

# Satellite Work Update

SAV Workgroup Meeting 2/19/21

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# Satellite Work Update

*David Wilcox, VIMS*

## Exploring Satellite Image Integration for the Chesapeake Bay SAV Monitoring Program



A Scientific and Technical Advisory Committee Workshop Report

Session 1, October 2019, Gloucester Point, VA  
Session 2, December 2019 – Gloucester Point, VA  
Session 3, February 2020 – Gloucester Point, VA

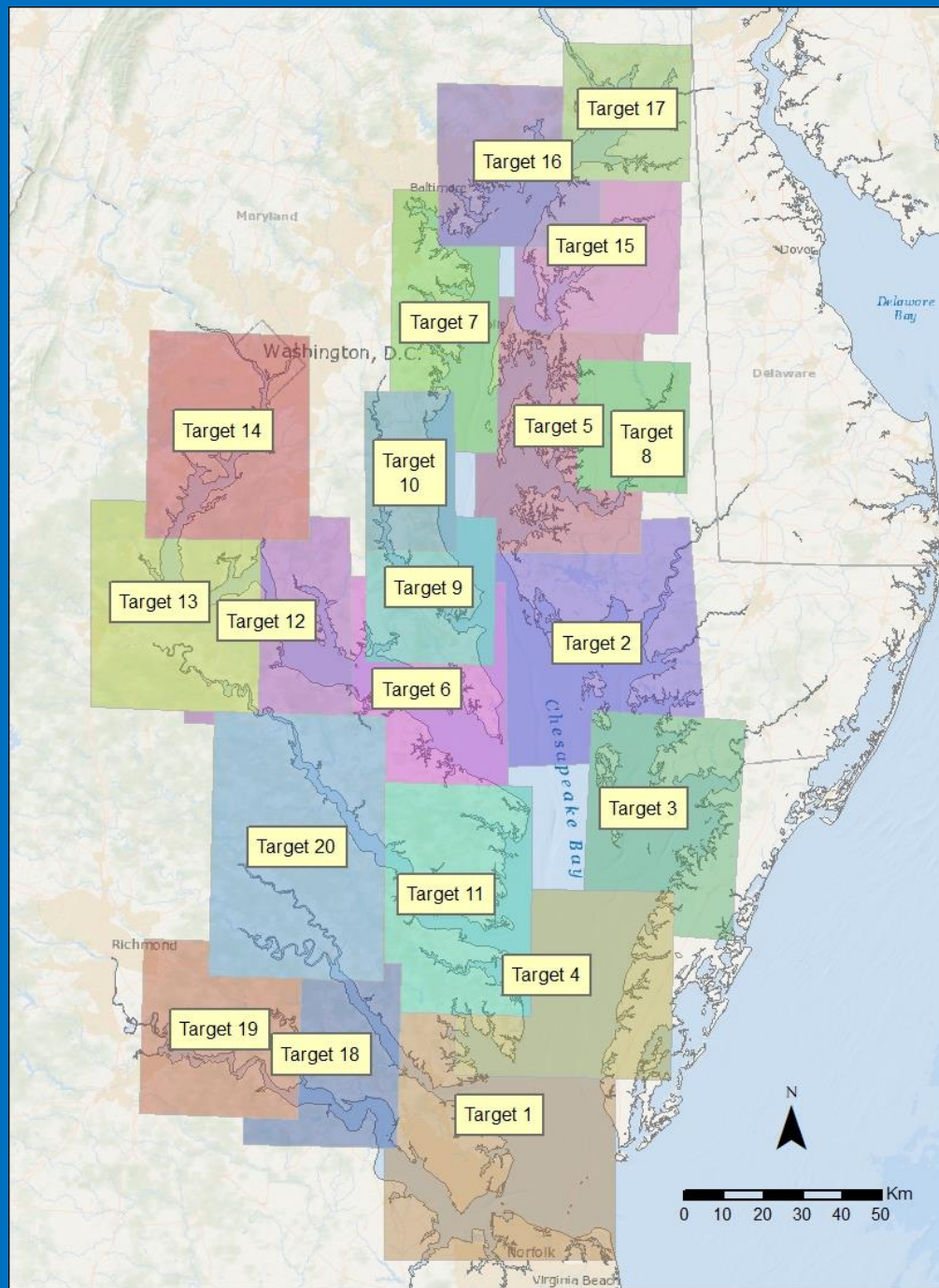


STAC Publication 20-XXX

## STAC SAV Workshop

October 2019, December 2019,  
February 2020

- Trial of full Bay acquisition in 2020
- Comparison of SAV monitoring using satellite and aerial imagery



- We divided the Bay into 20 target areas for potential satellite imagery acquisition.
- Only one area was selected per day to avoid competing with ourselves.
- Little ability to adjust target based on daily conditions.



