Grand Canyon Monitoring and Research Center

USGS
Biological Resources

2002 Orthophoto and LIDAR Collection

2002 – Proposed Collection

USGS

Methods

- Aerial LIDAR collection
- Digital orthorectified imagery (CIR or Multispectral)
- LIDAR used to orthorectify the scanned images
- No ground control needed for orthorectification process

Products

- Continuous imagery and topography from Lake Powell to Mead
- Imagery (18-24 cm pixel resolution/half to 2 m accuracy)
- **ONE** meter LIDAR post spacing (15 cm positional accuracy)
- **500 Meter** swath (expanded in areas where needed to include "Old High Water Zone")

The collected data will be used for:

- Monitoring terrestrial, fine-grained sediment movement and storage (e.g., sand bars and river terraces)
- Monitoring terrestrial, coarse-grained, sediment changes (e.g., cobble bars and debris fans)
- Mapping terrestrial vegetation types throughout the corridor
- Characterizing and monitoring terrestrial vegetation habitats for birds and insects
- Monitoring the quality of camping beaches

In addition, the data sets will be evaluated for:

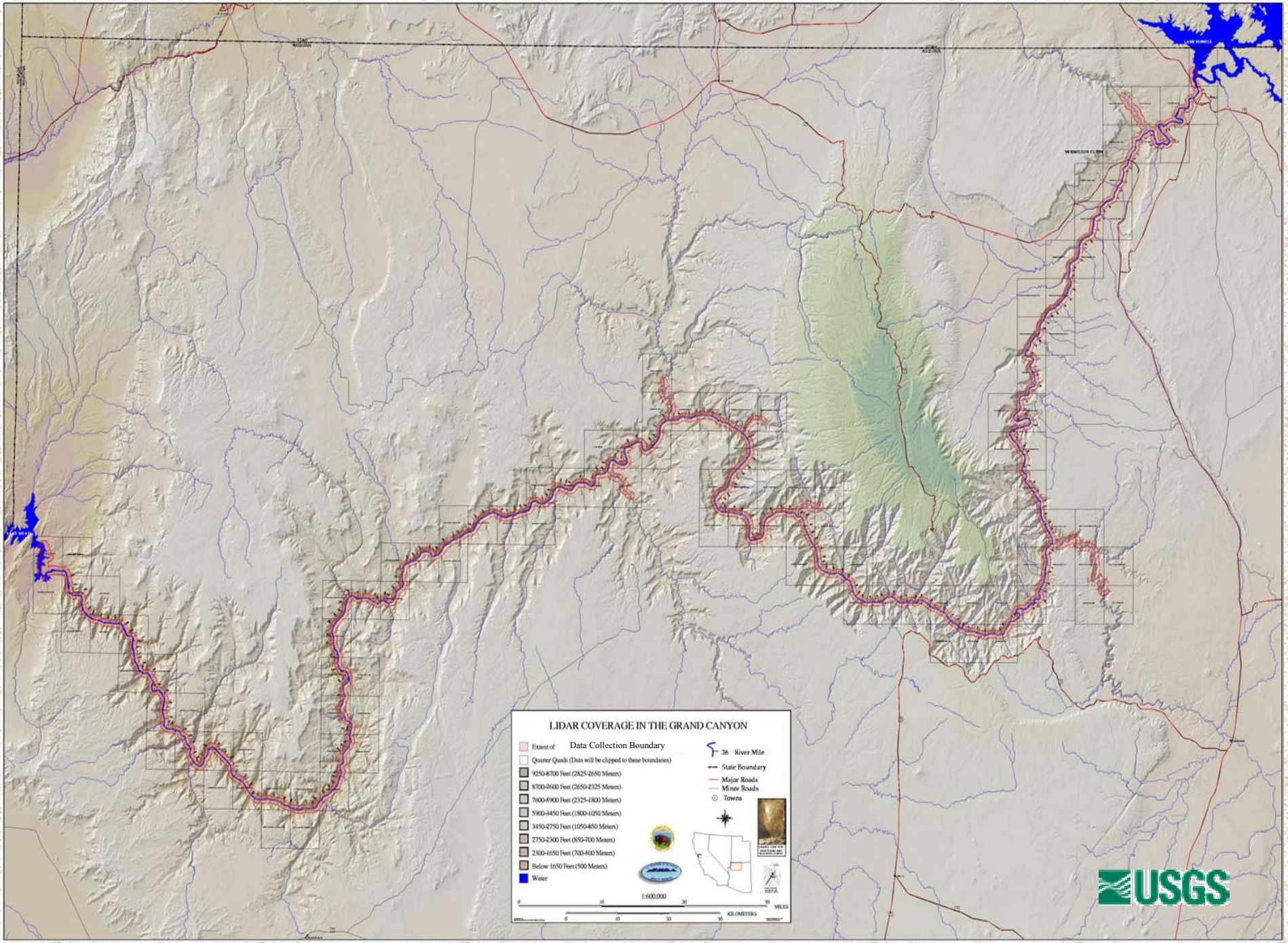
- Monitoring aquatic flux and storage of sediment within the main channel

