Video Transcript: Culture and Climate Change in the Arctic

Maggy Benson: The Arctic, it's very, very cold. But people have been living there and thriving for thousands of years. How have people adapted to climate change in the Arctic through time? Dr. Bill Fitzhugh is here to shed some heat ... light on that today. Are there any more marshmallows?

Maggy Benson: Wow.

Maggy Benson: Welcome everyone. Thank you so much for joining us for another episode of Live from Q?rius Smithsonian Science How. Today we're talking with Smithsonian archaeologist, Dr. Bill Fitzhugh to learn how people have lived in the Arctic and how they've dealt with climate changes through time.

Maggy Benson: Bill, thank you so much for being here today.

Bill Fitzhugh: Thanks, Maggy. It's great to be here.

Maggy Benson: So, Bill, before we can learn about how people have dealt with climate changes, we must first learn a little bit more about the Arctic and a little bit about what it's like to be there. So before you unpackage that for us, we actually wanna ask our viewers what they think the Arctic's like. Think that's a good idea?

Bill Fitzhugh: Great. Let's go.

Maggy Benson: Wonderful. So here's your chance to tell us what you think. What is the Arctic like? It is cold, dark, isolated, inaccessible, or inhospitable? Take a moment to think about it and tell us what you think by selecting the answer you see in the poll window to the right of your video screen.

Maggy Benson: Bill, we're watching the results come in together. Almost all of our viewers, 81%, think it's cold, but a large percentage too, think it's isolated. What is the Arctic like?

Bill Fitzhugh: Well, it's certainly all of those things. It's been peripheral to our knowledge for thousands of years as Europeans or Asians, but you know, it's been the home for native peoples have lived in the Arctic forever, and for them it's not isolated, it's home.

Maggy Benson: It is home. So where is the Arctic positioned in the world?

Bill Fitzhugh: Well, the Arctic is on the north, sitting on top of the world. Here's a shot just showing you what it's like with ice all in the Arctic Ocean and all those lands just kind of surrounding it. So in a sense, the Arctic is a single region with communication from Asia all around though Alaska to Greenland.

Bill Fitzhugh: It's kind like a Mediterranean lake in the north covered with ice.

Maggy Benson: And when I think of ice, I think of this big impenetrable expanse. How do people actually travel across that boundary?

Bill Fitzhugh: Well, they have learned to do this over years. And they've developed means like dog sleds, and skin boats, snowshoes, and other ways to get around. If you live there, you develop these technologies, and the northern people have been really expert technologists.

Maggy Benson: So you mentioned traveling across ice. Is the entire Arctic covered in ice or is there any vegetation?

Bill Fitzhugh: Well in the wintertime, the sea is covered with ice, but of course the rest of the year, a lot of it is open water, increasingly so. And we have all these different environments. We have the green on this polar map here is the forest. North of that is the tundra, and then you have the Arctic Ocean.

Bill Fitzhugh: So you really have two different kind of environments. You have an environment which has the forest and areas for the caribou are living. The tundra without any trees at all, and then the icy coast where the seals and the sea mammals are really important.

Maggy Benson: So these three regions, the forest, the ocean, and the tundra, do they stay the same through seasons and through time?

Bill Fitzhugh: They change a lot. The biggest change of course is the Arctic Ocean which freezes with one degree change in temperature from an open water ocean to an ice-filled sea. Unbelievable change. But in other areas, the forest changes, there's snow in the winter, and not in the tundra is generally open.

Bill Fitzhugh: So it's an environment that people have learned to live in and it's full of animals. It's a region that we're just starting to get to know.

Maggy Benson: So we see this graphic here with the tree line. Does the tree line shift?

Bill Fitzhugh: Yes, the tree line has shifted several hundred kilometers in north and south, and especially west of Hudson Bay. In Russia, it's also shifted north and south, and cold periods it's in the south, and then it migrates north in the warm periods. But the biggest change is the change in the ocean. It's the ice or no ice issue.

Maggy Benson: So tell us a little bit more about that, the shifts in sea ice.

