INNOVATIVE GEOGRAPHIC MEDIA

CONNECTING PEOPLE TO THE MINNESOTA RIVER

MN GIS/LIS Conference
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Duluth, MN

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MINNESOTA RIVER BASIN

Water Resources Center
Minnesota State University Mankato

The mission of the Water Resources Center is to gather, interpret, and distribute data of environmental significance to help citizens enhance the quality of regional lakes, rivers, wetlands, and groundwater. This is accomplished through faculty and student applied research, educational programming, technical assistance, and water resource planning.

HISTORIC LANDSCAPE

Minnesota Historical Society

A landscape covered in tall grass, wetlands, shallow lakes and forested areas

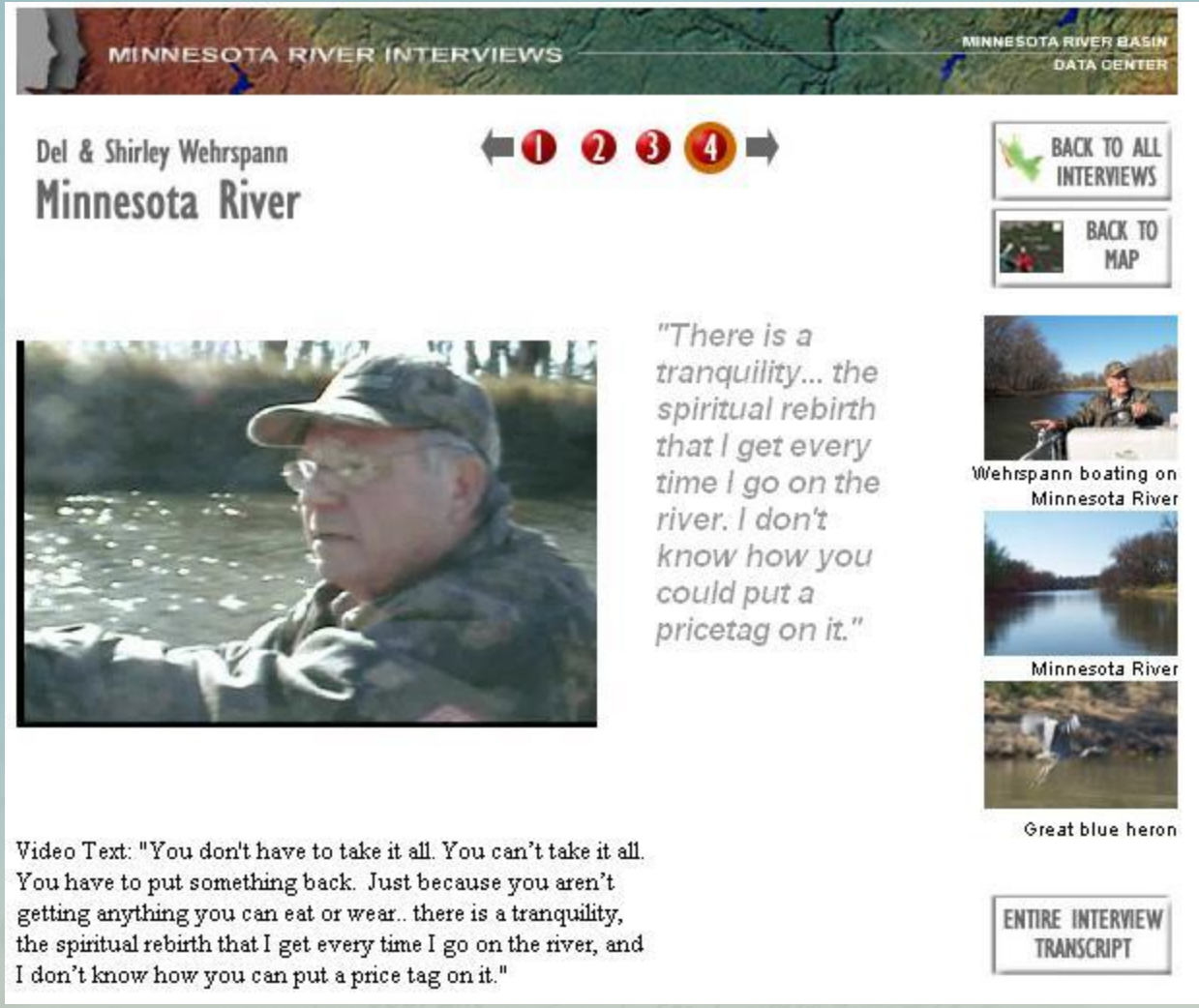
PURPOSE

"We don't have a river problem; we have a "watershed problem." The solution involves thousands of people and tens of thousands of acres. With collaborative management the Minnesota River can be a healthy, dynamic resource that we can enjoy today and pass on to our grandchildren as a clean water legacy." – Senator Dennis Fredrickson

HISTORY

- Interactive Tools Development for the Minnesota River Websites
  - Gain Historical Perspectives on Changes that have occurred during the past century
  - Incorporate Aerial Photography dating back to 1940's
  - Changing water and land use regimes have catalyzed river channel alterations.
  - Use of Interactive Hydrographs
  - Interviews with long time Minnesota River residents
  - Create a comprehensive visual experience highlighting and explaining many spatial connections with the river.

ORAL HISTORY PROJECT



ORAL HISTORY PROJECT

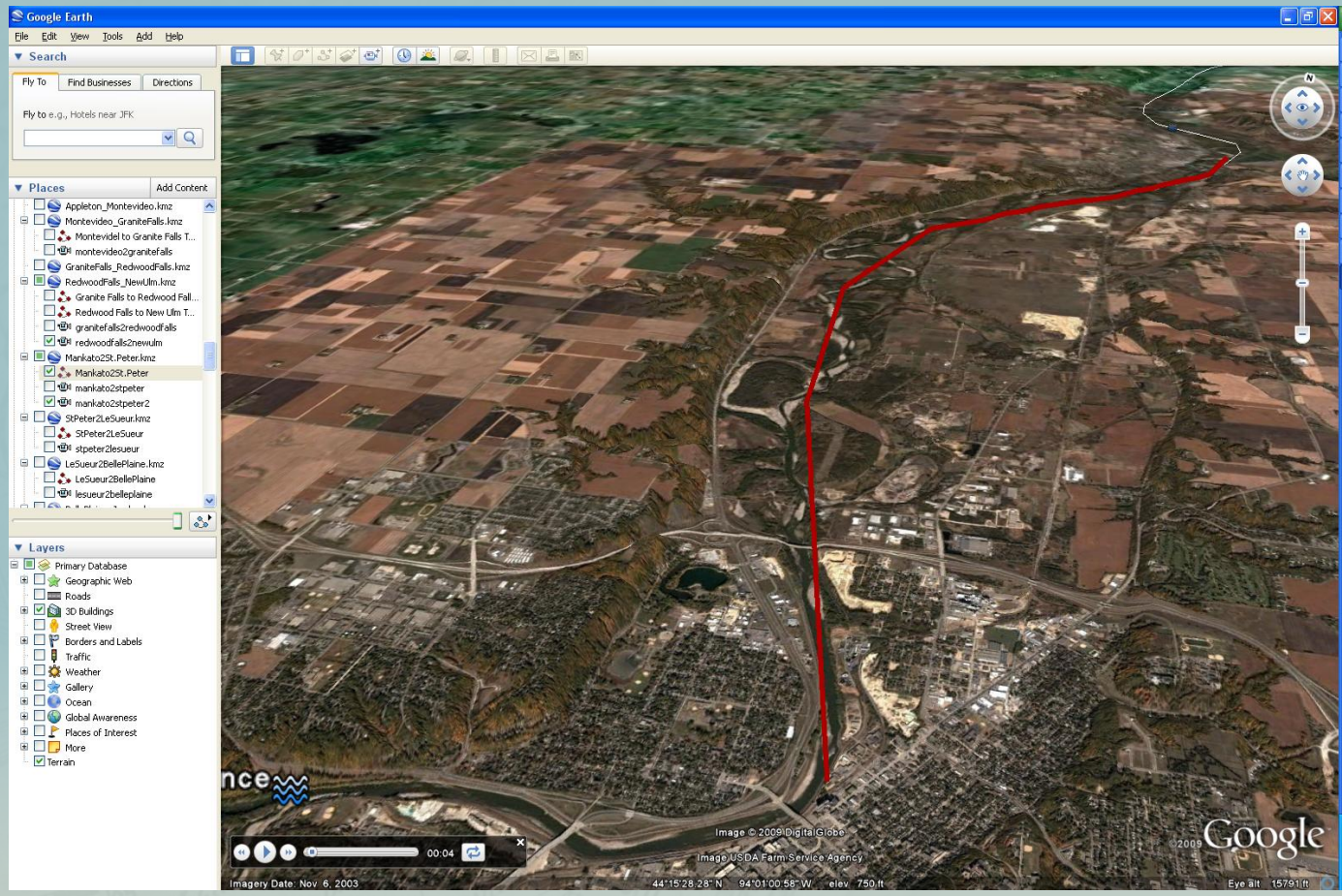
- How do we integrate the many landscape and hydrologic changes to enhance the experience and education about the river?

