

Animate the Oso Mudslide

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Time: 60 minutes

Visualizing the Oso mudslide with animation

Overview

Sharing GIS knowledge does not always require an interactive online scene; it can also be done with a video. This method is useful for communicating a specific storyline or analytical discovery, where it's simpler for users to see a scripted presentation of the data instead of exploring it for themselves. A video can also present very 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 are most often created as a final step after your maps or scenes are 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.

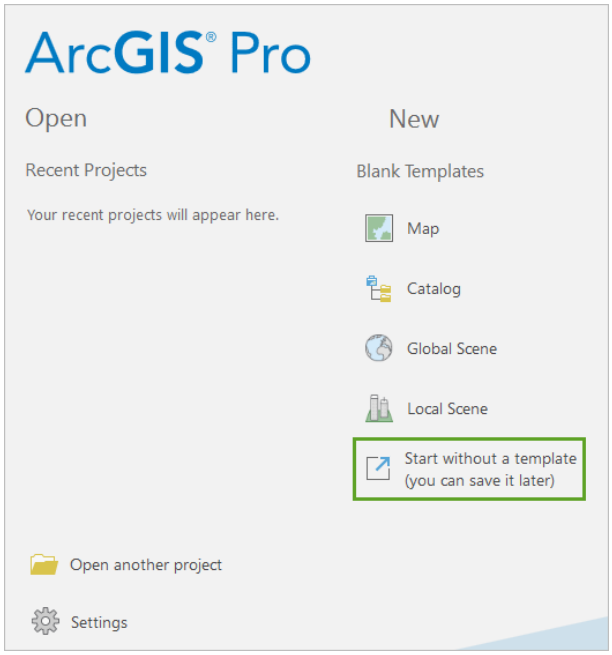
In this lesson you will learn to do the following:

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

Getting started

The content for this lesson is contained in a map package. First, you need to create a project using the Blank project template, then import the map package.

1. Download the **OsoMudSlide.zip** compressed folder.
2. Start ArcGIS Pro and under New, click Start without a template.



Note: If you don't have ArcGIS Pro or an ArcGIS account, you can sign up for an ArcGIS free trial.

3. On the Quick Access toolbar, click Save or press Ctrl+S to save your project.
4. In the **Save Project As** window, accept the default storage location and save the project as " **OsoMudslideAnimation** ".
5. On the **Insert** tab, in the **Project** group, click **Import Map**.
6. Browse to your home data folder, hold down **Ctrl**, and click **OsoMudSlide.mpkx**
7. Click **OK**.

The scene opens to display the Steelhead Haven community near Oso, Washington.

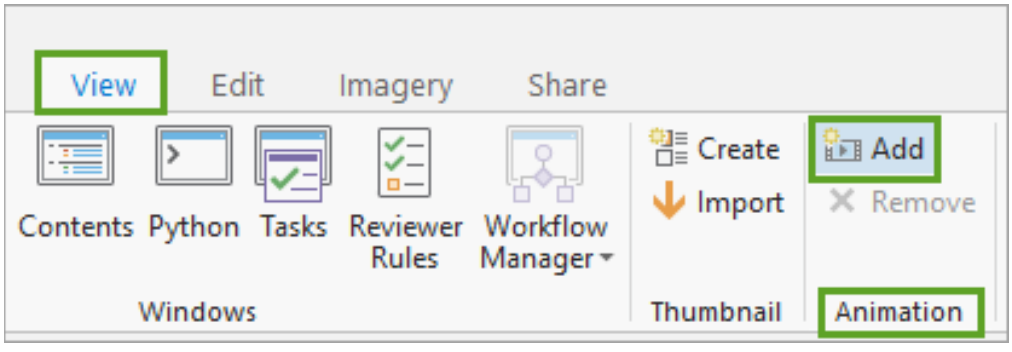


Add an animation to the scene

Maps can contain animations. The first step in making a video is to add an animation to your scene.

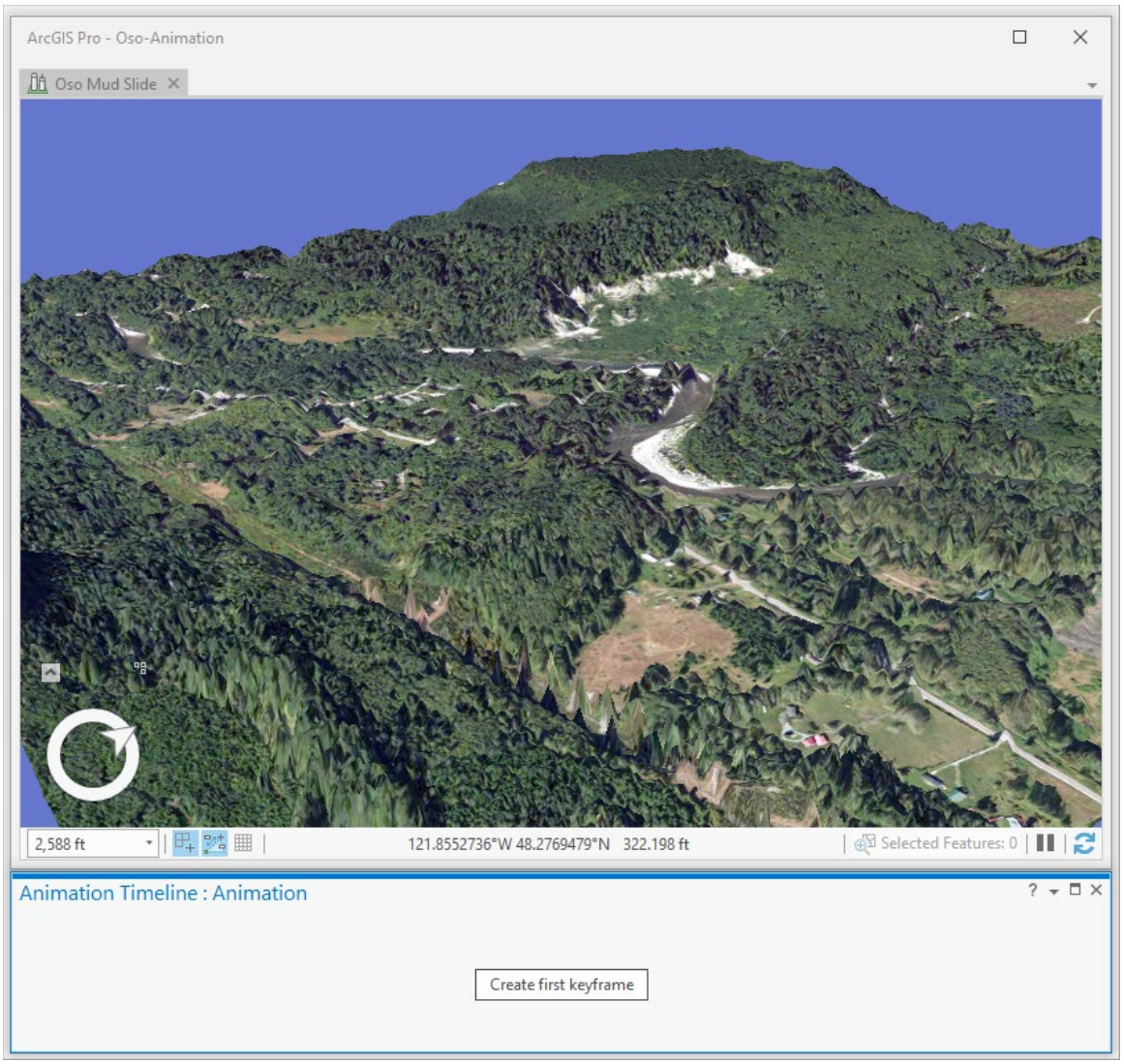
1. In the **Contents** pane, click **Oso Mud Slide** to make the scene active.

