Digitisation of South Australian Cultural Heritage Collections

Digitisation Guidelines

Preface

The *Digitisation Guidelines* for South Australian cultural and heritage collections support the implementation of the Arts and Culture *Digital Access Plan.* They have been developed on behalf of the Digital Access Consultative Group (DACG) to strengthen the digitisation capabilities within the key collecting organisations and, ultimately, amongst the wider distributed collections.

The *Guidelines* are designed to provide a foundation for quality digitising and will assist in building a community of practice in digitisation. In adopting these *Guidelines,* organisations reduce the risks associated with low quality digitising and will avoid the need to re-digitise in the future. The *Digitisation Guidelines* provide common technical specifications for digitising various formats of materials, together with links to additional resources. The specifications in the *Guidelines* are based on national and international standards and guidelines that are referenced in the document, and are also informed by current digitising practices in a number of the DACG collecting organisations. The digital specifications refer to the 'preservation' or 'master' copy.

Special thanks to the group of staff from the DACG organisations who have provided input and feedback. They include: Eleanor Adams, Heather Brown, Helen Chadwick, Antonietta Itropico, Kristy Kokegei, Keith Maguire and Beth Robertson.

Andrew Durham
Director, Artlab
Project Sponsor and DACG Chair

Contents

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	Documents - handwritten or typed text, bound or manuscripts	'High volume' documents (unbound, using document scanner)
Preservation Master		
File format	Uncompressed TIFF	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]	8 [24 bits/pixel]
Colour space	RGB	RGB
Resolution	Minimum 300 ppi	300 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 3000 pixels on the longest side. If the longest side is less than 3000 pixels then the resolution is increased to increase the number of pixels on the longest side to 3000.	100% with a minimum of 3000 pixels on the longest side.
File size (if minimum size is required)	Minimum 18 MB	
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.	
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.	

	Colour reflective formats - including coloured maps, pencil sketches with wash, sepia or coloured photographic prints, printed music, manuscripts
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]
Colour space	RGB
Resolution	Minimum 300 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Rare or significant documents, artworks, paintings, posters or large format documents with high level of detail See also *Other large format documents, oversize materials*
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]
Colour space	RGB
Resolution	Minimum 300 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Other large format documents, oversize material > A4 See also *Rare or significant documents with high level of detail*
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]
Colour space	RGB
Resolution	Minimum 400 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Newspapers hard copy originals See also *Hard copy digitised newspapers provided to Trove*	Newspapers hard copy originals-digitised-using document scanner See also *Hard copy digitised newspapers provided to Trove*
Preservation Master		
File format	Uncompressed TIFF	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]	8 [24 bits/pixel]
Colour space	RGB	RGB
Resolution	400 ppi	300 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	1:1 7016 pixels on the longest side	1: 1 6374 pixels on the longest side
File size (if minimum size is required)		
Additional notes: Note re ppi		
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Newspapers hard copy digitised newspapers provided to Trove See also *hard copy newspapers originals and digitised using document scanner*	Newspapers hard copy newspapers digitised as bitonal requirement for Trove See also *hard copy newspapers originals and digitised using document scanner*
Preservation Master		
File format	TIFF, compression type LZW	TIFF, compression type LZW
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]	8 [8 bits/pixel]
Colour space	Greyscale	Bitonal
Resolution	400 ppi	400 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	1:1 7016 pixels on the longest side	1: 1 7016 pixels on the longest side
File size (if minimum size is required)		
Additional notes: Note re ppi		
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Newspapers microfilm - greyscale	Newspapers microfilm - bitonal
Preservation Master		
File format	TIFF, compression type LZW	TIFF, compression type LZW
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]	8 [8 bits/pixel]
Colour space	Greyscale	Bitonal
Resolution	400 ppi	400 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	1:1 7016 pixels on the longest side	1: 1 7016 pixels on the longest side
File size (if minimum size is required)		
Additional notes: Note re ppi		
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.	

