



Penn State MGIS

Summer 2024

Cynthia Valen

Advisor: Patrick Kennelly



A Case Study: Using
Geographic
Information Systems
to investigate an
incident from the
Vietnam Conflict.

Presentation Outline

- Introduction
- Study Area
- Methodology
- Hypothesis
- Results
- Project Challenges
- Discussion



Introduction

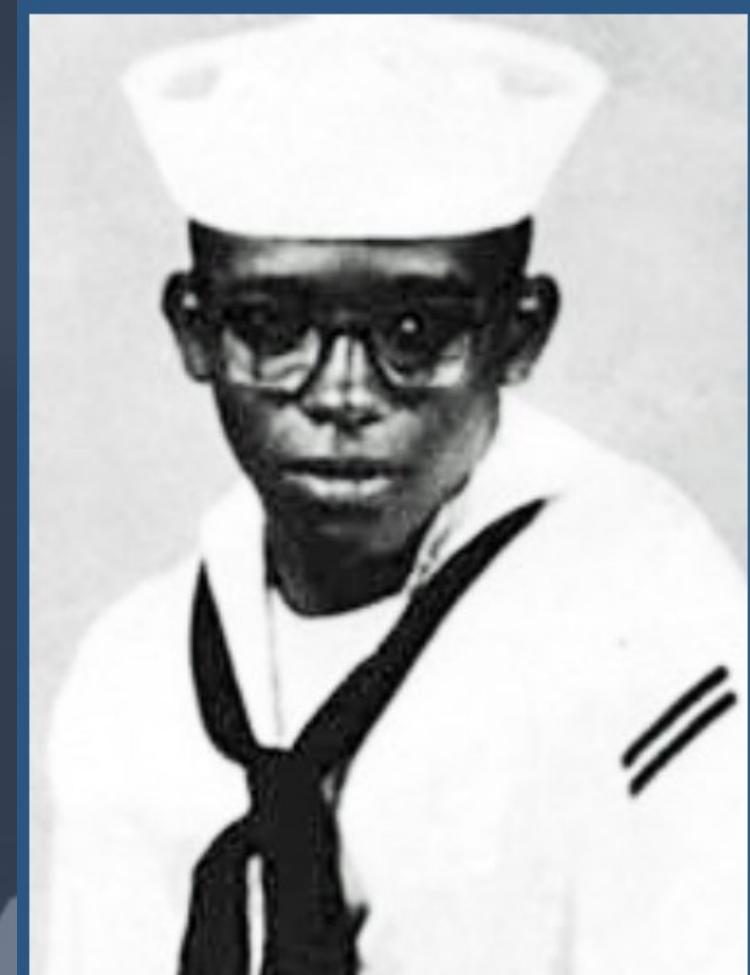
Petty Officer Third Class

1st Marine Division, 1st Battalion, 1st
Marines, H S

From: Charleston SC

Born: May 14, 1947

KIA: May 29, 1967



John Henry Garner

Vietnam War

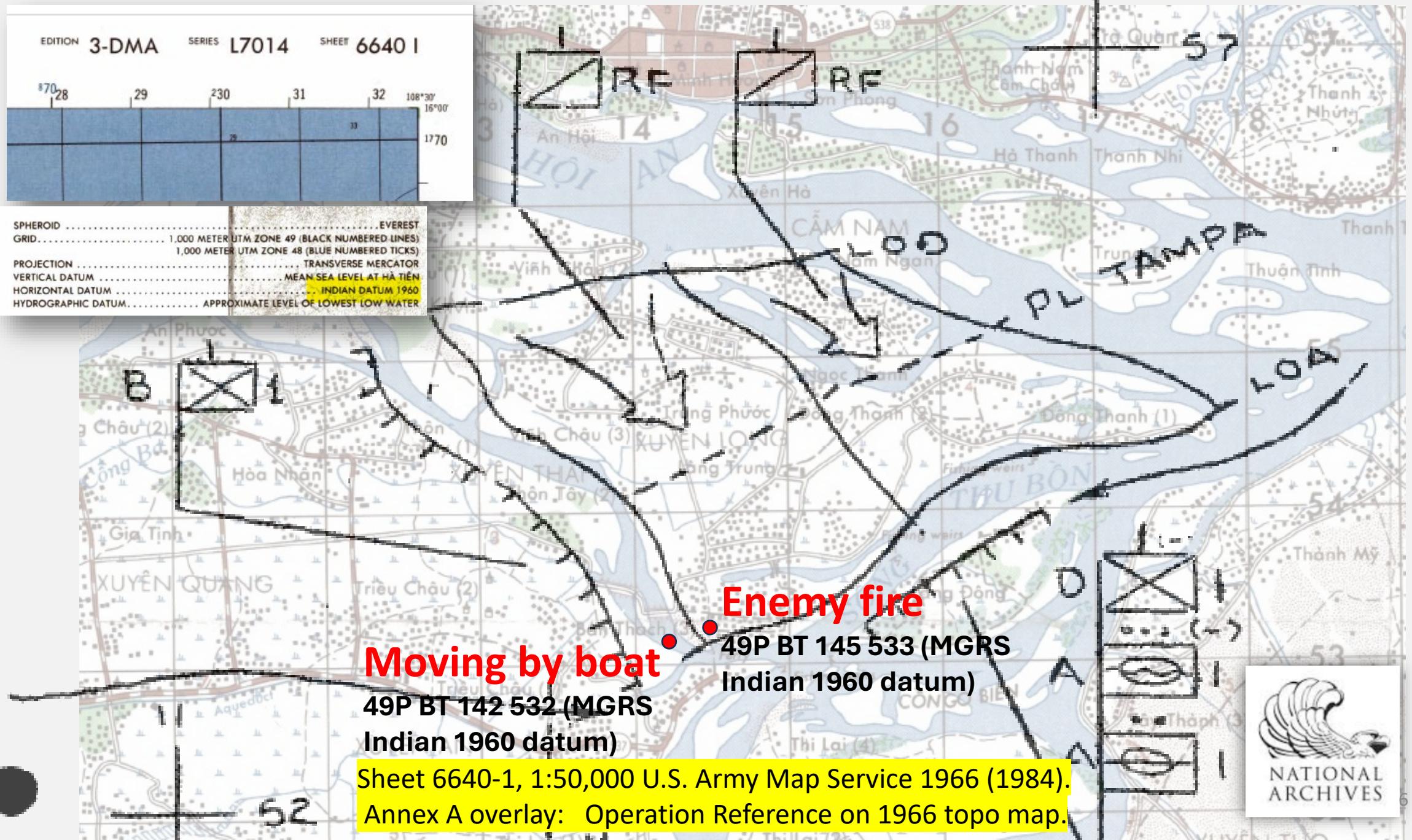
Study Area



Study area map produced in ArcGIS Pro 2.9.5 by Cynthia Valen

Methodology

1. Collect documentation and Imagery.
2. Plot location information from incident and investigation reports.
3. Georeference historic imagery
4. Overlay historic imagery, current imagery, and maps.
5. Digitize the change of river and land use change in Area of Interest.
6. Measure shoreline change and document the changes.



Witness statement during JPAC instigation on 28 August, 2013.

