Cartography. MOOC

Exercise

Create a Fly-Through Animation

Section 6 Exercise 2

05/2020

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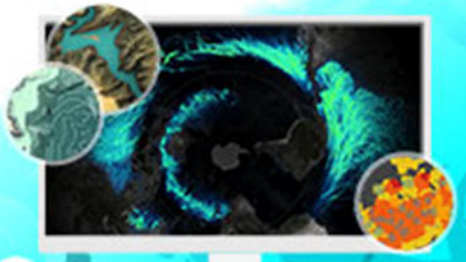


Create a Fly-Through Animation

Instructions

Use this guide and ArcGIS Pro to reproduce the results of the exercise on your own.

Note: The version of ArcGIS Pro that you are using for this course may produce slightly different results from the screen shots that you see in the course materials.

Time to complete

Approximately 40-50 minutes

Software requirements

ArcGIS Pro 2.5
ArcGIS Pro Standard license (or higher)

Note: The MOOC provides a separate ArcGIS account (user name and password) that you will need to use to license ArcGIS Pro and access other software applications used throughout the MOOC exercises. This account (user name ending with _cart) provides the appropriate ArcGIS Online role, ArcGIS Pro license, ArcGIS Pro extensions, and credits. We strongly recommend that you use the provided course ArcGIS account to ensure that you have the appropriate licensing to complete the exercises. Exercises may require credits. Using the provided course ArcGIS account ensures that you do not consume your organization's credits. Esri is not responsible for any credits consumed if you use a different account. Moreover, Esri will not provide technical support to students who use a different account.

Introduction

Sharing GIS knowledge does not always require a printed or interactive online map; it can also be done with a video. This method is useful for communicating a specific storyline or analytical discovery, where it is simpler for users to see a scripted presentation of the data instead of exploring it for themselves. A video can also present large and cumbersome data in a streamlined way and, with the advent of social media, allows you to engage with a larger audience.

In ArcGIS Pro, videos are the output of an animation, and they are most often created as a final step after your 2D or 3D map is fully prepared.

An animation is authored by creating an ordered set of keyframes, where each keyframe contains the current view position, the visibility and transparency of the layers in the map, and

the map's current time and/or range extent. When the animation is exported to a video file, intermediate frames are interpolated between the states captured in your keyframes.

What will you learn?

In this exercise, you will learn how to perform the following tasks:

- Author a simple fly-through animation in 3D.
- Change the visibility of content to help tell a story.
- Add on-screen text to provide additional information.

Note: When working with animation in ArcGIS Pro, you will encounter some new terms and may find this list of essential terminology for animation (https://bit.ly/2IldTgV) help topic useful.

You will be using two scenarios in this exercise to showcase what you can do with animations in ArcGIS Pro.

Step 1: Download the exercise data files

In this step, you will download the exercise data files.

a. Open a new web browser tab or window.

b. Go to https://bit.ly/2z6X1BH and download the exercise data ZIP file.

Note: The complete URL to the exercise data file is https://www.arcgis.com/home/item.html?id=efe564edbe584f779071bddbfe825efc. The file is 228 MB.

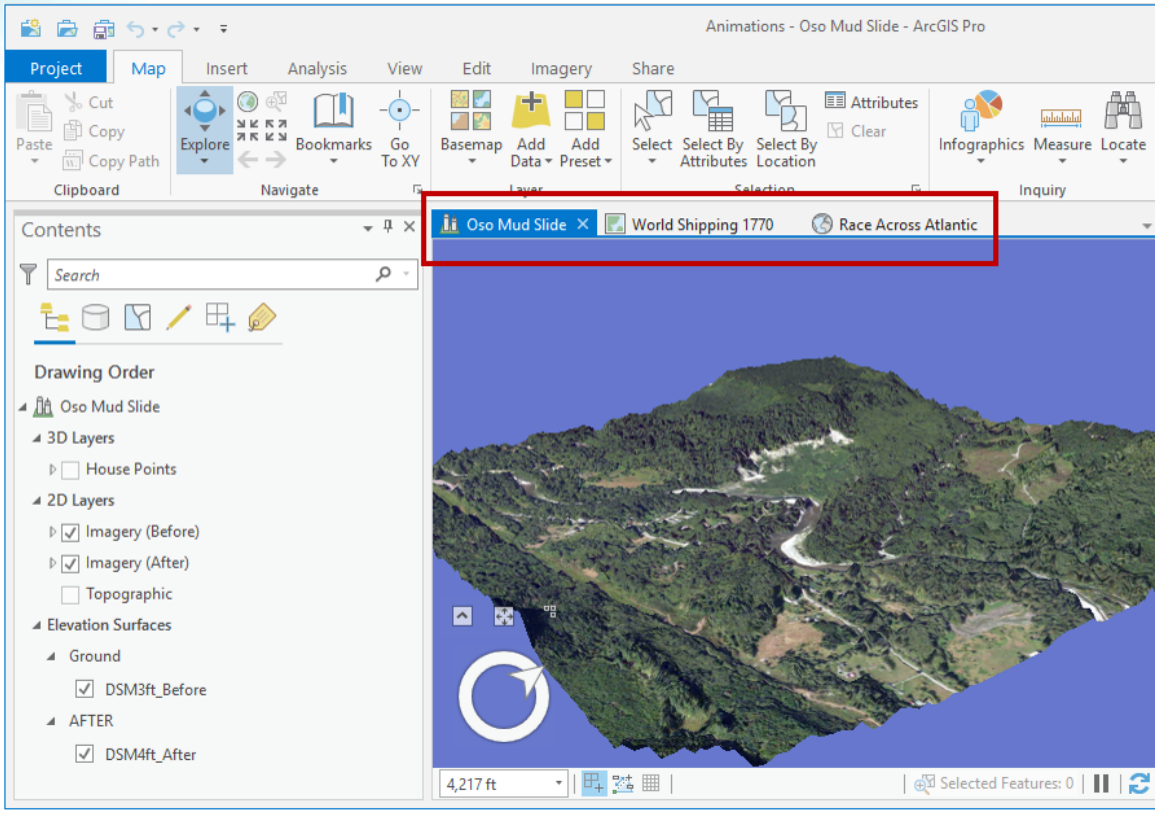
c. Extract the files to a folder on your local computer, saving them in a location that you will remember.

