

Handouts available at:

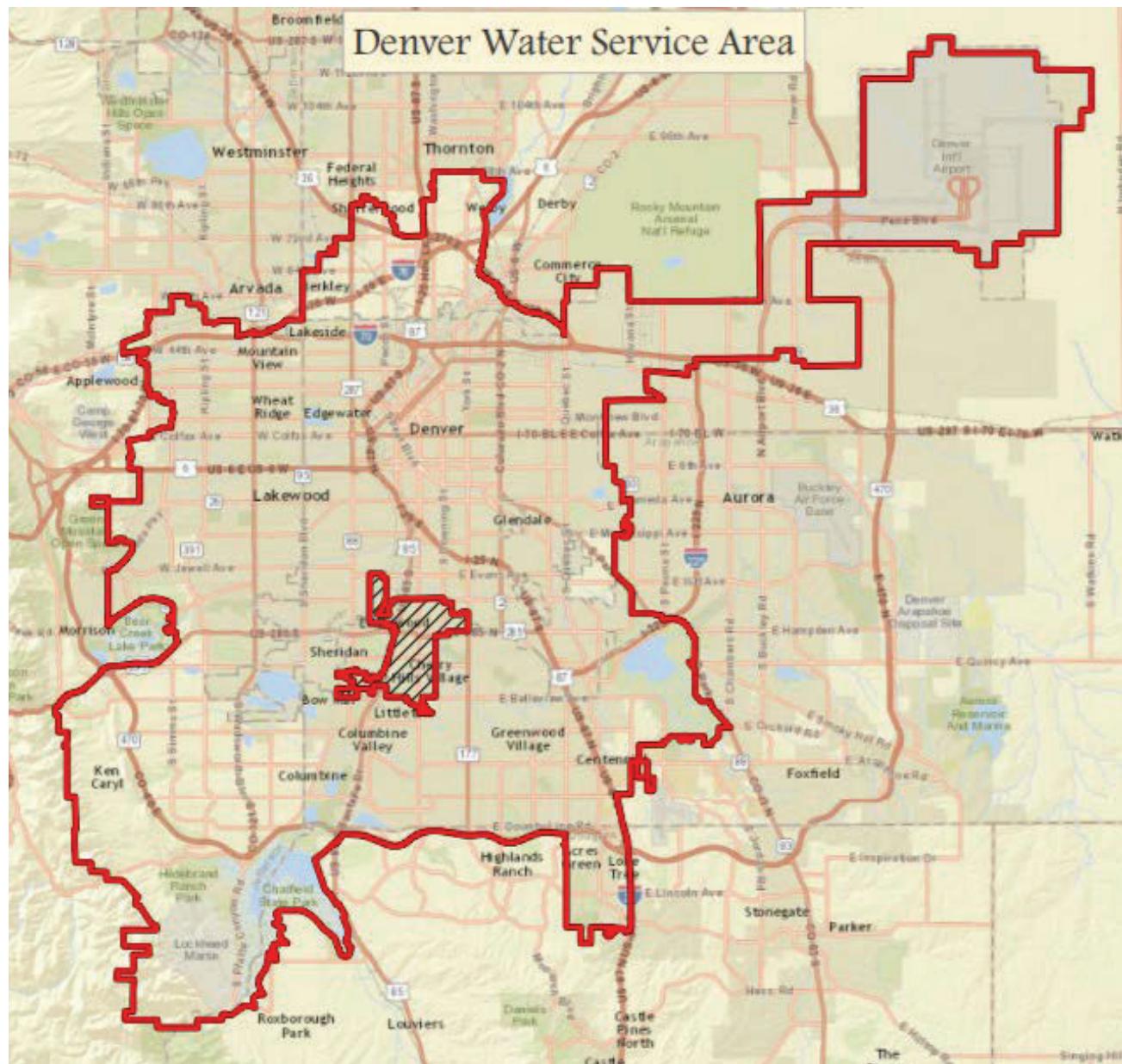
goo.gl/KNSRJN

Wrangling Data and Digital Objects at Denver Water



1 year in

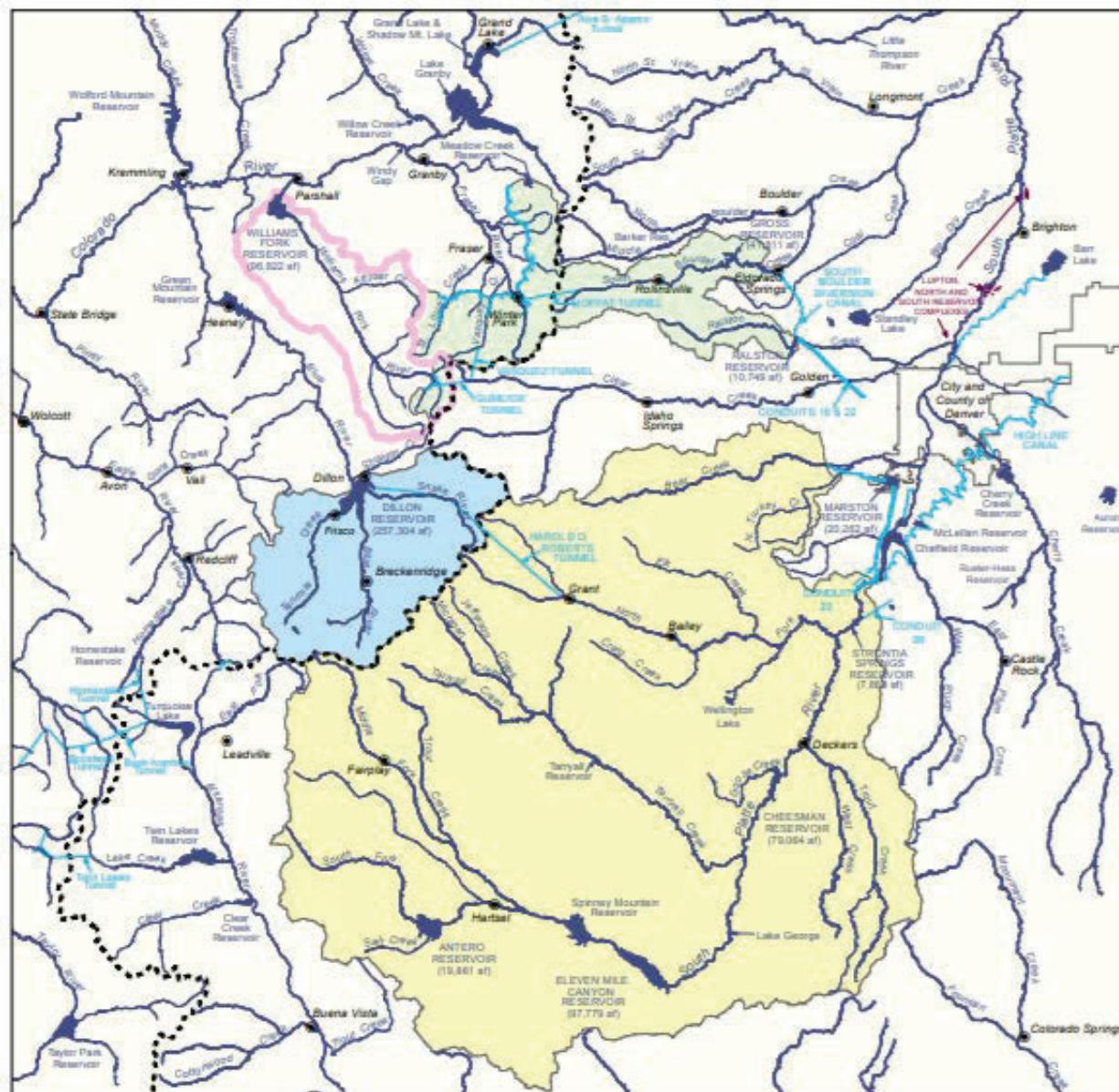
ABOUT DENVER WATER



goo.gl/KNSRJN

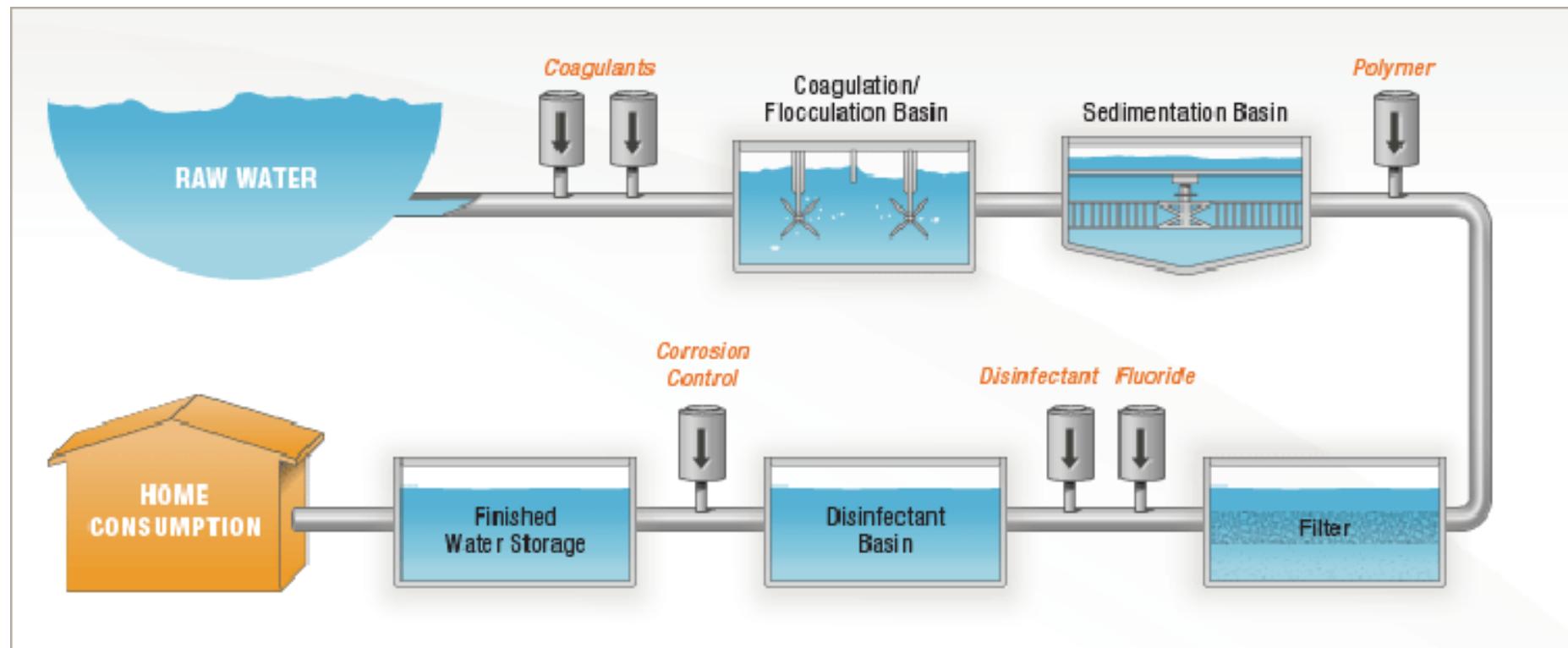


Water Collection System













ADAM SPEIRS RECORDS MANAGEMENT ANALYST

STATE AS ENCOUNTERED

Content and systems

- 24 file shares
- 154 database tables (21 pertinent)
- At least 3 databases (only 1 of which we “control”)
- 22 .NET or .ASP access applications
- 6 record groups with no metadata
- 4 record groups with metadata owned and managed elsewhere
- 2 other major internal application integrations (that we are aware of)
- Little to no documentation outside of IT

