
Mark Reynolds
The Nature Conservancy of California

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00:00:00,010 --> 00:00:04,050
So in the Central Valley, we once had a vast system

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00:00:04,070 --> 00:00:08,150
of about four million acres of wetlands and wetland-like features,

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00:00:08,170 --> 00:00:12,180
this integrated mosaic of wet stuff. And since that time,

4
00:00:12,200 --> 00:00:16,250
we've lost about 95% of those habitats.

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00:00:16,270 --> 00:00:20,330
[chime]
California's Central Valley is home to one of the largest agro-ecosystems

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00:00:20,350 --> 00:00:24,460
on the planet. Since the loss of the wetlands, migratory birds

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00:00:24,480 --> 00:00:28,520
are now very dependant on what's happening on that agricultural land

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00:00:28,540 --> 00:00:32,700
to find places to forage and to spend the winter.

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00:00:32,720 --> 00:00:36,750
So our work with farmers is really an integral part of the flyway.

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00:00:36,770 --> 00:00:40,900
Waterbirds need water to give them access to a lot

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00:00:40,920 --> 00:00:44,960
of the food resources. Shorebirds in particular eat a lot of the

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00:00:44,980 --> 00:00:49,130
aquatic invertebrates that grow in the water. And so, by knowing where the water

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00:00:49,150 --> 00:00:53,260
is, we can really maximize the value of the

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00:00:53,280 --> 00:00:57,340
restoration and conservation we do for waterbirds in the Central Valley.

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00:00:57,360 --> 00:01:01,500
The NASA and USGS data that are available allow us to make

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00:01:01,520 --> 00:01:05,530
the distribution maps on the probability that water might be in any given pixel –

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00:01:05,550 --> 00:01:09,570
so that's a 30-meter by 30-meter cell anywhere within the Central Valley of California.

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00:01:09,590 --> 00:01:13,700
The real value of the satellite, and Landsat archive,

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00:01:13,720 --> 00:01:17,720
is that we are able to look at the water distribution at a very fine spatial scale

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00:01:17,740 --> 00:01:21,740
so that's a 30- by 30-meter pixel, which is really relevant in terms of

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00:01:21,760 --> 00:01:25,820
understanding habitat for migratory water birds. We're also able then to look at that

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00:01:25,840 --> 00:01:29,860
across a very large spatial extent of the entire Central Valley.

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00:01:29,880 --> 00:01:33,930
Point Blue Conservation Science has been one of our

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00:01:33,950 --> 00:01:38,050
trusted conservation partners at the Nature Conservancy for many many years

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00:01:38,070 --> 00:01:42,090
and so I reached out to our partners at Point Blue and we started working

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00:01:42,110 --> 00:01:46,170
together on these Landsat data to try and perfect ways that

27
00:01:46,190 --> 00:01:50,200
we could use to predict water availability in the Central Valley.

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00:01:50,220 --> 00:01:54,250
So simultaneously, the Cornell Lab of Ornithology

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00:01:54,270 --> 00:01:58,430
was really making great strides in using citizen science data

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00:01:58,450 --> 00:02:02,490
to predict when and where birds would occur.

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00:02:02,510 --> 00:02:06,520
I'm Steve Kelling, I'm the Director of Information sciences

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00:02:06,540 --> 00:02:10,590
at the Cornell Lab of Ornithology.

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00:02:10,610 --> 00:02:14,690
I run a project called eBird.

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00:02:14,710 --> 00:02:18,770
eBird is a citizen scientist project that engages the public

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00:02:18,790 --> 00:02:22,910
to submit checklists of their bird observations

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00:02:22,930 --> 00:02:27,000
to a central database.

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00:02:27,020 --> 00:02:34,170
Currently we collect about a 100 million observations per year.

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00:02:34,190 --> 00:02:39,270
What makes eBird unique, though,

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00:02:39,290 --> 00:02:43,400
is that because we collect data year round, we can essentially

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00:02:43,420 --> 00:02:47,470
describe the entire life history of a bird or a population

41
00:02:47,490 --> 00:02:53,430
of birds as the move throughout the landscape.