### WordView-2

Bands: Panchromatic: 450-800 nm  
 8 Multispectral: (red, red edge, coastal, blue, green, yellow, near-IR1 and near-IR2) 400 nm – 1040 NM n, yellow, near-IR1 and near-IR2) 400 nm – 1040 NM  
 Resolution: 0.46 m Panchromatic  
 1.84 Multispectral  
 Swath width: 16.4 km

### GeoEye-1


Bands: Panchromatic: 450 - 800 nm  
 Blue: 450 - 510 nm  
 Green: 510 - 580 nm  
 Red: 655 - 690 nm  
 Near Infra Red: 780 - 920 nm  
 Resolution: 0.46 m Panchromatic  
 1.84 Multispectral  
 Swath width: 15.2 km

### WordView-3

Bands: Panchromatic: 450-800 nm  
 8 Multispectral: (red, red edge, coastal, blue, green, yellow, near-IR1 and near-IR2) 400 nm – 1040 NM  
 Resolution: 0.31 m Panchromatic  
 1.24 Multispectral  
 Swath width: 13.1 km

## Satellite Scenes

	Jun				Jul				Aug					Sep				Oct				2020
Sun	7	14	21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	4	11	18	25	
Sat	6	13	20	27	4	11	18	25	1	8	15	22	29	5	12	19	26	3	10	17	24	31
Fri	5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30
Thu	4	11	18	25	2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29
Wed	3	10	17	24	1	8	15	22	29	5	12	19	26	2	9	16	23	30	7	14	21	28
Tue	2	9	16	23	30	7	14	21	28	4	11	18	25	1	8	15	22	29	6	13	20	27
Mon	1	8	15	22	29	6	13	20	27	3	10	17	24	31	7	14	21	28	5	12	19	26

 Growing Season

*N.B.* Numbers in cells represent days in the month



## Satellite Scenes

	Jun					Jul				Aug					Sep				Oct				2020
Sun	0	4	0	4		5	3	5	2	5	6	13	6	13	12	16	0	14	0	16	0	0	
Sat	0	4	0	3		5	3	5	2	5	6	15	6	14	12	16	12	14	0	16	0	0	0
Fri	0	3	0	3		5	0	7	6	8	6	16	12	16	10	17	13	17	0	16	0	0	0
Thu	0	3	0	0		8	0	7	6	7	9	16	10	16	10	17	13	17	0	0	0	0	0
Wed	0	0	0	0		0	6	4	9	11	9	17	12	17	13	18	13	17	13	0	0	0	0
Tue	0	0	0	0	0	6	4	10	11	10	11	13	18	13	18	15	0	13	0	0	0	0	0
Mon	0	0	0	0	4	6	4	5	11	5	11	13	18	13	12	14	0	13	0	16	0	0	0