Records

- Engineering records
- Operation manuals
- Property records
- Board minutes and attachments
- Contracts and agreements
- Reports
- Maps
- Historical materials
- Indefinite legal hold

Assets

- New Records Management Manager
- New Digital Archivist
- Timing
 - New Manager's 1 year lead building coalition
 - Just reorged into new division
- The Law
- The Standards
- Professional Network



Digital Preservation Readiness Assessment

Denver Water
August 8, 2017

Leigh A. Grinstead, Digital Services Consultant, LYRASIS

Submitted October 2, 2017

TRIAGE AND POLICY EFFORTS

Strategic Plan

The Law

Digital Preservation Strategic Plan

Records and Document Administration (RDA)

APPROVAL DATE: 01/2018

Background

Under Title 24 - Article 80 of the Colorado Revised Statutes, Denver Water has a duty to preserve records of permanent value created in the course of doing business. RDA is committed to the preservation, long-term retention of, management of, and access to the permanent digital records in its collections.

Goal

Utilize internal and external resources to improve RDA's ability to collect, protect, and make available digital records of enduring value in accordance with internationally recognized standards.

Strategy

- Align Denver Water's permanent-record management systems with the ISO 14721:2012 Open archival information system (OAIS) -- Reference model
- Utilize ISO 16363:2012 - Audit and certification of trustworthy digital repositories and the National Digital Stewardship Alliance's Levels of Digital Preservation rubric as benchmarks for organizational progress in alignment.

Tactics

- [ISO 16363 gap analysis worksheet](#)
- [NDSA Levels of Digital Preservation gap analysis worksheet](#)
- Practices to Date documents for :
 - [Digital Collections](#)
 - [Digital Preservation](#)
 - [Metadata](#)
- [Personas document](#) (Designated Community)
- [Digital Collections Standard Operating Procedures](#)
- [Definitions – SIP, AIP, DIP](#)
- [2017-2020 Work Plan](#)

Review

This document is to be reviewed annually or in response to significant changes in the field.

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Strategic Plan

Our Mission

Digital Preservation Strategic Plan

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APPROVAL DATE: 01/2018

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Strategic Plan

Standards

Digital Preservation Strategic Plan

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APPROVAL DATE: 01/2018

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Strategic Plan

Benchmark

Digital Preservation Strategic Plan

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APPROVAL DATE: 01/2018

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Strategic Plan

Tactics

Digital Preservation Strategic Plan

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ISO 16363: 2012 Worksheet

ISO 16363: 2012 Relevant Sections	Status	Source	Notes
Section 3: Organizational Infrastructure			
3.1 Governance and Organizational Viability			
3.1.1 The repository shall have a mission statement that reflects a commitment to the preservation, long-term retention of, management of, and access to digital information.	Green		
3.1.2 The repository shall have a Preservation Strategic Plan that defines the approach the repository will take in the long-term support of its mission.	Green		
3.1.3 The repository shall have a Collection Policy or other document that specifies the type of information it will preserve, retain, manage, and provide access to.	Yellow		
3.2 Organizational Structure and Staffing			
3.2.1 The repository shall have identified and established the duties that it needs to perform and shall have appointed staff with adequate skills and expertise to fulfill these duties.	Green		
3.3 Procedural Accountability and Preservation Policy Framework			
3.3.1 The repository shall have defined its Designated Community and associated knowledge base(s) and shall have these definitions appropriately accessible.	Yellow		
3.3.2 The repository shall have Preservation Policies in place to ensure its Preservation Strategic Plan will be met.	Yellow		
3.3.3 The repository shall have a documented history of the changes to its operations, procedures, software, and hardware.	Yellow		
3.3.4 The repository shall commit to transparency and accountability in all actions supporting the operation and management of the repository that affect the preservation of digital content over time.	Yellow		
3.3.5 The repository shall define, collect, track, and appropriately provide its information integrity measurements.	Yellow		
3.3.6 The repository shall commit to regular schedule of self-assessment and external certification.	Yellow		
3.4 Financial Sustainability			
The repository shall have short- and long-term business	Yellow		

