

1

00:00:00,000 --> 00:00:14,100

This series presents information based in part on theory and conjecture.

2

00:00:14,100 --> 00:00:18,623

The producer's purpose is to suggest some possible explanations but not necessarily

3

00:00:18,623 --> 00:00:27,069

the only ones to the mysteries we will examine.

4

00:00:27,069 --> 00:00:36,155

In 1977, the worst winter in a century struck the United States.

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00:00:36,155 --> 00:00:41,438

Arctic cold gripped the Midwest for weeks on end.

6

00:00:41,438 --> 00:00:45,080

Great blizzards paralyzed cities of the northeast.

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00:00:45,080 --> 00:00:50,404

One desperate night in Buffalo, eight people froze to death in marooned cars.

8

00:00:50,404 --> 00:00:53,246

Pat Bushnell was on the road that night.

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00:00:53,246 --> 00:00:55,487

Traffic just absolutely stopped.

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00:00:55,487 --> 00:01:01,651

I was afraid of being stuck in the car all night long with the cold and the wind running

11

00:01:01,651 --> 00:01:04,013

out of gas and then what?

12

00:01:04,013 --> 00:01:10,977

I think that if we had to go through a real bad winter just like we just went through,

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00:01:10,977 --> 00:01:14,780

I think we'd have to think about moving someplace else.

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00:01:14,780 --> 00:01:16,621

Move where?

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00:01:16,621 --> 00:01:21,784

The brutal Buffalo winter might become common all over the United States.

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00:01:21,784 --> 00:01:25,587

And experts believe the next ice age is on its way.

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00:01:25,587 --> 00:01:37,915

According to recent evidence, it could come sooner than anyone had expected.

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00:01:37,915 --> 00:01:51,643

Of the nine planets in our solar system, only Earth has conditions favorable to human life.

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00:01:51,643 --> 00:01:59,448

Our existence depends on a delicate balance of climate.

20

00:01:59,448 --> 00:02:06,213

Despite our modern technology, we are vulnerable to the winds of weather and environment.

21

00:02:06,213 --> 00:02:11,336

Blanketing large areas of the Earth's surface, great storms are among nature's most frightening

22

00:02:11,336 --> 00:02:12,337

events.

23

00:02:12,337 --> 00:02:34,191

Uncontrollable tempests make us aware how fragile life on our planet really is.

24

00:02:34,191 --> 00:02:39,394

The comfortable cycle of spring sowing, summer growth and fall harvest is, in terms of long

25

00:02:39,394 --> 00:02:42,676

history, abnormal.

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00:02:42,676 --> 00:02:48,520

Only in the last 10,000 years has Earth enjoyed continuing warmth.

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00:02:48,520 --> 00:02:56,005

Because of this, our population has exploded to five billion people.

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00:02:56,005 --> 00:03:08,653

For most of the last million years, however, whole continents were buried by ice.

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00:03:08,653 --> 00:03:14,817

As recently as 18,000 years ago, a mile-thick sheet stretched down from the Arctic Circle

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00:03:14,817 --> 00:03:19,540

and covered what is now Seattle, Chicago and Boston.

31

00:03:19,540 --> 00:03:23,943

New York Harbor was choked with ice floes.

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00:03:23,943 --> 00:03:29,747

Winters were cold and snowy down to the Gulf of Mexico.

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00:03:29,747 --> 00:03:34,310

All that remains of the great glaciers that once covered North America are the ice caps

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00:03:34,310 --> 00:03:37,712

of the Canadian Arctic.

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00:03:37,752 --> 00:03:43,035

With the ice spreads over the continent again, it is here on Baffin Island in northern Canada

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00:03:43,035 --> 00:03:48,159

that the mysterious process will begin.

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00:03:48,159 --> 00:03:54,363

We look to this lonely outpost for warnings of a new ice age.

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00:03:54,363 --> 00:03:59,606

Straddling the Arctic Circle, Baffin Island is a harshly beautiful wilderness.

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00:03:59,606 --> 00:04:05,170

It is larger than California, but not one tree grows on the entire island.

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00:04:05,170 --> 00:04:11,334

The only vegetation is the stunted plant life of the tundra.