Step 2: Open an ArcGIS Pro project package

a. Start ArcGIS Pro and, if necessary, sign in using your provided course ArcGIS credentials (user name ending with _cart).

b. Click Open Another Project and browse to the Animations folder that you saved on your computer.

c. Open the Animations.aprx ArcGIS Pro project file.



The three scenes that you will be working with in this exercise and the next are available at the top of the ArcGIS Pro map view.

To maintain the original exercise project file, you will save your project with a different name.

d. From the Project tab, click Save As and type a name for your project, such as **Animations_<your first and last name>**.aprx.

e. Save the file to the folder on your computer where you are saving your work.

Scenario 1: Oso mudslide

Reusing a scene from earlier (Section 5 Exercise 1: *Mapping Terrain in 3D*), you will view the before and after topography of the Steelhead Haven community, near Oso, Washington, with the tragic mudslide of March 22, 2014. The volume of debris and range of its destruction were truly frightening. A video highlighting the change in topography can effectively communicate the degree of damage that occurred.

You will create a looping 3D fly-through of the scene, fading between the before and after states of the topography, and generate an animated GIF that you can embed in a web page

or on social media. A fly-through shows what you would see if you flew around the scene in a helicopter.

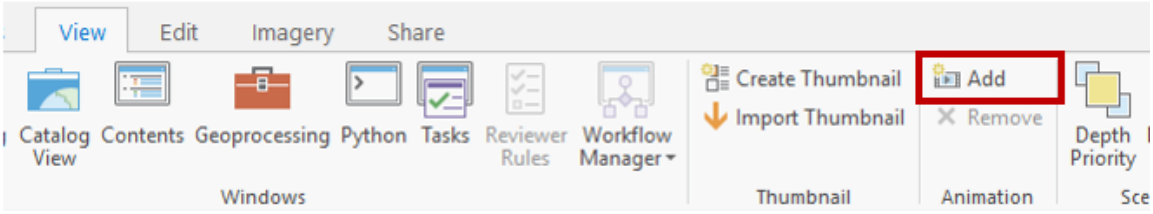
Note: If you would like to see the finished video for this scenario, you can find the Animations_Complete_OsoMudSlide.gif file in the VideoResults folder on your computer in the location where you extracted the exercise data files.

Step 3: Add an animation to the Oso Mud Slide scene

Maps can contain animations. The first step in making any animation is to add one to your map or scene.

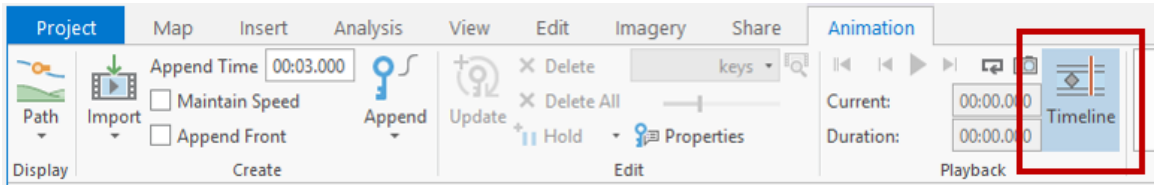
a. With the Oso Mud Slide scene active, click the View tab.

b. In the Animation group, click Add.

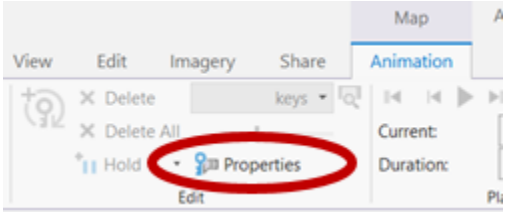


This adds an animation to the scene, which, in turn, reveals the Animation contextual tab and opens and docks the Animation Timeline pane at the bottom of the window.

Note: If the Animation Timeline pane does not open automatically, from the Animation tab, in the Playback group, click Timeline.



c. From the Animation tab, in the Edit group, click Properties.



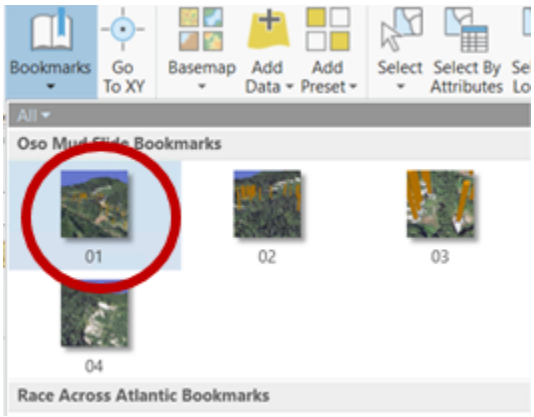
The Animation Properties pane opens. The pane is initially empty, as you have not yet created any keyframes. You will use this advanced configuration pane in later steps.

Step 4: Create the first keyframe

First, you need to define the starting point of the animation. When a keyframe is created, it captures the camera's location and the visibility states of all layers. Therefore, you should review the appearance of the scene before you create the keyframes.

a. From the Map tab, click the Bookmarks down arrow.

b. In the Oso Mud Slide Bookmarks section, click the 01 bookmark.



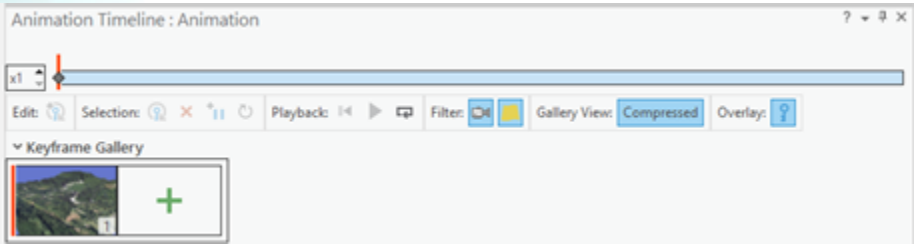
The initial layer properties have already been set. Note the following aspects in the Contents pane:

- The House Points layer is turned off.
- The Imagery (Before) layer is turned on with 0% transparency.
- The Imagery (After) layer is turned on but set to 100% transparency.