2. On the ribbon, click the **View** tab, in the **Animation** group, click **Add**.



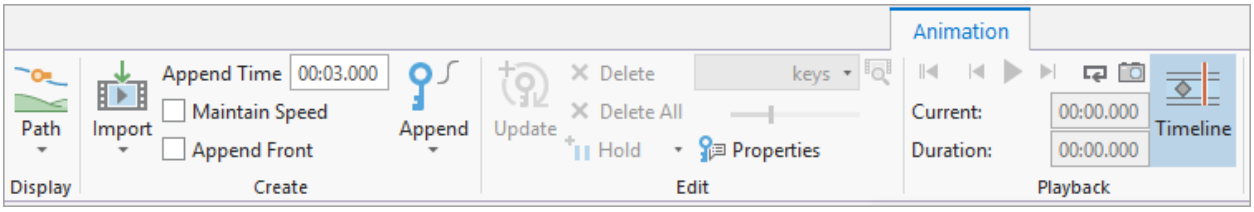
An animation is added to the scene and the **Animation Timeline** pane appears at the base of the application.

Visualizing the Oso mudslide with animation

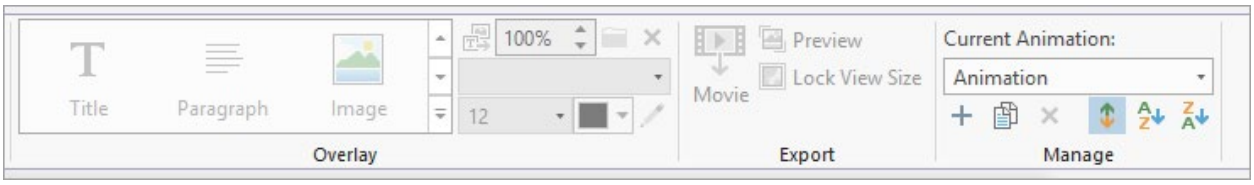


Tip: If the timeline pane is not shown automatically, you can open it by clicking the **Timeline** toggle button in the **Playback** category on the **Animation** ribbon tab.

Adding an animation also reveals the **Animation** contextual tab with groups of tools for the Display, Creation, Editing and Playback of an animation.



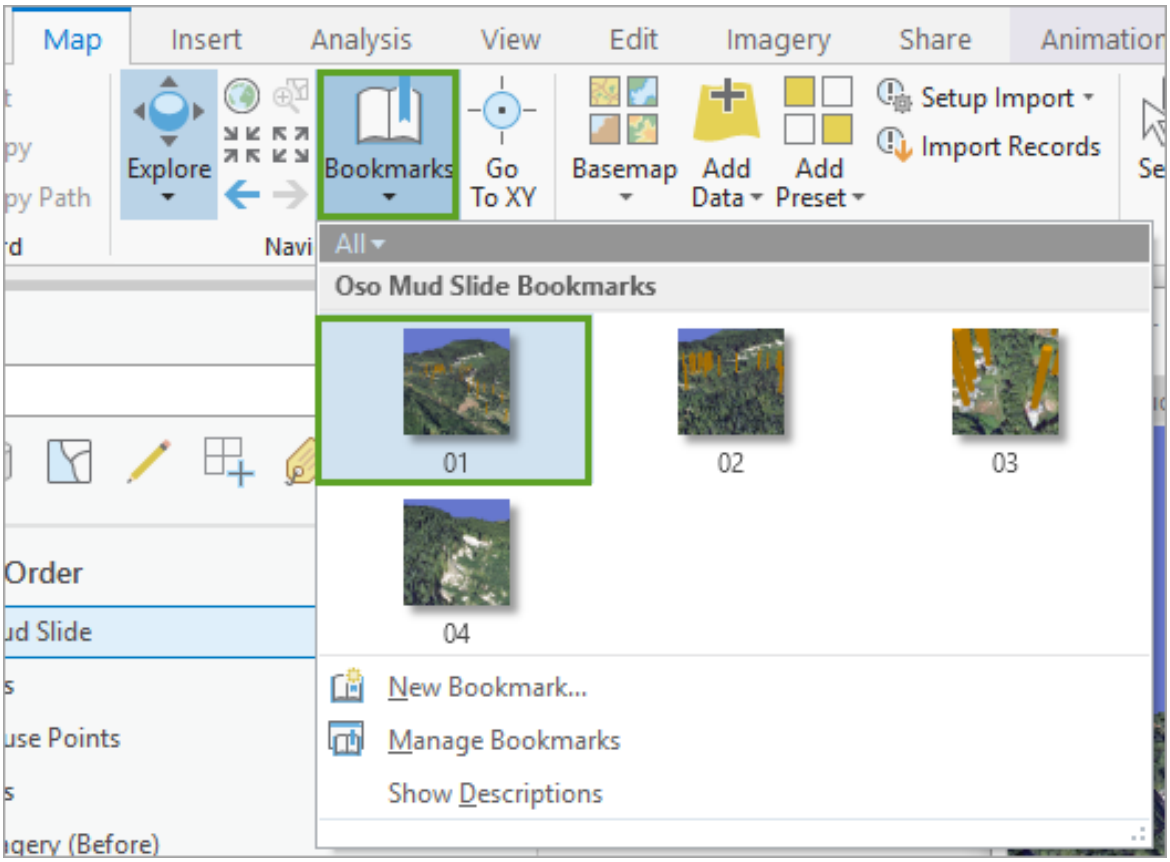
The tab also contains groups of tools used to add **Overlays** and **Export** and **Manage** your animation.



Create the first keyframe

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

1. On the ribbon, click the **Map** tab, click **Bookmarks,** and choose **01**.

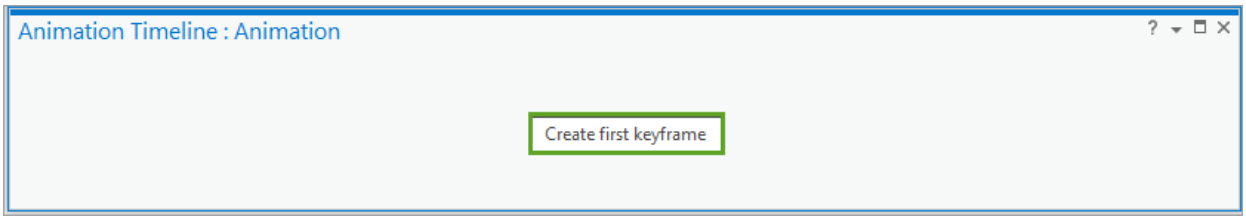


The scene updates and has been preconfigured in the following manner:

- The **HousePoints** layer is unchecked.
- The **Imagery (Before)** layer is checked, with **0%** transparency.
- The **Imagery (After)** layer is checked, with **100%** transparency set.

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

2. On the **Animation Timeline**, click **Create first keyframe.**

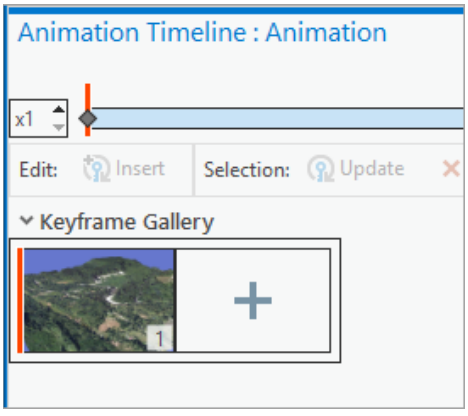


Congratulations, you have just created your first keyframe. This will be the start image for the animation and video. Notice that the scene has been refreshed and extra space has been added around the view.



By default, video export is configured for YouTube using a MP4 video file format with a resolution of 1280x720.

On the **Animation Timeline**, a thumbnail image for the new keyframe has been added.