High Tide
  Targeted

99 requested dates

*N.B.* Numbers in cells represent different sections of the Bay

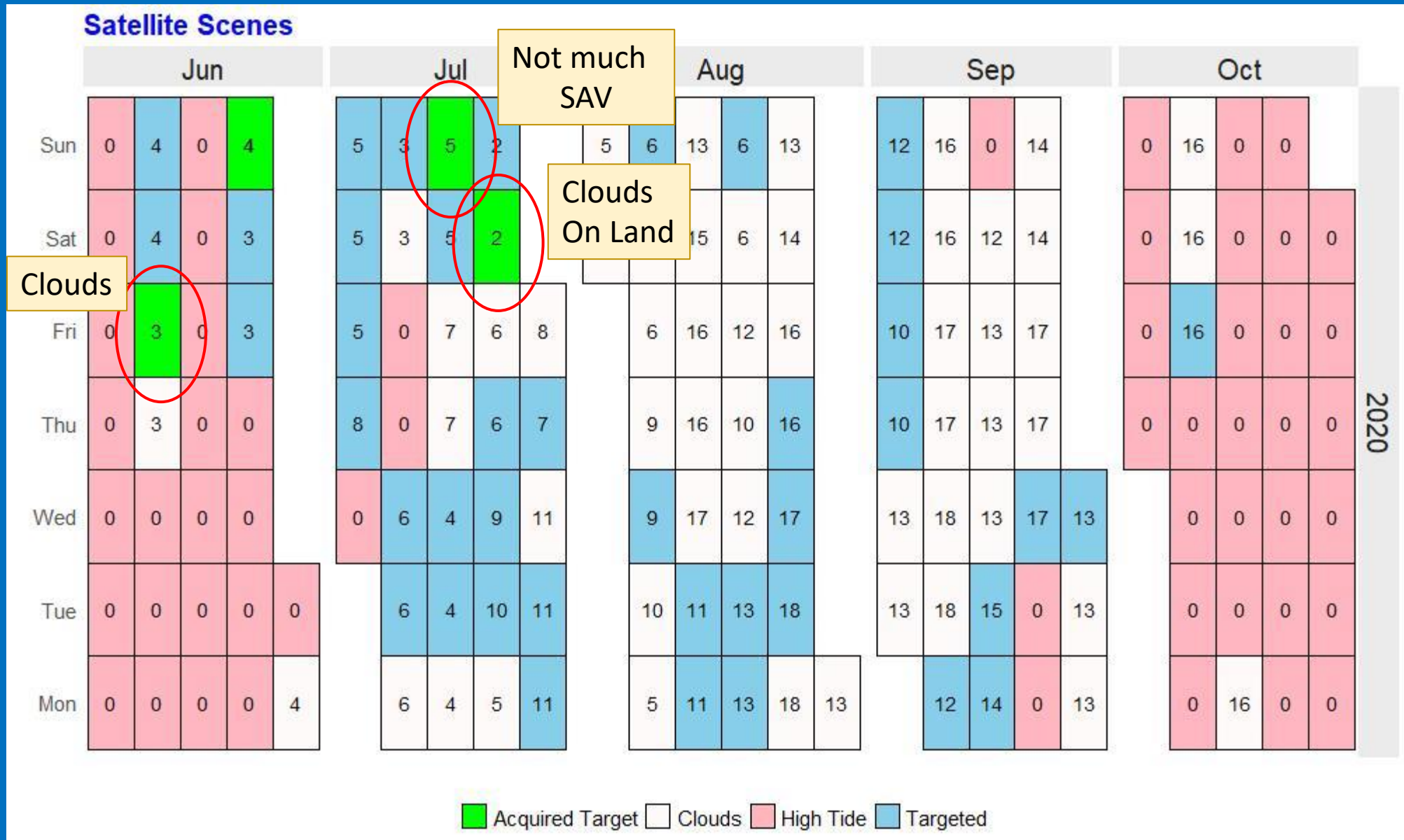
## Satellite Scenes

	Jun					Jul					Aug					Sep					Oct					2020
Sun	0	4	0	4		5	3	5	2		5	6	13	6	13	12	16	0	14	0	16	0	0			
Sat	0	4	0	3		5	3	5	2		5	6	15	6	14	12	16	12	14	0	16	0	0	0		
Fri	0	3	0	3		5	0	7	6	8		6	16	12	16	10	17	13	17	0	16	0	0	0		
Thu	0	3	0	0		8	0	7	6	7		9	16	10	16	10	17	13	17	0	0	0	0	0		
Wed	0	0	0	0		0	6	4	9	11		9	17	12	17	13	18	13	17	13	0	0	0	0		
Tue	0	0	0	0	0		6	4	10	11		10	11	13	18	13	18	15	0	13	0	0	0	0		
Mon	0	0	0	0	4		6	4	5	11		5	11	13	18	13		12	14	0	13	0	16	0	0	

