



Community Observations on Climate Change

Nushagak River Trip Report, September 22-25, 2014



Survey Team

Sue Flensburg – Bristol Bay Native Association
Mike Brubaker – Alaska Native Tribal Health Consortium
Gab Dunham – UAF Sea Grant Program

Technical Advisors

Delores Larson – Native Village of Koliganek
Mary Apokedak – Native Village of Koliganek
Peter Gumlickpuk – Native Village of New Stuyahok
Gabe Andrew – Native Village of New Stuyahok
Luki Akelkok Sr. – Native Village of Ekwok
Sylvia Kazimiroxicz - Native Village of Ekwok



Cover: Koliganek riverfront. Above: Ekwok riverfront.

The elders said that someday the climate would switch around in Alaska, and we would be warmer then outside. We are seeing this happen now. Luki Akelkok Sr. - Ekwok



Koliganek road - dry conditions persisted into September.

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This trip report documents climate change impacts as described by the community members and considers the effects as interpreted through the lens of public health.



Above: climate change was the topic of discussion at the community meeting in Koliganek.
Right: Peter Gumlickpuck inspects foliage in New Stuyahok.

Note: photos by Mike Brubaker unless otherwise indicated.

Primary funding provided by the U.S. Environmental Protection Agency. In-kind support from our project partners. Thank you for your support.



It has been very dry. The leaves are smaller this year. Peter Gumlickpuk – New Stuyahok

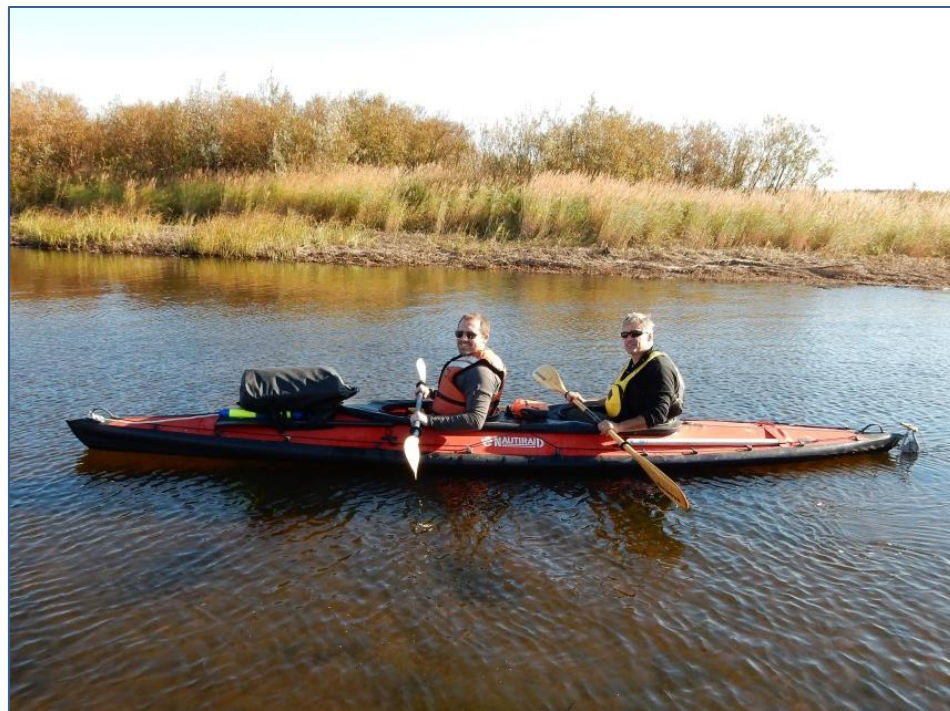


Introduction

In September 2014 the Bristol Bay Native Association, responding to local concerns about climate change impacts, organized an assessment of villages of the Nushagak River, including Koliganek, New Stuyahok and Ekwok. Previous community assessments in the Bristol Bay region were performed in Pilot Point, Levelock and Nondalton and this was an opportunity to investigate a new area and hear the observations and concerns of residents.

The assessment team was lead by Sue Flensburg of the Bristol Bay Native Association and included Gabe Dunham from Alaska Sea Grant Marine Advisory Program and Mike Brubaker from the Alaska Native Tribal Health Consortium's Center for Climate and Health. The assessments occurred from September 22nd to 25th, 2014. Each assessment included a community tour, public meetings, training, and installation of time lapse cameras for environmental monitoring. Video footage was taken of impact areas along the Nushagak River.

This report documents some of the impacts of climate change and the effects, good and bad, to the communities and people lives.



Above: Gabe Dunham and Mike Brubaker traveled 50 miles by kayak between Koliganek and Ekwok, to survey river conditions and to reduce their carbon footprint.

***Last year the water was so low, the barge almost did not make it up the river.
Gabe Andrew – New Stuyahok***



A sand bar in front of Koliganek.

The Region

The Nushagak – Mulchatna River Watershed covers an area of almost 7000 square miles. This assessment focused on the three permanent communities on the Upper Nushagak: Koliganek, New Stuyahok and Ekwok.

The watershed is a vast with diverse landscapes – mountains, tundra and lake dotted wetlands, mixed forests of conifers and deciduous trees, and the tributaries of the two great rivers that ultimately flow through tidal marshes, past Dillingham and into Bristol Bay.

It is critical habitat for the region's wildlife, birds and fish. The watershed supports all five species of the largest salmon run in the world. It provides the Yup'ik Eskimo people and other residents with clean air, and water resources and a wide range of subsistence foods. Protecting the environment of the watershed is important to support the fisheries and a healthy traditional lifestyle.

Today the watershed is rapidly changing as a result of climate change.

We used to get a hard break up. Then we started getting soft break up. Last year there was no break up. Glen Wysocki - Koliganek



Above: Gabe Dunham and Glen (Skin) Wysocki discuss river changes. Right: the Nushagak / Mulchatna watershed and project communities (red).



Wood-Tikchik State Park

Nushagak River

Mulchatna River

Koliganek

New Stuyahok

Ekwok

Dillingham

Togiak National
Wildlife Refuge

Lake Clark National
Park and Preserve

Katmai National
Park and Preserve

Bristol Bay

Google

The New Climate

“Climate” describes long term conditions, as opposed to our day to day “weather”. But with changing conditions, defining climate is becoming more difficult. The most accurate weather records in Bristol Bay are from the National Weather Service station in King Salmon. Mean annual temperature there is 35°F.* July is the warmest month averaging 55°F and January is the coldest at 16°F . Average annual precipitation is nineteen inches, and snowfall is forty-six.

