 61 (Spring 1998): 188-219.



For More Information

Sam's Technical Publishing. <http://www.samswebsite.com/> . (accessed on January 28, 2008).

Schuller, Dietrich. "Tracking the Reel World: A Survey of Audiovisual Collections in Europe." http://www.tape-online.net/docs/tracking_the_reel_world.pdf (accessed on June 12, 2008).

Texas Commission on the Arts. "Videotape Identification and Assessment Guide." <http://www.arts.state.tx.us/video/>. (accessed on January 17, 2008).

University of Illinois at Urbana-Champaign Library. "Audiovisual Self-Assessment Program Project." <http://www.library.uiuc.edu/prescons/AVSAP.htm>. (accessed on January 25, 2008).



For More Information

University of Washington Library. "Washington State Film Preservation Manual."
<http://www.lib.washington.edu/specialcoll/film/preservationmanual.pdf>
(accessed on June 12, 2008).

VideoPreservation Website. "Equipment Museum."
<http://videopreservation.stanford.edu/museum/>
(accessed on June 12, 2008).

Wheeler, Jim. "Videotape Preservation Handbook."
<http://www.mediamatters.net/docs/resources/Traditional%20Audiovisual%20Preservation/WheelerVideo.pdf>
(accessed on June 12, 2008).