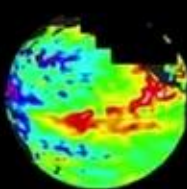
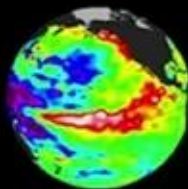


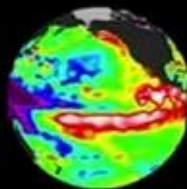
El Niño 2015 (Jason-2)



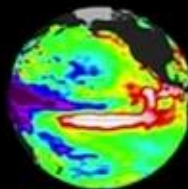
January



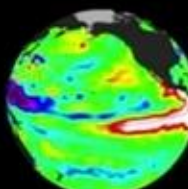
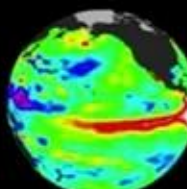
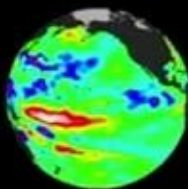
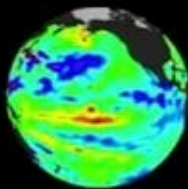
March



May



July



El Niño 1997 (TOPEX/Poseidon)

1
00:00:09,475 --> 00:00:07,573
PRESENTS, THE VON KARMAN

2
00:00:11,377 --> 00:00:09,542
LECTURE, A SERIES OF TALKS BY

3
00:00:12,678 --> 00:00:11,444
SCIENTISTS AND ENGINEERS WHO ARE

4
00:00:31,597 --> 00:00:12,745
EXPLORING OUR PLANET, OUR SOLAR

5
00:00:32,365 --> 00:00:31,664
SYSTEM AND ALL THAT LIES BEYOND.

6
00:00:34,333 --> 00:00:32,432
>>> GOOD EVENING.

7
00:00:34,667 --> 00:00:34,400
WHAT A HUGE CROWD WE HAVE

8
00:00:35,368 --> 00:00:34,734
TONIGHT.

9
00:00:39,172 --> 00:00:35,435
YOU'RE ALL HERE FOR ME, I

10
00:00:40,740 --> 00:00:39,239
ASSUME.

11
00:00:42,675 --> 00:00:40,807
WELL, THANK YOU FOR COMING.

12
00:00:44,177 --> 00:00:42,742
WELCOME TO THE JET PROPULSION

13
00:00:46,145 --> 00:00:44,244

LABORATORY, ONE OF THE GREATEST

14

00:00:46,813 --> 00:00:46,212

PLACES IN THE WORLD, VERY

15

00:00:47,447 --> 00:00:46,880

INSPIRING PLACE FULL OF

16

00:00:49,315 --> 00:00:47,514

WONDERFUL SCIENTISTS AND

17

00:00:50,016 --> 00:00:49,382

ENGINEERS.

18

00:00:52,218 --> 00:00:50,083

SO I THANK YOU ALL FOR COMING

19

00:00:54,454 --> 00:00:52,285

TONIGHT.

20

00:00:55,855 --> 00:00:54,521

MY NAME IS SUSAN CALORIE.

21

00:00:59,058 --> 00:00:55,922

I'M THE MANAGER OF THE EARTH

22

00:00:59,792 --> 00:00:59,125

PUBLIC ENGAGEMENT OFFICE.

23

00:01:01,561 --> 00:00:59,859

IT'S MY PRIVILEGE TO WORK WITH

24

00:01:03,629 --> 00:01:01,628

ALL OF OUR SCIENTISTS AND

25

00:01:04,931 --> 00:01:03,696

ENGINEERS AND HELP TRANSLATE

26
00:01:07,366 --> 00:01:04,998
THEIR WORK INTO EVERYDAY ENGLISH

27
00:01:08,501 --> 00:01:07,433
BECAUSE SOME OF THEM TALK IN

28
00:01:13,372 --> 00:01:08,568
WORDS WE CAN'T ALL UNDERSTAND

29
00:01:14,006 --> 00:01:13,439
EXCEPT FOR THE MAN WHO WILL BE

30
00:01:15,775 --> 00:01:14,073
SPEAKING TO YOU TONIGHT.

31
00:01:19,278 --> 00:01:15,842
SO WE'VE ALL HEARD A LOT ABOUT

32
00:01:22,048 --> 00:01:19,345
DROUGHT, EL NINO, LA NINA.

33
00:01:23,416 --> 00:01:22,115
MAYBE EVEN SOMETHING LIKE THE

34
00:01:25,118 --> 00:01:23,483
PACIFIC DECADEAL OSCILLATION

35
00:01:26,686 --> 00:01:25,185
LATELY IN THE NEWS.

36
00:01:29,755 --> 00:01:26,753
ALL OF THESE PHENOMENA HAVE BEEN

37
00:01:32,425 --> 00:01:29,822
IN THE NEWS A LOT LATELY.

38
00:01:33,926 --> 00:01:32,492

MOST OF US DO NOT KNOW WHAT THEY

39

00:01:35,428 --> 00:01:33,993

ARE OR WHAT THEY MEAN OR WHAT

40

00:01:37,730 --> 00:01:35,495

THESE CONDITIONS ARE.

41

00:01:39,532 --> 00:01:37,797

SO WE HAVE A VERY SPECIAL GUEST

42

00:01:45,204 --> 00:01:39,599

TONIGHT WHO IS GOING TO HELP

43

00:01:47,607 --> 00:01:45,271

EXPLAIN ALL OF THIS TO US, WHAT

44

00:01:47,940 --> 00:01:47,674

THEY MEAN AND WHAT WE CAN

45

00:01:49,542 --> 00:01:48,007

EXPECT.

46

00:01:50,309 --> 00:01:49,609

OFTEN HE IS CALLED THE PROPHET

47

00:01:53,312 --> 00:01:50,376

OF CALIFORNIA CLIMATE.

48

00:01:54,981 --> 00:01:53,379

THOSE OF US AT JPL ALSO CALL HIM

49

00:01:57,183 --> 00:01:55,048

THE KING OF ONE-LINERS IS

50

00:01:59,318 --> 00:01:57,250

BECAUSE HE HAS A REAL SPECIAL

51
00:02:01,387 --> 00:01:59,385
ABILITY TO BOIL DOWN REALLY

52
00:02:02,522 --> 00:02:01,454
COMPLEX TOPIC INTO A VERY SHORT

53
00:02:04,190 --> 00:02:02,589
PHRASE OR SENTENCE.

54
00:02:08,261 --> 00:02:04,257
BUT OUR SPEAKER TONIGHT HAS BEEN

55
00:02:08,561 --> 00:02:08,328
A SCIENTIST AT JPL SINCE ABOUT

56
00:02:10,897 --> 00:02:08,628
1983.

57
00:02:14,500 --> 00:02:10,964
HIS RESEARCH IS FOCUSED ON

58
00:02:16,068 --> 00:02:14,567
IMPROVING OUR UNDERSTANDING OF

59
00:02:17,136 --> 00:02:16,135
EARTH'S CLIMATE AND IMPORTANT

60
00:02:19,906 --> 00:02:17,203
ENVIRONMENTAL PROBLEMS LIKE EL

61
00:02:21,073 --> 00:02:19,973
NINO AND LA NINA AND LONG-TERM

62
00:02:23,209 --> 00:02:21,140
CLIMATE CHANGE.

63
00:02:24,877 --> 00:02:23,276

HE'S THE AUTHOR OF MANY

64

00:02:25,244 --> 00:02:24,944

SCIENTIFIC PAPERS, POPULAR

65

00:02:26,579 --> 00:02:25,311

ARTICLES.

66

00:02:27,413 --> 00:02:26,646

HE WORKS WITH STUDENTS FROM ALL

67

00:02:29,715 --> 00:02:27,480

OVER THE WORLD.

68

00:02:32,351 --> 00:02:29,782

HE GIVES LECTURES ALL OVER

69

00:02:34,387 --> 00:02:32,418

CALIFORNIA AND OTHER LOCATIONS.

70

00:02:35,021 --> 00:02:34,454

HE'S A HUGE FAVORITE WITH THE

71

00:02:37,056 --> 00:02:35,088

MEDIA.

72

00:02:39,759 --> 00:02:37,123

I BELIEVE HE WAS ON NBC NEWS

73

00:02:41,360 --> 00:02:39,826

TONIGHT, CBS NEWS AND CNN.

74

00:02:44,030 --> 00:02:41,427

HE'S SOUTH OUT BY REPORTERS

75

00:02:46,232 --> 00:02:44,097

BECAUSE HE KNOWS SO MUCH ABOUT

76
00:02:48,167 --> 00:02:46,299
WEATHER AND CLIMATE.

77
00:02:51,370 --> 00:02:48,234
AND HE ALSO IN A RECENT ARTICLE

78
00:02:52,405 --> 00:02:51,437
WAS NAMED ONE OF THE WEST'S MOST

79
00:02:54,507 --> 00:02:52,472
INFLUENTIAL INDIVIDUALS IN

80
00:02:56,976 --> 00:02:54,574
DEALING WITH WATER ISSUES.

81
00:02:58,344 --> 00:02:57,043
HE GRADUATED FROM PURDUE

82
00:03:00,313 --> 00:02:58,411
UNIVERSITY, AND THEN HE WENT ON

83
00:03:01,180 --> 00:03:00,380
TO EARN HIS Ph.D. IN

84
00:03:01,948 --> 00:03:01,247
OCEANOGRAPHY AT THE UNIVERSITY

85
00:03:04,350 --> 00:03:02,015
OF HAWAII, PRETTY NICE PLACE TO

86
00:03:08,354 --> 00:03:04,417
STUDY.

87
00:03:11,390 --> 00:03:08,421
HE BEGAN HIS CAREER AT THE

88
00:03:13,859 --> 00:03:11,457

SCRIPS INSTITUTE OCEANOGRAPHY IN

89

00:03:15,561 --> 00:03:13,926

LA HO YEA AND THEN CAME TO JPL.

90

00:03:16,829 --> 00:03:15,628

DURING HIS CAREER HE HAS SERVED

91

00:03:18,030 --> 00:03:16,896

AS CONSULTANT TO MANY

92

00:03:20,032 --> 00:03:18,097

ORGANIZATIONS INCLUDING THE

93

00:03:22,501 --> 00:03:20,099

DEPARTMENT OF COMMERCE AND THE

94

00:03:23,936 --> 00:03:22,568

UNITED NATIONS, AS WELL AS MANY

95

00:03:25,671 --> 00:03:24,003

OTHER SCIENTIFIC ORGANIZATIONS.

96

00:03:27,306 --> 00:03:25,738

HE'S RECEIVED MANY AWARDS FOR

97

00:03:29,041 --> 00:03:27,373

HIS SCIENTIFIC WORK.

98

00:03:30,276 --> 00:03:29,108

BUT ALSO FOR COMMUNICATING

99

00:03:32,144 --> 00:03:30,343

SCIENCE TO THE PUBLIC.

100

00:03:35,248 --> 00:03:32,211

WE'RE SO GLAD TO HAVE HIM WITH

101
00:03:37,450 --> 00:03:35,315
US TONIGHT TO EXPLAIN WHAT'S

102
00:03:41,153 --> 00:03:37,517
HAPPENING IN OUR WORLD.

103
00:03:41,587 --> 00:03:41,220
DR. BILL PATZERT.

104
00:03:46,125 --> 00:03:41,654
[APPLAUSE]

105
00:03:47,159 --> 00:03:46,192
>> THANK YOU, SUSAN.

106
00:03:47,693 --> 00:03:47,226
>> WELL, GOOD EVENING,

107
00:03:49,061 --> 00:03:47,760
EVERYBODY.

108
00:03:50,196 --> 00:03:49,128
CAN EVERYBODY HEAR ME?

109
00:03:51,497 --> 00:03:50,263
OKAY, GOOD.

110
00:03:53,699 --> 00:03:51,564
WELL, WELCOME TO JPL.

111
00:03:54,567 --> 00:03:53,766
YOU KNOW, I HOPE YOU ENJOY

112
00:03:55,668 --> 00:03:54,634
YOURSELF THIS EVENING BECAUSE

113
00:03:59,639 --> 00:03:55,735

YOU PAID FOR IT, RIGHT?

114

00:04:01,741 --> 00:03:59,706

WE'RE ALL WORKING FOR YOU.

115

00:04:02,508 --> 00:04:01,808

NOW, THE -- WE HAVE A BIG TOPIC

116

00:04:04,543 --> 00:04:02,575

THIS EVENING.

117

00:04:04,910 --> 00:04:04,610

EVERYBODY KNOWS ABOUT THE

118

00:04:06,979 --> 00:04:04,977

DROUGHT.

119

00:04:08,014 --> 00:04:07,046

WE'RE ON OUR KNEES WITH THIS

120

00:04:10,082 --> 00:04:08,081

DROUGHT, ALL RIGHT?

121

00:04:12,785 --> 00:04:10,149

THIS DROUGHTING IS PAINFUL.

122

00:04:13,252 --> 00:04:12,852

THIS DROUGHT HAS BEEN

123

00:04:15,454 --> 00:04:13,319

LONG-LASTING.

124

00:04:16,689 --> 00:04:15,521

AND WHAT WE ALL REALLY WANT TO

125

00:04:18,357 --> 00:04:16,756

KNOW, WHEN ARE WE GOING TO GET

126
00:04:21,327 --> 00:04:18,424
OUT OF THIS DROUGHT AND I'LL TRY

127
00:04:21,727 --> 00:04:21,394
TO ANSWER THAT QUESTION THIS

128
00:04:23,696 --> 00:04:21,794
EVENING.

129
00:04:26,332 --> 00:04:23,763
NOW, WHAT IS A DROUGHT?

130
00:04:27,933 --> 00:04:26,399
FIRST OF ALL, YOU KNOW, FOR SOME

131
00:04:30,269 --> 00:04:28,000
PEOPLE IT MIGHT BE THE LAST TIME

132
00:04:31,737 --> 00:04:30,336
YOU GOT A PAY RAISE, YOU KNOW?

133
00:04:33,906 --> 00:04:31,804
OR FOR SOME STUDENTS THE LAST

134
00:04:37,710 --> 00:04:33,973
TIME YOU GOT AN "A."

135
00:04:38,044 --> 00:04:37,777
OR THE LAST TIME YOU GOT A TAX

136
00:04:40,846 --> 00:04:38,111
REFUND.

137
00:04:42,081 --> 00:04:40,913
BUT I'M GOING TO BE TALKING

138
00:04:42,682 --> 00:04:42,148

ABOUT RAIN AND SNOW OR THE LACK

139

00:04:43,349 --> 00:04:42,749

OF IT.

140

00:04:45,484 --> 00:04:43,416

THAT'S MY DROUGHT FOR THIS

141

00:04:46,719 --> 00:04:45,551

EVENING.

142

00:04:49,355 --> 00:04:46,786

NOW, I'M GOING TO TELL YOU WHAT

143

00:04:51,490 --> 00:04:49,422

I'M GOING TO TELL YOU.

144

00:04:53,326 --> 00:04:51,557

THERE'S A STRONG CONNECTION

145

00:04:55,094 --> 00:04:53,393

BETWEEN WHAT HAPPENS IN THE

146

00:04:57,196 --> 00:04:55,161

PACIFIC OCEAN AND WHAT HAPPENS

147

00:04:59,699 --> 00:04:57,263

TO THE CLIMATE NOT ONLY HERE IN

148

00:05:00,032 --> 00:04:59,766

CALIFORNIA BUT ACROSS THE ENTIRE

149

00:05:02,835 --> 00:05:00,099

PLANET.

150

00:05:03,202 --> 00:05:02,902

SO THE KEY IS REALLY THE

151
00:05:04,003 --> 00:05:03,269
PACIFIC.

152
00:05:08,007 --> 00:05:04,070
WHEN THE PACIFIC SPEAKS, WE ALL

153
00:05:10,076 --> 00:05:08,074
SHOULD LISTEN.

154
00:05:11,844 --> 00:05:10,143
AND THEN THE BIG QUESTION IS, IS

155
00:05:13,179 --> 00:05:11,911
THAT THERE'S A LOT ABOUT EL

156
00:05:14,647 --> 00:05:13,246
NINO.

157
00:05:15,314 --> 00:05:14,714
EL NINO IS EMINENT.

158
00:05:17,283 --> 00:05:15,381
IT'S BUILDING.

159
00:05:17,650 --> 00:05:17,350
WE'LL TAKE A LOOK AT IT THIS

160
00:05:20,119 --> 00:05:17,717
EVENING.

161
00:05:21,787 --> 00:05:20,186
IF IT MATURES, WILL IT RESCUE US

162
00:05:23,689 --> 00:05:21,854
FROM THE DROUGHTING?

163
00:05:25,224 --> 00:05:23,756

SO THOSE ARE THREE BIG TOPICS.

164

00:05:27,426 --> 00:05:25,291

YOU KNOW THAT'S A LOT TO TALK

165

00:05:28,928 --> 00:05:27,493

ABOUT, BUT EACH ONE OF THEM IS A

166

00:05:30,329 --> 00:05:28,995

LECTURE IN THEMSELVES.

167

00:05:31,530 --> 00:05:30,396

BUT THEY'RE SO CONNECTED.

168

00:05:33,532 --> 00:05:31,597

I THOUGHT I'D SIMPLIFY IT AND

169

00:05:34,734 --> 00:05:33,599

PUT ALL THREE TOGETHER.

170

00:05:38,538 --> 00:05:34,801

DISCOURAGED HERE, ALL RIGHT?

171

00:05:40,773 --> 00:05:39,472

THIS IS THE RAINFALL IN

172

00:05:42,575 --> 00:05:40,840

LOS ANGELES.

173

00:05:44,777 --> 00:05:42,642

THE AVERAGE RAINFALL IN

174

00:05:45,111 --> 00:05:44,844

LOS ANGELES IS ABOUT 15 INCHES A

175

00:05:47,380 --> 00:05:45,178

YEAR.

176

00:05:49,849 --> 00:05:47,447

IF YOU'RE AT LONG BEACH, IT'S

177

00:05:54,487 --> 00:05:49,916

ABOUT 10 OR 12 INCHES A YEAR.

178

00:05:55,554 --> 00:05:54,554

UP HERE IN THE SAN GRAIB GABRIEL

179

00:05:56,222 --> 00:05:55,621

RAEL IT MANY BE 24 TO 30 INCHES

180

00:05:58,391 --> 00:05:56,289

A YEAR.

181

00:06:00,659 --> 00:05:58,458

A LOT DEPENDS ON TOPOGRAPHY, A

182

00:06:03,229 --> 00:06:00,726

LOT OF MICROCLIMATES.

183

00:06:06,499 --> 00:06:03,296

2004, THAT WAS A SWEET YEAR.

184

00:06:08,334 --> 00:06:06,566

THAT WAS ACTUALLY THE WETTEST

185

00:06:11,804 --> 00:06:08,401

YEAR IN THE LAST 140 YEARS, BUT

186

00:06:12,138 --> 00:06:11,871

AFTER THAT, WE HAD A LOT OF DRY

187

00:06:13,939 --> 00:06:12,205

YEARS.

188

00:06:16,208 --> 00:06:14,006

NOW, A COUPLE OF THOSE YEARS

189

00:06:17,843 --> 00:06:16,275

DON'T LOOK SO DRY.

190

00:06:19,545 --> 00:06:17,910

BUT ONE OF THE FEATURES WE HAVE

191

00:06:22,415 --> 00:06:19,612

HERE IN CALIFORNIA, ONE OF THE

192

00:06:23,115 --> 00:06:22,482

WAYS WE GET RAIN ARE THESE

193

00:06:25,651 --> 00:06:23,182

ATMOSPHERIC RIVERS.

194

00:06:26,919 --> 00:06:25,718

YOU KNOW, THEY COME AT US LIKE A

195

00:06:29,455 --> 00:06:26,986

FIRE HOSE.

196

00:06:32,124 --> 00:06:29,522

A GOOD EXAMPLE WAS THAT TWO

197

00:06:34,560 --> 00:06:32,191

WEEKS BEFORE CHRISTMAS IN 2010.

198

00:06:34,860 --> 00:06:34,627

WE HAD TEN INCHES OF RAIN IN TEN

199

00:06:38,164 --> 00:06:34,927

DAYS.

200

00:06:38,497 --> 00:06:38,231

BUT IT COMES AT YOU SO FAST AND

201
00:06:39,698 --> 00:06:38,564
FURIOUS.

202
00:06:41,600 --> 00:06:39,765
THOSE KIND OF EVENTS.

203
00:06:43,402 --> 00:06:41,667
IT'S LIKE SOMEBODY AIMING A FIRE

204
00:06:45,204 --> 00:06:43,469
HOSE AT YOU AND YOU'RE SITTING

205
00:06:46,872 --> 00:06:45,271
THERE WITH A CHAMPAGNE GLASS

206
00:06:48,707 --> 00:06:46,939
TRYING TO CATCH THE WATER.

207
00:06:50,209 --> 00:06:48,774
AND SO THE WAY WE'RE ENGINEERED

208
00:06:52,878 --> 00:06:50,276
HERE IN SOUTHERN CALIFORNIA,

209
00:06:53,746 --> 00:06:52,945
MOST OF THAT ENDS UP WHERE?

210
00:06:57,216 --> 00:06:53,813
IN THE OCEAN.

211
00:06:58,284 --> 00:06:57,283
MAN, YOU GUYS ARE GOOD.

212
00:07:01,187 --> 00:06:58,351
ALL RIGHT.

213
00:07:02,321 --> 00:07:01,254

SO LET'S TAKE THOSE SPHERIC

214

00:07:05,658 --> 00:07:02,388

RIVERS OUT OF EQUATION.

215

00:07:08,861 --> 00:07:05,725

SO THE BOTTOM LINE IS, WE'VE HAD

216

00:07:10,329 --> 00:07:08,928

TEN REALLY DRY YEARS IN A ROW.

217

00:07:10,830 --> 00:07:10,396

IF YOU TAKE THOSE SPHERIC

218

00:07:11,230 --> 00:07:10,897

RIVERS.

219

00:07:15,167 --> 00:07:11,297

ALL RIGHT?

220

00:07:16,168 --> 00:07:15,234

NOT FOUR YEARS.

221

00:07:18,337 --> 00:07:16,235

TEN YEARS.

222

00:07:19,705 --> 00:07:18,404

THE LAST FOUR YEARS HAVE JUST

223

00:07:21,407 --> 00:07:19,772

BEEN PUNISHING.

224

00:07:23,409 --> 00:07:21,474

NOW, THIS IS INTERESTING.

225

00:07:25,611 --> 00:07:23,476

IF YOU TAKE THE DRIEST FOUR

226
00:07:29,014 --> 00:07:25,678
CONSECUTIVE YEARS IN A ROW, YOU

227
00:07:33,953 --> 00:07:29,081
HAVE TO BE IN A ROW, FOUR IN A

228
00:07:36,222 --> 00:07:34,020
ROW, 2011 TO 2015 WAS 29 INCHES

229
00:07:38,624 --> 00:07:36,289
TOTAL FOR THE FOUR YEARS.

230
00:07:40,459 --> 00:07:38,691
SO IF THE AVERAGE IS 15 A YEAR,

231
00:07:42,127 --> 00:07:40,526
THAT MEANS FOR FOUR YEARS, WE

232
00:07:44,763 --> 00:07:42,194
HAD LESS THAN 50% OF OUR

233
00:07:46,232 --> 00:07:44,830
RAINFALL IN THE LAST FOUR YEARS.

234
00:07:47,500 --> 00:07:46,299
SOME OF THESE OTHER YEARS ARE

235
00:07:50,135 --> 00:07:47,567
REALLY INTERESTING TOO, BUT I

236
00:07:50,903 --> 00:07:50,202
DON'T WANT TO TAKE TOO LONG

237
00:07:51,303 --> 00:07:50,970
HERE.

238
00:07:53,205 --> 00:07:51,370

ALL RIGHT?

239

00:07:55,941 --> 00:07:53,272
47 TO '51, THAT WAS A BIG

240

00:07:57,276 --> 00:07:56,008
DROUGHT PERIOD, BY THE WAY, MID

241

00:07:59,645 --> 00:07:57,343
'40s TO THE MID '70s AND A

242

00:08:02,448 --> 00:07:59,712
COUPLE OF GUYS IN HERE WILL

243

00:08:02,982 --> 00:08:02,515
RECOGNIZE 1897, YOU KNOW, 1901.

244

00:08:07,219 --> 00:08:03,049
ALL RIGHT.

245

00:08:07,820 --> 00:08:07,286
I'M NOT GOING TO NAME ANY NAMES.

246

00:08:09,455 --> 00:08:07,887
ALL RIGHT.

247

00:08:10,789 --> 00:08:09,522
NOW, HOW CAN YOU REALLY TELL

248

00:08:13,659 --> 00:08:10,856
YOU'RE IN A DROUGHT?

249

00:08:16,262 --> 00:08:13,726
AND YOU KNOW, I HAVE EXPERIENCED

250

00:08:16,829 --> 00:08:16,329
THIS ALREADY FROM MY LOCAL WATER

251
00:08:17,229 --> 00:08:16,896
DISTRICT.

252
00:08:19,932 --> 00:08:17,296
ALL RIGHT?

253
00:08:21,100 --> 00:08:19,999
IF YOU HAVEN'T BEEN BUSTED YET,

254
00:08:22,334 --> 00:08:21,167
YOU WILL BE SOON.

255
00:08:23,469 --> 00:08:22,401
BECAUSE EVERYBODY HAS TO CUT

256
00:08:25,704 --> 00:08:23,536
BACK ON THEIR WATER.

257
00:08:26,038 --> 00:08:25,771
AND THAT'S A WHOLE LECTURE IN

258
00:08:27,473 --> 00:08:26,105
ITSELF.

259
00:08:28,173 --> 00:08:27,540
GOVERNOR BROWN, YOU KNOW I LOVE

260
00:08:29,808 --> 00:08:28,240
GOVERNOR BROWN.

261
00:08:30,209 --> 00:08:29,875
I VOTED FOR GOVERNOR BROWN FOUR

262
00:08:31,243 --> 00:08:30,276
TIMES.

263
00:08:31,677 --> 00:08:31,310

I LOVE THE GUY.

264

00:08:32,478 --> 00:08:31,744

ALL RIGHT?

265

00:08:34,980 --> 00:08:32,545

BUT HE'S RIGHT.

266

00:08:37,283 --> 00:08:35,047

WE'VE GOT TO CUT BACK ON WATER.

267

00:08:37,716 --> 00:08:37,350

SO THERE'S MY LITTLE

268

00:08:38,117 --> 00:08:37,783

ADVERTISEMENT.

269

00:08:41,086 --> 00:08:38,184

ALL RIGHT.

270

00:08:42,588 --> 00:08:41,153

SO LET'S LOOK AT THE LONG-TERM

271

00:08:43,522 --> 00:08:42,655

CLIMATE OF CALIFORNIA.

272

00:08:45,658 --> 00:08:43,589

THIS IS DOWNTOWN AGAIN.

273

00:08:47,226 --> 00:08:45,725

IT'S A NICE LONG RECORD, GOES

274

00:08:49,695 --> 00:08:47,293

BACK TO 1878.

275

00:08:50,796 --> 00:08:49,762

YOU SEE THE AVERAGE HERE IS 15

276

00:08:53,232 --> 00:08:50,863

INCHES A YEAR.

277

00:08:53,566 --> 00:08:53,299

SOME YEARS WE GET LESS THAN 4

278

00:08:55,634 --> 00:08:53,633

INCHES.

279

00:08:56,602 --> 00:08:55,701

WE'VE HAD OTHER YEARS WHERE

280

00:08:59,004 --> 00:08:56,669

THEY'RE ABOVE 30 INCHES.

281

00:09:01,173 --> 00:08:59,071

SO THERE'S A LOT OF VARIABILITY.

282

00:09:06,378 --> 00:09:01,240

BUT IF YOU LOOK CAREFULLY AT

283

00:09:07,613 --> 00:09:06,445

THIS CHART, ARE THERE MORE WET

284

00:09:08,614 --> 00:09:07,680

YEARS OR MORE DRY YEARS?

285

00:09:12,418 --> 00:09:08,681

DRY YEARS.

286

00:09:15,220 --> 00:09:12,485

IN FACT, SEVEN OUT OF TEN YEARS

287

00:09:15,621 --> 00:09:15,287

IN LOS ANGELES ARE BLOWS NORMAL

288

00:09:17,756 --> 00:09:15,688

RAINFALL.

289

00:09:19,725 --> 00:09:17,823

SO THE NEXT TIME SOMEBODY ASKS

290

00:09:21,260 --> 00:09:19,792

YOU, WHAT DOES IT LOOK LIKE FOR

291

00:09:22,294 --> 00:09:21,327

RAINFALL NEXT YEAR, WHAT ARE YOU

292

00:09:22,761 --> 00:09:22,361

GOING TO SAY?

293

00:09:23,896 --> 00:09:22,828

DRY.

294

00:09:25,164 --> 00:09:23,963

YOU'RE GOING TO BE RIGHT SEVEN

295

00:09:29,368 --> 00:09:25,231

OUT OF TEN TIMES.