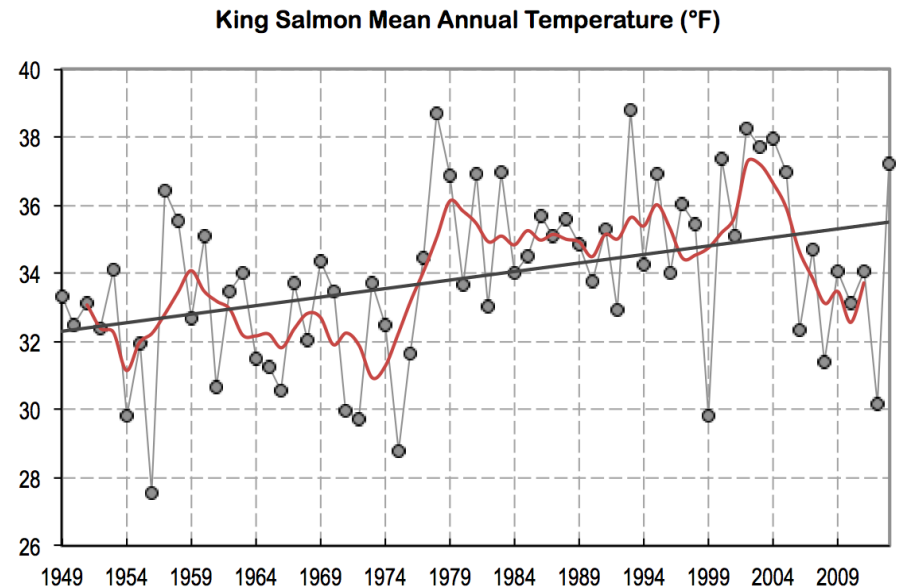
King Salmon’s mean annual temperature has increased by 3.7 degrees over the past sixty years.** Climate models developed by the University of Alaska Fairbanks show trends and projections for temperature and precipitation through 2099. Comparing two periods, 1960–1990, and 2010–2012, the average temperature has increased in every month. Precipitation has remained the same in one, decreased in three, and increased in eight months (see SNAP Community Charts). Based on these records, the new climate is warmer and wetter.

*1981-2010, National Climatic Data Center

** 1949-2009, Alaska Climate Research Center

When I was young there was a lot more snow. We had to watch out not to fall in the holes under the trees.

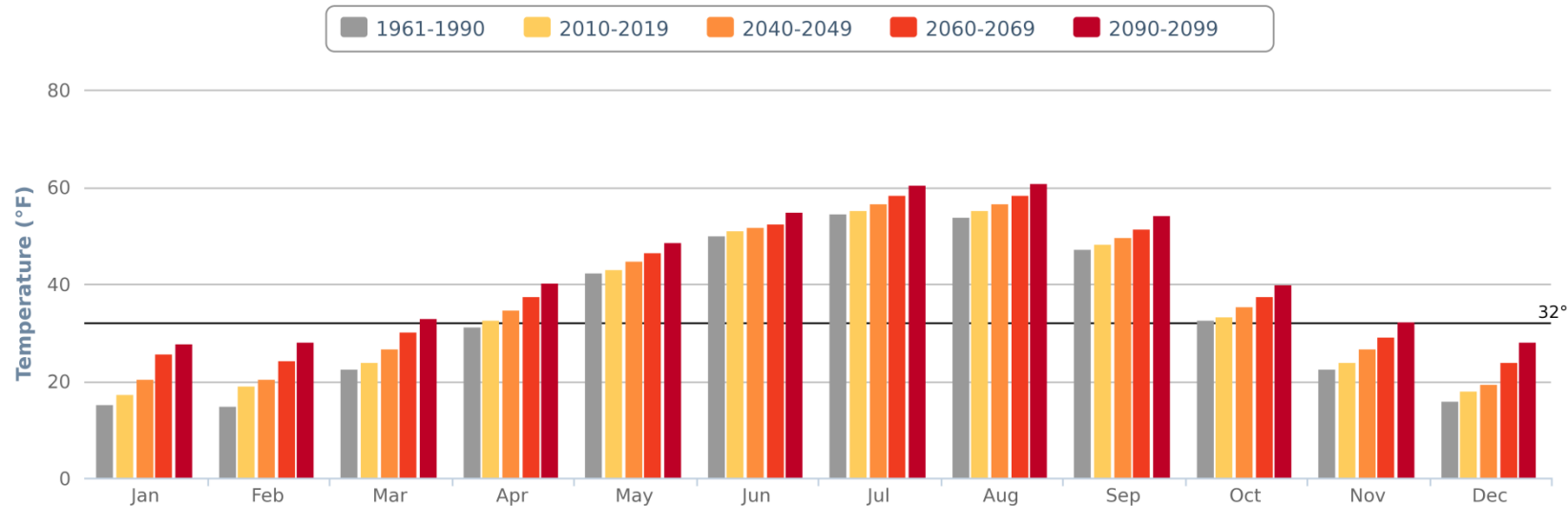
Socally Wonhola - New Syuyahok



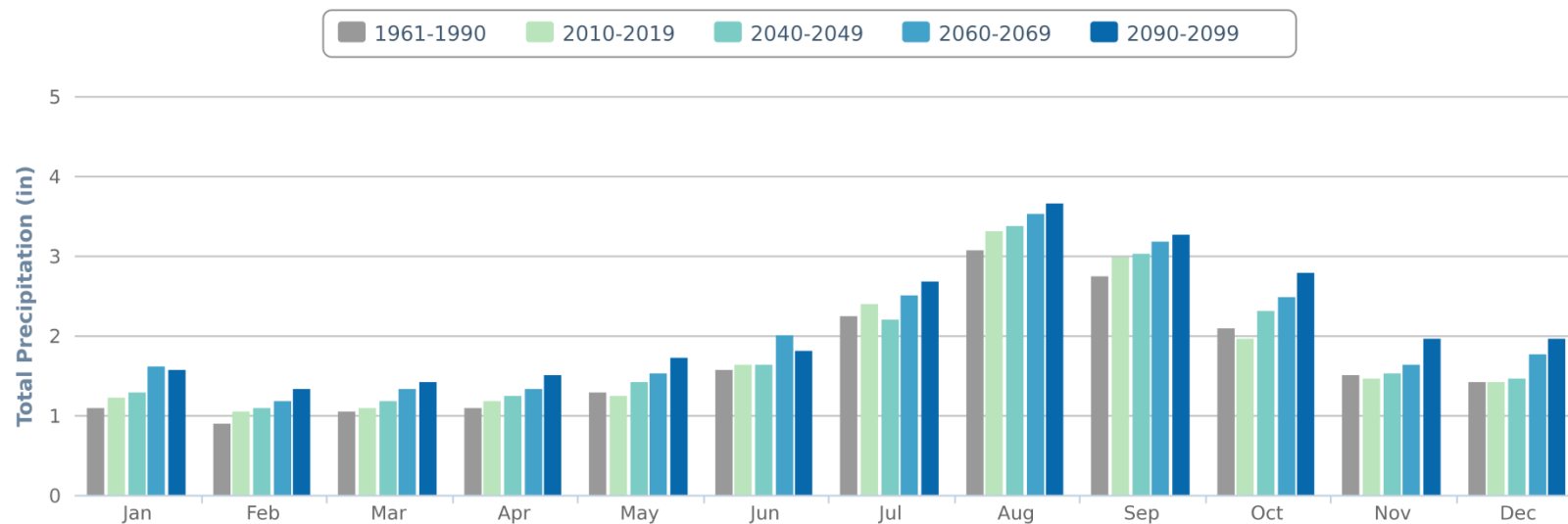
Above: mean average temperature for King Salmon shows an increasing trend since the 1940s. Right: temperature and precipitation trend models for King Salmon.