- Mapping/monitoring aquatic food base and selected water quality parameters

- Monitoring the effects of runoff and dam releases on archaeological structures

Project	Data set required	Estimated periodicity
Monitoring terrestrial, fine-grained sediment movement and storage	LIDAR and black and white or color infrared orthophotography	Bi-annual
Monitoring terrestrial, coarse-grained, sediment changes	Black and white or color infrared orthophotography	Annually
Mapping terrestrial vegetation types throughout the corridor	Color infrared orthophotography	Every five years for system-wide, annually for selected areas
Characterizing and monitoring terrestrial vegetation habitats for birds and insects	Color infrared orthophotography	Every five years for system-wide, annually for selected areas

Project	Data set required	Estimated periodicity
Monitoring the quality of camping beaches	Black and white or color infrared orthophotography	Annually
Potentially monitoring aquatic flux and storage of sediment within the main channel	Black and white or color infrared orthophotography	Bi-annually
Mapping/monitoring aquatic food base and selected water quality parameters	Color infrared orthophotography	Annually
Potentially monitoring the effects of runoff and dam releases on archaeological structures	Black and white or color infrared stereo photography	Annually


LIDAR COVERAGE IN THE GRAND CANYON
Extent of Data Collection Boundary
Quarter Quads (Data will be clipped to these boundaries)
9250-8700 Feet (2825-2650 Meters)
8700-7600 Feet (2650-2325 Meters)
7600-6900 Feet (2325-1800 Meters)
5900-4450 Feet (1800-1050 Meters)
3450-2750 Feet (1050-850 Meters)
2750-2300 Feet (850-700 Meters)
2300-1650 Feet (700-500 Meters)
Below 1650 Feet (500 Meters)
Water
36 River Mile
State Boundary
Major Roads
Minor Roads
Towns
1:600,000
0 10 20 30 MILES
0 10 20 30 KILOMETERS
USGS

Proposed Steady Flows from GCD

The BOR, WAPA, and the GCMRC have agreed upon the following flow scenario during the data collection:

1. Six days of steady 8,000 CFS flow beginning at midnight on Friday, May 24th.

2. If additional time is needed, the 6 initial days will be followed immediately by 4 additional days of steady 8,000 CFS flows from May 31st – June 3rd.

3. Representatives of the GCMRC, WAPA, BOR, and the remote sensing contractor will conference every day after Tuesday, May 28th regarding the progress of the overflight and whether or not additional days of steady flows will be needed.

NOTE: Additional time is needed for shadow abatement and possible weather and/or mechanic difficulties.

