



2009 ESRI User Conference

Technical Workshops

July 14–17, 2009



Please!
Turn **OFF** cell phones
and paging devices



Incorporating Animation into your Analysis and Presentation

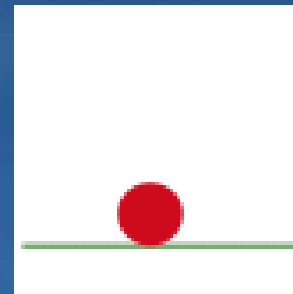
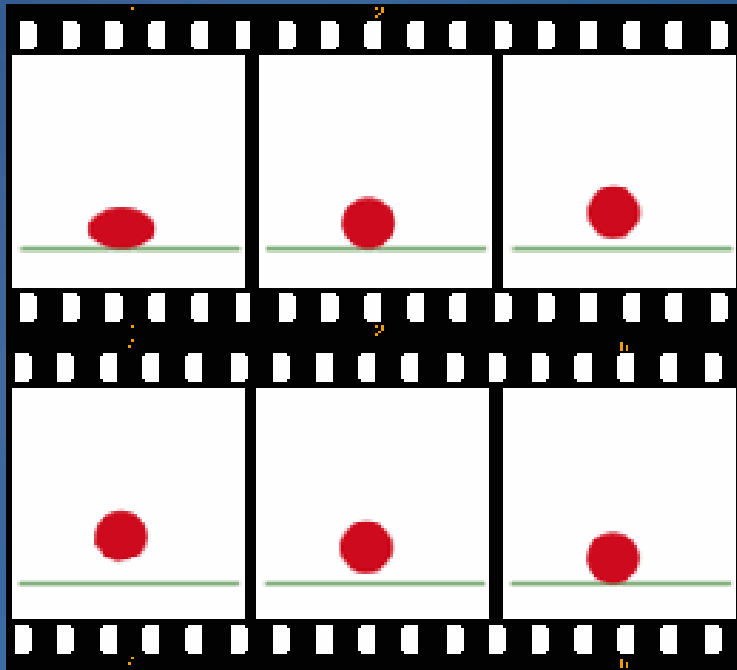
Colin Childs

Content

- **What is Animation**
- **What is ArcGIS animation**
- **What can be Animated**
- **Animation concepts**
- **Building blocks of an animation**
- **Creating an animation**
 - Animation toolbar
- **Animation manager**
 - Animation controls
- **Saving, sharing and exporting animation**
- **Animation examples**

What is an animation?

- The rapid display of a sequence of 2-D or 3-D images in order to create an illusion of movement
 - Visualize how data changes with time and space



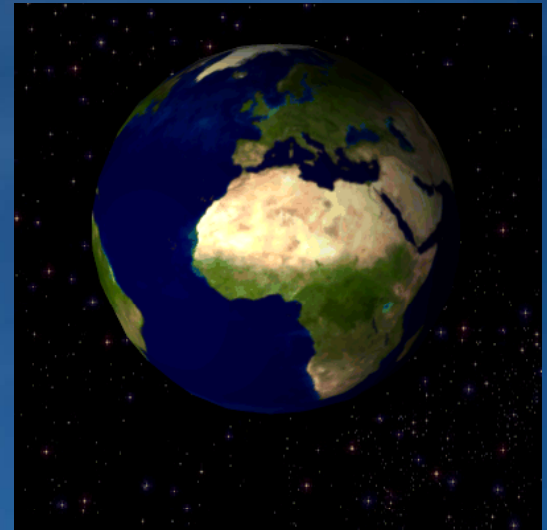
Bouncing ball animation
made up of 6 frames

ArcGIS Animation

- **Used to:**
 - **Visualize changes to layer properties**
 - Changes in perspective
 - Changes in document properties
 - Geographic movements
 - Temporal changes
 - Patterns in data through time
 - **Store actions to be replayed**
 - **Create simple and complex dynamic effects**
 - **Automate the process of effective demonstration and visualization of data**
- **Core ArcMap functionality - no extension**
- **ArcGlobe and ArcScene - 3D Analyst extension**

What can be Animated?

- **The view**
 - Pan and zoom, move the camera or view
- **Layer properties**
 - Move a layer, change transparency, group animation
- **Scene properties**
 - Modify background color, exaggerate the terrain
- **Time series**
 - Feature class, Raster catalog