Average Monthly Temperature for King Salmon, Alaska

Historical PRISM and 5-Model Projected Average, Mid-Range Emissions (A1B)



Historical PRISM and 5-Model Projected Average, Mid-Range Emissions (A1B)



Communities

This section provides an overview of each of the three communities included in the assessment. The location on the river, landscape, community population, local services and climate change related concerns are all included in the discussion.

During the assessments key observations were shared by community members, both about recent change, and changes that have occurred over decades or a lifetime.

Although each community is different, there were common impacts reported and shared concerns about extreme weather, drought, changes in the river channel, bank erosion, lake drying, vegetation change, and about the health of people and subsistence resources.

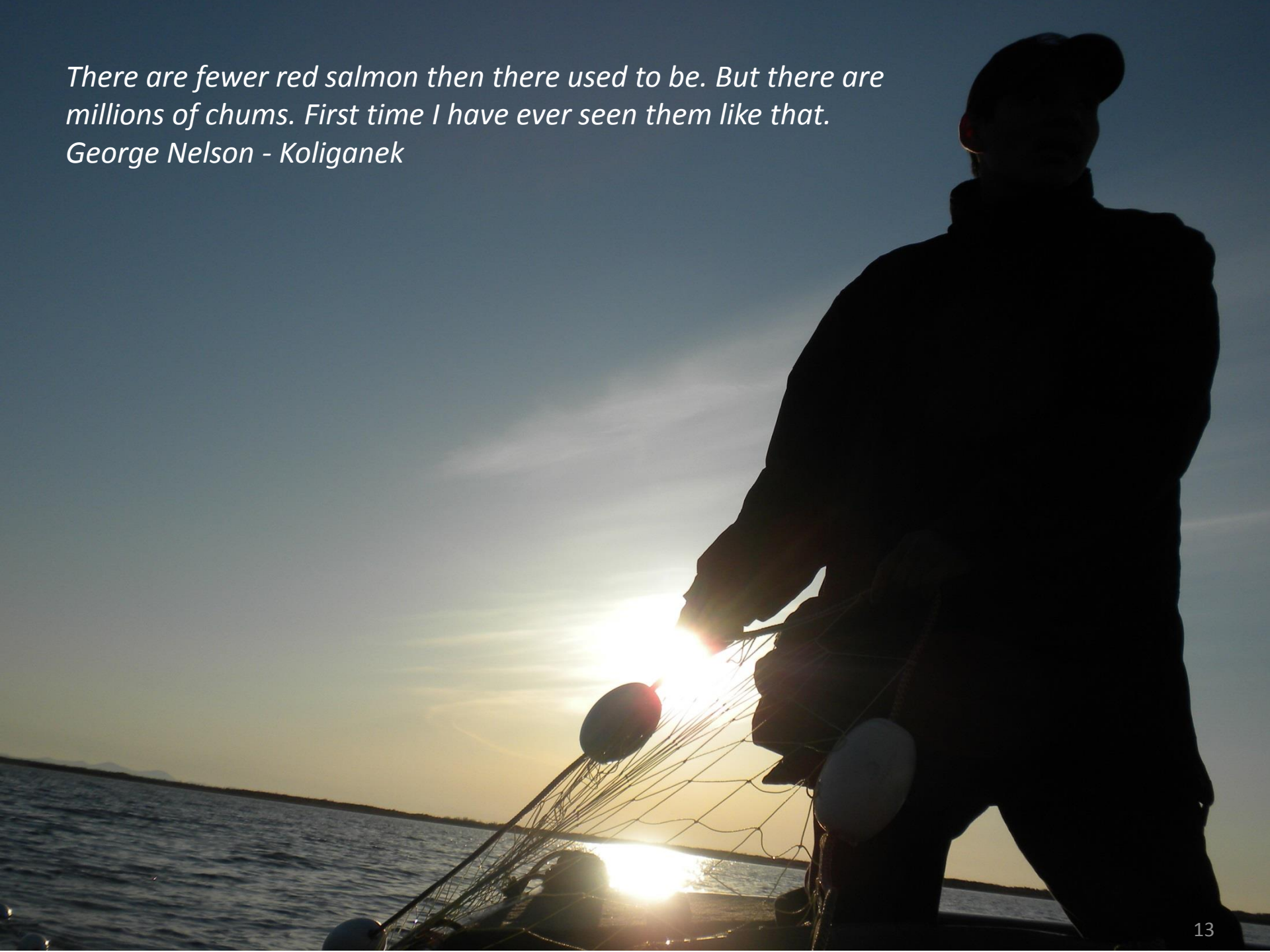
In the following pages, selected key observations and photos are provided to help characterize the conditions in the region.

Our dogs used to bark for month straight, from sun up to sun set, because there were so many caribou. Now it is quiet. There are no caribou.
Luki Akelkok Sr. - Ekwok



Above: Main street Koliganek. Right: hauling in the salmon gill net in the fall.

There are fewer red salmon then there used to be. But there are millions of chums. First time I have ever seen them like that.
George Nelson - Koliganek



Koliganek Koliganek is located on the Upper Nushagak River, above the confluence of the Mulchatna River. It is the furthest upstream community on the river, located 65 miles from Dillingham. The community is situated on a forested bluff above the west bank. Koliganek was moved in 1938 or 1940 because of a shortage of firewood. The original site was at the mouth of Nuyakuk River, at a site now referred to as “Middle Koliganek”. In 1964 the community moved to the current location because of flooding.

Today the community has a population of about 200, most people of Yup'ik Eskimo descent. Subsistence activities are an important part of the lifestyle and people harvest a range of wild foods including salmon and other fish, caribou, moose, a variety of birds, plants and berries. Access to the community is by air or water. Barges bring goods up river from Dillingham and there are daily flights.

The community has a store, school, Russian Orthodox church, community center and health clinic. The community water supply is groundwater through a well, and there is piped water and sewer. Waste water is handled through septic tanks.