296

00:09:29,668 --> 00:09:29,435

YOU WISH YOU HAD THOSE ODDS IN

297

00:09:30,069 --> 00:09:29,735

VEGAS.

298

00:09:33,472 --> 00:09:30,136

ALL RIGHT.

299

00:09:35,808 --> 00:09:33,539

SO IN MANY WAYS, WE'RE ALWAYS IN

300

00:09:36,208 --> 00:09:35,875

A DROUGHT IN SOUTHERN

301
00:09:39,778 --> 00:09:36,275
CALIFORNIA.

302
00:09:40,179 --> 00:09:39,845
IT'S A DRY PLACE, SOUTHERN

303
00:09:44,316 --> 00:09:40,246
CALIFORNIA.

304
00:09:45,918 --> 00:09:44,383
WITH JUST EPISODIC WET PERIODS.

305
00:09:47,119 --> 00:09:45,985
NOW, LET'S LOOK AT IT AGAIN A

306
00:09:48,787 --> 00:09:47,186
LITTLE MORE CAREFULLY.

307
00:09:50,022 --> 00:09:48,854
THIS IS THE SAME GRAPH, 15

308
00:09:52,257 --> 00:09:50,089
INCHES A YEAR.

309
00:09:56,362 --> 00:09:52,324
NOW FROM 1945 TO THE MID '70s WE

310
00:09:58,497 --> 00:09:56,429
IN A LOT OF DRY YEARS.

311
00:09:59,164 --> 00:09:58,564
THAT WAS A 30-YEAR DROUGHT, BY

312
00:10:00,666 --> 00:09:59,231
THE WAY.

313
00:10:02,735 --> 00:10:00,733

BUT IF YOU AVERAGE IT INSTEAD OF

314

00:10:03,836 --> 00:10:02,802

15 INCHES A YEAR, IT'S ABOUT 13

315

00:10:05,804 --> 00:10:03,903

INCHES A YEAR.

316

00:10:07,339 --> 00:10:05,871

AND THIS DROUGHT WHICH REALLY

317

00:10:08,907 --> 00:10:07,406

STARTED IN 2000, I THINK YOU'LL

318

00:10:10,576 --> 00:10:08,974

BE CONVINCED AT THE END OF THE

319

00:10:13,812 --> 00:10:10,643

TALK, AGAIN THE SAME THING ABOUT

320

00:10:15,280 --> 00:10:13,879

13 INCHES.

321

00:10:16,415 --> 00:10:15,347

THE '80s AND THE '90s WERE

322

00:10:18,384 --> 00:10:16,482

UNUSUALLY WET.

323

00:10:19,485 --> 00:10:18,451

THOSE WERE GOOD YEARS.

324

00:10:21,387 --> 00:10:19,552

THOSE WHERE IS SWEET YEARS.

325

00:10:23,355 --> 00:10:21,454

BUT YOU KNOW, THERE WERE ABOUT

326

00:10:25,290 --> 00:10:23,422

AVERAGING ABOUT 17 INCHES.

327

00:10:27,192 --> 00:10:25,357

SO THE INTERESTING THING ABOUT

328

00:10:30,729 --> 00:10:27,259

THAT, THIS IS HOW PRECARIOUS WE

329

00:10:32,698 --> 00:10:30,796

ARE WITH WATER IN CALIFORNIA.

330

00:10:35,768 --> 00:10:32,765

YOU ALSO GET MINI DROUGHTS.

331

00:10:37,970 --> 00:10:35,835

REMEMBER THE '87 TO '92 DROUGHT?

332

00:10:39,271 --> 00:10:38,037

NOW, THAT WAS THE DRIEST FIVE

333

00:10:40,239 --> 00:10:39,338

CONSECUTIVE YEARS IN THE

334

00:10:41,140 --> 00:10:40,306

HISTORICAL RECORD.

335

00:10:43,208 --> 00:10:41,207

REMEMBER THAT'S WHEN EVERYBODY

336

00:10:45,077 --> 00:10:43,275

WAS PAINTING THEIR LAWN GREEN.

337

00:10:45,444 --> 00:10:45,144

>> THAT'S WHEN THE THAT FIRST

338

00:10:47,980 --> 00:10:45,511

STARTED.

339

00:10:50,282 --> 00:10:48,047

AND THAT AVERAGED FOR FIVE YEARS

340

00:10:51,984 --> 00:10:50,349

ONLY 9.5 INCHES AND SO YOU GET

341

00:10:53,819 --> 00:10:52,051

FIVE YEARS, YOU GET 20 YEARS,

342

00:10:57,022 --> 00:10:53,886

YOU GET TEN YEARS, YOU GET 30

343

00:10:58,757 --> 00:10:57,089

YEARS ON AND OFF, WET AND DRY.

344

00:11:01,393 --> 00:10:58,824

NOW, ANYBODY RECOGNIZE WHAT

345

00:11:04,129 --> 00:11:01,460

THESE PINK THINGS ARE?

346

00:11:07,666 --> 00:11:04,196

THIS IS -- IF YOU GET THIS ONE,

347

00:11:07,966 --> 00:11:07,733

ALL RIGHT, YOU GET THE PRIZE.

348

00:11:10,502 --> 00:11:08,033

OKAY.

349

00:11:11,203 --> 00:11:10,569

THAT'S A HARD QUESTION.

350

00:11:15,841 --> 00:11:11,270

THAT'S WHEN JERRY BROWN WAS

351
00:11:16,241 --> 00:11:15,908
GOVERNOR.

352
00:11:16,675 --> 00:11:16,308
ALL RIGHT?

353
00:11:19,111 --> 00:11:16,742
[LAUGHTER]

354
00:11:19,712 --> 00:11:19,178
NOW, AS I MENTIONED, I LOVE

355
00:11:21,747 --> 00:11:19,779
JERRY BROWN.

356
00:11:24,516 --> 00:11:21,814
I VOTED FOR HIM FOUR TIMES.

357
00:11:26,552 --> 00:11:24,583
NOW, THE FIRST TIME I VOTED FOR

358
00:11:28,554 --> 00:11:26,619
HIM, HE WAS ELECTED INTO A

359
00:11:30,589 --> 00:11:28,621
DROUGHT IN 1975.

360
00:11:34,126 --> 00:11:30,656
THAT WAS A BAD DROUGHT.

361
00:11:36,795 --> 00:11:34,193
REMEMBER IT CULMINATED IN 1977?

362
00:11:38,797 --> 00:11:36,862
BUT IN HIS SECOND TERM, END OF

363
00:11:42,000 --> 00:11:38,864

HIS FIRST AND SECOND TERM, WE

364

00:11:44,403 --> 00:11:42,067

HAD SOME OF THE WETTEST YEARS IN

365

00:11:45,571 --> 00:11:44,470

THE EARLY LATE '70s, EARLY '80s.

366

00:11:46,438 --> 00:11:45,638

SEE THESE WET YEARS?

367

00:11:47,873 --> 00:11:46,505

THOSE ARE THREE.

368

00:11:49,441 --> 00:11:47,940

ONE THING YOU CAN SAY ABOUT

369

00:11:51,076 --> 00:11:49,508

JERRY BROWN, HE'S LUCKY.

370

00:11:53,612 --> 00:11:51,143

HE WAS ELECTED INTO A DROUGHT,

371

00:11:54,480 --> 00:11:53,679

BUT IN HIS SECOND TERM, HE GOT

372

00:11:57,516 --> 00:11:54,547

BAILED OUT.

373

00:11:57,950 --> 00:11:57,583

NOW, I VOTED FOR HIM A THIRD

374

00:11:58,350 --> 00:11:58,017

TIME.

375

00:11:59,284 --> 00:11:58,417

ALL RIGHT?

376
00:11:59,885 --> 00:11:59,351
IN SPIKE OF THE FACT WE WERE IN

377
00:12:02,054 --> 00:11:59,952
A DROUGHT.

378
00:12:04,189 --> 00:12:02,121
I THINK THAT'S WHY I VOTED FOR

379
00:12:06,058 --> 00:12:04,256
HIM BECAUSE HE WAS SO LUCKY THE

380
00:12:07,993 --> 00:12:06,125
FIRST TIME, ALL RIGHT, I FIGURE

381
00:12:10,529 --> 00:12:08,060
HE'S GOING TO GET US OUT OF THIS

382
00:12:10,929 --> 00:12:10,596
DROUGHT IN HIS FOURTH TERM

383
00:12:12,464 --> 00:12:10,996
COMING UP.

384
00:12:14,900 --> 00:12:12,531
THAT'S A JOKE, YOU GUYS.

385
00:12:15,167 --> 00:12:14,967
I'M NOT SURE HE'S GOING TO DO

386
00:12:15,834 --> 00:12:15,234
IT.

387
00:12:18,403 --> 00:12:15,901
ALL RIGHT.

388
00:12:18,704 --> 00:12:18,470

MY POINT IS, THE DROUGHT IS NOT

389

00:12:21,540 --> 00:12:18,771

ZERO.

390

00:12:24,476 --> 00:12:21,607

OR EVEN HALF OF NORMAL.

391

00:12:26,812 --> 00:12:24,543

IT'S ABOUT 85% OF AVERAGE, BUT

392

00:12:27,846 --> 00:12:26,879

OVER A FEW DECADES.

393

00:12:30,315 --> 00:12:27,913

NOT A FEW YEARS.

394

00:12:32,584 --> 00:12:30,382

A FEW DECADES.

395

00:12:32,985 --> 00:12:32,651

THAT'S ENOUGH TO SEND YOU TO

396

00:12:35,487 --> 00:12:33,052

YOUR KNEES.

397

00:12:39,391 --> 00:12:35,554

SO OUR LAST FOUR YEARS IS A B

398

00:12:39,758 --> 00:12:39,458

DROUGHT THAT'S PART OF A LONGER

399

00:12:40,692 --> 00:12:39,825

DROUGHT.

400

00:12:41,026 --> 00:12:40,759

NOW, THIS IS THE DROUGHT

401
00:12:42,561 --> 00:12:41,093
MONITOR.

402
00:12:43,095 --> 00:12:42,628
I'VE BEEN LOOKING AT THIS FOR

403
00:12:45,631 --> 00:12:43,162
MANY YEARS.

404
00:12:46,398 --> 00:12:45,698
IT MEASURES HOW INTENSE OVER THE

405
00:12:47,232 --> 00:12:46,465
CONTINENTAL UNITED STATES

406
00:12:49,902 --> 00:12:47,299
DROUGHTS ARE.

407
00:12:52,471 --> 00:12:49,969
AND YOU CAN SEE HERE THE DARKER

408
00:12:52,838 --> 00:12:52,538
NUMBERS, THOSE ARE EXCEPTIONAL

409
00:12:54,173 --> 00:12:52,905
DROUGHT.

410
00:12:56,408 --> 00:12:54,240
WE'VE BEEN IN EXCEPTIONAL

411
00:12:56,708 --> 00:12:56,475
DROUGHT HERE FOR A NUMBER OF

412
00:12:58,644 --> 00:12:56,775
YEARS.

413
00:13:00,512 --> 00:12:58,711

BUT YOU NOTICE THAT THE ENTIRE

414

00:13:02,214 --> 00:13:00,579

WEST IS IN A DROUGHT.

415

00:13:05,017 --> 00:13:02,281

NOT ONLY THAT, THAT DROUGHT GOES

416

00:13:05,384 --> 00:13:05,084

INTO MEXICO AND IT GOES INTO

417

00:13:05,784 --> 00:13:05,451

CANADA.

418

00:13:08,120 --> 00:13:05,851

ALL RIGHT?

419

00:13:08,487 --> 00:13:08,187

SO THIS IS A LONG-LASTING

420

00:13:09,788 --> 00:13:08,554

DROUGHT.

421

00:13:12,257 --> 00:13:09,855

BUT THE IMPORTANT THING YOU HAVE

422

00:13:13,759 --> 00:13:12,324

TO REMEMBER ABOUT DROUGHTS,

423

00:13:15,561 --> 00:13:13,826

DROUGHTS ARE LARGE.

424

00:13:16,295 --> 00:13:15,628

THEY'RE NOT LOCAL.

425

00:13:19,431 --> 00:13:16,362

THEY'RE LARGE.

426

00:13:22,034 --> 00:13:19,498

SO FIRES FROM ALASKA ALL UP

427

00:13:23,535 --> 00:13:22,101

THROUGH BRITISHbcñç COLUMBIA,

428

00:13:25,170 --> 00:13:23,602

PACIFIC NORTHWEST, BY THE WAY,

429

00:13:25,971 --> 00:13:25,237

OREGON AND WASHINGTONING ARE

430

00:13:26,271 --> 00:13:26,038

PRETTY SEVERE DROUGHT BY THE

431

00:13:27,973 --> 00:13:26,338

WAY.

432

00:13:29,241 --> 00:13:28,040

AND THEY DON'T HAVE THE WATER

433

00:13:32,444 --> 00:13:29,308

INFRASTRUCTURE THAT WE DO.

434

00:13:33,979 --> 00:13:32,511

SO DROUGHTS ARE LARGE.

435

00:13:36,114 --> 00:13:34,046

NOW, THIS IS AS INTERESTING ONE.

436

00:13:37,349 --> 00:13:36,181

THIS IS THE DROUGHT MONITOR FROM

437

00:13:38,784 --> 00:13:37,416

A YEAR AGO.

438

00:13:39,918 --> 00:13:38,851

AND THIS IS THIS MAY.

439

00:13:43,856 --> 00:13:39,985

YOU NOTICE THE DIFFERENCE

440

00:13:45,424 --> 00:13:43,923

BETWEEN THE TWO CHARTS?

441

00:13:47,459 --> 00:13:45,491

THAT SERIOUS DROUGHT IN TEXAS

442

00:13:49,661 --> 00:13:47,526

AND OKLAHOMA AND THE LOWER

443

00:13:51,763 --> 00:13:49,728

MIDWEST, ALL OF A STUDIES

444

00:13:54,566 --> 00:13:51,830

APPEARED IN SIX WEEKS OF

445

00:13:55,000 --> 00:13:54,633

TORRENTIAL RAINS IN TEXAS.

446

00:13:58,537 --> 00:13:55,067

ALL RIGHT?

447

00:14:02,374 --> 00:13:58,604

SO DROUGHTS END.

448

00:14:03,408 --> 00:14:02,441

BUT THIS IS SOMETHING YOU HAVE

449

00:14:04,943 --> 00:14:03,475

TO REMEMBER.

450

00:14:06,144 --> 00:14:05,010

AND THIS IS A VERY FAMOUS

451
00:14:08,247 --> 00:14:06,211
SCIENTIST ONCE SAID THIS.

452
00:14:08,580 --> 00:14:08,314
GREAT DROUGHTS END WITH GREAT

453
00:14:09,181 --> 00:14:08,647
FLOODS.

454
00:14:14,853 --> 00:14:09,248
YOU KNOW WHO THAT WAS?

455
00:14:15,387 --> 00:14:14,920
THAT WAS ME.

456
00:14:15,787 --> 00:14:15,454
[LAUGHTER]

457
00:14:17,522 --> 00:14:15,854
ALL RIGHT?

458
00:14:19,892 --> 00:14:17,589
AND SO THIS IS WHEN WE LOOK BACK

459
00:14:22,227 --> 00:14:19,959
IN HISTORY, OUR GREAT DROUGHTS

460
00:14:27,466 --> 00:14:22,294
TEND TO END IN GREAT FLOODS.

461
00:14:27,933 --> 00:14:27,533
SO BE CAREFUL WHAT YOU WISH FOR.

462
00:14:30,369 --> 00:14:28,000
ALL RIGHT?

463
00:14:34,973 --> 00:14:30,436

NOW, THIS IS JUST COOL.

464

00:14:36,308 --> 00:14:35,040

YOU KNOW, PICASSO ONCE SAID THAT

465

00:14:37,342 --> 00:14:36,375

GOODARDISTS BORROW AND GREAT

466

00:14:39,745 --> 00:14:37,409

ARTISTS STEAL.

467

00:14:40,045 --> 00:14:39,812

THE SAME THING IS TRUE FOR POWER

468

00:14:42,581 --> 00:14:40,112

POINT.

469

00:14:43,115 --> 00:14:42,648

I STOLE THIS ONE FROM THE "L.A.

470

00:14:44,750 --> 00:14:43,182

TIMES."

471

00:14:47,953 --> 00:14:44,817

BUT THE IMPORTANT THING HERE,

472

00:14:50,589 --> 00:14:48,020

THIS IS ABOUT FIVE YEARS OF THE

473

00:14:53,725 --> 00:14:50,656

DROUGHT MONITOR FROM 2011, 2015.

474

00:14:55,627 --> 00:14:53,792

AND YOU NOTICE HOW IT BUILDS

475

00:14:56,061 --> 00:14:55,694

OVER FOUR OR FIVE YEARS.

476
00:14:57,496 --> 00:14:56,128
OKAY.

477
00:15:01,033 --> 00:14:57,563
SO WHAT'S MY POINT?

478
00:15:02,367 --> 00:15:01,100
DROUGHTS ARE SLOW.

479
00:15:02,668 --> 00:15:02,434
SO THEY'RE LARGE.

480
00:15:07,606 --> 00:15:02,735
RIGHT?

481
00:15:11,209 --> 00:15:07,673
AND THEY'RE SLOW.

482
00:15:12,010 --> 00:15:11,276
NOW, I TOOK THIS SAME DATA, THIS

483
00:15:14,813 --> 00:15:12,077
DROUGHT MONITOR DATA AND I

484
00:15:16,648 --> 00:15:14,880
PLOTTED IT THIS WAY.

485
00:15:18,116 --> 00:15:16,715
ALL RIGHT.

486
00:15:18,917 --> 00:15:18,183
YOU CAN'T SEE IT THAT WELL FOR

487
00:15:20,452 --> 00:15:18,984
SOME REASON.

488
00:15:22,387 --> 00:15:20,519

ANY HOW WHAT IT'S SUPPOSED TO

489

00:15:24,523 --> 00:15:22,454

SHOW, THE DARKER COLORS TELL YOU

490

00:15:25,991 --> 00:15:24,590

HOW EXTREME THE DROUGHT IS.

491

00:15:29,394 --> 00:15:26,058

ZERO MEANS NO DAUGHTER.

492

00:15:29,761 --> 00:15:29,461

THE LIGHTER COLORS ARE MODERATE

493

00:15:31,396 --> 00:15:29,828

DROUGHT.

494

00:15:34,299 --> 00:15:31,463

THIS GOES BACKING TO 2000.

495

00:15:38,770 --> 00:15:34,366

SO THE POINT HERE WAS FROM 2000

496

00:15:39,338 --> 00:15:38,837

TO ABOUT 2004, WE WERE IN A

497

00:15:42,274 --> 00:15:39,405

BUILDING DROUGHT.

498

00:15:42,574 --> 00:15:42,341

THEN WE HAD A COUPLE OF YEARS OF

499

00:15:43,075 --> 00:15:42,641

RAIN.

500

00:15:45,110 --> 00:15:43,142

REMEMBER 2004?

501
00:15:45,410 --> 00:15:45,177
REMEMBER THAT WAS A REAL WET

502
00:15:47,446 --> 00:15:45,477
YEAR.

503
00:15:49,081 --> 00:15:47,513
BUT THEN THAT WAS FOLLOWED, THE

504
00:15:51,416 --> 00:15:49,148
DROUGHT CAME BACK.

505
00:15:51,883 --> 00:15:51,483
AND THEN 2010, WE HAD A LITTLE

506
00:15:56,421 --> 00:15:51,950
RAIN.

507
00:15:57,456 --> 00:15:56,488
AND THE LAST FOUR YEARS, AND SO

508
00:15:59,624 --> 00:15:57,523
WHAT'S THE POINT?

509
00:16:02,861 --> 00:15:59,691
IS THAT SINCE 2000, WE'VE HAD

510
00:16:03,996 --> 00:16:02,928
FIVE DRY YEARS.

511
00:16:06,465 --> 00:16:04,063
TWO WET YEARS.

512
00:16:07,265 --> 00:16:06,532
SO OUT OF THE LAST 15 YEARS,

513
00:16:09,901 --> 00:16:07,332

ONLY TWO HAVE BEEN WET.

514

00:16:12,270 --> 00:16:09,968

11 HAVE BEEN DRY.

515

00:16:16,208 --> 00:16:12,337

SO NOT ONLY ARE DROUGHTS LARGE

516

00:16:17,242 --> 00:16:16,275

AND SLOW, BUT THEY WAX AND WANE.

517

00:16:18,010 --> 00:16:17,309

SO IT'S LIKE THE GODFATHER.

518

00:16:19,277 --> 00:16:18,077

YOU KNOW?

519

00:16:19,911 --> 00:16:19,344

YOU THINK YOU'RE OUT AND THEN

520

00:16:25,550 --> 00:16:19,978

THEY PULL YOU BACK IN.

521

00:16:26,518 --> 00:16:25,617

THAT'S THE WAY DROUGHTS ARE.

522

00:16:30,355 --> 00:16:26,585

ALL RIGHT.

523

00:16:30,789 --> 00:16:30,422

NOW, LET'S LOOK AT SOMETHING

524

00:16:31,556 --> 00:16:30,856

TEMPERATURE.

525

00:16:33,759 --> 00:16:31,623

THIS IS CALIFORNIA WINTER

526
00:16:34,092 --> 00:16:33,826
TEMPERATURE FOR THE ENTIRE

527
00:16:34,493 --> 00:16:34,159
STATE.

528
00:16:36,728 --> 00:16:34,560
THE AVERAGE.

529
00:16:37,129 --> 00:16:36,795
THIS IS DECEMBER, JANUARY, AND

530
00:16:40,065 --> 00:16:37,196
FEBRUARY.

531
00:16:41,400 --> 00:16:40,132
AND THIS IS THE RECORD, IT GOES

532
00:16:43,101 --> 00:16:41,467
BACK, THIS IS TO 1900.

533
00:16:45,337 --> 00:16:43,168
IT GOES UP AND DOWN.

534
00:16:45,904 --> 00:16:45,404
BUT IF YOU LOOK CAREFULLY, THE

535
00:16:49,408 --> 00:16:45,971
AVERAGE IS ABOUT HERE.

536
00:16:51,009 --> 00:16:49,475
NOTICE THERE'S A TREND.

537
00:16:51,410 --> 00:16:51,076
IN THE TEMPERATURE.

538
00:16:54,913 --> 00:16:51,477

ALL RIGHT?

539

00:16:55,347 --> 00:16:54,980
IN CALIFORNIA, WINTER

540

00:16:55,981 --> 00:16:55,414
TEMPERATURE.

541

00:16:58,283 --> 00:16:56,048
ALL RIGHT?

542

00:16:58,617 --> 00:16:58,350
NOW, THAT'S THE GLOBAL WARMING

543

00:17:00,318 --> 00:16:58,684
SIGNAL.

544

00:17:02,220 --> 00:17:00,385
SO THE AVERAGE WINTER

545

00:17:07,926 --> 00:17:02,287
TEMPERATURE FOR THE LAST 115

546

00:17:08,326 --> 00:17:07,993
YEARS HAS INCREASED 2.5 DEGREES

547

00:17:09,761 --> 00:17:08,393
FAHRENHEIT.

548

00:17:11,863 --> 00:17:09,828
SO WE ALL KNOW THAT WE'RE LIVING

549

00:17:12,898 --> 00:17:11,930
IN A WARMING WORLD AND THE WORLD

550

00:17:14,433 --> 00:17:12,965
IS MELTING.

551

00:17:16,468 --> 00:17:14,500

SEA LEVELS ARE RISING.

552

00:17:19,571 --> 00:17:16,535

BUT THERE IT IS IN THE DATA.

553

00:17:20,605 --> 00:17:19,638

AND IT'S HAD A TREMENDOUS IMPACT

554

00:17:22,074 --> 00:17:20,672

ON SOMETHING THAT'S REALLY VERY

555

00:17:23,075 --> 00:17:22,141

DEAR AND IMPORTANT TO EACH AND

556

00:17:26,011 --> 00:17:23,142

EVERY ONE OF US.

557

00:17:27,813 --> 00:17:26,078

AND THAT'S THE SNOWPACK.

558

00:17:29,614 --> 00:17:27,880

THE SNOW SEASONS COME LATER.

559

00:17:29,981 --> 00:17:29,681

THEY LEAVE EARLIER.

560

00:17:31,149 --> 00:17:30,048

ALL RIGHT?

561

00:17:35,687 --> 00:17:31,216

AND SO WE'RE GETTING ROBBED OF

562

00:17:37,055 --> 00:17:35,754

OUR WINTER SNOWPACK.

563

00:17:39,558 --> 00:17:37,122

NOW, THE LAST TWO YEARS HAVE

564

00:17:41,827 --> 00:17:39,625

BEEN UNBELIEVABLE.

565

00:17:44,229 --> 00:17:41,894

THAT NOT ONLY WAS IT WARM, AND

566

00:17:45,797 --> 00:17:44,296

THIS IS MOSTLY MEETOLOGY, BUT

567

00:17:48,266 --> 00:17:45,864

THE PREVIOUS RECORD FOR THE

568

00:17:52,971 --> 00:17:48,333

WARMEST WINTER WAS 1935.

569

00:17:55,107 --> 00:17:53,038

ANYBODY REMEMBER WHAT THAT WAS?

570

00:17:56,708 --> 00:17:55,174

THAT WAS THE END OF THE DUST BOW

571

00:17:59,411 --> 00:17:56,775

DROUGHT.

572

00:18:01,546 --> 00:17:59,478

BUT THE LAST TWO YEARS HAVE BEEN

573

00:18:04,449 --> 00:18:01,613

A FULL TWO DEGREES FAHRENHEIT

574

00:18:06,618 --> 00:18:04,516

ABOVE THE PREVIOUS RECORD.

575

00:18:08,520 --> 00:18:06,685

AND SO IT'S BEEN WARM.

576

00:18:09,988 --> 00:18:08,587

AND EVERYBODY KNOWS THIS.

577

00:18:11,289 --> 00:18:10,055

IT WAS A WARM WINTER.

578

00:18:12,624 --> 00:18:11,356

IT WAS A WARM SPRING.

579

00:18:17,562 --> 00:18:12,691

I THINK EXCEPT FOR MAY.

580

00:18:22,100 --> 00:18:17,629

AND IT'S A SCORCHING SUMMER.

581

00:18:22,501 --> 00:18:22,167

THAT WAS THE DUST BOWL YEARS.

582

00:18:25,103 --> 00:18:22,568

ALL RIGHT?

583

00:18:26,571 --> 00:18:25,170

SO THIS DROUGHT IS A SCORCHER.

584

00:18:26,972 --> 00:18:26,638

IT'S A HOT DROUGHT.

585

00:18:31,176 --> 00:18:27,039

ALL RIGHT?

586

00:18:32,978 --> 00:18:31,243

IT'S A PUNISHING DROUGHT.

587

00:18:34,880 --> 00:18:33,045

SO HERE'S THE CALIFORNIA WHAT I

588

00:18:35,247 --> 00:18:34,947

CALL THE CALIFORNIA SNOW

589

00:18:37,849 --> 00:18:35,314

DROUGHT.

590

00:18:38,884 --> 00:18:37,916

SO HERE'S AVERAGE SNOWFALL HERE.

591

00:18:42,354 --> 00:18:38,951

THE GREEN IS ABOVE AVERAGE.

592

00:18:46,791 --> 00:18:42,421

THE RED IS BELOW AVERAGE.

593

00:18:49,361 --> 00:18:46,858

IT GOES FROM 1982 TONIGHT 2015.

594

00:18:49,895 --> 00:18:49,428

AND SO YOU SEE WE HAD WET

595

00:18:53,031 --> 00:18:49,962

PERIODS HERE.

596

00:18:56,935 --> 00:18:53,098

THE 1980s AND THE '90s WITH THE

597

00:18:57,302 --> 00:18:57,002

MINI DROUGHT '887 TO '92.

598

00:18:59,304 --> 00:18:57,369

SNOWPACK.

599

00:19:00,705 --> 00:18:59,371

SINCE 2000, WE'VE HAD A DROUGHT,

600

00:19:02,541 --> 00:19:00,772

WET, DROUGHT, WET.

601
00:19:03,975 --> 00:19:02,608
THAT'S WHAT I JUST SHOWED YOU

602
00:19:09,047 --> 00:19:04,042
EARLIER WHERE THE DROUGHT WAXED

603
00:19:09,648 --> 00:19:09,114
AND WANED.

604
00:19:13,919 --> 00:19:09,715
RIGHT?

605
00:19:14,286 --> 00:19:13,986
BUT SO HOT PLUS DRY EQUALS PUNY

606
00:19:16,421 --> 00:19:14,353
SNOWPACK.

607
00:19:18,523 --> 00:19:16,488
SO WE'RE GOING TO -- YOU HAVE TO

608
00:19:20,358 --> 00:19:18,590
REMEMBER THIS.

609
00:19:22,794 --> 00:19:20,425
1982, '83 EL NINO BECAUSE WE'RE

610
00:19:24,262 --> 00:19:22,861
GOING TO TALK ABOUT EL NINO.

611
00:19:26,331 --> 00:19:24,329
ESSENTIALLY IT DELIVERED TWICE

612
00:19:29,367 --> 00:19:26,398
OUR NORMAL SNOWPACK.