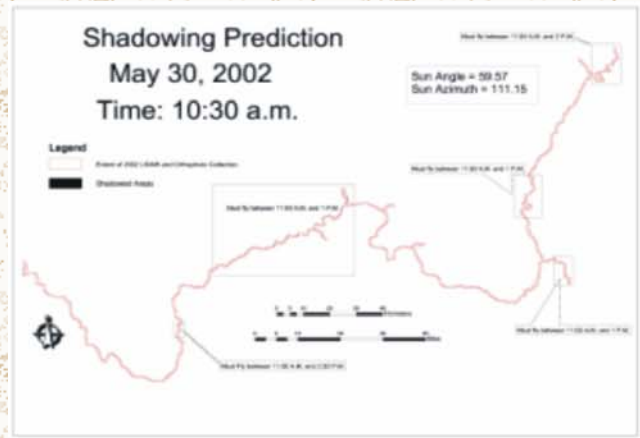
SHADOWING ABATEMENT

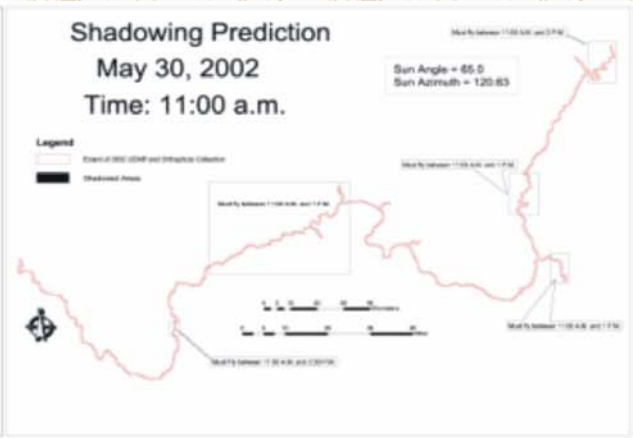
Shadowing in the river corridor has been a major limitation of airborne data collection in the past.

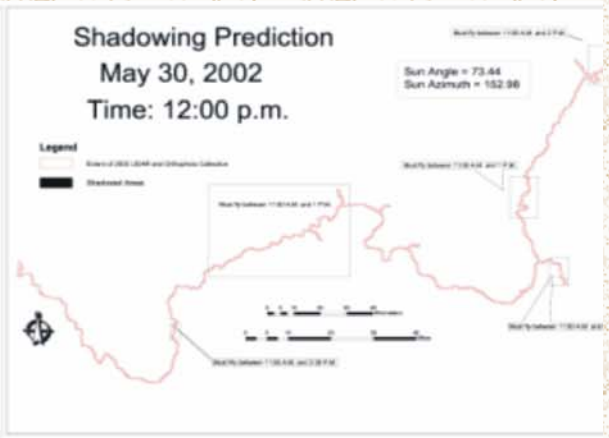
To minimize shadowing (and increase the value of airborne data collections) the following has been implemented this year:

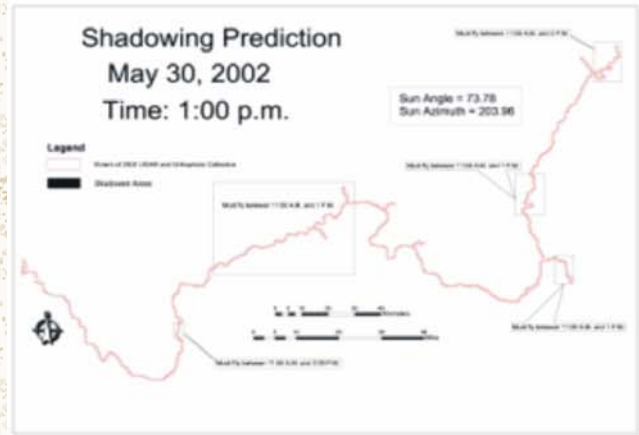
1. Switch flight from Labor Day to Memorial day to ensure a higher sun angle (closer the solstice).
2. Limiting data collections to times when the sun angle is 65 degrees or greater.
3. Shadowing Analysis to identify problematic areas.
4. Ensure remote sensing contractors fly at pre-determined times to minimize shadowing in problematic areas.