((B)) MR. MAY WAS ADAMANT THAT THE BURIAL LOCATION WAS JUST SOUTH AND WEST OF THE TIP OF THE SANDBAR. HE POINTED OUT THREE POINTS OF REFERENCE FROM THE SANDBAR THAT MR. MAY CALLED THE HIGH GROUND (STICK ONE, SEE PARA F, BELOW): A BRIDGE, APPROXIMATELY 168 METERS TO THE WEST AT AN APPROXIMATE 301 DEGREE AZIMUTH; A LARGE CHANNEL OR COVE ON THE OPPOSITE (SOUTH) SIDE OF THE RIVER (49P BT 136 535) THAT HAS BEEN THERE SINCE THE INCIDENT AT AN APPROXIMATE AZIMUTH OF 235 DEGREES; AND ANOTHER LARGE CHANNEL AT AN APPROXIMATE AZIMUTH OF 146 DEGREES AND APPROXIMATELY 250 METERS. AT THE TIME OF THE INCIDENT, THE RIVER WAS MUCH NARROWER AND YEARS OF FLOODING HAS MADE IT WIDER. THE CONCRETE BRIDGE TO THE WEST WAS ONCE A SHORT BAMBOO BRIDGE. FROM THE SANDBAR TO THE NORTH OF THE RIVER, THERE IS A SMALL SHALLOW CHANNEL FULL OF WATER, APPROXIMATELY 20 METERS WIDE AND APPROXIMATELY 50 CENTIMETERS DEEP, THAT DIVIDES THE SANDBAR FROM THE NORTH BANK. FLOODING IN 1989 CREATED THIS SMALL BACK CHANNEL AND AT THE TIME OF THE INCIDENT THERE WAS A CONTINUOUS STRETCH OF LAND GOING TO THE HIGH GROUND (TOWARDS THE CONCRETE ROAD AND HOUSES) ON THE NORTH SIDE OF THIS CHANNEL. THIS CHANNEL CONTINUES TO THE EAST APPROXIMATELY 100 METERS AND THEN MERGES IN WITH THE MAIN BODY OF THE RIVER.

Hypothesis

Buddy Newell: Lead investigator 2013



Bridge in Duy Vinh west of the Sand bar.