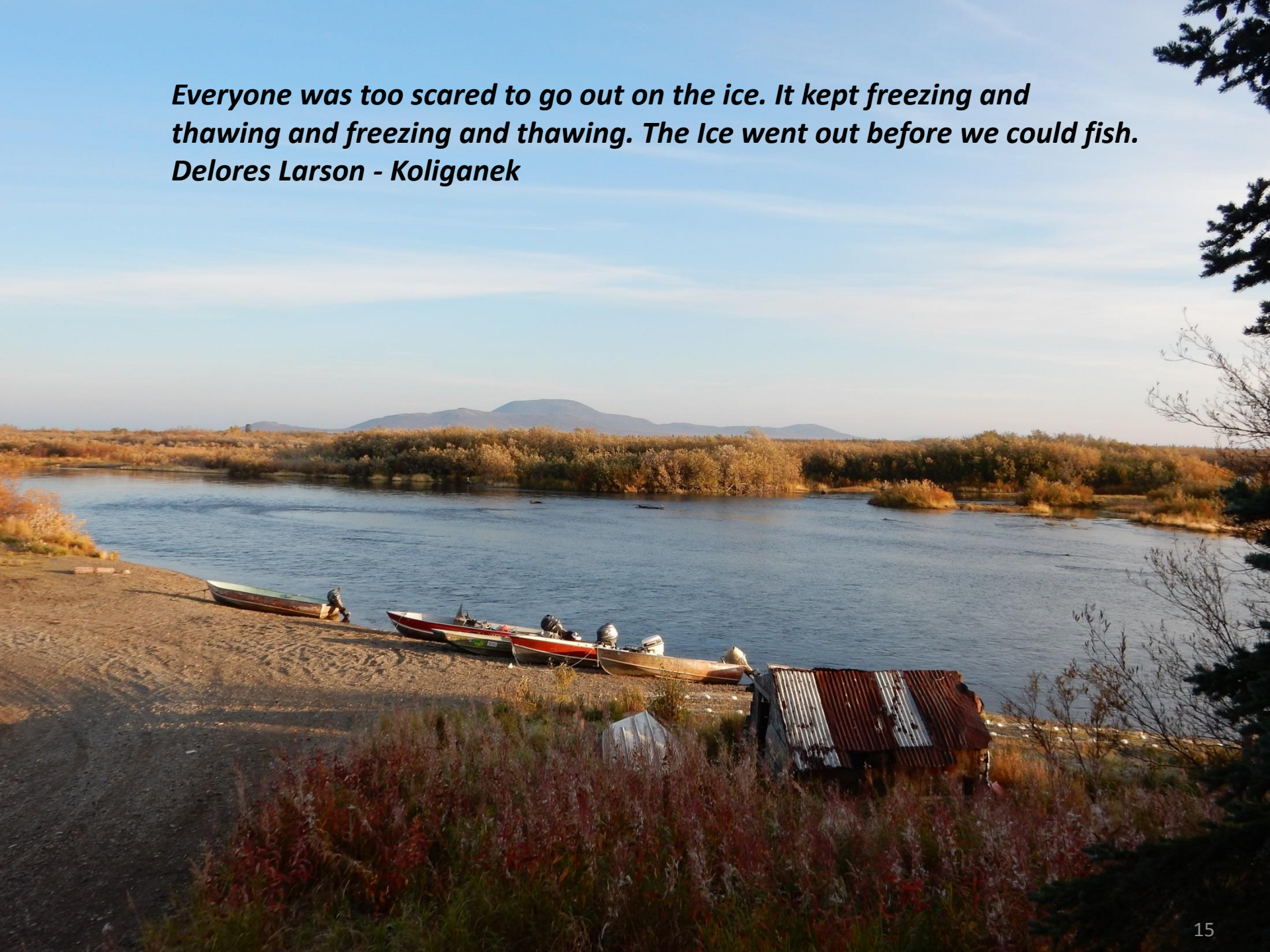
Climate Change Issues

- River change
- Erosion
- River level
- Drought
- Extreme weather (rain)
- Fish change (health and harvest)
- Caribou and moose decline
- Variable berry harvests



Above: George Nelson talks with Sue Flensburg.
Right: view of the river front in Koliganek.

***Everyone was too scared to go out on the ice. It kept freezing and thawing and freezing and thawing. The Ice went out before we could fish.
Delores Larson - Koliganek***



Last year you could hardly go anywhere by snow machine. George Nelson



Ice roads in Koliganek, 2014. Photo Delores Larson

There are hardly any caribou nowadays. Does climate change effect them?
Fevronia Neketa - Koliganek



Photo by Andrew Balser – National Snow and Ice Database

The bushes are as tall as the trees now. Mary Apokedak - Koliganek



We notice lake change when we are flying. One pretty good sized lake had completely dried up. Mary Apokedak - Koliganek



Break up used to be a big event. You could hear it from our house, popping and grinding. Now it is a non-event. Pam Johnson - Koliganek



Photo courtesy of Sylvia Kazimiroxicz - Ekwok

One good thing is that we don't have to burn so much fuel to heat our homes. I did not heat my home all summer and I bought a screen door to keep the house cool.
Delores Larson – Koliganek



New Stuyahok - is located on the Nushagak River, 52 miles northeast of Dillingham, about 12 miles upriver from Ekwok and 50 miles downriver from Koliganek. In Yupik Stuyahok means "going downriver place." The village was moved from Old Stuyahok, at the confluence of the Mulchatna River, in 1918; in 1940, it moved again to its present location. In 1941, residents built 14 log homes. Chief Ivan Blunka stayed in a tent so that his home could be used as a school.

Today New Stuyahok has a population of about 500, mostly of Yup'ik Eskimo descent.

Subsistence is important and people harvest a range of wild foods including salmon and other fish, caribou, moose, a variety of birds, plants and berries.

Access is by air or water. Barges bring goods up river from Dillingham and there are daily flights. The community is largely constructed at two levels, 25 and 40 feet above river level. There is a store, school, Russian Orthodox church, community center and health clinic. Water is from groundwater and there is piped water and sewer system. Waste water is handled through septic tanks.

Climate Change Issues

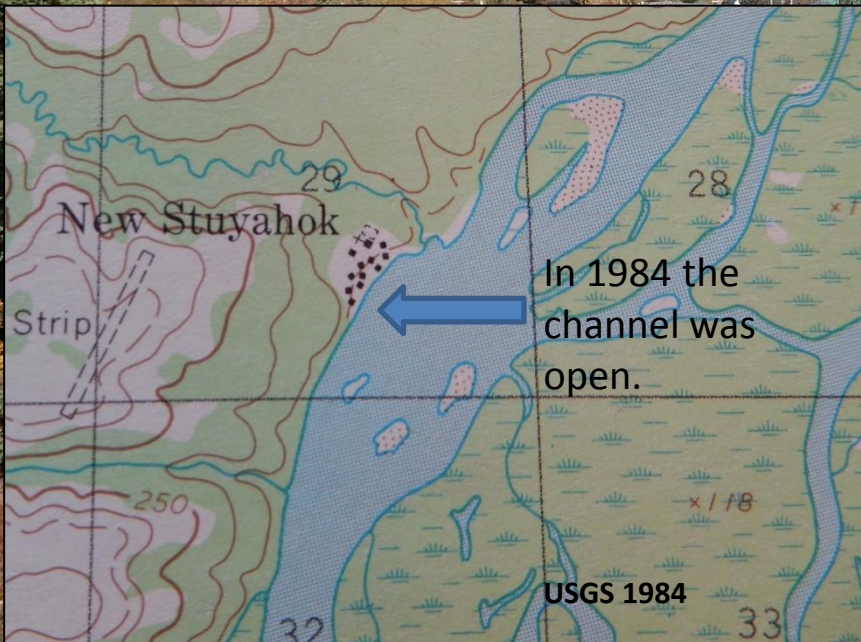
- River change
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Above: New Stuyahok river front. Right: new islands on the river

***These two islands in front of the village were not there when I was a kid.
We have lost four feet of water since the 1960s. – Peter Gumlikpuk***