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00:04:11,334 --> 00:04:16,657

Most of the inhabitants are Inuit Eskimos, whose ancestors migrated west from Greenland

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00:04:16,657 --> 00:04:19,899

a thousand years ago.

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00:04:19,899 --> 00:04:27,864

Today, the island is poised on the brink of ice age conditions, a critical signal post

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00:04:27,864 --> 00:04:32,387

for changes in the Earth's climate.

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00:04:32,387 --> 00:04:39,752

According to geologists, the last major ice age began on Baffin Island 115,000 years ago.

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00:04:39,752 --> 00:04:48,157

Perpetual snow spreads southward over the continents.

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00:04:48,157 --> 00:04:54,081

The weight of many years of snow compressed into ice.

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00:04:54,081 --> 00:04:59,285

The ice grew thicker until it covered Canada, the northern United States and Europe to a

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00:04:59,285 --> 00:05:01,446

depth of two miles.

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00:05:01,446 --> 00:05:06,209

For 100,000 years, the ice remained over large areas of the continents.

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00:05:06,209 --> 00:05:11,893

Then it retreated to the Arctic, and for the last 10,000 years, we have flourished in a

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00:05:11,893 --> 00:05:15,695

warm interglacial period.

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00:05:15,695 --> 00:05:22,019

Our planet is crowded.

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00:05:22,019 --> 00:05:27,303

What will we do when the fragile balance of climate shifts from today's abnormal warmth

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00:05:27,303 --> 00:05:33,026

to the next ice age begins?

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00:05:33,026 --> 00:05:38,030

One of the questions that I'm frequently asked is, when will this present warm interval end?

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00:05:38,030 --> 00:05:43,633

And the best answer to that probably is that it has in fact already ended and it ended

58

00:05:43,633 --> 00:05:48,156

3,000 years ago right here on Baffin Island.

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00:05:48,156 --> 00:05:52,719

Dr. Gifford Miller is a glaciologist from the University of Colorado.

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00:05:52,719 --> 00:05:57,042

He's been studying the climate and glaciers of Baffin Island for the past six years.

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00:05:57,042 --> 00:06:01,925

For the last 3,000 years, the summer temperatures have been getting colder and the amount of

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00:06:01,925 --> 00:06:07,609

precipitation, rainfall and snowfall has decreased so that the conditions have been drier and

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00:06:07,609 --> 00:06:09,010

colder.

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00:06:09,010 --> 00:06:13,052

And at the same time, the glaciers have expanded.

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00:06:13,052 --> 00:06:17,535

And the most recent expansion, which occurred between 300 years ago and the turn of the

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00:06:17,535 --> 00:06:22,098

present century, the glaciers attained their most extensive positions that they had during

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00:06:22,098 --> 00:06:23,699

the last 8,000 years.

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00:06:23,699 --> 00:06:30,463

The summer of 1972 was one of the most severe summers on record and the ice never melted

69

00:06:30,463 --> 00:06:31,464

that summer.

70

00:06:31,464 --> 00:06:35,947

And when I returned to Broughton Island, one of the local settlements here, talking to

71

00:06:35,947 --> 00:06:42,031

the Inuit people, and they could only tell me that their fathers had told them of a time

72

00:06:42,031 --> 00:06:44,713

when the ice hadn't gone out.

73

00:06:44,713 --> 00:06:49,996

This once in a lifetime summer ice has surprised old time Arctic residents.

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00:06:50,116 --> 00:06:54,799

Ernie Sieber is superintendent of Baffin Island National Park and has lived in the Arctic

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00:06:54,799 --> 00:06:56,400

for over 20 years.

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00:06:56,400 --> 00:07:03,605

Ernie Sieber, In 1973, we had ice all over the east coast.

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00:07:03,605 --> 00:07:07,808

The fjords, some of the ice in the fjords, they didn't even leave.

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00:07:07,808 --> 00:07:13,611

And almost every year since, we had the ice moving in after the fjords.

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00:07:13,611 --> 00:07:16,053

So it looks like the climate has changed.

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00:07:16,053 --> 00:07:18,935

It looks like it turned colder.

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00:07:18,935 --> 00:07:23,738

Since concern for our weather has increased, the park wardens now take daily records of

82

00:07:23,738 --> 00:07:29,061

temperatures, wind and solar radiation.