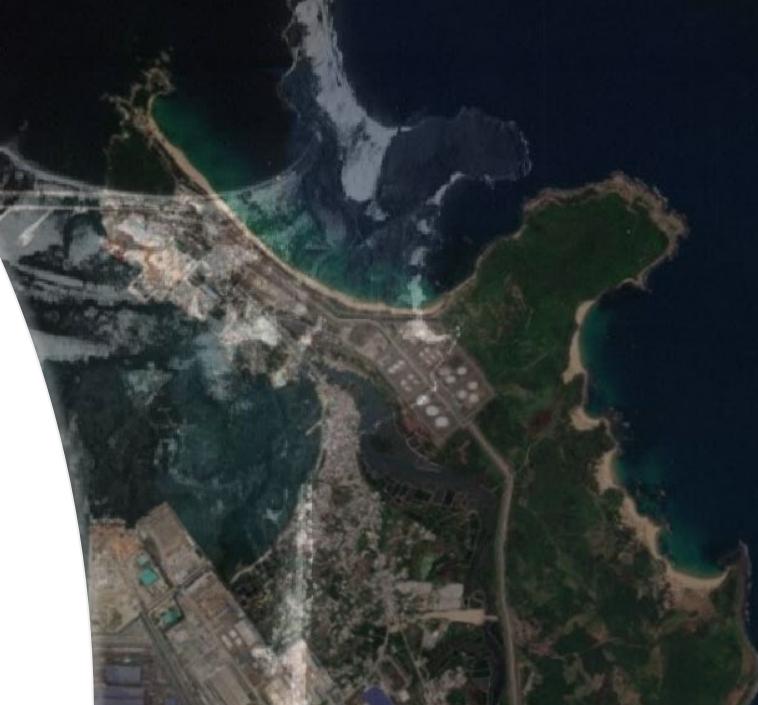


Imagery Sources

Source	Imagery Type	GSD	Details
Library of Congress National Archives	Wartime aerial imagery <ul style="list-style-type: none">Dec 1968 Imagery (Rainy season)Mar 1968 Imagery (Dry Season)	High resolution	<ul style="list-style-type: none">ObliqueFew identifying features to current day.Requires Georeferencing
Earth Explorer	Historic Imagery <ul style="list-style-type: none">1988 SPOT Imagery1977 Imagery	Medium resolution	<ul style="list-style-type: none">ObliqueFew identifying features to current day.Requires Georeferencing
Esri World Imagery	Current Imagery https://livingatlas.arcgis.com/wayback/#active=10&mapCenter=108.33356%2C15.84227%2C16	High resolution	<ul style="list-style-type: none">Imagery in dry season onlyImagery hosted via service.
Maxar/Digital Globe Imagery	Current Imagery (2002 & 2014)	High resolution	<ul style="list-style-type: none">Imagery in October which is the beginning of the rainy season.

Georeferencing Historical Imagery

1. Match up shorelines and geographic features.
2. Look for defining features in historic imagery.
3. Resolution from each type of imagery is different.