Note: Later, you will see how transitioning layer transparency allows content to fade in and out.

c. In the Animation Timeline pane, click Create First Keyframe.

The Animation Timeline pane shows the keyframe that you just created. The first keyframe will be the first image in your video.

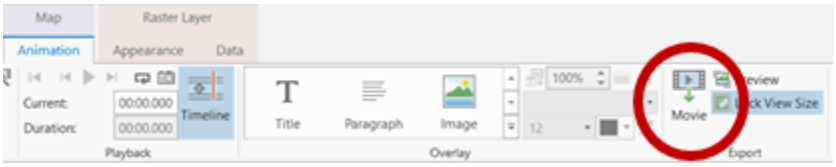


Step 5: Set the video export properties

You might have noticed that part of the view is now being culled. This is done to indicate which section of the view will be captured in the video. By default, the video's aspect ratio and quality settings are configured for YouTube—that is, an MP4 video file with an aspect ratio of 16:9 and a resolution of 1,280 pixels wide by 720 pixels high.

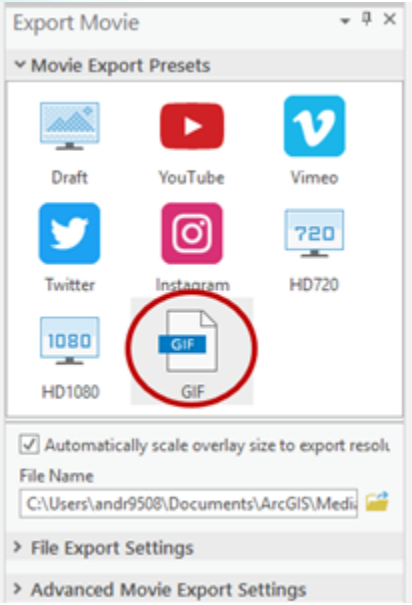
In your case, however, you want to create an animated GIF for a web page.

a. From the Animation tab, in the Export group, click Movie to open the Export Movie pane.



The Export Movie pane is where you will find movie export preset options and file export settings, which represent common video export configurations to help ensure that your video meets the preferred settings for the selected format.

b. In the Export Movie pane, in the Movie Export Presets section, click GIF.



This will both update the export file type and define a different export resolution: 640 pixels wide by 480 pixels high. This is a different aspect ratio than the YouTube preset, so you should see the framing of the view change again.

Note: In the Export Movie pane, you can expand the File Export Settings and Advanced Movie Export Settings sections for fine-grained control of the video export settings. Be aware that your export format might not support all possible aspect ratios.

c Close the Export Movie pane.

Step 6: Create additional keyframes

You add keyframes to make an animation, so you will use the first half of the video to highlight the "before" state.

To assist with the authoring of this animation, the scene contains a series of pre-authored bookmarks that will position the camera for you.

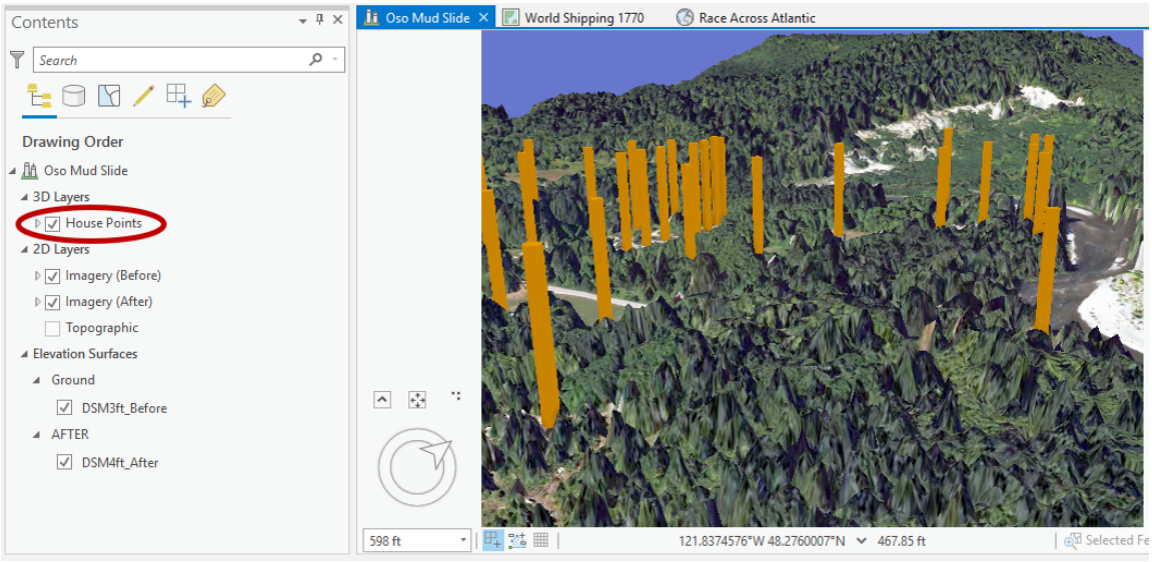
Note: You can always re-run this exercise later to experiment with different flight paths.

It is important that you use similar viewpoints for the "before" and "after" states so that the dramatic change can be seen from the same locations. Also, because you are creating an animated GIF, you need the video to be well-suited for looping. This means that the animation must finish in a way that transitions seamlessly into the start of the next iteration.

a From the Map tab, click the Bookmarks down arrow.