TRENDS IN
ARCHIVES
PRACTICE

MODULE 8
BECOMING A
TRUSTED DIGITAL
REPOSITORY

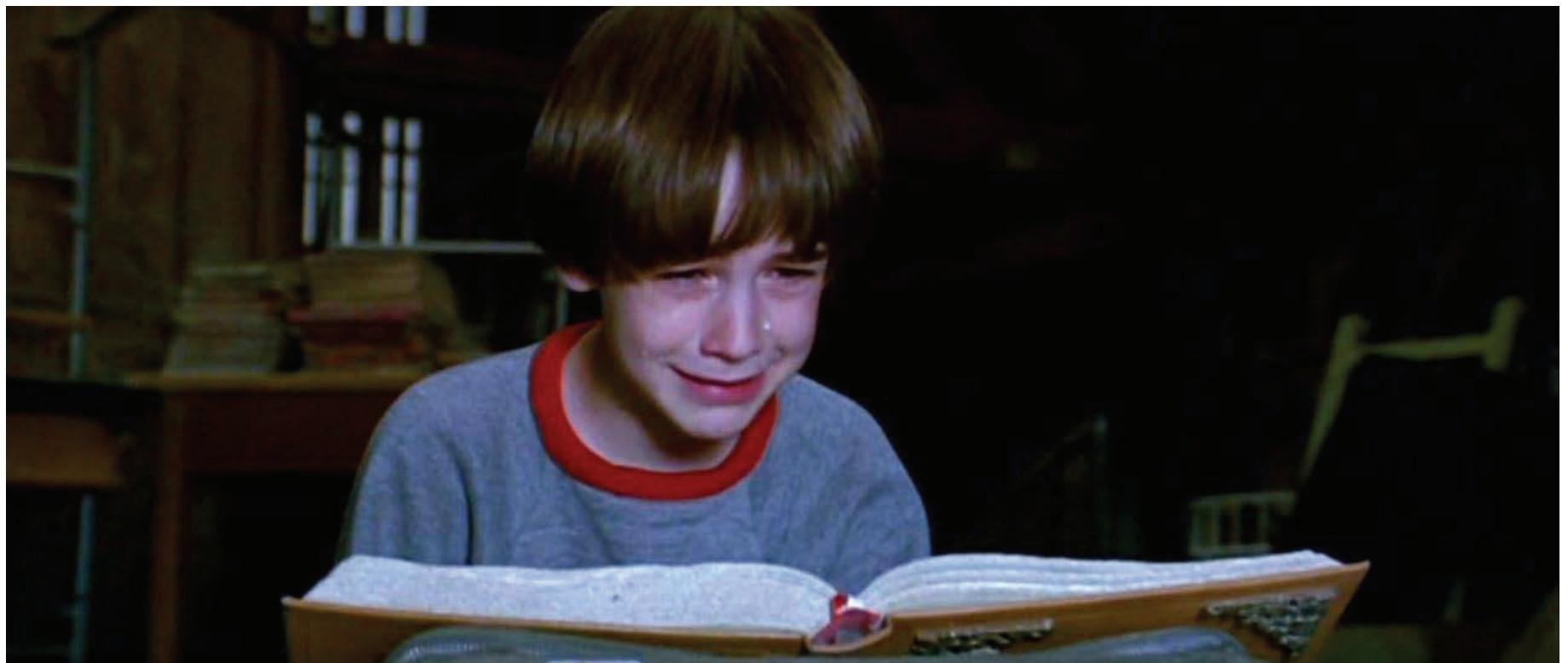
STEVE MARKS

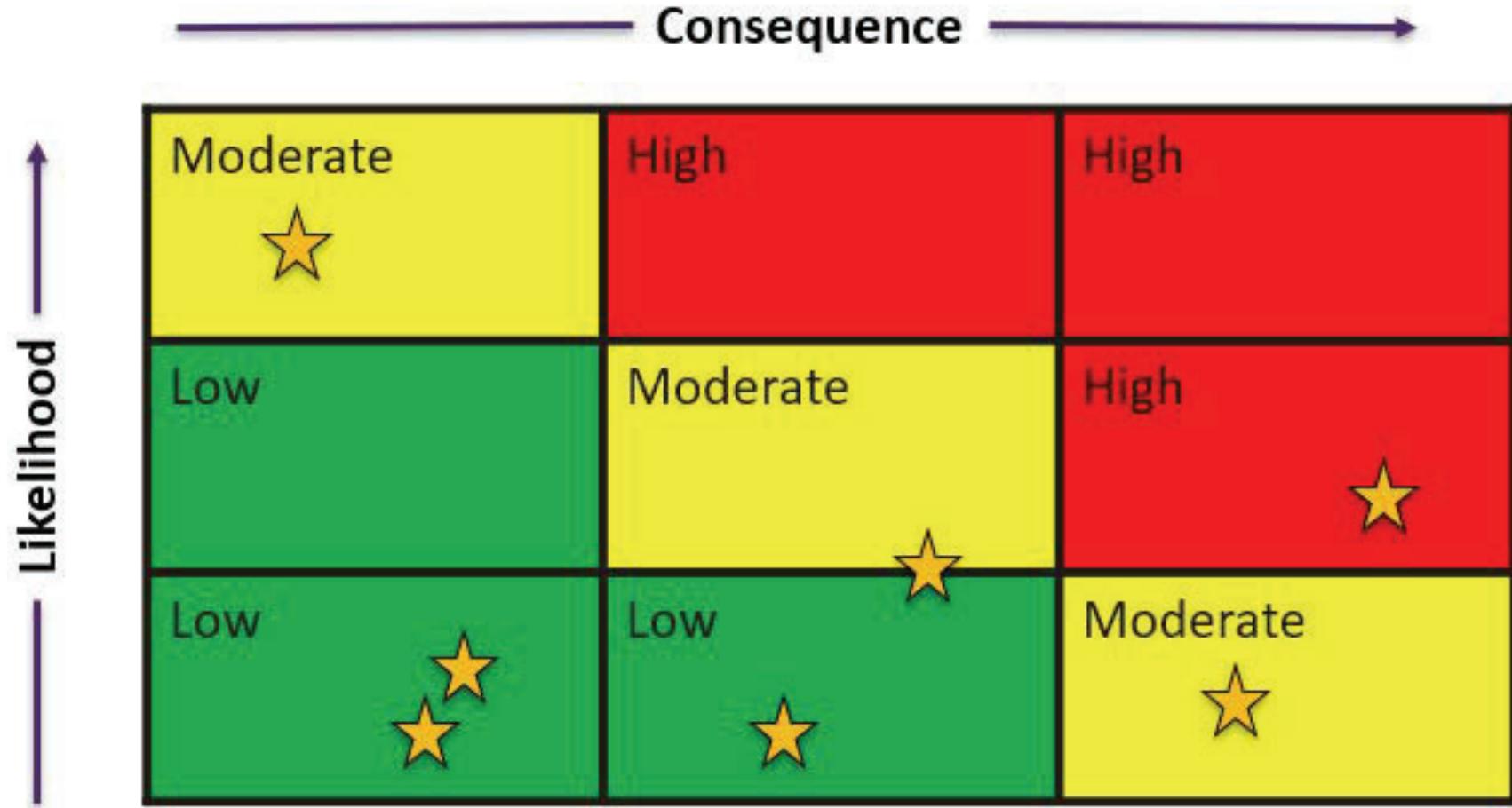
with an Introduction by Bruce Ambacher
Edited by Michael Shallcross