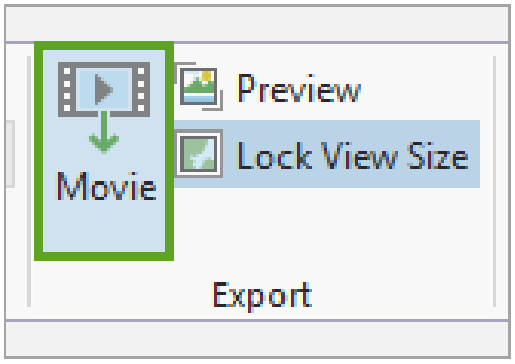


Set the export video format and size

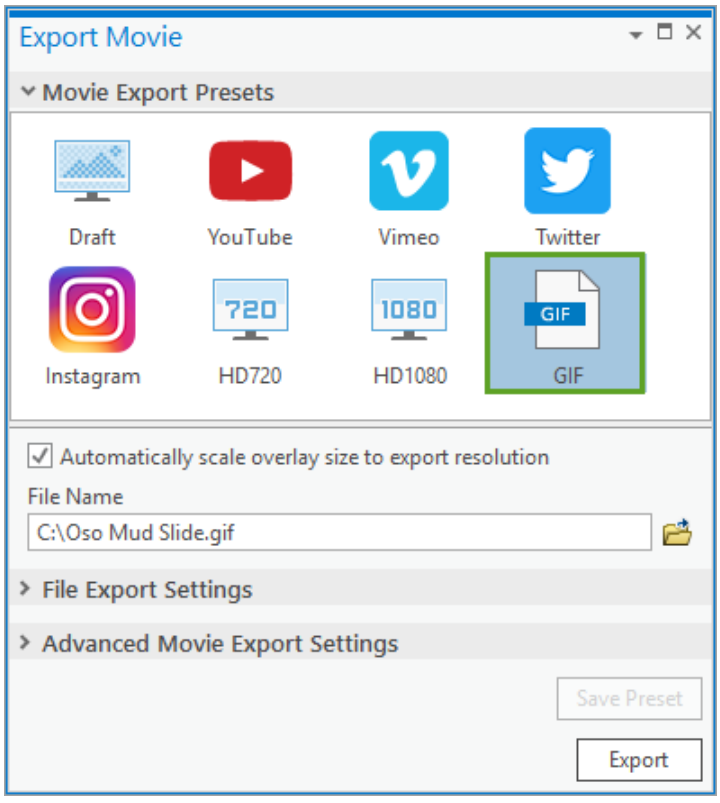
The extra space on the view (view-clipping) indicates which section of the view will be captured in the video, based on the aspect ratio of the export format.

For this lesson, we want to create an animated Graphics Interchange Format (GIF), a series of images creating a soundless video, for a web page. Next, you will modify the export format.

1. On the **Animation** tab, in the Export group, click **Movie** to open the **Export Movie** pane.

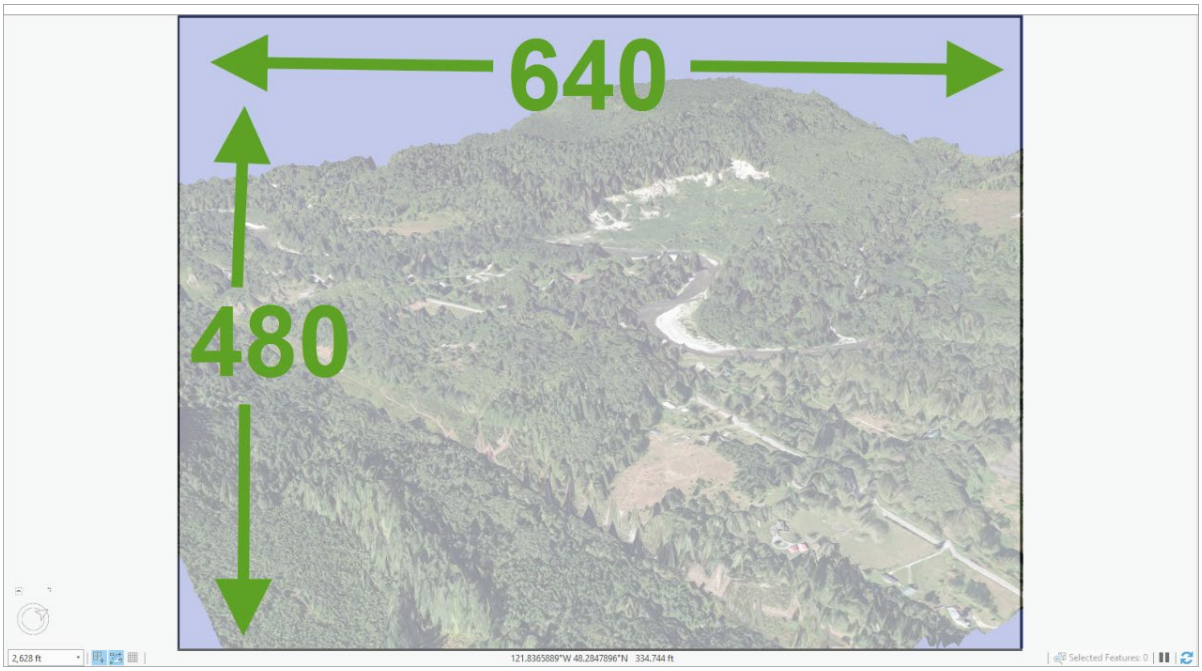


2. In the **Export Movie** pane, click **GIF** in **Movie Export Presets**.

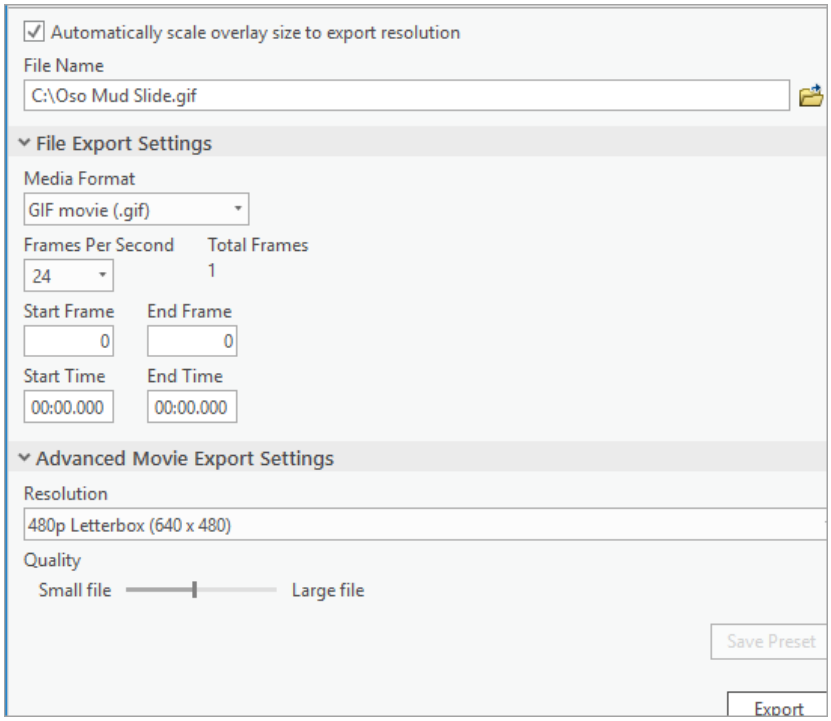


This action changes the export file type to GIF and updates the export resolution to 640x480.

Since this is a different aspect ratio than the YouTube preset, you will notice that the framing of the view has also been adjusted.



Tip: You can expand the **File Export Settings** and **Advanced Movie Export Settings** sections in the **Export Movie** pane for fine-grained control of the video export settings.



Be aware that the specific export format may not support all possible aspect ratios.