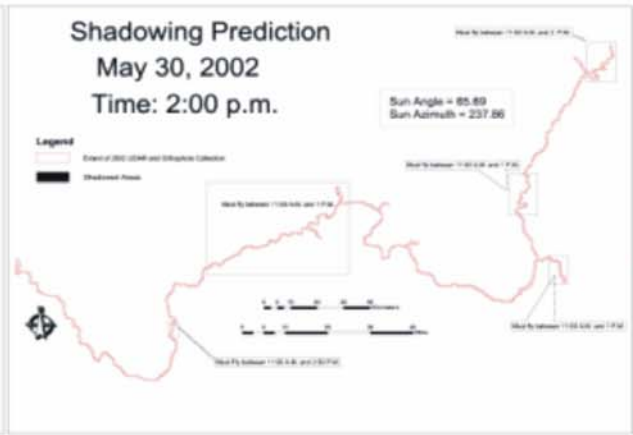
Shadowing Prediction Analysis

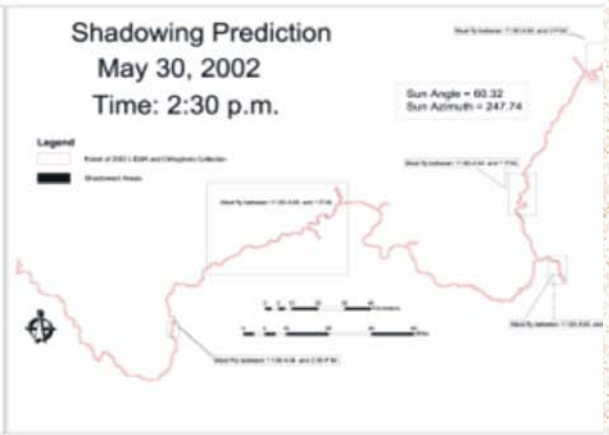




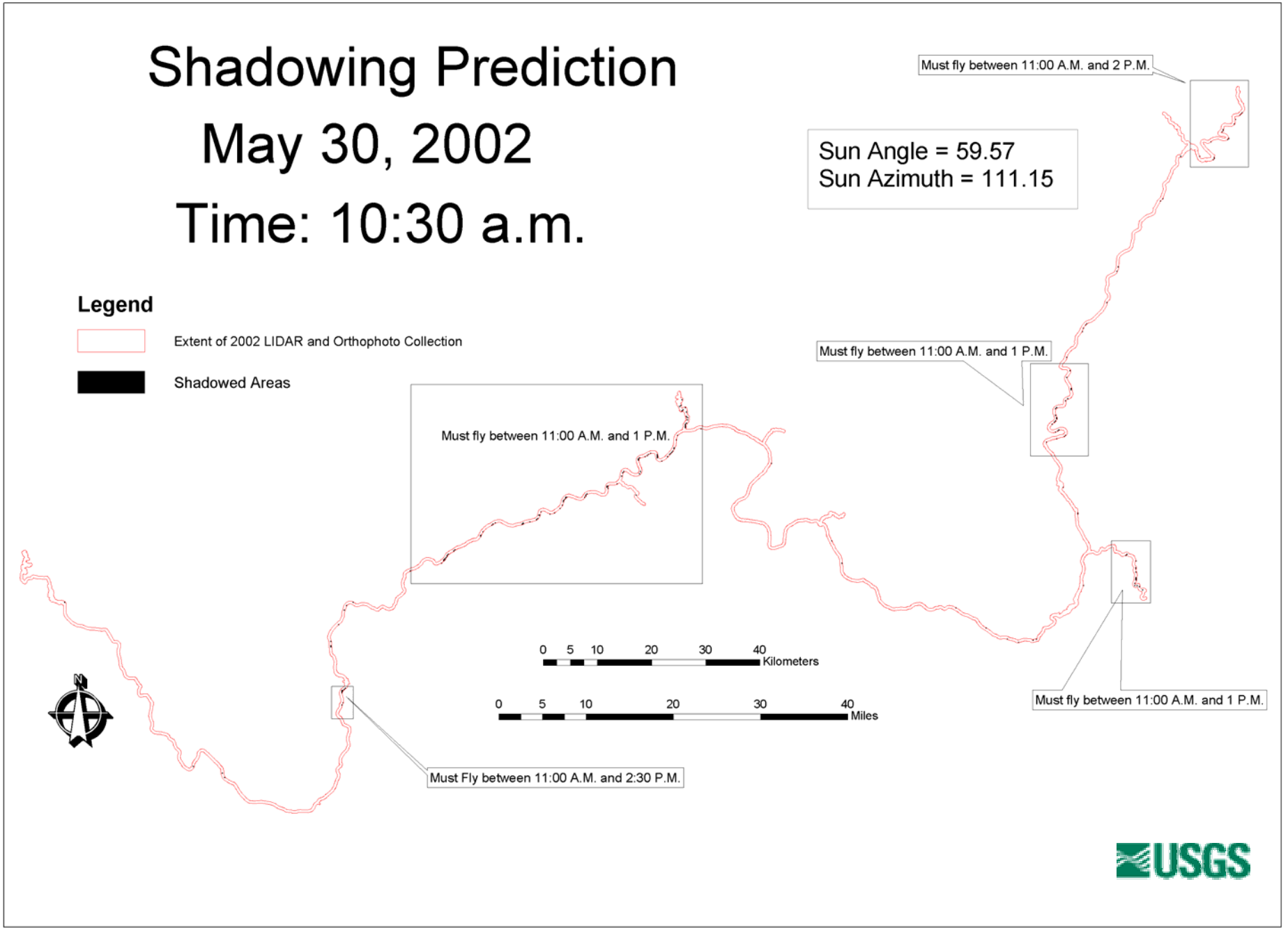




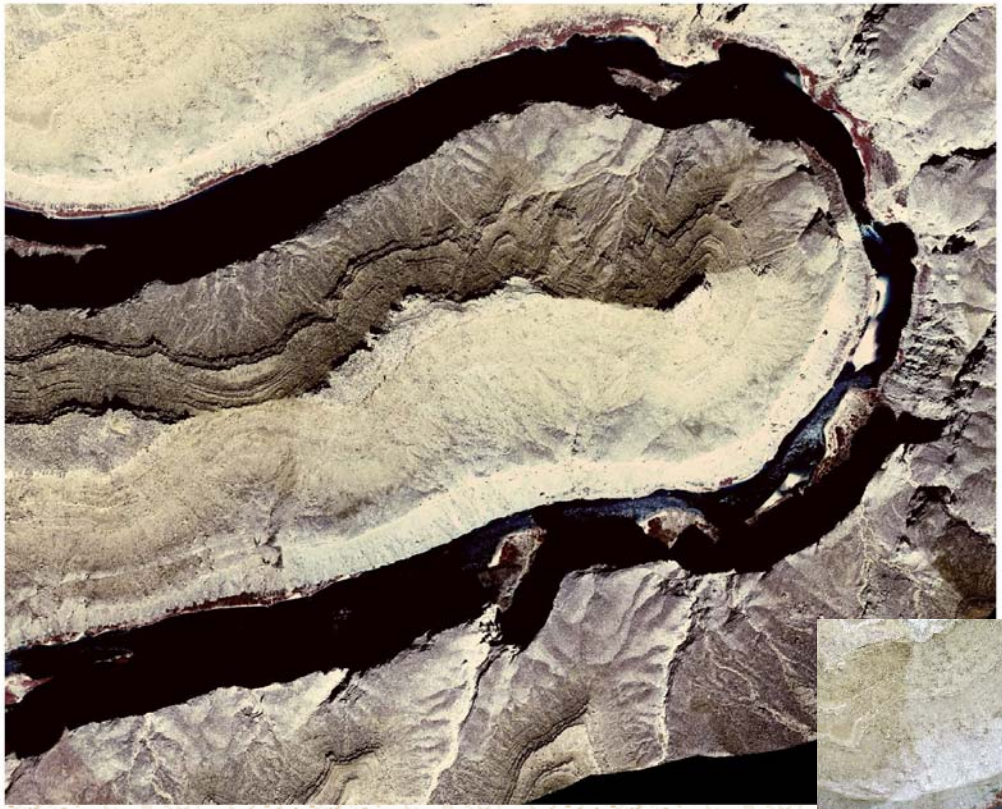




Shadowing Analysis was preformed to determine problematic areas (shown by boxes on map).



Special limits are placed upon contractors within problematic areas



Before Shadow Abatement

After Shadow Abatement