07 March 1968

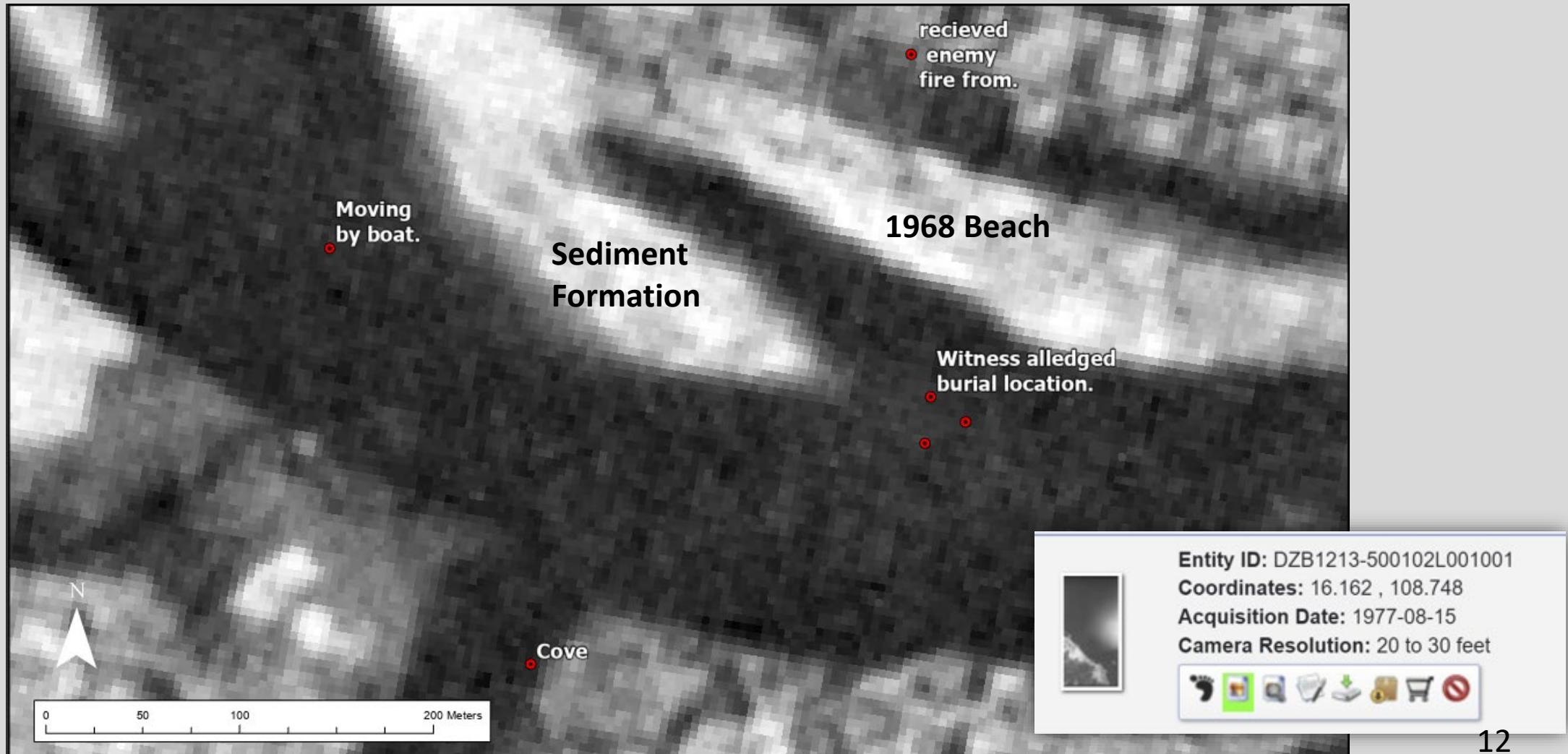
Giant Dragon T972

07 MAR 1968

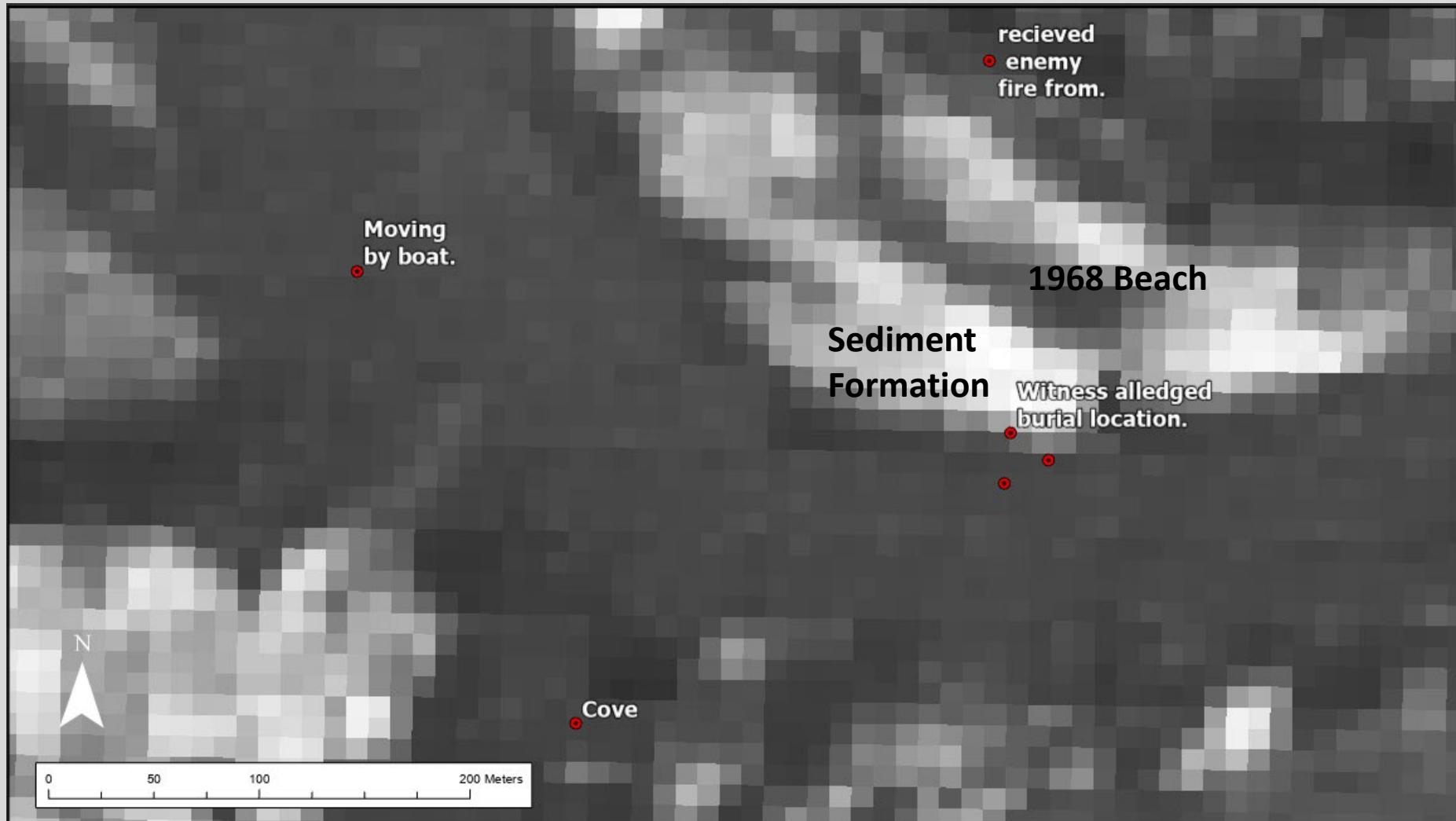


NATIONAL ARCHIVES

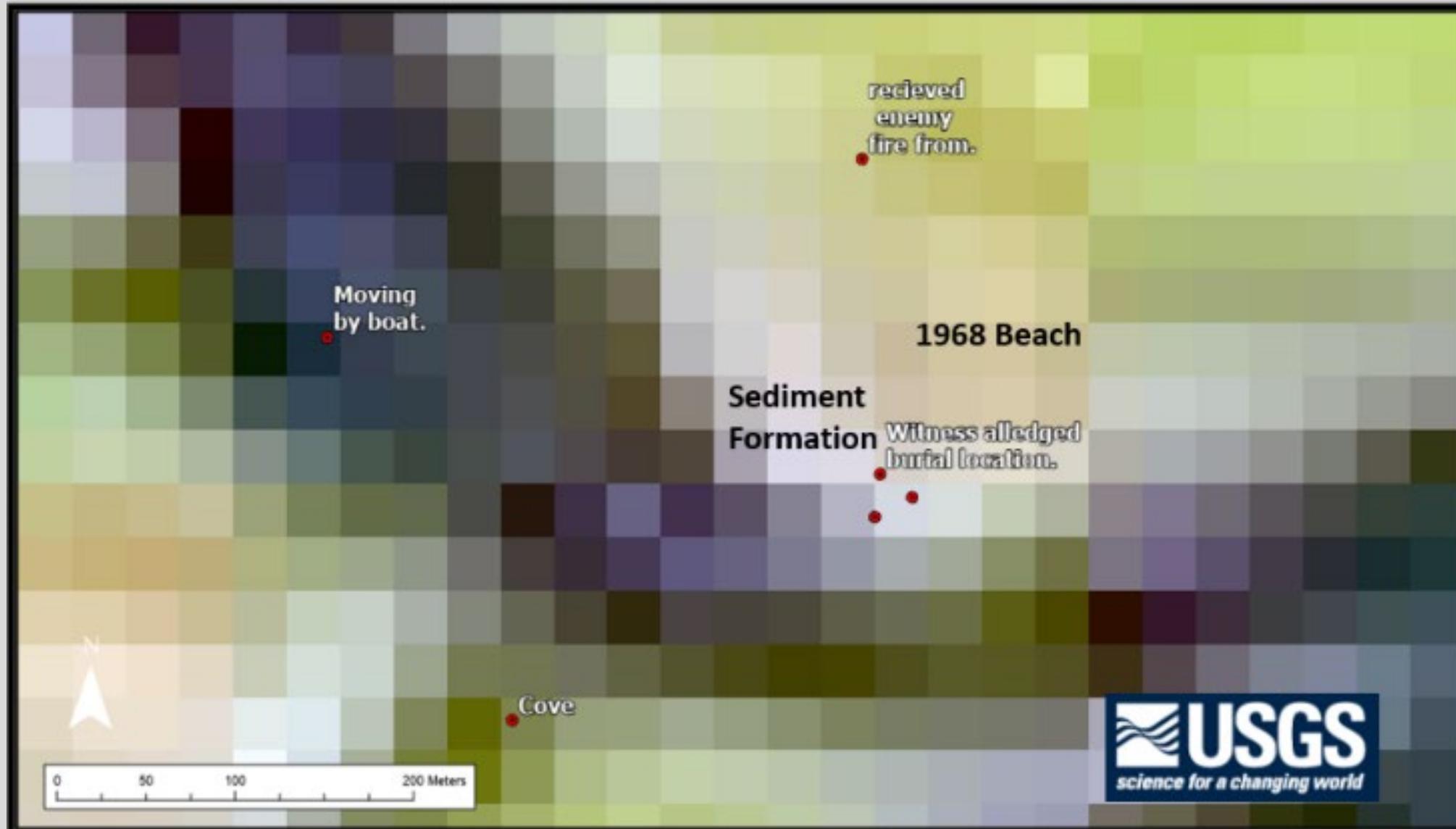
15 October 1977



SPOT Imagery 7 February 1988