Add intermediate keyframes

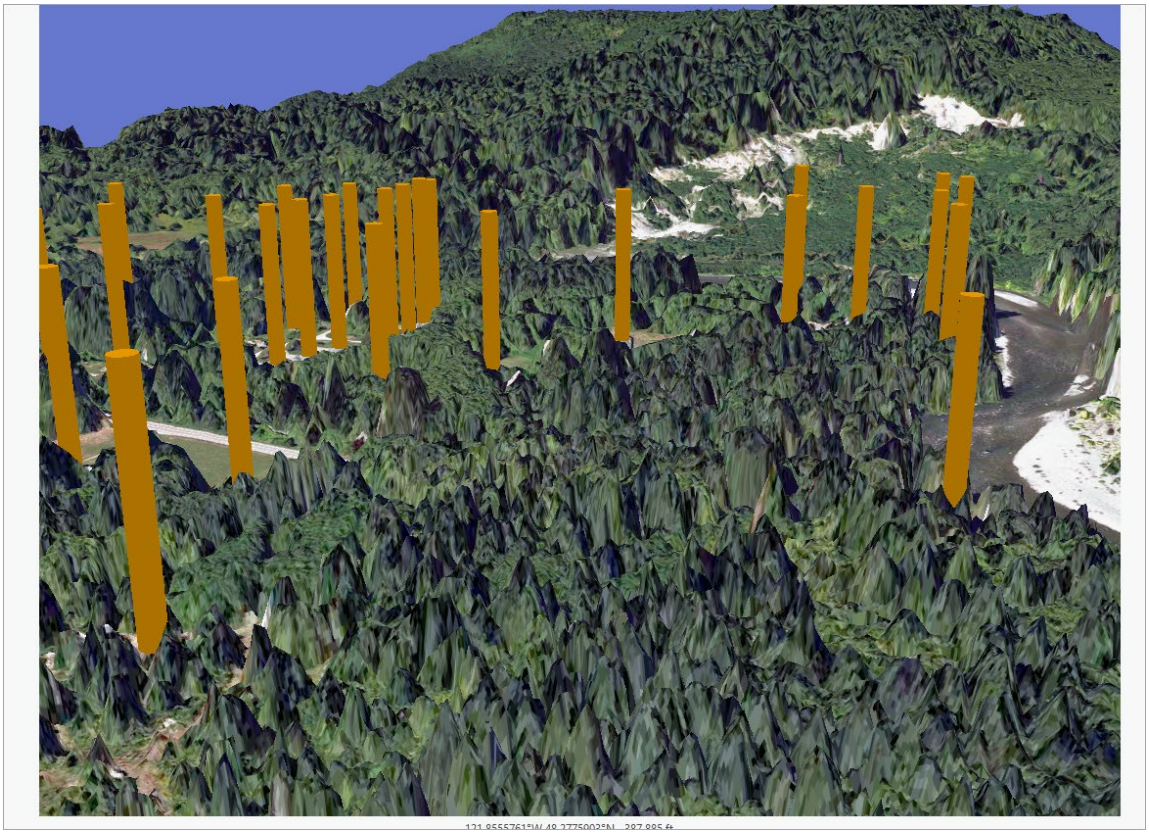
To make an animation, you add keyframes to the **Animation Timeline**. We'll use the first half of the video to highlight the before state and the second half to highlight the after state.

We want an understandable visual comparison between the two states, so the same flight path will be applied for the two stages. We also want the animated GIF to loop continuously, so the animation needs to finish and then transition seamlessly into the start of the next loop.

A set of bookmarks has been included in the scene to position the camera for you. You can always re-run this exercise later to experiment with different flight paths.

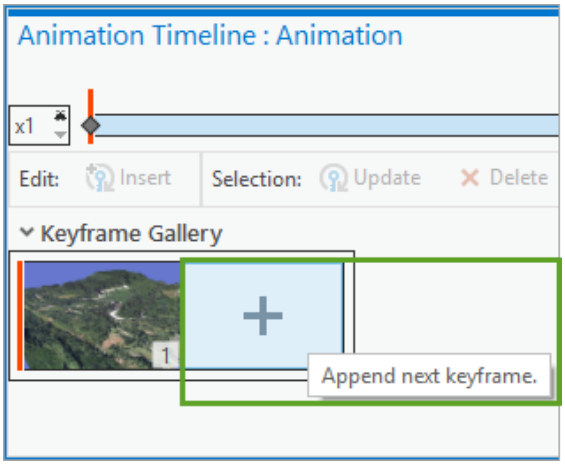
1. On the ribbon, click the **Map** tab, and on **Bookmarks**, click **02**.

2. In the **Contents** pane, check the **House Points** layer.

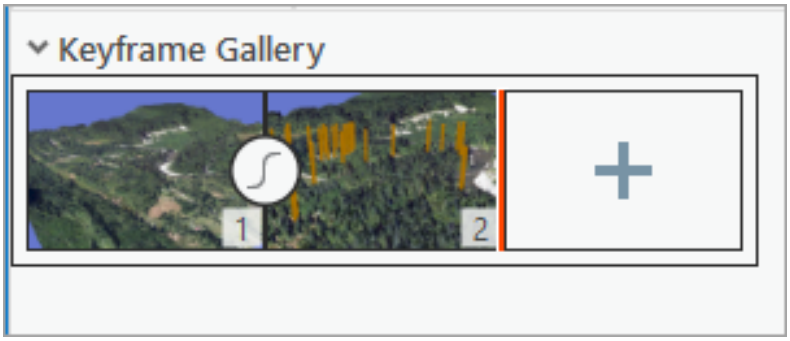


In the scene, the orange columns show the locations of houses in the area.

3. In the **Animation Timeline** pane, click the **add** button to add a second keyframe.

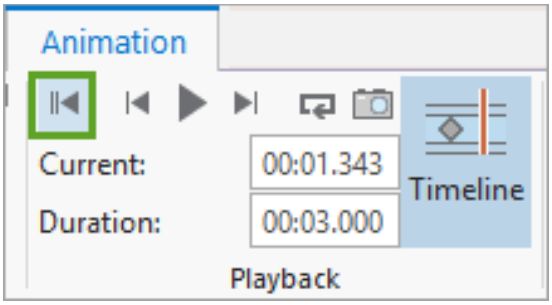


You now have a video with two keyframes and a default duration of 3 seconds.

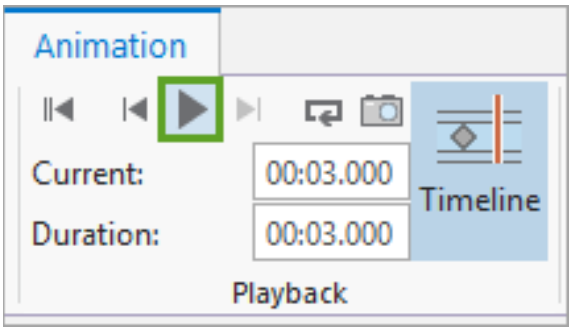


Next, you'll preview your animation in the application.

4. On the ribbon, click the **Animation** tab, in the **Playback** group, click the reset button to return to the start of the animation.



5. In the **Playback** group, click the play button to preview your fly-through (notice how the house points appear),

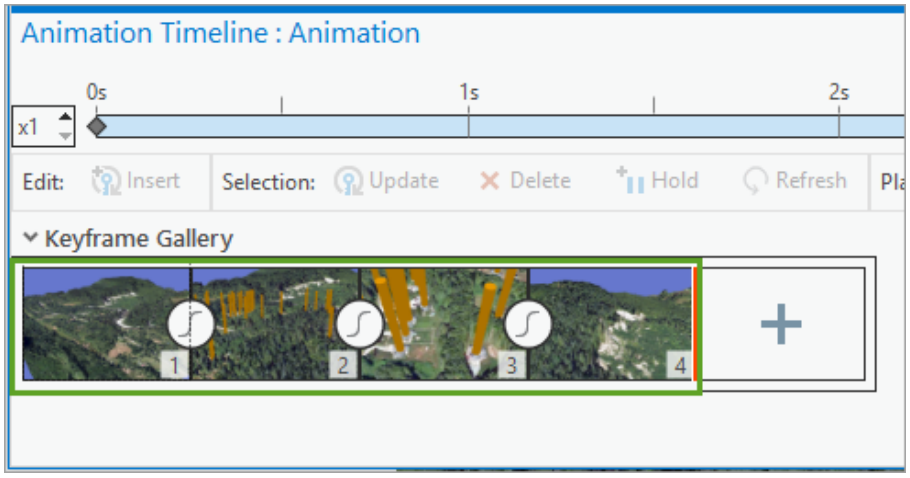


Let's finish authoring the fly-through for the before state.