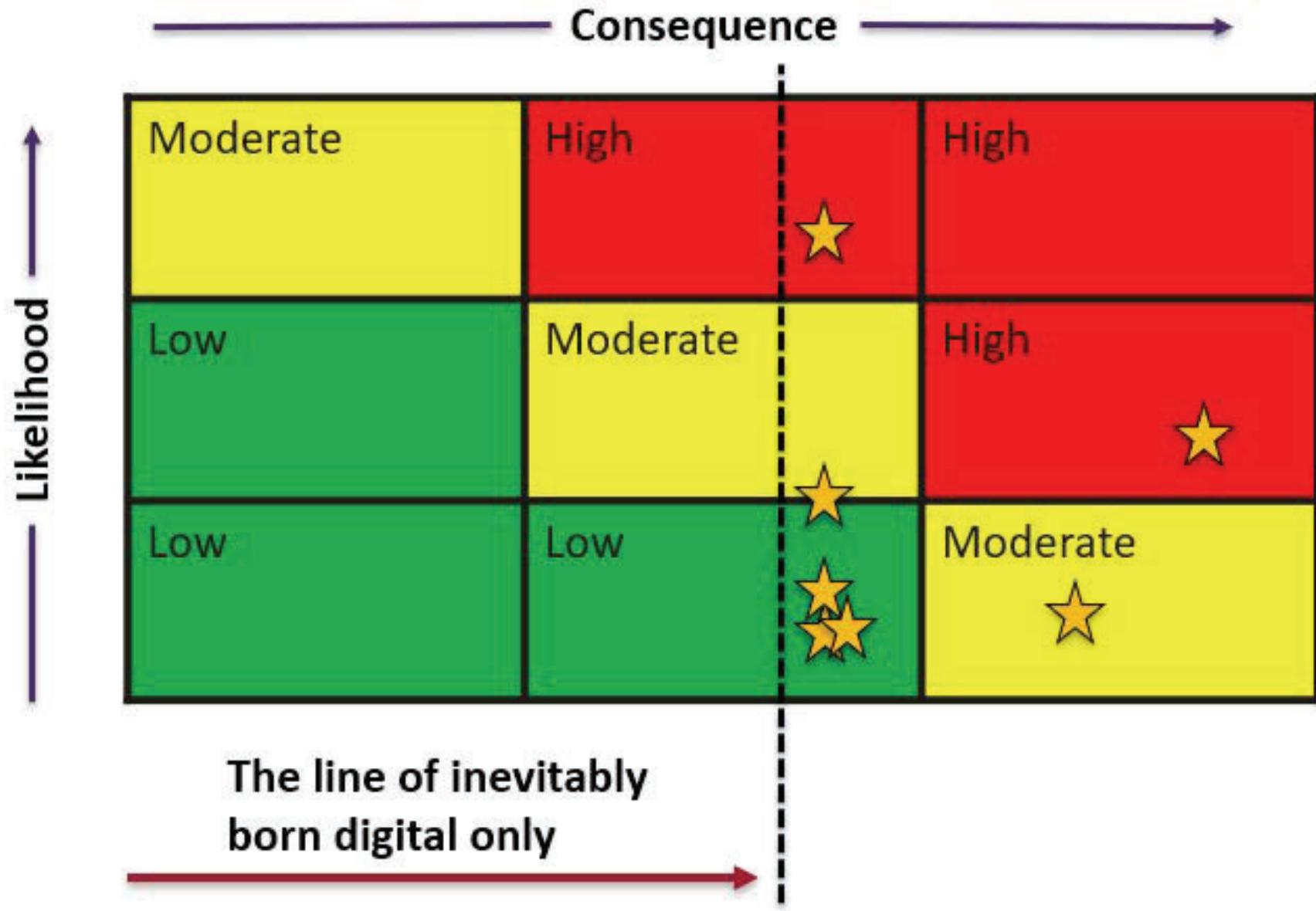


NDSA Worksheet*

NDSA Levels of Digital Preservation								
	Level One (Protect Your Data)	NOTES	Level Two (Know Your Data)	NOTES	Level Three (Monitor Your Data)	NOTES	Level Four (Repair Your Data)	NOTES
Storage and Geographic Location	Two complete copies that are not collocated		At least three complete copies		At least one copy in a geographic location with a different disaster		At least 3 copies in geographic locations with different disaster	
	For data on heterogeneous media (optical disks, hard drives, etc.) get the content off the medium and into your storage		At least one copy in a different geographic location		Obsolescence monitoring process for your storage system(s) and media		Have a comprehensive plan in place that will keep files and metadata on currently accessible media or systems	
			Document your storage system(s) and storage media and what you need to use them					
File Fixity and Data Integrity	Check file fixity on ingest if it has been provided with the content		Check fixity on all ingest		Check fixity of content at fixed intervals		Check fixity of all content in response to specific events or	
	Create fixity info if it wasn't provided with the content		Use write-blockers when working with original media		Maintain logs of fixity info; supply audit on demand		Ability to replace/repair corrupted data	
			Virus-check high risk content		Ability to detect corrupt data		Ensure no one person has write access to all	
Information Security	Identify who has read, write, move, and delete authorization to individual files		Document access restrictions for content		Maintain logs of who performed what actions on files, including deletions and preservation actions		Perform audit of logs	
	Restrict who has those authorizations to individual files							
Metadata	Inventory of content and its storage location		Store administrative metadata		Store standard technical and descriptive metadata		Store standard preservation metadata	
	Ensure backup and non-collocation of		Store transformative metadata and log					
File Formats	When you can give input into the creation of digital files encourage use of a limited set of known open file formats and codecs		Inventory of file formats in use		Monitor file format obsolescence issues		Perform format migrations, emulation and similar activities as needed	