613
00:19:29,968 --> 00:19:29,434

THAT WAS SWEET.

614

00:19:35,173 --> 00:19:30,035

ALL RIGHT?

615

00:19:37,342 --> 00:19:35,240

AND THE LATEST BIG EL NINO '97,

616

00:19:39,211 --> 00:19:37,409

'98 DELIVERED ABOUT THE SAME.

617

00:19:41,046 --> 00:19:39,278

ONE THING ABOUT EL NINOS, THE

618

00:19:43,682 --> 00:19:41,113

BIG ONES, THEY DELIVER WHEN IT

619

00:19:44,282 --> 00:19:43,749

COMES TO SNOWPACK.

620

00:19:47,419 --> 00:19:44,349

ALL RIGHT?

621

00:19:48,053 --> 00:19:47,486

BUT THIS WINTER, SOMETHING

622

00:19:50,922 --> 00:19:48,120

UNBELIEVABLE HAPPENED.

623

00:19:53,024 --> 00:19:50,989

AT THE END OF THE SNOW SEASON IN

624

00:19:54,593 --> 00:19:53,091

APRIL, THERE WAS NO SNOW.

625

00:19:55,260 --> 00:19:54,660

FIRST TIME IT EVER HAPPENED IN

626
00:19:58,129 --> 00:19:55,327
CALIFORNIA HISTORY.

627
00:20:00,198 --> 00:19:58,196
AND USUALLY, THE SNOWPACK IN THE

628
00:20:00,932 --> 00:20:00,265
SPRING SPG 30% OF OUR DRINKING

629
00:20:03,602 --> 00:20:00,999
WATER GOING THROUGH THE SUMMER

630
00:20:06,338 --> 00:20:03,669
INTO THE FALL.

631
00:20:07,872 --> 00:20:06,405
AS IT SLOWLY MELTS OUT OF THE

632
00:20:09,140 --> 00:20:07,939
SIERRA, GOES INTO THE NORTHERN

633
00:20:10,675 --> 00:20:09,207
RESERVOIRS, COMES DOWN THE

634
00:20:13,311 --> 00:20:10,742
SACRAMENTO RIVER, WE GRAB IT AND

635
00:20:15,413 --> 00:20:13,378
PUT IT IN THE CALIFORNIA

636
00:20:15,880 --> 00:20:15,480
AUTOMATIC QUESTION DUCKETT,

637
00:20:18,683 --> 00:20:15,947
RIGHT?

638
00:20:20,218 --> 00:20:18,750

THE MWD PUTS IT IN LAKE CA SAYIC

639

00:20:22,020 --> 00:20:20,285

AND DISTRIBUTES IT TO EACH AND

640

00:20:23,655 --> 00:20:22,087

EVERY ONE OF YOU BUT THAT WAS

641

00:20:24,089 --> 00:20:23,722

TAKEN OFF THE BOARD THIS SUMMER.

642

00:20:25,991 --> 00:20:24,156

ALL RIGHT.

643

00:20:27,726 --> 00:20:26,058

LET'S DO IT AGAIN.

644

00:20:28,293 --> 00:20:27,793

LET'S BEAT IT TO DEATH HERE.

645

00:20:31,463 --> 00:20:28,360

AGAIN, THIS IS 1900.

646

00:20:35,367 --> 00:20:31,530

TO THE PRESENT.

647

00:20:37,502 --> 00:20:35,434

SO I'M PUTTING IT HOT PLUS DRY

648

00:20:39,604 --> 00:20:37,569

TOGETHER IN SOMETHING CALLED

649

00:20:42,007 --> 00:20:39,671

PRECIPITATION ENVIROTRANSPORE

650

00:20:43,208 --> 00:20:42,074

RATION INDEX.

651
00:20:46,578 --> 00:20:43,275
JUST THINK OF IT, THIS IS WHEN

652
00:20:48,647 --> 00:20:46,645
YOU PUT RAIN AND HEAT TOGETHER.

653
00:20:50,048 --> 00:20:48,714
AT THE BEGINNING OF THE 20th

654
00:20:50,448 --> 00:20:50,115
CENTURY, IT WAS WET.

655
00:20:53,351 --> 00:20:50,515
ALL RIGHT?

656
00:20:53,718 --> 00:20:53,418
THEN WE HIT THE GREAT DUST BOWL

657
00:20:55,987 --> 00:20:53,785
DROUGHT.

658
00:20:59,791 --> 00:20:56,054
AND THEN THE EARLY '40s TO THE

659
00:21:01,159 --> 00:20:59,858
MID '40s WERE A VERY WET PERIOD.

660
00:21:03,228 --> 00:21:01,226
EVERYBODY, DO YOU REMEMBER THE

661
00:21:03,728 --> 00:21:03,295
1941 EL NINO, RIGHT?

662
00:21:04,963 --> 00:21:03,795
>> YEAH.

663
00:21:08,199 --> 00:21:05,030

>> I REMEMBER IT.

664

00:21:08,500 --> 00:21:08,266

THAT WAS A GREAT EL NINO IN

665

00:21:12,003 --> 00:21:08,567

1941.

666

00:21:12,270 --> 00:21:12,070

HAD A BIG IMPACT ON WORLD WAR

667

00:21:14,773 --> 00:21:12,337

II.

668

00:21:16,241 --> 00:21:14,840

THEN WE WENT FROM THE MID '40s

669

00:21:18,143 --> 00:21:16,308

TO THE MID '70s WHERE IT WAS

670

00:21:18,510 --> 00:21:18,210

MOSTLY DROUGHT BUT WE WERE IN

671

00:21:20,312 --> 00:21:18,577

AND OUT.

672

00:21:23,348 --> 00:21:20,379

THE WET '80s AND THE '90s AND

673

00:21:24,316 --> 00:21:23,415

THEN HERE WE ARE WAXING AND

674

00:21:25,984 --> 00:21:24,383

WANING SINCE 2000.

675

00:21:27,719 --> 00:21:26,051

BUT THE INTERESTING THING HERE

676
00:21:30,255 --> 00:21:27,786
IS THAT I HAVE TO BE CAREFUL NOT

677
00:21:31,756 --> 00:21:30,322
TO DRAW A TREND ON THIS BECAUSE

678
00:21:33,558 --> 00:21:31,823
IT STARTS WITH A WET PERIOD AND

679
00:21:34,025 --> 00:21:33,625
ENDS WITH A DRY PERIOD.

680
00:21:37,595 --> 00:21:34,092
ALL RIGHT?

681
00:21:39,531 --> 00:21:37,662
BUT THE FACT IS, WHEN YOU LOOK

682
00:21:42,634 --> 00:21:39,598
AT THAT, YOU GET THE IDEA THAT

683
00:21:44,669 --> 00:21:42,701
MAYBE DROUGHTS ARE INTENSIFYING.

684
00:21:47,405 --> 00:21:44,736
AND THAT'S A POSSIBILITY.

685
00:21:48,306 --> 00:21:47,472
BUT I'M CAREFUL NOT TO OVERSTATE

686
00:21:50,709 --> 00:21:48,373
THE DATA.

687
00:21:52,577 --> 00:21:50,776
BUT IT MAKES SENSE.

688
00:21:54,279 --> 00:21:52,644

BECAUSE THE SNOWPACK IS

689

00:21:55,580 --> 00:21:54,346
DISAPPEARING SLOWLY FROM THE

690

00:21:56,281 --> 00:21:55,647
CALIFORNIA SIERRAS, AND

691

00:22:01,152 --> 00:21:56,348
TEMPERATURES ARE DEFINITELY

692

00:22:03,088 --> 00:22:01,219
RISING.

693

00:22:05,156 --> 00:22:03,155
SO ONE OF THE THINGS WE SEE

694

00:22:05,523 --> 00:22:05,223
HERE, THIS THIS IS LAKE

695

00:22:07,125 --> 00:22:05,590
OROVILLE.

696

00:22:08,326 --> 00:22:07,192
THIS IS NORTHERN CALIFORNIA,

697

00:22:10,462 --> 00:22:08,393
LARGEST MANMADE RESERVOIR IN THE

698

00:22:13,031 --> 00:22:10,529
STATE OF CALIFORNIA.

699

00:22:15,066 --> 00:22:13,098
USUALLY AT THIS TIME OF THE

700

00:22:16,868 --> 00:22:15,133
YEAR, YOU WANT IT FULL OF SIERRA

701
00:22:17,402 --> 00:22:16,935
SNOW MELT SO THAT WE CAN USE IT

702
00:22:20,205 --> 00:22:17,469
INTO THE FALL.

703
00:22:22,674 --> 00:22:20,272
IT'S NEVER BEEN THIS LOW BEFORE.

704
00:22:24,509 --> 00:22:22,741
28% OF CAPACITY.JzKv

705
00:22:26,911 --> 00:22:24,576
AND THIS IS TRUE OF RESERVOIRS

706
00:22:28,713 --> 00:22:26,978
UP AND DOWN THE STATE OF

707
00:22:29,948 --> 00:22:28,780
CALIFORNIA.

708
00:22:33,485 --> 00:22:30,015
LARGE AND SMALL.

709
00:22:35,887 --> 00:22:33,552
SO WE'RE DEFINITELY ON RESERVES.

710
00:22:38,022 --> 00:22:35,954
ONE OF THE BIGGEST IMPACTS OF

711
00:22:39,958 --> 00:22:38,089
THIS DROUGHT IS IT'S BEEN LONG

712
00:22:41,593 --> 00:22:40,025
LASTING.

713
00:22:44,596 --> 00:22:41,660

IT'S BEEN HOT.

714

00:22:46,131 --> 00:22:44,663

AND THE WATER TABLE IN THE WILD

715

00:22:47,799 --> 00:22:46,198

LEFT-HANDS AND THE GREAT

716

00:22:49,601 --> 00:22:47,866

NATIONAL FORESTS IN CALIFORNIA,

717

00:22:50,034 --> 00:22:49,668

OF COURSE, HAVE BEEN WAY

718

00:22:51,569 --> 00:22:50,101

OVERGROWN.

719

00:22:52,937 --> 00:22:51,636

THERE'S WAY TOO MANY TREES.

720

00:22:54,806 --> 00:22:53,004

BUT THAT'S ANOTHER STORY.

721

00:22:57,342 --> 00:22:54,873

BUT BECAUSE WHEN THE WATER TABLE

722

00:22:59,744 --> 00:22:57,409

GOES DOWN, THE TREES STOP

723

00:23:01,146 --> 00:22:59,811

PRODUCING SAP, AND THEN THE BARK

724

00:23:03,014 --> 00:23:01,213

BEETLES MOVE IN.

725

00:23:06,284 --> 00:23:03,081

SO THERE'S OVER 15 MILLION DEAD

726

00:23:06,684 --> 00:23:06,351

TREES IN THE NATIONAL FORESTS IN

727

00:23:09,854 --> 00:23:06,751

CALIFORNIA.

728

00:23:11,055 --> 00:23:09,921

MORE WHEN YOU GO TO THE ROCKIES.

729

00:23:13,224 --> 00:23:11,122

MORE IN WASHINGTON AND OREGON

730

00:23:14,993 --> 00:23:13,291

AND IT'S REALLY BAD IN BRITISH

731

00:23:16,828 --> 00:23:15,060

COLUMBIA AND SASKATCHEWAN.

732

00:23:18,229 --> 00:23:16,895

SO THERE'S AN AWFUL LOT OF DEAD

733

00:23:21,099 --> 00:23:18,296

TREES AND IT'S HAVING A HUGE

734

00:23:23,368 --> 00:23:21,166

IMPACT ON THE EAN COSYSTEMS, THE

735

00:23:25,437 --> 00:23:23,435

NATURAL ECOSYSTEMS.

736

00:23:27,272 --> 00:23:25,504

AND, OF COURSE, THE BOTTOM LINE

737

00:23:28,573 --> 00:23:27,339

HERE, THIS IS ALREADY THE

738

00:23:30,141 --> 00:23:28,640

BEGINNING OF THE WORST FIRE

739

00:23:30,442 --> 00:23:30,208

SEASON WE'VE EVER SEEN IN THE

740

00:23:32,777 --> 00:23:30,509

WEST.

741

00:23:34,245 --> 00:23:32,844

AND REMEMBER, THE FIRE SEASON

742

00:23:37,248 --> 00:23:34,312

DOESN'T PEAK UNTIL SEPTEMBER,

743

00:23:39,451 --> 00:23:37,315

OCTOBER, NOVEMBER, DECEMBER.

744

00:23:39,884 --> 00:23:39,518

SANTA ANA SEASON IS NOVEMBER,

745

00:23:42,053 --> 00:23:39,951

DECEMBER.

746

00:23:45,857 --> 00:23:42,120

AND SO THIS IS PRETTY PUNISHING

747

00:23:48,293 --> 00:23:45,924

AND PRETTY COSTLY, TOO.

748

00:23:49,227 --> 00:23:48,360

NOW, DID ANYBODY SEE THIS

749

00:23:51,296 --> 00:23:49,294

DROUGHT COMING?

750

00:23:51,796 --> 00:23:51,363

THAT'S A GOOD QUESTION.

751
00:23:53,498 --> 00:23:51,863
ALL RIGHT?

752
00:23:56,201 --> 00:23:53,565
NOW, REMEMBER WHEN YOU WERE A

753
00:23:58,136 --> 00:23:56,268
KID AND YOU DID SOMETHING WRONG?

754
00:23:58,937 --> 00:23:58,203
AND YOUR MOTHER WOULD SAY, I

755
00:24:00,772 --> 00:23:59,004
TOLD YOU SO?

756
00:24:02,540 --> 00:24:00,839
DIDN'T YOU HATE THAT?

757
00:24:04,242 --> 00:24:02,607
I ALWAYS HATED THAT WHEN MY

758
00:24:08,012 --> 00:24:04,309
MOTHER SAID I TOLD YOU SO.

759
00:24:09,013 --> 00:24:08,079
JUST REMEMBER THAT FOR A MINUTE.

760
00:24:10,982 --> 00:24:09,080
OKAY.

761
00:24:13,351 --> 00:24:11,049
NOW, THIS WAS THE FRONT PAGE OF

762
00:24:16,554 --> 00:24:13,418
THE PASADENA STAR NEWS.

763
00:24:17,288 --> 00:24:16,621

ANYBODY RECOGNIZE THAT DASHING

764

00:24:19,123 --> 00:24:17,355

OLD GUY?

765

00:24:19,557 --> 00:24:19,190

I WAS A LITTLE YOUNGER THEN, YOU

766

00:24:20,425 --> 00:24:19,624

KNOW.

767

00:24:22,026 --> 00:24:20,492

LOOKED BETTER.

768

00:24:22,327 --> 00:24:22,093

THAT'S LIFE.

769

00:24:25,797 --> 00:24:22,394

YEAH.

770

00:24:28,500 --> 00:24:25,864

BUT LET'S SEE WHAT IT SAYS HERE.

771

00:24:29,400 --> 00:24:28,567

WATER SHIFT SPELLS DROUGHT.

772

00:24:30,368 --> 00:24:29,467

ALL RIGHT?

773

00:24:31,836 --> 00:24:30,435

OCEANOGRAPHER SAYS PACIFIC HOLDS

774

00:24:32,237 --> 00:24:31,903

THE KEY.

775

00:24:33,905 --> 00:24:32,304

ALL RIGHT?

776

00:24:35,974 --> 00:24:33,972

SO DROUGHT, PACIFIC, KEY.

777

00:24:38,176 --> 00:24:36,041

NOW, WHAT WAS THE DATE ON THAT?

778

00:24:42,146 --> 00:24:38,243

CAN ANYBODY READ THAT?

779

00:24:42,413 --> 00:24:42,213

NO, THAT'S -- EVEN I CAN'T READ

780

00:24:46,117 --> 00:24:42,480

IT.

781

00:24:46,417 --> 00:24:46,184

SEPTEMBER 21st IT, 2002.

782

00:24:48,586 --> 00:24:46,484

OKAY?

783

00:24:50,989 --> 00:24:48,653

SO ESSENTIALLY I STARTED TALKING

784

00:24:55,860 --> 00:24:51,056

ABOUT THIS DROUGHT IN 2002.

785

00:25:00,798 --> 00:24:55,927

SO THE ONE THING I WANT TO SAY

786

00:25:01,432 --> 00:25:00,865

ABOUT THAT IS, HUH?

787

00:25:03,801 --> 00:25:01,499

ALL RIGHT.

788

00:25:05,003 --> 00:25:03,868

SO THE REAL QUESTION, ARE THESE

789

00:25:09,707 --> 00:25:05,070

DROUGHTS PREDICTABLE?

790

00:25:10,508 --> 00:25:09,774

DO CAN I REALLY KNOW WHAT I'M

791

00:25:11,376 --> 00:25:10,575

TALKING ABOUT?

792

00:25:13,811 --> 00:25:11,443

MAYBE.MÑ

793

00:25:15,513 --> 00:25:13,878

SO WHY DID I SAY THAT?

794

00:25:15,947 --> 00:25:15,580

YOU KNOW, ON WHAT BASIS DID I

795

00:25:18,983 --> 00:25:16,014

SAY HA?

796

00:25:19,384 --> 00:25:19,050

YOU KNOW, WAS THAT JUST A WILD

797

00:25:21,219 --> 00:25:19,451

SHOT?

798

00:25:22,287 --> 00:25:21,286

OR, NO, I SAID IT BECAUSE IT'S

799

00:25:23,888 --> 00:25:22,354

THE PDO.

800

00:25:25,456 --> 00:25:23,955

WHAT'S THE PDO?

801
00:25:26,691 --> 00:25:25,523
YOU KNOW, WHAT DO YOU MEAN,

802
00:25:28,092 --> 00:25:26,758
WHAT'S THE PDO.

803
00:25:29,394 --> 00:25:28,159
THE QUESTION IS HERE, THIS IS

804
00:25:30,094 --> 00:25:29,461
WHERE WE MOVE INTO THE NEXT

805
00:25:31,696 --> 00:25:30,161
PHASE OF THE TALK.

806
00:25:33,164 --> 00:25:31,763
WHAT'S THE PDO.

807
00:25:34,799 --> 00:25:33,231
WE ALL HAVE A LITTLE IDEA OF

808
00:25:37,468 --> 00:25:34,866
WHAT EL NINO IS.

809
00:25:39,137 --> 00:25:37,535
WHAT GOES ON IN THE PACIFIC, SO

810
00:25:42,674 --> 00:25:39,204
I'M NOW I'M GOING TO TELL YOU

811
00:25:44,676 --> 00:25:42,741
ABOUT THE PDO.

812
00:25:45,510 --> 00:25:44,743
SO SOME REALLY SMART MARINE

813
00:25:47,812 --> 00:25:45,577

ECOLOGISTS FROM THE UNIVERSITY

814

00:25:49,147 --> 00:25:47,879

OF WASHINGTON LOOKED AT 100

815

00:25:51,482 --> 00:25:49,214

YEARS OF SEA SURFACE TEMPERATURE

816

00:25:53,718 --> 00:25:51,549

DATA IN THE PACIFIC AND THEY DID

817

00:25:57,255 --> 00:25:53,785

A FANCY STATISTICAL ANALYSIS OF

818

00:25:58,022 --> 00:25:57,322

THE DATA, ESSENTIALLY LEAST

819

00:25:59,824 --> 00:25:58,089

SQUARE FIT IN TIME AND SPACE AND

820

00:26:00,191 --> 00:25:59,891

THEY CAME UP WITH TWO BIG

821

00:26:02,160 --> 00:26:00,258

PATTERNS.

822

00:26:03,895 --> 00:26:02,227

THIS IS THE PACIFIC, COVERS 30%

823

00:26:05,330 --> 00:26:03,962

OF THE PLANET AND ONE PATTERN

824

00:26:07,799 --> 00:26:05,397

LOOKED LIKE A WEDGE OF WARM

825

00:26:08,733 --> 00:26:07,866

WATER COMING OFF THE AMERICAS,

826
00:26:10,802 --> 00:26:08,800
RED IS WARM.

827
00:26:11,169 --> 00:26:10,869
OF SURROUNDED BY A BLUE

828
00:26:13,004 --> 00:26:11,236
HORSESHOE.

829
00:26:14,939 --> 00:26:13,071
IT'S A BIG PATTERN, GOES FROM

830
00:26:16,608 --> 00:26:15,006
THE ALLUSIONS TO ANTARCTICA AND

831
00:26:19,143 --> 00:26:16,675
THE AMERICAS TO ASIA.

832
00:26:21,346 --> 00:26:19,210
THEN THEY SAW A SECOND PATTERN.

833
00:26:23,181 --> 00:26:21,413
WHERE THERE WAS A COOL WEDGE

834
00:26:25,917 --> 00:26:23,248
SURROUNDED BY A WARM HORSESHOE.

835
00:26:27,151 --> 00:26:25,984
SO IT'S REALLY THE SAME PATTERN,

836
00:26:27,552 --> 00:26:27,218
IT JUST FLIPPED.

837
00:26:28,853 --> 00:26:27,619
ALL RIGHT?

838
00:26:30,521 --> 00:26:28,920

IT'S THE SAME PATTERN.

839

00:26:32,890 --> 00:26:30,588

SO THAT'S PRETTY COOL.

840

00:26:35,193 --> 00:26:32,957

THE OTHER THING ABOUT IT IS THAT

841

00:26:37,095 --> 00:26:35,260

LOOKS LIKE A BIG EL NINO AND

842

00:26:39,297 --> 00:26:37,162

THAT LOOKS LIKE A BIG LA NINA.

843

00:26:41,733 --> 00:26:39,364

SO THE QUESTION IS, THAT'S COOL.

844

00:26:43,568 --> 00:26:41,800

BUT HOW DOES THAT PATTERN CHANGE

845

00:26:45,336 --> 00:26:43,635

OVER TIME?

846

00:26:46,437 --> 00:26:45,403

THIS TELLS US I KNOW, I HATE TO

847

00:26:49,007 --> 00:26:46,504

DO THIS TO YOU.

848

00:26:52,343 --> 00:26:49,074

I HATE THESE GRAPHS BUT LET'S

849

00:26:55,179 --> 00:26:52,410

LOOK BACK TO 1900.

850

00:26:57,115 --> 00:26:55,246

BLUE MEANS WHEN IT'S IN THE BLUE

851
00:26:57,715 --> 00:26:57,182
PHASE, IT MEANS IT'S IN THE COOL

852
00:26:58,049 --> 00:26:57,782
PHASE.

853
00:26:59,217 --> 00:26:58,116
RIGHT?

854
00:27:01,085 --> 00:26:59,284
OR THE NEGATIVE PHASE.

855
00:27:02,987 --> 00:27:01,152
WHEN IT'S IN THE RED PHASE, LIKE

856
00:27:04,188 --> 00:27:03,054
IN THE '80s AND THE '90s, IT'S

857
00:27:06,391 --> 00:27:04,255
THIS WAY.

858
00:27:10,495 --> 00:27:06,458
AND LATELY SINCE 2000, IT'S

859
00:27:10,995 --> 00:27:10,562
MOSTLY BEEN IN THE BLUE PHASE.

860
00:27:12,697 --> 00:27:11,062
OKAY.

861
00:27:15,199 --> 00:27:12,764
SO BECAUSE MOST OF THE OCEAN

862
00:27:18,102 --> 00:27:15,266
ISN'T IN THE TROPICS, WHEN YOU

863
00:27:19,704 --> 00:27:18,169

GET THE POSITIVE OR THE WARM PDO

864

00:27:23,408 --> 00:27:19,771

PATTERN, NOT ONLY WARMS THE

865

00:27:25,076 --> 00:27:23,475

PACIFIC, IT ACTUALLY WARMS THE

866

00:27:26,844 --> 00:27:25,143

ENTIRE EARTH.

867

00:27:28,346 --> 00:27:26,911

AND WHEN IT COOLS THE PACIFIC,

868

00:27:28,680 --> 00:27:28,413

IT ACTUALLY COOLS THE ENTIRE

869

00:27:30,148 --> 00:27:28,747

EARTH.

870

00:27:31,683 --> 00:27:30,215

THAT'S A DIFFERENT TALK.

871

00:27:33,651 --> 00:27:31,750

THAT'S THE TALK ABOUT THE

872

00:27:35,787 --> 00:27:33,718

HIATUS, THE WARMING AND COOLING

873

00:27:38,489 --> 00:27:35,854

OF THE GLOBAL WARMING CURVE.

874

00:27:43,161 --> 00:27:38,556

BUT ESSENTIALLY SINCE 2000,

875

00:27:44,495 --> 00:27:43,228

WE'VE BEEN IN A COOL FACE, A

876

00:27:47,398 --> 00:27:44,562

NEGATIVE PHASE.

877

00:27:48,666 --> 00:27:47,465

BACK IN THE MID '40s TO THE

878

00:27:49,801 --> 00:27:48,733

MID-'70s REMEMBER WHEN JER RAY

879

00:27:52,236 --> 00:27:49,868

BROWN WAS FIRST ELECTED AND HE

880

00:27:53,037 --> 00:27:52,303

WAS IN A DROUGHT, THAT WAS A

881

00:27:55,640 --> 00:27:53,104

30-YEAR DROUGHT.

882

00:27:57,141 --> 00:27:55,707

WE'RE ALSO IN A COOL PHASE.

883

00:27:59,243 --> 00:27:57,208

IN THE '80s AND THE '90s WHEN IT

884

00:28:00,078 --> 00:27:59,310

WAS WET, WE LOVED THE '80s AND

885

00:28:02,547 --> 00:28:00,145

THE 90s.

886

00:28:06,017 --> 00:28:02,614

IT WAS IN THIS WARM PHASE.

887

00:28:09,454 --> 00:28:06,084

AND SO THIS IS A LARGE PATTERN

888

00:28:10,822 --> 00:28:09,521

THAT SHIFTS VERY SLOWLY.

889

00:28:13,958 --> 00:28:10,889

SOMETIMES IT STICKS AROUND FOR A

890

00:28:14,492 --> 00:28:14,025

COUPLE OF DECADES.

891

00:28:16,360 --> 00:28:14,559

ALL RIGHT?

892

00:28:17,028 --> 00:28:16,427

AND SO WHAT HAS THAT GOT TO DO

893

00:28:18,663 --> 00:28:17,095

WITH THE DROUGHT?

894

00:28:19,130 --> 00:28:18,730

SO JUST FOR THE FUN OF IT, I DID

895

00:28:21,733 --> 00:28:19,197

THIS ONCE.

896

00:28:24,635 --> 00:28:21,800

I PLOTTED THAT PDO INDEX THAT

897

00:28:26,170 --> 00:28:24,702

YOU SEE DOWN HERE AT THE BOTTOM

898

00:28:28,339 --> 00:28:26,237

AGAINST L.A. RAINFALL.

899

00:28:31,142 --> 00:28:28,406

AND IT'S NOT A PERFECT FIT.

900

00:28:36,114 --> 00:28:31,209

BUT IN SOME WAYS, IF I KNOW WHAT

901
00:28:36,848 --> 00:28:36,181
PHASE OF THE PDO WE'RE IN, I

902
00:28:39,217 --> 00:28:36,915
ESSENTIALLY CAN FORECAST L.A.

903
00:28:41,085 --> 00:28:39,284
RAINFALL PRETTY GOOD.

904
00:28:41,385 --> 00:28:41,152
AND I'VE BEEN DOING THAT FOR

905
00:28:42,987 --> 00:28:41,452
YEARS.

906
00:28:43,387 --> 00:28:43,054
EVERYBODY THOUGHT I WAS A

907
00:28:47,024 --> 00:28:43,454
MAGICIAN.

908
00:28:47,391 --> 00:28:47,091
NOW YOU KNOW MY SECRET.

909
00:28:50,094 --> 00:28:47,458
ALL RIGHT?

910
00:28:51,696 --> 00:28:50,161
SO WE'RE IN A WARP PHASE.

911
00:28:51,996 --> 00:28:51,763
L.A. AND CALIFORNIA TEND TO BE

912
00:28:54,499 --> 00:28:52,063
WET.

913
00:28:55,333 --> 00:28:54,566

WE'RE IN A COOL PHASE, LIKE THE

914

00:28:58,402 --> 00:28:55,400

LAST 15 YEARS, L.A. TENDS TO BE

915

00:29:01,439 --> 00:28:58,469

DRY.

916

00:29:03,908 --> 00:29:01,506

NOW, WHY IS THAT?

917

00:29:07,411 --> 00:29:03,975

WELL, THE PACIFIC HAS A HUGE

918

00:29:09,614 --> 00:29:07,478

IMPACT DEPENDING ON THE

919

00:29:11,482 --> 00:29:09,681

TEMPERATURE DISTRIBUTION ON THE

920

00:29:14,385 --> 00:29:11,549

SPHERIC J=DU8%UáTz PATTERNS THT

921

00:29:14,719 --> 00:29:14,452

DIFFICULT OUR STORMS EVERY

922

00:29:16,320 --> 00:29:14,786

WINTER.

923

00:29:18,456 --> 00:29:16,387

SO FOR INSTANCE, WHEN YOU'RE IN

924

00:29:20,291 --> 00:29:18,523

A NEGATIVE PHASE OF THE PDO, YOU

925

00:29:22,627 --> 00:29:20,358

GET A PATTERN LIKE THIS.