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00:07:29,061 --> 00:07:34,625

Weather data from stations all over the Arctic is collected and fed into central computers.

84

00:07:34,625 --> 00:07:46,272

Balloons are launched every day to monitor the winds and temperatures at high altitudes.

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00:07:46,272 --> 00:07:50,715

The data shows that average temperatures in the Arctic have fallen dramatically over

86

00:07:50,715 --> 00:07:52,917

the last 30 years.

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00:07:52,917 --> 00:07:58,080

In most locations, the drop has been about 2 degrees centigrade.

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00:07:58,080 --> 00:08:05,845

At that rate, the descent to ice age temperatures could take less than 200 years.

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00:08:05,845 --> 00:08:10,648

It is not only the lonely Arctic that has cooled, the whole northern hemisphere is growing

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00:08:10,648 --> 00:08:14,651

steadily colder.

91

00:08:14,651 --> 00:08:18,613

There is little doubt that someday the ice will return.

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00:08:18,613 --> 00:08:23,576

At least eight times in the past million years, it has advanced and retreated with clockwork

93

00:08:23,576 --> 00:08:25,298

regularity.

94

00:08:25,298 --> 00:08:30,141

If we are unprepared for the next advance, the result could be hunger and death on a scale

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00:08:30,141 --> 00:08:33,143

unprecedented in all of history.

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00:08:33,143 --> 00:08:37,585

What scientists are telling us now is that the threat of an ice age is not as remote

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00:08:37,585 --> 00:08:39,587

as they once thought.

98

00:08:39,587 --> 00:08:45,791

In the lifetime of our grandchildren, Arctic cold and perpetual snow could turn most of

99

00:08:45,791 --> 00:08:51,194

the inhabitable portions of our planet into a polar desert.

100

00:08:51,194 --> 00:08:56,157

In Greenland, the snows of centuries have piled up on the largest ice cap in the northern

101

00:08:56,157 --> 00:08:58,799

hemisphere.

102

00:08:58,799 --> 00:09:06,644

Scientists have recently discovered evidence of a climatic catastrophe.

103

00:09:06,644 --> 00:09:15,570

Going down over 1400 meters, geologists have collected precious samples of ancient ice.

104

00:09:15,570 --> 00:09:23,375

Some of it fell as snow over 100,000 years ago.

105

00:09:23,375 --> 00:09:29,019

The ice has shipped south, where it is kept frozen at minus 35 degrees and carefully vited

106

00:09:29,019 --> 00:09:34,022

up for study.

107

00:09:34,022 --> 00:09:39,225

By separating out the two forms of oxygen in the ice, scientists have been able to chart

108

00:09:39,225 --> 00:09:44,229

the temperatures when it fell as snow.

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00:09:44,229 --> 00:09:49,392

Near the bottom of the ice cap, they found traces of widespread freezing occurring with

110

00:09:49,392 --> 00:09:54,155

dramatic suddenness.

111

00:09:54,155 --> 00:10:01,540

Dr. Chester Langway is chairman of the geology department at the State University of New

112

00:10:01,540 --> 00:10:03,201

York, Buffalo.

113

00:10:03,201 --> 00:10:09,885

We have evidence from the ice core studies that approximately 89,000 years ago, the global

114

00:10:09,885 --> 00:10:18,291

climate changed from one of greater warmth than today into one of glacial severity.

115

00:10:18,291 --> 00:10:26,576

It is possible that a tremendous volcanic event occurred shielding the sun, cooling the earth's

116

00:10:26,576 --> 00:10:31,979

temperatures and thereby providing the explanation of the advancing glaciers.

117

00:10:31,979 --> 00:10:37,863

The significance of this catastrophic event is that within a hundred year period of time

118

00:10:37,863 --> 00:10:42,746

that the glaciers could have re-advanced over the surface of the earth.

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00:10:42,746 --> 00:10:49,070

It is possible that we may enter into such a cold climate almost instantaneously in the

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00:10:49,070 --> 00:10:53,954

very near future.

121

00:10:54,074 --> 00:10:56,755

The climate does suddenly cool.

122

00:10:56,755 --> 00:11:01,679

Will we survive the change?

123

00:11:01,679 --> 00:11:09,243

18,000 years ago, Manhattan Island was buried under a mile of ice.