Let's take a look at some examples

- **ArcMap Animations**

- Map View Animation
- Map Layer Animation
- Time Layer Animation

- **ArcScene Animations**

- Camera Animation
- Layer Animation
- Scene Animation

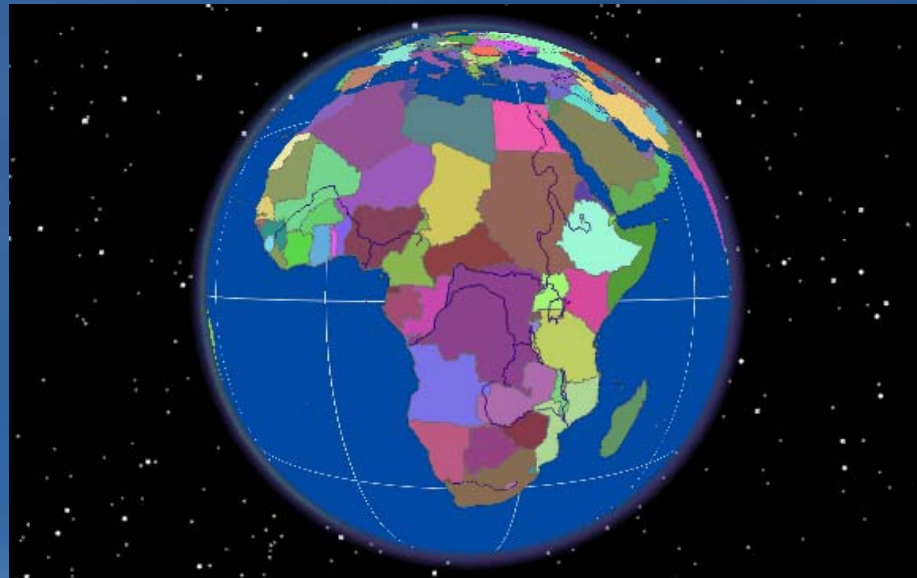
- **ArcGlobe Animations**

- Globe Camera Animation
- Globe Layer Animation

Basic Animation Concepts

- **Animation**

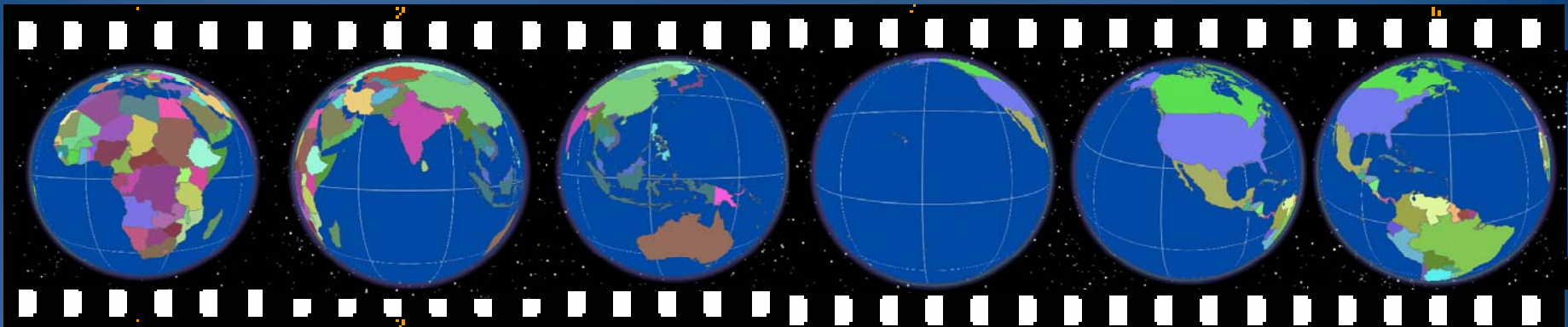
- The rapid display of a sequence of 2-D or 3-D images in order to create an illusion of movement
 - Visualize how data changes with time and space
- Consists of : one or more Tracks executed in parallel
- Similar or different types of tracks can be played together



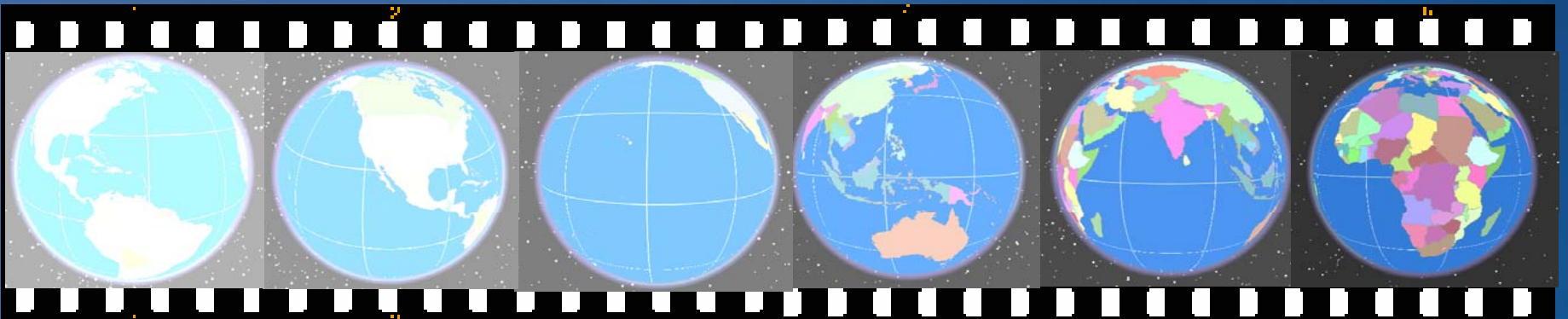
Basic Animation Concepts

- **Animation Track**

- Collection of keyframes of the same type
- Each track - bound to one or more objects and describe their behavior over animation time



Animation Track – A1

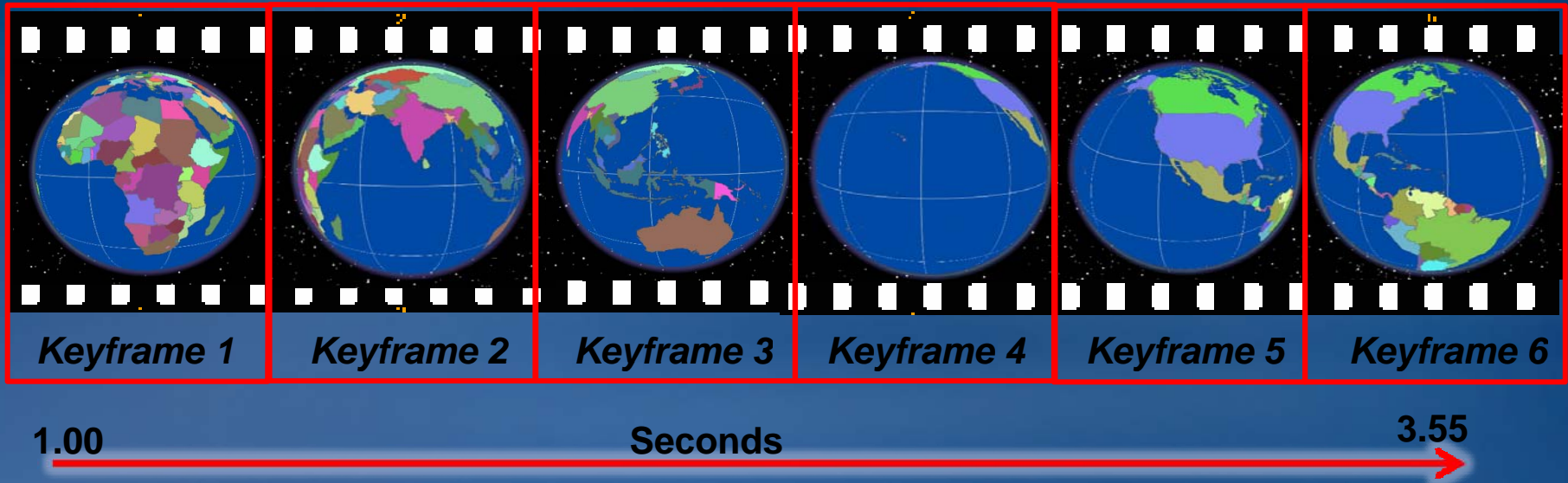


Animation Track – A2

Basic Animation Concepts

- **Keyframe**

- Snapshot of an object's properties at a certain time



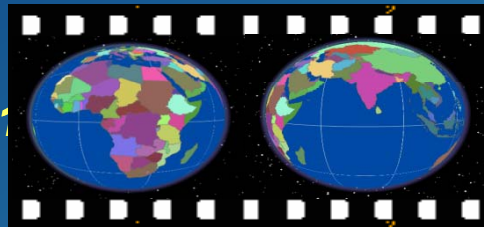
- Objects can be -

- Camera, Layer, Scene, Map View and Time Layer

Building blocks of an animation

Animation

Animation Track – A1



Keyframe 1

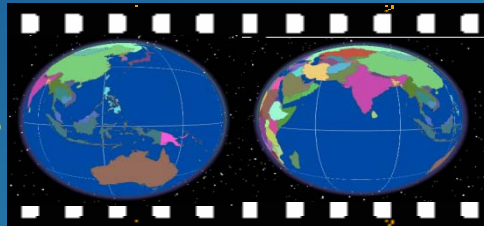
Keyframe 2

.....

