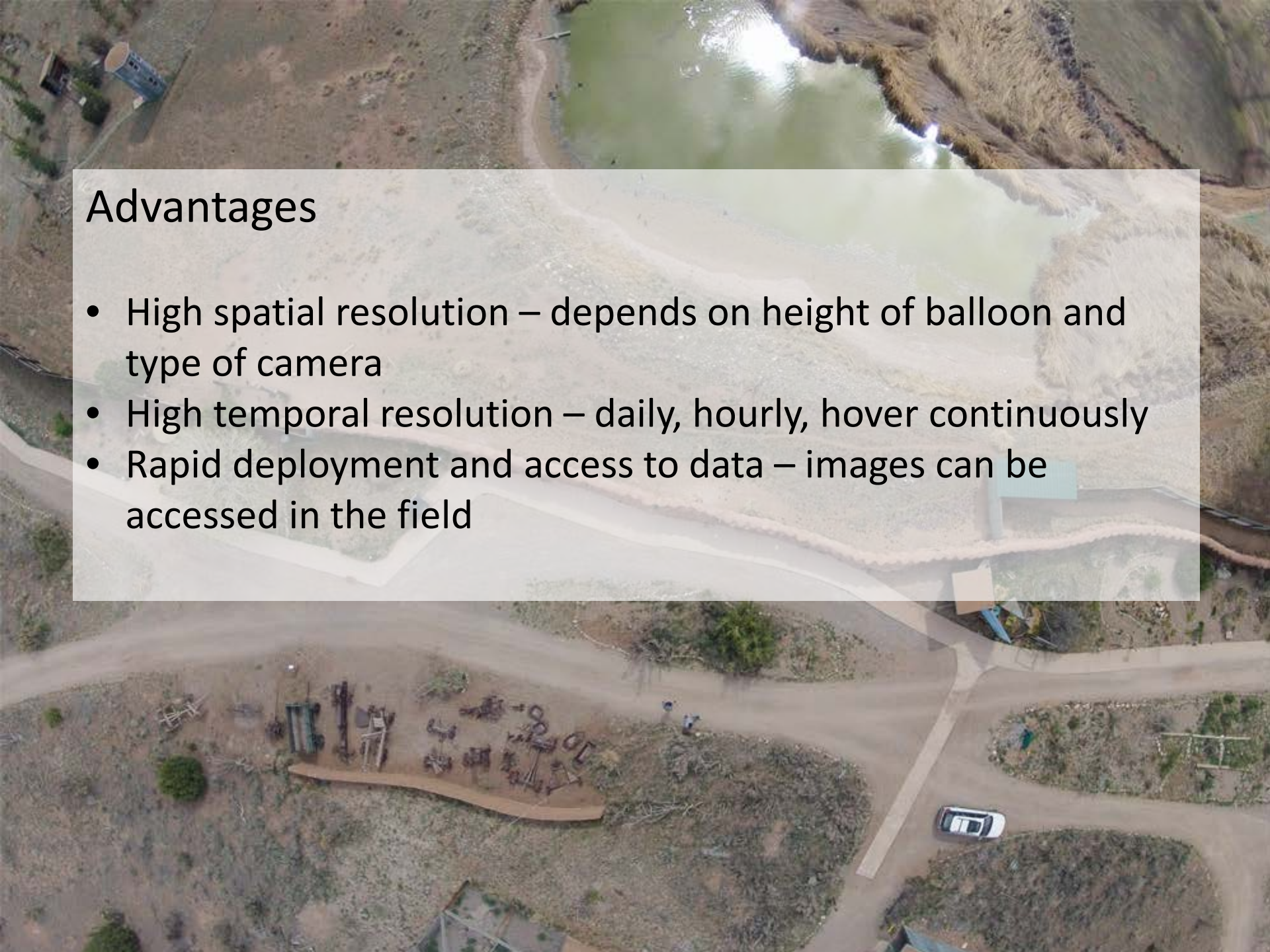
Balloon Mapping

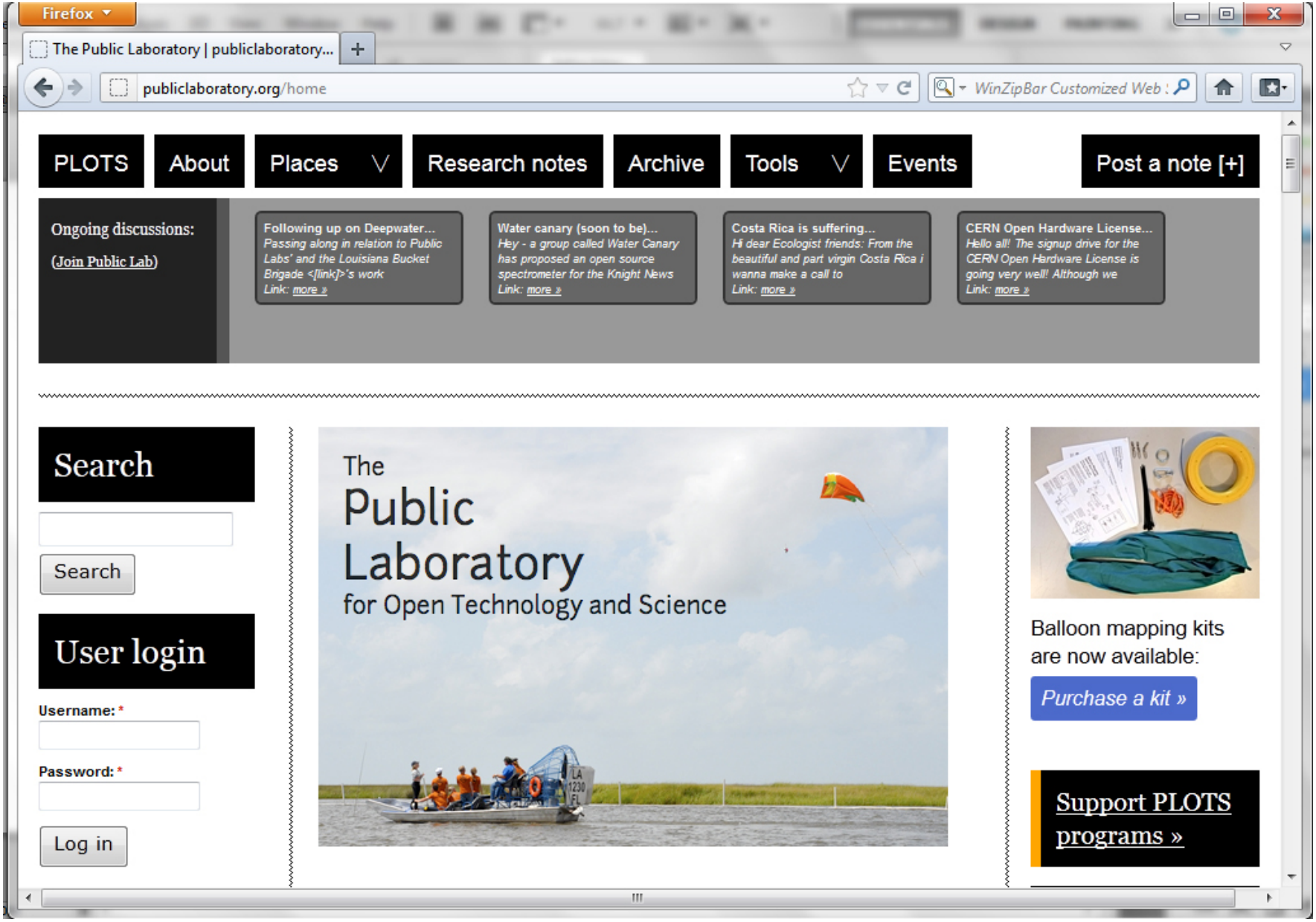
by Larry Heard



Advantages

- High spatial resolution – depends on height of balloon and type of camera
- High temporal resolution – daily, hourly, hover continuously
- Rapid deployment and access to data – images can be accessed in the field

Publiclaboratory.org 2010 - present



Grassrootsmapping.org

Thousands of images created by the public of the Gulf Coast

New images and ideas on a wide range of topics are shared daily.