124

00:11:09,243 --> 00:11:13,806

With the Hudson River flows today, there was a huge glacier.

125

00:11:13,806 --> 00:11:18,449

Pack ice filled the ocean off Long Island.

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00:11:18,449 --> 00:11:22,892

We're only beginning to understand the cyclic history of the ice, but evidence is mounting

127

00:11:22,892 --> 00:11:27,575

that another ice age is due.

128

00:11:27,575 --> 00:11:34,940

The most persuasive data comes from beneath the sea.

129

00:11:34,940 --> 00:11:40,263

The research ship Vima sails the world's oceans, taking samples of sediments deposited

130

00:11:40,263 --> 00:11:44,786

long ago.

131

00:11:44,786 --> 00:11:57,995

A crew of scientists rig a long cylinder and drop it vertically to the ocean floor.

132

00:11:57,995 --> 00:12:06,520

The cylinder dredges up mud from the seabed in the form of long cores.

133

00:12:06,520 --> 00:12:11,604

The types of tiny fossils found at different levels in the core shows the sea temperatures

134

00:12:11,604 --> 00:12:13,885

of the past.

135

00:12:13,885 --> 00:12:19,008

Geologists have collected enough sea cores to form a detailed history of climate during

136

00:12:19,008 --> 00:12:21,050

the last million years.

137

00:12:21,050 --> 00:12:26,733

The cores are analyzed at the Lamont-Daherty Geological Laboratory of Columbia University.

138

00:12:26,733 --> 00:12:29,415

Dr. James Hayes leads the research.

139

00:12:29,415 --> 00:12:35,219

The climatic record in these deep sea cores tells us that there have been eight ice ages

140

00:12:35,219 --> 00:12:37,821

in the last 700,000 years.

141

00:12:37,821 --> 00:12:41,503

It also tells us when they have occurred.

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00:12:41,503 --> 00:12:46,186

This provides us with a test of various theories of the ice ages.

143

00:12:46,186 --> 00:12:52,430

We now have a theory that tells us that changes in the shape of the Earth's orbit act as

144

00:12:52,430 --> 00:12:55,632

a pacemaker for the ice age succession.

145

00:12:55,632 --> 00:13:00,635

Since this theory can precisely predict when ice ages occurred in the past, which can be

146

00:13:00,635 --> 00:13:05,919

tested against these deep sea cores, it also can predict when ice ages will occur in the

147

00:13:05,919 --> 00:13:07,680

future.

148

00:13:07,680 --> 00:13:12,243

In this theory, we can say with confidence that we are currently heading toward another

149

00:13:12,243 --> 00:13:15,245

ice age.

150

00:13:15,245 --> 00:13:22,009

In the winter of 1976-77, one storm after another buried the northeast under record amounts

151

00:13:22,009 --> 00:13:28,653

of snow.

152

00:13:28,653 --> 00:13:33,617

Months of brutal cold made much of the nation seem like the Arctic.

153

00:13:33,617 --> 00:13:43,623

In Chicago, temperatures hovered at 19 degrees below zero, Dayton, 21 degrees below zero,

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00:13:43,623 --> 00:13:49,347

Cincinnati, 25 degrees below zero.

155

00:13:49,347 --> 00:13:55,271

Of all the hard-hit places, Buffalo, New York provides the best lesson.

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00:13:55,271 --> 00:14:00,154

That unfortunate city had 44 consecutive days of snow.

157

00:14:00,154 --> 00:14:04,797

The first sudden blizzard paralyzed traffic.

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00:14:04,797 --> 00:14:10,040

Thousands were forced to abandon their cars and seek refuge from the storm.

159

00:14:10,040 --> 00:14:15,444

Some who didn't were found frozen.

160

00:14:15,444 --> 00:14:19,927

As the storms continued, the resources of government were strained.

161

00:14:19,927 --> 00:14:23,809

Snow plows had to be flown in by the Air Force.

162

00:14:23,809 --> 00:14:32,415

Even the National Guard couldn't keep up with the unrelenting snow.

163

00:14:32,415 --> 00:14:38,779

Just how long can a modern city hold out when whole regions are cut off from food and fuel?

164

00:14:38,779 --> 00:14:44,182

When the weather turns on us again, how thin is the margin between life and death?