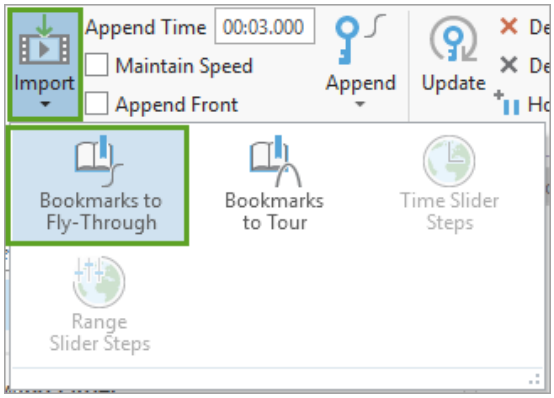
6. On the **Map** tab, on **Bookmarks,** click **03.**

7. In the **Animation Timeline** pane, click the **add** button to add a third keyframe.
8. On the **Map** tab, on **Bookmarks,** click **04.**

9. In the **Animation Timeline** pane, click the **add** button to add a fourth keyframe.



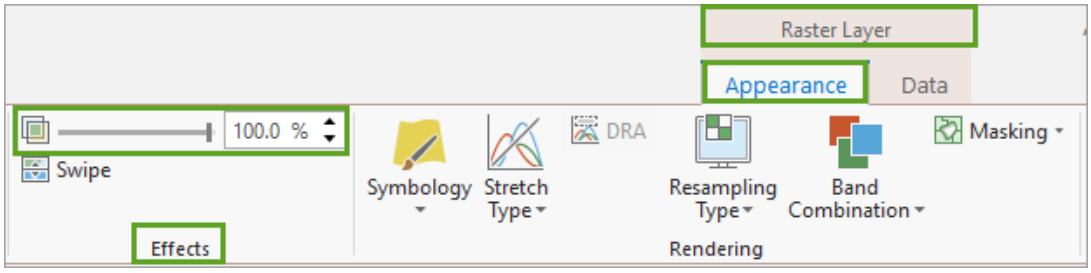
NOTE: a quick way to generate keyframes would be to use the **Import** tool in the **Create** group to automatically import multiple bookmarks to create keyframes.



Next, we need to add transitions to display from the before state of the mudslide to the after state of the mudslide.

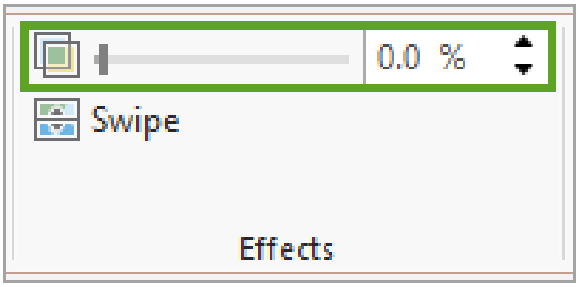
10. In the **Contents** pane, click **2D layers**, and select the **Imagery (Before)** layer.

11. On the ribbon, click **Raster Layer**, click the **Appearance** tab, in the **Effects** group, set the transparency to 100%.



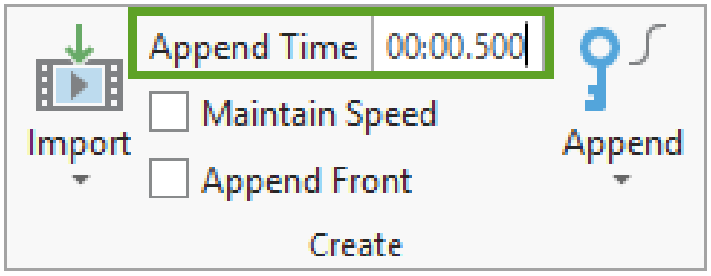
12. In the **Contents** pane, select the **Imagery (After)** layer.

13. On the ribbon, click **Raster Layer**, click the **Appearance** tab, in the **Effects** group, and set the transparency to **0.0%**.



Next, we should make the transition between the before and after imagery relatively fast. A duration of a half-second should be sufficient.

14. On the **Animation** tab, in the **Create** group, update **Append Time** to 0.5 seconds (00:00.500).



15. In the **Animation Timeline** pane, click the **+** button to add a fifth keyframe.



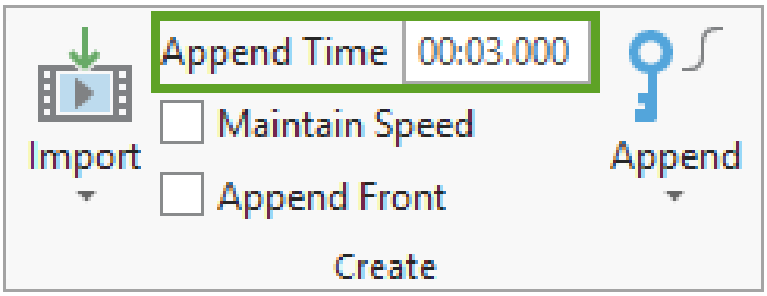
Tip: Using layer transparency to fade between the two layers, rather than just switching layers on/off, will make the transition between the before and after states less jarring.

Now that you have updated the transparency of the before and after layers and effectively turned off the before layer, it would be good to add additional keyframes showing the after state of the mudslide.

To achieve this, the camera needs to fly back to its starting point, along the same route, to highlight the after state of the topography with the same visual consistency of the before state.

To do so, you will revisit the same bookmarks but reverse the order.

16. On the **Animation** tab, in the **Create** group, update **Append Time** to 3 seconds (00:03.000).



17. On the **Map** tab, on **Bookmarks,** click **03.**

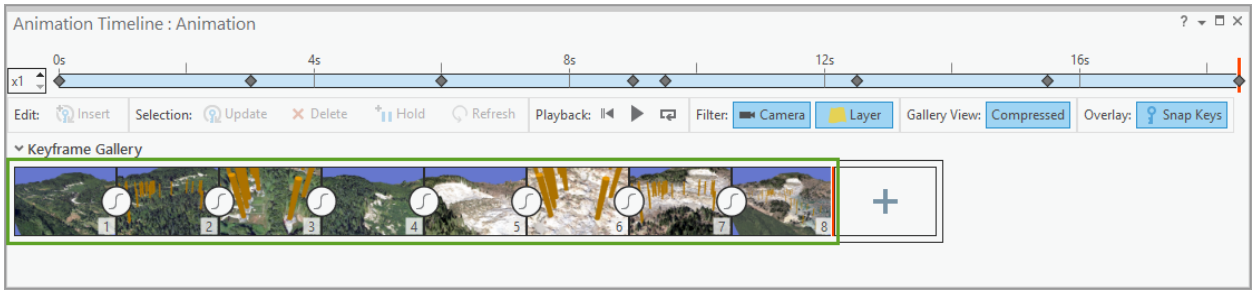
18. In the **Animation Timeline** pane, click the **add** button to add a sixth keyframe.

19. On the **Map** tab, on **Bookmarks,** click **02**.

20. In the **Animation Timeline** pane, click the **add** button to add a seventh keyframe.

21. On the **Map** tab, on **Bookmarks,** click **01.**

22. In the **Animation Timeline** pane, click the **add** button to add an eighth keyframe.



23. Save the project.

Transition back to the starting point, and update the duration

The last keyframe step is to transition back to the starting point so the animated GIF will loop nicely. As with our earlier transition between the before and after states, we'll use a faster transition time.

1. On the **Animation** tab, in the **Create** group, update **Append Time** to 0.5 seconds (00:00.500).

Now let's reset the scene so the layers are back in their initial state, then we can capture a final keyframe.

2. In the **Contents** pane, click **2D layers**, and select the **Imagery (After)** layer.

3. On the ribbon, click **Raster Layer**, click the **Appearance** tab, in the **Effects** group, set the transparency to 100%.