GOOGLE EARTH FLYOVERS

- Google Earth
- Paths
- Tours
- Google Earth Plugin
- Integrate with local and national KMZ files

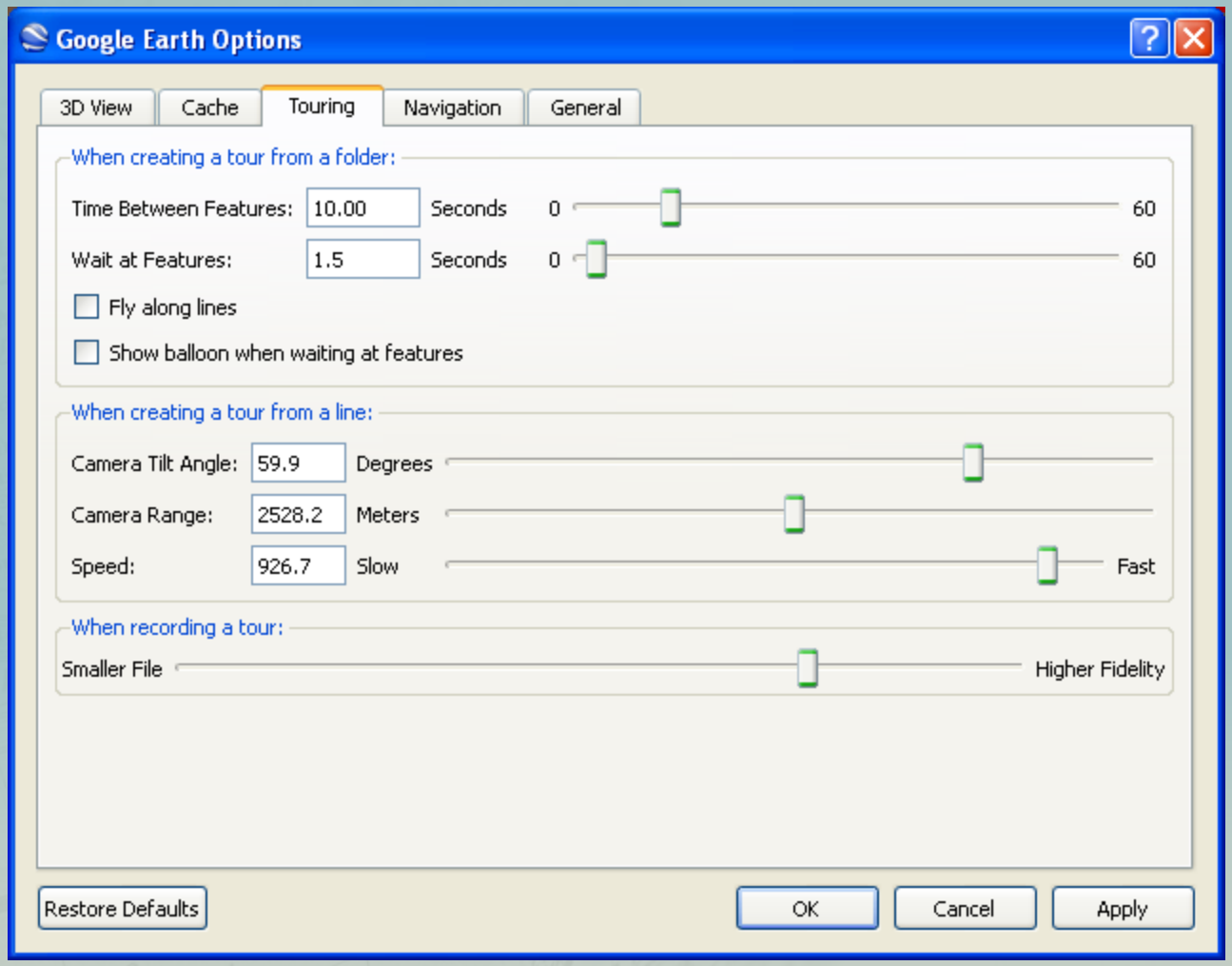
GOOGLE EARTH FLYOVERS

- Google Earth
- Create Path
- Play Path
- Save Path as Tour
- Save Tour as… KMZ file
- Settings can be adjusted for view



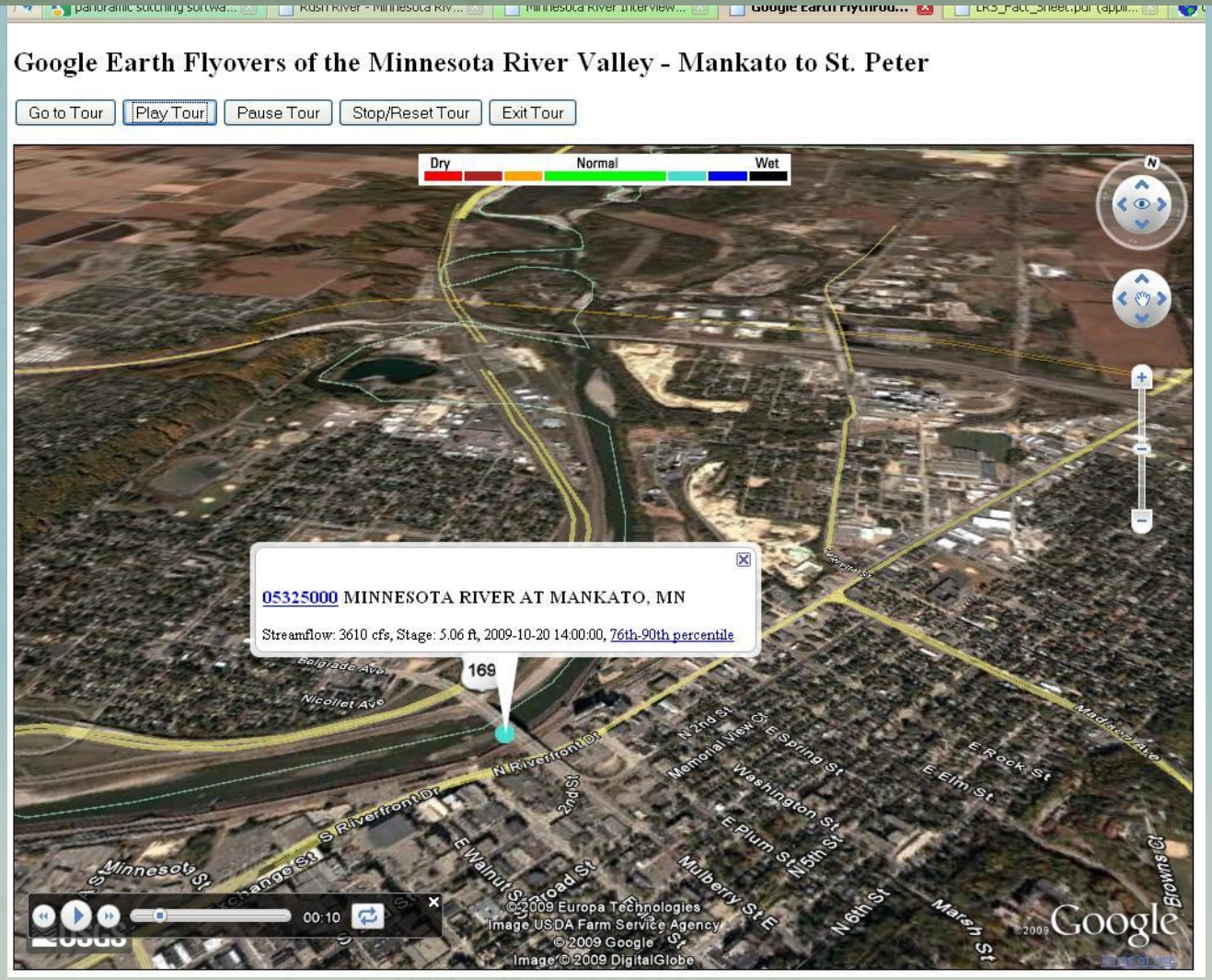
GOOGLE EARTH FLYOVERS

- Touring Tab under Options
- Camera Tilt Angle
- Camera Range
- Speed
- Uncheck Fly Along Lines for Smoother Path/Tour