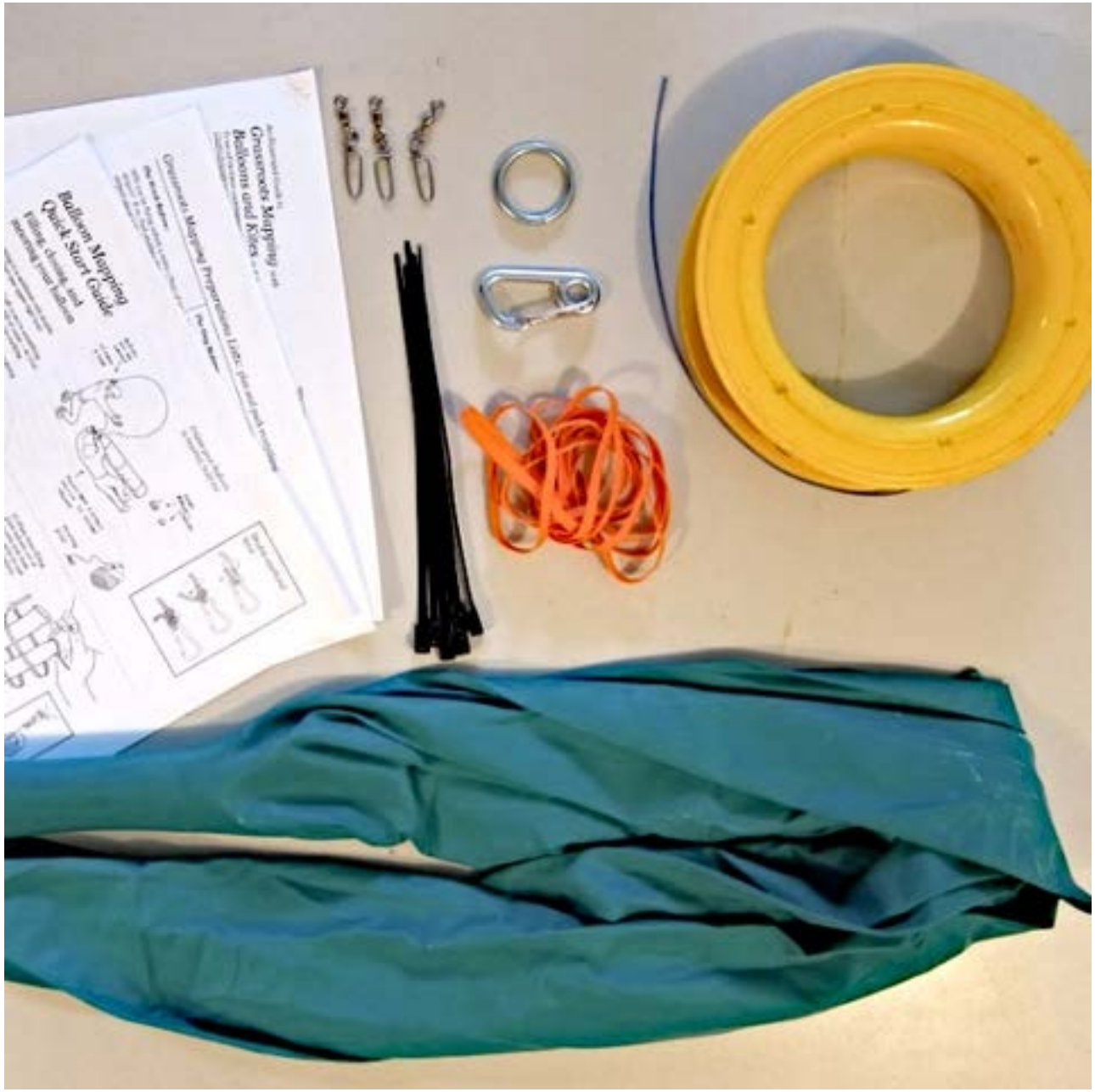
Mississippi River levee flood damage, April 7, 2012

Tutorials, Software and Mapping Kits

Make an infrared camera:

NDVI example:

Paul purchased the Balloon Mapping Kit



Balloon Mapping Kit

- A 5.5 foot (170cm) reusable balloon made of a latex/chloroprene (neoprene) mix
- 1000 feet (305m) of 110lb test (55 kilo) Dacron line, pre-wound on an 8" hoop winder
- Protective **rubberized cotton gloves** for handling the line. Thin line can cause burns to unprotected hands.
- Three high-strength swivel clips
- 10 rubber bands for making a camera cradle
- 10 **reversible** zip ties for closing the balloon
- One 1" ring for attaching the balloon to the line
- Instructions