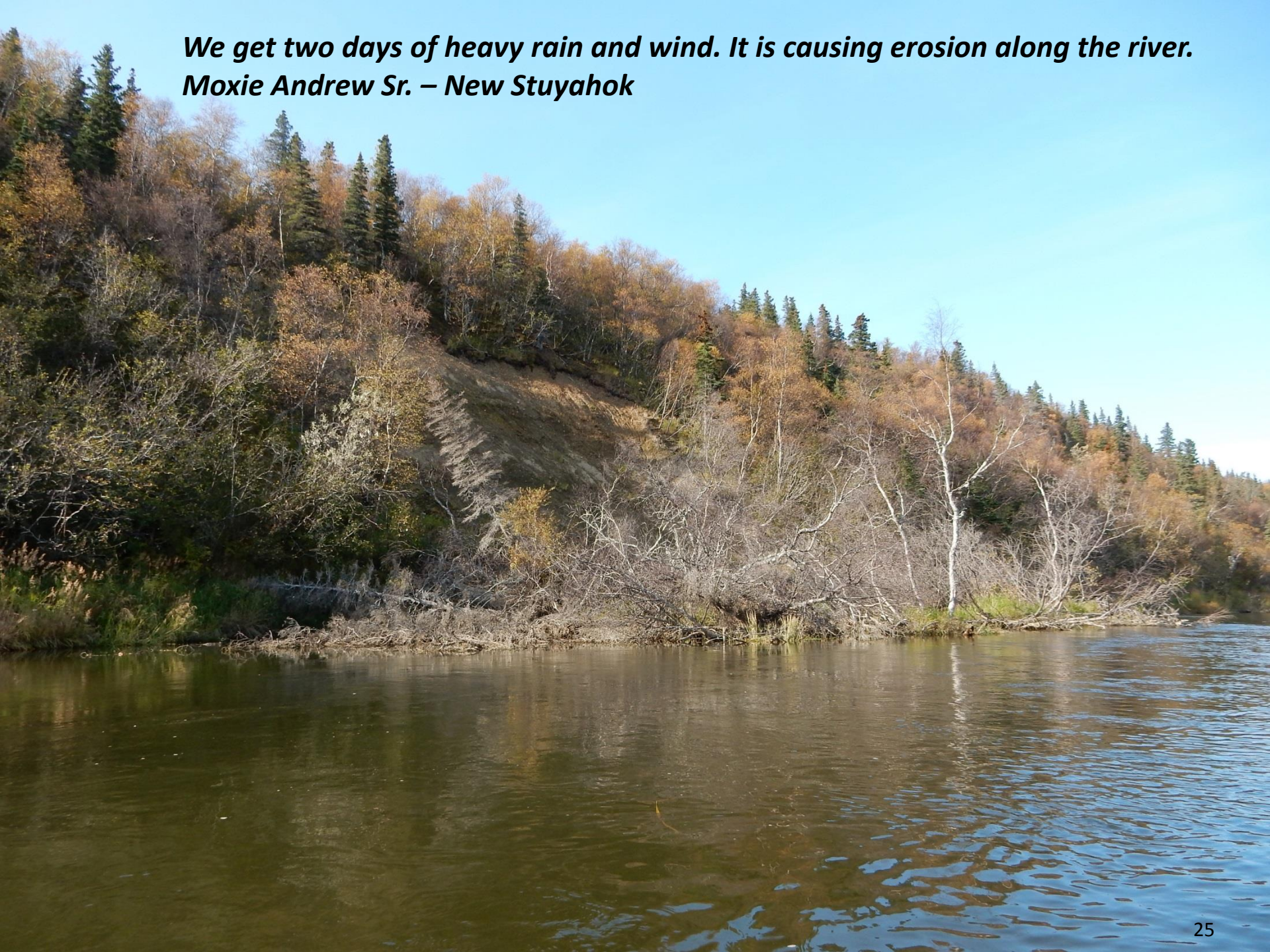
Channel with islands as it
appears today.



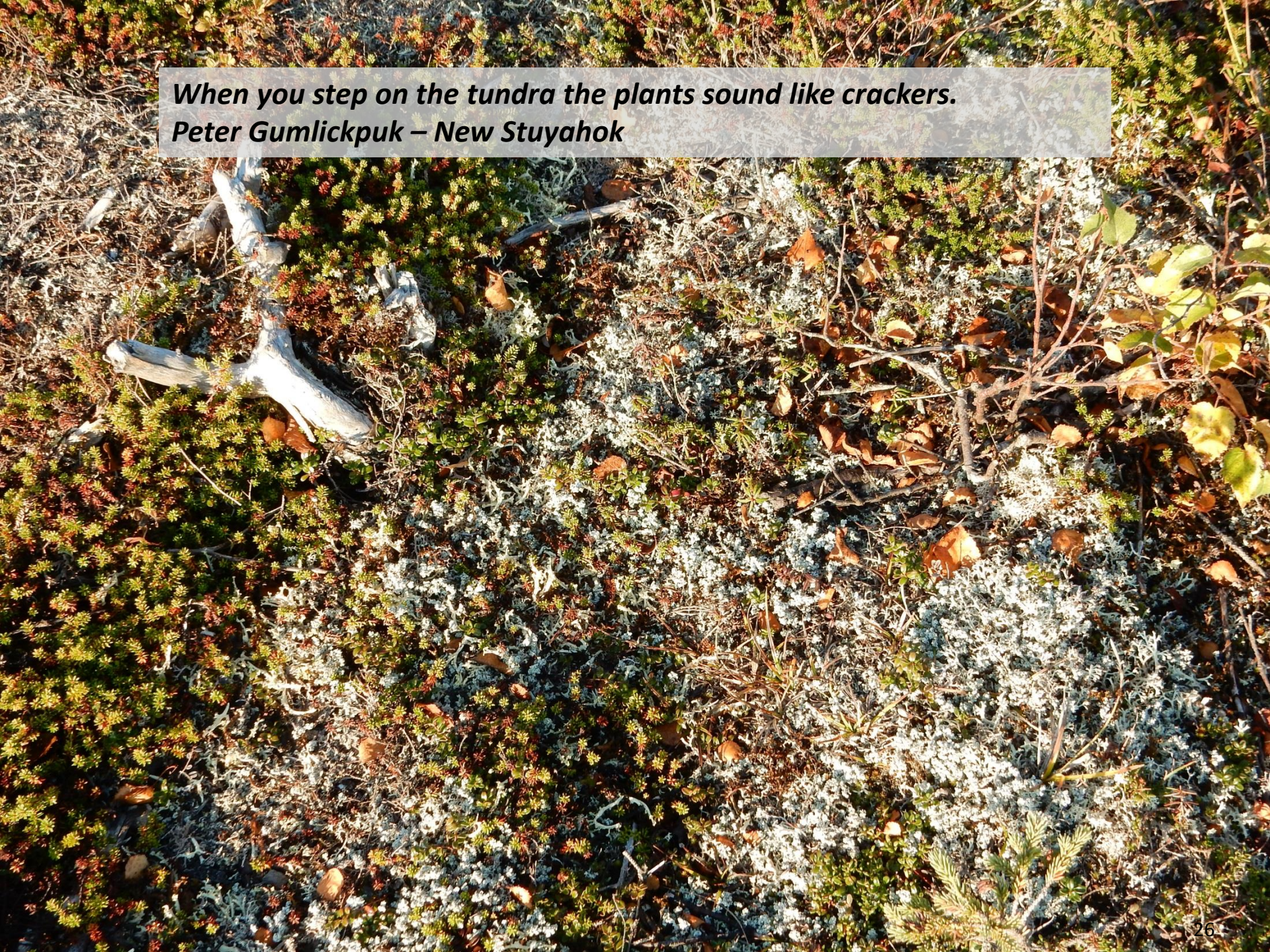
Dry, dry, dry. Then huge rains. It washed the dirt out from under my deck and now the house is leaning. Peter Gumlickpuk – New Stuyahok