	Colour transparencies and colour negatives including 35mm See also *Rare or significant documents with high level of detail*
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]
Colour space	Adobe RGB
Resolution	4500 ppi for 35mm; 2000 ppi for larger than 35mm
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. Curve and level adjustments to be applied to maximise the dynamic range as part of this process. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Black and white reflective formats including photographic prints, black and white line art, black and white maps See also *Rare or significant documents with high level of detail*
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [24 bits/pixel]
Colour space	RGB
Resolution	Minimum 300 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. An original that has degraded to a flat tonal range may be optimised. Corrections are undertaken are to eliminate introduced degradations like colour cast from scanning equipment.

	Black and White negatives 35mm and larger	Glass plate negatives
Preservation Master		
File format	Uncompressed TIFF	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	8 [16bits/pixel]	8 [16 bits/pixel]
Colour space	Grey Gamma 2.2	Grey Gamma 2.2
Resolution	[4500 ppi for 35mm; 2000 ppi for larger than 35mm]	2000 ppi
Output size (Applies to use of a scanner; variations apply for cameras)	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.	100% with a minimum of 5000 pixels on the longest side. If the longest side is less than 5000 pixels then the resolution is increased to increase the number of pixels on the longest side to 5000.
File size (if minimum size is required)	Minimum 50 MB	Maximum 1.5 GB
Additional notes: Note re ppi	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.	Use scanning software to calculate the ppi necessary to achieve the minimum file size, i.e. if 300 ppi will result in an under-sized master file, ppi is increased until the minimum master file size is exceeded.
Additional notes exceptions to flat transfer principle	Images to be digitised and colour corrected to match the original at the time of scanning. Curve and level adjustments to be applied to maximise the dynamic range as part of this process.	Images to be digitised and colour corrected to match the original at the time of scanning. Curve and level adjustments to be applied to maximise the dynamic range as part of this process.

	Audio Aligned with IASA TC04 *Guidelines on the Production and Preservation of Digital Audio Objects*
Preservation Master	
File format	Uncompressed BWF
Bit depth & sampling rate (if applicable)	Speech: 24-bit, 48 kHz Music: 24-bit, 96 kHz
Colour space	
Resolution	
Output size (Applies to use of a scanner; variations apply for cameras)	
File size (if minimum size is required)	
Additional notes: Note re ppi	
Additional notes exceptions to flat transfer principle	Very low level analogue recordings require a level increase (gain) in order to reach appropriate signal levels for digitising. Record disc transfers will have an appropriate equalisation curve applied to the output of the turntable by the Elberg MD12 multicurve phono pre-amp.

	Exceptional 9.5mm & 16mm [very rarely used] No current standards for film however DPX is the frequently used standard format	Film 9.5mm, 16mm & exceptional 8mm
Preservation Master		
File format	Captured as Digital Moving-Picture Exchange (DPX) sequence; compressed as lossless Motion Jpeg 2000 with mxf wrapper	Captured as Digital Moving-Picture Exchange (DPX) sequence; compressed as lossless Motion Jpeg 2000 with mxf wrapper
Bit depth & sampling rate (if applicable)	12 bit DPX	12 bit DPX
Colour space	RGB	RGB
Resolution	2336 x 1752 pixels	2048 x 1556 pixels
Output size		
File size (if minimum size is required)		
Additional notes:	A sound track is rendered as a .wav file in the mxf wrapper.	A sound track is rendered as a .wav file in the mxf wrapper.
Additional notes exceptions to flat transfer principle	Colour grading is required to compensate for colour fade and different film stocks incorporated in a single work.	Colour grading is required to compensate for colour fade and different film stocks incorporated in a single work.
Other comments	Some archives are exploring approaches that will permit the carriage of synchronised sound and picture signals in the same wrapper, and/or the ability to incorporate additional colour and tonal data. These explorations entail the reformatting of the initially captured DPX picture signals (and soundtracks) into preservation master formats like those selected for video, e.g., lossless JPEG 2000 in MXF or FFV1 picture in QuickTime or Matroska.	