926

00:29:24,162 --> 00:29:22,694

AND THIS IS, YOU KNOW, ALL OF

927

00:29:25,563 --> 00:29:24,229

HEARD ABOUT THE RIDICULOUSLY

928

00:29:25,930 --> 00:29:25,630

RESILIENT RIDGE OF HIGH

929

00:29:28,065 --> 00:29:25,997

PRESSURE.

930

00:29:29,100 --> 00:29:28,132

THERE IT IS RIGHT THERE.

931

00:29:30,468 --> 00:29:29,167

THAT STUCK AROUND IN THE

932

00:29:32,436 --> 00:29:30,535

NORTHEAST PACIFIC AND THE GULF

933

00:29:34,739 --> 00:29:32,503

OF ALASKA FOR THE LAST COUPLE

934

00:29:36,908 --> 00:29:34,806

YEARS AND WHAT IT DID IT

935

00:29:39,010 --> 00:29:36,975

DIVERTED THE JET STREAM UP INTO

936

00:29:41,245 --> 00:29:39,077

ALASKA, SWOOPED DOWN INTO THE

937

00:29:44,282 --> 00:29:41,312

UPPER MIDWEST AND THE NORTHEAST,

938

00:29:46,117 --> 00:29:44,349

LEFT ESSENTIALLY THE ENTIRE WEST

939

00:29:47,985 --> 00:29:46,184

COAST HIGH AND DRY FOR THE LAST

940

00:29:49,954 --> 00:29:48,052

FOUR YEARS, AND GAVE ALL THOSE

941

00:29:52,390 --> 00:29:50,021

PEOPLE IN BOSTON AND CHICAGO

942

00:29:56,694 --> 00:29:52,457

JUST PUNISHING WINTERS.

943

00:29:58,029 --> 00:29:56,761

NOW, WHEN IS YOU LOOK AT THE

944

00:30:00,698 --> 00:29:58,096

HISTORICAL PATTERNS ASSOCIATED

945

00:30:01,098 --> 00:30:00,765

WITH THESE PDOs, THAT'S WHAT YOU

946

00:30:03,267 --> 00:30:01,165

SEE.

947

00:30:05,870 --> 00:30:03,334

NOW, I'M WORKING ON A PAPER ON

948

00:30:08,873 --> 00:30:05,937

THAT RIGHT NOW THE TO SEE, TO

949

00:30:10,842 --> 00:30:08,940

EXPLAIN DYNAMICALLY EXACTLY HOW

950

00:30:13,311 --> 00:30:10,909

THAT HAPPENS, HOW HEAT PATTERNS

951
00:30:14,812 --> 00:30:13,378
OR TEMPERATURE PATTERNS IN THE

952
00:30:17,215 --> 00:30:14,879
TROPICS AFFECT WEATHER PATTERNS

953
00:30:20,518 --> 00:30:17,282
IN THE MID LATITUDES.

954
00:30:23,287 --> 00:30:20,585
PRETTY COOL, HUH?

955
00:30:25,423 --> 00:30:23,354
AND SO THIS HAS YOUR NEGATIVE

956
00:30:27,825 --> 00:30:25,490
PDO PATTERN.

957
00:30:28,159 --> 00:30:27,892
FOR THE NORTHERN HEMISPHERE JET

958
00:30:33,164 --> 00:30:28,226
STREAM.

959
00:30:33,998 --> 00:30:33,231
PRETTY NICE, HUH?

960
00:30:36,901 --> 00:30:34,065
ALL RIGHT.

961
00:30:38,336 --> 00:30:36,968
NOW, IF YOU WANT PROOF THAT THE

962
00:30:40,905 --> 00:30:38,403
PDO IS THE REAL DEAL AND JUST

963
00:30:43,541 --> 00:30:40,972

NOT A FIGMENT OF MY IMAGINATION,

964

00:30:45,142 --> 00:30:43,608

ALL RIGHT, LOOK AT THE LARGER

965

00:30:47,879 --> 00:30:45,209

LONGER IMPACT.

966

00:30:50,314 --> 00:30:47,946

AND MY FAVORITE IS LAKE MEAD.

967

00:30:54,285 --> 00:30:50,381

NOW, LAKE MEAD IS THE LARGEST

968

00:30:54,919 --> 00:30:54,352

RESERVOIR MANMADE RESERVOIR IN

969

00:30:56,621 --> 00:30:54,986

THE WEST.

970

00:30:59,123 --> 00:30:56,688

THIS IS WHAT IT LOOKS LIKE.

971

00:30:59,523 --> 00:30:59,190

AND I CALL LAKE MEAD THE PDO

972

00:31:04,962 --> 00:30:59,590

BAROMETER.

973

00:31:05,663 --> 00:31:05,029

IT MEASURES THE PDO.

974

00:31:06,831 --> 00:31:05,730

OF COURSE, ITS LAKE LEVEL IS

975

00:31:08,532 --> 00:31:06,898

CONTROLLED BY THE DO.

976
00:31:09,834 --> 00:31:08,599
SO HERE'S THE LAKE LEVEL GOING

977
00:31:11,302 --> 00:31:09,901
BACK TO 1940.

978
00:31:13,304 --> 00:31:11,369
REMEMBER, THEY STARTED FILLING

979
00:31:13,971 --> 00:31:13,371
IT IN 1935.

980
00:31:16,908 --> 00:31:14,038
ALL RIGHT.

981
00:31:17,975 --> 00:31:16,975
AND THIS IS WHERE THEY'RE

982
00:31:20,544 --> 00:31:18,042
FILLING LAKE POWELL.

983
00:31:20,878 --> 00:31:20,611
SO THEY CUT OFF THE FLOW TO LAKE

984
00:31:24,815 --> 00:31:20,945
MEAD.

985
00:31:26,284 --> 00:31:24,882
BUT ANY HOW, LET'S LOOK

986
00:31:29,420 --> 00:31:26,351
RECENTLY.

987
00:31:32,723 --> 00:31:29,487
SINCE 2000 HERE, THE LAKE LEVEL

988
00:31:33,658 --> 00:31:32,790

IN LAKE MEAD HAS DROPPED

989

00:31:37,628 --> 00:31:33,725

PRECIPITOUSLY CONTINUOUSLY ON

990

00:31:39,397 --> 00:31:37,695

AND OFF FOR THE LAST 15 YEARS.

991

00:31:40,398 --> 00:31:39,464

SO WHAT DID WE SAY ABOUT THESE

992

00:31:41,799 --> 00:31:40,465

DROUGHT PATTERNS?

993

00:31:43,768 --> 00:31:41,866

WE SAID THEY WERE LARGE.

994

00:31:46,904 --> 00:31:43,835

WE SAID THEY WERE LONG-LASTING.

995

00:31:47,305 --> 00:31:46,971

SO IT'S NOT JUST L.A., IT'S NOT

996

00:31:49,106 --> 00:31:47,372

CALIFORNIA.

997

00:31:50,775 --> 00:31:49,173

IT'S ALSO THE ENTIRE WATERSHED

998

00:31:52,543 --> 00:31:50,842

OF THE COLORADO RIVER.

999

00:31:55,146 --> 00:31:52,610

IT'S THE ENTIRE WEST.

1000

00:31:56,814 --> 00:31:55,213

AND SO WHEN L.A. HAS A DROUGHT,

1001
00:31:59,317 --> 00:31:56,881
LAKE MEAD HAS A DROUGHT.

1002
00:31:59,717 --> 00:31:59,384
IT'S ON THE ENTIRE COLORADO

1003
00:32:01,786 --> 00:31:59,784
WATERSHED.

1004
00:32:05,056 --> 00:32:01,853
SO THERE'S YOUR 15-YEAR DROUGHT.

1005
00:32:06,557 --> 00:32:05,123
NOW YOU CAN'T DROP THIS IN FOUR

1006
00:32:09,060 --> 00:32:06,624
YEARS OR FIVE YEARS.

1007
00:32:10,828 --> 00:32:09,127
LAKE MEAD IS TOO BIG.

1008
00:32:11,963 --> 00:32:10,895
THE FILL TIME IS 17 YEARS.

1009
00:32:17,335 --> 00:32:12,030
AND SO IT'S A GREAT BAROMETER

1010
00:32:19,804 --> 00:32:17,402
FOR THE PDO.

1011
00:32:21,539 --> 00:32:19,871
AND RIGHT NOW, IT'S NEVER BEEN

1012
00:32:22,073 --> 00:32:21,606
THIS LOW IN THE HISTORICAL

1013
00:32:24,375 --> 00:32:22,140

RECORD.

1014

00:32:26,043 --> 00:32:24,442

NOW, THAT'S A PROBLEM.

1015

00:32:27,511 --> 00:32:26,110

BECAUSE SEVEN STATES AND FIVE

1016

00:32:30,081 --> 00:32:27,578

INDIAN NATIONS SHARE THE WATER

1017

00:32:30,815 --> 00:32:30,148

FROM THE COLORADO RIVER.

1018

00:32:31,782 --> 00:32:30,882

IT'S REALLY IMPORTANT TO THE

1019

00:32:34,785 --> 00:32:31,849

WELL-BEING OF THE WEST.

1020

00:32:38,823 --> 00:32:34,852

REALLY IMPORTANT.

1021

00:32:39,390 --> 00:32:38,890

BUT A FUNNY THING HAPPENED IN

1022

00:32:40,725 --> 00:32:39,457

2000.

1023

00:32:42,493 --> 00:32:40,792

THE RED CURVE IS THE AVERAGE

1024

00:32:44,795 --> 00:32:42,560

WATER USAGE, HOW MUCH WATER DID

1025

00:32:46,030 --> 00:32:44,862

WE TAKE OUT OF THE COLORADO

1026
00:32:47,732 --> 00:32:46,097
GOING BACK TO THE '20s, AND

1027
00:32:50,401 --> 00:32:47,799
HERE'S THE LAKE LEVEL OR HOW

1028
00:32:52,403 --> 00:32:50,468
MUCH IS AVAILABLE IN LAKE MEAD.

1029
00:32:55,573 --> 00:32:52,470
NOW, IN 2000, BECAUSE EVERYBODY

1030
00:33:01,345 --> 00:32:55,640
TOOK THEIR FULL ALLOCATION OUT

1031
00:33:03,080 --> 00:33:01,412
OF THE COLORADO, THE SUPPLY

1032
00:33:03,914 --> 00:33:03,147
CURVE AND THE OTHER CURVE

1033
00:33:05,616 --> 00:33:03,981
FINALLY CROSSED.

1034
00:33:08,119 --> 00:33:05,683
SO EVERYBODY'S GOING TO REMEMBER

1035
00:33:10,287 --> 00:33:08,186
FROM ECONOMICS 101, WHAT HAPPENS

1036
00:33:10,621 --> 00:33:10,354
WHEN THE SUPPLY AND DEMAND

1037
00:33:11,022 --> 00:33:10,688
CURVE.

1038
00:33:14,158 --> 00:33:11,089

ALL RIGHT?

1039

00:33:14,592 --> 00:33:14,225

THAT MEANS YOU'RE IN DEEP DOO

1040

00:33:14,959 --> 00:33:14,659

DOO.

1041

00:33:17,328 --> 00:33:15,026

ALL RIGHT?

1042

00:33:18,029 --> 00:33:17,395

DEPEND IS GREATER THAN THE

1043

00:33:18,329 --> 00:33:18,096

SUPPLY.

1044

00:33:20,798 --> 00:33:18,396

RIGHT?

1045

00:33:21,932 --> 00:33:20,865

AND HERE'S A QUOTE I PICKED OUT

1046

00:33:24,735 --> 00:33:21,999

OF THE NEWSPAPER.

1047

00:33:26,404 --> 00:33:24,802

JUST AS THE DEMAND STARTED TO

1048

00:33:28,606 --> 00:33:26,471

SOAR BECAUSE OF THE DROUGHT,

1049

00:33:30,307 --> 00:33:28,673

THIS 15-YEAR DROUGHT BEGAN AND

1050

00:33:31,375 --> 00:33:30,374

THIS IS THE GOOD NIGHT FROM THE

1051
00:33:34,912 --> 00:33:31,442
METROPOLITAN WATER DISTRICT THAT

1052
00:33:35,479 --> 00:33:34,979
MANAGED THE COLORADO RIVER

1053
00:33:38,616 --> 00:33:35,546
WATER.

1054
00:33:41,819 --> 00:33:38,683
SO THERE'S ANOTHER BAD SIGN.

1055
00:33:42,286 --> 00:33:41,886
THE WATER FROM THE COLORADO IS

1056
00:33:45,356 --> 00:33:42,353
OVERALLOCATED.

1057
00:33:45,756 --> 00:33:45,423
WE DON'T HAVE ANY SNOWPACK.

1058
00:33:47,825 --> 00:33:45,823
ALL RIGHT?

1059
00:33:49,493 --> 00:33:47,892
AND WE DEFINITELY HAVEN'T HAD

1060
00:33:49,860 --> 00:33:49,560
ANY GOOD RAIN HERE FOR THE LAST

1061
00:33:54,098 --> 00:33:49,927
15 YEARS.

1062
00:33:55,800 --> 00:33:54,165
SO THAT'S A DROUGHT.

1063
00:33:58,035 --> 00:33:55,867

OKAY.

1064

00:33:59,937 --> 00:33:58,102

SO NOW, THE RING AROUND LAKE

1065

00:34:02,039 --> 00:34:00,004

MEAD, THIS IS A MINERAL DEPOSIT,

1066

00:34:06,577 --> 00:34:02,106

SO ANYBODY WANT TO TAKE A GUESS

1067

00:34:13,717 --> 00:34:06,644

WHETHER HE IT WAS THIS HIGH?

1068

00:34:15,686 --> 00:34:13,784

WHAT WERE THE DECADES?

1069

00:34:18,556 --> 00:34:15,753

>> WHEN WE WERE IN THE POSITIVE

1070

00:34:20,658 --> 00:34:18,623

PDO AND THE WEST WAS WET.

1071

00:34:23,294 --> 00:34:20,725

SO THIS IS AFTER THE EL NINO

1072

00:34:25,162 --> 00:34:23,361

WINTER OF 1983 AND THE LA NINA

1073

00:34:29,934 --> 00:34:25,229

WINTER OF 1998.

1074

00:34:30,968 --> 00:34:30,001

LAKE MEAD WAS SO FULL, IT ALMOST

1075

00:34:32,870 --> 00:34:31,035

OVERFLOWED, THEY HAD TO RELEASE

1076
00:34:34,772 --> 00:34:32,937
WATER OUT OF THE LAKE.

1077
00:34:35,072 --> 00:34:34,839
THERE WAS TOO MUCH WATER IN LAKE

1078
00:34:39,110 --> 00:34:35,139
MEAD.

1079
00:34:40,611 --> 00:34:39,177
HOW DID WE GET TO THE BOTTOM?

1080
00:34:43,347 --> 00:34:40,678
AS LONG AS WE STAYED HERE IN

1081
00:34:45,349 --> 00:34:43,414
THIS NEGATIVE PDO AND SO NEXT

1082
00:34:47,284 --> 00:34:45,416
TIME YOU THINK ABOUT THAT RING

1083
00:34:48,552 --> 00:34:47,351
AROUND LAKE MEAD AND BY THE WAY,

1084
00:34:49,787 --> 00:34:48,619
EVERYBODY SHOULD GO SEE LAKE

1085
00:34:50,187 --> 00:34:49,854
MEAD AND HOOVER DAM.

1086
00:34:50,588 --> 00:34:50,254
FANTASTIC.

1087
00:34:52,523 --> 00:34:50,655
YOU KNOW?

1088
00:34:52,923 --> 00:34:52,590

BEFORE YOU DIE, YOU GOT TO THE

1089

00:34:53,324 --> 00:34:52,990

GO.

1090

00:34:54,158 --> 00:34:53,391

ALL RIGHT?

1091

00:34:56,127 --> 00:34:54,225

DEFINITELY TAKE THE KIDS.

1092

00:34:57,995 --> 00:34:56,194

IT'S AN AMAZING THING.

1093

00:35:00,030 --> 00:34:58,062

SO BUT THE NEXT TIME YOU SEE THE

1094

00:35:02,566 --> 00:35:00,097

RING AROUND LAKE MEAD, WHAT ARE

1095

00:35:05,202 --> 00:35:02,633

YOU GOING TO THINK?

1096

00:35:05,503 --> 00:35:05,269

YOU'RE GOING TO THINK PDO.

1097

00:35:06,270 --> 00:35:05,570

YEAH?

1098

00:35:12,643 --> 00:35:06,337

THAT LAKE WAS BUILT TO MEASURE

1099

00:35:15,880 --> 00:35:12,710

THE PDO.

1100

00:35:16,247 --> 00:35:15,947

SO RIGHT NOW, IT'S AT 35%

1101
00:35:18,182 --> 00:35:16,314
CAPACITY.

1102
00:35:18,482 --> 00:35:18,249
THAT'S REALLY BAD.

1103
00:35:20,317 --> 00:35:18,549
OKAY.

1104
00:35:20,851 --> 00:35:20,384
SO WE GOT A LITTLE RECIPE FOR

1105
00:35:22,620 --> 00:35:20,918
DISASTER HERE.

1106
00:35:24,088 --> 00:35:22,687
THIS DROUGHT IS ON AND OFF FOR

1107
00:35:27,091 --> 00:35:24,155
THE LAST 15 YEARS.

1108
00:35:28,425 --> 00:35:27,158
RESERVOIRS ARE LOW TO EMPTY.

1109
00:35:30,127 --> 00:35:28,492
THE SNOWPACK IS NEGLIGIBLE AND

1110
00:35:31,996 --> 00:35:30,194
THE GROUNDWATER SUPPLIES HERE IN

1111
00:35:33,397 --> 00:35:32,063
THE SAN GABRIEL VALLEY AND

1112
00:35:35,366 --> 00:35:33,464
SOUTHERN CALIFORNIA ARE AT ALL

1113
00:35:37,668 --> 00:35:35,433

TIME LOWS IF THEY'RE NOT

1114

00:35:38,269 --> 00:35:37,735

POLLUTED WHICH IS ABOUT HALF OF

1115

00:35:40,938 --> 00:35:38,336

THEM.

1116

00:35:42,173 --> 00:35:41,005

AND THE GREAT AQUIFERS THAT WERE

1117

00:35:44,708 --> 00:35:42,240

LAID DOWN DURING THE RETREAT OF

1118

00:35:46,710 --> 00:35:44,775

THE ICE AGE, THE GREAT AQUIFERS

1119

00:35:48,579 --> 00:35:46,777

IN THE SAN JOAQUIN VALLEY AND

1120

00:35:49,780 --> 00:35:48,646

FOR INSTANCE THE COACHELLA

1121

00:35:52,049 --> 00:35:49,847

VALLEY, ALL THOSE GOLF COURSE

1122

00:35:52,416 --> 00:35:52,116

OFS THAT WATER IS 10,000 YEARS ■

1123

00:35:53,951 --> 00:35:52,483

OLD.

1124

00:35:55,186 --> 00:35:54,018

NOBODY REALLY KNOWS WHAT THE

1125

00:35:56,587 --> 00:35:55,253

RESERVES ARE BUT WE'VE BEEN

1126
00:35:58,722 --> 00:35:56,654
PUMPING IT FOR A CENTURY.

1127
00:36:00,057 --> 00:35:58,789
SOONER OR LATER, YOU'RE GOING TO

1128
00:36:01,926 --> 00:36:00,124
HEAR THAT SOUND LIKE YOU KNOW

1129
00:36:03,327 --> 00:36:01,993
WHEN YOU GET A MILKSHAKE AT IN

1130
00:36:05,963 --> 00:36:03,394
AND OUT BURGER AND YOU GET TO

1131
00:36:06,764 --> 00:36:06,030
THE BOTTOM AND ALL OF A SUDDEN

1132
00:36:08,365 --> 00:36:06,831
YOU HEAR

1133
00:36:10,401 --> 00:36:08,432
[SLURPING]

1134
00:36:11,569 --> 00:36:10,468
THEN WE'RE REALLY IN TROUBLE.

1135
00:36:15,206 --> 00:36:11,636
OF COURSE, THE COLORADO

1136
00:36:16,340 --> 00:36:15,273
WATERSHED IS IN A LARGE VERY

1137
00:36:19,610 --> 00:36:16,407
LONG-TERM DROUGHT.

1138
00:36:20,377 --> 00:36:19,677

REMEMBER, 30% OF THE WATER IN

1139

00:36:21,946 --> 00:36:20,444

SOUTHERN CALIFORNIA COMES FROM

1140

00:36:24,515 --> 00:36:22,013

THE COLORADO RIVER.

1141

00:36:27,818 --> 00:36:24,582

WE PUSH IT IN AN AQUEDUCT FROM

1142

00:36:29,019 --> 00:36:27,885

LAKE HAVASU INTO NEAR HEMET.

1143

00:36:31,322 --> 00:36:29,086

DIAMOND VALLEY LAKE.

1144

00:36:33,591 --> 00:36:31,389

SO 70% OF THE WATER IN SOUTHERN

1145

00:36:35,292 --> 00:36:33,658

CALIFORNIA IS IMPORTED.

1146

00:36:36,527 --> 00:36:35,359

USUALLY 40 FROM NORTHERN AND 30

1147

00:36:38,862 --> 00:36:36,594

FROM THE COLORADO.

1148

00:36:40,464 --> 00:36:38,929

AND THEY CUT OFF THE 40 AND

1149

00:36:43,167 --> 00:36:40,531

THEY'RE GOING TO CUT OFF PART OF

1150

00:36:43,701 --> 00:36:43,234

OUR 30.

1151
00:36:45,035 --> 00:36:43,768
ALL RIGHT?

1152
00:36:49,740 --> 00:36:45,102
SO CALIFORNIA, SOUTHERN

1153
00:36:50,040 --> 00:36:49,807
CALIFORNIA WAS BUILT ON IMPORTED

1154
00:36:51,742 --> 00:36:50,107
WATER.

1155
00:36:54,411 --> 00:36:51,809
ALL RIGHT.

1156
00:36:55,446 --> 00:36:54,478
SO THIS IS DEFINITELY NO DOUBT

1157
00:36:58,782 --> 00:36:55,513
WHATSOEVER, THIS IS THE WORST

1158
00:36:59,149 --> 00:36:58,849
DROUGHT WE'VE HAD IN THE PAST

1159
00:37:01,285 --> 00:36:59,216
CENTURY.

1160
00:37:03,320 --> 00:37:01,352
AND THIS IS ANOTHER TALK.

1161
00:37:04,888 --> 00:37:03,387
HALF OF THIS DROUGHT WAS CAUSED

1162
00:37:08,626 --> 00:37:04,955
BY NOT THE PDO, WAS CAUSED BY

1163
00:37:10,828 --> 00:37:08,693

US.

1164

00:37:14,131 --> 00:37:10,895
IN 1950, THERE WERE ONLY 10

1165

00:37:14,531 --> 00:37:14,198
MILLION PEOPLE IN CALIFORNIA.

1166

00:37:16,500 --> 00:37:14,598
ALL RIGHT?

1167

00:37:18,469 --> 00:37:16,567
NOW THERE'S 40 MILLION.

1168

00:37:20,471 --> 00:37:18,536
AND SO THAT'S A LOT MORE PEOPLE

1169

00:37:22,873 --> 00:37:20,538
USING A LOT MORE WATER.

1170

00:37:24,508 --> 00:37:22,940
AND AGRICULTURE IS ESSENTIALLY

1171

00:37:27,778 --> 00:37:24,575
DOUBLED AND INDUSTRIES THAT

1172

00:37:28,946 --> 00:37:27,845
DIDN'T EXIST IN THE 1950s ARE

1173

00:37:30,848 --> 00:37:29,013
FLOURISHING TODAY.

1174

00:37:32,349 --> 00:37:30,915
AND SO YOU KNOW, CALIFORNIA GOT

1175

00:37:33,017 --> 00:37:32,416
TO BE THE SEVENTH LARGE ECONOMY

1176

00:37:36,086 --> 00:37:33,084

IN THE WORLD.

1177

00:37:38,122 --> 00:37:36,153

IT'S A BIGGER ECONOMY THAN

1178

00:37:38,489 --> 00:37:38,189

RUSSIA OR FRANCE.

1179

00:37:43,093 --> 00:37:38,556

ALL RIGHT?

1180

00:37:43,494 --> 00:37:43,160

AND THE LIMITING FACTOR IS WHAT?

1181

00:37:43,827 --> 00:37:43,561

WATER.

1182

00:37:45,396 --> 00:37:43,894

RIGHT?

1183

00:37:48,265 --> 00:37:45,463

SO DEFINITELY I WANT YOU TO CUT

1184

00:37:49,967 --> 00:37:48,332

BACK ON THAT 25% LIKE MY BUDDY

1185

00:37:50,434 --> 00:37:50,034

JERRY BROWN SAID.

1186

00:37:51,869 --> 00:37:50,501

ALL RIGHT?

1187

00:37:52,169 --> 00:37:51,936

SO NOW WE'RE COMING TO THE PUNCH

1188

00:37:55,205 --> 00:37:52,236

LINE.

1189

00:37:56,073 --> 00:37:55,272

YOU GOT ALL THE FACTS IN FRONT

1190

00:37:58,742 --> 00:37:56,140

OF YOU.

1191

00:37:59,109 --> 00:37:58,809

WHEN IS THE DROUGHT GOING TO

1192

00:37:59,543 --> 00:37:59,176

END?

1193

00:38:01,245 --> 00:37:59,610

ANYBODY KNOW?

1194

00:38:01,945 --> 00:38:01,312

COME ON, YOU GOT TO KNOW.

1195

00:38:04,481 --> 00:38:02,012

OTHERWISE, I'M GOING TO FLUNK

1196

00:38:07,284 --> 00:38:04,548

YOU ALL.

1197

00:38:07,851 --> 00:38:07,351

OR SLIT MY WRISTS, ONE OR THE

1198

00:38:10,754 --> 00:38:07,918

OTHER.

1199

00:38:12,690 --> 00:38:10,821

ONE, WHO SAID IT?

1200

00:38:13,557 --> 00:38:12,757

>> RIGHT.

1201
00:38:18,495 --> 00:38:13,624
SUSAN.

1202
00:38:19,963 --> 00:38:18,562
SUSAN'S MY BEST STUDENT.

1203
00:38:21,765 --> 00:38:20,030
SO SOME PEOPLE THINK IT'S WHEN

1204
00:38:23,567 --> 00:38:21,832
THE EL NINO SHOWS UP BUT WHEN

1205
00:38:25,903 --> 00:38:23,634
YOU'RE OUT OF THIS DROUGHT IS

1206
00:38:27,905 --> 00:38:25,970
WHEN THE PDO FLIPS AND YOU GET A

1207
00:38:29,640 --> 00:38:27,972
DECADE OF ABOVE NORMAL RAINFALL

1208
00:38:31,041 --> 00:38:29,707
BECAUSE IT TOOK YOU A LONG TIME

1209
00:38:32,042 --> 00:38:31,108
TO GET INTO THIS DROUGHT AND

1210
00:38:33,544 --> 00:38:32,109
THERE'S NO QUICK FIX.

1211
00:38:34,912 --> 00:38:33,611
IT'S GOING TO TAKE YOU A LONG

1212
00:38:35,312 --> 00:38:34,979
TIME TO GET OUT.

1213
00:38:37,448 --> 00:38:35,379

ALL RIGHT?

1214

00:38:42,052 --> 00:38:37,515

SO YOU DEFINITELY BETTER BE

1215

00:38:43,153 --> 00:38:42,119

THINKING POSITIVE PDO.

1216

00:38:47,991 --> 00:38:43,220

SO WHAT HAPPENED HERE?

1217

00:38:50,694 --> 00:38:48,058

THIS IS THE PDO AGAIN, RIGHT?

1218

00:38:53,430 --> 00:38:50,761

NEST 2000, WE WENT FROM THE WET

1219

00:38:53,697 --> 00:38:53,497

PDO, THE WARM PDO TO THE COOL

1220

00:38:58,268 --> 00:38:53,764

PDO.

1221

00:39:00,704 --> 00:38:58,335

AND IT ESSENTIALLY STAYED THERE

1222

00:39:01,138 --> 00:39:00,771

MOSTLY FOR LAST 15 YEARS ON AND

1223

00:39:01,538 --> 00:39:01,205

OFF.

1224

00:39:05,476 --> 00:39:01,605

ALL RIGHT?

1225

00:39:07,411 --> 00:39:05,543

SO WHAT I'M THINKING NOW, WHAT

1226
00:39:09,580 --> 00:39:07,478
WOULD BE REALLY SWEET IS WITH

1227
00:39:11,582 --> 00:39:09,647
THIS BIG EL NENIO BUILDING IN

1228
00:39:14,251 --> 00:39:11,649
THE PACIFIC, WOULDN'T IT BE NICE

1229
00:39:17,287 --> 00:39:14,318
IF THAT BIG EL NINO FLIPPED THE

1230
00:39:17,654 --> 00:39:17,354
PDO FROM A NEGATIVE TO A

1231
00:39:18,322 --> 00:39:17,721
POSITIVE?