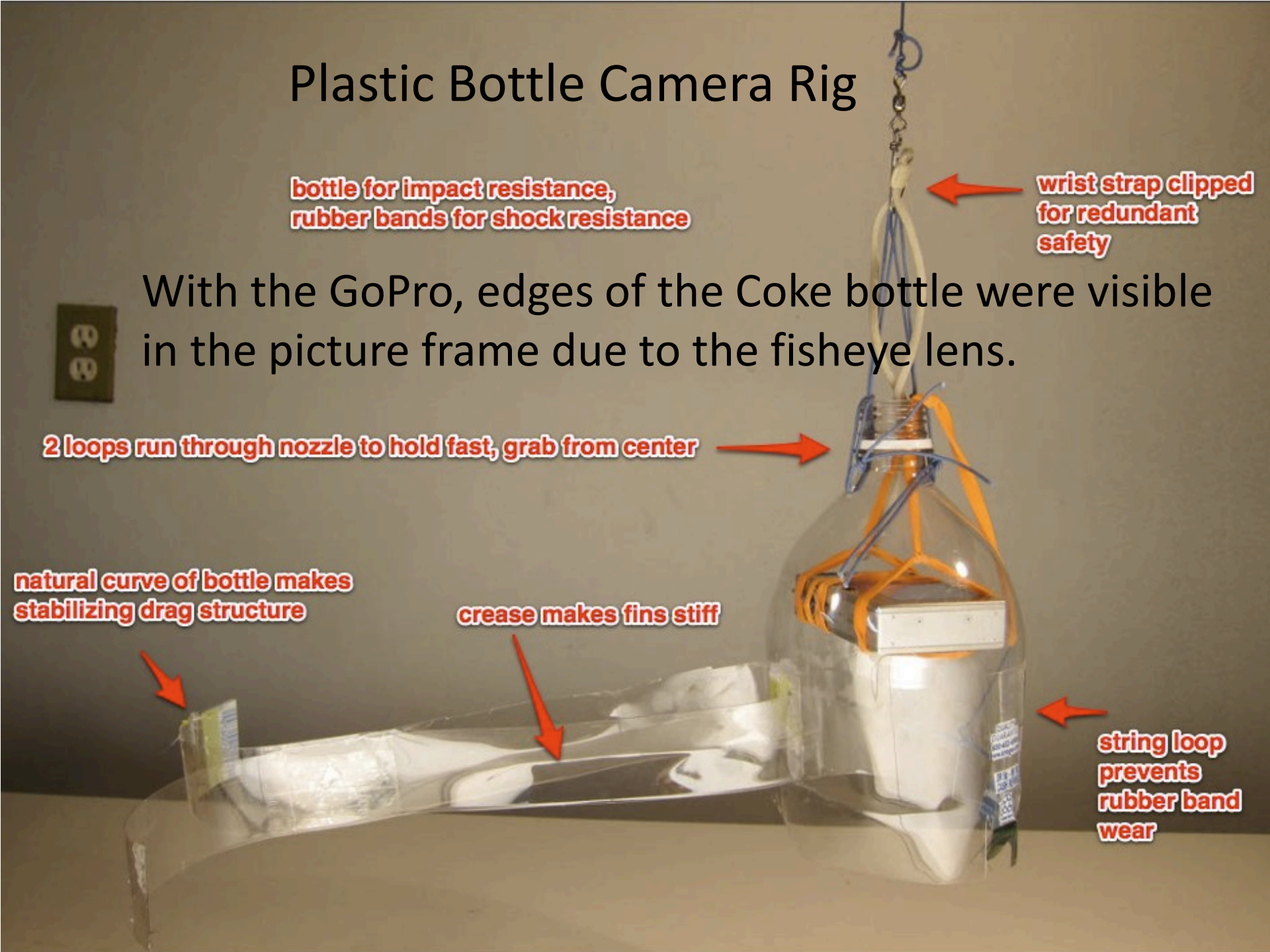
Cameras

- Continuous shooting mode
- Cannon Powershot – most popular
- GoPro Hero - action sports camera

Available camera modifications

- Cannon Powershot modified for near infrared
- Program for customizing the continuous mode option

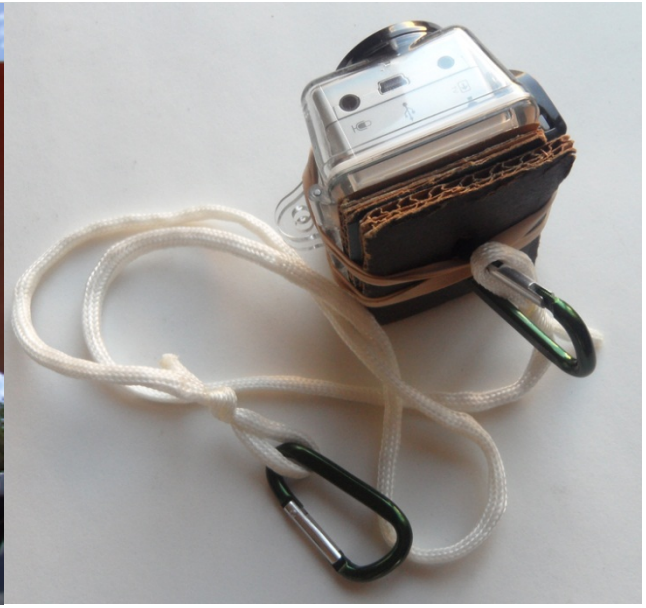
Plastic Bottle Camera Rig



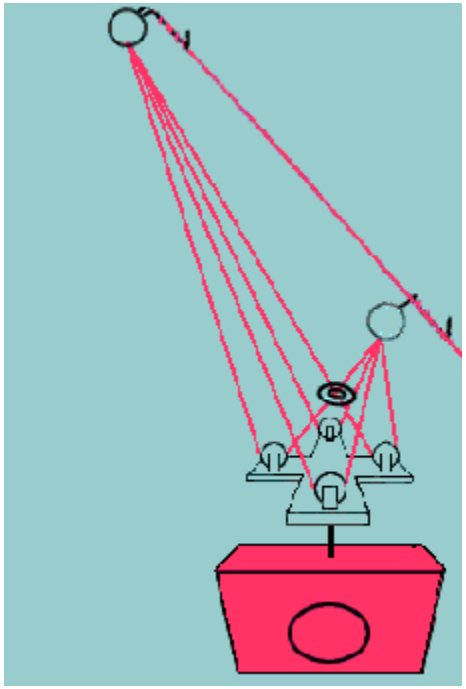
Camera Rigs

My GoPro camera rig

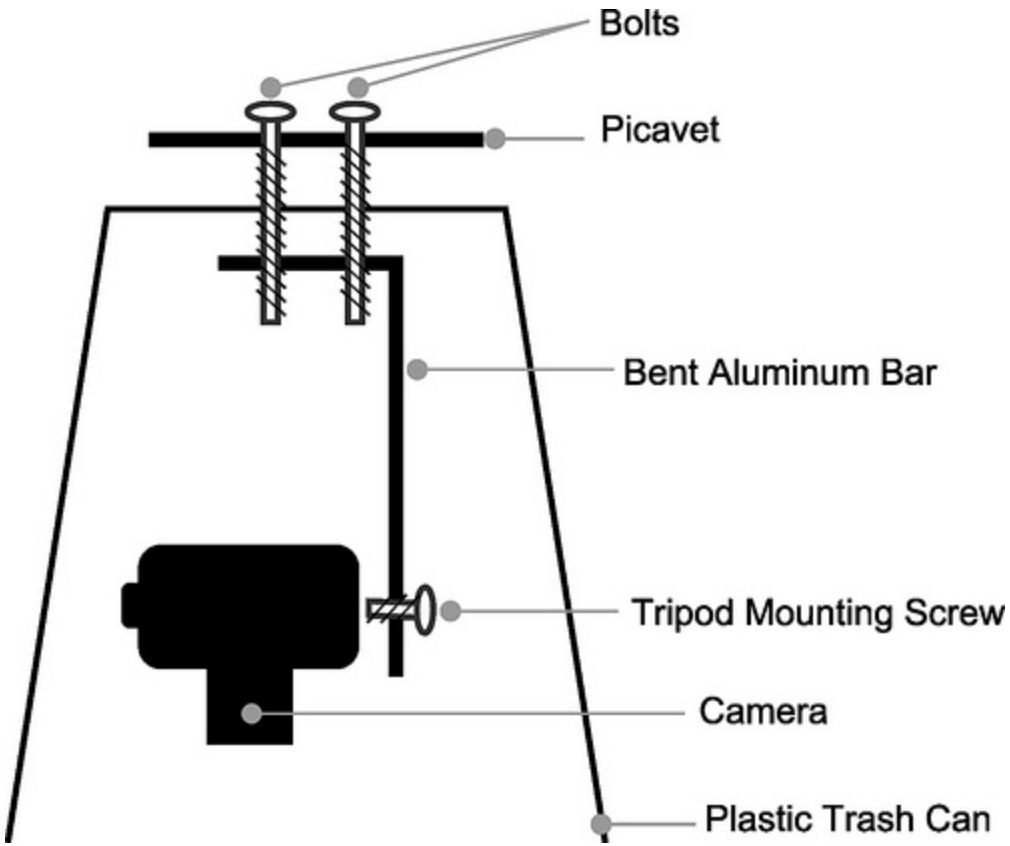
- 2 1.5 inch carabiner style keychain clips
- Nylon String
- The GoPro camera waterproof housing
- 2 pieces of cardboard to level the camera housing
- 2 rubber bands