Bill Fitzhugh: Well seasonal frequencies are something that we're well accustomed to. In the north, the animals have adapted to this. Here you see a lot of walrus on a very little bit of ice. This is the story today. We're losing a lot of that ice. In the wintertime, the ice has expanded all the way down, you see in the light blue

colored here. And in the summertime, it (the open water) is almost punching into the North Pole and in another couple of decades, we're gonna probably lose that (the ice) in the summertime. So huge seasonal differences, and the animals have adapted to this, and the people likewise.

Maggy Benson: What's the importance of animals shifting with the sea ice?

Bill Fitzhugh: Well, you know if you have a big expansion of the Arctic sea ice, the seals and the walrus expand with it. And as that retreats in warmer periods, those animals have to live further north. The same is true with caribou.

Bill Fitzhugh: The caribou are the great ... we call the caribou kind of like the hardware store for the northern people. It's where they get their clothing, their antlers for making tools, sinews for sewing, you know food, and so forth. The seals are likewise for people like the Eskimo peoples, that's their bread and butter because they use them for covering their kayaks, for waterproof clothes, and for food.

Maggy Benson: So people are really dependent on the animals in the Arctic.

Bill Fitzhugh: They wouldn't be there without the animals. And they still depend on them today too.

Maggy Benson: Bill, you showed me a really amazing artifact here at the Smithsonian that we couldn't actually bring to the set, which showed this intimate relationship that people have with the animals in the Arctic. Let's have a look.

Maggy Benson: Bill, what are we looking at?

Bill Fitzhugh: Well this is a drum. It's a huge ceremonial drum, one of the largest that I've ever seen. It's made of whale stomach skin, that's the fabric of the drum, and then inside is a driftwood frame, and it's all tied together with sinew, animal sinew. So the whole thing is a part of the world that they're living in. The animals they hunt, and the materials that they use to celebrate and honor the animals.

Maggy Benson: What's this image?

Bill Fitzhugh: Well this is the way they illustrated their life and their spiritual relations with animals. And they believed that by picturing hunters who are in the act of hunting animals, that the animal spirits would be more likely to give themselves to the hunter. These types of illustrations are present on many other kinds of artifacts including food bowls, feast bowls, and even on clothing and so on.

Bill Fitzhugh: It all is giving this idea that people and animals are very closely related, and that they have to talk together to be able to survive.

Maggy Benson: So Bill as we saw in that video, it's clear through the illustrations and artifacts that Arctic people have really close relationships with people. Now I'd like to learn a little bit more about the animals that live in the Arctic. Is there a lot of biodiversity?

Bill Fitzhugh: There certainly is. But the key thing about the Arctic is something you can contrast with the tropics. The Arctic has very few numbers of species, but those species are present in very large numbers seasonally. The opposite is true of the tropical forest with much diversity.

Bill Fitzhugh: So the animals like the walrus, and the foxes and other ... they are, especially in the summertime when there's a big bloom of Arctic marine life, and so it's a very seasonal environment.

Bill Fitzhugh: In the wintertime you have very few species to live on, so you have to cache food to survive. You have to tune in to the seasons and to the animal movements.

Maggy Benson: So, the migration of animals is also really important seasonally, then.

Bill Fitzhugh: Yeah, well for instance, we know on the Labrador Coast, that the harp seals migrate between Greenland and the south. The polar bears move north and south. The caribou are big migrants in huge herds, maybe 800,000 in some of these herds moving north and south. So people have to adapt to intercept them and hunt them at certain times of year.

Maggy Benson: So are modern day people living in the Arctic dependent on the animals like they have been in the past?

Bill Fitzhugh: They are indeed. You won't find any northern peoples who have given up their traditional life with the animals here in Alaska. We see the continuance of the whale hunting tradition. And seals, walrus, caribou and so forth. But of course northern peoples today are modern peoples. They're shopping in grocery stores, but they have this continual reverence for the animals and a need to keep their subsistence life going.