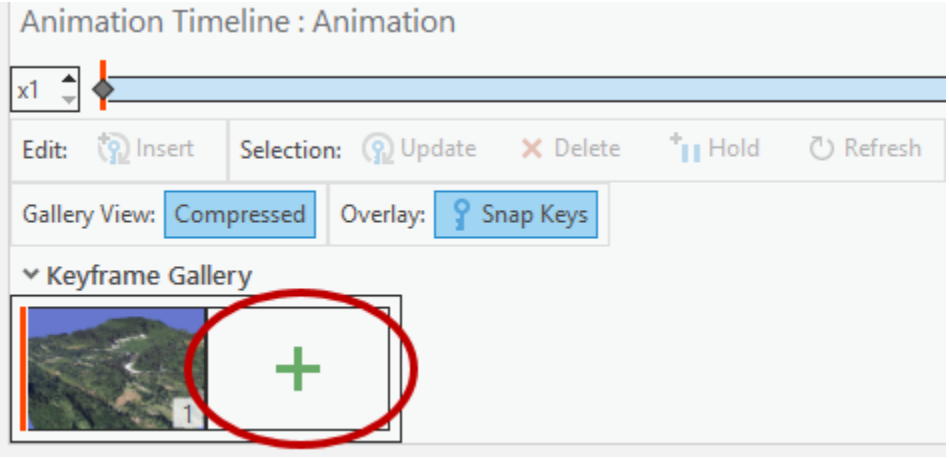
b. In the Oso Mud Slide Bookmarks section, click the 02 bookmark.

c. In the Contents pane, turn on the House Points layer.

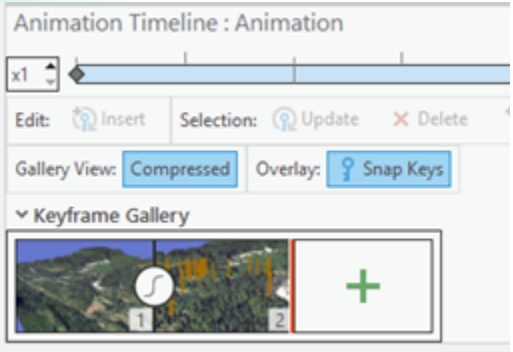


These real-world-sized orange columns show the locations of houses in the area and will become more visually important when the "after" state is shown.

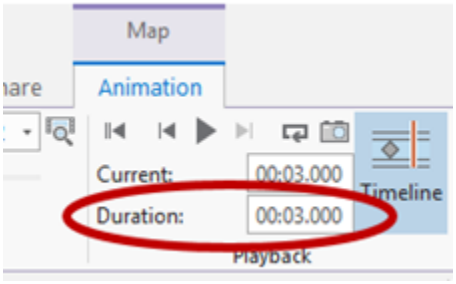
d. In the Animation Timeline pane, click the Append Next Keyframe button + to add the current state of the scene as a second keyframe.



You now have a video with two keyframes with the default duration of 3 seconds. In the Animation Timeline pane, you can see the two keyframes.



e. From the Animation tab, in the Playback group, notice the animation duration.



f. From the Animation tab, in the Playback group, perform the following steps:

- Click the Reset button to return to the start of the animation.
- Click the Play button to preview your fly-through (notice how the house points appear).

g. From the Map tab, in the Navigate group, click the Bookmarks down arrow, and then click the Oso Mud Slide 03 bookmark.

h. In the Animation Timeline pane, click the Append Next Keyframe button to add a third keyframe.

i. Use the same procedure to add the 04 bookmark location as a keyframe.

j. Save your project.

Next, you will smoothly transition the visible layers from the "before" state to the "after" state.

Step 7: Use transparency to fade between two layers

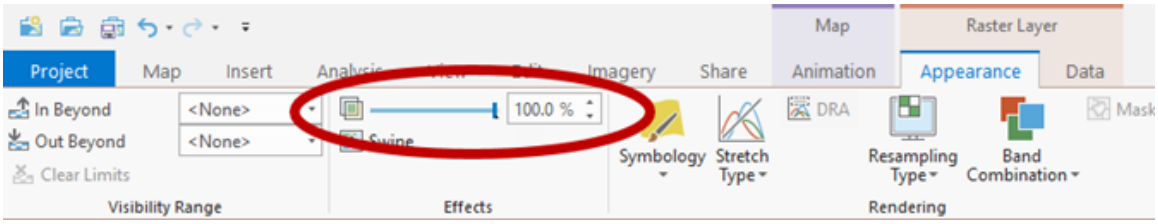
You will use layer transparency to fade between the two layers, rather than just switching layers on and off, so the switch between the two states is less jarring.

Changing the transparency, or opacity, of a layer in a map allows you to see more, or less, of the underlying layers. The transparency of any layer can be adjusted from 0 percent to 100 percent. The more transparent a layer is, the less visible it appears on the map, and the more visible the other layers appear.

To fade between the two layers for this animation, you will use decreasing transparency values (from 100% to 0%) in successive keyframes to fade a layer in and increasing transparency values (from 0% to 100%) to fade a layer out.

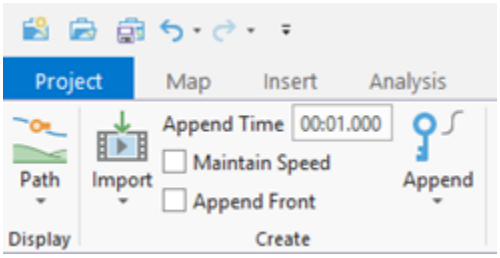
a. In the Contents pane, select the Imagery (Before) layer.

b. From the Appearance tab, in the Effects group, drag the transparency slider to 100%.