Picavet Camera Rig – for camera stability



Picavet Camera Rig – for large or multiple cameras



Balloon Alternatives

Balloons

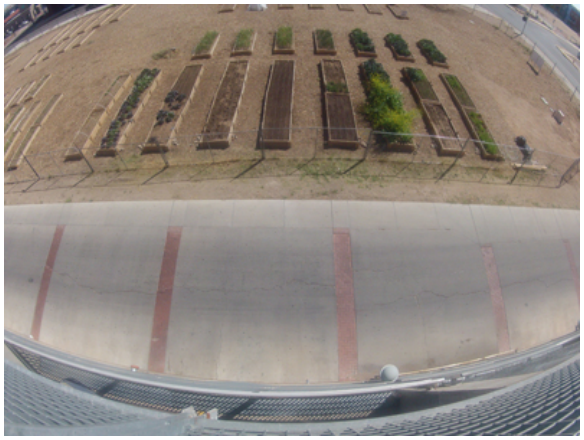
- Weather balloon
- Party balloons
- Emergency mylar sleeping bags
- Trash bags taped together

Lifting Gas

- Helium – large heavy tank, expensive
- Hot Air - hair dryer and mylar bags?

GoPro Hero 2 2.5 mm fisheye lens

- Challenges in dealing with distortion
- GoPro field of view = 170 degrees (180 degrees would make a circular image)
- Advantages in ground coverage and dealing with movement in the air



No correction

Photoshop Custom Correction

PTL Lens

First Launch at Wildlife West near Edgewood, NM

Wildlife West Nature Park

- Home
- About Wildlife West
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  - New Animal Announcment
  - Golden Eagle
  - Crested Caracaras
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Sustainable Design

WILDLIFE WEST IS DEDICATED TO SUSTAINABLE DESIGN AND construction practices. Unlike many conventional zoos, we have made a concerted effort to minimize our disturbance of the ecosystem to the maximum extent possible, preferring to seek harmony between our designs and the environment in which they are placed. Wildlife West has a certain advantage to this; since all our captive species are native to the Southwest, they are generally already well-adapted to the environment in which they

Wildlife West Nature Park

- Environmental education
- Rescued native wildlife – pronghorn, wolves, bear, bobcat . . .
- Community activities
- The NM Youth Conservation Corps build structures, maintain the facility and provide tours
- Sustainable site design
- Diverse landscape - trees, buildings, objects, animals

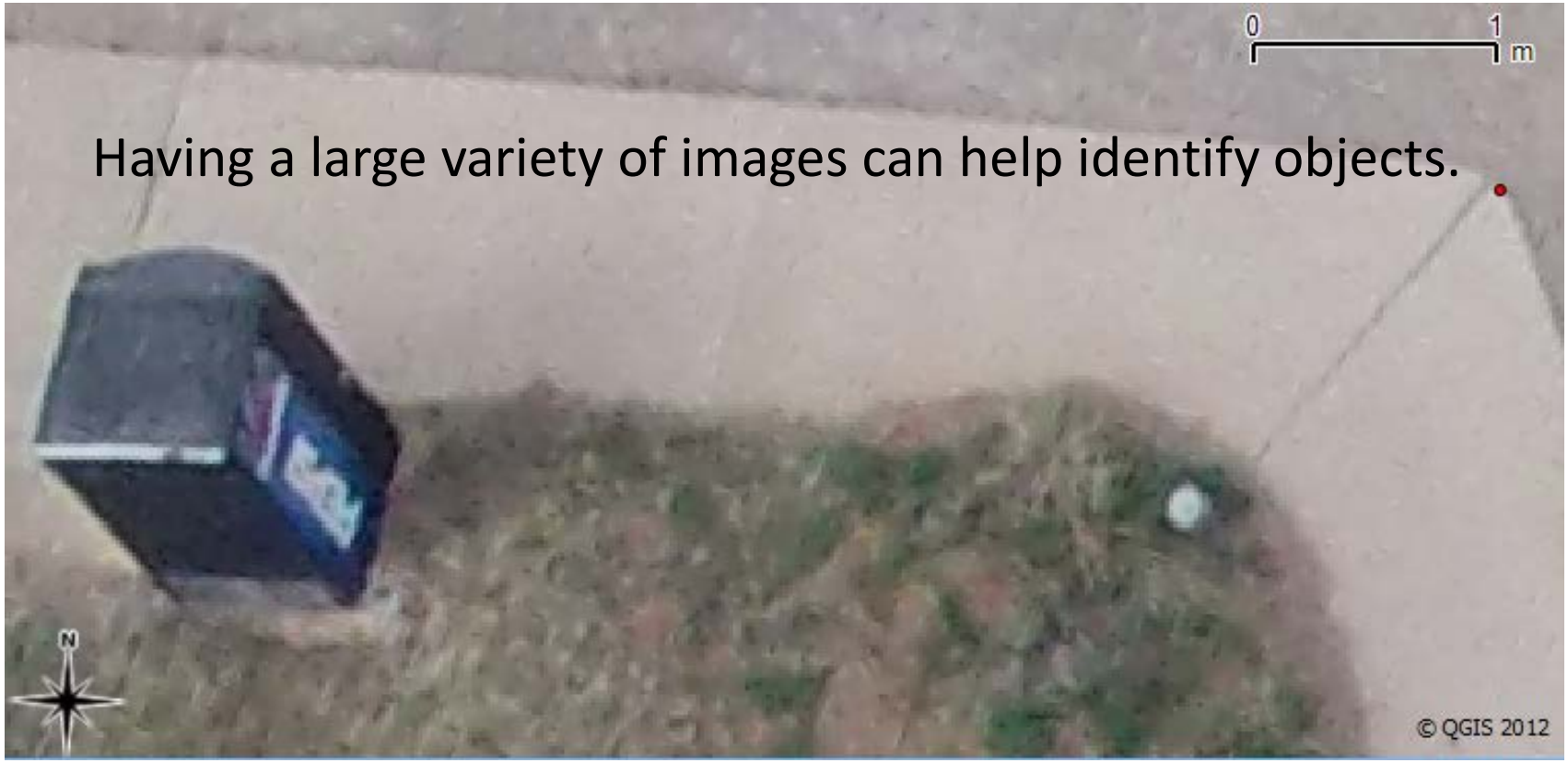
Launch Day

- Windy, partly cloudy
- The camera bounced and twisted more than anticipated
- First launch 3-4 ft. diameter balloon – little control of height and position, balloon drifted out more than up
- Second launch 5 ft. diameter – significantly stronger lift

Photo Processing

- Over 1000 images - need to develop process for sorting and organizing images
- Deleted images with sky visible or extreme blurring
- Color balance shifting occurred in some images

