How to convert an aRGB HDR into a sRGB HDR/EXR

A) Applications used:

Adobe Photoshop CS4
LittleCMS Color Translator 2.18

B) Extra ICC profiles

aRGB (1998) Linear
sRGB (IEC61966-2.1) Linear

Specially want to thank my friend Gerardo Estrada who helped with the workflow research. He also generated the Linear aRGB.icc & Linear sRGB.icc profiles.

Profile info

Linear aRGB.icc - Linear version of the ICC v2.1 Adobe RGB (1998) profile. Primaries, white point and illuminant are exactly the same as Adobe specs. Tone Reproduction curve is linear. This profile is compatible with V2 and V4 Color Management Modules.

Linear sRGB.icc - Linear version of the ICC v2.1 sRGB IEC61966-2.1 profile. Primaries, white point and illuminant are exactly the same as Hewlett Packard specs as the profile shipped with Adobe products. Tone Reproduction curve is linear. This profile is compatible with V2 and V4 CMMs.

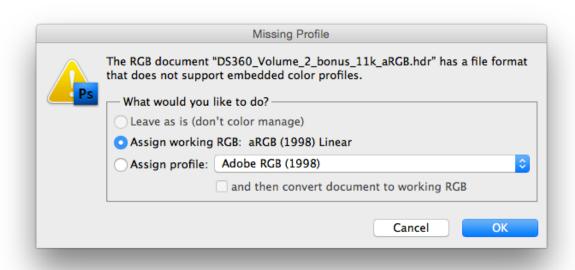Released into the public domain. No Warranty, Use at your own risk.

The profiles can be downloaded here:
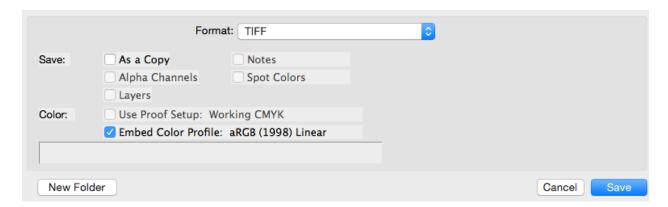http://dutch360hdr.com/downloads/profiles/20150710_Linear_aRGB_sRGB_ICC_profiles.zip

Ps a while ago wrote a article for HDRLabs [http://www.hdrlabs.com/news/index.php?id=2690683916811714984], in that article showed a workflow how to convert a hdr based on aRGB primaries into a hdr based on sRGB primaries that is used for generating the sIBL HDR set and for regular usage in sRGB range. This Workflow is a updated version.

STEP 1

a) Open DS360_Volume_2_bonus_11k_aRGB.hdr (just a example file - not included here) in Photoshop and add the aRGB (1998) Linear profile.

b) Save the the file and next as a DS360_Volume_2_bonus_11k_aRGB.tiff file - 32 bit float with the aRGB (1998) Linear profile embedded.

TIFF Options

Bit Depth
- ( ) 16 bit (Half)
- ( ) 24 bit (FP24)
- (•) 32 bit (Float)

Image Compression
- (•) NONE
- ( ) LZW
- ( ) ZIP
- [ ] Use Predictor Compression

Pixel Order
- (•) Interleaved (RGBRGB)
- ( ) Per Channel (RRGGBB)

Byte Order
- (•) IBM PC
- ( ) Macintosh

[ ] Save Image Pyramid
[ ] Save Transparency

Layer Compression
- ( ) ZIP
- ( ) Discard Layers and Save a Copy

OK

Cancel

STEP 2

LittleCMS Color Translator

a) An 11k .hdr based on aRGB primaries for users who want to take advantage of a wider color range.
For creating a regular sIBL set is better to convert this aRGB based panorama into a sRGB version. So we need:

b) An 11k .hdr based on sRGB primaries that it's used for generating the sIBL HDR set and for regular usage in sRGB range.
For converting the colorspaces we need to install the ~~Color~~ profiles for Color Translator
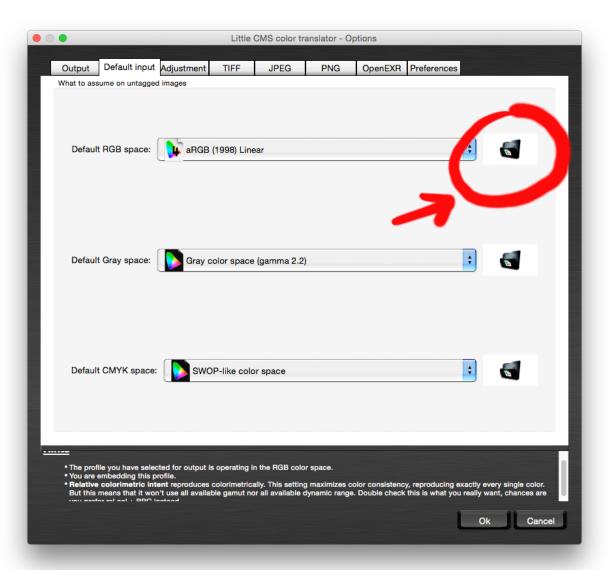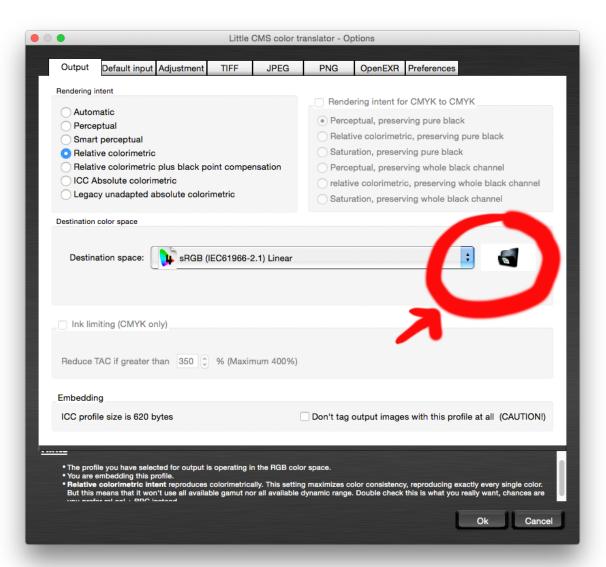
The needed profiles for this work can be downloaded here (same download as mention before):
http://dutch360hdr.com/downloads/profiles/20150710_Linear_aRGB_sRGB_ICC_profiles.zip

You need to install these profiles in your color profiles folder. Just have a look here for a very good manual how to do that on your platform (http://www.drycreekphoto.com/Learn/profile_install.htm).

When opening Color Translator you see in the Input & Output tabs on the right, a black folder, just click on it and select your color profiles folder as mentioned below.

Little CMS color translator - Options

Output | Default input | Adjustment | TIFF | JPEG | PNG | OpenEXR | Preferences

What to assume on untagged images

Default RGB space: aRGB (1998) Linear

Default Gray space: Gray color space (gamma 2.2)

Default CMYK space: SWOP-like color space

- The profile you have selected for output is operating in the RGB color space.
- You are embedding this profile.
- **Relative colorimetric intent** reproduces colorimetrically. This setting maximizes color consistency, reproducing exactly every single color. But this means that it won't use all available gamut nor all available dynamic range. Double check this is what you really want, chances are you prefer rel.col. + BPC instead.

Ok   Cancel

Little CMS color translator - Options

| Output | Default input | Adjustment | TIFF | JPEG | PNG | OpenEXR | Preferences |

Rendering intent

- ○ Automatic
- ○ Perceptual
- ○ Smart perceptual
- ● Relative colorimetric
- ○ Relative colorimetric plus black point compensation
- ○ ICC Absolute colorimetric
- ○ Legacy unadapted absolute colorimetric

☐ Rendering intent for CMYK to CMYK

- ● Perceptual, preserving pure black
- ○ Relative colorimetric, preserving pure black
- ○ Saturation, preserving pure black
- ○ Perceptual, preserving whole black channel
- ○ relative colorimetric, preserving whole black channel
- ○ Saturation, preserving whole black channel

Destination color space

Destination space: sRGB (IEC61966-2.1) Linear

☐ Ink limiting (CMYK only)

Reduce TAC if greater than 350 ↕ % (Maximum 400%)

Embedding

ICC profile size is 620 bytes   ☐ Don't tag output images with this profile at all (CAUTION!)