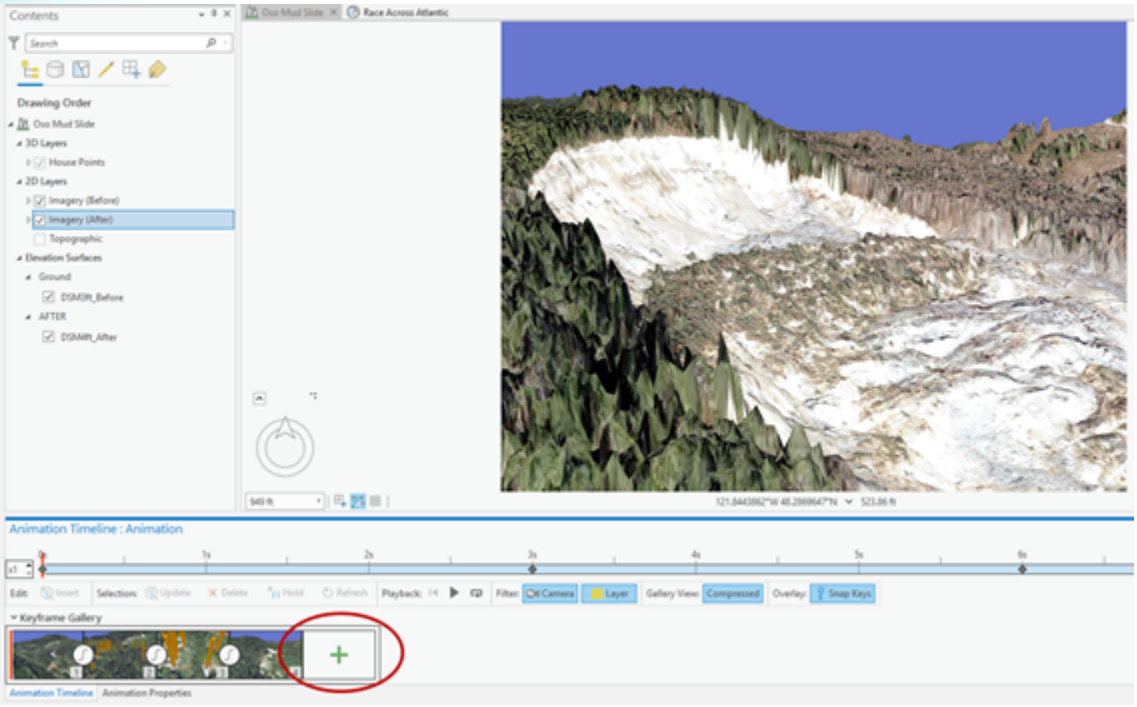
c. In the Contents pane, select the Imagery (After) layer and set the transparency to 0%.

d. From the Animation tab, in the Create group, for Append Time, reduce the default value down to **1** second.



Changing the timing between keyframes will change the speed at which the camera travels along the path. By default, the transition time between keyframes is 3 seconds. You want a relatively fast transition between the two states, and 1 second is enough.

e. In the Animation Timeline pane, click the Append Next Keyframe button + to add a fifth keyframe.



Next, you will use the second half of the video to highlight the "after" state of the topography. And, for consistency with the camera path that was used in the first half of the video, you will revisit the same bookmark locations on the way back.

Step 8: Add more keyframes

First, you will add a few more keyframes for the "after" state.

a. From the Animation tab, in the Create group, reset the default Append Time back to **3** seconds.

b. From the Map tab, click the Bookmarks down arrow and click the 03 Oso Mud Slide bookmark.

c. In the Animation Timeline pane, click the Append Next Keyframe button + to add a sixth keyframe.

d. Perform the previous two steps for the 02 and 01 bookmark locations to add them to the timeline.

Finally, you will set up the transition back to the starting point so that the animated GIF will loop nicely. As with the earlier transition between the "before" and "after" states, you will use a faster transition time.

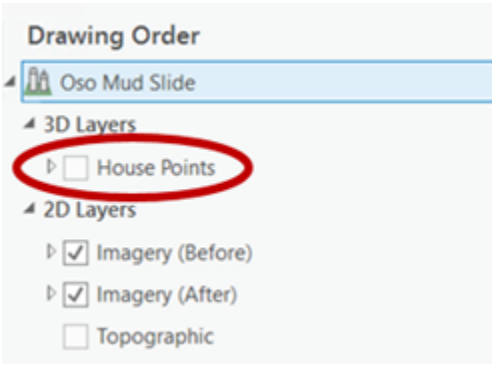
e. From the Animation tab, reduce the default Append Time value down to **1** second.

f. In the Contents pane, select the Imagery (After) layer, if necessary.

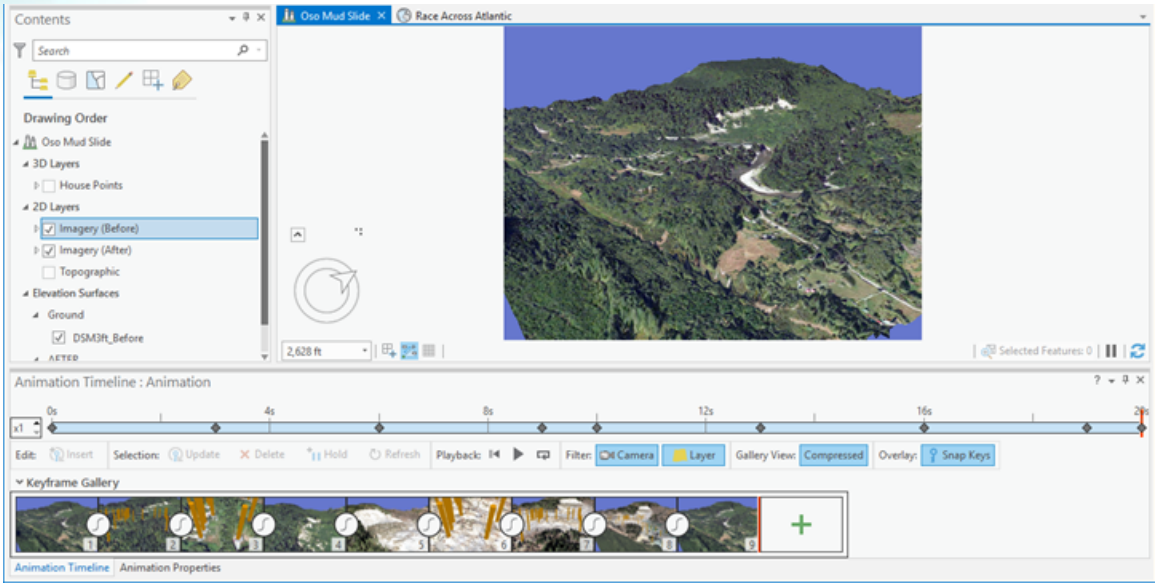
g. From the Appearance tab, drag the transparency slider to 100%.

h. In the Contents pane, select the Imagery (Before) layer and set the transparency to 0%.

i. In the Contents pane, turn off the House Points layer.