Spatial Resolution



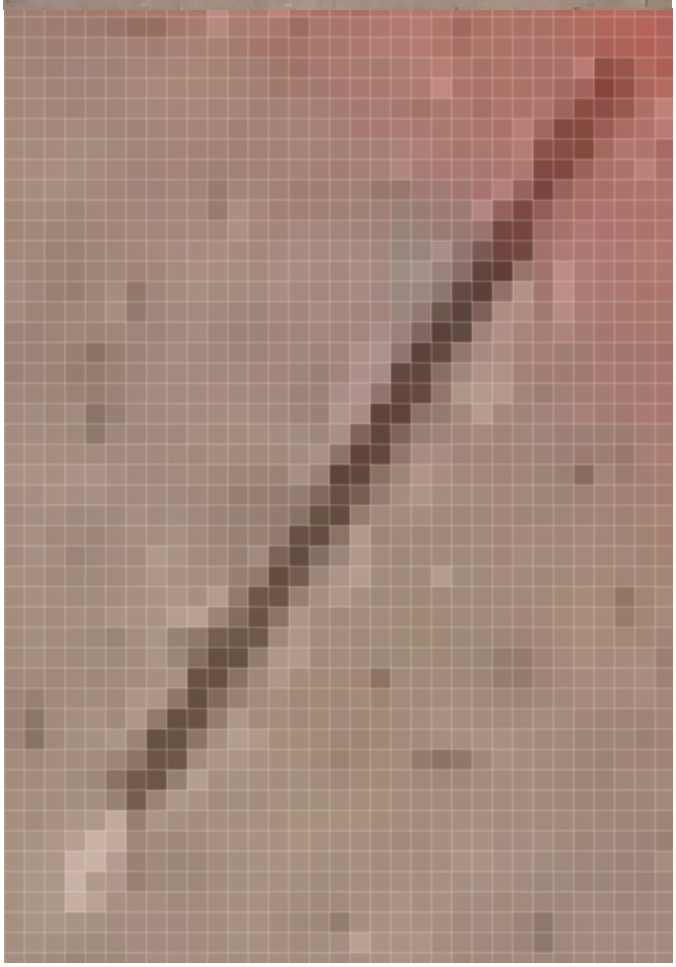
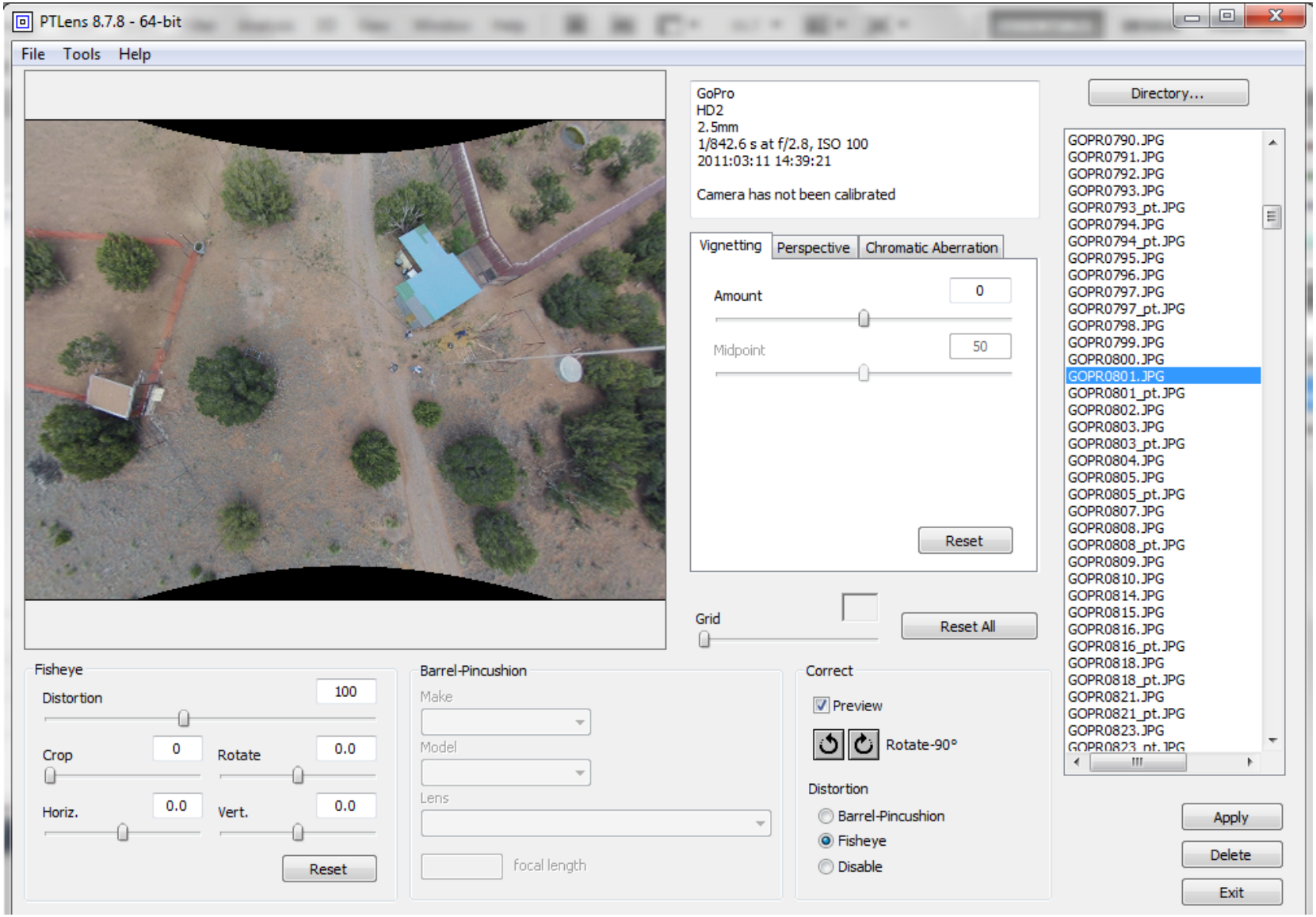
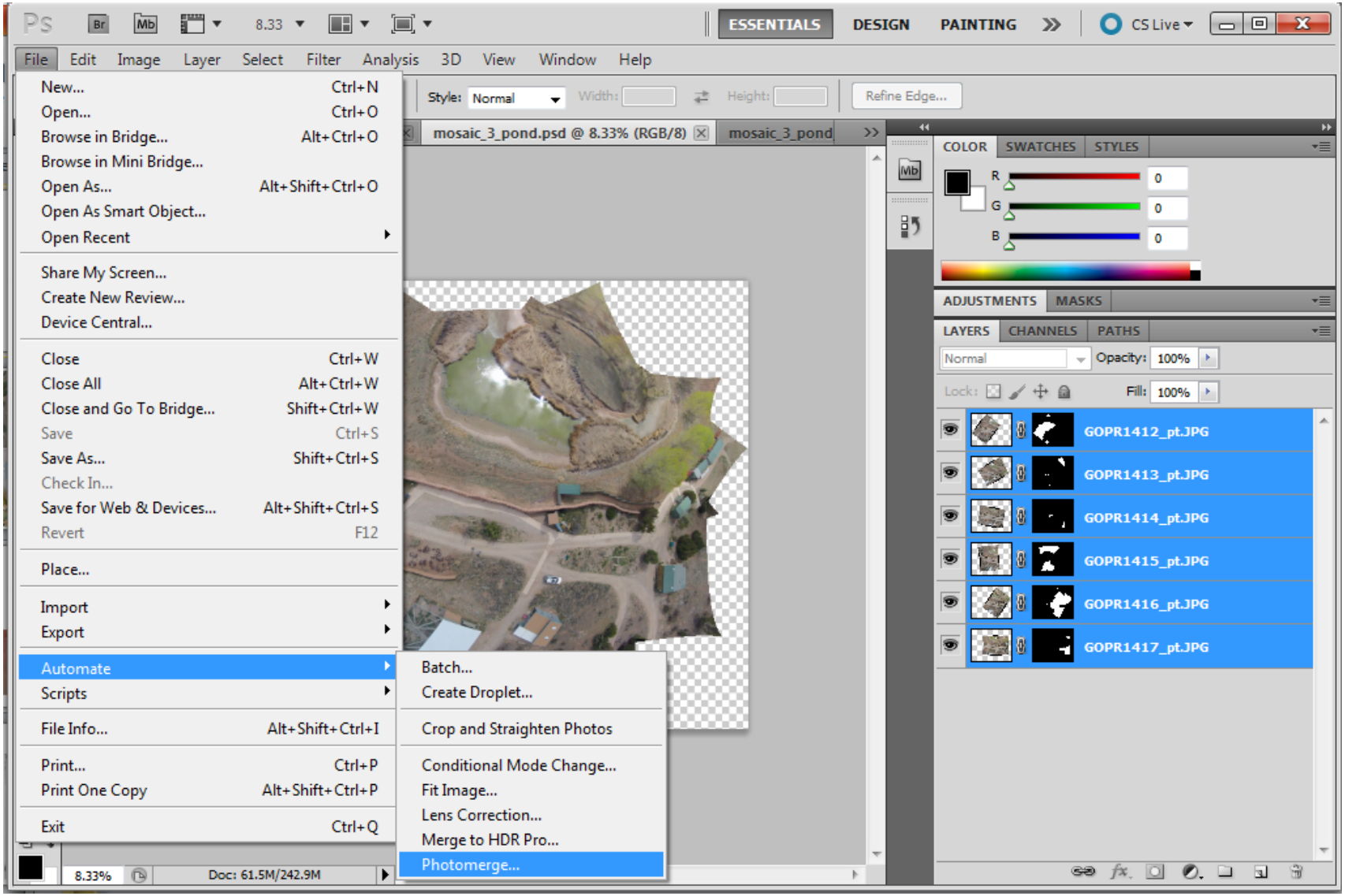