Landsat 5: June 19, 1995, 30m GSD



21 October 2002



24 October 2014



ESRI | World Imagery Wayback

- 2022-11-02
- 2022-03-16
- 2020-12-16
- 2019-12-12
- 2018-03-28
- 2017-04-19
- 2017-02-27
- 2014-02-20



03 April 2024

Data Source		Set Data Source...
Data Type	Tiled Internet Layer	
Server	https://mt1.google.com/vt/lyrs=s&hl=es&z={level}&x={col}&y={row}	
Vertical Units	Meter	

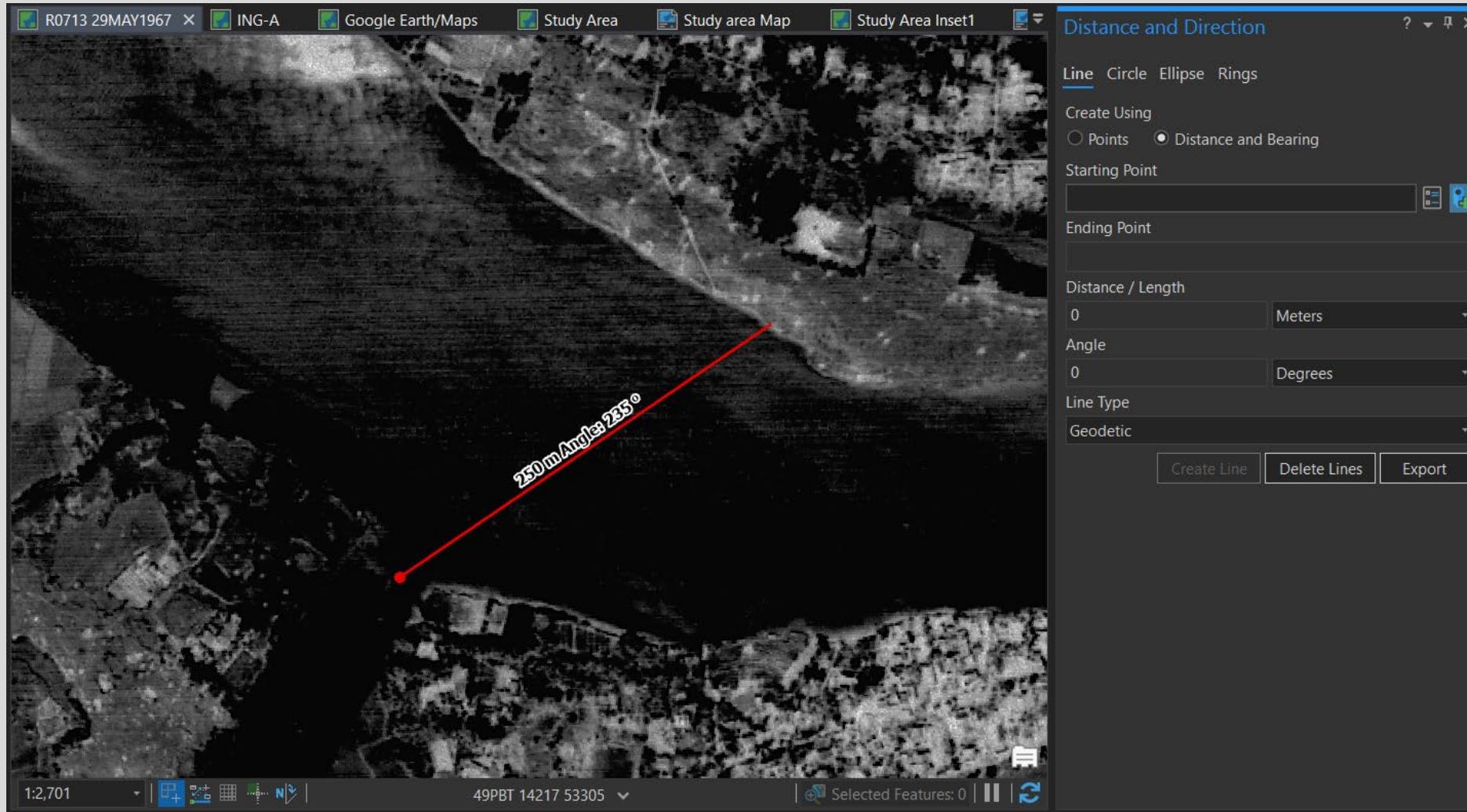


Digitize shorelines change from select images.