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00:02:53,450 --> 00:03:00,510
So when we think of how a bird moves across a hemisphere,

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00:03:00,530 --> 00:03:04,560
we can use MODIS landcover information to allow us

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00:03:04,580 --> 00:03:08,630
to make these habitat relationships

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00:03:08,650 --> 00:03:12,660
with particular species of birds.

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00:03:12,680 --> 00:03:16,730
And with that kind of relationship we can then make predictions

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00:03:16,750 --> 00:03:20,860
in areas where we don't have information about birds

48
00:03:20,880 --> 00:03:24,880
but we do have information about the habitats that they're in.

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00:03:24,900 --> 00:03:28,970
What we're able to show

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00:03:28,990 --> 00:03:33,140
was that there was a high correlation between

51
00:03:33,160 --> 00:03:37,310
abundance of shorebirds

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00:03:37,330 --> 00:03:41,390
with rice farming

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00:03:41,410 --> 00:03:45,510
and then go out to the rice fields and feed during the day

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00:03:45,530 --> 00:03:49,540
and then go to the refuges at night to roost.

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00:03:49,560 --> 00:03:53,610
And the a-ha moment really came with putting

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00:03:53,630 --> 00:03:57,750
these two datasets together and realizing that there were some horrible mis-matches.

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00:03:57,770 --> 00:04:01,810
So we had models predicting high abundances of birds

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00:04:01,830 --> 00:04:05,870
at times when there was not very much water.

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00:04:05,890 --> 00:04:09,970
And that made us realize there was something we could do out there to make that place better

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00:04:09,990 --> 00:04:14,010
for birds at that time.

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00:04:14,030 --> 00:04:18,090
Our program Bird Returns allows us to work directly with farmers to help them help us create bird habitat.

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00:04:18,110 --> 00:04:22,120
Rice farmers typically flood their fields

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00:04:22,140 --> 00:04:26,210
to grow the crop, so we knew there was water available

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00:04:26,230 --> 00:04:30,240
just not at the right times and places to help the birds. So by working with

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00:04:30,260 --> 00:04:34,300
rice farmers we were able to essentially rent their fields

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00:04:34,320 --> 00:04:38,350
for a couple weeks a year, and instead of growing rice, create the conditions

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00:04:38,370 --> 00:04:42,410
which would grow birds or create habitat for wintering birds.

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00:04:42,430 --> 00:04:46,580
Look, these birds are migratory superheroes.

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00:04:46,600 --> 00:04:50,670
They mystify us. The shorebirds we work with are breeding in Alaska

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00:04:50,690 --> 00:04:54,750
and wintering as far south as southern Peru.

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00:04:54,770 --> 00:04:58,890
We're talking up to 20,000 kilometers each year, some of these small birds

72
00:04:58,910 --> 00:05:02,950
are flying. So it behooves us to

73
00:05:02,970 --> 00:05:07,130
help them on their journey, provide this food resource for them

74
00:05:07,150 --> 00:05:11,300
but to do it in a responsible way that again shows our respect

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00:05:11,320 --> 00:05:15,450
for the limited resource that water is, today, in the Western United States.

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00:05:15,470 --> 00:05:19,530
Bird Returns is having a lot of impact,

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00:05:19,550 --> 00:05:23,660
both for wetland conditions and for farmers, but also for the birds.

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00:05:23,680 --> 00:05:27,700
And we're monitoring birds on all of the fields that we flood

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00:05:27,720 --> 00:05:31,800
out there and we're comparing those with bird observations on fields that aren't flooded.

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00:05:31,820 --> 00:05:35,990
So we're finding densities that are 30 times

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00:05:36,010 --> 00:05:40,090
greater on our fields than on the comparison control fields.

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00:05:40,110 --> 00:05:44,110
The ability of them to use refuge lands and

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00:05:44,130 --> 00:05:48,160
a compatible agricultural landscape allows us to manage

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00:05:48,180 --> 00:05:52,210
the whole valley as an integrated matrix.

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00:05:52,230 --> 00:05:56,310
This is really the power of using these kinds of data to make conservation decisions.