
Washington
Oregon

1
00:00:01,210 --> 00:00:07,170
My name's Robert Kennedy. I'm an Assistant Professor in the Department of Earth and Environment at Boston

2
00:00:07,190 --> 00:00:12,660
All of these images are numbers.

3
00:00:12,680 --> 00:00:16,740
Now we can display them on a monitor as different colors.

4
00:00:16,760 --> 00:00:20,920
but what we work with, analytically, are the numbers themselves.

5
00:00:20,940 --> 00:00:25,100
When we're looking at how processes affect landscapes

6
00:00:25,120 --> 00:00:31,450
you need to understand how the processes unfold over time.

7
00:00:31,470 --> 00:00:35,590
Hindsight's 20/20. Landsat gives you that hindsight.

8
00:00:35,610 --> 00:00:40,620
In the Pacfic Northwest, known for its timber, right for producing lumber.

9
00:00:40,640 --> 00:00:45,140
So you've got a stable forest and it looks kind of the same to the satellite over time

10
00:00:45,160 --> 00:00:49,860
and then you come along and cut down all the trees – boom, it's a lot brighter.

11
00:00:49,880 --> 00:00:53,900
So you can think of sutracting one part of the information.

12
00:00:53,920 --> 00:00:58,930
And the other thing is that you've revealed something new which is the soil, the rocks.

13
00:00:58,950 --> 00:01:01,990

So you've added this soil in there, this signal that

14
00:01:02,010 --> 00:01:05,370
sort of bursts out at you like a flag.

15
00:01:05,390 --> 00:01:08,450
That soil signal that was there, that you saw right after the clear cut,

16
00:01:08,470 --> 00:01:13,530
immediately starts getting obscured - grass will come in, shrubs will come in....

17
00:01:13,550 --> 00:01:18,700
So as that happens the soil gets covered up. So you can actually watch that whole process happen,

18
00:01:18,720 --> 00:01:24,880
from an older forest to this bright soil to recovering vegetation

19
00:01:26,080 --> 00:01:31,240
So the progression in the bark beetle case, we have a fairly stable lodgepole forest.

20
00:01:31,260 --> 00:01:34,430
There'll be sort of an explosion, and epidemic of these beetles.

21
00:01:34,450 --> 00:01:38,600
Our color scheme goes from stable forest which is in tones of blue

22
00:01:38,620 --> 00:01:43,770
to this bright red coming from the soil and from branches and things

23
00:01:43,790 --> 00:01:47,890
that are revealed when the trees lose their needles and when the needles change color.

24
00:01:47,910 --> 00:01:52,020
One of the insects thats increasingly important is

25
00:01:52,040 --> 00:01:55,150
Western Spruce Budworm. They don't go in and kill the tree outright,

26
00:01:55,170 --> 00:01:59,270
but come in and eat the buds or the young needles off a tree.

27
00:01:59,290 --> 00:02:03,050
So the satellite sees that as a bit of a darkening of the picture over time.

28
00:02:03,070 --> 00:02:07,550
By the end of the time period, we see pure yellow and that's associated with broadleaf shrubs,

29
00:02:07,570 --> 00:02:10,450
it could even be a shrub field, just dense.

30
00:02:10,470 --> 00:02:15,130
Those bugs have changed the environment for everything else there,

31
00:02:15,150 --> 00:02:20,800
and the Everything Else there in this part of the world are shrubs: rhododendrons, other shrubs

32
00:02:20,820 --> 00:02:24,980
that are usually hanging out underneath the trees

33
00:02:25,000 --> 00:02:30,980
where its kind of dark and shady. Boom, they get all this light, they love it, they grow like gangbusters.

34
00:02:32,060 --> 00:02:36,220
One of the interesting things about managing forests in the Pacific northwest,

35
00:02:36,240 --> 00:02:41,700
you can see a very strict delineation on your landscape

36
00:02:41,720 --> 00:02:45,890
from the satellite's perspective, and that's just

37
00:02:45,910 --> 00:02:50,060
a manifestation of the policy differences, of the ownership differences.

38
00:02:50,080 --> 00:02:54,220

The idea behind science is to develop understanding,

39
00:02:54,240 --> 00:02:58,360
ultimately to be able to predict and understand processes.

40
00:02:58,380 --> 00:03:02,480
When we look at a change, when we look at those graphs of life histories

41
00:03:02,500 --> 00:03:07,180
of individual pixels, it's that the numbers that drive everything.

42
00:03:07,200 --> 00:03:12,370
It's the numbers that we use to look at how severe things are, it's the numbers that we to quantify how long did

43
00:03:12,390 --> 00:03:14,710
or when did that start or how big was that clear cut.

44
00:03:14,730 --> 00:03:18,770
The Landsat perspective is really the only tool that lets you look at what's going on

45
00:03:18,790 --> 00:03:22,940
at the scale that you're interested in where you can see individual events and