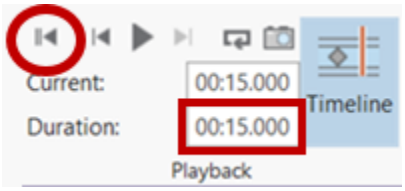
j. In the Animation Timeline pane, click the Append Next Keyframe button to add a ninth (and final) keyframe.



You should have an animation with a total of nine keyframes and a duration of 20 seconds. That is still a little slow for the kind of looping video that you want, so you will make the whole video shorter.

k. From the Animation tab, in the Playback group, change the Duration from 20 seconds to **15** seconds.

l. Click the Reset button to return to the start of the animation.



m. Click the Play button to preview the animation.

Do not worry if the interactive playback looks a bit jerky; you are only previewing the animation. ArcGIS Pro will fully render each frame when it exports the animation, resulting in a smooth, continuous display when the final video is played.

Note: Slower playback performance is more common when layer transparency, map time, or map range is changing between exported frames. To improve playback performance, on the Animation tab, in the Playback group, you can turn on the Camera Only Playback option to see the animation play with only the camera flight-path calculated.

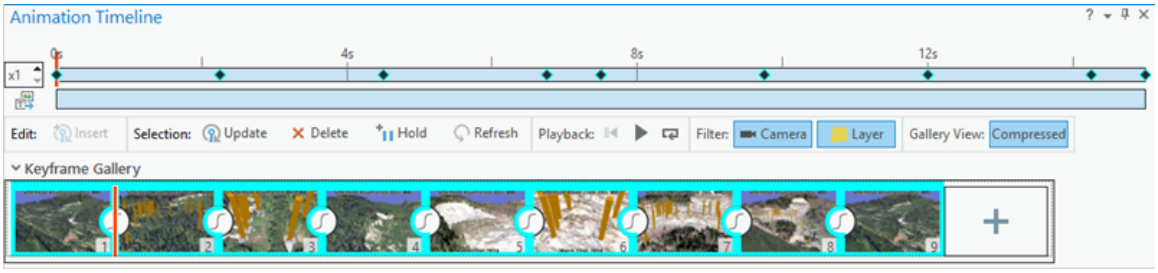
n. Save your project.

Step 9: Add text overlays

Your video now has a well-authored flight path and layer transitions, but there is nothing that explains where you are or *when* the event happened. You can add this extra detail and information using what are referred to as overlays. When adding a text or image overlay, you also define how long it should be shown in the video.

First, you will add a title that displays for the entire duration of the video.

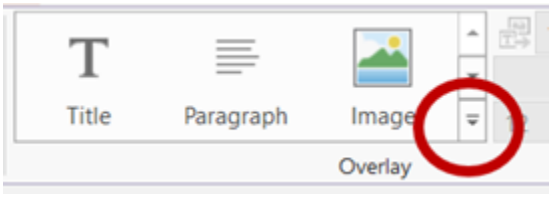
a. In the Animation Timeline pane, select all the keyframes.



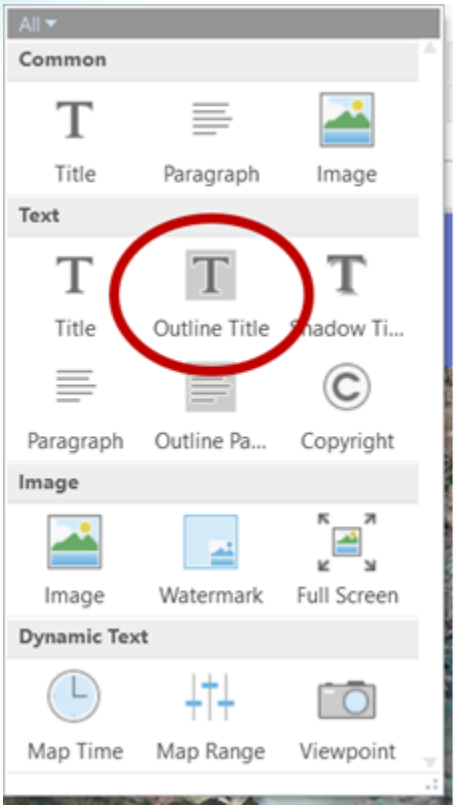
Hint: Click the first keyframe, press and hold down Shift on your keyboard, and click the last keyframe.

Overlays are connected to keyframe numbers (rather than time). When an overlay is added, it will display for the extent of the selected keyframes.

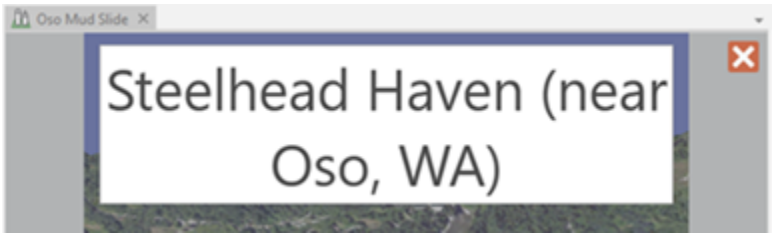
b. From the Animation tab, in the Overlay group, expand the gallery of overlay presets.



c. In the Text section, click the Outline Title preset.