- The profile you have selected for output is operating in the RGB color space.
- You are embedding this profile.
- **Relative colorimetric intent** reproduces colorimetrically. This setting maximizes color consistency, reproducing exactly every single color. But this means that it won't use all available gamut nor all available dynamic range. Double check this is what you really want, chances are you prefer rel.col + BPC instead.

Ok   Cancel

Now we are going to use Color Translator to convert to Linear sRGB:
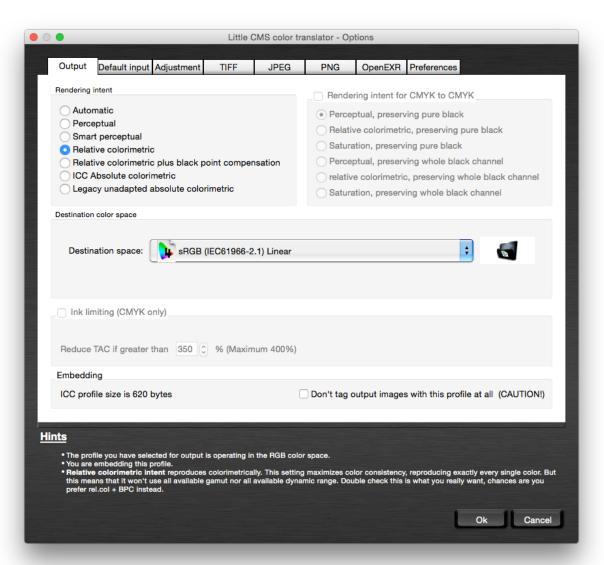
input tab

Be sure you have the default RGB space set to aRGB (1998) Linear profile – we just installed
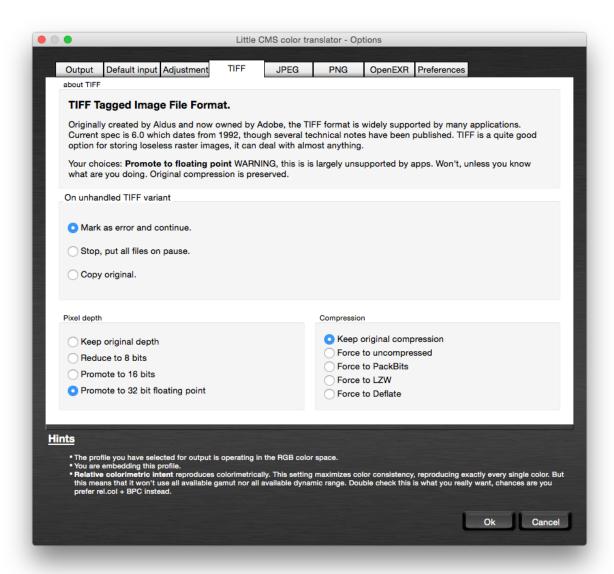

Output tab

Destination space must be set to the sRGB (IEC61966-2.1) Linear profile – we just installed

Enable also : Relative Colorimetric

Little CMS color translator - Options

| Output | Default input | Adjustment | TIFF | JPEG | PNG | OpenEXR | Preferences |

Rendering intent

- ○ Automatic
- ○ Perceptual
- ○ Smart perceptual
- ● Relative colorimetric
- ○ Relative colorimetric plus black point compensation
- ○ ICC Absolute colorimetric
- ○ Legacy unadapted absolute colorimetric

☐ Rendering intent for CMYK to CMYK

- ● Perceptual, preserving pure black
- ○ Relative colorimetric, preserving pure black
- ○ Saturation, preserving pure black
- ○ Perceptual, preserving whole black channel
- ○ relative colorimetric, preserving whole black channel
- ○ Saturation, preserving whole black channel

Destination color space

Destination space: [🎨 sRGB (IEC61966-2.1) Linear ⬍] [📁]

☐ Ink limiting (CMYK only)

Reduce TAC if greater than [350 ⬍] % (Maximum 400%)

Embedding

ICC profile size is 620 bytes   ☐ Don't tag output images with this profile at all (CAUTION!)