165

00:14:54,069 --> 00:15:03,355

When the snowfall finally stopped, downtown Buffalo lay quiet and deserted.

166

00:15:03,355 --> 00:15:07,717

Businesses remain closed for weeks.

167

00:15:07,717 --> 00:15:10,479

The airport was unusable.

168

00:15:10,479 --> 00:15:14,081

There was no way to reach or leave the city.

169

00:15:14,081 --> 00:15:17,324

The mail could not go through.

170

00:15:17,324 --> 00:15:21,006

Supplies of food and drugs ran perilously low.

171

00:15:21,006 --> 00:15:23,728

The ambulances could not reach the sick.

172

00:15:23,728 --> 00:15:28,371

For the old and infirm, it was a time of pain and misery.

173

00:15:28,371 --> 00:15:35,175

Suppliers of natural gas had to put emergency plans into effect, cutting off thousands of users.

174

00:15:35,175 --> 00:15:38,697

Electrical utilities ordered temporary blackouts.

175

00:15:38,697 --> 00:15:42,940

Fire engines froze in the Sub-Zero cold.

176

00:15:42,940 --> 00:15:48,864

In the suburbs, strong winds piled the snow in drifts as high as 30 feet.

177

00:15:48,864 --> 00:15:53,067

Many people had to enter their homes through second-story windows.

178

00:15:53,067 --> 00:16:00,231

No matter how much snow was cleared, fresh storms brought in more.

179

00:16:00,231 --> 00:16:15,521

Snowmobiles, the only viable form of transportation, were pressed into emergency service.

180

00:16:15,521 --> 00:16:18,643

That bushnell remembers how the buffalo storm began.

181

00:16:18,643 --> 00:16:20,244

It was terrible.

182

00:16:20,244 --> 00:16:24,847

It was the worst winter that we have ever, ever had around here.

183

00:16:24,847 --> 00:16:31,371

When I left work, knowing it was bad, but still thinking I could get home, gone maybe

184

00:16:31,371 --> 00:16:36,975

three miles from work and realized that the roads were closed at that point, you couldn't

185

00:16:36,975 --> 00:16:37,976

walk.

186

00:16:37,976 --> 00:16:42,338

The wind coming right off the lake at that point, it's right in downtown Buffalo, was

187

00:16:42,338 --> 00:16:45,020

so brutal that you just couldn't walk.

188

00:16:45,581 --> 00:16:51,704

So I sat for a while, just sat and waited in the car, and finally realized that it was

189

00:16:51,704 --> 00:16:52,705

hopeless.

190

00:16:52,705 --> 00:16:57,388

The thought of freezing to death, that's kind of frightened me.

191

00:16:57,388 --> 00:16:59,550

My worst fear at that point was the children.

192

00:16:59,550 --> 00:17:01,311

I was worried sick about them.

193

00:17:01,311 --> 00:17:03,072

They were in the house alone.

194

00:17:03,072 --> 00:17:05,233

That was the biggest worry.

195

00:17:05,233 --> 00:17:08,515

To go through that every year just wouldn't be worth the fight.

196

00:17:08,515 --> 00:17:09,516

And it's a fight.

197

00:17:09,516 --> 00:17:11,517

It's a real fight.

198

00:17:12,158 --> 00:17:17,201

Half a million workers in the United States were laid off because of fuel shortages.

199

00:17:17,201 --> 00:17:21,444

Hundreds died of illness made worse by the cold.

200

00:17:21,444 --> 00:17:26,087

Had the storms continued much longer, millions would have been in jeopardy for lack of food

201

00:17:26,087 --> 00:17:27,087

and fuel.

202

00:17:27,087 --> 00:17:33,692

The experience of 1977 leads us to imagine the disaster the future might bring.

203

00:17:34,692 --> 00:17:41,417

In the descent to an ice age, one severe winter would follow another.

204

00:17:41,417 --> 00:17:45,459

Eventually, the snows of Buffalo would never melt.

205

00:17:49,462 --> 00:17:57,467

Increased demand for heating fuel would trigger an energy crisis beyond anything we can imagine.

206

00:17:57,467 --> 00:18:01,710

Winters in Dallas and Atlanta would grow cold and icy.

207

00:18:02,710 --> 00:18:07,714

Snows would blanket Southern California and Northern Florida.