GOOGLE EARTH FLYOVERS

- Google Earth Plugin – Browser version of GE
- Sign up for API to integrate Tour
- Add external KMZ files to enhance experience

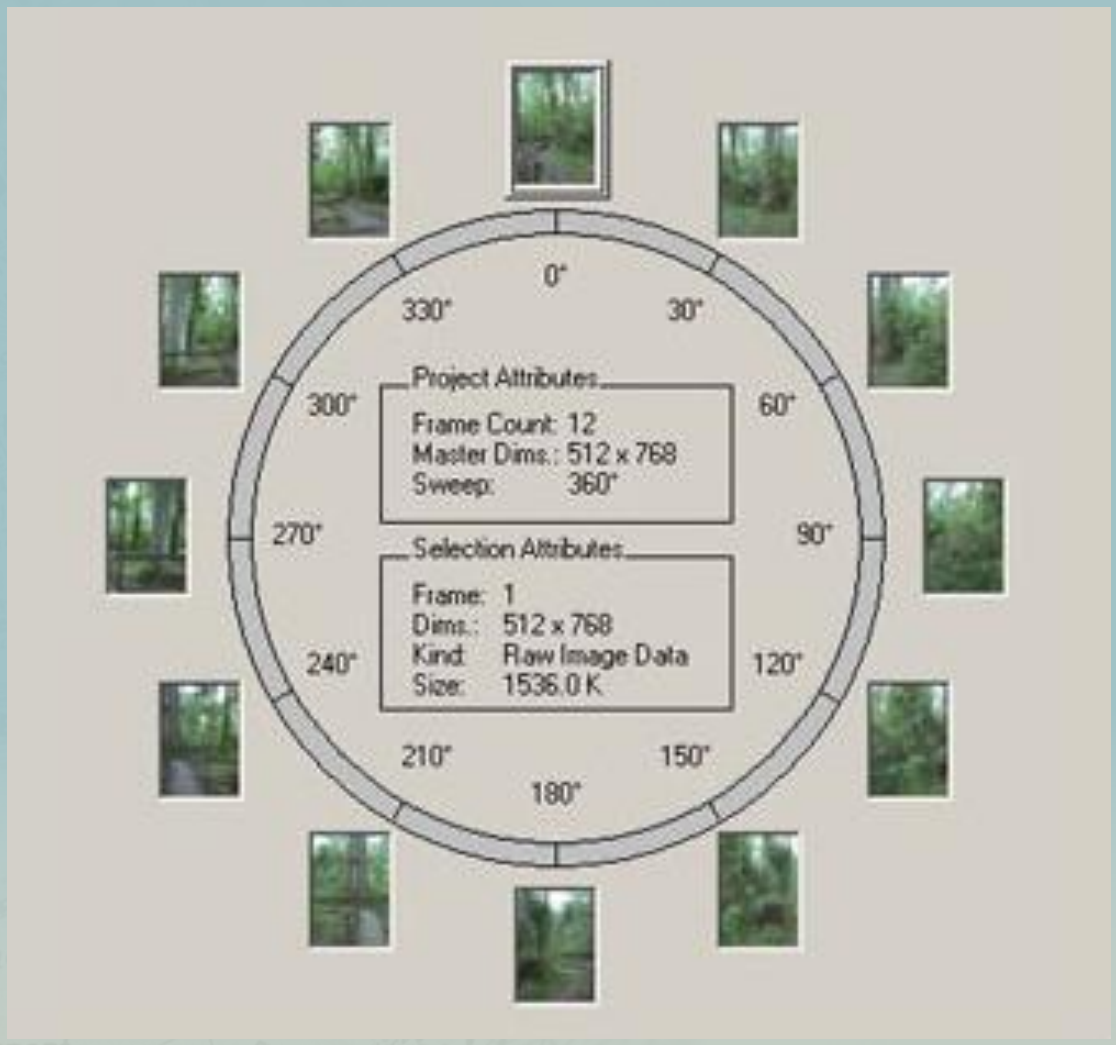


360 DEGREE PANORAMAS

- Digital Camera
- Tripod
- Photo Stitching Software – Photoshop, AutoStitch
- Convert to QuickTime Movie (QTVR) www.ptgui.com
- Embed QuickTime Movie into Webpage
- User clicks on image and drags right, left, up or down to investigate the area.

360 DEGREE PANORAMAS

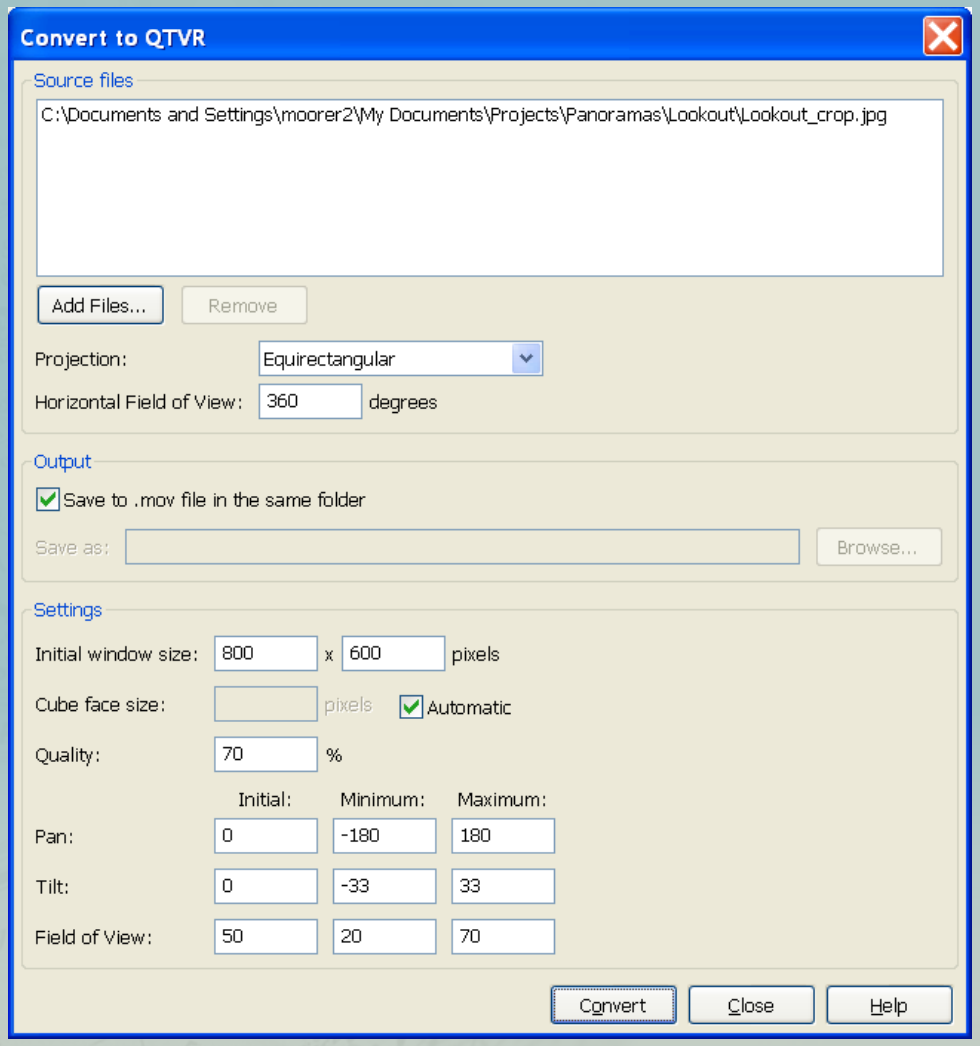
- 12 Overlapping Pictures
- Overlap about 25% of previous picture
- Use Tripod to keep the camera level
- 3 possible levels
  - Level
  - Angled Up
  - Angled Down