*N.B.* Numbers in cells represent different sections of the Bay

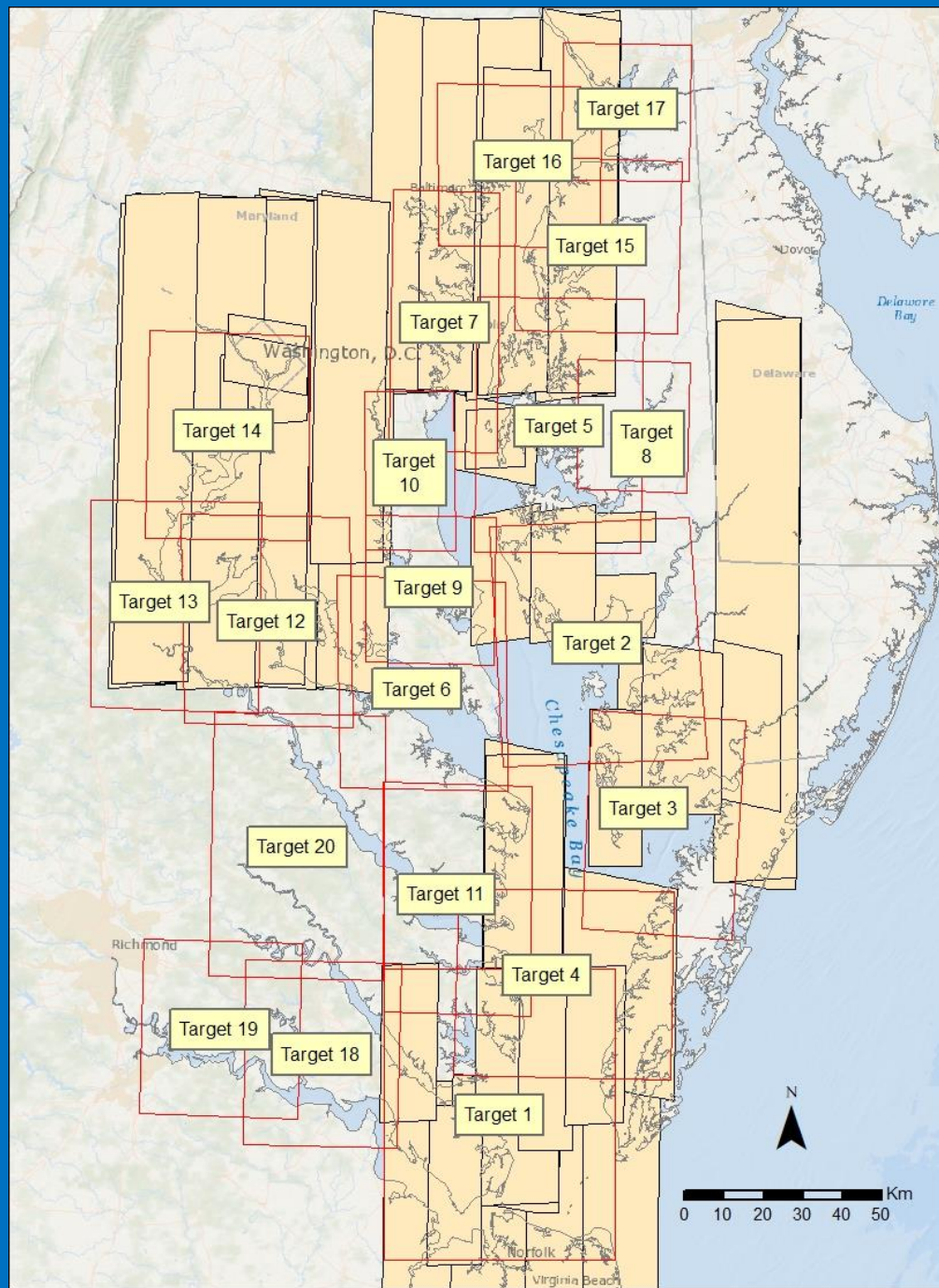
Four out of 99 requests were successful.

One out of four were usable.