Maggy Benson: So, Bill, revisiting our poll, the Arctic is really cold, and it can be dark, but it's really a hospitable place if you're adapted to live there.

Bill Fitzhugh: Well you know we think of the wintertime as a difficult time to live in the north, but actually, this was the big ceremonial time for most of the Eskimo peoples. They had villages that came together. They had their ceremonial dances, and of course, they were eating cached food from the summer. The fish and the caribou and the seals and whale.

Maggy Benson: Well thanks for helping us understand a little bit more about how people live in the Arctic. Let's get to some of our text questions. We're getting a ton of them.

Maggy Benson: So this one comes from Michelle and Ala. They wanna know do people in the Arctic have food.

Bill Fitzhugh: Yeah, Michelle, they do, but as I mentioned they sort of mix their economy between the modern economy and the natural game that they have. I've hunted and worked with a lot of northern communities. They're living a life like ours but they also use the local resources, which are crucial.

Maggy Benson: Great question. So we have another question but this one comes in by video. Let's have a look.

Hope: Hi, my name is Hope and I wanted to know why are there such large concentrations of animals in the Arctic.

Bill Fitzhugh: Hi, Hope. Well, this is because of the pattern I mentioned where the animals are there in great numbers seasonally or in certain migrations. So you'll have very large numbers of caribou, or you'll have huge herds of seals. Maybe groups of whales.

Bill Fitzhugh: So there are large numbers, but they're only there at certain times, and you have to be there just exactly at the right time to get them.

Maggy Benson: So Maya and Alana from Canyon Ridge want to know how can people survive in the Arctic.

Bill Fitzhugh: People have survived for a long, long time in the Arctic, and they've learned to do it incrementally since the Ice Age. They've learned how to build houses out of snow, how to freeze, keep their food in frozen cellars and so on. They've learned all sorts of new technologies that work with the Arctic regions.

Bill Fitzhugh: So it's something that has developed over a long period, but the Eskimos and the northern people, they're great technologists.

Maggy Benson: So, now that you've helped us understand that the Arctic is a place that people can thrive in, we wanna know how people have adapted to climate changes through time. And before you tell us about that, we again want to ask our viewers what they think about this.

Maggy Benson: So tell us, how have Arctic people been affected by climate changes? Not been affected, migrated, died off, acquired technologies, or changed practices? Remember, you can tell us what you think by clicking the button in the poll window that appears to the right of your video screen.

Maggy Benson: Bill, we're both looking at the results coming in, and our viewers are really selecting most of the answers that were there, but most of them are picking changed practices. Tell us, where does our story start with people being able to adapt to climate change?

Bill Fitzhugh: Well this goes way, way back in time. By the way I hope there was a box for all of the above. Because all of those are things that have happened in the north. And there's a long tradition people have continued, but in the same time, they've developed different ways of approaching.

Bill Fitzhugh: In the ancient days, 40,000 years ago, that's when some of the first people who came into the Arctic. They were mostly land hunters. They were living in Eurasia, and they were living in skin tents using the animals, and so forth.

Bill Fitzhugh: They've adapted in different ways. This is the migration route that we see. People first adapted in the north, Europe, and Asia. They learned how to hunt the tundra animals. They moved into North America around probably 20,000 years ago, maybe even earlier, down to the western part of the country, because there was glacial ice over the eastern part of Canada, and northern Canada. And then they moved back up into these areas.

Bill Fitzhugh: So this was the first peopling, but later groups, Eskimo groups, Paleo Eskimo groups also came out of Asia, and went into the Arctic regions.

Maggy Benson: So I see that the ice isn't always consistent throughout the years when we're looking back 40,000 years. Why is this ice growing and shrinking? It's almost like elastic.

Bill Fitzhugh: Well this is the climate factor. And you know, when we have interglacial periods, the ice melts and when we have glacial periods, the ice builds up. And so here's 15,000 years, this is from ice core data. This gives us temperatures back into the ages and you see this very cold period at the left hand side of the slide.