360 DEGREE PANORAMAS

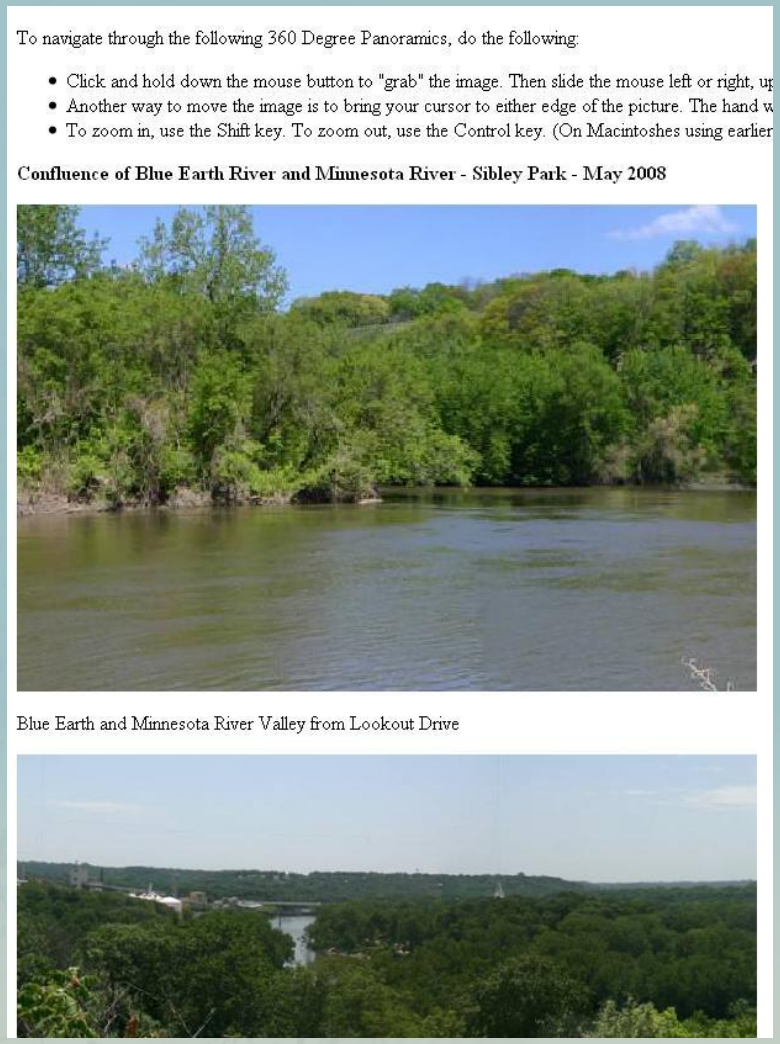
360 DEGREE PANORAMAS

- Horizontal Field of View
- Pan – Area user is allowed to rotate around in picture
- Tilt – Up and Down Angle in View
- Field of View – Zoom in and out level and starting FOV



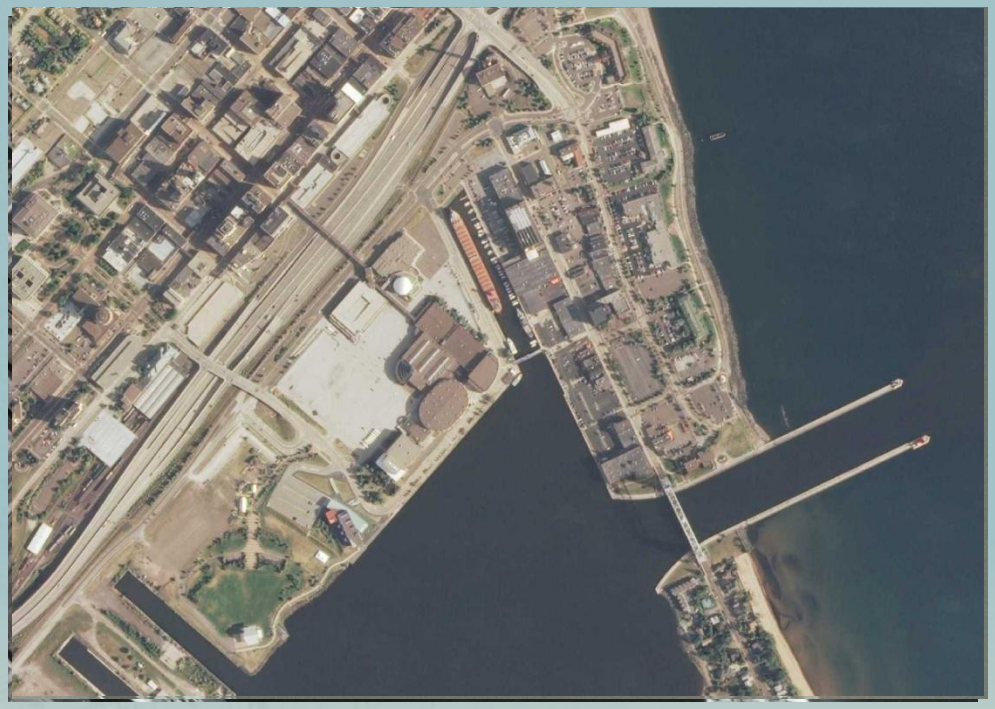
360 DEGREE PANORAMAS

- Integrate into website using QuickTime video plugin (free)
- User navigates through the image with mouse
- Minimal amount of code needed for integration



HISTORICAL AERIAL PHOTO SLIDESHOWS

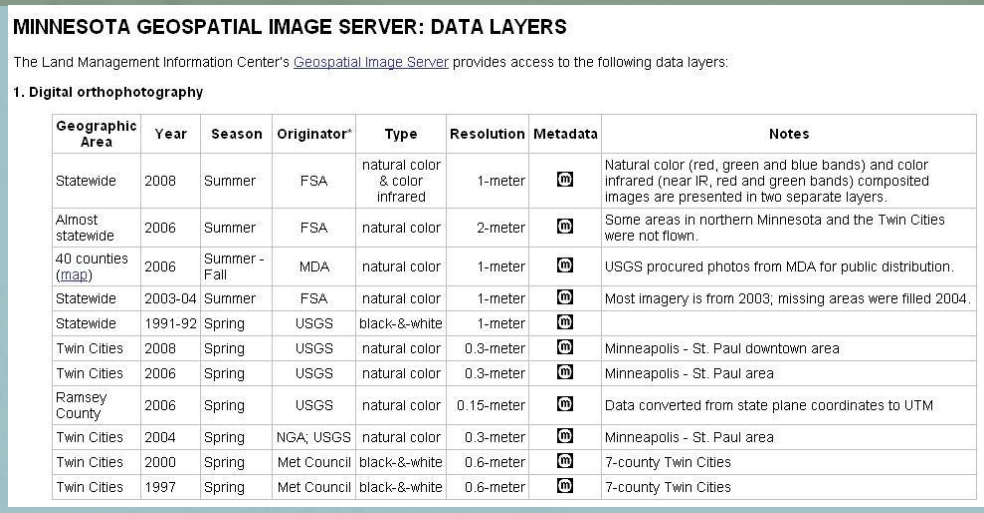
- Historical Photos show Land Use changes over time
- Visually seeing the changes allows our minds to better understand the change
- ArcGIS and DNR Landview allow us to incorporate these images together