N.B. Numbers in cells represent different sections of the Bay





# Satellite Scenes Captured

79 scenes were captured over Chesapeake Bay

- 4 of the scenes were specifically requested
- 75 scenes from areas that may have wrong tide or growing season

26 scenes were rejected immediately

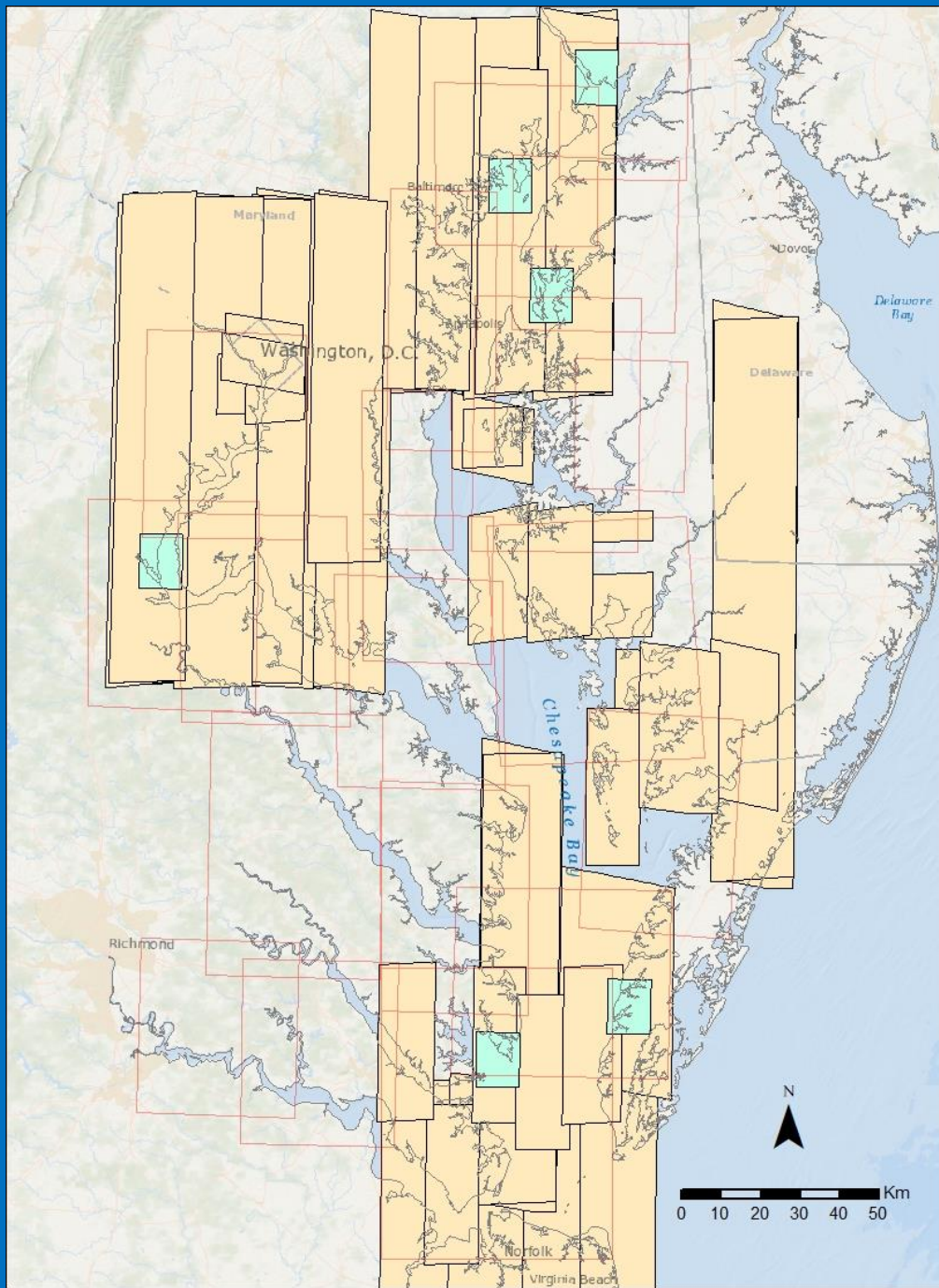
- Covered non-tidal areas only
- Obscured by clouds
- Extensive sun surface reflection

53 scenes were downloaded for a closer look

The scenes

- cover 24 dates
- are large, covering a wide tidal range
- often contain at least some cloud cover
- will require additional funding to fully evaluate usability for SAV monitoring