**Cost of
alternatives,
including
continuing to
do nothing**





COLLECTION ANALYSIS

Redux of list of things

- 24 file shares
- 154 database tables (21 pertinent)
- At least 3 databases (only 1 of which we “control”)
- 22 .NET or .ASP access applications
- 6 record groups with no metadata
- 4 record groups with metadata owned and managed elsewhere
- 2 other major internal application integrations (that we are aware of)
- Little to no documentation outside of IT

Tools

Content Analysis

- Windows Explorer
- TreeSize Pro
- DROID

Metadata

- Access 2016
- IBM Cognos
- Excel 2016
- OpenRefine

Manipulation

- CLI
- BASH
- Powershell
- Excel 2016
- PDFtk
- Flash Renamer
- OpenRefine

RECORD INTEGRITY AUDITING*

Powershell:

```
Get-FileHash -Algorithm MD5 -Path  
(Get-ChildItem "~~FILEPATH~~\*.*"  
-Recurse) | Export-csv -Path  
"~~RECORD GROUP~~_YYYY-MM-  
DD.csv"
```

#TYPE Microsoft.PowerShell.Utility.FileHash		
Algorithm	Hash	Path
MD5	96AA3E7E93E9D38D00793FC6151B8D22	\denverwater.org\shares\RDAImages\History\Movies\414997947\Master Files\Film transfer_1.mov
MD5	A259C4C79B81C2D21790D9C3C6DD3E1B	\denverwater.org\shares\RDAImages\History\Movies\414997947\Master Files\Film transfer_2.mov
MD5	410DDF16D28DCD200668254ABFCD2D7D	\denverwater.org\shares\RDAImages\History\Movies\414997947\Master Files\Film transfer_3.mov
MD5	E5A6DABBA7B55B177DDC1EED8EBB9B38	\denverwater.org\shares\RDAImages\History\Movies\414997947\Master Files\Film transfer_4.mov
MD5	5881A3FE88AAEFB444FE297C969C0010	\denverwater.org\shares\RDAImages\History\Movies\414997947\PDI\Master Files MD5.txt
MD5	77596AB6A6E763675D96D8E7C78CC325	\denverwater.org\shares\RDAImages\History\Movies\1970_Flood.mp4
MD5	45E66133A59F1335EC1E5A687AA2B622	\denverwater.org\shares\RDAImages\History\Movies\Blue River.mp4
MD5	6469A082E0F0F1E8EE3544D18AF31407	\denverwater.org\shares\RDAImages\History\Movies\Buffalo Creek Flood 1996.m1v
MD5	E3C23B7F88EC6B9591C0246C14A0749A	\denverwater.org\shares\RDAImages\History\Movies\Century of Water.mp4
MD5	9A0073577B0C88AA28D53AD834DB9720	\denverwater.org\shares\RDAImages\History\Movies\Colorado Water A Fragile Oppotunity.mp4
MD5	E7F8A006EEAE43A942D333F2452EE529	\denverwater.org\shares\RDAImages\History\Movies\ECH2Onergy House.mp4
MD5	86D5188006552A680505BB54F8EB2B5E	\denverwater.org\shares\RDAImages\History\Movies\Eco Stripe.mp4
MD5	CA5726E8A326819F1B366301A39FD4E1	\denverwater.org\shares\RDAImages\History\Movies\Films by WU Gortska.mp4
MD5	BF38306EF16AFB841BC3B538DB94C8FD	\denverwater.org\shares\RDAImages\History\Movies\Foothills for Man and Nature.mp4
MD5	7688CD8A74C839877B17FF707DFEA545	\denverwater.org\shares\RDAImages\History\Movies\From Melting Snows to Denver Faucets.mp4
MD5	34E1FF340CA7A0DFA80B0847F1976D75	\denverwater.org\shares\RDAImages\History\Movies\From Melting Snows to You.mp4
MD5	A4F6C667EE913B85B873160AF4A73276	\denverwater.org\shares\RDAImages\History\Movies\Gross Reservoir and Conduit 90.mp4
MD5	4B0250C08332B69EBCED29DAD7212ADA	\denverwater.org\shares\RDAImages\History\Movies\Harvest From the Sky.mp4
MD5	DBC566B2D7C1194690F5E403E90C5BB6	\denverwater.org\shares\RDAImages\History\Movies\James Lochhead Introduction CEO-Manager 2010.wmv
MD5	8C9B07DD3A1AB62D1F5482E831F5839B	\denverwater.org\shares\RDAImages\History\Movies\Moffat and Capital Hill.mp4
MD5	CD3FF1A526FC98DE30F64C89E45F158A	\denverwater.org\shares\RDAImages\History\Movies\Our Greatest Legacy- The Story of Colorado's Water.mp4
MD5	02CA52502FF1491B163972CDA6A17840	\denverwater.org\shares\RDAImages\History\Movies\Pipeline to the Clouds.mp4
MD5	A44D79CA644078A7F2635547E09E5CC4	\denverwater.org\shares\RDAImages\History\Movies\Pure Water Again - Reuse 1990.wmv
MD5	B06119A8E22E9D3B05F645F26EE12905	\denverwater.org\shares\RDAImages\History\Movies\Ralston Creek Reservoir and Dam - Moffat Treatment.mp4
MD5	EAF62B23A77B94F3D6E0D8DC236BAF50	\denverwater.org\shares\RDAImages\History\Movies\Ralston Creek Reservoir and Dam Part 1.mp4

