Best Focal Length to Represent a Landscape View Using a Single-Frame Photograph

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Photograph Standards

“A 70mm focal length lens on a 35mm SLR is required for distances up to 1.5 km from the viewpoint to the nearest turbine and a 75mm focal length lens for distances exceeding 1.5 km. We may require additional focal lengths for long distance views.”

The Highland Council and Scottish Natural Heritage, 2010
A typical statement from the methods section of a VIA ...

The camera was set to record at a "normal" focal length (i.e., equivalent to that found on a 50mm SLR camera), which matches the image seen by the human eye.

Northern Pass Transmission Project VIA
This is a Myth, a False Fact ...

The camera was set to record at a "normal" focal length (i.e., equivalent to that found on a 50mm SLR camera), which matches the image seen by the human eye.

Northern Pass Transmission Project VIA
Photographs cannot “match” the image we see because …
And it’s even more complicated than that ...

- **Saccades** are rapid eye movements between points of fixation, both conscious and unconscious.

- **Head and body movement** to increase range of visible area.

- **Locomotion** further increases the range of visible area and viewpoints.
Consider how visual impact simulations are displayed?

- Printed in color on paper at 600 dpi or greater
  - A3 (297 x 420 mm)
  - Tabloid paper (11” x 17”)
- Color computer monitor (typically < 100 ppi)
  - 1,366 x 768 on a laptop or 18.5” monitor
  - 1,920 x 1080 on a 21.5”-23” monitor or 1080p TV
- Typical viewing distance is 16” to 24” or a comfortable arm’s length.
If this is the format for a single frame photograph, what lens focal length should we be using?

- I believe that this question is best submitted to empirical investigation.
- This paper presents the results of an initial teaching workshop field study.
- **We invite replications!**
Research opportunity ...

COST TU 1401 Training Workshop on Renewable Energy and Landscape Quality

• August 22-26, 2016 in Dublin, Ireland

• Organizers:
  – Dr. Ken Boyle, Dublin Institute of Technology
  – Prof. Pat Brereton, Dublin City University
  – Dr. Michael Roth, Nürtingen-Geislingen University

• 26 faculty and student participants
Methods

• Vincent Vanderheyden photographed three views in Kilmacanogue, Co. Wicklow, Ireland
  – Purple heather (NW)
  – Sugar Loaf Mountain (NE)
  – Fields separated by hedges (E)

• Nikon D7100 with Nikkor DX 18-105mm lens
• Image size is 6,000-by-4,000 pixels
• Focal lengths between 30mm and 90mm in 10mm increments
Purple Heather
Sugar Loaf Mountain
Fields and Hedges
“Does the extent of the photograph show exactly enough of the relevant surroundings to understand [this view] in its landscape context, or is there too little context or a too much context, or way too little or way too much context in the photo than is necessary to represent the actually view.”

1. Way to little
2. Too little
3. Exactly the Same
4. Too much
5. Way too much
Results

Legend

- Heather
- Sugar Loaf Mtn
- Fields & Hedges
- All Views

Focal Length

Rating

Way too much
Too much
Exactly the Same
Too little
Way to little
In response to the Great Philosophical Treatise ...
“The answer to the ultimate question of life, the universe, and everything", is ...

a 50 mm lens
on a FX camera body
Though this is just a first approximation, and Deep Thought is still working on the ultimate answer, which may change because we used a

• Very limited range of landscape types
• Limited number of respondents
• Views are of landscape features, not impacts
There’s still lots more to do ...  

Static single frame photographs do not represent some visual conditions well.

For instance, ...
Movement ...
Nighttime ...
Expansive Views ...
There are also possible extensions ...

• Judge the size and distance to features.
• Effect of how people hold & view the simulations.
• Compare a single panorama to multiple photos.
• Compare display media attributes:
  – Resolution   – Motion   – Immersion   – Interactive
• Compare response equivalence:
  – Off-site meeting   – On-site evaluation
  – Engaged in onsite activity
• Use alternate methods:
  – visitor employed photograph
Did I mention...we’re recruiting?

DON’T PANIC