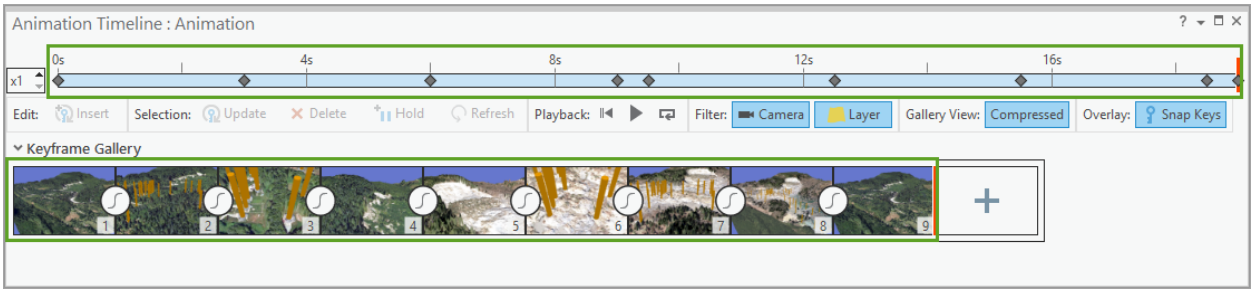
4. In the **Contents** pane, click **2D layers**, and select the **Imagery (Before)** layer.

5. On the ribbon, click **Raster Layer**, click the **Appearance** tab, in the **Effects** group, set the transparency to 0%

6. In the **Contents** pane, uncheck the **House Points** layer.

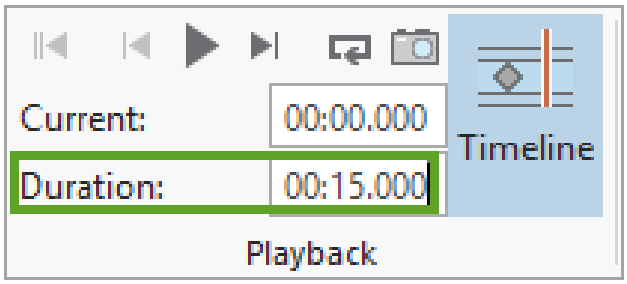
7. In the **Animation Timeline** pane, click the **add** button to add a ninth, and final, keyframe.

You should have an animation with a total of nine keyframes with a duration of 19 seconds.



Nineteen seconds is a bit slow for a looping video, so let's compress the duration of the video.

8. On the **Animation** ribbon, in the **Playback** group, change the **Duration** to 15 seconds.



9. On the **Animation** ribbon, in the **Playback** group, click the reset button to return to the start of the animation

10. In the **Playback** group, click the play button to preview the animation.

Don't worry if the interactive playback looks a bit jerky because the application will fully render each frame when you export the animation, resulting in a smooth, continuous display when the video is reviewed.

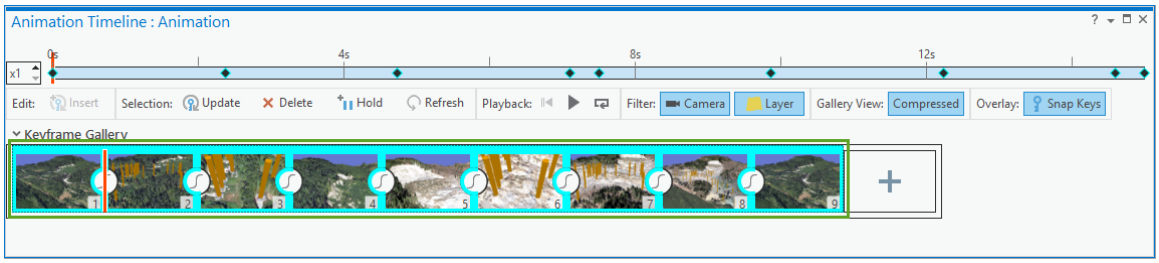
Tip: You can switch on the **Camera Only Playback** option in the **Playback** group to see the animation play with only the camera flight path calculated. Slower playback performance is more common when layer transparency, map time, or map range is changing between exported frames.

Add overlay text

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 kind of information as a text or image overlay. When adding an overlay, you also define how long it should be shown in the video.

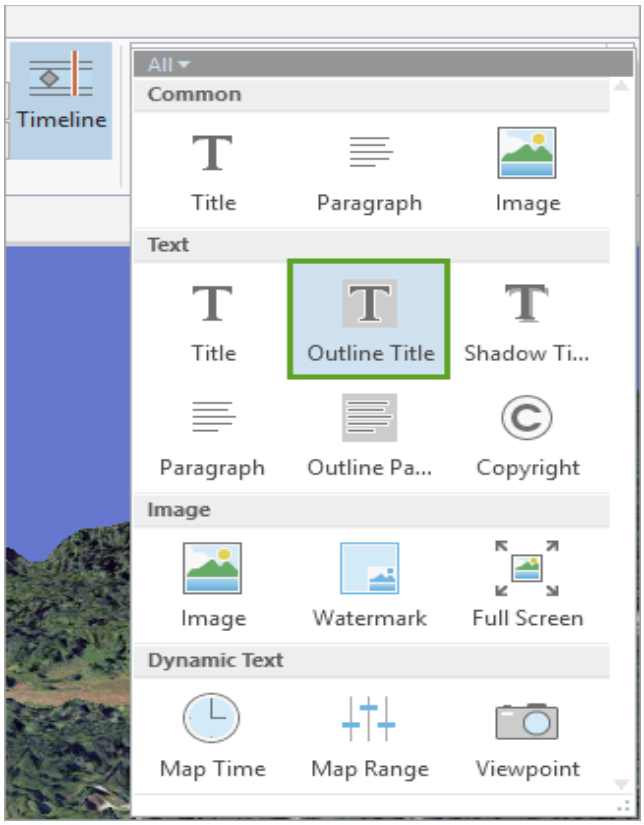
Let's add a title that displays for the entire video.

1. In the **Animation Timeline** pane, select all the keyframes by clicking a keyframe then pressing **Ctrl-A**.

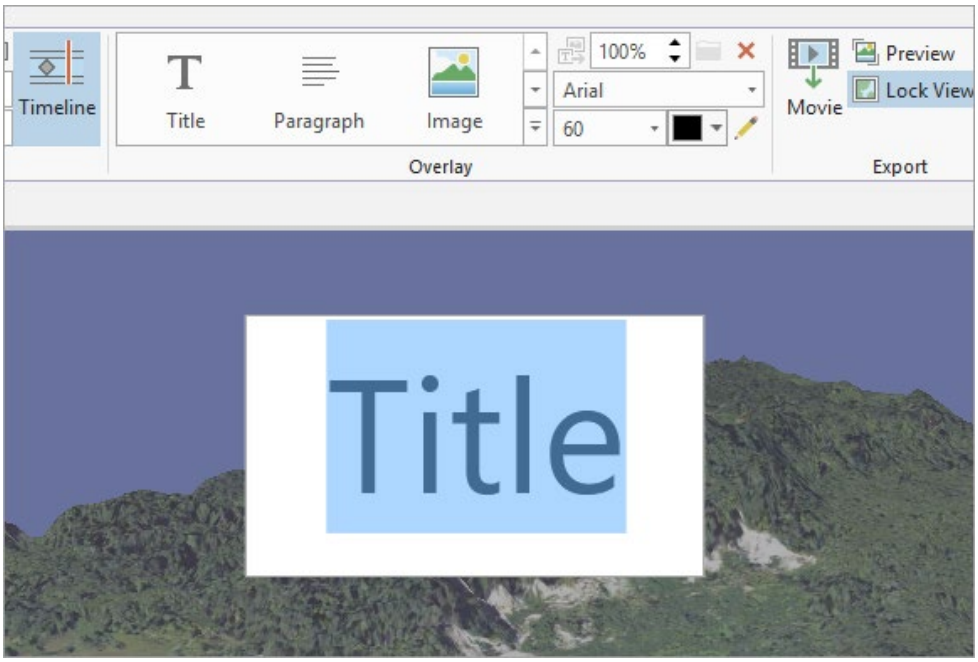


Tip: When an overlay is added, it displays for the extent of the selected keyframes. In this case, with all selected keyframes, the overlay will display for the entire extent of the keyframes.