From this witness statement, there are 5 statements to verify with imagery.

1. Was the Cove across the river in 1967? Azimuth 235 degrees/250 meters
2. Was the river narrower during 1967?
3. When did the sandbar appear? Was it present in 1967? Witness states that the channel behind the sandbar appeared after flooding in 1989.
4. When was the concrete bridge constructed?
5. Witness states he buried the body 15 meters from the shoreline, approximately 80 centimeters (2062 feet) deep, perpendicular to the shore (06-3VM).

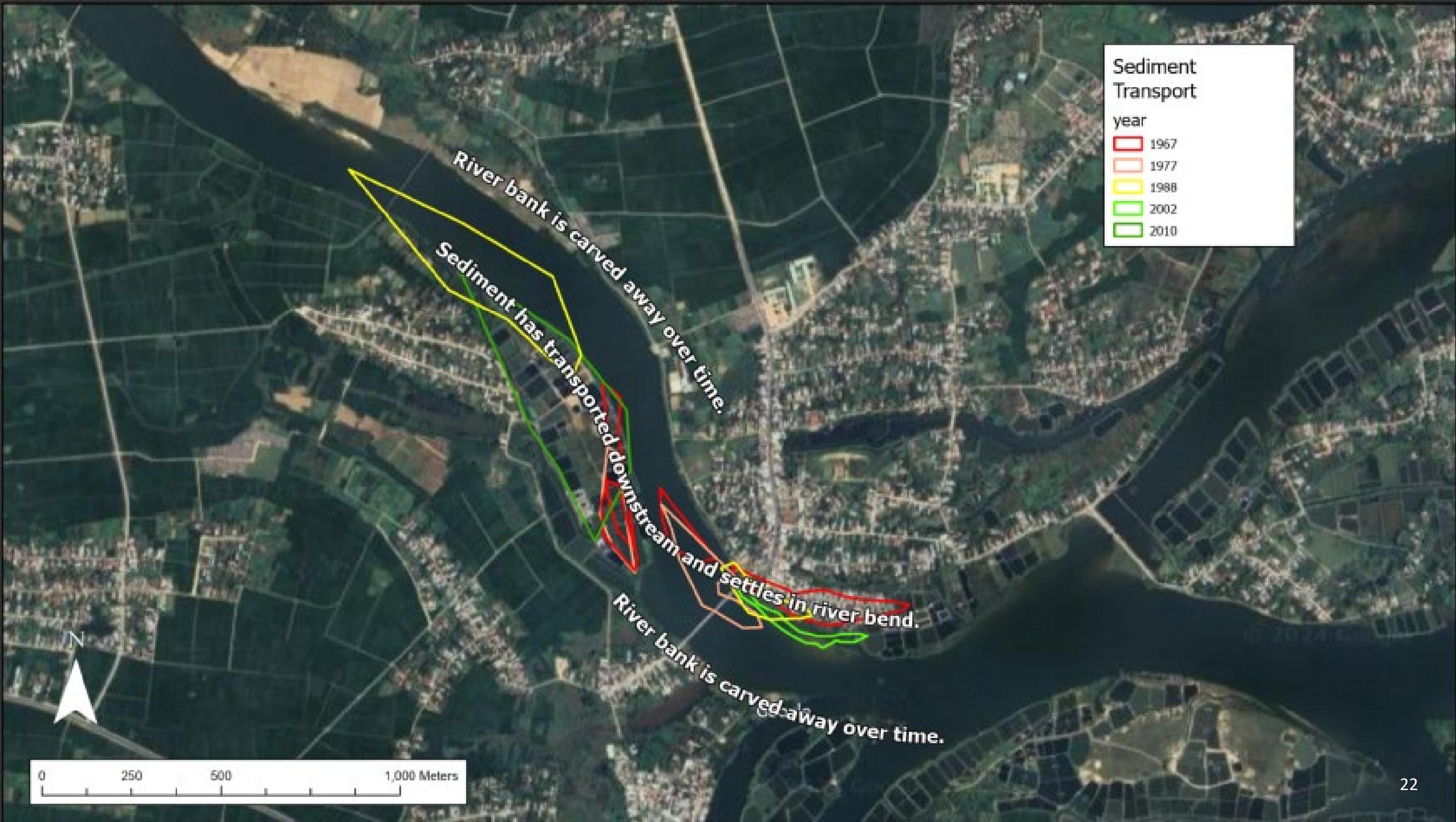
Was the Cove across the river in 1967? Azimuth 235 degrees/250 meters (2014). YES!