208

00:18:08,714 --> 00:18:15,719

The people of Mississippi and Alabama would have to contend with old-fashioned New England winters.

209

00:18:20,722 --> 00:18:24,725

Icy winds would sweep the Kansas wheat fields.

210

00:18:25,725 --> 00:18:30,728

Colorado's summer grazing lands would resemble the Arctic tundra.

211

00:18:30,728 --> 00:18:37,733

In California, glaciers would advance from the Sierra Nevada toward the fertile San Joaquin Valley.

212

00:18:37,733 --> 00:18:39,734

Food production would plummet.

213

00:18:39,734 --> 00:18:42,736

Prices would soar out of sight.

214

00:18:43,737 --> 00:18:48,740

Every winter, the line of year-round snow would move further and further south.

215

00:18:49,741 --> 00:18:56,745

If the catastrophic event of 89,000 years ago repeats itself, the ice could return within a single lifetime.

216

00:18:57,746 --> 00:19:02,749

If an ice age is coming, what can we do to stop it?

217

00:19:03,750 --> 00:19:07,752

Nuclear energy might be used to loosen polar ice caps.

218

00:19:08,753 --> 00:19:14,757

Sea ice could be melted by covering it with black soot to increase the absorption of sunlight.

219

00:19:15,757 --> 00:19:21,761

Dr. Steven Schneider is a climatologist from the National Center for Atmospheric Research.

220

00:19:22,762 --> 00:19:24,763

Can we do these things?

221

00:19:24,763 --> 00:19:27,765

Yes, but will they make things better?

222

00:19:27,765 --> 00:19:28,766

I'm not sure.

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00:19:28,766 --> 00:19:33,769

We can't predict with any certainty what's happening to our own climatic future.

224

00:19:33,769 --> 00:19:36,771

How can we come along and intervene then in that ignorance?

225

00:19:36,771 --> 00:19:37,772

You could melt the ice caps.

226

00:19:37,772 --> 00:19:39,773

What would that do to the coastal cities?

227

00:19:39,773 --> 00:19:41,774

The cure could be worse than disease.

228

00:19:41,774 --> 00:19:45,777

Would that be better or worse than the risk of an ice age?

229

00:19:46,778 --> 00:19:51,781

If the polar ice melted completely, sea level would rise 180 feet.

230

00:19:51,781 --> 00:19:55,783

New Orleans, San Francisco and New York would be submerged.

231

00:19:57,785 --> 00:20:03,788

Clearly, one of the future's great problems will be to survive the next ice age.

232

00:20:10,793 --> 00:20:17,798

Earth, water, air and ice comprise a delicate system in which everything is connected to everything else.

233

00:20:18,798 --> 00:20:22,801

It's the interaction between people and climate that worry me the most.

234

00:20:22,801 --> 00:20:28,805

Because with everyone jammed in in countries, locked in in national boundaries,

235

00:20:28,805 --> 00:20:33,808

a change in climate means a redistribution of where the rain is, where the growing seasons are.

236

00:20:33,808 --> 00:20:41,813

My worst fear is that the climate could induce a change in some country that would be devastating to their local survivability,

237

00:20:42,814 --> 00:20:47,817

and that would lead them to desperate acts that can drag everybody else down.

238

00:20:48,818 --> 00:20:53,821

In the past, weather disasters have fostered a spirit of mutual concern.

239

00:20:54,821 --> 00:21:02,827

When drastic changes in our climate occur, hopefully the same acts of courage and cooperation will prevail.

240

00:21:04,828 --> 00:21:06,829

Tonight on the History Channel.

241

00:21:06,829 --> 00:21:11,832

Okay, a ship vanishes into thin air and then reappears somewhere else.

242

00:21:11,832 --> 00:21:13,834

You've got to be kidding me, right?

243

00:21:13,834 --> 00:21:16,836

Well, that's exactly what some say happened in the fall of 1943.

244

00:21:16,836 --> 00:21:19,838

The true story of the Philadelphia experiment.

245

00:21:19,838 --> 00:21:21,839

Unincredible but true.

246

00:21:21,839 --> 00:21:23,840

Tonight at 8 on the History Channel.

247

00:21:36,849 --> 00:21:38,850

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