Photo Processing

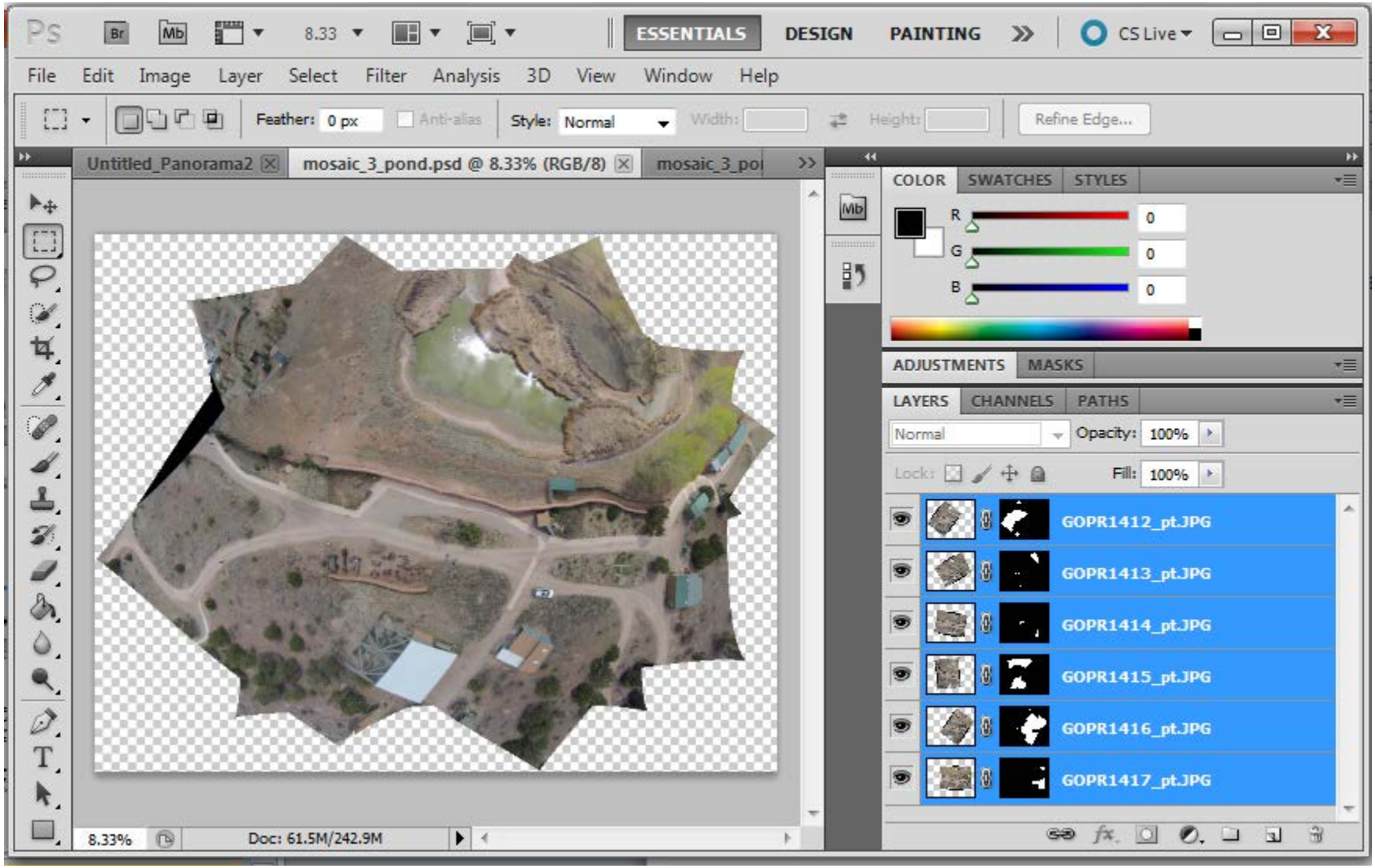
1. Fisheye lens correction using PTL Lens



