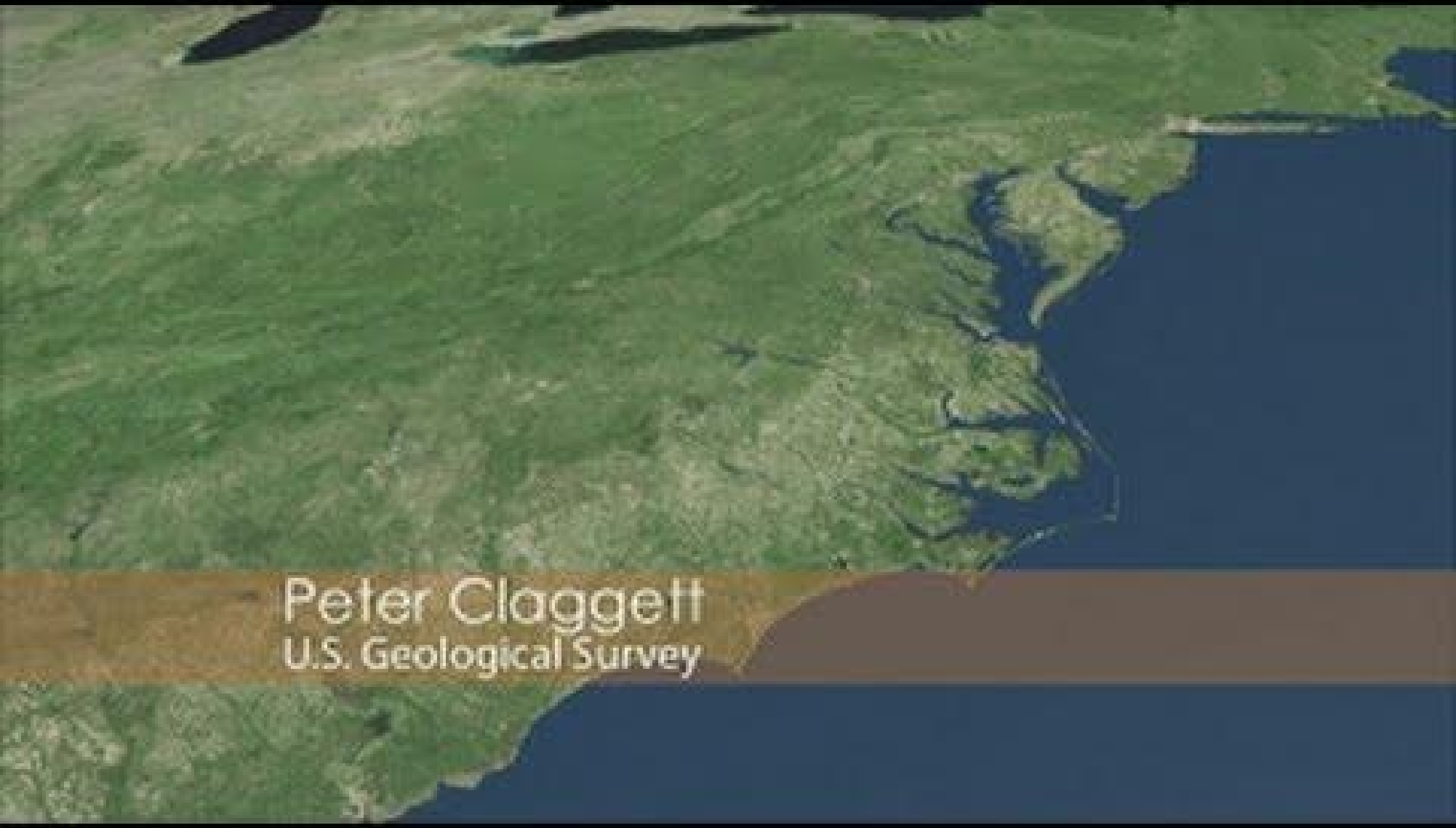
Peter Claggett
U.S. Geological Survey

1
00:00:06,000 --> 00:00:09,590
The Chesapeake Bay is the national treasure.

2
00:00:09,610 --> 00:00:12,910
It’s one of the most productive estuaries in the world.