***We get two days of heavy rain and wind. It is causing erosion along the river.
Moxie Andrew Sr. – New Stuyahok***



*When you step on the tundra the plants sound like crackers.
Peter Gumlickpuk – New Stuyahok*



The swallows indicate that the king salmon are swimming. This year the swallows came two weeks early. The kings were early too. Tim Wonhola – New Stuyahok



***It gets really hot now. In the spring the white fish gets too hot and gets really dry.
Moxie Andrew Jr. – New Stuyahok***



We used to have a lot of spawning areas between here and the Mulchatna, now there is only four. Evan Wonhola - New Stuyahok



We fillet a fish and noticed that there were bumps on the fish between the skin and the flesh. I was wondering if this fish was safe to eat. Moxie Andrew Jr.



The parasite Myxobolus squamalis; influenced by environmental conditions, harmless to people.

*We worry about change along the migration route. I only got one goose last year.
The birds are flying too high. Moxie Andrew Jr. – New Stuyahok*



Every spring I get allergies. This year it was really bad. It was warm then cold, and rather than getting hay fever just in the spring, I had it all summer. I went through twice as much medicine. Moxie Andrew Jr. – New Stuyahok



One good thing was that the fiddleheads were really good. And the long growing season. Moxie Andrew Jr. – New Stuyahok



Ekwok - means "end of the bluff" and is the oldest continuously-occupied village on the Nushagak. During the 1800s, Ekwok was used in summer as fish camp and in the fall as a base for berry picking. By 1923, it was the largest settlement along the river. Many of the earliest homes were located near the riverbank. After a severe flood in the early 1960s, villagers relocated to higher ground. The village is vulnerable to flooding, most recently from an ice jam during the spring breakup. With soft breakup occurring more frequently, ice jam-related flooding may decrease in the future. Extreme rain events have resulted in bank erosion and landslides in recent years.

Today Ekwok has a population of about 100, mostly people of Yup'ik Eskimo descent. Subsistence is important and people harvest a range of wild foods including salmon and other fish, caribou, moose, a variety of birds, plants and berries. Access is by air or water. Barges bring goods up river from Dillingham and there are daily flights. There is a store, school, Russian Orthodox church, community center and health clinic. Water is from groundwater and there is piped water and sewer system. Waste water is handled through septic tanks.

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Above: preparing for the public meeting. Right: Ekwok from the water.



In the 1970s the ice was 8-12 feet thick. Now it is 3 feet thick. Phillip Akelkok - Ekwok

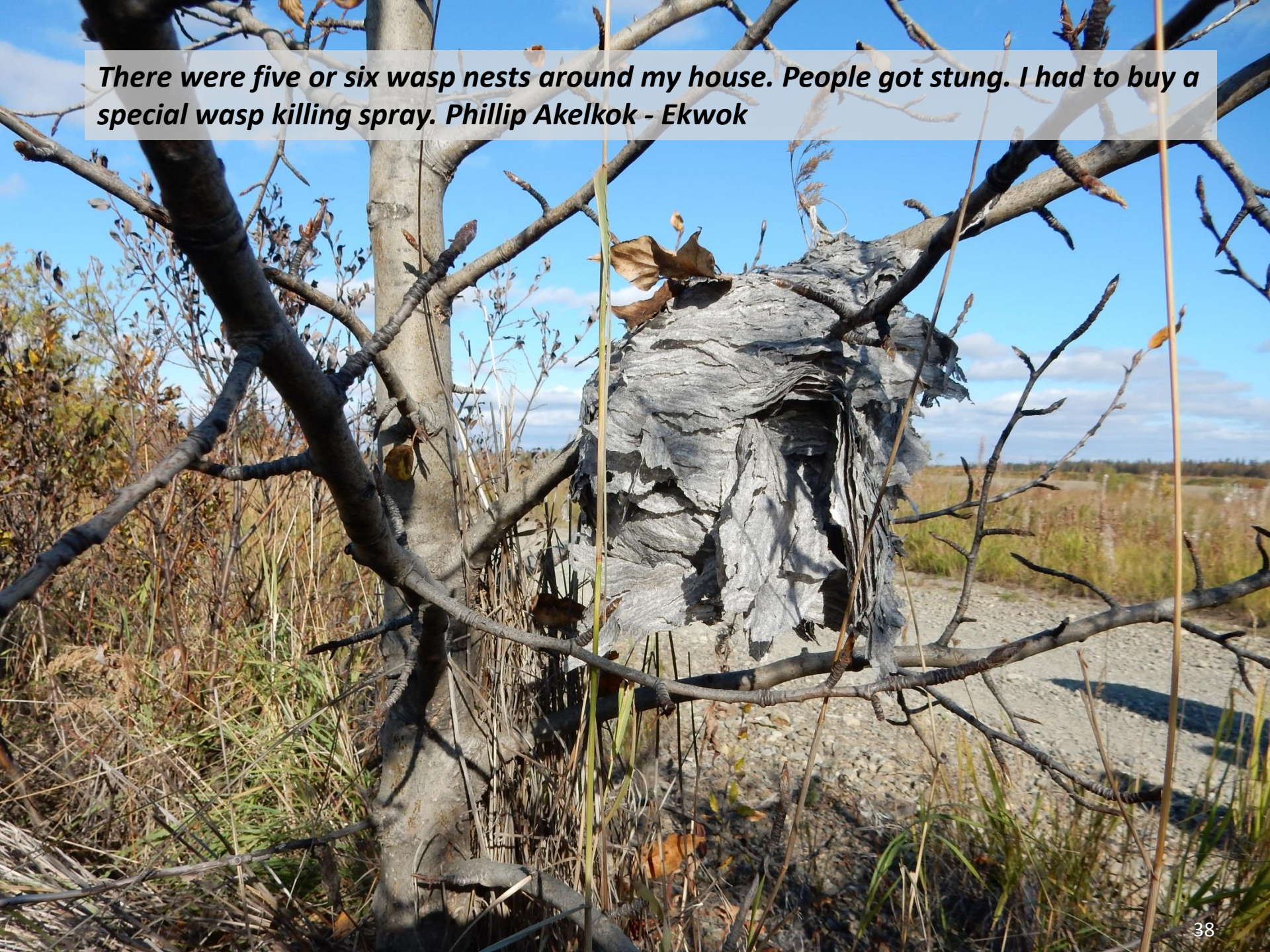


Photo Jake Bell

***There used to be lots of sockeye salmon on the Mulchatna. Now there are fewer. We wonder how temperatures effect the salmon spawning.
Corey Nicoli - Ekwok***