2. Photographs were stitched together in Adobe Photoshop

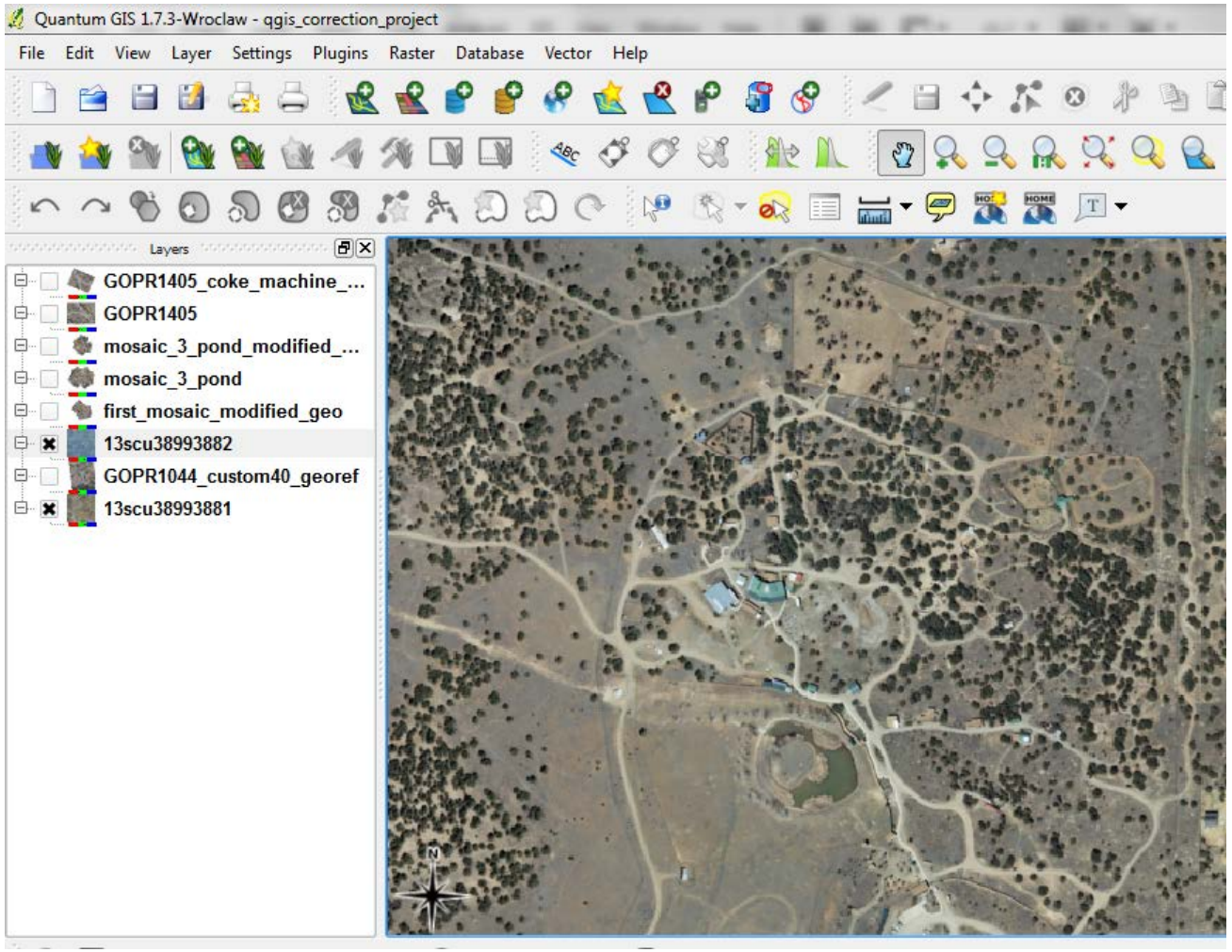


6 pictures merged in Photoshop

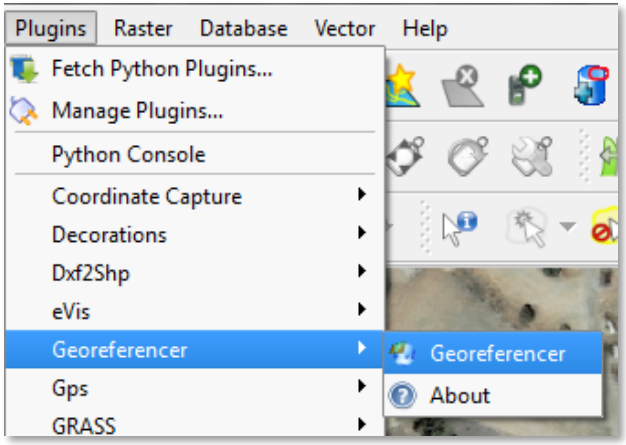


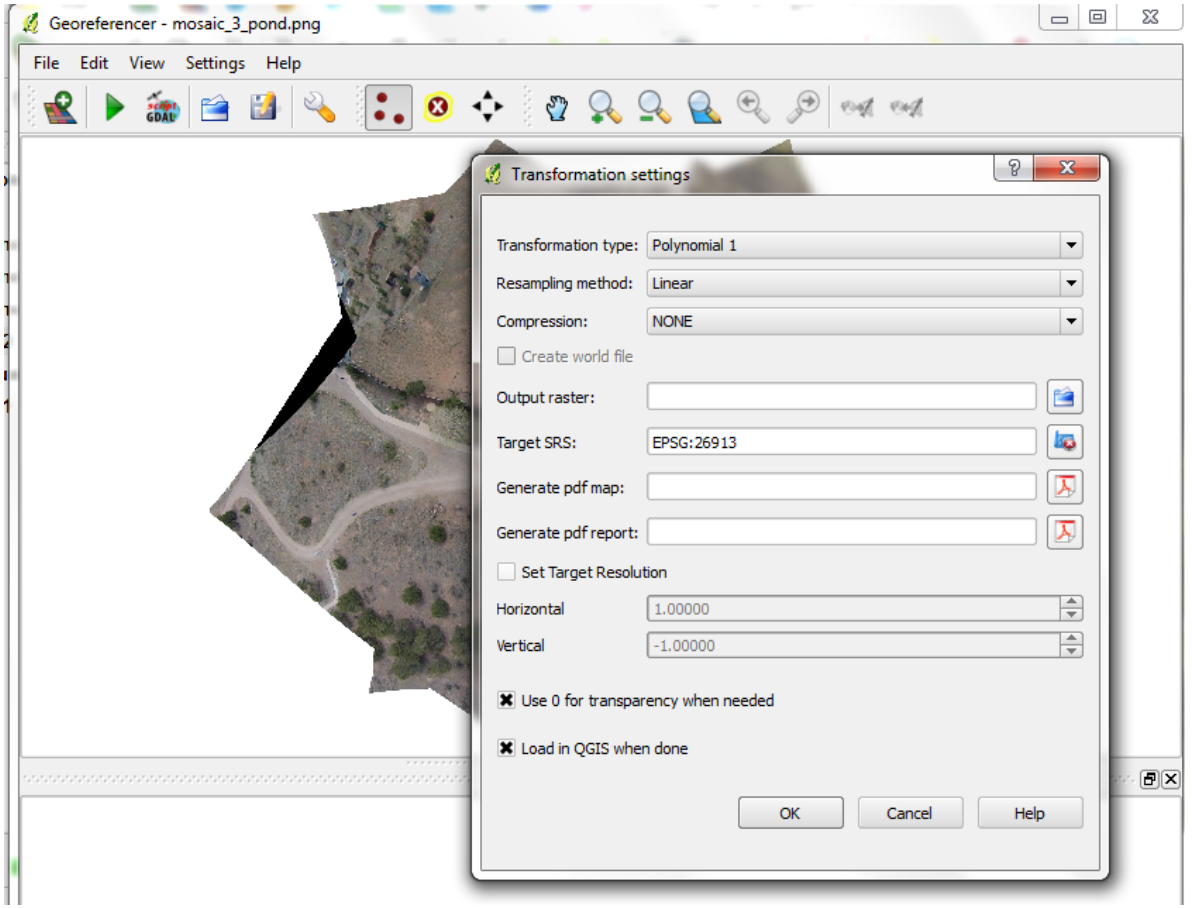
3. Quantum GIS was used to georeference the mosaic