Excel:

=NOT(ISERROR (MATCH(A1, B:B, 0)))

A	B	C	D	E	F
Mar Hash	Feb Hash	=NOT(ISERROR(MATCH(A1,B:B,0)))	=NOT(ISERROR(MATCH(E1,F:F,0)))	Mar File path	Feb File path
		True	True		
		False	True		
		False	False		

If **True | True**, files have not changed.

If **True | False**, files have been renamed or file path changed.

If **False | True**, files have been modified, either intentionally or unintentionally.

If **False | False**, files are new.

96AA3E7E93E9D38D00793FC6151B8D22	96AA3E7E93E9D38D00793FC6151B8D22	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
A259C4C79B81C2D21790D9C3C6DD3E1B	A259C4C79B81C2D21790D9C3C6DD3E1B	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
410DDF16D28DCD200668254ABFCDF2D7D	410DDF16D28DCD200668254ABFCDF2D7D	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
E5A6DABBA7B55B177DDC1EED8EBB9B38	E5A6DABBA7B55B177DDC1EED8EBB9B38	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
5881A3FE88AAEFB444FE297C969C0010	5881A3FE88AAEFB444FE297C969C0010	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
77596AB6A6E763675D96D8E7C78CC325	77596AB6A6E763675D96D8E7C78CC325	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
45E66133A59F1335EC1E5A687AA2B622	45E66133A59F1335EC1E5A687AA2B622	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
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DBC566B2D7C1194690F5E403E90C5BB6	DBC566B2D7C1194690F5E403E90C5BB6	TRUE	TRUE	\denverwater.org\shares\RDAImages\History\Move\denverwater.org\shares\RDAImage
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FORMAT REGISTRY

Format Registry

- Data Accessioner
 - DROID
 - TreeSize Pro
-
- 100/113 file formats identified and referenced to PRONOM
 - 9 file formats named
 - 4 still unidentified

Format Name	Format Version	Extension	PRONOM Unique ID	Registry URL	Identifier
Hypertext Markup Language	4.01	html	fmt/100	https://www.nationalarchives.gov.uk/PRONOM/fmt/100	DROID
Extensible Markup Language	1	config	fmt/101	https://www.nationalarchives.gov.uk/PRONOM/fmt/101	DROID
Extensible Markup Language	1	dlog	fmt/101	https://www.nationalarchives.gov.uk/PRONOM/fmt/101	DROID
Extensible Markup Language	1	pjs	fmt/101	https://www.nationalarchives.gov.uk/PRONOM/fmt/101	DROID
Extensible Markup Language	1	xml	fmt/101	https://www.nationalarchives.gov.uk/PRONOM/fmt/101	DROID
OLE2 Compound Document Format		db	fmt/111	https://www.nationalarchives.gov.uk/PRONOM/fmt/111	DROID
OLE2 Compound Document Format		shs	fmt/111	https://www.nationalarchives.gov.uk/PRONOM/fmt/111	DROID
Windows Bitmap	3	bmp	fmt/116	https://www.nationalarchives.gov.uk/PRONOM/fmt/116	DROID
Windows Bitmap	3	tif	fmt/116	https://www.nationalarchives.gov.uk/PRONOM/fmt/116	DROID
Portable Network Graphics	1.1	png	fmt/12	https://www.nationalarchives.gov.uk/PRONOM/fmt/12	DROID
Microsoft Powerpoint Presentation	97-2003	ppt	fmt/126	https://www.nationalarchives.gov.uk/PRONOM/fmt/126	DROID
Windows Media Video		wmv	fmt/133	https://www.nationalarchives.gov.uk/PRONOM/fmt/133	DROID
MPEG 1/2 Audio Layer 3		MP3	fmt/134	https://www.nationalarchives.gov.uk/PRONOM/fmt/134	DROID
Acrobat PDF 1.0 - Portable Document Format	1	del	fmt/14	https://www.nationalarchives.gov.uk/PRONOM/fmt/14	DROID
Acrobat PDF 1.0 - Portable Document Format	1	pdf	fmt/14	https://www.nationalarchives.gov.uk/PRONOM/fmt/14	DROID
Waveform Audio (PCMWAVEFORMAT)		wav	fmt/141	https://www.nationalarchives.gov.uk/PRONOM/fmt/141	DROID
Tagged Image File Format for Image Technology (TIFF/IT)		tif	fmt/153	https://www.nationalarchives.gov.uk/PRONOM/fmt/153	DROID
Tagged Image File Format for Internet Fax (TIFF-FX)		tif	fmt/156	https://www.nationalarchives.gov.uk/PRONOM/fmt/156	DROID
Acrobat PDF 1.2 - Portable Document Format	1.2	del	fmt/16	https://www.nationalarchives.gov.uk/PRONOM/fmt/16	DROID
Acrobat PDF 1.2 - Portable Document Format	1.2	pdf	fmt/16	https://www.nationalarchives.gov.uk/PRONOM/fmt/16	DROID
Acrobat PDF 1.3 - Portable Document Format	1.3	del	fmt/17	https://www.nationalarchives.gov.uk/PRONOM/fmt/17	DROID
Acrobat PDF 1.3 - Portable Document Format	1.3	pdf	fmt/17	https://www.nationalarchives.gov.uk/PRONOM/fmt/17	DROID
Acrobat PDF 1.4 - Portable Document Format	1.4	_badpdf	fmt/18	https://www.nationalarchives.gov.uk/PRONOM/fmt/18	DROID
Acrobat PDF 1.4 - Portable Document Format	1.4	del	fmt/18	https://www.nationalarchives.gov.uk/PRONOM/fmt/18	DROID
Acrobat PDF 1.4 - Portable Document Format	1.4	pdf	fmt/18	https://www.nationalarchives.gov.uk/PRONOM/fmt/18	DROID
Office Open XML Document	2007 onwards		fmt/189	https://www.nationalarchives.gov.uk/PRONOM/fmt/189	DROID
Acrobat PDF 1.5 - Portable Document Format	1.5	pdf	fmt/19	https://www.nationalarchives.gov.uk/PRONOM/fmt/19	DROID
MPEG-4 Media File		mp4	fmt/199	https://www.nationalarchives.gov.uk/PRONOM/fmt/199	DROID
Acrobat PDF 1.6 - Portable Document Format	1.6	pdf	fmt/20	https://www.nationalarchives.gov.uk/PRONOM/fmt/20	DROID
Information or Setup File		inf	fmt/212	https://www.nationalarchives.gov.uk/PRONOM/fmt/212	DROID
Microsoft Excel for Windows	2007 onwards	xlsx	fmt/214	https://www.nationalarchives.gov.uk/PRONOM/fmt/214	DROID
Acrobat PDF 1.7 - Portable Document Format	1.7	pdf	fmt/276	https://www.nationalarchives.gov.uk/PRONOM/fmt/276	DROID
AutoCAD Drawing	R11/12	dwg	fmt/32	https://www.nationalarchives.gov.uk/PRONOM/fmt/32	DROID
AutoCAD Drawing	2000-2002	dwg	fmt/35	https://www.nationalarchives.gov.uk/PRONOM/fmt/35	DROID
Tagged Image File Format		a	fmt/353	https://www.nationalarchives.gov.uk/PRONOM/fmt/353	DROID