Duluth 1998

HISTORICAL AERIAL PHOTO SLIDESHOWS

- LMIC's WMS Service 1991, 2003, 2006, 2008
- DNR LandView – 1940's – 1980's Aerial Photos
- Aerial Photography Repository's – Libraries, Courthouses, SWCD's

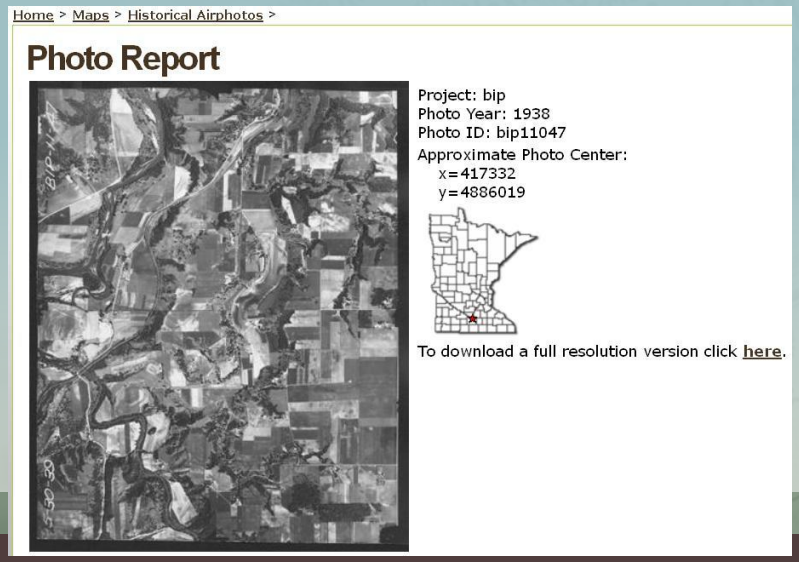


MINNESOTA GEOSPATIAL IMAGE SERVER: DATA LAYERS

The Land Management Information Center's Geospatial Image Server provides access to the following data layers:

1. Digital orthophotography

Geographic Area	Year	Season	Originator*	Type	Resolution	Metadata	Notes
Statewide	2008	Summer	FSA	natural color & color infrared	1-meter	m	Natural color (red, green and blue bands) and color infrared (near IR, red and green bands) composited images are presented in two separate layers.
Almost statewide	2006	Summer	FSA	natural color	2-meter	m	Some areas in northern Minnesota and the Twin Cities were not flown.
40 counties (map)	2006	Summer - Fall	MDA	natural color	1-meter	m	USGS procured photos from MDA for public distribution.
Statewide	2003-04	Summer	FSA	natural color	1-meter	m	Most imagery is from 2003; missing areas were filled 2004.
Statewide	1991-92	Spring	USGS	black-&-white	1-meter	m	
Twin Cities	2008	Spring	USGS	natural color	0.3-meter	m	Minneapolis - St. Paul downtown area
Twin Cities	2006	Spring	USGS	natural color	0.3-meter	m	Minneapolis - St. Paul area
Ramsey County	2006	Spring	USGS	natural color	0.15-meter	m	Data converted from state plane coordinates to UTM
Twin Cities	2004	Spring	NGA; USGS	natural color	0.3-meter	m	Minneapolis - St. Paul area
Twin Cities	2000	Spring	Met Council	black-&-white	0.6-meter	m	7-county Twin Cities
Twin Cities	1997	Spring	Met Council	black-&-white	0.6-meter	m	7-county Twin Cities

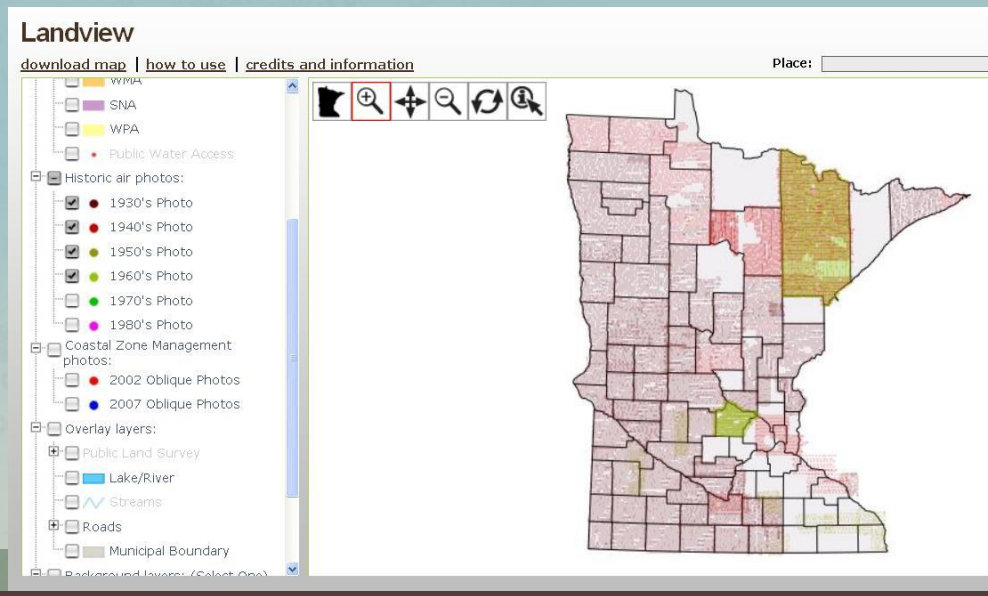


Home > Maps > Historical Airphotos >

Photo Report

Project: bip
Photo Year: 1938
Photo ID: bip11047
Approximate Photo Center:
x=417332
y=4886019

To download a full resolution version click here.



Landview

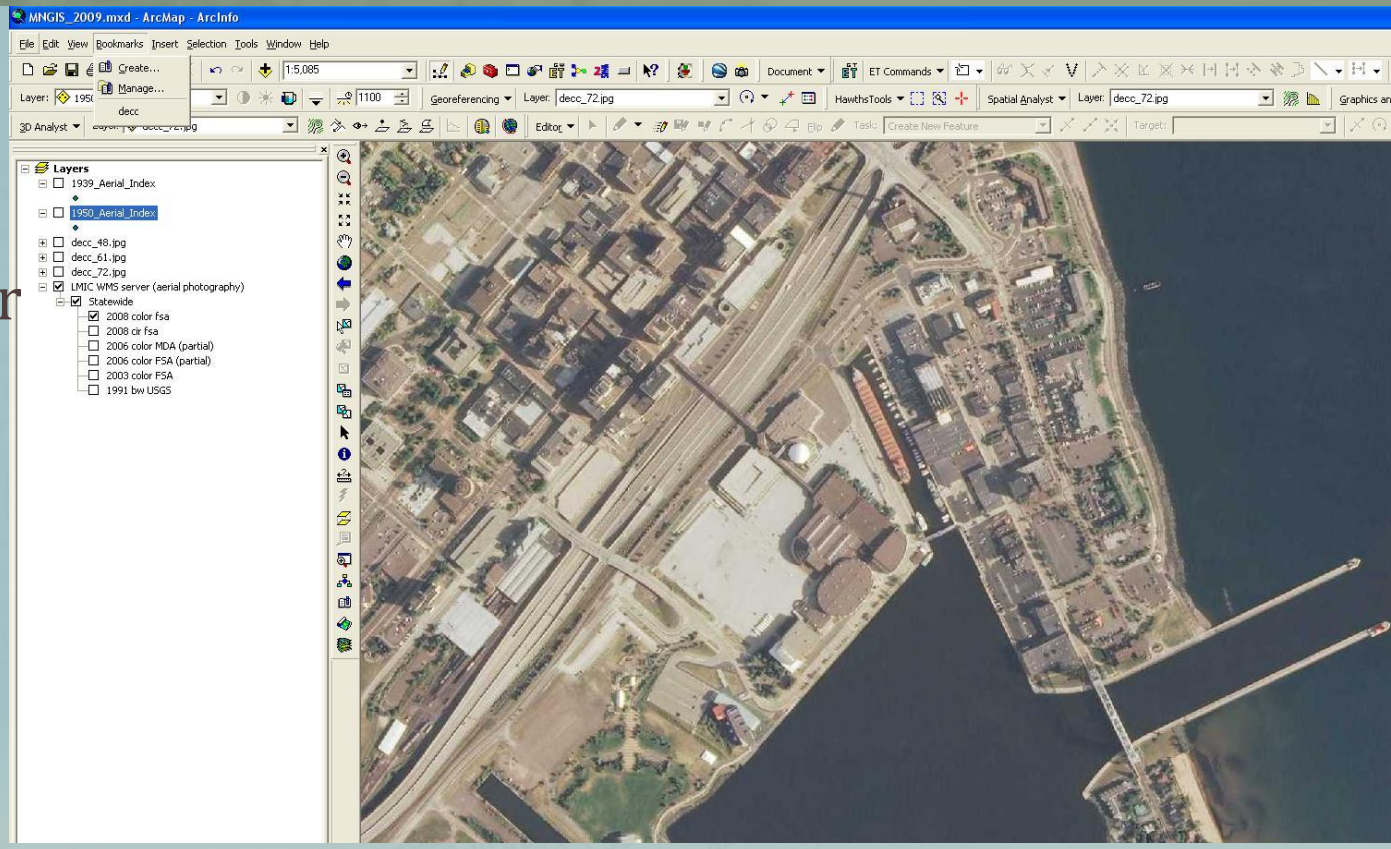
download map | how to use | credits and information