Keyframe N

Object

Animation Track – A2



Keyframe 1

Keyframe 2

.....

Keyframe N

Object



Animation Track – A3



Keyframe 1

Keyframe 2

.....

Keyframe N

Object

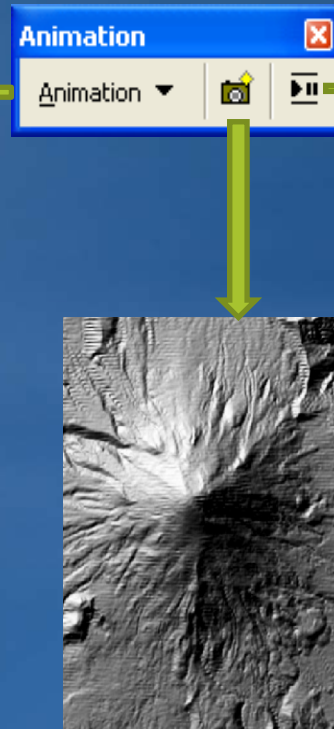
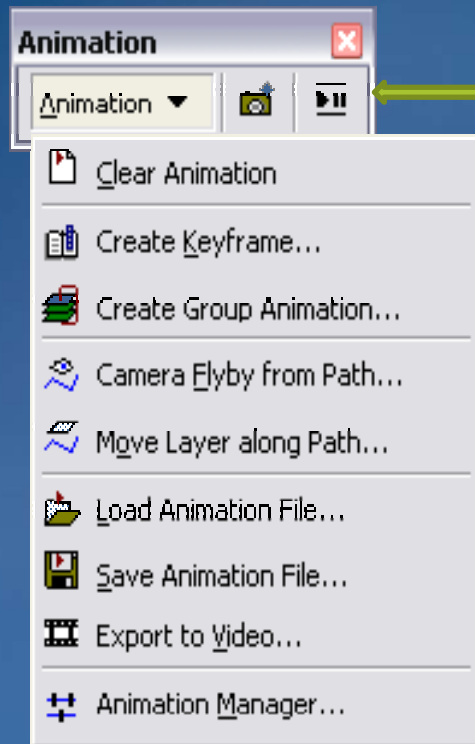
Object – Camera, Layer, Scene, Map View, and Time Layer

Creating Animations

Simple	Build animations from keyframes	<ul style="list-style-type: none">• Capture current view to animation• Record and play a flyby
	Build animations from paths	<ul style="list-style-type: none">• Create flyby using flight paths• Move layers along a path (Scene)
	Create Group Layer animations	<ul style="list-style-type: none">• Toggling layers on and off
	Time layer animations	<ul style="list-style-type: none">• Temporal visualization
Advanced	Manipulate object properties	<ul style="list-style-type: none">• Use the Animation Manager<ul style="list-style-type: none">• Edit keyframe and track properties
	ArcObjects customization	<ul style="list-style-type: none">• Animate objects

Tools used to create animation

- Animation toolbar
- Create, Load, Manage, Play, Save, Export
 - AVI, MOV, ASA, AGA



Capture the current view to an animation

Animation toolbar

The image shows a software interface with an 'Animation' toolbar and its dropdown menu. The toolbar contains a dropdown menu, a camera icon, and a play/pause icon. The dropdown menu lists several options: 'Clear Animation', 'Create Keyframe...', 'Create Group Animation...', 'Create Time Layer Animation...', 'Create Elyby from Path...', 'Move Layer along Path...', 'Load Animation File...', 'Save Animation File...', 'Export to Video...', and 'Animation Manager...'. Blue lines connect text callouts to specific icons and menu items.

Remove all animation tracks from the document.

Create an animation by capturing views.

Create a keyframe for a new or existing track.

Create a track that animates the properties of grouped layers (visibility/transparency).

Create a track that animates temporal data.

Create a track by defining a path along which the camera or the view will travel.

Create a track by defining a path along which another layer will travel (ArcScene only).

Load an existing animation file into your document.

Save an animation file so it can be loaded at a later date.

Export animation files to .avi or .mov files.

Edit and fine-tune animations. Modify properties of keyframes and tracks. Edit the timing of keyframes and tracks while previewing your changes.

Animation Manager

- Organizes and manages
 - Tracks and Keyframes
 - Arranges the animation timeline

Animation Manager - Keyframes

Keyframes of Type: **Map Layer** In Track: **Map L**

	Time	Name	Visibility	Transparency
0	0.000	Visible Layer	Yes	0
1	0.250	Invisible Layer	No	0
2	0.500	Transparent Layer	Yes	60
3	0.			
4	1.			

Animation Manager - Tracks

View only tracks of type: **Map Layer**

	Name	Type	Attache
0	<input checked="" type="checkbox"/> Map Layer track 1	Map Layer	Yes
1	<input checked="" type="checkbox"/> Map Layer track 2	Map Layer	Yes
2	<input checked="" type="checkbox"/> Map Layer track 3	Map Layer	No
3	<input checked="" type="checkbox"/> Map Layer track 4	Map Layer	No
4	<input checked="" type="checkbox"/> Map Layer track 5	Map Layer	Yes

Animation Manager - Time View

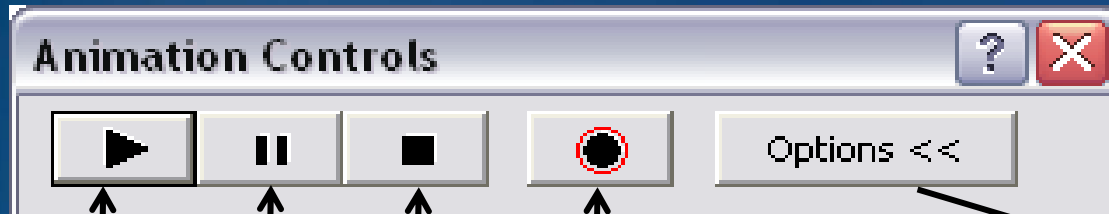
Time Scale: **1.000** View enabled tracks only Restore state after preview