Bill Fitzhugh: Then around 10,000 years ago, the world, the northern hemisphere warms up and it's been quite warm then for the 10,000 to 5,000 years ago. And then it's gradually cooling off, and so each one of those oscillations, they affect the people in the north, and at times there was conditions like today with open water and then other times when almost no open water in the Arctic making it very difficult.

Maggy Benson: So Bill, you're an archeologist. You look for evidence to learn about how people lived in the past. And while we'd love to learn about every culture that ever lived in the Arctic, we really don't have enough time today. So our story today is going to focus on your work in Labrador, Canada, and for very specific cultures that we'll be walking through as we see here.

Bill Fitzhugh: We're gonna talk about four different cultures. The first is the Maritime Archaic Indians who lived between about 8,000 and 4,000 years ago. Then a new culture, Paleo Eskimo cultures shows up from the Arctic and ultimately Siberia. They're followed by the Dorset culture, and then the Thule, who are the ancestors of the modern Inuit.

Bill Fitzhugh: So we'll sort of go through that history.

Maggy Benson: Let's start with the Maritime Archaic Indians. Can you tell us again when they arrived in Labrador?

Bill Fitzhugh: Maritime Archaic folks got there around 8,000 or 9,000 years ago as the ice withdrew from the coast opening up landscape.

Maggy Benson: So this was more like a warming period.

Bill Fitzhugh: This was a warm period. It's probably the warmest period we've ever had until the modern days. And so there was very little sea ice. There was a lot of caribou hunting. People moved up from Newfoundland into northern Labrador, where they found some wonderful rock.

Bill Fitzhugh: This is what we call "Ramah chert." And it was the stuff that they used for making a lot of their tools. They were hunting both seals and caribou. They had a kind of even subsistence. As you can see, there's sort of a mixed forest and tundra environment.

Bill Fitzhugh: It was the first time that people worked in this culture. And we have some examples here of some of their tools. Stone axes and gouges that were used because these people made log canoes, dugout canoes like the northwest coast Indians we know today.

Bill Fitzhugh: They also were master technologists making stone tools. This is an ultrashort tool here.

Maggy Benson: They're beautiful.

Bill Fitzhugh: They made a curbed edge knife, which is kind of like an ulu here. So they were masterful technologists. And they also lived in very interesting ways.

Maggy Benson: How did they live? What kind of housing did they have?

Bill Fitzhugh: Well, we didn't know what houses until we started doing the archeology and we found all these little ... lots of places with lots of things in them, but we didn't know how to interpret it.

Bill Fitzhugh: When we got into northern Labrador where there's very little soil, we could see the patterns. And you can see in this picture here, a long house, a Maritime Archaic long house.

Bill Fitzhugh: These guys developed over 4,000 years from very small single room houses, to multi-room houses, maybe even for 20 or 30 families, living way up north. And when we excavated them, we found in each of the little sort of apartment complexes, each little family group a hearth, and then these very interesting

soap stone carvings that were little pendants that they probably wore around their neck. Kind of like a dog tag.

Bill Fitzhugh: Each one of them is different and we think that the ideas for the designs came from dreams.

Maggy Benson: Wow, that's incredible. And what are we seeing here?

Bill Fitzhugh: This is Maritime Archaic cemetery, which we discovered down near Rigolet. And they made wonderful, wonderful tools, which were preserved in these cemetery complexes. Some of them are known very well in Porteschoi in Newfoundland.

Bill Fitzhugh: In Labrador, the graves didn't have any human bones in them, but we had just beautiful stone tools, and they traded these stone tools over thousands of miles.

Maggy Benson: You mentioned this stone ax that they used to carve out their canoes, which meant that they'd access to trees. How do you know where the tree boundary was from 9,000 years ago? There's certainly no written history about that left.

Bill Fitzhugh: This is what we used to find out that. We have two different ways. This is charcoal, and we would collect the charcoal from the fireplaces and we could immediately tell by the species of charcoal whether we were with trees, in trees or in tundra. And actually, we found out they were in both areas. But they always kept one foot in the forest and we also had pollen diagrams from lake core sediments.