Was the river narrower during 1967? Depends!



Data and dataframe in WGS84 UTM Z11N. Measurements in Meters.



When did the sandbar appear?

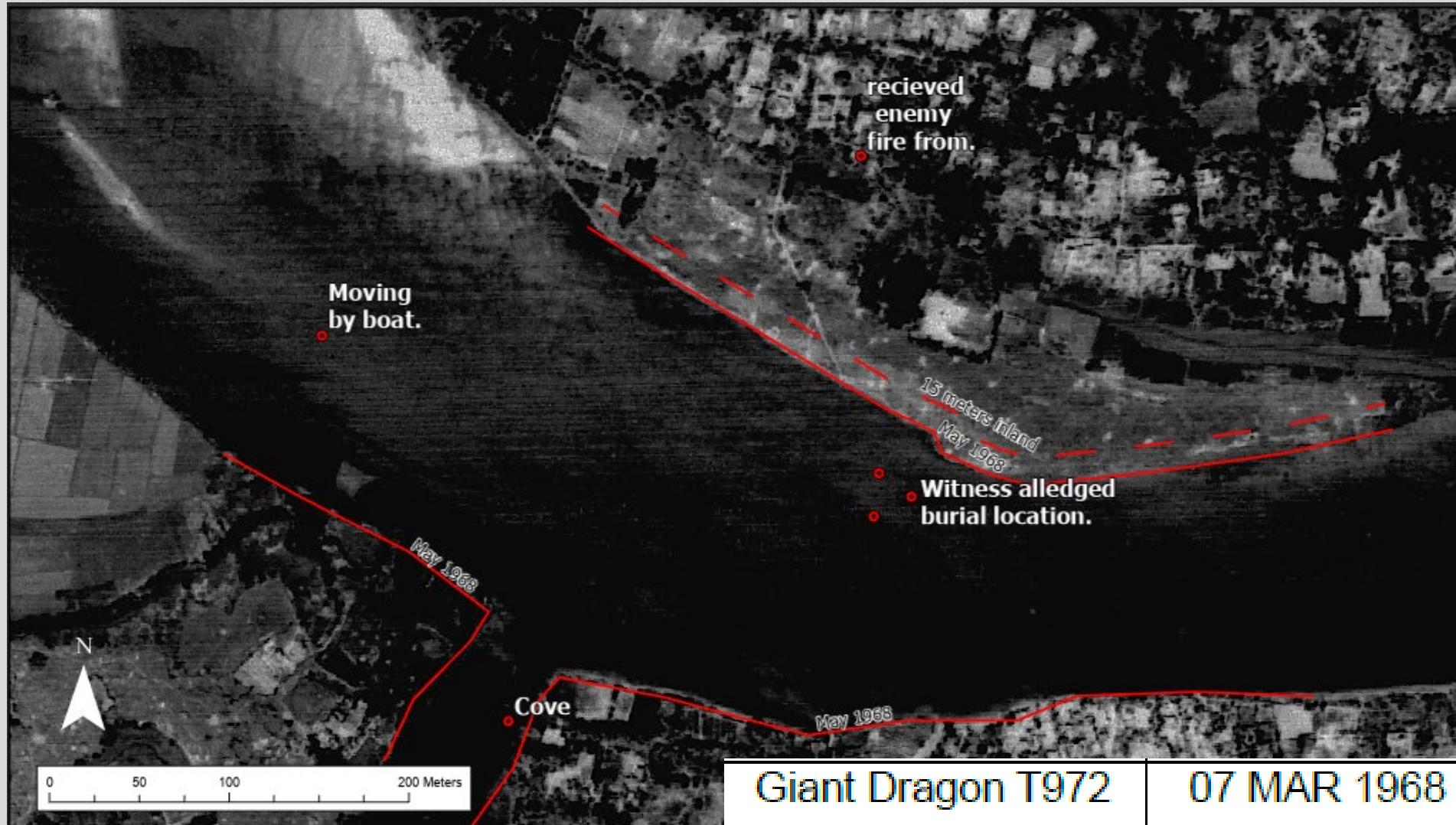
Was it present in 1967?

Witness states that the channel behind the sandbar appeared after flooding in 1989.



Results

Adjusted alleged burial location.



Results

Adjusted alleged burial location.



Research Conclusion

- Imagery Comparison
 - Indicates witness identified location was not the 1967 shoreline but an alluvial deposit.
 - Historical imagery overlays reveal a new research location for the alleged burial area.





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