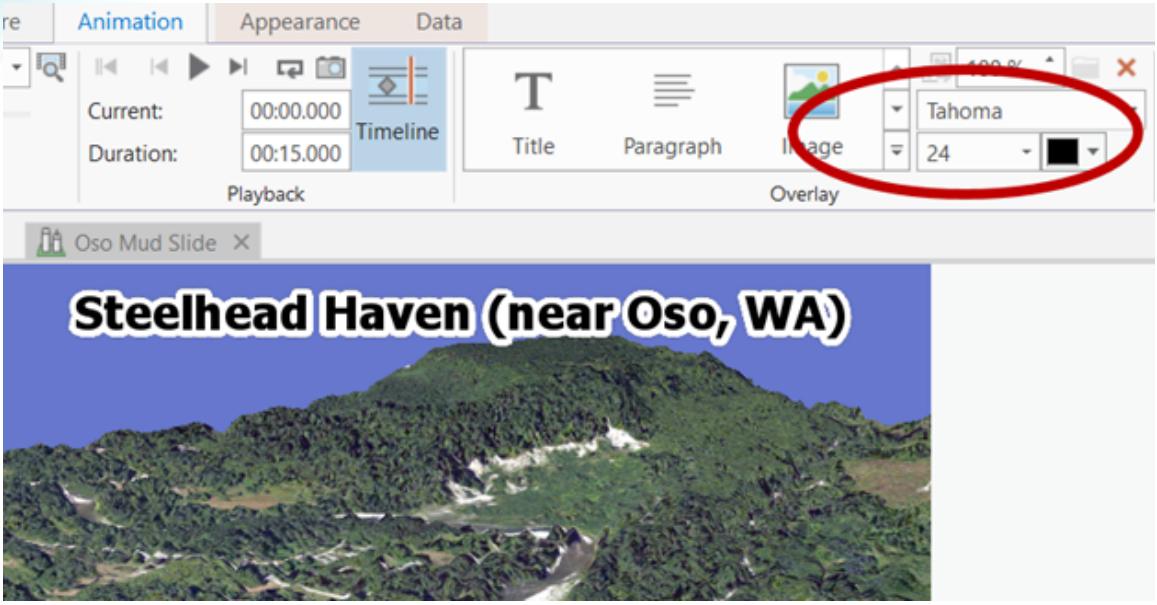
d. In the text box that appears in the map window, type **Steelhead Haven (near Oso, WA)**.



e. In the upper-right corner of the map window, click the red X to exit the text edit mode.

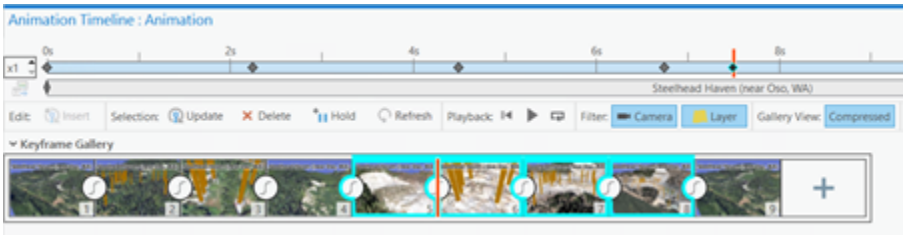
The overlay is created, but the default title text size is too wide for your video export size. You will make it smaller.

f. From the Animation tab, in the Overlay group, use the text editor controls to update the font settings so that the text displays as a single line (for example, as Tahoma font at 24 points).



Next, you want to show the date of the mudslide, but you want the text to appear when the content in the view switches from the "before" state to the "after" state.

g. In the Animation Timeline pane, select keyframes 5 through 8.



Hint: Click in the blank area of the Animation Timeline pane to deselect all the keyframes first, and then press and hold down Ctrl and click to select keyframes 5 through 8.

This is the section of the video where the "after" state is being shown.

h. From the Animation tab, in the Overlay group, expand the gallery of overlay presets again.

i. Click the Outline Title preset.

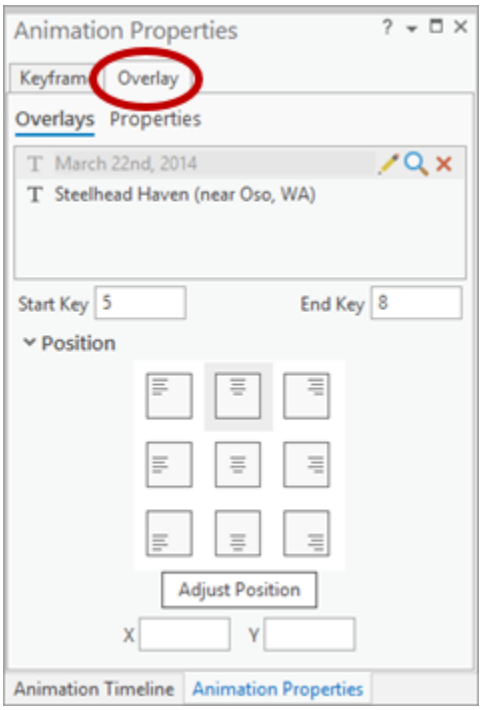
j. In the text box, type **March 22nd, 2014**, and then click the red X in the upper-right corner to exit the text edit mode.

k. From the Animation tab, in the Overlay group, use the text editor controls to update the font settings so that the text displays as a single line (for example, as Tahoma font at 24 points).

The date overlay text is now in the view, but it is displayed in the top-center of the view and clashing with your earlier title overlay text. It needs to be placed elsewhere on the view.

l. From the Animation tab, in the Overlay group, click the Overlay Properties launch button .

The Animation Properties pane opens to the Overlay tab.

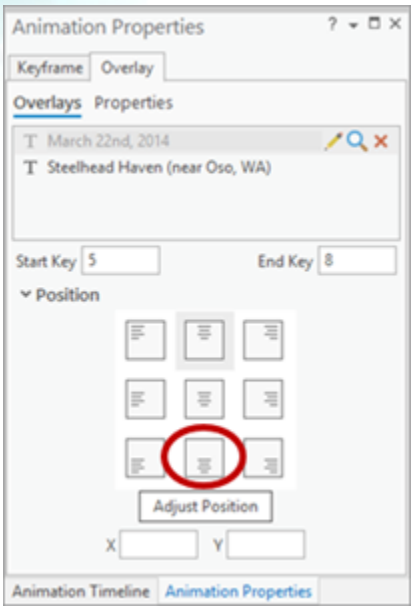


All overlays in the animation, whether text or image, will be listed here.

m. Select the March 22nd, 2014 overlay item.