1232
00:39:20,224 --> 00:39:18,389
ALL RIGHT.

1233
00:39:20,524 --> 00:39:20,291
THAT'S WHAT WE'RE ALL HOPING

1234
00:39:23,994 --> 00:39:20,591
FOR.

1235
00:39:25,562 --> 00:39:24,061
BECAUSE UNTIL THAT HAPPENS,

1236
00:39:26,930 --> 00:39:25,629
YOU'RE IN THE DROUGHT.

1237
00:39:31,268 --> 00:39:26,997
FOREVER.

1238
00:39:33,637 --> 00:39:31,335

UNTIL THAT FLIPS.

1239

00:39:37,040 --> 00:39:33,704

ALL RIGHT?

1240

00:39:38,942 --> 00:39:37,107

SO NOW HERE'S A HOPEFUL SIGN.

1241

00:39:42,246 --> 00:39:39,009

FOR THE LAST 1 MONTHS LOOKING AT

1242

00:39:45,048 --> 00:39:42,313

THE INDEX HERE, THE PDO HAS

1243

00:39:45,616 --> 00:39:45,115

ACTUALLY SHIFTED TO A POSITIVE

1244

00:39:46,016 --> 00:39:45,683

PHASE.

1245

00:39:49,153 --> 00:39:46,083

ALL RIGHT?

1246

00:39:51,922 --> 00:39:49,220

NOW IT COULD FLIP BACK.

1247

00:39:53,857 --> 00:39:51,989

BUT THIS IS A VERY WARM HIGH PDO

1248

00:39:55,025 --> 00:39:53,924

SIGNAL RIGHT HERE FOR THE LAST

1249

00:39:56,994 --> 00:39:55,092

18 MONTHS.

1250

00:39:59,396 --> 00:39:57,061

SO I'M PRETTY HOPEFUL.

1251
00:40:00,130 --> 00:39:59,463
NOT GUARANTEED BUT WOULDN'T THAT

1252
00:40:03,033 --> 00:40:00,197
BE SWEET?

1253
00:40:06,637 --> 00:40:03,100
IF WE GOT INTO A LONG-LASTING

1254
00:40:07,504 --> 00:40:06,704
MOSTLY POSITIVE PDO.

1255
00:40:09,006 --> 00:40:07,571
OF COURSE, THE OTHER

1256
00:40:13,544 --> 00:40:09,073
ALTERNATIVE, AND THIS HAS BEEN

1257
00:40:14,845 --> 00:40:13,611
IN THE NEWS LATELY, IS THAT YOU

1258
00:40:17,047 --> 00:40:14,912
KNOW, EL NINO HAS ALWAYS BEEN

1259
00:40:18,882 --> 00:40:17,114
BILLS AS THE GREAT DROUGHT

1260
00:40:21,185 --> 00:40:18,949
BUSTER, THE SUPER EL NINO.

1261
00:40:22,219 --> 00:40:21,252
SO I CALL IT THE GREAT WET HOPE,

1262
00:40:23,387 --> 00:40:22,286
EL NINO, ALL RIGHT?

1263
00:40:26,990 --> 00:40:23,454

SO THE WHAT'S GOING TO HAPPEN

1264

00:40:27,357 --> 00:40:27,057

HERE WITH THE EL NINO OF

1265

00:40:28,425 --> 00:40:27,424

2015-'16?

1266

00:40:30,694 --> 00:40:28,492

BUT EVEN MORE IMPORTANT, I'M

1267

00:40:31,061 --> 00:40:30,761

GOING TO HIT YOU WITH THIS ONE

1268

00:40:32,729 --> 00:40:31,128

AGAIN.

1269

00:40:34,231 --> 00:40:32,796

WOULDN'T IT BE SWEET IF WE HAD

1270

00:40:36,366 --> 00:40:34,298

THE BIG SWITCH FROM THE NEGATIVE

1271

00:40:38,502 --> 00:40:36,433

TO THE POSITIVE PDO ALONG WITH

1272

00:40:40,471 --> 00:40:38,569

THAT BIG EL NINO?

1273

00:40:44,141 --> 00:40:40,538

WHAT IS EL NINO?

1274

00:40:44,408 --> 00:40:44,208

THIS IS AS SIX AS I COULD MAKE

1275

00:40:46,043 --> 00:40:44,475

IT.

1276

00:40:46,343 --> 00:40:46,110

THIS IS THE TROPICAL PACIFIC

1277

00:40:49,246 --> 00:40:46,410

HERE.

1278

00:40:51,014 --> 00:40:49,313

THE AMERICAS, THIS IS ASIA.

1279

00:40:52,716 --> 00:40:51,081

WHEN YOU HAVE STRONG TRADE

1280

00:40:55,018 --> 00:40:52,783

WINDS, BLOWING FROM THE AMERICAS

1281

00:40:56,954 --> 00:40:55,085

TO ASIA, WARM WATER PILES UP

1282

00:40:59,990 --> 00:40:57,021

HERE OFF ASIA.

1283

00:41:01,058 --> 00:41:00,057

AND IT COOLS OFF ALONG THE COAST

1284

00:41:03,393 --> 00:41:01,125

OF THE AMERICAS.

1285

00:41:05,896 --> 00:41:03,460

SO YOU GET VERY WARM WATER PILED

1286

00:41:07,331 --> 00:41:05,963

UP HERE, VERY COOL WATER THERE.

1287

00:41:09,132 --> 00:41:07,398

THE HIGHEST ACTUALLY, IT'S

1288

00:41:11,034 --> 00:41:09,199

ALMOST A HALF A METER HIGHER IN

1289

00:41:11,435 --> 00:41:11,101

THE WEST DURING NORMAL

1290

00:41:14,571 --> 00:41:11,502

CONDITIONS.

1291

00:41:16,073 --> 00:41:14,638

BUT WHEN YOU GET AN EL NOIPIO,

1292

00:41:17,107 --> 00:41:16,140

THESE TRADE WINDS HERE THEY TEND

1293

00:41:20,677 --> 00:41:17,174

TO WEAKEN.

1294

00:41:22,880 --> 00:41:20,744

AND ALL THAT WARM WATER OFF ASIA

1295

00:41:23,313 --> 00:41:22,947

TENDS TO SHIFT BACK ACROSS THE

1296

00:41:27,451 --> 00:41:23,380

AMERICAS.

1297

00:41:28,485 --> 00:41:27,518

AND THAT'S A BIG DISTANCE.

1298

00:41:29,653 --> 00:41:28,552

THAT'S A THIRD OF THE

1299

00:41:31,321 --> 00:41:29,720

CIRCUMFERENCE OF THE EARTH ALL

1300

00:41:32,923 --> 00:41:31,388

THAT WATER SLOSHING BACK AND IT

1301
00:41:36,493 --> 00:41:32,990
MOVES TOWARDS THE AMERICAS.

1302
00:41:39,763 --> 00:41:36,560
AND SO THAT'S EL NINO 101.

1303
00:41:42,366 --> 00:41:39,830
NOW, HERE AT JPL, WE'VE BEEN

1304
00:41:44,334 --> 00:41:42,433
FLYING A SERIES OF SATELLITES

1305
00:41:46,069 --> 00:41:44,401
WHICH I CALL STALKING EL NAINIO

1306
00:41:46,503 --> 00:41:46,136
FROM SPACE.

1307
00:41:49,139 --> 00:41:46,570
ALL RIGHT?

1308
00:41:52,276 --> 00:41:49,206
SINCE 1992.

1309
00:41:54,645 --> 00:41:52,343
ONE THE FIRST UP WITH WAS

1310
00:41:56,947 --> 00:41:54,712
POSEIDON JOINT VENTURE WITH THE

1311
00:41:59,116 --> 00:41:57,014
FRENCH SPACE AGENCY, JASON 1,

1312
00:42:01,285 --> 00:41:59,183
JASON 2, AND JASON 3 WE HOPE TO

1313
00:42:05,055 --> 00:42:01,352

LAUNCH LATER THIS YEAR ON ONE OF

1314

00:42:06,790 --> 00:42:05,122

ELON MUSK'S ROCKETS.

1315

00:42:08,358 --> 00:42:06,857

MY FERNGS CROSSED.

1316

00:42:09,860 --> 00:42:08,425

AND WHAT IT MEASURES IS THE

1317

00:42:12,029 --> 00:42:09,927

HEIGHT OF THE SEA SURFACE.

1318

00:42:15,165 --> 00:42:12,096

IT HAS A RADAR THAT BOUNCES

1319

00:42:16,800 --> 00:42:15,232

RADAR SIGNALS OFF THE SURFACE,

1320

00:42:18,268 --> 00:42:16,867

MEASURES THE DISTANCE BY

1321

00:42:19,536 --> 00:42:18,335

MEASURING THE TIME AND WE DO IT

1322

00:42:22,072 --> 00:42:19,603

SO GOOD HERE.

1323

00:42:23,106 --> 00:42:22,139

WE'RE SO GOOD AT JPL, WE

1324

00:42:26,410 --> 00:42:23,173

ACTUALLY IT CAN MEASURE THAT

1325

00:42:28,545 --> 00:42:26,477

DISTANCE FROM 1300 KILOMETERS IN

1326
00:42:29,112 --> 00:42:28,612
SPACE DOWN TO THE SUB CENTIMETER

1327
00:42:30,948 --> 00:42:29,179
LEVEL.

1328
00:42:33,717 --> 00:42:31,015
NOW, IS THAT COOL OR WHAT?

1329
00:42:34,151 --> 00:42:33,784
YOU KNOW, ARE YOU GETTING YOUR

1330
00:42:36,587 --> 00:42:34,218
MOPE'S WORTH?

1331
00:42:41,024 --> 00:42:36,654
SO STALKING EL NINO FROM SPACE.

1332
00:42:43,927 --> 00:42:41,091
AND WHAT I DO IS I PRODUCE MAPS

1333
00:42:44,795 --> 00:42:43,994
OF THE TOPOGRAPHY OF THE SURFACE

1334
00:42:47,030 --> 00:42:44,862
OF THE SEA SURFACE.

1335
00:42:50,534 --> 00:42:47,097
SO WHAT YOU'RE GOING TO BE

1336
00:42:53,403 --> 00:42:50,601
LOOKING AT ARE MAPS LIKE THIS.

1337
00:42:55,205 --> 00:42:53,470
AND WHAT THEY REALLY ARE IS MAPS

1338
00:42:55,572 --> 00:42:55,272

OF THE TOPOGRAPHY OF THE SEA

1339

00:42:56,740 --> 00:42:55,639

SURFACE.

1340

00:42:59,843 --> 00:42:56,807

SOME PLACES SIT HIGHER.

1341

00:43:02,879 --> 00:42:59,910

SOME PLACES SIT LOWER.

1342

00:43:05,649 --> 00:43:02,946

SO WHEN THERE'S MORE HEAT IN THE

1343

00:43:07,851 --> 00:43:05,716

UPPER LAYER, THE WATER EXPANDS

1344

00:43:08,185 --> 00:43:07,918

AND SO THE OCEAN ACTUALLY SITS

1345

00:43:10,253 --> 00:43:08,252

HIGHER.

1346

00:43:10,587 --> 00:43:10,320

WHEN IT COOLS OFF, IT SITS

1347

00:43:11,421 --> 00:43:10,654

LOWER.

1348

00:43:13,223 --> 00:43:11,488

IS THAT COOL?

1349

00:43:13,523 --> 00:43:13,290

THAT'S VERY COOL.

1350

00:43:14,625 --> 00:43:13,590

YEAH?

1351
00:43:17,394 --> 00:43:14,692
SO IT'S REALLY MEASURING HOW

1352
00:43:17,794 --> 00:43:17,461
MUCH HEAT IS STORED IN THE UPPER

1353
00:43:22,366 --> 00:43:17,861
OCEAN.

1354
00:43:22,766 --> 00:43:22,433
THE HEIGHT OF THE SEA SURFACE.

1355
00:43:25,402 --> 00:43:22,833
ALL RIGHT?

1356
00:43:26,870 --> 00:43:25,469
SO BEGINNING -- THIS WAS

1357
00:43:29,139 --> 00:43:26,937
REMEMBER WE'VE BEEN DOING THIS

1358
00:43:32,242 --> 00:43:29,206
FOR 23 YEARS.

1359
00:43:33,043 --> 00:43:32,309
SO PHI MIRS BIG EL NINO WAS 187.

1360
00:43:36,046 --> 00:43:33,110
THAT WAS GREAT.

1361
00:43:37,481 --> 00:43:36,113
WE SAW IN JANUARY THE EL NINO

1362
00:43:38,482 --> 00:43:37,548
STARTED TO BUILD A SERIES OF

1363
00:43:40,550 --> 00:43:38,549

WAVES FROM THE WESTERN PACIFIC

1364

00:43:42,686 --> 00:43:40,617

MOVING TO THE EASTERN PACIFIC.

1365

00:43:43,854 --> 00:43:42,753

THE SAME THING IN JANUARY OF

1366

00:43:46,056 --> 00:43:43,921

THIS YEAR.

1367

00:43:49,159 --> 00:43:46,123

MARCH, APRIL, MAY, JULY, NOW,

1368

00:43:50,961 --> 00:43:49,226

THE INTERESTING THING IS, IN

1369

00:43:57,834 --> 00:43:51,028

JULY, WHICH ONE DO YOU THINK WAS

1370

00:43:59,403 --> 00:43:57,901

BIGGER, THE '97 OR THE 2015?

1371

00:44:02,539 --> 00:43:59,470

THIS ONE OR THIS ONE?

1372

00:44:05,075 --> 00:44:02,606

COME ON.

1373

00:44:06,543 --> 00:44:05,142

THE 2015 IS THE CHAMP.

1374

00:44:06,943 --> 00:44:06,610

IT'S DEFINITELY BIGGER.

1375

00:44:09,446 --> 00:44:07,010

ALL RIGHT.

1376
00:44:12,616 --> 00:44:09,513
SO THIS IS A BIGGER EVENT SO FAR

1377
00:44:15,752 --> 00:44:12,683
THAN WHAT WE SAW IN '97.

1378
00:44:16,153 --> 00:44:15,819
AND '97 WAS PRETTY EXCITING.

1379
00:44:16,520 --> 00:44:16,220
ALL RIGHT?

1380
00:44:24,728 --> 00:44:16,587
ALL RIGHT.

1381
00:44:25,028 --> 00:44:24,795
LET'S SEE IF I CAN DO THIS NOW.

1382
00:44:28,765 --> 00:44:25,095
OKAY.

1383
00:44:29,066 --> 00:44:28,832
THIS IS COOL.

1384
00:44:32,002 --> 00:44:29,133
OKAY.

1385
00:44:36,640 --> 00:44:32,069
THIS IS AN ANIMATION SIDE BY

1386
00:44:38,675 --> 00:44:36,707
SIDE OF THE '97 EVENT AND THE

1387
00:44:39,576 --> 00:44:38,742
2015 EVENT.

1388
00:44:41,244 --> 00:44:39,643

ALL RIGHT?

1389

00:44:42,045 --> 00:44:41,311

AND, OF COURSE, IT STOPS RIGHT

1390

00:44:43,947 --> 00:44:42,112

NOW.

1391

00:44:45,816 --> 00:44:44,014

BUT YOU CAN SEE FROM AUGUST

1392

00:44:47,117 --> 00:44:45,883

THROUGH NOVEMBER, THAT '97 EVENT

1393

00:44:49,286 --> 00:44:47,184

REALLY PUMPED UP.

1394

00:44:51,488 --> 00:44:49,353

ABOUT BECAUSE THE TRADE WINDS

1395

00:44:53,857 --> 00:44:51,555

REALLY RELAXED AND SO MORE AND

1396

00:44:57,360 --> 00:44:53,924

MORE HEAT SHIFTED FROM THE

1397

00:44:59,763 --> 00:44:57,427

WESTERN INTO THE EASTERN

1398

00:45:00,530 --> 00:44:59,830

PACIFIC.

1399

00:45:07,704 --> 00:45:00,597

SEE IF I CAN DO THIS I LOVE THIS

1400

00:45:08,004 --> 00:45:07,771

ANIMATION.

1401
00:45:09,873 --> 00:45:08,071
OKAY.

1402
00:45:10,173 --> 00:45:09,940
THAT WAS ENOUGH FOR NOW.

1403
00:45:12,375 --> 00:45:10,240
OKAY?

1404
00:45:14,745 --> 00:45:12,442
JUST BECAUSE WE'RE RUNNING LATE.

1405
00:45:16,246 --> 00:45:14,812
SO THE REAL QUESTION AT THIS

1406
00:45:18,882 --> 00:45:16,313
POINT IS YOU CAN SEE BY THE

1407
00:45:21,451 --> 00:45:18,949
FIRST WEEK IN AUGUST OR THIS

1408
00:45:23,386 --> 00:45:21,518
WEEK, IS THAT THIS IS A STRONGER

1409
00:45:24,855 --> 00:45:23,453
SIGNAL THAN THIS WAS AT THE SAME

1410
00:45:25,255 --> 00:45:24,922
TIME IN AUGUST.

1411
00:45:26,757 --> 00:45:25,322
ALL RIGHT?

1412
00:45:29,993 --> 00:45:26,824
BUT THE REAL QUESTION IS, DOES

1413
00:45:31,928 --> 00:45:30,060

THIS EL NINO HAVE THE STAYING

1414

00:45:32,929 --> 00:45:31,995

POWER?

1415

00:45:35,098 --> 00:45:32,996

WILL THE TRADE WINDS COLLAPSE TO

1416

00:45:36,933 --> 00:45:35,165

GIVE US AN EVENT THE SIZE OF

1417

00:45:39,336 --> 00:45:37,000

WHAT WE SAW IN 1997.

1418

00:45:39,836 --> 00:45:39,403

SO THAT'S THE HIGH DRAMA HERE,

1419

00:45:41,538 --> 00:45:39,903

ALL RIGHT?

1420

00:45:42,239 --> 00:45:41,605

NOW, ALL OF YOU CAN PARTICIPATE

1421

00:45:47,077 --> 00:45:42,306

IN THIS.

1422

00:45:49,813 --> 00:45:47,144

SO THE QUESTION IS, NINO 2015,

1423

00:45:50,213 --> 00:45:49,880

IS IT GOING TO BE A STUD OR A

1424

00:45:52,149 --> 00:45:50,280

DUD?

1425

00:45:53,350 --> 00:45:52,216

WELL WILL THE TRADE WINDS RELAX

1426
00:45:57,120 --> 00:45:53,417
FROM AUGUST TO NOVEMBER?

1427
00:45:57,521 --> 00:45:57,187
THAT'S THE HIGH DRAMA.

1428
00:46:00,190 --> 00:45:57,588
ALL RIGHT?

1429
00:46:01,792 --> 00:46:00,257
OR THE OTHER WAY TO LOOK AT IT

1430
00:46:03,593 --> 00:46:01,859
IS EL ANYONE DWROE IS IT GOING

1431
00:46:05,529 --> 00:46:03,660
TO BE A CHAMP OR' CHUMP?

1432
00:46:10,133 --> 00:46:05,596
WELL, YOU CAN ACTUALLY GO TO THE

1433
00:46:10,667 --> 00:46:10,200
WEB SITE, SEA

1434
00:46:13,270 --> 00:46:10,734
LEVEL.JPL.NASA.GOV.

1435
00:46:14,938 --> 00:46:13,337
AND EVERY 15 DAYS, UPDATA

1436
00:46:16,807 --> 00:46:15,005
WEBSITE WITH THE NEW IMAGE WITH

1437
00:46:19,442 --> 00:46:16,874
THE NEW ANIMATION, ALL RIGHT?

1438
00:46:23,346 --> 00:46:19,509

AND SINCE ALL OF YOU HAVE SUCH A

1439

00:46:24,514 --> 00:46:23,413

BIG STAKE IN THIS DROUGHT, ALL

1440

00:46:26,283 --> 00:46:24,581

RIGHT, YOU KNOW, IT'S REAL

1441

00:46:27,751 --> 00:46:26,350

SIMPLE TO GO TO.

1442

00:46:29,619 --> 00:46:27,818

AND YOU CAN GO BACK AND PLAY

1443

00:46:33,256 --> 00:46:29,686

WITH THIS ANIMATION AND LOOK AT

1444

00:46:34,758 --> 00:46:33,323

ALL THE IMAGES FROM THE PAST.

1445

00:46:37,027 --> 00:46:34,825

NOW, SUPPOSE IT DOES DELIVER.

1446

00:46:39,396 --> 00:46:37,094

WHAT DOES IT LOOK LIKE?

1447

00:46:41,698 --> 00:46:39,463

THE SUBTROPICAL JET STREAM WHICH

1448

00:46:43,967 --> 00:46:41,765

IS NORMALLY BRINGS RAIN INTO THE

1449

00:46:45,468 --> 00:46:44,034

ARENA FOREST IN GUATEMALA AND

1450

00:46:49,339 --> 00:46:45,535

CENTRAL MEXICO SHIFTS NORTH.

1451
00:46:50,674 --> 00:46:49,406
SO WHAT WE GET IS A VERY WET

1452
00:46:51,675 --> 00:46:50,741
WINTER ACROSS ACCOUNT SOUTHERN

1453
00:46:53,977 --> 00:46:51,742
TIER OF THE UNITED STATES WHICH

1454
00:46:55,679 --> 00:46:54,044
IS NORMALLY DRY.

1455
00:46:56,079 --> 00:46:55,746
THE SOUTHEAST, TEXAS, SOUTHERN

1456
00:46:57,981 --> 00:46:56,146
CALIFORNIA.

1457
00:46:59,983 --> 00:46:58,048
THOSE ARE ALL DRY PLACES.

1458
00:47:03,820 --> 00:47:00,050
AND THE POLAR JET STREAM WHICH

1459
00:47:04,888 --> 00:47:03,887
WAS SO PUNISHING LAST WINTER

1460
00:47:06,790 --> 00:47:04,955
SHIFTS TO THE NORTH.

1461
00:47:07,691 --> 00:47:06,857
AND THE NORTHERN TIER OF THE

1462
00:47:09,926 --> 00:47:07,758
UNITED STATES AND SOUTHERN

1463
00:47:13,797 --> 00:47:09,993

CANADA GET A VERYMIDE WENTER.

1464

00:47:16,633 --> 00:47:13,864

AND SO WHAT YOU SEE IS ON THE

1465

00:47:20,203 --> 00:47:16,700

NEWS IN JANUARY, IS MUDSLIDES IN

1466

00:47:20,770 --> 00:47:20,270

CALIFORNIA AND GOLFING IN

1467

00:47:24,040 --> 00:47:20,837

MINNESOTA.

1468

00:47:25,709 --> 00:47:24,107

YOU REMEMBER THAT FROM '97.

1469

00:47:27,510 --> 00:47:25,776

IT'S A BIG SWITCH.

1470

00:47:29,880 --> 00:47:27,577

AND IT KIND OF LOOKS LIKE THIS.

1471

00:47:31,114 --> 00:47:29,947

THIS IS THE PATTERN WE SAW LAST

1472

00:47:33,583 --> 00:47:31,181

WINTER, THE PURPLE CURVE.

1473

00:47:34,985 --> 00:47:33,650

AND THIS WOULD BE THE PATTERN WE

1474

00:47:39,322 --> 00:47:35,052

SEE THIS COMING WENTER.

1475

00:47:42,025 --> 00:47:39,389

DECEMBER THROUGH FEBRUARY.

1476
00:47:46,630 --> 00:47:42,092
BUT THE OTHER THING TO REMEMBER

1477
00:47:50,834 --> 00:47:46,697
ABOUT EL NINO, IT'S GLOBAL.

1478
00:47:52,702 --> 00:47:50,901
THAT EL NINO SIGNAL IS SO LARGE

1479
00:47:55,138 --> 00:47:52,769
THAT THERE ISN'T ONE CONTINENT

1480
00:47:55,572 --> 00:47:55,205
ON THE PLANET THAT DOESN'T FEEL

1481
00:47:56,740 --> 00:47:55,639
EL NINO.

1482
00:47:58,475 --> 00:47:56,807
IT'S WET ACROSS THE SOUTHERN

1483
00:48:00,110 --> 00:47:58,542
TIER OF THE U.S., MILDER WINTER

1484
00:48:04,514 --> 00:48:00,177
ACROSS THE NORTHERN TIER.

1485
00:48:06,783 --> 00:48:04,581
GETS VERY WET IN PLACES LIKE

1486
00:48:07,918 --> 00:48:06,850
ECUADOR AND CHILE WHICH ARE

1487
00:48:09,653 --> 00:48:07,985
NOFRL MALI DRY.

1488
00:48:11,454 --> 00:48:09,720

THE BIGGEST IMPACT IS ALL THAT

1489

00:48:16,326 --> 00:48:11,521

WARM WATER LEAVING THE WESTERN

1490

00:48:18,061 --> 00:48:16,393

PACIFIC THEY GET EXTREME DROUGHT

1491

00:48:18,828 --> 00:48:18,128

INDONESIA, THE PHILIPPINES,

1492

00:48:21,298 --> 00:48:18,895

NORTHERN AUSTRALIA, SOUTHEAST

1493

00:48:22,432 --> 00:48:21,365

ASIA AND IT'S A WARMER WINTER.

1494

00:48:24,000 --> 00:48:22,499

NOW THIS IS REALLY IMPORTANT

1495

00:48:25,568 --> 00:48:24,067

BECAUSE TWO-THIRDS OF THE

1496

00:48:27,938 --> 00:48:25,635

EARTH'S POPULATION LIVES IN

1497

00:48:28,738 --> 00:48:28,005

SOUTHEAST ASIA UNDER THE

1498

00:48:30,073 --> 00:48:28,805

MONSOON.

1499

00:48:30,473 --> 00:48:30,140

TWO-THIRDS OF THE WORLD'S

1500

00:48:32,842 --> 00:48:30,540

POPULATION.

1501
00:48:34,611 --> 00:48:32,909
AND SO FOR THEM, IT THE EL NINO

1502
00:48:36,746 --> 00:48:34,678
IS REALLY PUNISHING.

1503
00:48:39,916 --> 00:48:36,813
WE'VE ALREADY SEEN IMPACTS, ARE

1504
00:48:40,283 --> 00:48:39,983
THE DROUGHT HAS ALREADY BEGUN IN

1505
00:48:42,552 --> 00:48:40,350
INDONESIA.

1506
00:48:43,787 --> 00:48:42,619
THEY'VE SEEN HEAVY FLOODING IN

1507
00:48:45,989 --> 00:48:43,854
ECUADOR AND PERU.

1508
00:48:48,024 --> 00:48:46,056
EVEN HAS IMPACTS IN AFRICA.

1509
00:48:48,525 --> 00:48:48,091
SOUTH AFRICA TENDS TO HAVE A

1510
00:48:50,694 --> 00:48:48,592
DROUGHT.

1511
00:48:52,495 --> 00:48:50,761
THE SUB SA HEAL WHICH IS

1512
00:48:52,796 --> 00:48:52,562
NORMALLY VERY DRY TENDS TO BE

1513
00:48:54,397 --> 00:48:52,863

WET.

1514

00:48:58,301 --> 00:48:54,464

THERE'S EVEN A CONNECTION IN

1515

00:49:00,203 --> 00:48:58,368

EUROPE IN THE BIG EL NINOS

1516

00:49:02,472 --> 00:49:00,270

EASTERN EUROPE AND WESTERN

1517

00:49:03,273 --> 00:49:02,539

RUSSIA HAVE EXTREME WINTERS.

1518

00:49:05,141 --> 00:49:03,340

EXTREME.

1519

00:49:06,910 --> 00:49:05,208

PUNISHING WINTERS.

1520

00:49:08,912 --> 00:49:06,977

SO I ALWAYS LIKE TO TELL THIS

1521

00:49:11,715 --> 00:49:08,979

STORY ABOUT EL NINO.

1522

00:49:12,315 --> 00:49:11,782

ANYBODY REMEMBER WHAT HAPPENED

1523

00:49:14,718 --> 00:49:12,382

IN 1812?

1524

00:49:15,151 --> 00:49:14,785

COME ON, YOU GOT TO KNOW SOME

1525

00:49:18,421 --> 00:49:15,218

HISTORY.

1526

00:49:20,924 --> 00:49:18,488

WHAT HAPPENED IN 112?

1527

00:49:21,658 --> 00:49:20,991

>> NAPOLEON.

1528

00:49:23,426 --> 00:49:21,725

ALL RIGHT?

1529

00:49:25,295 --> 00:49:23,493

NAPOLEON MARCHED LIKE 400,000

1530

00:49:25,595 --> 00:49:25,362

TROOPS INTO THE HEART OF RUSSIA,

1531

00:49:28,131 --> 00:49:25,662

RIGHT?

1532

00:49:33,236 --> 00:49:28,198

AND THEY ALL FROZE TO DEATH.

1533

00:49:33,870 --> 00:49:33,303

NOW WHAT HAPPENED IN 1941?

1534

00:49:36,373 --> 00:49:33,937

SAME THING.