Map Layer track 1
Map Layer track 2
Map Layer track 3
Map Layer track 4
Map Layer track 5
Time Layer track 1

0.000 0.500

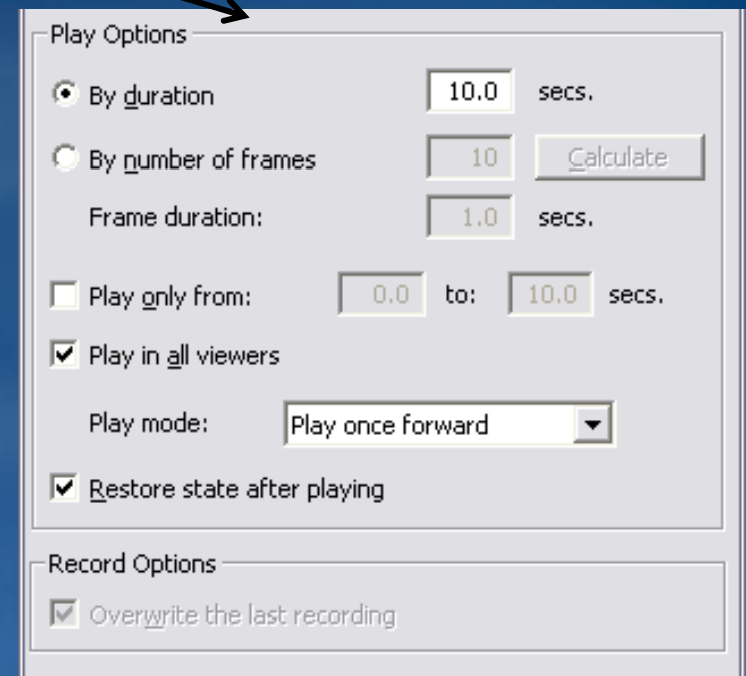
	No	0.198	0.992						
	No	0.198	0.992						
	No	0.198	0.992						

Playing Animations



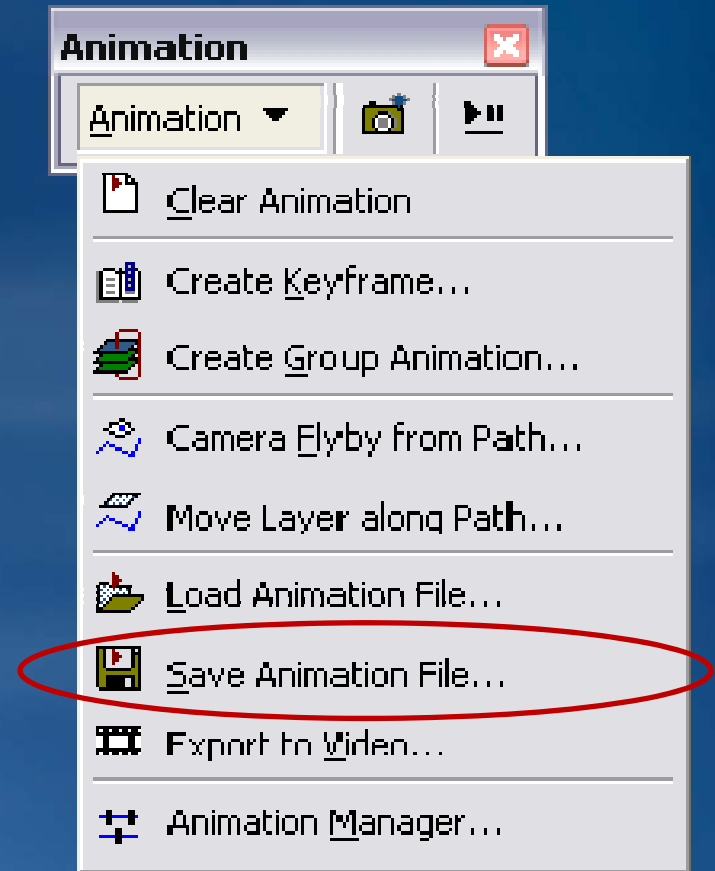
Play **Pause** **Stop** **Record**

- **Two ways:**
 - **Animation Controls dialog box**
 - **Manually ,use Time View slider**
- **Play options:**
 - Duration (speed)
 - Number of frames to display
 - Play portions
- **Looping options**
 - Play once forward
 - Play once reverse
 - Loop forward
 - Loop forward and reverse
- **Restore state after playing**



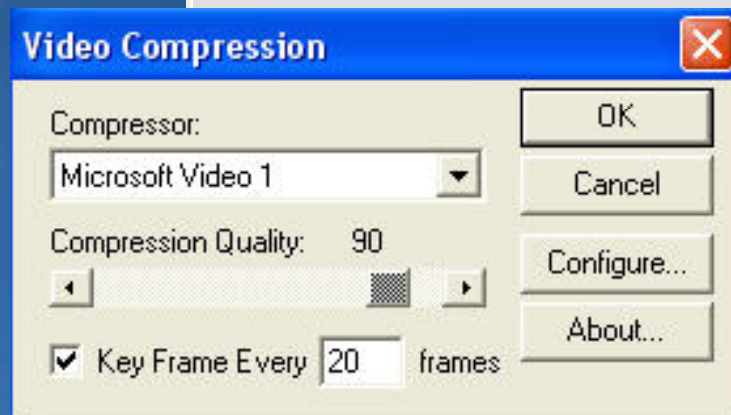
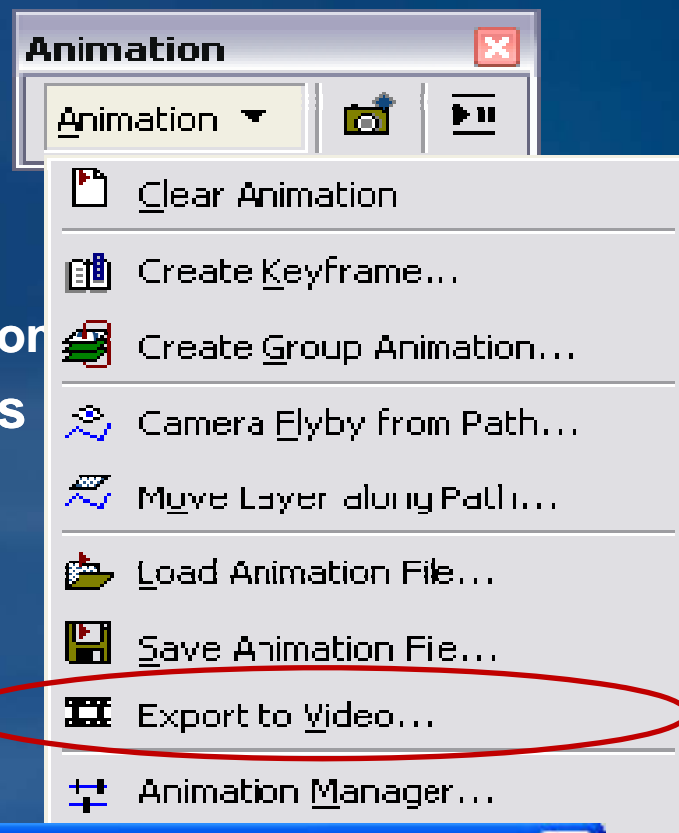
Saving and Sharing Animations