3
00:00:12,930 --> 00:00:15,130
It’s the largest estuary in the United States and

4
00:00:15,150 --> 00:00:20,060
has the largest land area to water volume ratio of any estuary in the US.

5
00:00:20,080 --> 00:00:27,000
Which means what happens on the land greatly affects the conditions of the Chesapeake Bay.

6
00:00:27,020 --> 00:00:33,000
Landsat is a critical and invaluable tool for characterizing the landscape and

7
00:00:33,020 --> 00:00:38,410
characterizing it in terms of mapping impervious surface, mapping it over time.

8
00:00:38,430 --> 00:00:42,940
We have satellite imagery for the Chesapeake Bay that covers the entire

9
00:00:42,960 --> 00:00:48,330
64,000 square miles of the Chesapeake Bay watershed.

10
00:00:49,870 --> 00:00:54,930
Unfortunately, the Chesapeake Bay and 90 percent of its title tributaries are impaired.

11
00:00:54,950 --> 00:01:00,600
They're impaired with poor water clarity and low dissolved oxygen, as a result of

12
00:01:00,620 --> 00:01:04,570
excess nutrients and sediment coming into the bay.

13
00:01:04,590 --> 00:01:09,820

Excess nitrogen and phosphorous and sediment that's draining off the land into the Bay

14
00:01:09,840 --> 00:01:14,150
is obscuring the clarity of the water.

15
00:01:14,170 --> 00:01:18,410
The nutrients are contributing to increased algal growth.

16
00:01:18,430 --> 00:01:23,720
And when those algae die at the bottom of the bay and decompose, they starve the bay of oxygen

17
00:01:23,740 --> 00:01:27,190
oxygen that living resources need to survive.

18
00:01:27,210 --> 00:01:32,170
The sources of those nutrients and sediments are fertilizers, both manure and chemical fertilizers,

19
00:01:32,190 --> 00:01:38,140
applied to farmland and applied to residential lawns.

20
00:01:38,160 --> 00:01:47,150
It's also from the exhaust from our cars and air pollution from power plants out in the Ohio Valley.

21
00:01:47,170 --> 00:01:53,170
Landsat imagery is critical for monitoring changes in impervious surfaces,

22
00:01:53,190 --> 00:01:58,620
monitoring changes in tree canopy and and then other ground cover like grasses and shrubs.

23
00:01:58,640 --> 00:02:03,560
We can use the satellite imagery to track consistently through time across six states

24
00:02:03,580 --> 00:02:12,560
how the condition of the landscape has changed and what it is like.

25
00:02:25,580 --> 00:02:30,560
The Landsat satellite is basically a camera in space,

26
00:02:30,580 --> 00:02:33,130
and in essence it's actually seven cameras,

27
00:02:33,150 --> 00:02:37,250
because it collects the reflection of the sun off the earth's surface

28
00:02:37,270 --> 00:02:41,830
in seven bands, seven kind of wavelengths.

29
00:02:41,850 --> 00:02:46,640
We use this information to characterize different features on the land

30
00:02:46,660 --> 00:02:49,210
such as trees or impervious cover

31
00:02:49,230 --> 00:02:53,820
because each one of these features reflects the sun in different wavelengths.

32
00:02:53,840 --> 00:02:59,820
We're able to take the information from the satellite

33
00:02:59,840 --> 00:03:01,590
and take what's basically a bunch of numbers

34
00:03:01,610 --> 00:03:06,490
and translate that into well these numbers correspond to trees

35
00:03:06,510 --> 00:03:10,930
and these other numbers correspond to impervious surfaces,

36
00:03:10,950 --> 00:03:16,940
and do that consistently across very large areas.

37
00:03:18,730 --> 00:03:26,620
Landsat is just invaluable in providing this baseline of observations

38
00:03:26,640 --> 00:03:30,120

for science about how human activities on the land

39
00:03:30,140 --> 00:03:36,530
affect water quality, affect wildlife habitat, affect air quality.

40
00:03:36,550 --> 00:03:40,020
Without it we wouldn't be able to really understand

41
00:03:40,040 --> 00:03:43,300
how sources of nutrients and sediment have changed