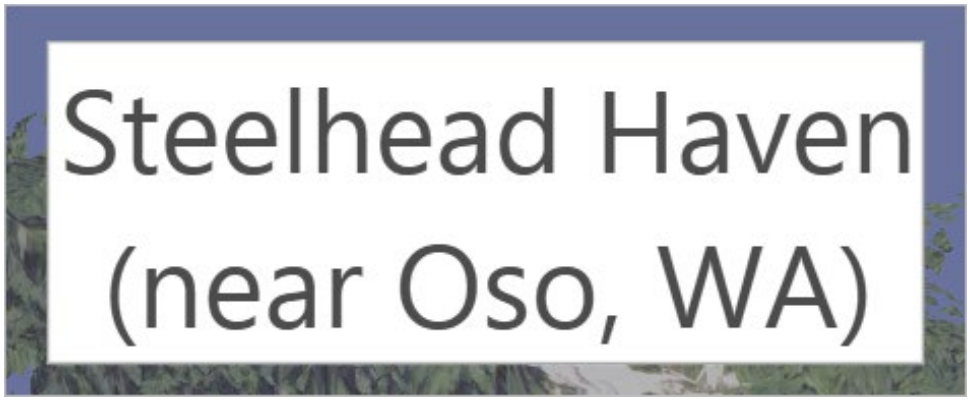
2. On the **Animation** ribbon, in the **Overlay** group, expand the gallery of overlay presets.



3. Choose the **Outline Title** preset.



4. In the view, in the **Title** box, type “Steelhead Haven (near Oso, WA)”.

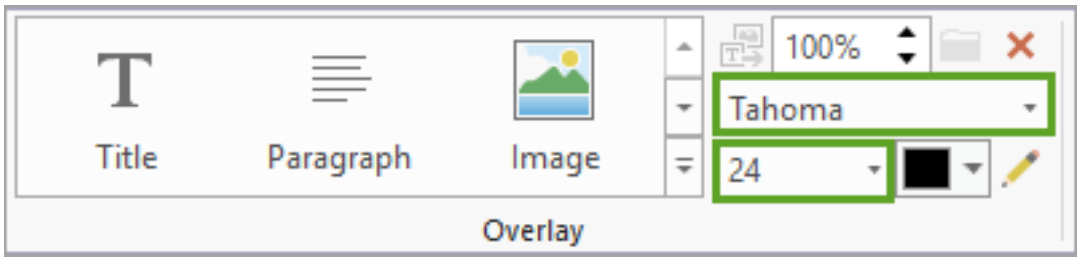


5. In the view, click the red **X** in the upper right corner to exit edit mode.

The overlay is created, but the default title text size is too wide for our video export size. Let's make it smaller.



6. On the **Animation** ribbon, **Overlay** group, update:
   - Font to **Tahoma**
   - Size to **24**

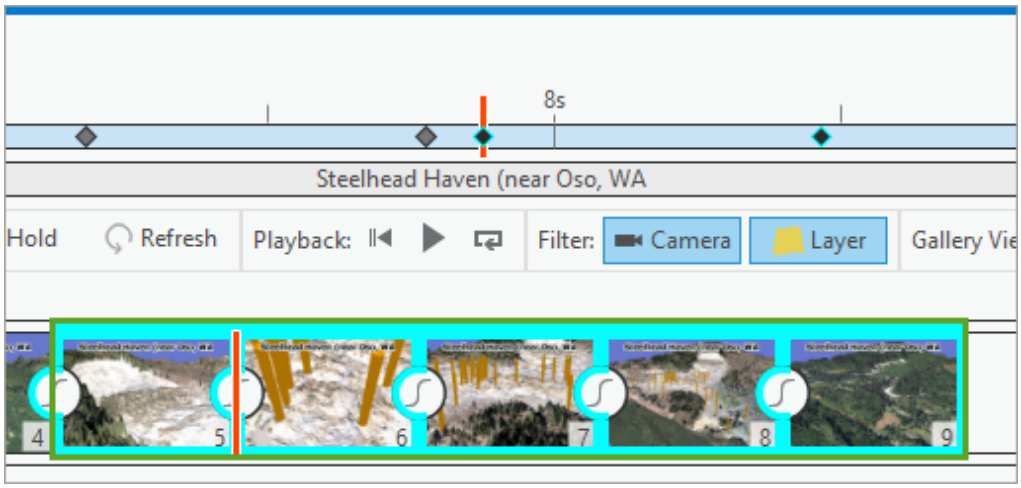


In the view, the title font and text size are updated.



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

7. In the **Animation Timeline** pane, select keyframes 5 to 9, which represent the after state of the mudslide.



8. On the **Animation** ribbon, click the **Overlay** group, and expand the gallery of overlay presets.

9. Choose the **Outline Title** preset.

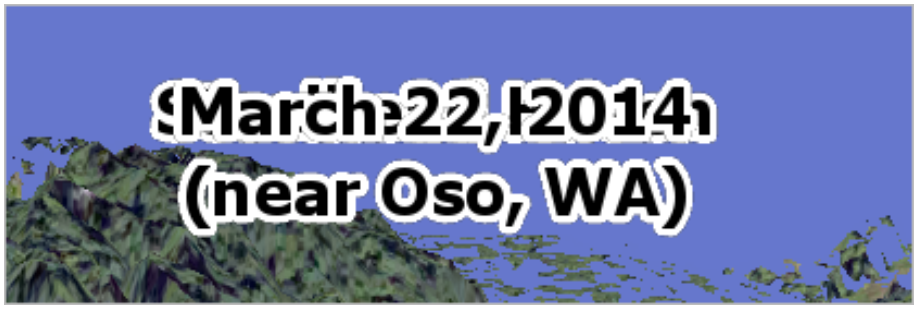


10. In the view, for **Title**, type “March 22, 2014”.

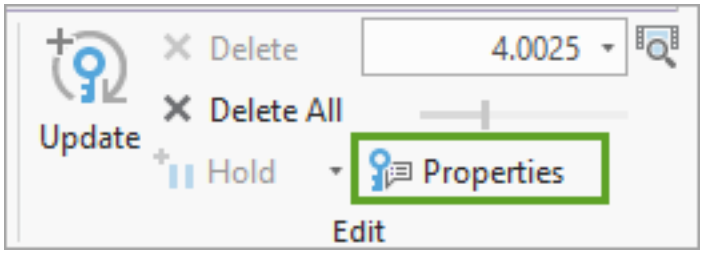
11. In the view, click the red **X** in the upper right corner to exit edit mode.

12. On the **Animation** ribbon, **Overlay** group, update:
    - Font to **Tahoma**
    - Size to **24**

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



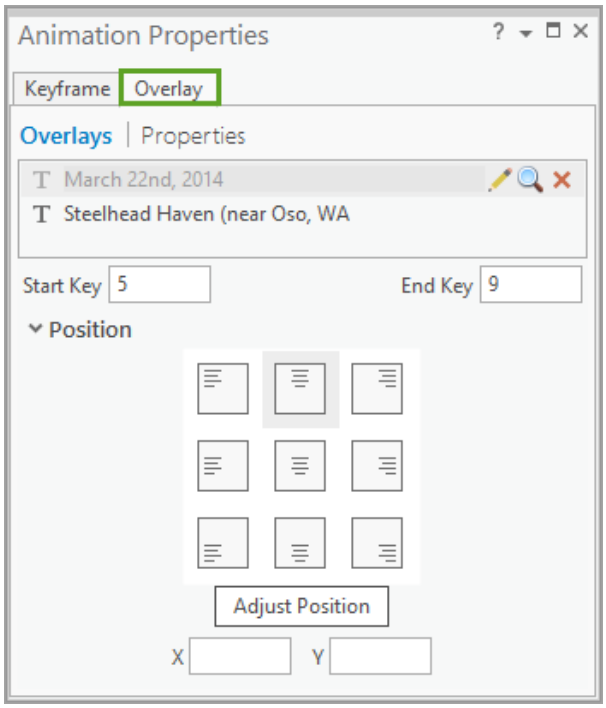
13. On the **Animation** ribbon, in the **Edit** group, click **Properties** to open the **Animation Properties** pane.



In the properties, it is possible to update and modify keyframe properties and to define overlay characteristics.