- Save in:
 - **.mxd, .sxd, .3dd**
 - or
 - **.ama, .asa, or .aga file**
- Reusable
 - Same or different document
 - TOC should contain the same data for Layer and Time animation



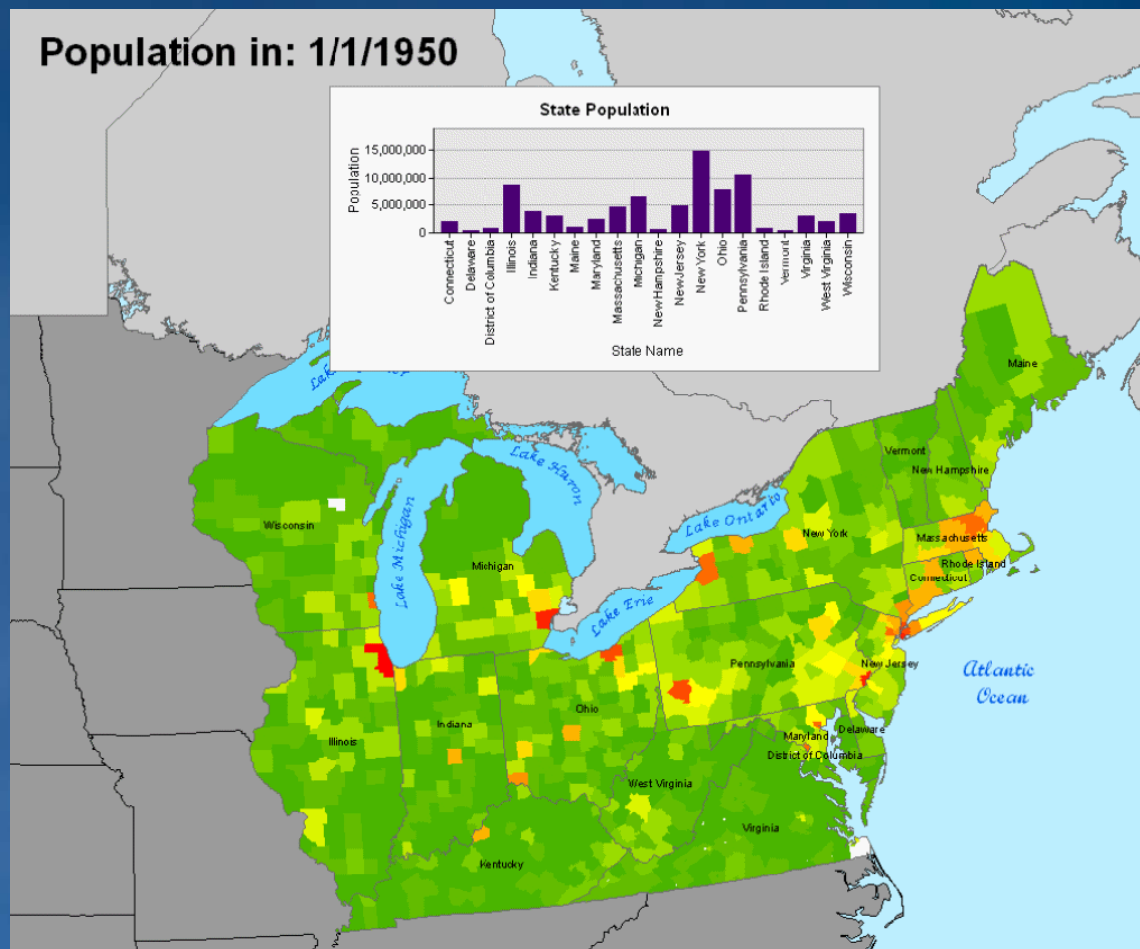
Exporting Animations

- **Formats supported**
 - .avi, .mov
- **Compression properties**
 - Quality, frames per second, frame duration
- **Compatible with standard media players**
- **Distortion-free custom videos**



Example: Animation in ArcMap

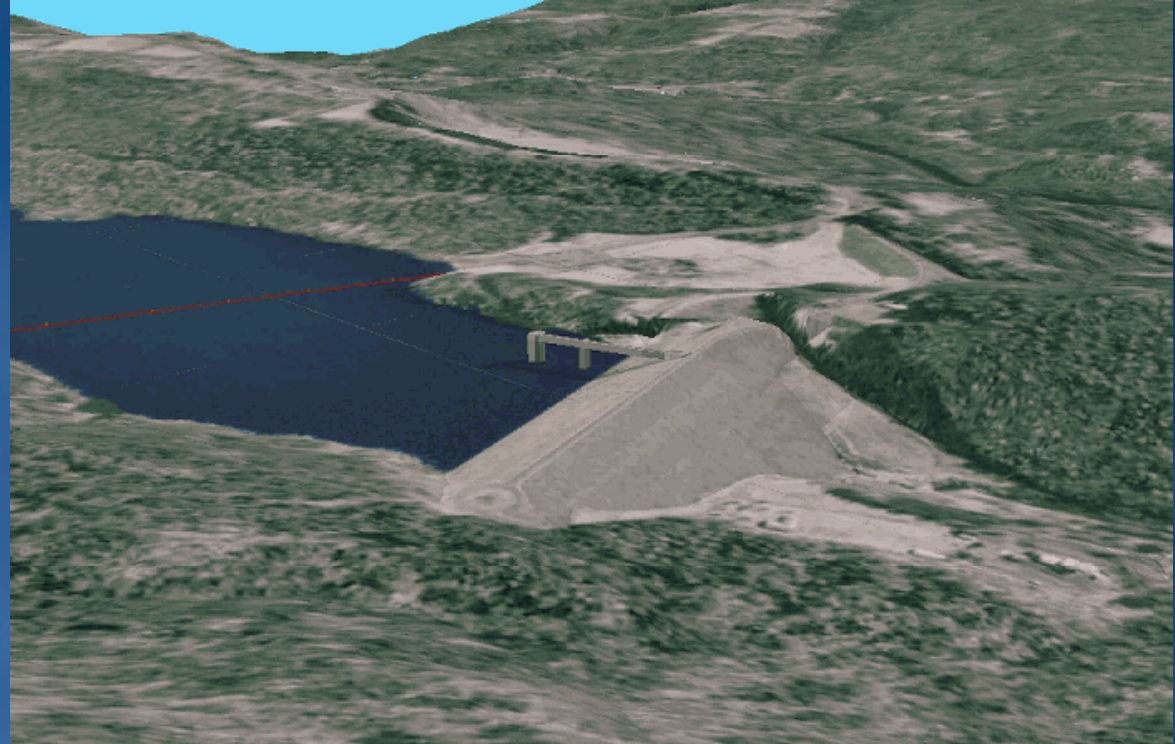
- Map View Animation
 - View Extent
- Map Layer Animation
 - Visibility
 - Transparency