	Film: 8mm & Super 8
Preservation Master	
File format	Captured as Digital Moving-Picture Exchange (DPX) sequence; compressed as lossless Motion Jpeg 2000 with mxf wrapper
Bit depth & sampling rate (if applicable)	12 bit DPX
Colour space	RGB
Resolution	1920 X 1080 pixels
Output size	
File size (if minimum size is required)	
Additional notes:	A sound track is rendered as a .wav file in the mxf wrapper.
Additional notes exceptions to flat transfer principle	Colour grading is required to compensate for colour fade and different film stocks incorporated in a single work.
Other comments	Some archives are exploring approaches that will permit the carriage of synchronised sound and picture signals in the same wrapper, and/or the ability to incorporate additional colour and tonal data. These explorations entail the reformatting of the initially captured DPX picture signals (and soundtracks) into preservation master formats like those selected for video, e.g., lossless JPEG 2000 in MXF or FFV1 picture in QuickTime or Matroska.

	Video Aligned with IASA-TC06 Guidelines for the Preservation of Video Recordings
Preservation Master	
File format	Lossless Motion Jpeg 2000 with mxf wrapper
Bit depth & sampling rate (if applicable)	10 bit DPX
Colour space	RGB
Resolution	720 x 576 pixels
Output size	
File size (if minimum size is required)	
Additional notes:	A sound track is rendered as a .wav file in the Motion Jpeg.
Additional notes	
Other comments	

	Herbarium and Microscopic specimens
Preservation Master	
File format	Uncompressed TIFF
Bit depth & sampling rate (if applicable)	24 bit colour
Colour space	RGB
Resolution	600 ppi
Output size	
File size (if minimum size is required)	
Additional notes:	
Additional notes	
Other comments	

	3D imaging
	For useful information on 3D imaging, refer to the following guides that are listed in the **Resources**: DCHE Expert Group, 2020 Johnson et al, 2018 Library of Congress, 2020

Resources

European Commission's Expert Group on Digital Cultural Heritage and Europeana (DCHE Expert Group) 2020, *Basic principles and tips for 3D digitisation of tangible cultural heritage,* <https://ec.europa.eu/digital-single-market/en/news/basic-principles-and-tips-3d-digitisation-cultural-heritage>.

Federal Agencies Digital Guidelines Initiative (FADGI) 2016, *Guidelines: Technical Guidelines for Digitizing Cultural Heritage Material: creation of raster image files,* FADGI Still Image Working Group, **<**http://www.digitizationguidelines.gov/guidelines/FADGI%20Federal%20%20Agencies%20Digital%20Guidelines%20Initiative-2016%20Final_rev1.pdf**>.**

Johnson, J, Miller, D, Palmer, K, 2018, *Advancing 3D Digitization for Libraries, Museums, and Archives,* Indiana University Indiana University–Purdue University Indianapolis (IUPUI) University Library Center for Digital Scholarship, <https://www.lyrasis.org/Leadership/Documents/Advancing-3D-Digitization.pdf>

Library of Congress 2020, *Recommended Formats Statement - 2020-2021,* <https://www.loc.gov/preservation/resources/rfs/>.

National Archives of Australia (NAA) 2018, Preservation Digitisation Standards <https://www.naa.gov.au/about-us/our-organisation/accountability-and-reporting/archival-policy-and-planning/preservation-digitisation-standards>.

National Library of Australia (NLA) n.d., *Image Capture Standards, NLA* <https://www.nla.gov.au/standards/image-capture>.

Nieva de la Hidalga, A, Rosin, P, Sun, X, Bogaerts, A, De Meeter, N, De Smedt, S, Van Schijndel, M, Van Wambeke, P & Groom Q 2020, 'Designing an herbarium digitisation workflow with built- in image quality management,' *Biodiversity Data Journal*, 26 Mar, 8:e47051**,** DOI: 10.3897/bdj.8.e47051**,** <https://europepmc.org/article/pmc/pmc7125238>.

State Library of South Australia 2019, *Specifications for master digital image files*, https://www.slsa.sa.gov.au/sites/default/files/2019-02/Specifications%20for%20Master%20Digital%20Image%20Files.pdf

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