Bill Fitzhugh: So we kind of developed the history of the forest and discovered that these Indians moved north as the forest moved north after the ice sort of withdrew.

Maggy Benson: So this is a story about how cultures shift in response to climate change. So this group, the Maritime Archaic Indians, must have been impacted by the climate shift that happened eventually. What happened after this one period?

Bill Fitzhugh: There is ... after around 3,500 years ago, the Maritime Archaic people kind of disappear, and we have other Indians, represented by some of the tools that we see on the table here, that came after them.

Bill Fitzhugh: It was a time period when cooling took place and the first Eskimo peoples came from Siberia across Arctic Canada and moved in to the north.

Bill Fitzhugh: And so this is the Paleo Eskimo time period. They were ... you can imagine the surprise of the Indian people who were living there with no one else around, and all of the sudden, out of the north show these ... come these people in kayaks and seal skins and so forth.

Bill Fitzhugh: Wonderful, wonderful tools. We see some of the examples here. They were master chip stone makers. They made barbed harpoons for catching fish, and very importantly, they had a toggling harpoon that allowed them to very efficiently capture sea mammals, especially seals.

Bill Fitzhugh: So they were the first Eskimo peoples to occupy northern Labrador, and they were living side by side with the Indians.

Maggy Benson: Now do they have the same types of houses, these long houses that we saw with the Maritime Archaic Indians?

Bill Fitzhugh: No, everything about their culture was different. The spirits that they believed in, the stone tools. Here's a house, a Paleo Eskimo house about 3,000 years old. And you can see the mid passage and the two family areas on either side. They were living in these things all winter long. No insulation. Just a little fireplace there.

Maggy Benson: I don't know if that's the life for me.

Bill Fitzhugh: They had some dogs, thank God. They had polar bears around too. So it was unbelievably hardy culture.

Maggy Benson: So they were in a sense co-existing in some capacity in Labrador, but did the climate change again?

Bill Fitzhugh: Yes it did. It warmed again. And this ... we've sort of now moved out of that period into the Dorset period now, where around 800 BC it cooled off. We had what we called the Little Ice Age. And that's the Dorset culture where the people who were the successors of the early Paleo Eskimos. And we have some of their tools here.

Bill Fitzhugh: Beautiful little scrapers, arrow points, and so forth. They developed a technique for keeping their houses warm with soapstone lamps, with cooking pots and so forth. So they were really well adapted to the marine environment, whereas the Indian groups were mostly stuck with the caribou in the forest. So two cultures side by side.

Maggy Benson: So these new group, the Dorsets, they were adapted to hunting these marine mammals, but were they also hunting on land?

Bill Fitzhugh: Yeah, they did. Everybody had to use caribou for clothing, for winter clothing and so forth, and also for sinews. But especially the Dorset worked on the walrus. They were master hunters of the walrus, and as we see the technology changing, it changes from these small harpoons, to bigger, more efficient harpoons.

Bill Fitzhugh: When you get into a big walrus hunting deal, you've gotta have floats, you've gotta have a really secure fastening to that animal. The toggling harpoon is the way to do that, so you see a lot of these things.

Bill Fitzhugh: There's a site in northern Labrador called Aveolic, a very rare site where we got some wood preservation, usually we only see stone tools, and we even see some of their clothing, the open parka. We can't figure out how they kept the snow out of their ears with that kind of a parka.

Maggy Benson: So this kind of evidence is really showing you how the people lived, but we know that our story today doesn't end with this Dorset culture. What happened to that culture once the climate shifted again?

Bill Fitzhugh: Well we had another warming period. And that's the same warming period that brought the Vikings across the north Atlantic. It brought Indians back north replacing the Eskimos quite in the far north in Labrador. They started using the Ramah chert that the Eskimos had been using and so forth.

Bill Fitzhugh: And these are the ancestors of the Thule culture, and they arrived from Alaska as whale hunters that come across Arctic Canada about 1300 AD, meet the Vikings I think. You know, they moved down the Labrador coast, they replaced the Dorset people-

Maggy Benson: They replaced them?