What are we going to do with it?

- Teachable moments
- Plan for format migration
- Document dependencies

Adobe Acrobat

X



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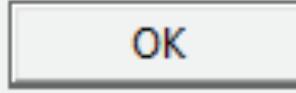
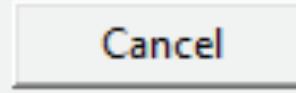
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System requirement



The Windows extension DotNet Framework 1.1 is not installed. It will be installed subsequently to make full use of the functionalities of WinCanViewer. If you don't want that, cancel the installation. You can download the DotNet Framework 1.1 from the website www.microsoft.com and install it.

OKCancel

ACCEPTABLE FILE FORMATS*

Acceptable File Formats for Permanent Digital Records

Records and Document Administration (RDA)

07/2018

Text

Files must contain no measures (such as digital rights management or encryption) that control access or prevent use.

- Acceptable formats in order of preference:
 - PDF/UA (must also conform to PDF/A-1 or PDF/A-2)
 - PDF/A-1
 - PDF/A-2
 - Rich text format (.rtf)
 - Plain text (.txt)
 - Open and widely used word-processing formats such as Microsoft Word (.docx)
- PDF/A-3 is **not recommended** as a sustainable format for long-term digital preservation due to its ability to accept embedded third-party-dependent files.

MINIMUM METADATA REQUIREMENTS*

Minimum Metadata Required Elements

	Name	Description	Field Type
CORE	Creator	The person or entity responsible for the creation of the record.	Single line
	Creation Date	Date final record created. Preferred format: YYYY-MM-DD	Date
	Filename	Complete filename including extension.	Single line
	Record ID	Any unique identifier assigned by a system. (e.g. GUID)	Single line
	Title	The name given to the record.	Single line
	Description	Narrative description of the content of the record.	Multiple line
	Rights	Information about any rights or restrictions held in or over the record including access rights such as Critical Energy Infrastructure Information (CEII) restrictions, personally identifiable information (PII), HIPAA requirements, or usage rights relating to copyright or trademark.	Multiple line
ADDITIONAL	Relation	The relation element should be used if a record is composed of multiple files that form a logical record, or is a necessary component of another logical record.	Multiple line
	Coverage	The geographic and temporal extent or scope of the content of the record.	Single line
TRANSFER	Integrity Check	An integrity check is a method for determining if a digital record has been altered during transmission. Must include both hash function name and message digest . The hash function is a reproducible algorithm that produces the digital fingerprint of a record in the form of a string of characters (message digest). RDA prefers the MD5 hash function for this purpose.	Single line

PREPARING TO MIGRATE OUT OF MULTIPLE LEGACY SYSTEMS*

Record Group Name

Department Name

Contents

Owner	1
Retention	1
System Outline	1
Creation	1
Content	2
Metadata.....	3
Access.....	3

Owner

Owner Name

Point of contact: *Staff Member*

Retention

Series # – Permanent (*Citation*)

System Outline

Creation	Content Storage	Metadata	Access
Brief Statement	*Location Name*	*System Name*	*Tool Name and Location*

Creation

More full description of process

LESSONS LEARNED

Document everything.

If it's past retention,
you don't have to
wrangle it
(just the disposition).

**A decision made on the
best available
information in the past
is still a good decision,
regardless of where you
are now.**

**Relationships are
more important
than systems.**

(See also: humility.)

Thank You

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