1535

00:49:38,708 --> 00:49:36,440

YOU KNOW, A SECOND EUROPEAN

1536

00:49:40,176 --> 00:49:38,775

DESPOT, A DO HAVE HITLER MARCHED

1537

00:49:41,611 --> 00:49:40,243

ALL HIS TROOPS INTO RUSSIA THE

1538

00:49:42,312 --> 00:49:41,678

SAME THING AND THEY ALL FROEDS

1539

00:49:44,647 --> 00:49:42,379

TO DEATH.

1540

00:49:47,150 --> 00:49:44,714

AND SO THE WINTER OF 1812 AND

1541

00:49:49,319 --> 00:49:47,217

THE WINTER OF 1941, THAT

1542

00:49:49,686 --> 00:49:49,386

FINISHED OFF HITLER AND

1543

00:49:51,755 --> 00:49:49,753

NAPOLEON.

1544

00:49:53,223 --> 00:49:51,822

AND SO SOME PEOPLE SAY THAT

1545

00:49:54,090 --> 00:49:53,290

RUSSIA ACTUALLY DEFEATED

1546

00:49:55,925 --> 00:49:54,157

NAPOLEON AND HITLER.

1547

00:49:56,760 --> 00:49:55,992

AND YOU KNOW, THAT'S DEFINITELY

1548

00:50:00,997 --> 00:49:56,827

NOT TRUE.

1549

00:50:01,297 --> 00:50:01,064

IT WAS EL NINO.

1550

00:50:03,166 --> 00:50:01,364

OKAY.

1551
00:50:03,566 --> 00:50:03,233
WRAP IT UP HERE.

1552
00:50:04,167 --> 00:50:03,633
ALL RIGHT?

1553
00:50:06,736 --> 00:50:04,234
ALL RIGHT.

1554
00:50:08,338 --> 00:50:06,803
WHAT CAN WE EXPECT IF EL NINO

1555
00:50:10,940 --> 00:50:08,405
DELIVERS?

1556
00:50:11,641 --> 00:50:11,007
1982, '83.

1557
00:50:13,043 --> 00:50:11,708
'97-'98.

1558
00:50:14,277 --> 00:50:13,110
30 INCHES.

1559
00:50:16,613 --> 00:50:14,344
SOUTHERN CALIFORNIA GOT DOUBLE

1560
00:50:16,913 --> 00:50:16,680
ITS NORMAL RAINFALL.

1561
00:50:18,481 --> 00:50:16,980
OKAY?

1562
00:50:19,816 --> 00:50:18,548
WOULDN'T THAT BE GREAT?

1563
00:50:20,683 --> 00:50:19,883

OF COURSE, IT, WOULDN'T MAKE

1564

00:50:23,453 --> 00:50:20,750

MUCH DIFFERENCE TO US BECAUSE

1565

00:50:24,120 --> 00:50:23,520

WHAT HAPPENS TO ALL OUR RAIN IN

1566

00:50:25,388 --> 00:50:24,187

L.A.?

1567

00:50:26,790 --> 00:50:25,455

YEAH, YOU GUYS KNOW.

1568

00:50:28,892 --> 00:50:26,857

IT ALL GOES OUT INTO THE OCEAN

1569

00:50:29,292 --> 00:50:28,959

BECAUSE ALL THE RIVERS ARE

1570

00:50:30,627 --> 00:50:29,359

CONCRETED.

1571

00:50:32,395 --> 00:50:30,694

BUT STILL IT WOULD BE NICE.

1572

00:50:34,130 --> 00:50:32,462

MAYBE MY LAWN WOULD FINALLY COME

1573

00:50:36,866 --> 00:50:34,197

BACK BUT I DON'T THINK SO.

1574

00:50:37,267 --> 00:50:36,933

I THINK IT'S GONE FOREVER.

1575

00:50:38,868 --> 00:50:37,334

ALL RIGHT?

1576
00:50:41,571 --> 00:50:38,935
NOW, LET'S LOOK AT THE SNOWPACK

1577
00:50:42,372 --> 00:50:41,638
WHICH IS MORE IMPORTANT.

1578
00:50:44,974 --> 00:50:42,439
SAME THING.

1579
00:50:46,810 --> 00:50:45,041
IS THAT IN THOSE TWO WENTERS WE

1580
00:50:48,778 --> 00:50:46,877
ESSENTIALLY GOT DOUBLE THE

1581
00:50:49,646 --> 00:50:48,845
SNOWPACK NAN THE SIERRAS UP AND

1582
00:50:50,847 --> 00:50:49,713
DOWN THE STATE.

1583
00:50:51,881 --> 00:50:50,914
THAT WOULD BE SWEET.

1584
00:50:55,552 --> 00:50:51,948
THAT WOULD DEFINITELY BE SWEET.

1585
00:50:55,852 --> 00:50:55,619
SO I'M EXCITED ABOUT THAT.

1586
00:50:58,421 --> 00:50:55,919
OKAY.

1587
00:51:01,491 --> 00:50:58,488
SO HERE WE GO.

1588
00:51:03,927 --> 00:51:01,558

ONE OF MY THEORYS IS A REALLY

1589

00:51:05,795 --> 00:51:03,994

BIG EL NINO REDISTRIBUTES SO

1590

00:51:08,731 --> 00:51:05,862

MUCH HEAT IN THE PACIFIC, IT CAN

1591

00:51:10,600 --> 00:51:08,798

ACTUALLY FLIP THE PDO.

1592

00:51:12,569 --> 00:51:10,667

FROM A WARM PHASE TO A COOL

1593

00:51:13,470 --> 00:51:12,636

PHASE OR A COOL PHASE TO HE AN

1594

00:51:14,904 --> 00:51:13,537

WARM PHASE.

1595

00:51:16,439 --> 00:51:14,971

AND WE'VE SEEN THAT IN THE PAST

1596

00:51:18,975 --> 00:51:16,506

BUT I DIDN'T PUT THAT SLIDE UP.

1597

00:51:20,643 --> 00:51:19,042

SO THE QUESTION IS, IS THIS BIG

1598

00:51:23,580 --> 00:51:20,710

EL NINO WHICH LOOKS A LOT LIKE

1599

00:51:27,117 --> 00:51:23,647

THE POSITIVE PDO, ALL RIGHT, IS

1600

00:51:29,586 --> 00:51:27,184

IT GOING TO FLIP THE PDO, ALL

1601
00:51:33,156 --> 00:51:29,653
RIGHT, TO A POSITIVE PHASE?

1602
00:51:34,057 --> 00:51:33,223
AND REMEMBER, THE DROUGHT BUSTER

1603
00:51:36,226 --> 00:51:34,124
IS WHAT?

1604
00:51:36,659 --> 00:51:36,293
IT'S THE POSITIVE PHASE OF THE

1605
00:51:39,963 --> 00:51:36,726
PDO.

1606
00:51:40,497 --> 00:51:40,030
NOT THE EL NINO.

1607
00:51:40,797 --> 00:51:40,564
ALL RIGHT?

1608
00:51:41,364 --> 00:51:40,864
OKAY.

1609
00:51:43,333 --> 00:51:41,431
SO HERE IT IS.

1610
00:51:44,100 --> 00:51:43,400
YOU MADE IT TO THE END.

1611
00:51:46,169 --> 00:51:44,167
ALL RIGHT.

1612
00:51:47,837 --> 00:51:46,236
NOW, GODZILLA EL NINO WOULD BE

1613
00:51:49,172 --> 00:51:47,904

SWEET AND A HUGE DOWN PAYMENT ON

1614

00:51:51,141 --> 00:51:49,239

DROUGHT RELIEF.

1615

00:51:51,441 --> 00:51:51,208

I MEAN WE'RE PRETTY DESPERATE

1616

00:51:53,009 --> 00:51:51,508

HERE.

1617

00:51:54,577 --> 00:51:53,076

LET'S GET RIGHT DOWN TO IT.

1618

00:51:55,612 --> 00:51:54,644

WE NEED SOME WATER.

1619

00:51:57,747 --> 00:51:55,679

OF COURSE, YOU'D HAVE TO SURVIVE

1620

00:51:58,781 --> 00:51:57,814

THE FLOODS AND THE MUDSLIDES AND

1621

00:52:00,950 --> 00:51:58,848

THE HAVOC.

1622

00:52:04,454 --> 00:52:01,017

REMEMBER THE LAST TWO THE BIG EL

1623

00:52:06,022 --> 00:52:04,521

NINOS '82, '83, '97, '98 WE WERE

1624

00:52:08,158 --> 00:52:06,089

NOT IN A DROUGHT.

1625

00:52:09,626 --> 00:52:08,225

SO THOSE EL NINOS IF YOU WERE

1626
00:52:10,994 --> 00:52:09,693
AROUND, WERE NEVER BILLED AS

1627
00:52:15,064 --> 00:52:11,061
DROUGHT BUSTERS.

1628
00:52:16,599 --> 00:52:15,131
I WENT THROUGH THE WHOLE '97-'9

1629
00:52:19,269 --> 00:52:16,666
EL NINO AND NOBODY EVER ASKED ME

1630
00:52:22,071 --> 00:52:19,336
ONCE IS THIS A DROUGHT BUSTER.

1631
00:52:24,807 --> 00:52:22,138
BECAUSE WE WEREN'T IN A DROUGHT.

1632
00:52:27,010 --> 00:52:24,874
BUT THEY WERE PLANNING ON MUD

1633
00:52:28,778 --> 00:52:27,077
SLIDES AND HAVOC, RIGHT?

1634
00:52:31,414 --> 00:52:28,845
BUT A SWITCH TO THE POSITIVE PDO

1635
00:52:33,116 --> 00:52:31,481
WHICH WOULD BE LONGER TERM,

1636
00:52:34,217 --> 00:52:33,183
REMEMBER, THERE'S NO QUICK FIX

1637
00:52:35,552 --> 00:52:34,284
TO THE DROUGHT.

1638
00:52:37,287 --> 00:52:35,619

ONE YEAR IS NEVER GOING TO GET

1639

00:52:39,956 --> 00:52:37,354

YOU OUT OF HAD DROUGHT IS REALLY

1640

00:52:40,356 --> 00:52:40,023

THE DROUGHT BUSTER.

1641

00:52:42,225 --> 00:52:40,423

ALL RIGHT?

1642

00:52:44,027 --> 00:52:42,292

GIVE US A DECADE OR MORE OF

1643

00:52:45,395 --> 00:52:44,094

ABOVE NORMAL RAINFALL AND

1644

00:52:47,263 --> 00:52:45,462

SNOWPACK, AND SO THAT'S REALLY

1645

00:52:47,931 --> 00:52:47,330

WHAT WE HAVE OUR FINKS CROSSED.

1646

00:52:48,364 --> 00:52:47,998

BEEN A GREAT AUDIENCE.

1647

00:53:07,984 --> 00:52:48,431

THANKS A LOT.

1648

00:53:08,551 --> 00:53:08,051

[APPLAUSE]

1649

00:53:09,586 --> 00:53:08,618

>> OKAY.

1650

00:53:11,554 --> 00:53:09,653

ANYBODY HAVE ANY QUESTIONS?

1651
00:53:13,189 --> 00:53:11,621
LOVE TO ANSWER -- YOU KNOW,

1652
00:53:14,757 --> 00:53:13,256
THERE'S SO MUCH I SKIPPED OVER

1653
00:53:15,658 --> 00:53:14,824
AND I KNOW THAT PEOPLE HAVE A

1654
00:53:22,498 --> 00:53:15,725
LOT OF KNOWLEDGE ABOUT THIS

1655
00:53:22,899 --> 00:53:22,565
DROUGHT AND THE EL NINO.

1656
00:53:25,101 --> 00:53:22,966
YES, SIR.

1657
00:53:26,469 --> 00:53:25,168
>> PDO -- ARE YOU AMERICANING

1658
00:53:27,904 --> 00:53:26,536
THE SAME THEY THINK THAT YOU

1659
00:53:29,806 --> 00:53:27,971
MEASURED TO TRACK EL NINO?

1660
00:53:30,440 --> 00:53:29,873
INTO NO, THAT'S A GOOD QUESTION.

1661
00:53:33,676 --> 00:53:30,507
EXCELLENT QUESTION.

1662
00:53:36,479 --> 00:53:33,743
THE PDO IS SAY SEA SURFACE

1663
00:53:40,350 --> 00:53:36,546

TEMPERATURE MEASUREMENT, OKAY?

1664

00:53:42,218 --> 00:53:40,417

THE SATELLITES -- MY EL NIPIO

1665

00:53:43,553 --> 00:53:42,285

TALK STALKERS THAT'S A SEA

1666

00:53:44,787 --> 00:53:43,620

SURFACE HEIGHT MEASUREMENT.

1667

00:53:48,992 --> 00:53:44,854

THEY'RE COMPLIMENTARY BUT THEY

1668

00:53:51,327 --> 00:53:49,059

DO MEASURE DIFFERENT THINGS.

1669

00:53:51,761 --> 00:53:51,394

YES, SIR, IN THE BACK.

1670

00:53:54,464 --> 00:53:51,828

>> YES.

1671

00:53:55,798 --> 00:53:54,531

>> I HAVE A QUESTION.

1672

00:53:59,702 --> 00:53:55,865

THERE WAS AN INTENSE RAINFALL

1673

00:54:00,336 --> 00:53:59,769

THROUGHOUT THE YEAR AND I THINK

1674

00:54:01,971 --> 00:54:00,403

IT WAS 2005 OR '06.

1675

00:54:03,339 --> 00:54:02,038

>> 2004, 2005.

1676
00:54:04,274 --> 00:54:03,406
>> AND THERE WAS FLOURS IN THE

1677
00:54:04,941 --> 00:54:04,341
DESERT AND ALL THAT.

1678
00:54:06,142 --> 00:54:05,008
>> FANTASTIC.

1679
00:54:08,478 --> 00:54:06,209
>> HOW DOES THAT --

1680
00:54:10,613 --> 00:54:08,545
>> YOU KNOW, WHEN YOU LOOK AT

1681
00:54:11,481 --> 00:54:10,680
HOW WE GET OUR RAIN IN

1682
00:54:13,483 --> 00:54:11,548
CALIFORNIA, EVERYBODY MAKES A

1683
00:54:16,185 --> 00:54:13,550
BIG DEAL OUT OF EL NINO.

1684
00:54:18,087 --> 00:54:16,252
BUT IN ACTUAL FACT, OVER THE

1685
00:54:20,990 --> 00:54:18,154
LANGUAGE HAUL WE ONLY GET 7% OF

1686
00:54:21,324 --> 00:54:21,057
OUR RAIN FROM EL NINO.

1687
00:54:22,025 --> 00:54:21,391
7%.

1688
00:54:25,228 --> 00:54:22,092

THAT'S ALL.

1689

00:54:26,462 --> 00:54:25,295

ALMOST 50% COMES FROM THESE AT

1690

00:54:28,431 --> 00:54:26,529

MOSS ATMOSPHERIC RIVER EVENTS,

1691

00:54:30,767 --> 00:54:28,498

THESE FIRE HOSE EVENTS WHICH ARE

1692

00:54:31,067 --> 00:54:30,834

SO COOL LIKE IN THE DECEMBER OF

1693

00:54:32,969 --> 00:54:31,134

2010.

1694

00:54:34,470 --> 00:54:33,036

AND THEN IF YOU REALLY GET

1695

00:54:36,306 --> 00:54:34,537

LUCKY, YOU GET THESE COOL

1696

00:54:38,007 --> 00:54:36,373

STORMS, YOU KNOW, THESE CUTOFF

1697

00:54:38,975 --> 00:54:38,074

LOWS OUT OF THE GULF OF

1698

00:54:41,377 --> 00:54:39,042

ALASKAING THAT WORK THEIR WAY

1699

00:54:42,145 --> 00:54:41,444

DOWN THE SPINE OF THE SIERRAS.

1700

00:54:44,314 --> 00:54:42,212

THEY'RE COLD.

1701
00:54:45,615 --> 00:54:44,381
THEY GIVE YOU A LOT OF SNOW.

1702
00:54:47,850 --> 00:54:45,682
IF THEY STALL OFF LOS ANGELES,

1703
00:54:50,486 --> 00:54:47,917
IT GIVES YOU FOUR OR FIVE DAYS

1704
00:54:52,755 --> 00:54:50,553
OF REAL NICE RAIN.

1705
00:54:54,891 --> 00:54:52,822
AND THAT'S WHAT HAPPENED IN

1706
00:54:55,992 --> 00:54:54,958
2004, 2005.

1707
00:54:56,993 --> 00:54:56,059
THAT'S THE BEST.

1708
00:54:58,261 --> 00:54:57,060
ALL RIGHT?

1709
00:54:59,062 --> 00:54:58,328
AND, OF COURSE, WITH THIS

1710
00:55:02,665 --> 00:54:59,129
BLOCKING HIGH PRESSURE THAT

1711
00:55:04,067 --> 00:55:02,732
WE'VE SEEN FOR THE PAST FEW

1712
00:55:04,801 --> 00:55:04,134
YEARS, ALL THOSE STORMS WENT

1713
00:55:06,803 --> 00:55:04,868

NORTH AND ENDED UP IN CHICAGO

1714

00:55:12,575 --> 00:55:06,870

AND BOSTON.

1715

00:55:13,042 --> 00:55:12,642

GOOD QUESTION.

1716

00:55:14,744 --> 00:55:13,109

YES, SIR.

1717

00:55:16,779 --> 00:55:14,811

>> FROM THE TENOR OF YOUR TALK

1718

00:55:19,982 --> 00:55:16,846

AND FROM WE'RE GETTING FROM

1719

00:55:20,750 --> 00:55:20,049

GOVERNOR BROWN, DO WE GET THE

1720

00:55:22,318 --> 00:55:20,817

IMPRESSION THAT WE AS HUMANS ARE

1721

00:55:23,920 --> 00:55:22,385

SORT OF AT THE MERCY OF NATURAL

1722

00:55:26,255 --> 00:55:23,987

EVENTS AND VICTIMS OF THINGS

1723

00:55:27,824 --> 00:55:26,322

LIKE EARTHQUAKES, DROUGHTS, ET

1724

00:55:30,960 --> 00:55:27,891

CETERA BUT HISTORICALLY THAT HAS

1725

00:55:31,527 --> 00:55:31,027

NOT BEEN TRUE FOR COUNTRIES THAT

1726

00:55:33,863 --> 00:55:31,594

BUILD INFRASTRUCTURE.

1727

00:55:36,332 --> 00:55:33,930

AND YOU MADE ME AWARE THAT 50

1728

00:55:38,067 --> 00:55:36,399

YEARS AGO, PAD DINA CARSON

1729

00:55:39,736 --> 00:55:38,134

PROPOSED A PLAN CALLED THE NORTH

1730

00:55:41,771 --> 00:55:39,803

AMERICAN WATER AND POWER

1731

00:55:43,606 --> 00:55:41,838

ALLIANCE TO BRING WATER DOWN

1732

00:55:45,408 --> 00:55:43,673

FROM THE YUKON IN ALASKA AND

1733

00:55:46,008 --> 00:55:45,475

DISTRIBUTE IT THROUGHOUT THE

1734

00:55:48,478 --> 00:55:46,075

SOUTHWESTERN STATES.

1735

00:55:49,445 --> 00:55:48,545

THAT ALMOST PASSED THE SENATE IN

1736

00:55:51,314 --> 00:55:49,512

1964.

1737

00:55:52,515 --> 00:55:51,381

WHAT WOULD YOU SAY WOULD BE THE

1738

00:55:53,816 --> 00:55:52,582

DIFFERENCE TODAY IF THAT PROJECT

1739

00:55:55,084 --> 00:55:53,883

HAD BEEN BUILT?

1740

00:55:57,120 --> 00:55:55,151

>> FANTASTIC IDEA.

1741

00:56:00,423 --> 00:55:57,187

IF WE CAN BUILD A PIPELINE FROM

1742

00:56:01,457 --> 00:56:00,490

CANADA FOR OIL, WHICH WE DON'T

1743

00:56:03,493 --> 00:56:01,524

NEED, ALL RIGHT?

1744

00:56:05,128 --> 00:56:03,560

YOU KNOW, BUILDING A COUPLE OF

1745

00:56:06,729 --> 00:56:05,195

BIG WATER PIPELINES BECAUSE

1746

00:56:09,165 --> 00:56:06,796

WATER IS ONE OF THEIR GREAT

1747

00:56:11,801 --> 00:56:09,232

NATURAL RESOURCES, WE COULD TURN

1748

00:56:15,204 --> 00:56:11,868

THE AMERICAN DESERT, THE MEXICAN

1749

00:56:17,440 --> 00:56:15,271

DESERT, ALL OF INLAND AREAS IN

1750

00:56:18,775 --> 00:56:17,507

THE WEST THAT ARE SO DRY, WE

1751

00:56:19,876 --> 00:56:18,842

COULD MAKE THEM BLOOM.

1752

00:56:21,411 --> 00:56:19,943

THE PROBLEM IS, CANADA DOESN'T

1753

00:56:22,745 --> 00:56:21,478

WANT TO GIVE US THE WATER.

1754

00:56:24,981 --> 00:56:22,812

BUT IT'S A TERRIFIC IDEA.

1755

00:56:27,450 --> 00:56:25,048

YOU KNOW, WILLIAM SHATNER TALKED

1756

00:56:29,085 --> 00:56:27,517

ABOUT IT A COUPLE OF MONTHS AGO.

1757

00:56:31,521 --> 00:56:29,152

BUT I LOVE THE WATER PIPELINE.

1758

00:56:31,821 --> 00:56:31,588

I WROTE A PAPER ABOUT IT IN

1759

00:56:37,026 --> 00:56:31,888

1965.

1760

00:56:39,362 --> 00:56:37,093

EVERYBODY IGNORED IT.

1761

00:56:40,329 --> 00:56:39,429

YES, SIR, YOU'RE STANDING THERE.

1762

00:56:41,898 --> 00:56:40,396

>> WELL, MY QUESTION IS RELATED

1763

00:56:44,634 --> 00:56:41,965

TO SOME OF THE OTHER QUESTIONS.

1764

00:56:46,536 --> 00:56:44,701

SO FAR YOU SHOWED THE GRAPH

1765

00:56:49,038 --> 00:56:46,603

WHERE THE JET STREAM WENT VERY

1766

00:56:50,807 --> 00:56:49,105

FAR NORTH AND PUSHED ALL THE

1767

00:56:51,140 --> 00:56:50,874

WATER AROUND THE WHOLE WEST

1768

00:56:51,507 --> 00:56:51,207

COAST.

1769

00:56:53,142 --> 00:56:51,574

>> YES.

1770

00:56:54,844 --> 00:56:53,209

>> I'VE ALSO HEARD THERE'S BEEN

1771

00:56:55,178 --> 00:56:54,911

DROUGHT THAT EVEN UP INTO

1772

00:56:55,945 --> 00:56:55,245

ALASKA.

1773

00:56:58,681 --> 00:56:56,012

>> ABSOLUTELY.

1774

00:57:01,050 --> 00:56:58,748

>> SO IS THERE -- DOES THE WATER

1775

00:57:03,119 --> 00:57:01,117

ALWAYS FALL SOMEWHERE OR CAN IT

1776

00:57:07,523 --> 00:57:03,186

FALL ON THE OCEAN ITSELF AND NOT

1777

00:57:09,292 --> 00:57:07,590

EVEN GET TO LAND OR WITH GLOBAL

1778

00:57:11,227 --> 00:57:09,359

WARMING THERE'S MORE MOISTURE IN

1779

00:57:12,728 --> 00:57:11,294

THE ATMOSPHERE SO YOU WOULD

1780

00:57:15,097 --> 00:57:12,795

THINK THE TOTAL AMOUNT OF RAP

1781

00:57:17,099 --> 00:57:15,164

WOULD KEEP GOING UP.

1782

00:57:17,400 --> 00:57:17,166

CAN EVERYBODY BE IN A DROUGHT AT

1783

00:57:18,901 --> 00:57:17,467

ONCE?

1784

00:57:20,603 --> 00:57:18,968

>> THE INTERESTING THING THERE'S

1785

00:57:21,504 --> 00:57:20,670

ALWAYS THE SAME AMOUNT OF WATER

1786

00:57:23,272 --> 00:57:21,571

ON THE PLANET AND MORE OR LESS

1787

00:57:23,573 --> 00:57:23,339

THE SAME AMOUNT OF RAIN EACH

1788

00:57:25,174 --> 00:57:23,640

YEAR.

1789

00:57:28,911 --> 00:57:25,241

THE DIFFERENCE IS WHO GETS IT.

1790

00:57:31,681 --> 00:57:28,978

SO ESSENTIALLY BOSTON, CHICAGO,

1791

00:57:32,148 --> 00:57:31,748

EAST, WEST AND MIDWEST GOT OUR

1792

00:57:34,584 --> 00:57:32,215

RAIN.

1793

00:57:35,485 --> 00:57:34,651

THEY GOT WAY MORE SNOW THAN THEY

1794

00:57:35,885 --> 00:57:35,552

WANTED.

1795

00:57:37,420 --> 00:57:35,952

ALL RIGHT?

1796

00:57:38,921 --> 00:57:37,487

AND WE DIDN'T GET ANY.

1797

00:57:41,090 --> 00:57:38,988

SO WHAT THESE BIG PATTERNS

1798

00:57:43,493 --> 00:57:41,157

WHETHER IT'S THE PDO OR THE EL

1799

00:57:45,828 --> 00:57:43,560

NINO DO, THEY REDISTRIBUTE ALL

1800

00:57:48,798 --> 00:57:45,895

THE PIECES ON WEATHER BOARD.

1801
00:57:49,699 --> 00:57:48,865
SO PLACES THAT ARE DRY GET WET.

1802
00:57:51,634 --> 00:57:49,766
ALL RIGHT?

1803
00:57:54,770 --> 00:57:51,701
PLACES THAT WERE WET FOR A

1804
00:57:57,940 --> 00:57:54,837
DECADE OR TWO TURN INTO DROUGHT.

1805
00:57:59,575 --> 00:57:58,007
AND SO THESE GREAT DECADAL OR

1806
00:58:02,111 --> 00:57:59,642
SEMIANNUAL THINGS LIKE EL NINO

1807
00:58:04,881 --> 00:58:02,178
OR LA NINA AND THIS HAS BEEN THE

1808
00:58:06,883 --> 00:58:04,948
HISTORY OF CIVILIZATION IS THAT

1809
00:58:08,618 --> 00:58:06,950
YOU KNOW IN THE AMERICAN WEST,

1810
00:58:11,354 --> 00:58:08,685
WE'VE SEEN GREAT DROUGHTS.

1811
00:58:11,754 --> 00:58:11,421
UNG SEE IT IN THREE RINGS FOR

1812
00:58:14,290 --> 00:58:11,821
CENTURIES.

1813
00:58:16,359 --> 00:58:14,357

AND SOME OF THESE PDO DROUGHT

1814

00:58:19,462 --> 00:58:16,426

THINGS IN THE 13th CENTURY WE

1815

00:58:20,463 --> 00:58:19,529

HAD A DROUGHT THAT LASTED 100

1816

00:58:21,397 --> 00:58:20,530

YEARS.

1817

00:58:24,834 --> 00:58:21,464

CALLED THE MEGADROUGHT.

1818

00:58:25,134 --> 00:58:24,901

JUST HOPE WE'RE NOT IN ONE OF

1819

00:58:26,702 --> 00:58:25,201

THOSE.

1820

00:58:29,238 --> 00:58:26,769

>> SO CAN -- DOES AUSTRALIA GET

1821

00:58:30,306 --> 00:58:29,305

MORE WATER WHEN WE GET LESS?

1822

00:58:30,973 --> 00:58:30,373

>> ABSOLUTELY.

1823

00:58:33,175 --> 00:58:31,040

>> EXACTLY.

1824

00:58:34,176 --> 00:58:33,242

BECAUSE ALL THE WARM WATERS IN

1825

00:58:36,345 --> 00:58:34,243

THE WEST.

1826

00:58:38,514 --> 00:58:36,412

>> YES, MA'AM.

1827

00:58:40,182 --> 00:58:38,581

>> WITH THE RAIN THAT THE --

1828

00:58:42,418 --> 00:58:40,249

THAT TEXAS AND THOSE AREAS HAVE

1829

00:58:44,620 --> 00:58:42,485

GOTTEN IN THE LAST YEAR OR SO,

1830

00:58:47,757 --> 00:58:44,687

THAT HAS HELPED THEM, QUOTE

1831

00:58:48,424 --> 00:58:47,824

UNQUOTE, END HAIR PART OF THE

1832

00:58:50,126 --> 00:58:48,491

DROUGHT, HAVE ANY OF THE

1833

00:58:52,094 --> 00:58:50,193

AQUIFERS BEEN ABLE TO BENEFIT

1834

00:58:53,829 --> 00:58:52,161

FROM THEIR LATEST DROUGHT TIME?

1835

00:58:55,364 --> 00:58:53,896

OUR AQUIFERS HAVE BEEN DRAINED.

1836

00:58:56,866 --> 00:58:55,431

>> THE QUESTION IS ALL THE HEAVY

1837

00:58:59,302 --> 00:58:56,933

RAINS THAT THEY'VE HAD IN TEXAS,

1838

00:59:03,506 --> 00:58:59,369

HAS THAT IMPROVED THE SITUATION

1839

00:59:03,873 --> 00:59:03,573

IN TERMS OF REPLENISHING THEIR

1840

00:59:04,373 --> 00:59:03,940

AQUIFERS.