Bill Fitzhugh: Yeah, they seem to have completely replaced them. Genetic studies now show that there is no trace of Dorset in the Thule genetic makeup, or in the modern day Eskimos Inuit people today. So a very different ... another one of these waves of migration, climate-inspired.

Maggy Benson: And is this an image of one of their houses?

Bill Fitzhugh: This is a Thule house with a flagstone floor, and you see the little alcove in the back. Whale bones are around the side of it, so they were using the whales for structural members for their house. This is the Labrador Inuit people living the same, the descendants of those early Thule people in the coast of Labrador. They developed really, really big houses. Well insulated, and at this time, they were trading with the Europeans.

Maggy Benson: So Bill, you showed me a really amazing innovation of the Thule people that allowed them to come to Labrador in the first place. Let's have a look.

Maggy Benson: Bill, this is awesome. Clearly a boat. What kind of boat is it?

Bill Fitzhugh: This is a kayak, one of the real important inventions of northern people. Arctic peoples around the world developed these things so that they can hunt in the

open waters, sometimes extremely rough water in the Arctic Ocean. So they had to develop a boat that was capable of keeping the water out.

Bill Fitzhugh: When you're making a kayak, you're using seal skins. Usually bearded seal, which is one of the larger seals. The man made the frame, the woman sewed the skins, and cleaned the skins and so on.

Bill Fitzhugh: Every year they would put a new coat on it.

Maggy Benson: So was a boat like this used for hunting?

Bill Fitzhugh: It's basically a hunting boat. You could sneak up on game very quietly, but they're also having started a huge new sport. So the Eskimo kayak has become the kayak that we have for competitive racing and white water kayaking and so forth. So they've given us a wonderful vehicle.

Maggy Benson: It all started in the Arctic.

Maggy Benson: Bill, we saw that the kayak was an amazing innovation to allow the Thule come to Labrador in the first place. And kind of to recap these four different cultures, we see that there was migration, there was extinction of the Dorset culture, but there was also this new technologies and changing practices that allowed people to deal with climate shifts in the Arctic.

Maggy Benson: But we know that the temperature in the Arctic is changing again today. What are we seeing with sea ice decline?

Bill Fitzhugh: Well this is really dramatic. In the last 15 to 20 years, there've been unbelievable changes in the sea ice patterns. We are predicting now that there will be almost no Arctic sea ice in the summertime by 2050 or something like that, maybe even sooner.

Bill Fitzhugh: And this is gonna really change the lives of everyone. For the first time Europeans are starting to get it... the business industries are looking for oil and resources. Probably gonna be fishing industries that will expand into the Arctic.

Bill Fitzhugh: It's gonna be the biggest change we've ever seen. And all because of that single degree of change in ice or not.

Maggy Benson: So what's gonna happen to modern Arctic cultures today in the face of climate change?

Bill Fitzhugh: With this long history we have from archeology, we see how these cultures change. We see new waves showing up. We see them evolving, adapting new technologies, perfecting their harpoons, going from seals to walrus to big whale hunters, now adapting to Industrial Age as well.

Bill Fitzhugh: So the Arctic peoples will continue, and they will continue to need their animals. They need a pollution-free environment and so forth. They're great technologists. They will move with the tide, but they're gonna be a lot of new vistas.

Maggy Benson: Bill, thank you so much for being here and helping us better understand the Arctic and the people who lived there. And thanks for all of your amazing questions. Can you tell our viewers where they can learn a little bit more about your work?

Bill Fitzhugh: I can indeed. Come to the Arctic Study Center website and you can also look at this book, Maine to Greenland, which Smithsonian Press published last year. There's a lot of information about climate and culture change, especially in Labrador, Greenland and even as far as south as Maine. And sometimes we think of Maine as part of the Arctic.

Maggy Benson: Interesting. Thank you so much, Bill. Thank you so much for tuning in. If you want to see this broadcast, it will be archived later this evening at qrious.si.edu. We hope to see you next time on December 10th with Ted Shultz on Smithsonian Science How.