- Obtained high resolution orthoimagery of the area from the USGS website

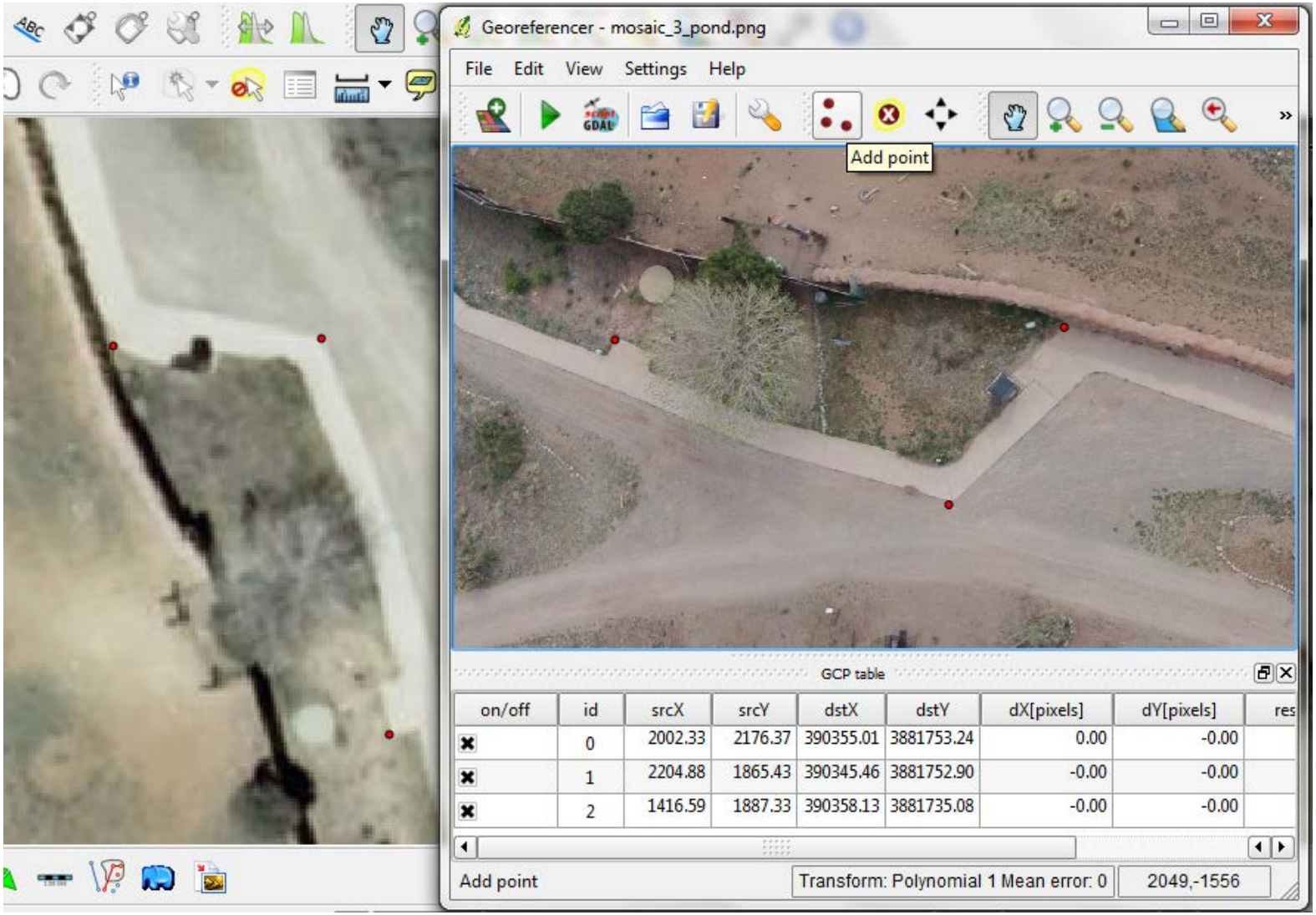


Georeference plugin in Quantum GIS





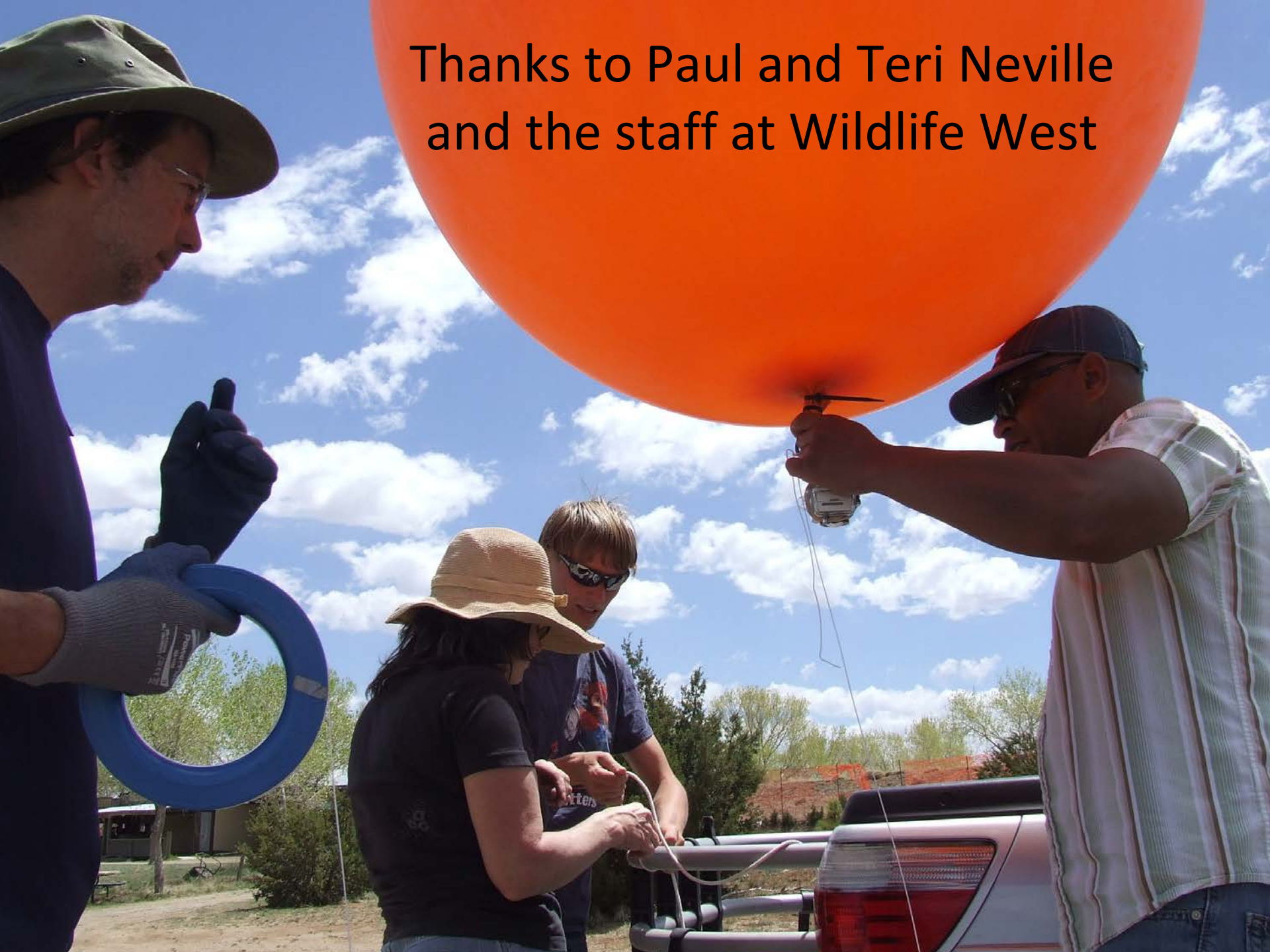
I selected 3 or 4 control points to locate, rotate and size (approximate scale) the image.



April 22, 2012

March 2010

This mosaic was geocorrected in Quantum GIS without lens correction in PTL Lens.


Thanks to Paul and Teri Neville
and the staff at Wildlife West


Questions