1841

00:59:06,375 --> 00:59:04,440

>> THANK YOU.

1842

00:59:08,744 --> 00:59:06,442

>> AND THE ANSWER IS NO.

1843

00:59:10,279 --> 00:59:08,811

BECAUSE MOST OF THE AQUIFERS

1844

00:59:13,649 --> 00:59:10,346

THEY'RE SHALLOW GROUNDWATER

1845

00:59:17,620 --> 00:59:13,716

BASINS LIKE IN ALTADENA, LIKE IN

1846

00:59:20,556 --> 00:59:17,687

LA KANADA, LIKE IN SIERRA MADRE

1847

00:59:23,726 --> 00:59:20,623

AND RELATIVELY CLOSE TO THE

1848

00:59:25,494 --> 00:59:23,793

SURFACE BUT THE DEEP AQUIFERS

1849

00:59:26,996 --> 00:59:25,561

THAT WERE LEFT, GRAVEL AND SAND

1850

00:59:29,498 --> 00:59:27,063

DEPOSITS THEY'RE DEEP, 1,000

1851
00:59:31,100 --> 00:59:29,565
FEET BENEATH THE SURFACE.

1852
00:59:32,068 --> 00:59:31,167
THAT'S WATER FROM THE

1853
00:59:34,403 --> 00:59:32,135
PLEISTOCENE, THAT'S NOT WATER

1854
00:59:36,639 --> 00:59:34,470
THAT GETS REFILLED WHEN YOU HAVE

1855
00:59:38,140 --> 00:59:36,706
HEAVY RAIN FOR A WINTER.

1856
00:59:40,309 --> 00:59:38,207
SO THAT WATER IS THE 10,000

1857
00:59:41,477 --> 00:59:40,376
YEARS OLD.

1858
00:59:42,545 --> 00:59:41,544
AND, OF COURSE, ALL OVER THE

1859
00:59:44,814 --> 00:59:42,612
UNITED STATES AS WELL AS ALL

1860
00:59:46,882 --> 00:59:44,881
OVER THE WORLD, THESE DEEP

1861
00:59:48,718 --> 00:59:46,949
AQUIFERS HAVE BEEN DRILLED

1862
00:59:49,051 --> 00:59:48,785
PRIMARILY FOR AGRICULTURE, ALL

1863
00:59:51,387 --> 00:59:49,118

RIGHT?

1864

00:59:54,056 --> 00:59:51,454

AND SOONER OR LATER, LIKE I SAID

1865

00:59:54,590 --> 00:59:54,123

EARLIER, WE HEAR THE BIG SUCKING

1866

00:59:54,957 --> 00:59:54,657

SOUND.

1867

00:59:56,626 --> 00:59:55,024

ALL RIGHT?

1868

00:59:58,995 --> 00:59:56,693

AND THAT'S SCARY.

1869

00:59:59,996 --> 00:59:59,062

IT GOES -- IT'S TOTALLY

1870

01:00:01,797 --> 01:00:00,063

UNREGULATED IN CALIFORNIA.

1871

01:00:04,800 --> 01:00:01,864

IF YOU LIVE ABOVE AN AQUIFER,

1872

01:00:05,234 --> 01:00:04,867

YOU OWN THE AQUIFER.

1873

01:00:07,703 --> 01:00:05,301

YES, MA'AM.

1874

01:00:09,872 --> 01:00:07,770

>> HOW LONG DO YOU HAVE TO WAIT

1875

01:00:11,641 --> 01:00:09,939

UNTIL YOU KNOW WHETHER THE PDO

1876

01:00:13,509 --> 01:00:11,708
HAS FLIPPED OR NOT?

1877

01:00:17,613 --> 01:00:13,576
>> ABOUT FIVE YEARS, SIX YEARS.

1878

01:00:18,648 --> 01:00:17,680
I'LL BE RETIRED BY THEN SO --

1879

01:00:19,448 --> 01:00:18,715
YEAH, IT'S SLOW.

1880

01:00:20,950 --> 01:00:19,515
YOU KNOW?

1881

01:00:22,752 --> 01:00:21,017
AND YOU KNOW, YOU THINK YOU'RE

1882

01:00:24,286 --> 01:00:22,819
IN IT LIKE I SAID EARLIER.

1883

01:00:25,221 --> 01:00:24,353
THEN ALL OF A SUDDEN, YOU'RE OUT

1884

01:00:25,921 --> 01:00:25,288
OF IT.

1885

01:00:27,490 --> 01:00:25,988
YOU KNOW?

1886

01:00:32,795 --> 01:00:27,557
OR YOU'RE OUT AND THEN THEY PULL

1887

01:00:36,198 --> 01:00:32,862
YOU BACK IN LIKE THE GODFATHER,

1888

01:00:36,599 --> 01:00:36,265

REMEMBER?

1889

01:00:38,167 --> 01:00:36,666

YES, SIR.

1890

01:00:41,737 --> 01:00:38,234

>> WHAT WOULD THE EFFECT OF

1891

01:00:43,973 --> 01:00:41,804

BUILDING SAY A DOZEN OR SO

1892

01:00:44,640 --> 01:00:44,040

NUCLEAR DESALINATION PLANTS ON

1893

01:00:45,541 --> 01:00:44,707

THE COAST HAVE.

1894

01:00:47,843 --> 01:00:45,608

>> AN EXCELLENT QUESTION.

1895

01:00:48,344 --> 01:00:47,910

THERE'S A LOT OF WATER OUT THERE

1896

01:00:49,512 --> 01:00:48,411

IN THE PACIFIC.

1897

01:00:51,714 --> 01:00:49,579

LET'S FACE IT, THAT'S WHERE ALL

1898

01:00:53,082 --> 01:00:51,781

THE WATER IS, IT'S OUT THERE IN

1899

01:00:54,483 --> 01:00:53,149

THE PACIFIC EXCEPT IT'S SALTY.

1900

01:00:56,719 --> 01:00:54,550

SO WE'VE GOT TO THE FIGURE OUT

1901
01:00:58,621 --> 01:00:56,786
HOW TO TAKE THE SALT OUT OF IT.

1902
01:01:00,923 --> 01:00:58,688
THEY HAVE MODERN TECHNOLOGY

1903
01:01:04,560 --> 01:01:00,990
TODAY WHICH CAN TAKE THROUGH

1904
01:01:06,762 --> 01:01:04,627
VARIOUS FILTERS AND AN AWFUL LOT

1905
01:01:07,930 --> 01:01:06,829
OF POWER, THEY CAN TURN

1906
01:01:10,366 --> 01:01:07,997
SALTWATER INTO FRESH WATER.

1907
01:01:12,068 --> 01:01:10,433
RIGHT NOW THE BIGGEST DESAL

1908
01:01:14,937 --> 01:01:12,135
PLANT EMPTY WESTERN HEMISPHERE

1909
01:01:15,838 --> 01:01:15,004
IS BEING BUILT IN CARLSBAD,

1910
01:01:17,406 --> 01:01:15,905
NORTH ZAENG COUNTY.

1911
01:01:19,375 --> 01:01:17,473
THE COST OF THAT, THEY'VE BEEN

1912
01:01:21,143 --> 01:01:19,442
BUILDING IT FOR TEN YEARS.

1913
01:01:21,544 --> 01:01:21,210

COST IS IT \$1 BILLION.

1914

01:01:24,246 --> 01:01:21,611

ALL RIGHT?

1915

01:01:27,116 --> 01:01:24,313

SOUGHT TAXPAYERS.

1916

01:01:29,051 --> 01:01:27,183

AND IT WILL TAKE CARE OF ABOUT

1917

01:01:29,719 --> 01:01:29,118

7% OF SAN DIEGO COUNTY'S WATER

1918

01:01:31,087 --> 01:01:29,786

NEEDS.

1919

01:01:33,989 --> 01:01:31,154

IF IT WORKS.

1920

01:01:34,523 --> 01:01:34,056

THEY HAVEN'T TURNED IT ON YET.

1921

01:01:36,959 --> 01:01:34,590

ALL RIGHT.

1922

01:01:38,828 --> 01:01:37,026

SO LET'S JUST TAKE THIS THING

1923

01:01:40,096 --> 01:01:38,895

OUT TO ITS LOGICAL CONCLUSION.

1924

01:01:42,398 --> 01:01:40,163

WE'RE OUT OF WATER.

1925

01:01:43,833 --> 01:01:42,465

SO IF THE CITIES IN CALIFORNIA

1926
01:01:46,635 --> 01:01:43,900
ARE GOING TO HAVE WATER, WE'RE

1927
01:01:46,969 --> 01:01:46,702
GOING TO HAVE TO BUILD DESAL

1928
01:01:49,238 --> 01:01:47,036
PLANTS.

1929
01:01:52,575 --> 01:01:49,305
AT A BILLION DOLLARS A POP.

1930
01:01:53,676 --> 01:01:52,642
WELL, I'VE CALCULATED HOW MANY

1931
01:01:55,544 --> 01:01:53,743
DESAL PLANTS YOU WOULD NEED TO

1932
01:01:56,612 --> 01:01:55,611
TAKE CARE OF ALL THE URBAN WATER

1933
01:01:59,181 --> 01:01:56,679
NEEDS IN CALIFORNIA.

1934
01:01:59,749 --> 01:01:59,248
THE NUMBER IS 200.

1935
01:02:02,651 --> 01:01:59,816
ALL RIGHT?

1936
01:02:05,254 --> 01:02:02,718
SO THAT'S \$200 BILLION OF BOPDS

1937
01:02:06,021 --> 01:02:05,321
FOR THE TAXPAYERS.

1938
01:02:08,424 --> 01:02:06,088

ALL RIGHT?

1939

01:02:10,459 --> 01:02:08,491

AND FIGURING OUT IT WOULD TAKE

1940

01:02:14,096 --> 01:02:10,526

AT LEAST 20 YEARS BEFORE ANY OF

1941

01:02:14,497 --> 01:02:14,163

THEM GOT AN ENVIRONMENTAL IMPACT

1942

01:02:14,897 --> 01:02:14,564

APPROVAL.

1943

01:02:20,069 --> 01:02:14,964

ALL RIGHT?

1944

01:02:21,871 --> 01:02:20,136

AND THE OTHER THING IS, THEY'RE

1945

01:02:23,606 --> 01:02:21,938

EXCEPTIONALLY ENERGY INTENSIVE.

1946

01:02:25,374 --> 01:02:23,673

IT TAKES A LOT OF POWER AND

1947

01:02:27,409 --> 01:02:25,441

ENERGY TO RUN THOSE DESAL PLANTS

1948

01:02:29,111 --> 01:02:27,476

AND ONCE YOU DESAL THE WATER,

1949

01:02:32,014 --> 01:02:29,178

YOU'RE AT SEA LEVEL.

1950

01:02:35,951 --> 01:02:32,081

AND WHERE ARE ALL THE CUSTOMERS?

1951

01:02:36,318 --> 01:02:36,018

ALL THE CUSTOMERS ARE UPHILL.

1952

01:02:38,687 --> 01:02:36,385

ALL RIGHT?

1953

01:02:42,525 --> 01:02:38,754

SO IN WHAT WE'RE TRYING TO DO

1954

01:02:45,127 --> 01:02:42,592

HERE IS SWITCH OUR ECONOMY FROM

1955

01:02:47,630 --> 01:02:45,194

AN OIL, GAS ECONOMY AND COAL

1956

01:02:48,230 --> 01:02:47,697

ECONOMY TO A RENEWABLE ENERGY

1957

01:02:48,631 --> 01:02:48,297

ECONOMY.

1958

01:02:51,100 --> 01:02:48,698

ALL RIGHT?

1959

01:02:51,467 --> 01:02:51,167

AND SO THERE'S A LOT OF

1960

01:02:53,169 --> 01:02:51,534

NEGATIVES.

1961

01:02:55,838 --> 01:02:53,236

ON THE OTHER HAND, YOU KNOW,

1962

01:02:57,940 --> 01:02:55,905

WHEN WE RUN OUT OF WATER, YOU

1963

01:02:59,942 --> 01:02:58,007

KNOW, PEOPLE GET DESPERATE AND

1964

01:03:00,342 --> 01:03:00,009

MAKE BAD DECISIONS.

1965

01:03:02,278 --> 01:03:00,409

ALL RIGHT?

1966

01:03:04,547 --> 01:03:02,345

WE'RE DEFINITELY NOT ALL GOING

1967

01:03:05,981 --> 01:03:04,614

TO GET IN OUR PRIUSS AND GO TO

1968

01:03:06,749 --> 01:03:06,048

BRITISH COLUMBIA, ALL RIGHT?

1969

01:03:08,450 --> 01:03:06,816

WE'RE STUCK HERE.

1970

01:03:08,851 --> 01:03:08,517

WE'RE GOING TO HAVE TO FIGURE IT

1971

01:03:10,719 --> 01:03:08,918

OUT.

1972

01:03:13,289 --> 01:03:10,786

IT'S GOING TO BE MORE THAN

1973

01:03:14,256 --> 01:03:13,356

CUTTING BACK 25% ON YOUR HOPE

1974

01:03:16,192 --> 01:03:14,323

WATER USAGE.

1975

01:03:18,294 --> 01:03:16,259

IT'S BIGGER THAN THAT.

1976

01:03:19,595 --> 01:03:18,361

BUT YOU KNOW, DESAL I'M WILLING

1977

01:03:21,297 --> 01:03:19,662

TO LISTEN TO IT.

1978

01:03:22,932 --> 01:03:21,364

BUT IT'S EXPENSIVE.

1979

01:03:23,332 --> 01:03:22,999

IT'S POWER INTENSIVE.

1980

01:03:25,968 --> 01:03:23,399

ALL RIGHT?

1981

01:03:29,471 --> 01:03:26,035

SO ESSENTIALLY, 200 PLANTS,

1982

01:03:31,273 --> 01:03:29,538

YOU'D NEED A PLANT EVERY FOUR

1983

01:03:33,742 --> 01:03:31,340

MILES BETWEEN TIJUANA AND THE

1984

01:03:38,047 --> 01:03:33,809

OREGON BORDER TO SUPPLY ALL THE

1985

01:03:39,949 --> 01:03:38,114

URBAN WATER NEEDS FOR

1986

01:03:41,383 --> 01:03:40,016

CALIFORNIA.

1987

01:03:43,052 --> 01:03:41,450

YES, MA'AM.

1988

01:03:46,255 --> 01:03:43,119

>> WHAT ABOUT THE PLAN THAT

1989

01:03:49,258 --> 01:03:46,322

SUPPOSEDLY L.A. IS WORKING ON

1990

01:03:50,960 --> 01:03:49,325

WASTEWATER TO DRINKING WATER?

1991

01:03:53,295 --> 01:03:51,027

>> GREAT IDEA.

1992

01:03:54,864 --> 01:03:53,362

TOILET TO TAP.

1993

01:03:55,698 --> 01:03:54,931

TASTES BETTER THAN THE COLORADO

1994

01:03:57,600 --> 01:03:55,765

RIVER WATER.

1995

01:03:59,034 --> 01:03:57,667

DEFINITELY A GREAT IDEA.

1996

01:04:00,269 --> 01:03:59,101

THEY'RE DOING ITxWBB ALL RIGHT

1997

01:04:02,471 --> 01:04:00,336

THEY'RE JUST NOT TELLING YOU.

1998

01:04:04,340 --> 01:04:02,538

WE NEED MORE OF IT.

1999

01:04:06,008 --> 01:04:04,407

IT'S A GREAT IDEA.

2000

01:04:07,576 --> 01:04:06,075

AND THERE'S GRAY WATER.

2001

01:04:09,345 --> 01:04:07,643

WATER YOU USE IN YOUR YARD THAT

2002

01:04:11,480 --> 01:04:09,412

YOU USED IN YOUR WASHING MACHINE

2003

01:04:12,014 --> 01:04:11,547

AND YOUR DISHWASHER.

2004

01:04:13,616 --> 01:04:12,081

ALL RIGHT?

2005

01:04:16,752 --> 01:04:13,683

YOU KNOW, THIS DROUGHT IS IN

2006

01:04:17,186 --> 01:04:16,819

SOME WAYS IT'S AN ECONOMIC

2007

01:04:18,921 --> 01:04:17,253

OPPORTUNITY.

2008

01:04:21,457 --> 01:04:18,988

YOU KNOW, THIS IS CALIFORNIA.

2009

01:04:22,758 --> 01:04:21,524

YOU KNOW?

2010

01:04:23,125 --> 01:04:22,825

THIS IS NOT THIRD WORLD.

2011

01:04:24,159 --> 01:04:23,192

ALL RIGHT?

2012

01:04:26,095 --> 01:04:24,226

THIS IS AN OPPORTUNITY.

2013

01:04:26,395 --> 01:04:26,162

WHEN HAVE YOU SOMETHING LIKE

2014

01:04:28,430 --> 01:04:26,462

THIS.

2015

01:04:31,000 --> 01:04:28,497

WE ENGINEERED OUR WAY OUT OF ALL

2016

01:04:31,634 --> 01:04:31,067

THE PAST DROUGHTS.

2017

01:04:32,334 --> 01:04:31,701

WE BUILT THE CALIFORNIA

2018

01:04:34,370 --> 01:04:32,401

ACQUESTION DUCKETT.

2019

01:04:34,737 --> 01:04:34,437

WE BUILT THE COLORADO ACQUESTION

2020

01:04:36,505 --> 01:04:34,804

DUCKETT.

2021

01:04:38,340 --> 01:04:36,572

WE BUILT DAMS EXCEPT NOW WE'VE

2022

01:04:38,707 --> 01:04:38,407

GO THE TO BE A LITTLE MORE

2023

01:04:40,009 --> 01:04:38,774

CREATIVE.

2024

01:04:41,977 --> 01:04:40,076

WE COULD BECOME THE WATER

2025

01:04:43,212 --> 01:04:42,044

FESHTCY EXPERTS FOR THE WORLD

2026
01:04:43,879 --> 01:04:43,279
BECAUSE THIS IS NOT JUST A

2027
01:04:46,715 --> 01:04:43,946
CALIFORNIA PROBLEM.

2028
01:04:47,116 --> 01:04:46,782
THIS IS A WORLD PROBLEM.

2029
01:04:48,884 --> 01:04:47,183
ALL RIGHT?

2030
01:04:50,953 --> 01:04:48,951
SO GET RIGHT DOWN TO IT, YOU

2031
01:04:52,054 --> 01:04:51,020
KNOW, ALL YOU YOUNG PEOPLE, YOU

2032
01:04:53,088 --> 01:04:52,121
KNOW, GET INTO THE WATER

2033
01:04:53,822 --> 01:04:53,155
EFFICIENT SIT BUSINESS.

2034
01:05:03,799 --> 01:04:53,889
THE AIR CONDITIONING BUSINESS,

2035
01:05:04,199 --> 01:05:03,866
TOO.

2036
01:05:06,769 --> 01:05:04,266
YES, SIR.

2037
01:05:09,872 --> 01:05:06,836
>> EXAMPLE WHICH APPARENTLY IS

2038
01:05:11,173 --> 01:05:09,939

ALL DESERT, CHIEF WATER

2039

01:05:12,608 --> 01:05:11,240

SELF-SUFFICIENCY THROUGH

2040

01:05:14,977 --> 01:05:12,675

DESALINATION AND RECOVERY OF

2041

01:05:16,545 --> 01:05:15,044

USED WATER, CAN THAT BE SCALED?

2042

01:05:16,979 --> 01:05:16,612

>> ISRAEL IS AN EXCELLENT

2043

01:05:18,580 --> 01:05:17,046

EXAMPLE.

2044

01:05:19,715 --> 01:05:18,647

THERE'S TWO COUNTRIES THAT

2045

01:05:21,784 --> 01:05:19,782

REALLY DRY COUNTRIES.

2046

01:05:24,153 --> 01:05:21,851

ISRAEL AND AUSTRALIA.

2047

01:05:26,088 --> 01:05:24,220

IN ISRAEL, THEY USE 50 GALLONS

2048

01:05:27,723 --> 01:05:26,155

OF WATER PER DAY PER PERSON.

2049

01:05:29,892 --> 01:05:27,790

I HOPE YOU'RE ALL WHEN YOU'RE

2050

01:05:31,260 --> 01:05:29,959

TAKING YOUR SHOWERS YOU SOAK

2051
01:05:33,095 --> 01:05:31,327
YOURSELF DOWN AND YOU TURN THE

2052
01:05:33,829 --> 01:05:33,162
WATER OFF AND THEN YOU SO.

2053
01:05:35,998 --> 01:05:33,896
YOU KNOW?

2054
01:05:38,467 --> 01:05:36,065
AND I HOPE YOU'RE ALL LETTING IT

2055
01:05:40,336 --> 01:05:38,534
MELLOW IN THE TOILET, ALL THAT

2056
01:05:42,137 --> 01:05:40,403
YELLOW, LET IT MELLOW, RIGHT?

2057
01:05:44,106 --> 01:05:42,204
I'M LIKE A CHAMPION.

2058
01:05:46,008 --> 01:05:44,173
I HAVE SAVED YOU'RE LOOKING AT A

2059
01:05:48,077 --> 01:05:46,075
GUY THAT IN THE LAST SIX MONTHS

2060
01:05:49,745 --> 01:05:48,144
HAS SAVED THOUSANDS OF GALLONS

2061
01:05:51,313 --> 01:05:49,812
OF WATER JUST LETTING THAT

2062
01:05:51,747 --> 01:05:51,380
YELLOW MELLOW.

2063
01:05:52,915 --> 01:05:51,814

ALL RIGHT?

2064

01:05:55,184 --> 01:05:52,982

BUT WHAT'S MY POINT?

2065

01:05:57,987 --> 01:05:55,251

IN ISRAEL, THEY USE 50 GALLONS

2066

01:06:00,055 --> 01:05:58,054

OF WATER PER DAY PER PERSON.

2067

01:06:03,192 --> 01:06:00,122

AUSTRALIA, THEY USE 80.

2068

01:06:03,459 --> 01:06:03,259

THE AVERAGE IN CALIFORNIA IS

2069

01:06:04,226 --> 01:06:03,526

160.

2070

01:06:05,728 --> 01:06:04,293

COME ON.

2071

01:06:09,331 --> 01:06:05,795

WE COULD DEFINITELY DO AS GOOD

2072

01:06:09,698 --> 01:06:09,398

AS AUSTRALIA.

2073

01:06:12,067 --> 01:06:09,765

ALL RIGHT?

2074

01:06:13,802 --> 01:06:12,134

AND BY THE WAY, THEY HAVE BIG

2075

01:06:15,971 --> 01:06:13,869

WATER TECHNOLOGY AND EFFICIENCY

2076
01:06:17,973 --> 01:06:16,038
INDUSTRIES IN BOTH COUNTRIES.

2077
01:06:19,575 --> 01:06:18,040
BUT ONE OF THE THINGS THE

2078
01:06:21,143 --> 01:06:19,642
AUSTRALIANS DID THEY CENTRALIZED

2079
01:06:21,543 --> 01:06:21,210
WATER MANAGEMENT.

2080
01:06:23,012 --> 01:06:21,610
ALL RIGHT?

2081
01:06:25,047 --> 01:06:23,079
SO NONE OF THIS STUFF WHERE YOU

2082
01:06:26,682 --> 01:06:25,114
KNOW IT'S THE WILD WEST HERE.

2083
01:06:27,082 --> 01:06:26,749
WHERE WE'VE GOT 600 WATER

2084
01:06:27,716 --> 01:06:27,149
DISTRICTS.

2085
01:06:30,152 --> 01:06:27,783
YOU KNOW?

2086
01:06:31,153 --> 01:06:30,219
AND WE'VE GOT LAWS THAT GO BACK

2087
01:06:32,588 --> 01:06:31,220
TO THE 19th CENTURY.

2088
01:06:34,123 --> 01:06:32,655

I GOT HERE FIRST.

2089

01:06:35,724 --> 01:06:34,190

IT'S MY WATER.

2090

01:06:37,059 --> 01:06:35,791

YOU KNOW.

2091

01:06:38,660 --> 01:06:37,126

AUSTRALIANS DID AWAY WITH ALL

2092

01:06:40,329 --> 01:06:38,727

THAT AND THEY HAD CENTRALIZED

2093

01:06:41,597 --> 01:06:40,396

PLANNING SO YOU GET A MORE

2094

01:06:43,232 --> 01:06:41,664

EQUITABLE BE DISTRIBUTION OF

2095

01:06:45,901 --> 01:06:43,299

WATER.

2096

01:06:49,938 --> 01:06:45,968

SO YOU KNOW, FRIPS, IN

2097

01:06:52,508 --> 01:06:50,005

AUSTRALIA, THE FARMERS DON'T GET

2098

01:06:53,675 --> 01:06:52,575

80% OF THE WATER.

2099

01:06:55,611 --> 01:06:53,742

>> TWO ONLINE QUESTIONS.

2100

01:06:59,948 --> 01:06:55,678

>> ONLINE QUESTIONS.

2101

01:07:01,817 --> 01:07:00,015

OKAY OH, GREAT.

2102

01:07:03,419 --> 01:07:01,884

ORBITAL BEAR ASKS, IS THERE

2103

01:07:04,787 --> 01:07:03,486

GEOLOGIC EVIDENCE OF EL NINO

2104

01:07:05,254 --> 01:07:04,854

PRIOR TO HISTORICAL

2105

01:07:06,789 --> 01:07:05,321

RECORDKEEPING.

2106

01:07:07,656 --> 01:07:06,856

THAT'S A AN GREAT QUESTION.

2107

01:07:09,758 --> 01:07:07,723

THERE SELF IS.

2108

01:07:11,260 --> 01:07:09,825

WHEN WE LOOK BACK IN TREE RING

2109

01:07:14,396 --> 01:07:11,327

RECORDS OVER THE LAST COUP OF

2110

01:07:16,665 --> 01:07:14,463

THOUSAND YEARS, WE SEE DRY

2111

01:07:18,033 --> 01:07:16,732

YEARS, WET YEARS, DRY DECADES,

2112

01:07:20,235 --> 01:07:18,100

WET DECADES.

2113

01:07:23,105 --> 01:07:20,302

AND SO THERE'S NO DOUBT THAT

2114

01:07:24,440 --> 01:07:23,172

THESE PDO EPISODES AND EL NINO

2115

01:07:28,277 --> 01:07:24,507

EPISODES HAVE BEEN HAPPENING FOR

2116

01:07:28,744 --> 01:07:28,344

THOUSANDS OF YEARS.

2117

01:07:29,111 --> 01:07:28,811

ALL RIGHT?

2118

01:07:32,347 --> 01:07:29,178

OKAY.

2119

01:07:33,949 --> 01:07:32,414

BE SMART ASKS, AND THE PNW

2120

01:07:37,486 --> 01:07:34,016

REGION, IS THERE A CHANCE OUR

2121

01:07:40,055 --> 01:07:37,553

CAN AQUIFERS MIGHT DRY UP?

2122

01:07:40,456 --> 01:07:40,122

EVEN WITH THE HEP OF AN EL-INIO.

2123

01:07:43,592 --> 01:07:40,523

ABSOLUTELY.

2124

01:07:45,894 --> 01:07:43,659

I THINK I TRIED TO GET THAT

2125

01:07:48,197 --> 01:07:45,961

MESSAGE ACROSS SOME OF THESE

2126
01:07:49,364 --> 01:07:48,264
DEEP AQUIFERS MY FAVORITE IS THE

2127
01:07:51,300 --> 01:07:49,431
COACHELLA VALLEY.

2128
01:07:53,602 --> 01:07:51,367
THERE'S A DEEP AQUIFER THERE.

2129
01:07:55,471 --> 01:07:53,669
AT ONE END OF THE AQUIFER, THIS

2130
01:07:56,805 --> 01:07:55,538
IS WATER THAT'S BEEN THERE

2131
01:08:00,509 --> 01:07:56,872
THOUSANDS OF YEARS.

2132
01:08:01,944 --> 01:08:00,576
THEY REPLENISH IT A LITTLE BIT.

2133
01:08:03,212 --> 01:08:02,011
ARROWHEAD IS PUMPING WATER OUT

2134
01:08:04,379 --> 01:08:03,279
OF THE AQUIFER.

2135
01:08:07,015 --> 01:08:04,446
THAT'S COCA-COLA AND SELLING IT

2136
01:08:08,717 --> 01:08:07,082
BACK TO ALL YOU PEOPLE, RIGHT,

2137
01:08:10,319 --> 01:08:08,784
AS THE EXORBITANT FEE.

2138
01:08:12,054 --> 01:08:10,386

THAT'S WATER YOU KNOW, THE

2139

01:08:13,288 --> 01:08:12,121

INDIANS ARE SELLING IT TO THEM

2140

01:08:15,524 --> 01:08:13,355

OFF THE RESERVATION.