Place:

- SNA
- WPA
- Public Water Access
- Historic air photos:
  - 1930's Photo
  - 1940's Photo
  - 1950's Photo
  - 1960's Photo
  - 1970's Photo
  - 1980's Photo
- Coastal Zone Management photos:
  - 2002 Oblique Photos
  - 2007 Oblique Photos
- Overlay layers:
  - Public Land Survey
  - Lake/River
  - Streams
  - Roads
  - Municipal Boundary

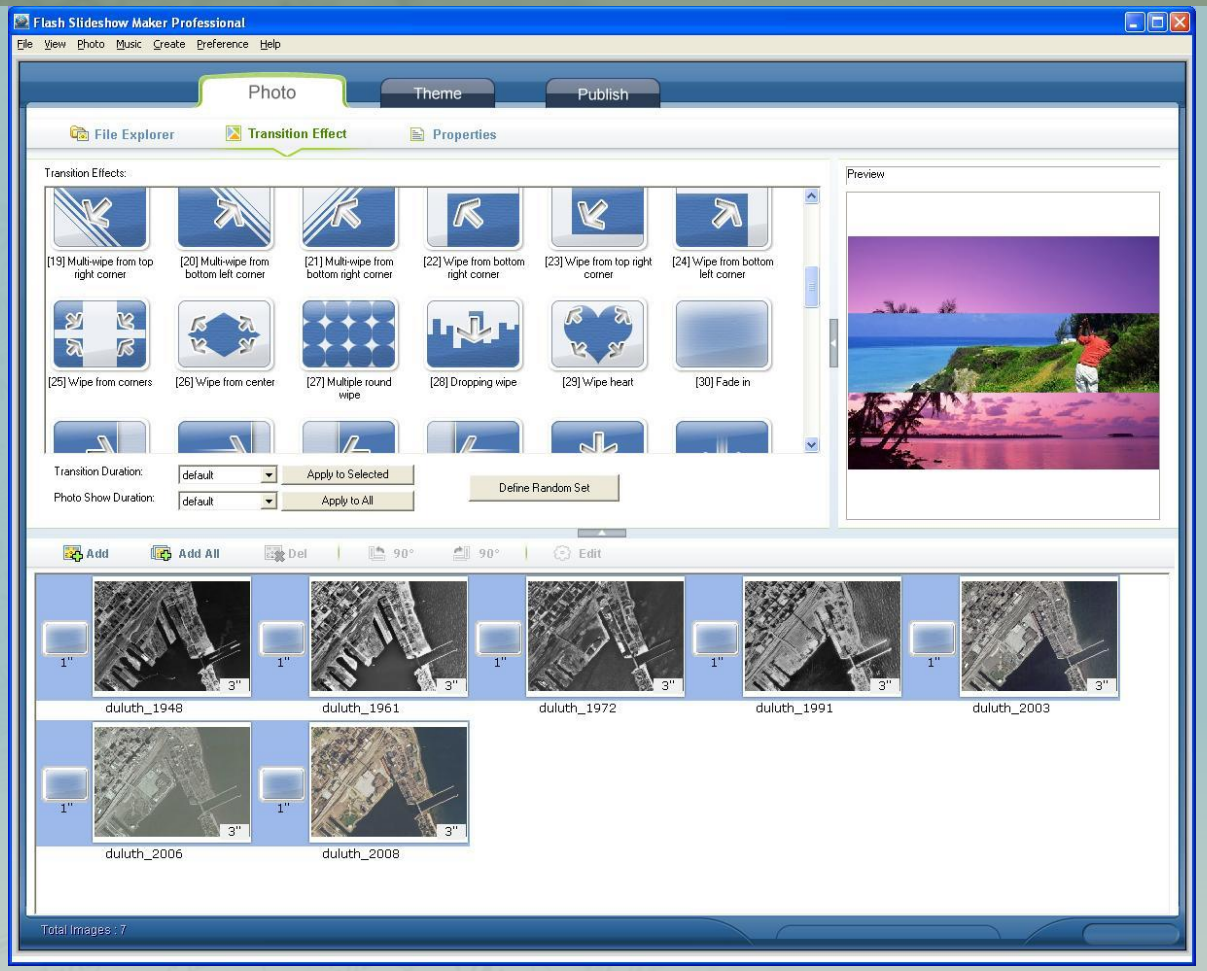
HISTORICAL AERIAL PHOTO SLIDESHOWS

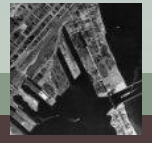
- ArcGIS
- WMS →
- Add WMS Server
- Landview
- GeoReference
- Export Map
  - File
  - Export Map
  - Save As: JPG
  - Resolution: 300
  - Background: Black
- Export for each year



HISTORICAL AERIAL PHOTO SLIDESHOWS

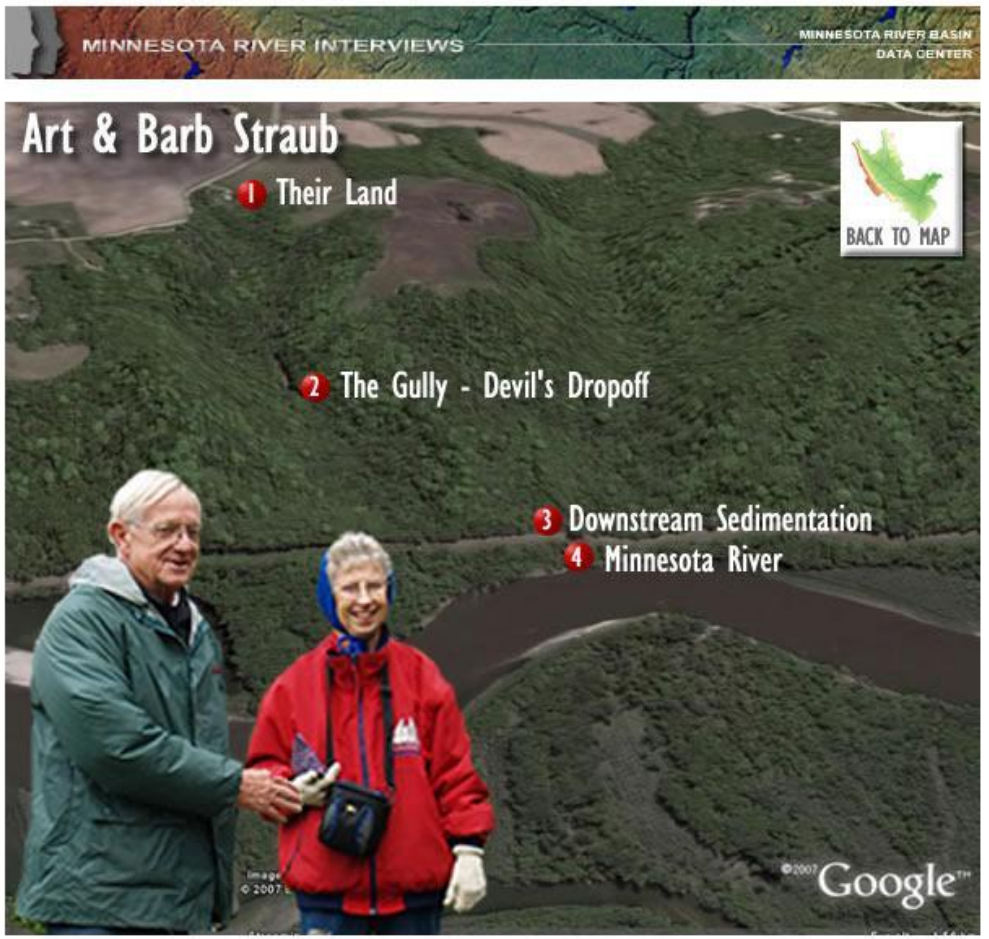
- Flash Slideshow Maker Professional
- Add Photos
- Add Transition
- Adjust Transition and Photo Show Duration
- Choose Theme
- Customize Theme Properties
- Build All
- Publish – SWF, XML, and HTML