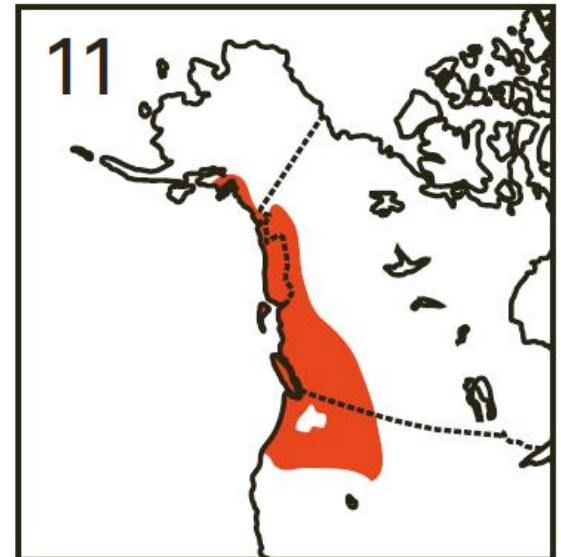
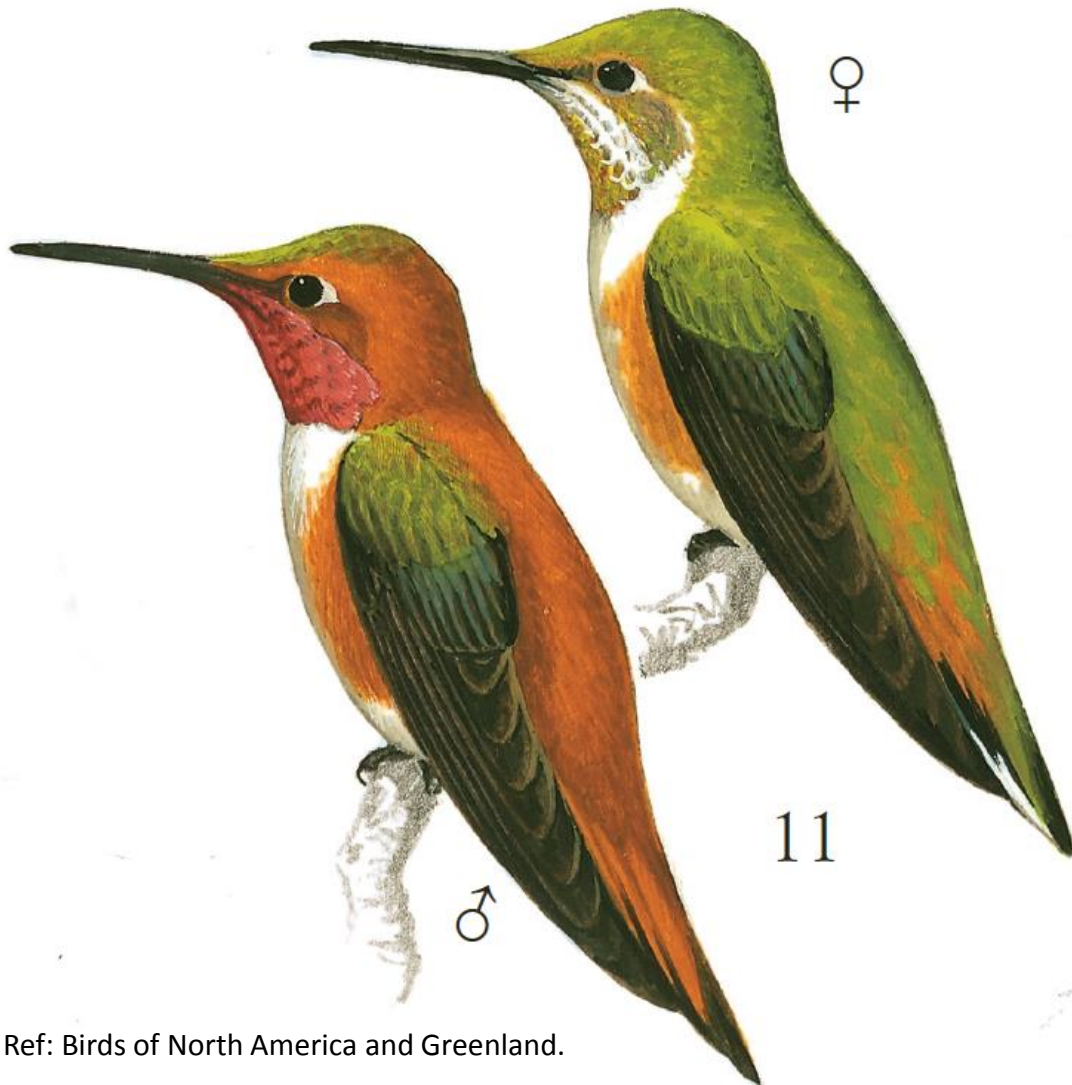
There were five or six wasp nests around my house. People got stung. I had to buy a special wasp killing spray. Phillip Akelkok - Ekwok



We had almost no snow this year, and almost no berries. No salmonberries, no blueberries, no blackberries no cranberries. Sylvia Kazimirowicz - Ekwok



I came to Alaska in 1961 and I have begun to see insects and birds that I have never seen here before. We had a hummingbird in our garden. George Taylor - Ekwok



Ref: Birds of North America and Greenland.

Other activities:

In addition to collecting observation from the three communities, the survey team trained tribal environmental staff and enrolled new members for the Local Environmental Observer (LEO) Network. Three observations were posted to the network: on abundance of wasp hives (Koliganek), parasites in salmon (New Stuyahok) and poor berry harvest (Ekwok). These can be viewed on the [September 2014 LEO Network Map](#).

Tribal environmental staff were trained on the installation and use of time lapse cameras. Cameras were installed in Koliganek and New Stuyahok. Installation of the camera in Ekwok is being performed by tribal environmental staff. All three programs were enrolled into the LEO Network's [Community Camera Project](#).

During the staff and public meetings, briefings were provided about climate change activities in the Bristol Bay region and about Sea Grant technical services and activities. During river and air travel, footage was collected using a GoPro Camera to document environmental conditions and areas that may be affected by climate change.



Above: Mike Brubaker and Delores Larson prep a camera. Below: Delores sites the camera. Right: Cam view.





Findings - Resilience and Vulnerabilities to Climate Change

- Warming is resulting in less winter snow and more rain, lack of river ice, changes in the seasons, and hazardous conditions for travel. Harvest for fishing, hunting and gathering have been delayed or disrupted due to changes in seasonal conditions.
- Changing river conditions is a concern for all communities including bank erosion and land slides from extreme weather (such as rain events), drought, and related low stream levels, and increased difficulty related to barge navigation and travel by large skiffs and commercial fishing vessels stored upriver. Staging areas for skiffs in Koliganek and New Stuyahok are more limited than in past years and there have been low river years where fuel and other barges couldn't make it upriver.
- Changing river conditions is also a concern for salmon health and habitat. Residents report change in salmon runs with declines in some species (sockeye) and increases in others (pinks, silvers, chums). There is less spawning habitat between Ekwok and Koliganek and fish are thought to be declining on the Mulchatna River.
- Changing river conditions such as water depth, water quality, temperature, presence of algae, invasive species and other factors can stress fish and other wildlife including subsistence food resources. Community members were concerned about food safety related to parasites and illness in fish.
- All three communities are well sited with generally good elevation above the river. Flooding has occurred in Ekwok due to ice jams. Risk of spring flooding may decline as there have been fewer hard break ups in recent years.
- There is an ongoing crisis as a result of changes in the Mulchatna caribou herd. Variability in harvest of other resources seems to be increasing. Last year produced a bumper crop of berries. This year the berry harvest was a failure for all four primary species.