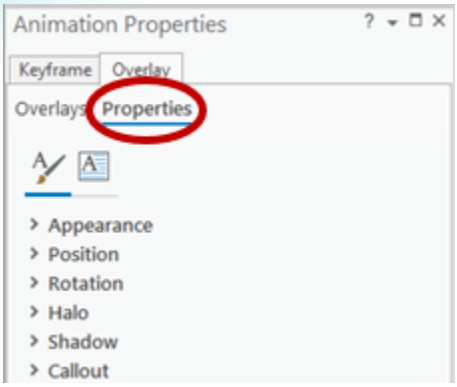
Note: The Start Key is set to 5 and the End Key is set to 8.

n. In the Position section, select the bottom-center alignment.



The date is moved to the bottom of the view. While your background imagery may be different, your overlay text should now look like the following graphic.

Note: In the Animation Properties pane, on the Overlay tab, you can click Properties to get full access to how the overlay text is symbolized, including halos, shadows, and callouts.



o. When you are finished making changes to the overlay text, close the Animation Properties pane.

p. In the Animation Timeline pane, click in a blank area to deselect all keyframes.

Step 10: Export the animation as a GIF

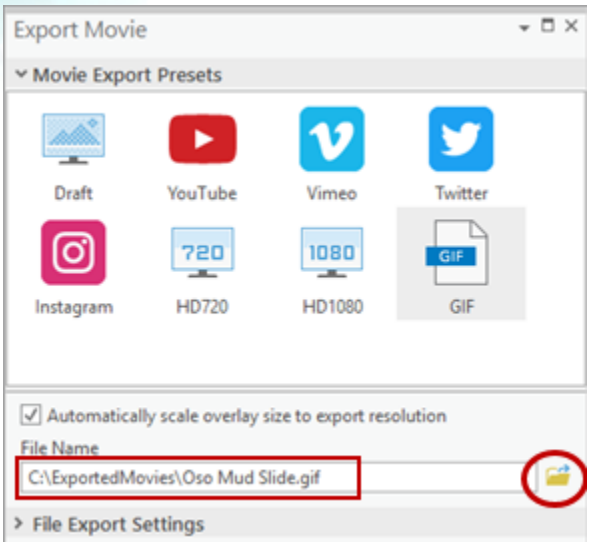
Your animation is now ready to be exported to a file to share with others. It is a good idea to save your animation before exporting.

a. Save your project.

For this exercise, you will export your animation as a GIF movie.

b. From the Animation tab, in the Export group, click Movie to open the Export Movie pane.

c. In the Export Movie pane, click the Browse button , and then specify an output file name, such as **Oso Mud Slide.gif**, and a folder location.



Note: When you export your animation, there is a default location for the output file. Typically, this is **C:\Users\Documents\ArcGIS\Media**. *You may want to create a folder elsewhere on your computer for your exported movies that is easier to find. For this example, a folder named ExportedMovies was created.*

d In the Export Movie pane, click Export.

Note: The time required to export the animated GIF will vary depending on your computer, though usually it takes between 4 and 6 minutes.

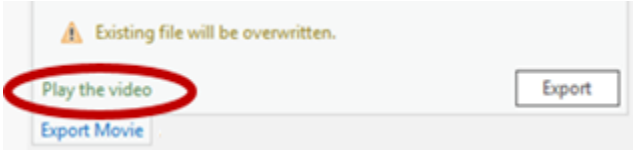
The progress and estimated time remaining are displayed at the bottom of the Export Movie pane, and you can discontinue the export at any time by clicking Stop.

Note: The application remains active while the animation is exporting, so other work can be done. You could, for example, open the map for the next exercise and familiarize yourself with the content while you wait for the export to finish.

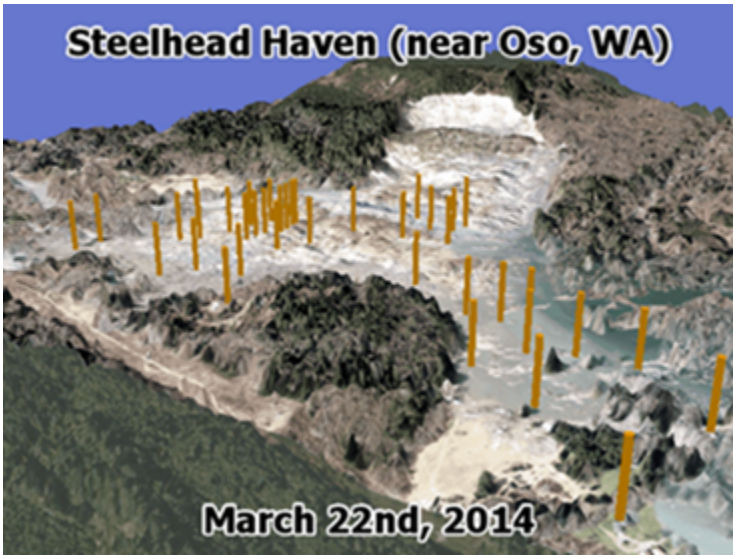
When the export process has finished, a message will display at the bottom of the Export Movie pane, indicating that the file has been created.

e At the bottom of the Export Movie pane, click Play The Video.

Hint: You can also browse to the output file location and double-click the GIF file to view it.



The video will play in your default GIF viewing application, and it loops nicely back to the start after 15 seconds.



Note: If you would like to compare your final map with the author's, you can open the Animations_Complete_OsoMudSlide.mpkx file in the VideoResults folder on your computer where you extracted the exercise data files. There is also a final Animations_Complete_OsoMudSlide.gif video file in that same location for comparison purposes.

f. In ArcGIS Pro, close the Oso Mud Slide scene and save your project.

In this introductory example, you created a simple fly-through animation in 3D. Can you see the value of a 3D animation for telling a story, showing change in time and space, bringing a static map to life, and helping your audience visualize and experience the scene as if they were there?

g. If you are continuing to the next exercise now, leave ArcGIS Pro open.

h. If you will continue to the next exercise at a later time, exit ArcGIS Pro.