INNOVATIVE MEDIA INTEGRATION

- Interviews
- Google Earth Flyovers
- 360 Degree Panoramas
- Historical Photo Animations
- KMZ Files for use in Google Earth



http://mrbdc.mnsu.edu/mnbasin/interactive/interactive.html

FINAL THOUGHT

"The Minnesota River winds for 330 miles through the heart of Minnesota. It also winds through the hearts of many Minnesotans. It is clear from talking to people who live on its banks, float on its currents, embrace its history, that there is a growing awareness of the value of this remarkable resource."

John Cross, Mankato Free Press

QUESTIONS?

Thank You.

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Creating Google Earth Flyovers for viewing on the web

1. Google Earth Flyovers allow the user to experience the topography and surrounding features of an area you want to target. In our example, WRC wanted users to experience how the Minnesota River changes throughout the basin depending on land use, dams, and hydrology.
2. The most recent iteration of the Google Earth Flyovers is the use of the Google Earth Plugin for both Firefox and Internet Explorer. The Google Earth Plugin allows the user to experience the same visual 3D view of the standalone Google Earth but in an internet browser. Content is restricted to what you put on it but the user can zoom in, zoom and move anywhere on earth.
3. The process of setting up a Google Earth Flyover involves two components. The first component is the creation of the path or tour. The second component is the design and implementation of the Google Earth API (Application Programming Interface). The Google Earth API is a free service, available for any web site that is free to consumers. The Google Earth Plug-in and its JavaScript API let you embed Google Earth, a true 3D digital globe, into your web pages. Using the API you can draw markers and lines, drape images over the terrain, add 3D models, or load KML files, allowing you to build sophisticated 3D map applications.
4. It is best to upgrade to Google Earth Version 5 because of the new features.
5. Creation of Tour – We need to set up some properties for the tour to show what angle and speed you will be using for your tour. Under Tools, click on Options. Click on the Touring Tab. We want to set Camera Tilt Angle, Camera Range and Speed. The Camera Tilt Angle ranges from 0 – Straight Down View to 90 – View from the land. The Camera Range shows how much range from the path will be seen during the tour. For close up views, choose a smaller range and for large views, choose a higher number. The Speed will determine how fast the tour is flown. For longer paths, choose a faster speed and for more detailed paths, choose a slower speed. Our defaults were Angle = 60, Range = 2500 meters, and Speed = 925. Click OK to save the options.
6. Within Google Earth, use the Add Path Feature from the button on top of the page. A window will open up but leave the window open and move it to the side. Using the mouse, click to start your route and then click to continue the path. A smoother path will allow the movement to be smoother since GE follows the path lines. When the path is completed, double click and then enter a name for the path in the open window. Click OK. The path gets placed in the PLACES window on the left.

7. Click on the path to highlight the path and then click the button right below it that looks like three dots with lines connecting them and an arrow on upper right. This will play your path. Allow the path to completely run. As it runs you should see a bar in the lower left show the timeline. Once the path has completed, click the far right button on the timeline bar that looks like a floppy disk. This will save your path as a tour.

8. Tours can also be done by using the Record Tour button on the top. This will allow the user to create a tour by navigating within the window and allow for

different angles and speeds. Press the record button to start recording and then navigate. Press the record button again to stop. Your tour will replay. If you are satisfied with the tour, click on the floppy disk to save the tour.

9. The tour will now also be placed in the PLACES window on the left. You can replay this recorded tour over and over. We want to save this tour for use in the Google Earth Plugin. Right click on the Tour you created and choose Save Place As. Name the file accordingly and choose the KMZ file extension. Google Earth and Google Earth Plugin use KML and KMZ files to display spatial data in them.

10. For the Google Earth Plugin, you will need access to a webserver to place the html files and kmz files on them. The basic setup involves just the html file holding the code to run the main webpage and the kmz file.
11. You will need to sign up for a Google Earth API at the following location to use the plugin ***http://code.google.com/apis/earth/*** . You will need to know where you will be storing your html and kmz file. They ask for the location when you sign up for the API. Signing up a key for *http://yourdomain.com* is usually the best practice, as it will work for all subdomains and directories. Once you have signed up for the API, they will send you a key to enter in the code on the site.
12. At the same site above, there is a link for the KML Tour Playback. You can use this code for your site or contact me directly for the code from our site. The only change I made to the html file is the link to the KMZ file we created, which would look like this.
    var href = 'http://mrbdc.mnsu.edu/interactive/KMZ/mankato2stpeter.kmz';
13. The end users will need to install the plugin but this is a onetime install and does not take very long or too many resources.
14. Other external KMZ files can be inserted into the code for extra layers. In our example, the USGS monitoring stations are available from the view if a user wants to access that data, as well as popup windows to our other interactive 360 degree panoramas and historical animations.
15. Any questions, please contact me. Rick Moore, GIS Specialist, Water Resources Center, Minnesota State University, Mankato, 56003. (507) 398-3267 or richard.moore@mnsu.edu

Creating Historical Slideshows for viewing on the web

1. Within ArcGIS, you can export the image in the screen through File → Export Map function. Aerial Photography from 1991 to 2008 can be accessed online through LMIC's WMS service. This allows use of aerial photography to be accessed from their server and not need to be housed locally on your computer. Information can be found at http://www.lmic.state.mn.us/chouse/wms/wms_image_server_description.html .
2. For earlier historical photos, the MN DNR has a online mapping program that you can download the photos at http://www.dnr.state.mn.us/maps/landview.html
3. Within ArcGIS, you will need to import the downloaded photos and georeference them to their correct spatial location using the Georeferencing Toolbar. Using know road intersections or landmarks as common points between the two photos will give the best product.
4. Once all the photos have been Georeferenced and the 1991-2008 photos are linked through WMS, you can set the view that you want to export from ArcGIS. What is seen in the window is what will be exported to a JPEG. You can resize your ArcGIS program but having it maximized allows for a 720 x 480 slideshow.
5. You should bookmark this extent by choosing BookMarks → Create (9.3 version). This will allow you to go back to this extent in the future if you add more historical photos or need to add a new year to it. IT IS IMPORTANT TO KEEP THE SAME EXTENT ON ALL PHOTOS FOR THE CERTAIN SITE SO THAT THE CHANGES IN YEARS CAN BE SEEN IN THEIR CORRECT SPATIAL LOCATION AND CONTEXT.
6. Under File, Choose Export Map and be sure to choose JPEG as the Save As Type. The Resolution can be set at 300 under General and choose Black as a Background Color under Format.
7. Export each year, making sure that that year is the top photo in the view. Name your photos the same except for the year of the photo such as Rush_River_1938 or Rush_River_1991. Export each year photo to the same folder.
8. This completes all the work needed in ArcGIS.
9. Download Flash Slideshow Maker Professional. The best version to work with is version 4.54 http://download.cnet.com/Flash-Slide-Show-Maker-Professional/3000-6676_4-10759248.html . **Do not update this program as this version works best for this project.**
10. Open Flash Slideshow Maker Professional
11. Add Photos under the menu Photo →Add Photos… Select all the photos that you exported in ArcGIS
12. Under the Photo Tab, choose Transition Effect. For most historical photo comparisons, you would want a Fade transition. Choose FADE IN [30] by clicking on it. You can adjust the Transition Duration and Photo Show Duration. Transition Duration is how long the transition takes to go between photos. Type in 2 or 3 next to Transition Duration. Photo Show Duration is how long the photo will be shown. Take into account the Transition time on each end of the photo. Type in 5 or 7 next to Photo Show Duration. Click Apply to All. You can see the changes in the window on the bottom.