Courtesy: U.S. Census

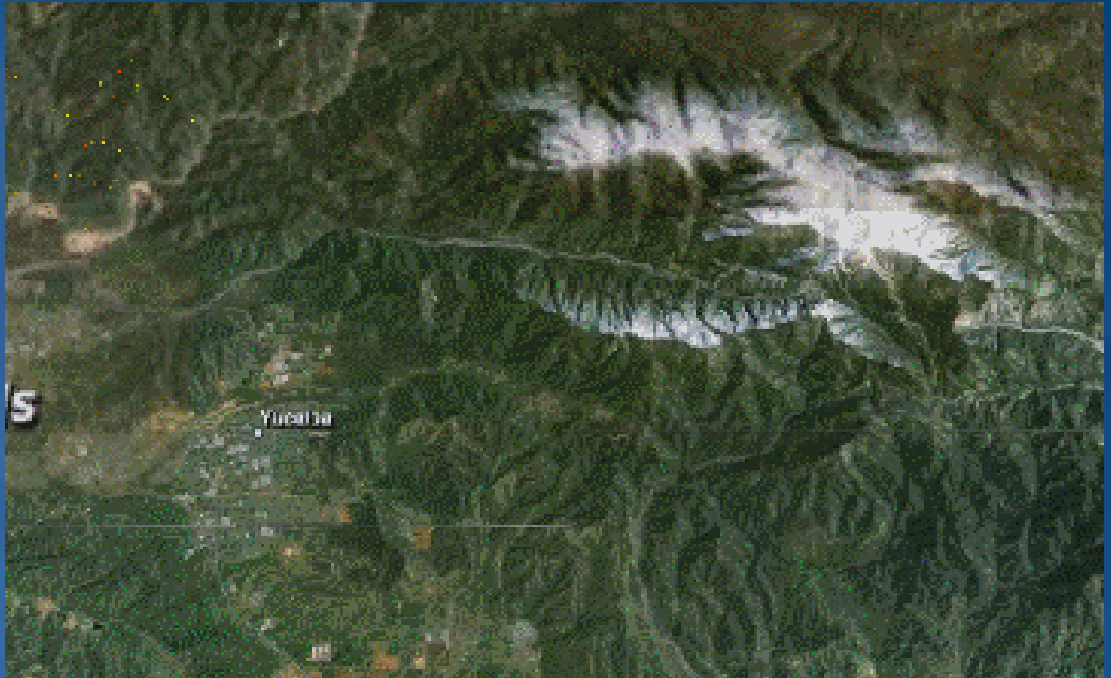
Example: Animation in ArcScene

- **Camera Animation**
 - Observer
 - Target
 - View Angle
- **Layer Animation**
 - Visibility
 - Transparency
 - Translation
- **Scene Animation**
 - Vertical Exaggeration
 - Sun Azimuth