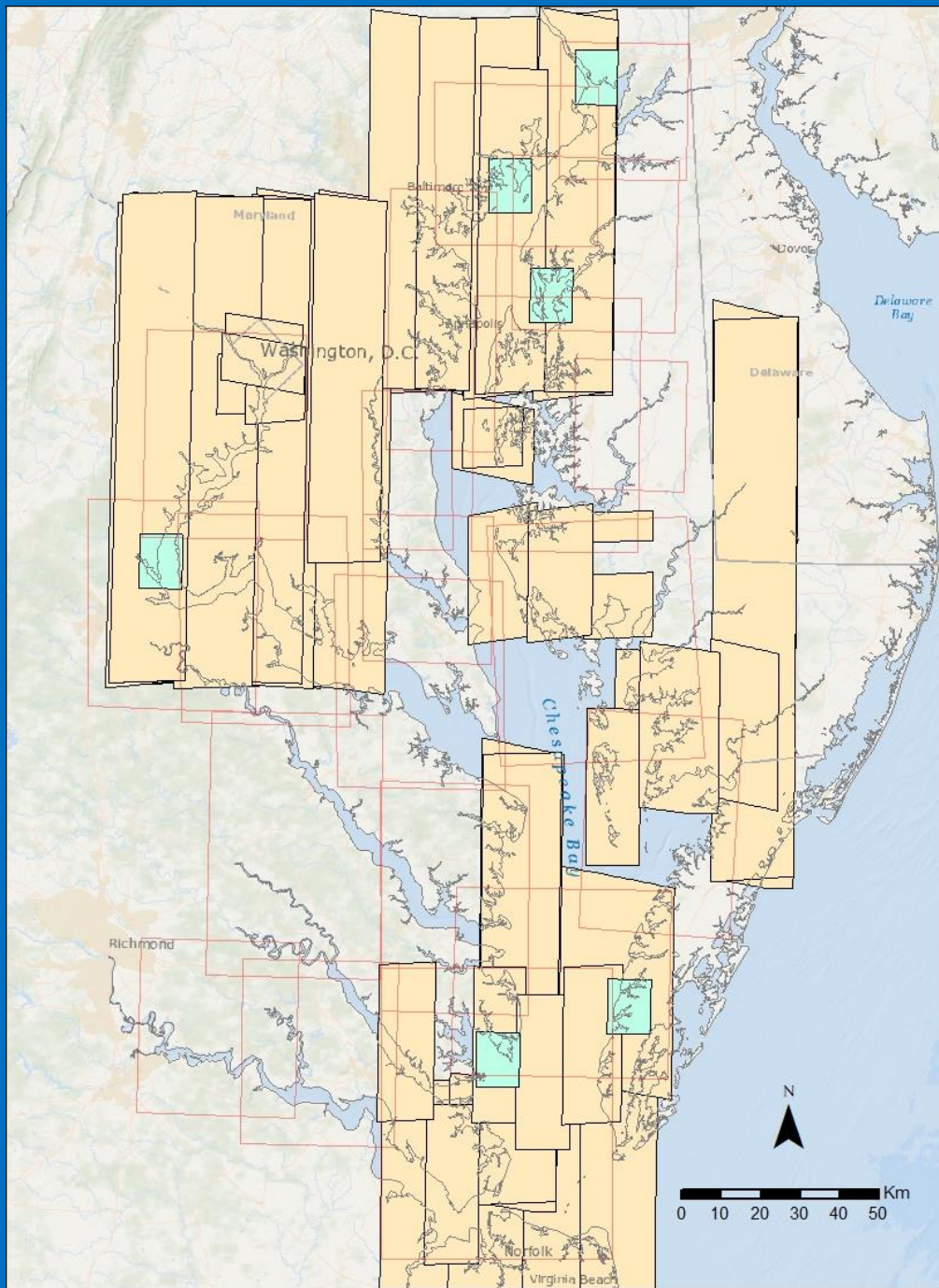
# Satellite vs. Aerial Comparison

## Six areas were selected

- Satellite imagery was available
- Aerial and satellite imagery in the same time frame
- No obvious defects in the satellite imagery
- Covering the majority of a USGS quadrangle
- Fairly large amount of SAV in the area

## Process

- Each area is mapped by two analysts
  - One using the satellite imagery
  - One using the aerial imagery
- The resulting raw SAV polygons are compared
- Once both are complete, the area is reviewed by both analysts and the PI to evaluate potential sources of difference



# Questions?

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