2141

01:08:18,727 --> 01:08:15,591

AND AT THE OTHER END OF THE

2142

01:08:21,797 --> 01:08:18,794

AQUIFER, IT'S BEING PUMPED FOR

2143

01:08:22,664 --> 01:08:21,864

123 GOLF COULD YOURS IN PALM

2144

01:08:23,165 --> 01:08:22,731

SPRINGS.

2145

01:08:24,399 --> 01:08:23,232

OKAY?

2146

01:08:25,634 --> 01:08:24,466

123 GOLF COURSES.

2147

01:08:27,469 --> 01:08:25,701

THE AVERAGE RAINFALL IS FIVE

2148

01:08:28,871 --> 01:08:27,536

INCHES A YEAR IN PALM SPRINGS.

2149

01:08:30,205 --> 01:08:28,938

WHAT ARE THEY THINKING?

2150

01:08:31,140 --> 01:08:30,272

YOU KNOW?

2151
01:08:31,874 --> 01:08:31,207
ALL RIGHT.

2152
01:08:35,777 --> 01:08:31,941
IT'S RIDICULOUS.

2153
01:08:37,179 --> 01:08:35,844
YOU KNOW, IN PALM SPRINGS, IT

2154
01:08:39,882 --> 01:08:37,246
TAKES 300 MILLION GALLONS OF

2155
01:08:40,215 --> 01:08:39,949
WATER A YEAR FOR ONE GOLF

2156
01:08:42,684 --> 01:08:40,282
COURSE.

2157
01:08:44,720 --> 01:08:42,751
THAT SAME GOLF COURSE HERE IN

2158
01:08:46,421 --> 01:08:44,787
PASADENA ONLY TAKES 100 MILLION

2159
01:08:47,723 --> 01:08:46,488
GALLONS OF WATER A DAY.

2160
01:08:52,494 --> 01:08:47,790
SO IT'S THE MOST RIDICULOUS

2161
01:08:57,366 --> 01:08:52,561
THING I EVER HEARD OF.

2162
01:08:58,233 --> 01:08:57,433
103 -- 123 GOLF COURSES ALL THIS

2163
01:09:00,702 --> 01:08:58,300

PRECIOUS WATER THAT'S BEEN

2164

01:09:02,671 --> 01:09:00,769

PILING UP FOR THOUSANDS OF

2165

01:09:03,005 --> 01:09:02,738

YEARS, THEY'RE USING IT FOR GOLF

2166

01:09:04,773 --> 01:09:03,072

COURSES.

2167

01:09:11,713 --> 01:09:04,840

WHAT'S WRONG WITH RICH PEOPLE,

2168

01:09:13,882 --> 01:09:11,780

YOU KNOW IN RICH PEOPLE ARE

2169

01:09:14,516 --> 01:09:13,949

SELFISH.

2170

01:09:15,717 --> 01:09:14,583

YES, MA'AM.

2171

01:09:18,120 --> 01:09:15,784

>> WITH THE RIDGE OF HIGH

2172

01:09:20,222 --> 01:09:18,187

PRESSURE UP IN THE AREA YOU

2173

01:09:22,925 --> 01:09:20,289

SHOWED, IF IT WERE TO SHIFT OVER

2174

01:09:23,759 --> 01:09:22,992

TO A LOW OR IT WERE TO GO AWAY

2175

01:09:27,496 --> 01:09:23,826

WOULD THAT HELP AT ALL.

2176
01:09:28,664 --> 01:09:27,563
>> OH, MAN, YOU KNOW, IF IT

2177
01:09:29,765 --> 01:09:28,731
SWITCHED TO A LOW PRESSURE

2178
01:09:31,366 --> 01:09:29,832
SYSTEM THAT WAS GENERATING

2179
01:09:32,768 --> 01:09:31,433
STORMS OUT OF THE GULF OF

2180
01:09:35,637 --> 01:09:32,835
ALASKA, MAKING THEIR WAY DOWN

2181
01:09:37,806 --> 01:09:35,704
THE WEST COAST, YOU KNOW, TILLED

2182
01:09:38,407 --> 01:09:37,873
BE SO HAPPY.

2183
01:09:41,009 --> 01:09:38,474
YOU KNOW?

2184
01:09:43,845 --> 01:09:41,076
BUT AND, OF COURSE, THAT COULD

2185
01:09:45,847 --> 01:09:43,912
HAPPEN IF WE SWITCH TO THE WARM

2186
01:09:46,148 --> 01:09:45,914
PHASE OF THE PDO FROM THE COOL

2187
01:09:48,483 --> 01:09:46,215
PHASE.

2188
01:09:50,519 --> 01:09:48,550

BUT YOU KNOW, THAT'S WHAT

2189

01:09:52,387 --> 01:09:50,586

WEEP -- GOOD EXCELLENT POINT

2190

01:09:52,688 --> 01:09:52,454

BECAUSE IN ONE PATTERN IT'S A

2191

01:09:55,757 --> 01:09:52,755

HIGH.

2192

01:09:56,191 --> 01:09:55,824

BUT IN THE OTHER PATTERN, IT'S A

2193

01:09:57,726 --> 01:09:56,258

LOW.

2194

01:10:02,431 --> 01:09:57,793

SO THAT'S WHY YOU GET WET

2195

01:10:04,499 --> 01:10:02,498

DECADES AND DRY DECADES.

2196

01:10:06,335 --> 01:10:04,566

YES, MA'AM.

2197

01:10:07,569 --> 01:10:06,402

>> SOUNDS TO ME LIKE WE'RE

2198

01:10:10,539 --> 01:10:07,636

PLANNING NOW FOR WATER SCARCITY

2199

01:10:11,974 --> 01:10:10,606

BUT IF WE'RE GOING TO HAVE THAT

2200

01:10:14,076 --> 01:10:12,041

FLIP OF THE PDO, DO WE REALLY

2201
01:10:16,144 --> 01:10:14,143
NEED TO PLAN BETTER FOR WATER

2202
01:10:17,479 --> 01:10:16,211
ABUNDANCE SO WE CAN CAPTURE THAT

2203
01:10:20,148 --> 01:10:17,546
WATER AT LEAST IN THE

2204
01:10:20,782 --> 01:10:20,215
GROUNDWATER INSTEAD OF HAVING IT

2205
01:10:22,284 --> 01:10:20,849
ALL RUN OFF TO THE OCEAN?

2206
01:10:24,286 --> 01:10:22,351
>> THAT'S A GOOD POINT.

2207
01:10:25,387 --> 01:10:24,353
IF WE'RE GOING TO GET INTO A WET

2208
01:10:27,289 --> 01:10:25,454
PERIOD, WE SHOULD PLAN BETTER

2209
01:10:27,589 --> 01:10:27,356
HOW TO CA TOUR THE WATER WHEN IT

2210
01:10:29,024 --> 01:10:27,656
COMES.

2211
01:10:30,525 --> 01:10:29,091
IT'S A GOOD POINT.

2212
01:10:31,860 --> 01:10:30,592
NOW, WE HAVE ACTUALLY BIG

2213
01:10:33,962 --> 01:10:31,927

GROUNDWATER SUPPLIES WHEN THE

2214

01:10:37,099 --> 01:10:34,029

GREAT ICE SHEETS RETREATED, THEY

2215

01:10:38,333 --> 01:10:37,166

LEFT BIG DEPOSITS OF GRAVEL,

2216

01:10:39,968 --> 01:10:38,400

SAND, UNDERNEATH LOS ANGELES.

2217

01:10:41,503 --> 01:10:40,035

AND SO THERE ARE BIG GROUNDWATER

2218

01:10:42,804 --> 01:10:41,570

SUPPLIES ALL THE WAY FROM LONG

2219

01:10:44,973 --> 01:10:42,871

BEACH TO PASADENA.

2220

01:10:47,075 --> 01:10:45,040

ALL THE WAY INTO THE INLAND

2221

01:10:49,244 --> 01:10:47,142

EMPIRE, THE SAN FERNANDO VALLEY.

2222

01:10:49,611 --> 01:10:49,311

EXCEPT HALF OF THEM ARE

2223

01:10:51,847 --> 01:10:49,678

POLLUTED.

2224

01:10:53,615 --> 01:10:51,914

SO YOU CAN'T USE THEM.

2225

01:10:55,250 --> 01:10:53,682

THAT'S REALLY A SHAME.

2226
01:10:57,686 --> 01:10:55,317
AND SO WE'RE GOING TO HAVE TO

2227
01:10:59,888 --> 01:10:57,753
SPEND SOME MONEY TO CLEAN THOSE

2228
01:11:00,922 --> 01:10:59,955
GROUNDWATER BASINS UP AND USE

2229
01:11:04,159 --> 01:11:00,989
THEM FOR STORAGE.

2230
01:11:05,894 --> 01:11:04,226
SO DURING THE WET YEARS, WE LET

2231
01:11:07,396 --> 01:11:05,961
THE WATER ACCUMULATE IN OUR

2232
01:11:11,733 --> 01:11:07,463
LOCAL GROUNDWATER BASINS AND

2233
01:11:12,334 --> 01:11:11,800
THEN WE USE IT LATER ON FOR THE

2234
01:11:13,835 --> 01:11:12,401
DRY YEARS.

2235
01:11:15,871 --> 01:11:13,902
IT'S A BIG PART.

2236
01:11:17,806 --> 01:11:15,938
SO IN SOME WAYS WE'RE TOO LEE

2237
01:11:20,008 --> 01:11:17,873
LOIPT ON IMPORTED WATER.

2238
01:11:23,211 --> 01:11:20,075

IF 70% IS COMING FROM NORTHERN

2239

01:11:25,213 --> 01:11:23,278

CALIFORNIA AND THE COLORADO, WE

2240

01:11:27,949 --> 01:11:25,280

COULD ACTUALLY CHANGE THATTING

2241

01:11:28,550 --> 01:11:28,016

TO 70% BEING LOCALLY GROWN

2242

01:11:29,284 --> 01:11:28,617

WATER.

2243

01:11:33,955 --> 01:11:29,351

BUT WE HAVE TO CLEAN UP THE

2244

01:11:34,556 --> 01:11:34,022

GROUND WATER BASINS.

2245

01:11:36,258 --> 01:11:34,623

>> YES.

2246

01:11:38,193 --> 01:11:36,325

>> HAF HEARD THEY'RE THINKING

2247

01:11:40,829 --> 01:11:38,260

ABOUT TAKING OUT SOME OF THE

2248

01:11:42,364 --> 01:11:40,896

CEMENT THAT'S LINING SOME OF THE

2249

01:11:44,833 --> 01:11:42,431

RIVERS THAT WE ARTIFICIALLY

2250

01:11:47,469 --> 01:11:44,900

CEMENTED IN TO ASSIST IN

2251
01:11:49,338 --> 01:11:47,536
REPLENISHING THE AQUIFERS.

2252
01:11:52,040 --> 01:11:49,405
IS THERE A STATEWIDE PLAN TO DO

2253
01:11:52,374 --> 01:11:52,107
THAT OR IS IT JUST AN ISOLATED

2254
01:11:53,408 --> 01:11:52,441
AREA.

2255
01:11:53,875 --> 01:11:53,475
>> THAT'S AN EXCELLENT QUESTION

2256
01:11:56,511 --> 01:11:53,942
AGAIN.

2257
01:11:57,012 --> 01:11:56,578
L.A. RIVER IS CONCRETED FOR 51

2258
01:11:58,447 --> 01:11:57,079
MILES.

2259
01:11:59,748 --> 01:11:58,514
ESSENTIALLY FROM THE SAN

2260
01:12:00,515 --> 01:11:59,815
FERNANDO VALLEY ALL THE WAY TO

2261
01:12:00,916 --> 01:12:00,582
LONG BEACH.

2262
01:12:03,452 --> 01:12:00,983
ALL RIGHT?

2263
01:12:05,120 --> 01:12:03,519

AND IT'S HOOKED UP TO 1600 MILES

2264

01:12:07,155 --> 01:12:05,187
OF STORM SEWERS.

2265

01:12:08,390 --> 01:12:07,222
AND IT WAS BUILT AFTER A GREAT

2266

01:12:11,660 --> 01:12:08,457
FLOOD IN 1938.

2267

01:12:13,962 --> 01:12:11,727
AND WE DECIDED THAT WE WOULD

2268

01:12:15,797 --> 01:12:14,029
ESSENTIALLY USE IMPORTED WATER,

2269

01:12:17,299 --> 01:12:15,864
NOT LOCAL WATER.

2270

01:12:18,800 --> 01:12:17,366
NOW, THE ONLY PROBLEM IS BE

2271

01:12:19,868 --> 01:12:18,867
THERE'S ONLY ONE THING IN

2272

01:12:22,270 --> 01:12:19,935
CALIFORNIA THAT'S MORE VALUABLE

2273

01:12:23,305 --> 01:12:22,337
THAN WATER.

2274

01:12:24,806 --> 01:12:23,372
WHAT'S THAT?

2275

01:12:25,107 --> 01:12:24,873
RIGHT, REAL ESTATE.

2276

01:12:27,209 --> 01:12:25,174

OKAY?

2277

01:12:29,344 --> 01:12:27,276

SO IN 1938, EVERYTHING SOUTH OF

2278

01:12:31,680 --> 01:12:29,411

DOWNTOWN L.A. FOR THREE MILES ON

2279

01:12:33,415 --> 01:12:31,747

BOTH SIDES OF THE RIVER FLOODED.

2280

01:12:33,749 --> 01:12:33,482

SO THAT'S WHY THEY CONCRETED THE

2281

01:12:35,417 --> 01:12:33,816

RIVER.

2282

01:12:37,219 --> 01:12:35,484

SINCE THEN, THERE'S BEEN A LOT

2283

01:12:38,420 --> 01:12:37,286

OF CONSTRUCTION, THERE'S BEEN

2284

01:12:40,055 --> 01:12:38,487

MORE STORM SEWERS.

2285

01:12:40,355 --> 01:12:40,122

I'M DOING A STUDY ON THAT RIGHT

2286

01:12:41,857 --> 01:12:40,422

NOW.

2287

01:12:42,891 --> 01:12:41,924

THE QUESTION IS, CAN YOU

2288

01:12:44,926 --> 01:12:42,958

ACTUALLY TAKE SOME OF THE

2289

01:12:48,663 --> 01:12:44,993

CONCRETE OUT OF THE L.A. RIVER

2290

01:12:52,401 --> 01:12:48,730

WITHOUT FLOODING L.A.?

2291

01:12:55,537 --> 01:12:52,468

OR HAS ALL THE GROWTH THAT HAS

2292

01:12:57,572 --> 01:12:55,604

HAPPENED SINCE 1940s AND '50S,

2293

01:12:58,006 --> 01:12:57,639

DOES THAT PRECLUDE TAKING

2294

01:13:00,142 --> 01:12:58,073

CONCRETE?

2295

01:13:00,509 --> 01:13:00,209

BECAUSE IT IS A FLOOD-CONTROL

2296

01:13:02,477 --> 01:13:00,576

CHANNEL.

2297

01:13:03,879 --> 01:13:02,544

AND THE ANSWER AT THIS POINT IS

2298

01:13:06,014 --> 01:13:03,946

THAT DON'T TOUCH THE CONCRETE IN

2299

01:13:06,982 --> 01:13:06,081

THE L.A. RIVER.

2300

01:13:08,316 --> 01:13:07,049

ALL RIGHT?

2301
01:13:10,085 --> 01:13:08,383
OTHERWISE, EVERYTHING YOU KNOW,

2302
01:13:10,786 --> 01:13:10,152
ON BOTH SIDES OF THE 110 SOUTH

2303
01:13:15,123 --> 01:13:10,853
OF DOWNTOWN L.A. IS GOING TO

2304
01:13:17,559 --> 01:13:15,190
FLOOD.

2305
01:13:19,060 --> 01:13:17,626
IT'S NOT A GOOD ANSWER.

2306
01:13:20,529 --> 01:13:19,127
NOW, WE COULD BUILD CATCHMENT

2307
01:13:20,862 --> 01:13:20,596
BASINS ON BOTH SIDES OF THE

2308
01:13:23,098 --> 01:13:20,929
RIVER.

2309
01:13:23,498 --> 01:13:23,165
WE COULD MAKE THE RIVER MORE

2310
01:13:26,401 --> 01:13:23,565
ATTRACTIVE.

2311
01:13:27,002 --> 01:13:26,468
BUT WE SORT OF MADE IT

2312
01:13:30,906 --> 01:13:27,069
IRREVERSIBLE DECISION.

2313
01:13:31,239 --> 01:13:30,973

WHEN WE COP CREATED THOSE

2314

01:13:32,808 --> 01:13:31,306

RIVERS.

2315

01:13:35,277 --> 01:13:32,875

THE FRIENDS OF THE RIVER THEY

2316

01:13:36,178 --> 01:13:35,344

HATE ME.

2317

01:13:37,546 --> 01:13:36,245

YOU KNOW?

2318

01:13:39,047 --> 01:13:37,613

YOU KNOW.

2319

01:13:39,681 --> 01:13:39,114

PLUS, LET'S GET RIGHT DOWN TO

2320

01:13:40,882 --> 01:13:39,748

IT.

2321

01:13:41,883 --> 01:13:40,949

95% OF THE TIME THERE'S NO WATER

2322

01:13:46,555 --> 01:13:41,950

IN THAT RIVER.

2323

01:13:46,955 --> 01:13:46,622

SO DON'T CALL IT A RIVER.

2324

01:13:48,790 --> 01:13:47,022

YES, SIR.

2325

01:13:51,493 --> 01:13:48,857

>> I'M ROOTING FOR THAT PDO

2326

01:13:52,761 --> 01:13:51,560

SHIFT LIKE YOU ARE, BUT LET'S

2327

01:13:55,263 --> 01:13:52,828

JUST SAY WORST CASE SCENARIO,

2328

01:13:59,935 --> 01:13:55,330

WHAT'S YOUR PREDICTIONS FOR WHEN

2329

01:14:02,204 --> 01:14:00,002

WE'LL GET INTO HAVING FORCED

2330

01:14:02,704 --> 01:14:02,271

MANDATORY RATIONING IF THE PDO

2331

01:14:04,940 --> 01:14:02,771

DOESN'T HAPPEN.

2332

01:14:07,843 --> 01:14:05,007

>> THERE'S GOING TO HAPPEN.

2333

01:14:09,611 --> 01:14:07,910

THERE'S TOO MANY OF US AND

2334

01:14:09,978 --> 01:14:09,678

THERE'S TOO MOECH GROWTH IN THE

2335

01:14:11,112 --> 01:14:10,045

ECONOMY.

2336

01:14:12,547 --> 01:14:11,179

WE'VE REACHED THE POINT WHERE

2337

01:14:15,851 --> 01:14:12,614

THE OLD SYSTEM DOESN'T WORK.

2338

01:14:16,251 --> 01:14:15,918

SO WE NEED A NEW SYSTEM.

2339

01:14:17,919 --> 01:14:16,318

ALL RIGHT?

2340

01:14:20,121 --> 01:14:17,986

AND SO YOU KNOW, WE'RE GOING TO

2341

01:14:21,356 --> 01:14:20,188

HAVE TO RETHINK, FRANS, FOR

2342

01:14:21,756 --> 01:14:21,423

INSTANCE, WATER LAWS IN

2343

01:14:23,825 --> 01:14:21,823

CALIFORNIA.

2344

01:14:25,393 --> 01:14:23,892

WHO OWNS THE WATER.

2345

01:14:25,827 --> 01:14:25,460

WHAT'S THE EQUITABLE

2346

01:14:28,430 --> 01:14:25,894

DISTRIBUTION?

2347

01:14:30,599 --> 01:14:28,497

YOU KNOW, WHAT KIND OF

2348

01:14:31,533 --> 01:14:30,666

LANDSCAPING WILL WILL BE LEGAL

2349

01:14:34,536 --> 01:14:31,600

IN SOUTHERN CALIFORNIA?

2350

01:14:35,871 --> 01:14:34,603

YOU KNOW, THE PEOPLE IN RANCHO

2351

01:14:38,707 --> 01:14:35,938

SANTA FE HAVE FOUR ACRES AND AN

2352

01:14:40,375 --> 01:14:38,774

YOU KNOW, YOU MIGHT BE USING 160

2353

01:14:42,444 --> 01:14:40,442

GALLONS PER DAY PER PERSON BUT

2354

01:14:43,345 --> 01:14:42,511

THEY'RE USING 480.

2355

01:14:44,713 --> 01:14:43,412

YOU KNOW?

2356

01:14:45,313 --> 01:14:44,780

THAT DEFINITELY SHOULD BE

2357

01:14:46,581 --> 01:14:45,380

ILLEGAL.

2358

01:14:50,185 --> 01:14:46,648

YOU KNOW?

2359

01:14:51,253 --> 01:14:50,252

MONTECITO, THE SAME THING.

2360

01:14:52,020 --> 01:14:51,320

YOU KNOW?

2361

01:14:53,989 --> 01:14:52,087

BEVERLY HILLS.

2362

01:14:56,191 --> 01:14:54,056

YOU KNOW WESTWOOD.

2363

01:14:57,292 --> 01:14:56,258

YOU KNOW?

2364

01:15:00,195 --> 01:14:57,359

POOR PEOPLE DON'T USE WATER.

2365

01:15:00,929 --> 01:15:00,262

RICH PEOPLE ABUSE WATER.

2366

01:15:02,230 --> 01:15:00,996

ALL RIGHT.

2367

01:15:04,266 --> 01:15:02,297

IT'S NOT FAIR.

2368

01:15:06,935 --> 01:15:04,333

SO WE HAVE TO COME UP WITH A

2369

01:15:09,938 --> 01:15:07,002

FAIRsK SYSTEM.

2370

01:15:12,607 --> 01:15:10,005

>>L RIGHT? IN ADDITION TO LEGAL

2371

01:15:16,344 --> 01:15:12,674

POLITICAL QUESTIONS, WE HEARD

2372

01:15:17,412 --> 01:15:16,411

IDEAS OF INNOVATION ESSENTIAL

2373

01:15:19,548 --> 01:15:17,479

INNOVATION, I REMEMBER DEAN KANE

2374

01:15:21,182 --> 01:15:19,615

WAS ON THE TV THIS WINTER

2375

01:15:22,317 --> 01:15:21,249

SHOWING SOME OF THE WATER

2376

01:15:24,452 --> 01:15:22,384

PURIFICATION DAMAGE ES THAT

2377

01:15:26,454 --> 01:15:24,519

COULD BE USED IN AFRICA.

2378

01:15:28,690 --> 01:15:26,521

SO EAMES TO ME WE HAVEN'T REALLY

2379

01:15:30,158 --> 01:15:28,757

TALKED ABOUT VENTURE CAPITAL AND

2380

01:15:31,760 --> 01:15:30,225

BASICALLY CALIFORNIA PROBABLY

2381

01:15:32,994 --> 01:15:31,827

HAS THE BIGGEST CONCENTRATION OF

2382

01:15:34,195 --> 01:15:33,061

VENTURE CAPITAL IN THE WORLD.

2383

01:15:36,164 --> 01:15:34,262

SO I DON'T KNOW WHETHER YOU OR

2384

01:15:37,399 --> 01:15:36,231

ANYBODY IN THE AUDIENCE KNOWS

2385

01:15:39,501 --> 01:15:37,466

WHETHER VENTURE CAPITAL SKILLS

2386

01:15:41,503 --> 01:15:39,568

ARE BEING APPLIED AND MAYBE

2387

01:15:42,704 --> 01:15:41,570

PRICING OF WATER ALONGSIDE THE

2388

01:15:45,440 --> 01:15:42,771

POLITICAL AND THE LEGAL.

2389

01:15:47,108 --> 01:15:45,507

>> I AGREE WITH YOU 100%.

2390

01:15:49,210 --> 01:15:47,175

THIS IS AN OPPORTUNITY.

2391

01:15:50,412 --> 01:15:49,277

BECAUSE WE'RE SO DEPENDENT ON

2392

01:15:51,346 --> 01:15:50,479

THE WATER HERE.

2393

01:15:53,682 --> 01:15:51,413

THIS IS DEFINITELY AN

2394

01:15:54,816 --> 01:15:53,749

OPPORTUNITY FOR NEW IDEAS AND

2395

01:15:56,384 --> 01:15:54,883

NEW TECHNOLOGY.

2396

01:15:58,320 --> 01:15:56,451

BETTER WATER EFFICIENCY.

2397

01:15:59,888 --> 01:15:58,387

AND SO YOU KNOW, YOUNG PEOPLE

2398

01:16:02,023 --> 01:15:59,955

BETTER GET ON STICK HERE AND

2399

01:16:02,424 --> 01:16:02,090

START TAKING ADVANTAGE OF THIS

2400

01:16:04,059 --> 01:16:02,491

OPPORTUNITY.

2401
01:16:06,227 --> 01:16:04,126
YOU KNOW, THAT'S WHAT MADE

2402
01:16:07,829 --> 01:16:06,294
CALIFORNIA SUCH A GREAT PLACE.

2403
01:16:09,164 --> 01:16:07,896
NEW IDEAS.

2404
01:16:11,299 --> 01:16:09,231
NEW TECHNOLOGIES.

2405
01:16:12,801 --> 01:16:11,366
AND SO I'M PRETTY OPTIMISTIC

2406
01:16:14,369 --> 01:16:12,868
ACTUALLY THAT WE CAN GET OUT OF

2407
01:16:16,071 --> 01:16:14,436
THIS WHOLE THING.

2408
01:16:17,806 --> 01:16:16,138
BUT WE'RE DEFINITELY GOING TO

2409
01:16:18,206 --> 01:16:17,873
FUNDAMENTALLY HAVE TO CHANGE OUR

2410
01:16:19,641 --> 01:16:18,273
LIFESTYLES.

2411
01:16:21,576 --> 01:16:19,708
AND YOU KNOW, THIS HAS BEEN

2412
01:16:24,679 --> 01:16:21,643
GOING ON A LONG TIME HERE.

2413
01:16:25,714 --> 01:16:24,746

BUT LET ME MAKE ONE FINAL THING.

2414

01:16:27,048 --> 01:16:25,781

THIS IS AMERICA.

2415

01:16:30,652 --> 01:16:27,115

WHAT'S THE MOST IMPORTANT THING

2416

01:16:32,621 --> 01:16:30,719

YOU DO IN AMERICA?

2417

01:16:34,956 --> 01:16:32,688

ALL RIGHT IT'S NOT LETTING THE

2418

01:16:36,157 --> 01:16:35,023

YELLOW MELLOW IN YOUR TOILET.

2419

01:16:37,392 --> 01:16:36,224

THAT DOESN'T CHANGE THE WORLD.

2420

01:16:38,460 --> 01:16:37,459

IT HELPS A LITTLE BIT.

2421

01:16:41,596 --> 01:16:38,527

BUT THE MOST IMPORTANT THING

2422

01:16:41,997 --> 01:16:41,663

THAT YOU DO IS IT VOTE.

2423

01:16:43,331 --> 01:16:42,064

ALL RIGHT?

2424

01:16:46,835 --> 01:16:43,398

AND RIGHT NOW, THE POLITICAL

2425

01:16:47,268 --> 01:16:46,902

POWER IN THIS STATE IS WITH

2426

01:16:47,669 --> 01:16:47,335

AGRICULTURE.

2427

01:16:49,571 --> 01:16:47,736

ALL RIGHT?

2428

01:16:51,640 --> 01:16:49,638

AND WITH THE WATER BARE RONS.

2429

01:16:53,108 --> 01:16:51,707

SO IF YOU WANT THE SITUATIONS

2430

01:16:56,011 --> 01:16:53,175

CHANGED, YOU WANT THE WATER LAWS

2431

01:16:57,846 --> 01:16:56,078

TO CHANGE, YOU WANT THE WATER

2432

01:16:59,814 --> 01:16:57,913

ALLOCATION, ALL RIGHT, YOU WANT

2433

01:17:01,583 --> 01:16:59,881

HIGH WHAT KIND OF ENERGY WE USE

2434

01:17:03,652 --> 01:17:01,650

TO RUN THIS STATE, WHETHER IT'S

2435

01:17:06,087 --> 01:17:03,719

GOING TO BE RENEWABLE ENERGY OR

2436

01:17:08,957 --> 01:17:06,154

COAL OR GAS, ALL RIGHT, HOW YOU

2437

01:17:09,357 --> 01:17:09,024

DO THAT IS WHO YOU VOTE FOR.

2438

01:17:10,925 --> 01:17:09,424

ALL RIGHT?

2439

01:17:11,926 --> 01:17:10,992

SO YOU KNOW, TAKING SHOWERS

2440

01:17:13,928 --> 01:17:11,993

TOGETHER IS GOOD.

2441

01:17:16,064 --> 01:17:13,995

DRIVING A PRIUS IS GOOD.

2442

01:17:17,532 --> 01:17:16,131

PLANTING A TREE IS SUPER.

2443

01:17:21,469 --> 01:17:17,599

BUT THE MOST IMPORTANT THING YOU

2444

01:17:22,037 --> 01:17:21,536

DO IS HOW YOU VOTE AND WHO YOU

2445

01:17:23,438 --> 01:17:22,104

VOTE FOR.

2446

01:17:30,011 --> 01:17:23,505

AND I'M RUNNING.

2447

01:17:34,349 --> 01:17:30,078

I'M RUNNING FOR WATER CZAR.