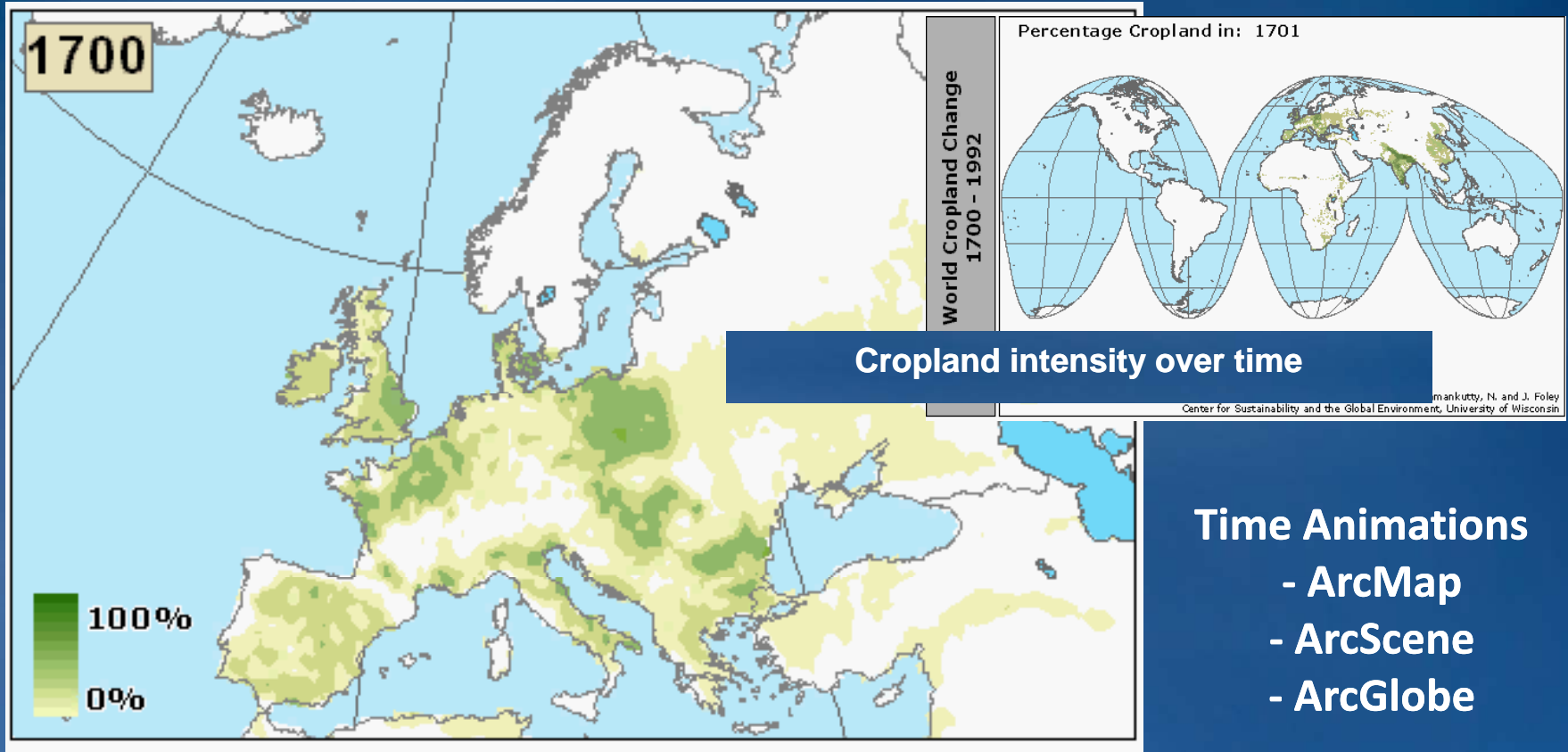
Example: Animation in ArcGlobe

- **Camera Animation**
 - Navigation mode
 - Target
 - View Angle
- **Layer Animation**
 - Visibility
 - Transparency



Example: Animation through time

Sequential display of data with time stamps



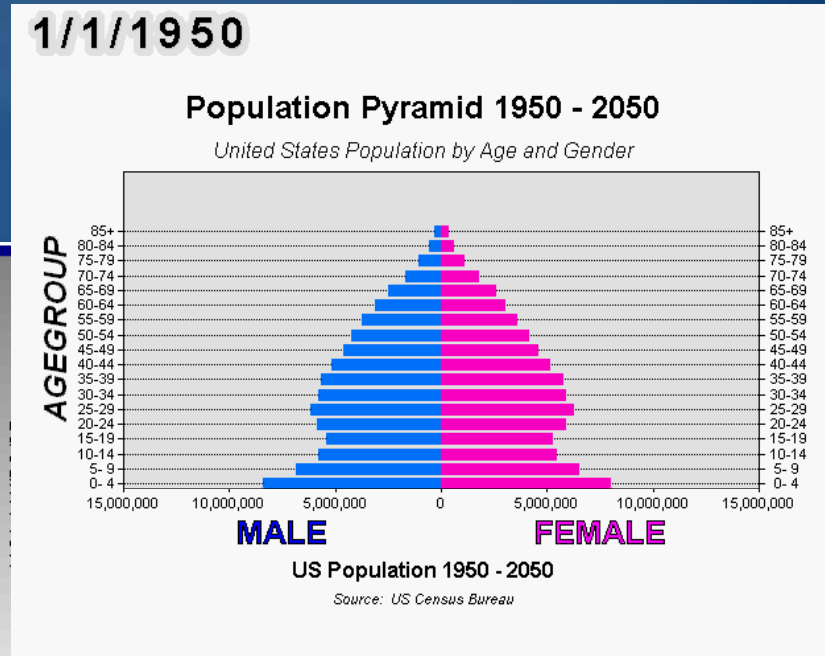
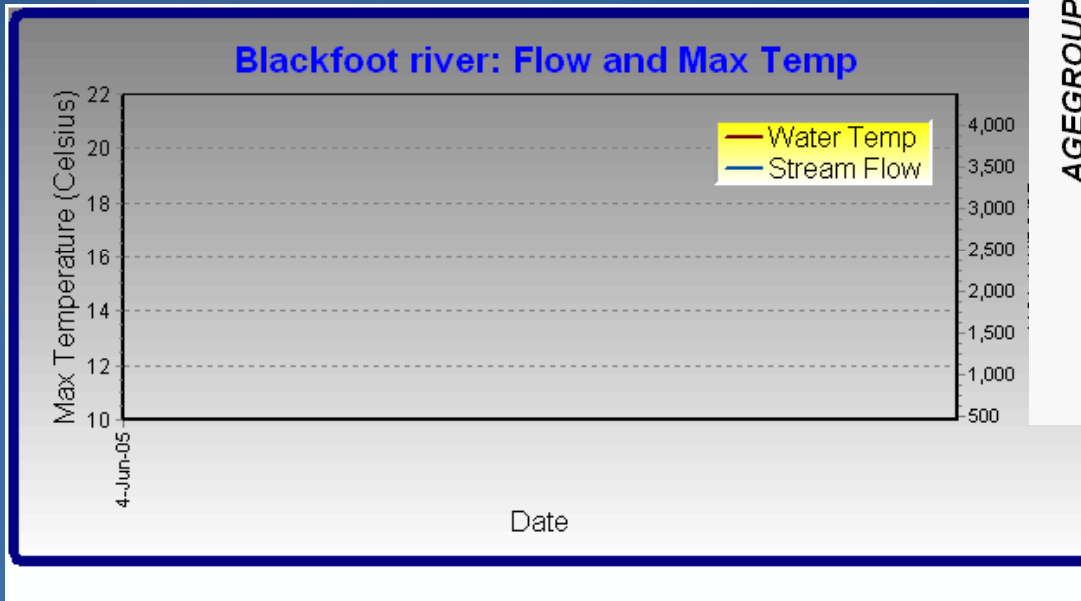
Time Animations