Findings - Resilience and Vulnerabilities to Climate Change

- Invasive species include new birds, insects and plants. Climate conditions including mild winters may contribute to an increase in wasps and related increases in insect stings.
- Educating health and medical providers on emerging health issues related to climate change is recommended. Clinic staff may expect to see increases in allergy related respiratory visits.
- Vulnerabilities include food security related to changing harvest conditions of wild foods, economic and social impacts from changing river and ocean conditions, and forest change related to drought.
- Resilience includes new food production due to a longer growing season, to floods (generally) because of good planning and siting of infrastructure at elevations high above river, energy related to firewood harvest, and ample sources of drinking water.
- Positive effects of climate change include a longer growing season, growth of some trees which create habitat and reduce dust in the communities, and lower heating fuel consumption due to warmer temperatures.

We are all specialists here. Everyone has their skills. Some people are really good at fishing, others are really good at hunting. We stay connected with each other and to our land and our culture. Francis Nelson - Koliganek



Conclusion

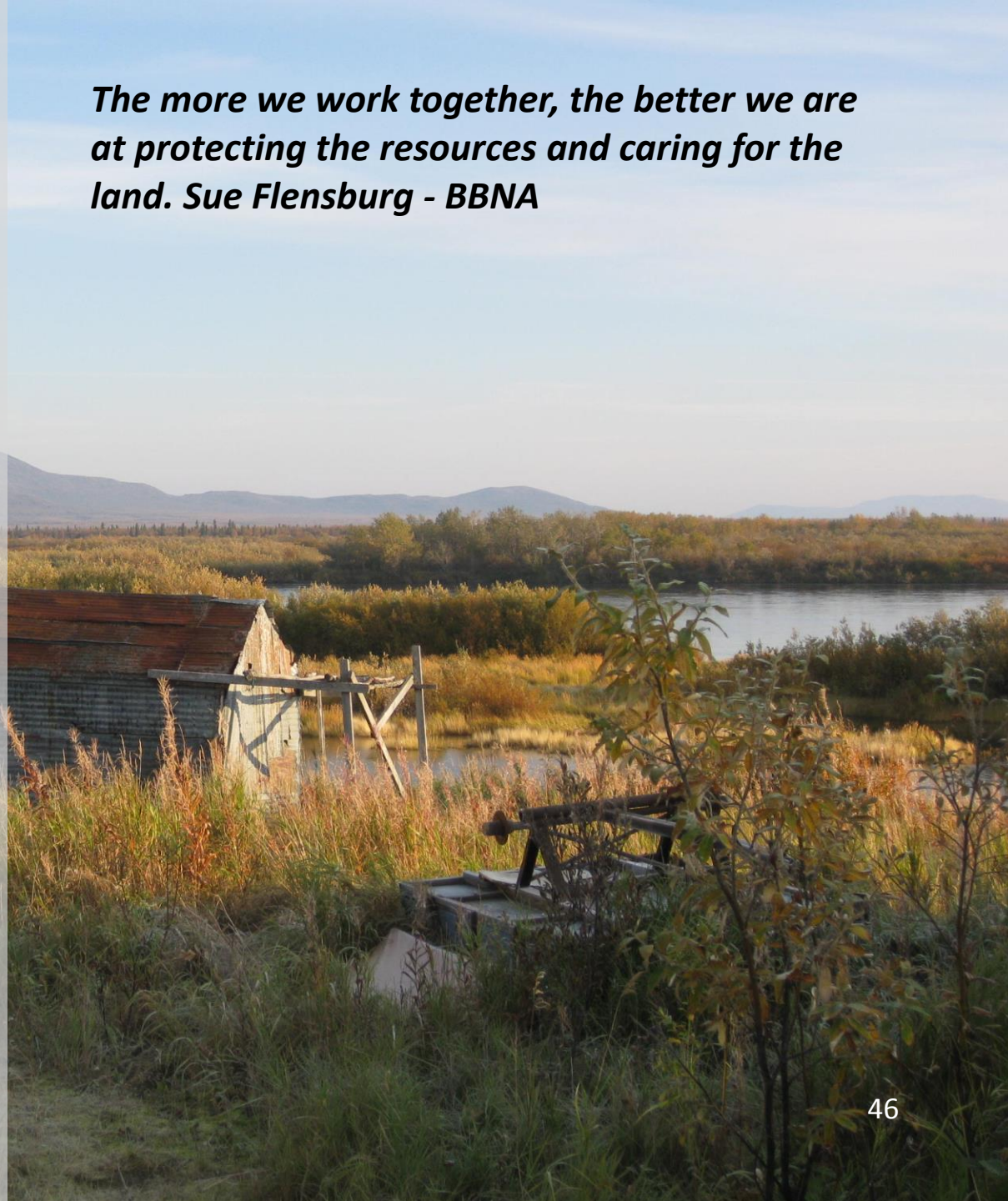
The most comprehensive measure of climate change is the observations of people who live here, travel the trails, watch the weather and harvest food from the land and river.

By listening we are learning the nature of these changes, insights on causes, specific implications, and adaptations that are being developed and used every day.

This report provides a snapshot of conditions and concerns as reported in September of 2014. They include complex observations and insights based on decades of experience and generations of local and traditional knowledge.

It is hoped that this report will help the Upper Nushagak communities and the Bristol Bay region in planning healthy and productive ways to adapt to changing climate and environmental conditions.

The more we work together, the better we are at protecting the resources and caring for the land. Sue Flensburg - BBNA



Koliganek

Anuska M. Hanson
George Nelson
Fevronia Neketa
Frances A. Nelson
Gregory Kapotak Jr.
Delores Larson
Mary Apokedak
Glen "Skin" Wysocki
Pam Johnson
Annie Tunguing

New Stuyahok

Tim Wonhola
Socally Wonhola
Evan Wonhola
Billy Pavella
Moxie Andrew Jr.
Moxie Andrew Sr.
Peter Gumlickpuk
Gabe Andrew

Ekwok

Luki Akelkok Sr.
Pauline Akelkok
Julia Williams
Buck Williams
Phillip Akelkok
Kenny Jensen
Corey Nicoli
Quisto Akelkok
George Taylor
Joseph Kazimirowicz
Sylvia Kazimirowicz
Tom Hurley

Thank you to the residents of the Upper Nushagak for opening your homes, giving your time, and sharing your knowledge.



We would also like to express our appreciation to the U.S. Environmental Protection Agency who funded this project; and the Western Alaska Landscape Conservation Cooperative for supporting community climate change activities in the region.

For more information please contact:

Sue Flensburg
Environmental Department
BBNA
sflensburg@bbna.com
907-842-6241

Mike Brubaker
Center for Climate and Health
ANTHC
mbrubaker@anthc.org
907-729-2464

Gabe Dunham
Alaska Sea Grant
Marine Advisory Program
gabe.dunham@alaska.edu
907-842-8321