14. In the **Animation Properties** pane, click the **Overlay** tab.

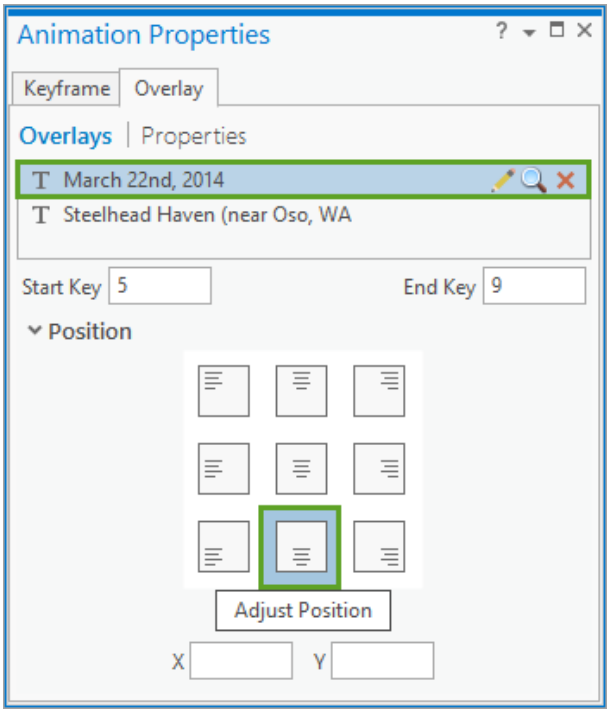
15. If necessary, expand **Position** to display the various preset **Adjust Position options** for an overlay.



Notice that the **Overlays** tab lists all the current overlays in the animation. In this case, you have two overlays, one for the title and one for the date.

16. In the **Overlays** list, click the **March 22nd, 2014** overlay to select it.

17. For **Position**, select the **Place overlay bottom center** alignment button.



The date overlay text is updated and now positioned at the bottom center of the view.



18. Close the **Animation Properties** pane when done.

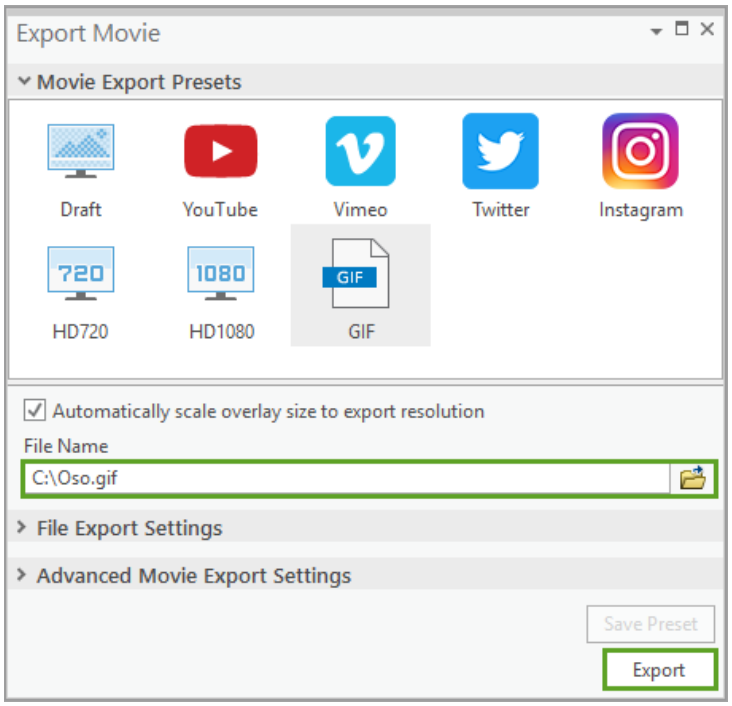
19. Save the project.

Export the animation

Your animation is now ready to be exported to a file to share.

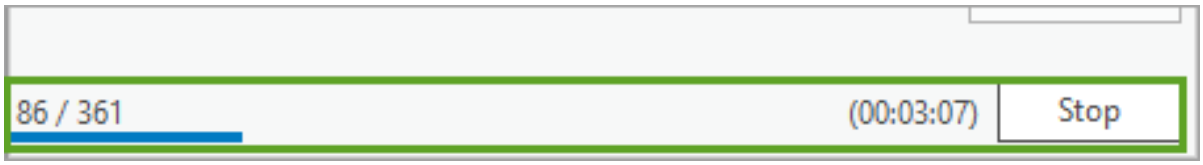
1. On the ribbon, click the **Animation** tab, in the **Export** group, click **Movie** to display the **Export Movie** pane.

2. In the **Export Movie** pane, for **File Name,** specify an output location and name for your movie. For example: “C:\Oso.gif”



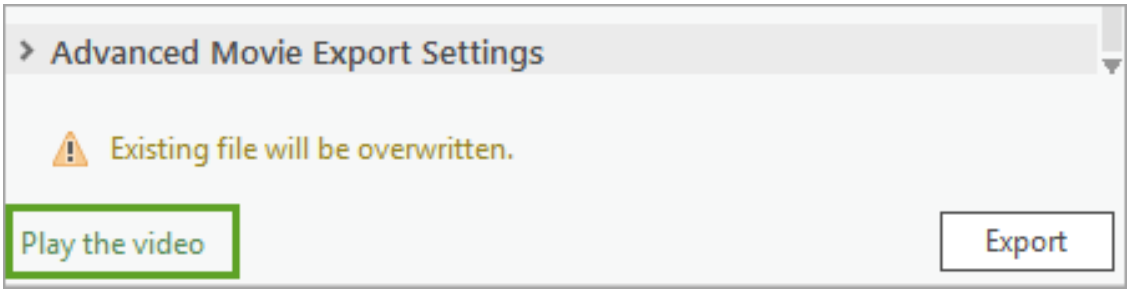
3. Click **Export.**

Notice as the file is being created, a status bar in the lower left of the pane is incremented to show the status of the movie creation process.

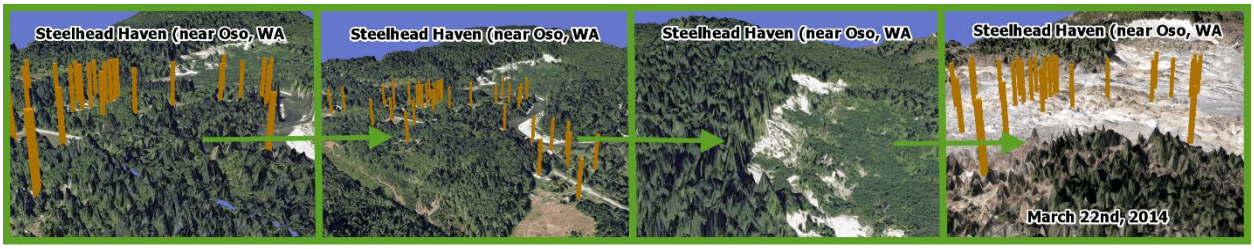


The time required to export the animation to a GIF depends on your machine. The progress and estimated time remaining are displayed at the bottom of the **Export Movie** pane. If necessary, you can discontinue the export at any time by clicking **Stop**.

4. When the export is complete, click **Play the video** to view it.



The video will play in your default GIF viewing application and repeat (loop) after 15 seconds.



5. Save the project.

Summary

Animation videos are a great way to share information with non-GIS experts.

In this lesson, we covered: authoring camera fly-throughs, showing before-and-after scenarios by transitioning layer visibility, and using on-screen text to provide details about the contents of the video.

There are many other capabilities available with animations–for example, you can set the transition type between keyframes to linear, fixed curve, hopped, and stepped, or use the scene's lighting to cast shadows through time–so spending more time reading the help or watching these instructional videos is highly recommended.

One element of video construction not covered in this section is the audio component. ArcGIS Pro does not include the ability to add audio to your videos yet, so post-production work using third-party software, such as Camtasia, GoPro, or Movie Maker, would be required.
If you have the time and resources to do so, audio can be extremely effective at providing detailed information, such as a narrated explanation of the content, as well as adding mood and ambience, such as an appropriate background soundtrack.

Whatever GIS story you want to tell, animation is a powerful way to get your message out to a huge range of people. Good luck animating!