13. The next process is to choose the THEME that will display your photos on the website. Click on the THEME tab. The Theme Preview shows how the slideshow will look. The Category is different types of views that you can choose from. It is best to start here and choose a look. Professional is shown but there are other choices under the dropdown arrow.
14. Once you have the Category chosen, you will want to choose Customize Properties. (The floating picture is a default Ken Burns Affect) Under the properties, you can adjust many different things. The basic ones we change are the Movie Size from 480,400 to 720,480. The Title should be changed also. The Ken Burns Affect should be changed to False. Once you have made changes, click BUILD ALL under the slideshow and the effects will be rebuilt and you can see your changes. Experiment with the properties to get the effect you want.
15. Once you are satisfied with your slideshow, click on the PUBLISH Tab on the top of the page. This will generate a Flash File, an HTML File, and an XML File. You can change the name of the files but it is best to have them consistent. Stay consistent with photos such as rush_river.swf, rush_river.html, and rush_river.xml following our previous example. Keep it lower case as the html code will be easier to change knowing that everything is lowercase.
16. All the files get save in a folder called output and can usually be found under My Documents\Flash Slideshow Maker Professional\output\. There will be a folder in there that is name from the names you gave the files. In our case, it would be rush_river.
17. Once the file has been published, choose Open Output folder. You can view the Flash Slide Show by clicking the html file that is within the folder that opens up.
18. Within the XML file, the different photos and thumbnails of the photos are referenced in code. You can make adjustments within this code as well such as the phototime (Photo Show Duration) and the names of the pictures as they show on the slideshow under TITLE. It is also possible to remove the last slide referencing the slideshow program.
19. The HTML file contains the code necessary for it to be a webpage within your website. You can change the name of the title within this code as well as remove or change code you do not want. The SWF file is needed as the program that runs the slideshow.
20. When using the slideshow on the web, you will need to copy all the files within this folder into your website. The different files reference photos, thumbnails and other files that are contained in this folder.
21. You can save the settings and setup for the current Flash Slideshow for editing at a later time by choosing File → Save in the Flash Slideshow program and then saving it to your documents folder.

Questions: Email or Call
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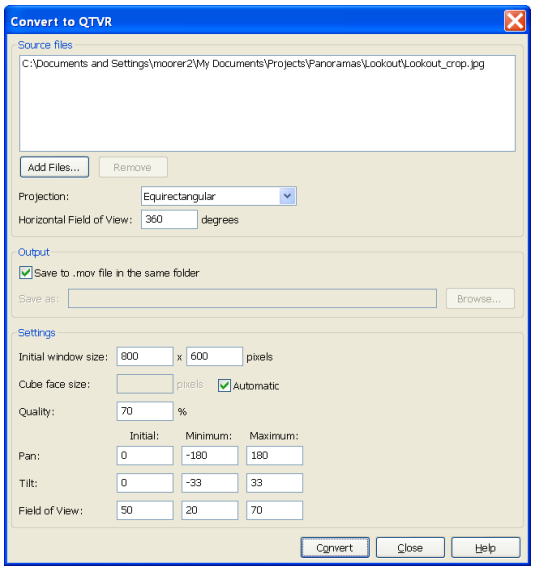
Creating 360 degree panoramics for viewing on the web

1. Using your camera, take 10-12 pictures using a level tripod and overlapping your images about 20%
2. 

3. Once you have gone around the tripod 360 degrees, tilt your camera up at an angle that overlaps the horizontal pictures. Take 10-12 pictures around the tripod. Repeat for tilting the camera downwards and take 10-12 pictures.
4. Return to your computer and download the pictures to a specific folder.
5. Open Photoshop – *(If you don't own Photoshop, www.autostitch.net is software that can accomplish the same functions as Photoshop but only for one level of pictures. It produces the stitched photo with some tweaks to the settings, most notably the pixel width (I use 10,000). Most cameras currently have 8 – 10 megapixels. A value of 10,000 will produce a high resolution image that can be resized after stitching.)*
6. Under File, choose Automate, then Photomerge.
7. Choose Auto for Layout. Under Source Files, choose Files for USE and then click Browse. Select all photos that need to be merged. It is best to have one folder that contains only the images that you have taken for the 360.
8. Click OK
9. Photoshop will now go through each photograph and find overlapping areas of the images so that it can find similar features.
10. At this point the photo is merged. Save a copy of this image as an original
11. When the merge is completed, the photo will need to be cropped. The top and bottom should be as far as the images will show content. The left and right areas need to be cropped so that they fall on the same line thus creating a seamless 360. Finding a similar landmark on the right and left and then cropping on that will help.
12. Once the image is cropped, save it with a different name so the original is not changed.
13. For the mov file, the image needs to be around 2 or 3 mb, the original image is most likely around 16 mb. To make the image smaller, go under IMAGE in photoshop, choose IMAGE SIZE and then adjust the width to about 1/4 of the original width. Play around with this value to get the right size file. Without Photoshop, right click on the picture, choose Open With… and the Microsoft Office Picture Manager. On the top toolbar, choose Edit Picture, then Resize. Reduce pixels down to about 3000 – 5000 pixels.
14. Open PTGUI (www.ptgui.com). This program will need to be installed the first time from the listed website. PTGUI will be a trial version but the Convert To QTVR does not have any limitations.
15. Under TOOLS, choose CONVERT TO QTVR

16. 

17. Choose Add Files and browse to the cropped image. Choose OK. Adjust the Tilt and Field of View. The values in the picture above show what I use for the panorama that has the horizontal pictures and a set of pictures up and down from horizontal. The tilt will need to be played with to remove black areas on top and bottom. This correlates to your camera tilt up and down. A larger camera tilt, the larger the number. For one set of just horizontal pictures, it is usually about 23, a horizontal and one tilt up, can range from 23 to 45 or so. The field of view is where the mov. starts. The maximum should be about twice what your maximum tilt is. The minimum should be how far you want your audience to zoom in. The picture may get grainy if it is too low. The initial is somewhere in between so they can tilt left and right and up and down. The Initial for Pan and Tilt can be set to start the picture on a certain point. Experiment with settings.
18. Click CONVERT. If there is a message about the file being too large, go back to photoshop and reduce the image a little more until Convert works.
19. Click on CLOSE after the conversion has been completed.
20. Use the following html code for your site. Change the .mov files to reflect the names of yours. Also you will need to move the .mov file into the same folder as your html file.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<title>360 Degree Panoramas</title>
</head>
<body>
<p>To navigate through the following 360 Degree Panoramics, do the following:</p>
<ul><li>Click and hold down the mouse button to &amp;quot;grab&amp;quot; the image. Then slide the  mouse left or right, up or down to move the image. </li>
 <li>Another way to move the image is to bring your cursor to either edge of the  picture. The hand will change to an arrow. Click and hold down the mouse button  to move the image. </li>
 <li>To zoom in, use the Shift key. To zoom out, use the Control key. (On  Macintoshes using earlier versions of the QuickTime Software, the 'option' key  zooms in and the 'control' key zooms out.) </li>
</ul>
<p><b>Confluence of Blue Earth River and Minnesota River - Sibley Park - May 2008</b></p>
<p></p>
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To view the <a href="http://www.apple.com/quicktime/technologies/qtvr/"> QuickTime VR </a> image, click and hold down your mouse button and drag your cursor left or right to view the entire picture.
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