Hints

- The profile you have selected for output is operating in the RGB color space.
- You are embedding this profile.
- **Relative colorimetric intent** reproduces colorimetrically. This setting maximizes color consistency, reproducing exactly every single color. But this means that it won't use all available gamut nor all available dynamic range. Double check this is what you really want, chances are you prefer rel.col + BPC instead.
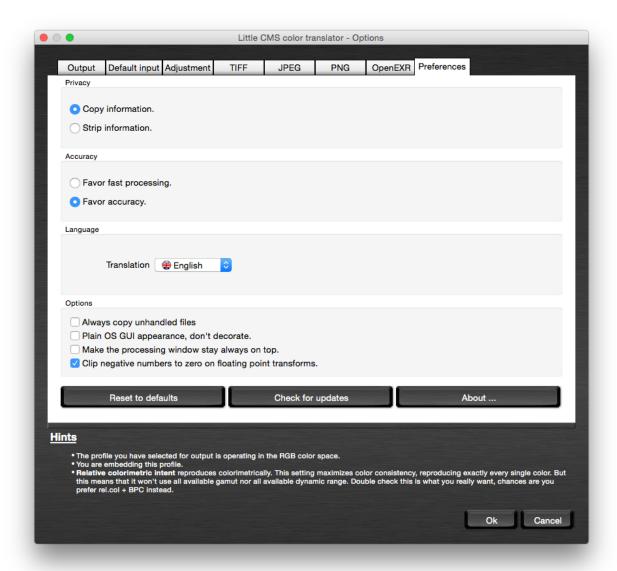
[Ok] [Cancel]

Tiff tab

In this specific case we keep the Pixel Depth set to Promote to 32 bit floating (although you also can use "Keep Original Depth" the result will be the same in this kind of conversions).

Preferences Tab

Enable the Accuracy to : "Favor Accuracy"

Also be sure to enable the option: " Clip Negative numbers to zero on Floating point transforms" (this may prevents some complications in some applications).
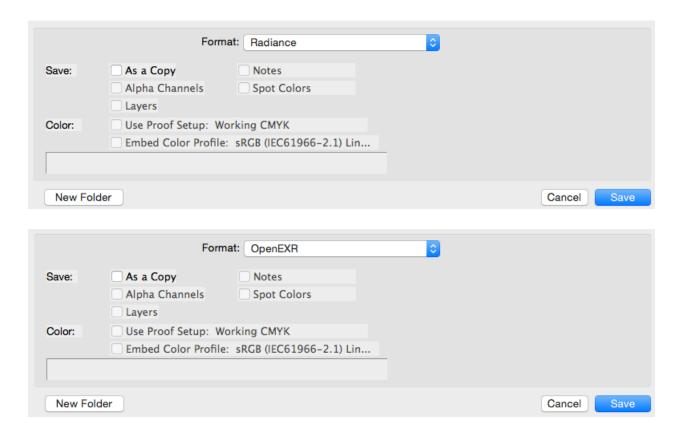
Now the settings are complete ~~so~~ we can convert the DS360_Volume_2_bonus_11k_aRGB.tiff from Step 1 into a DS360_Volume_2_bonus_11k_sRGB.tiff file with Color Translator.

STEP 3

This is the last step:

Now we can convert the DS360_Volume_2_bonus_11k_sRGB.tiff into a DS360_Volume_2_bonus_11k_sRGB.hdr (or DS360_Volume_2_bonus_11k_sRGB.exr) file with Photoshop.
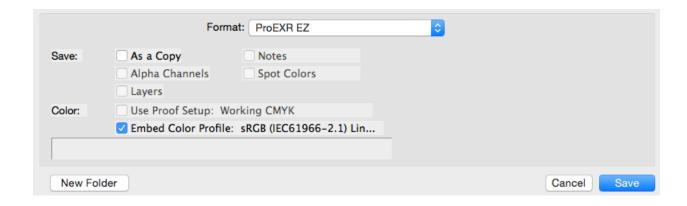
Note that .hdr files cannot store ICC profiles but the image is sRGB Linear based. So when opening in Photoshop you simply assign the sRGB profile. On 32-bpc images, Photoshop will linearize the chosen profile on the fly automatically.

The sRGB version panorama can be used for generating your own sIBL sets + tonemapping.

PRO EXR EZ

When you want store the profile info also, you can use a great free Photoshop plugin called ProEXR EZ

You can download it here for free: http://fnordware.blogspot.nl/2012/04/proexr-ez-is-free.html

Legal notes:

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