- ArcMap
- ArcScene
- ArcGlobe

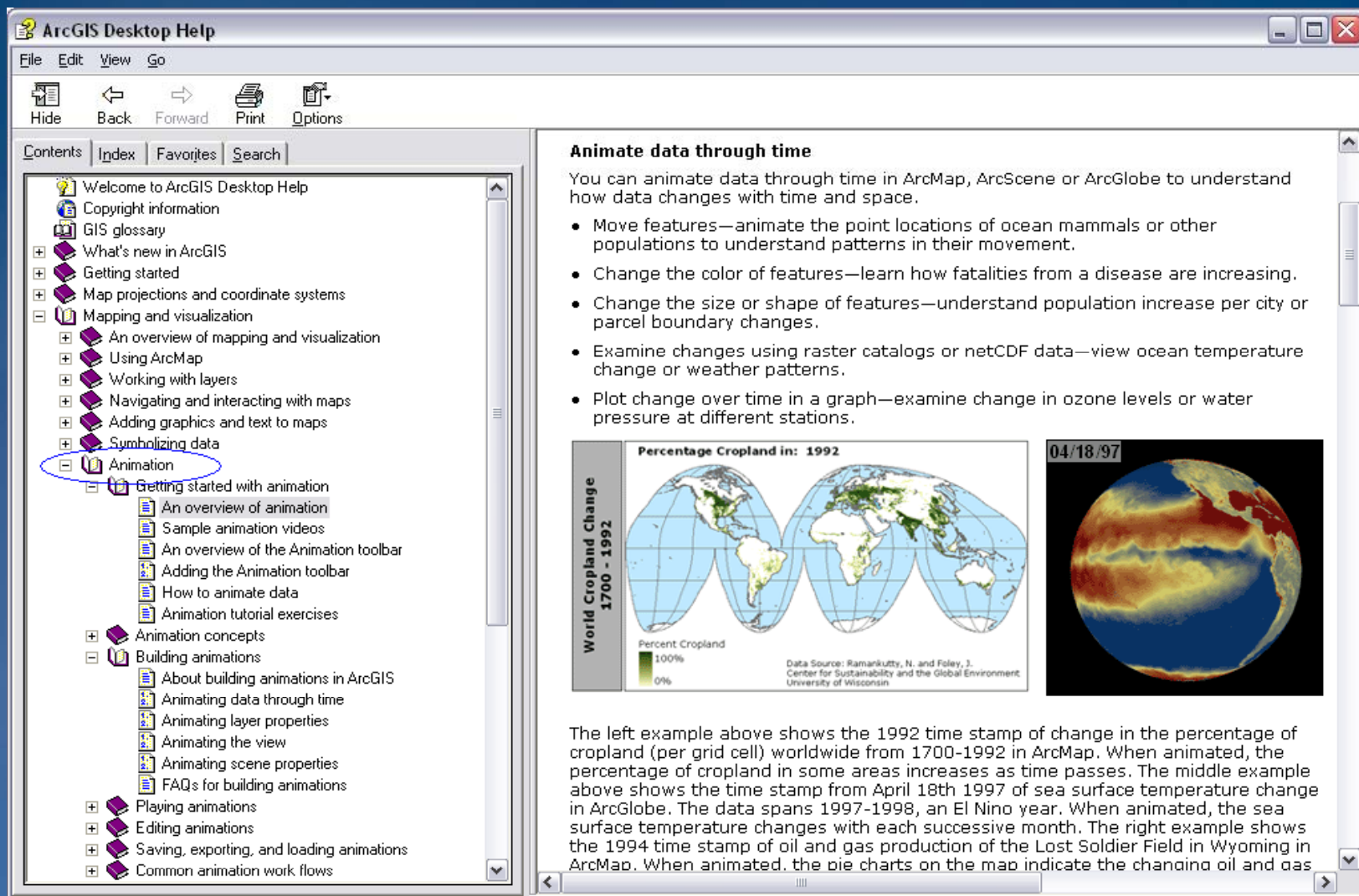
Courtesy: NetCDF Data Source: Ramankutty, N. and Foley, J. Center for Sustainability and the Global Environment, University of Wisconsin

Animating data in graphs

- *Create a graph using a layer or table*
- Create an animation in the usual way, attaching the layer or table to a time layer track
- When the animation is played, the graph will animate



Location of Animation Help



The screenshot shows the ArcGIS Desktop Help window. The left pane displays a tree view of help topics, with 'Animation' selected and circled. The right pane shows the 'Animate data through time' help page, which includes a list of animation capabilities and three examples of data visualization over time.

Animation

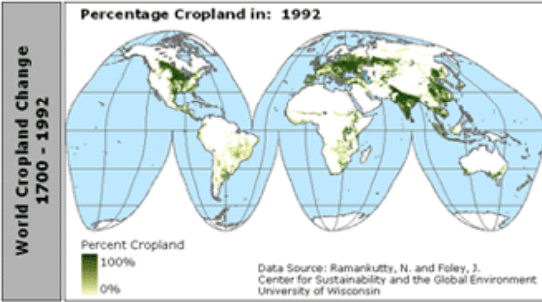
- Getting started with animation
 - An overview of animation
 - Sample animation videos
 - An overview of the Animation toolbar
 - Adding the Animation toolbar
 - How to animate data
 - Animation tutorial exercises
- Animation concepts
- Building animations
 - About building animations in ArcGIS
 - Animating data through time
 - Animating layer properties
 - Animating the view
 - Animating scene properties
 - FAQs for building animations
- Playing animations
- Editing animations
- Saving, exporting, and loading animations
- Common animation work flows

Animate data through time

You can animate data through time in ArcMap, ArcScene or ArcGlobe to understand how data changes with time and space.

- Move features—animate the point locations of ocean mammals or other populations to understand patterns in their movement.
- Change the color of features—learn how fatalities from a disease are increasing.
- Change the size or shape of features—understand population increase per city or parcel boundary changes.
- Examine changes using raster catalogs or netCDF data—view ocean temperature change or weather patterns.
- Plot change over time in a graph—examine change in ozone levels or water pressure at different stations.

World Cropland Change 1700 - 1992

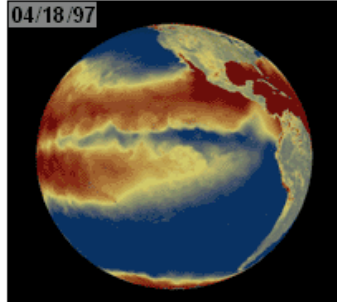


Percent Cropland

100%
0%

Data Source: Ramankutty, N. and Foley, J., Center for Sustainability and the Global Environment, University of Wisconsin

04/18/97



The left example above shows the 1992 time stamp of change in the percentage of cropland (per grid cell) worldwide from 1700-1992 in ArcMap. When animated, the percentage of cropland in some areas increases as time passes. The middle example above shows the time stamp from April 18th 1997 of sea surface temperature change in ArcGlobe. The data spans 1997-1998, an El Nino year. When animated, the sea surface temperature changes with each successive month. The right example shows the 1994 time stamp of oil and gas production of the Lost Soldier Field in Wyoming in ArcMap. When animated, the pie charts on the map indicate the changing oil and gas

ArcGIS Desktop Help > Mapping and Visualization > Animation

Open to questions