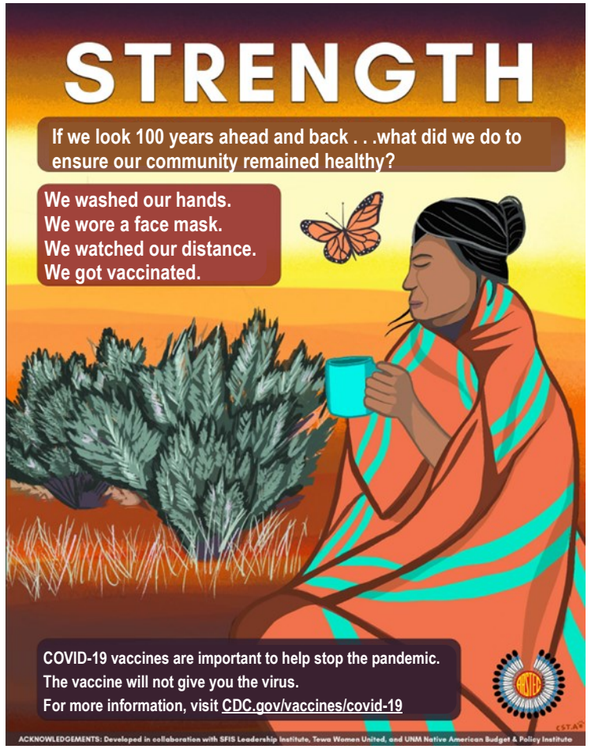
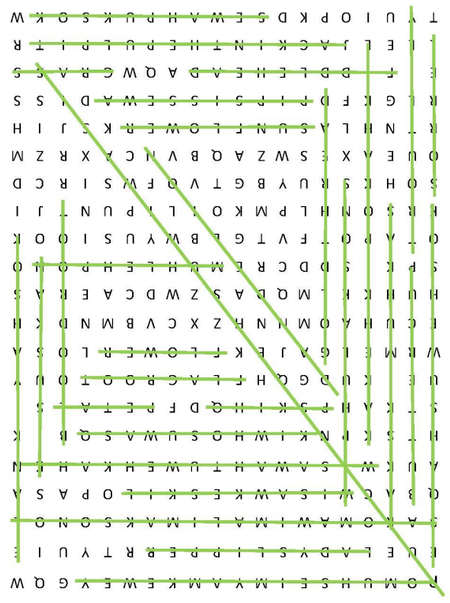
Houlton Band of Maliseet Indians
Natural Resources Department
88 Bell Road
Littleton, ME 04730

PRESORT
STANDARD MAIL
U.S. POSTAGE
PAID
PERMIT #2
HOULTON ME

ADDRESS SERVICE REQUESTED



Puzzle Answers



Siqon - March 2021
Clarissa Sabattis – Tribal Chief
Susan Young - Editor
This newsletter is printed on 100% recycled chlorine free paper

In this Issue

Natural Resources
(207) 532-4273
1-800-564-8524 (Maine only)
1-800-545-8524
Fax 207-532-6883
Environmental Planning
Sharri Venno - ext. 215
Natural Resources
Matthew Edberg - ext. 220
Water Resources
Rhonda Smart ext. 212
Sam St. John - ext. 221
Angie Reed 207-694-0490
Natural Resources
Real Estate Director
Sue Young - ext. 202

Follow us on Facebook

Milestones to Restoring Salmon in the Meduxnekeag River *by Sharri Venno*

><(©)> During the summer of 2020, HBMI completed another stretch of Instream habitat restoration along the main stem of the Meduxnekeag, from just south of Lowery Bridge upstream to the southerly border of Maliseet Riverside Village. This means habitat has been restored along the entire length of the main stem bordered by tribal land! (photo left).

><(©)> This spring, HBMI, Maliseet Nation Conservation Council (MNCC), and our respective federal partners, the US Environmental Protection Agency (EPA) and Canadian Department of Fisheries and Oceans (DFO) will begin another season of collecting very small samples or "fin clips" of tissue from salmon living in a number of tributaries of the Wolastoq/St John, including the Meduxnekeag. We take very good care of the fish we catch (and then release) using special protocols including a natural anesthetic made from clove oil! The tissue samples will be used to study genetic diversity in Wolastoq/St John salmon. This will help us ensure that we don't lose genetic diversity as we make salmon restoration decisions. The Meduxnekeag currently hosts only a very small population of salmon which resides across the border in New Brunswick, Canada.

To increase our chances of collecting enough tissue samples from this population to make the study useful, we plan to install one or two "smolt wheels." A smolt wheel - also called a rotary screw trap (see photo above)

Continued page 2

The World's Forgotten Fishes

Valuing freshwater fish is critical for people and nature. The World's Forgotten Fishes report is a celebration of freshwater fishes - and it's a call to action too.

Rivers, lakes and wetlands are among the most biodiverse places on earth. They cover less than 1% of the planet's total surface, yet they're home to almost a quarter of all vertebrate species - including over half of all the world's fish species.

It's an extraordinary fact: 51% of all known species of fish live in freshwater - 18,075 species. And more are being discovered all the time.

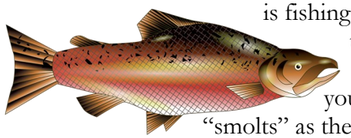
But few people have any idea of the unimaginable diversity that swims below the surface of the world's freshwater ecosystems or how critical these undervalued and overlooked freshwater fishes are to the health of people and nature around the world.

- Freshwater fishes account for almost 1/4 of all the world's vertebrate species;
- Freshwater fishes provide food for 200 million people;
- And livelihoods for 60 million;
- Recreational fishing is valued at over US $100 billion per year;
- But 1/3rd of freshwater fishes are threatened with extinction;
- And 80 species are already extinct.

Promoting thriving populations of freshwater fishes and the ecosystems within which they thrive is a priority for the World Wildlife Fund and the 15 organizations and alliances that produced this report.

To read this report in it's entirety go to:
https://www.panda.org/discover/our_focus/freshwater_practice/the world's_forgotten_fishes/

Restoring Salmon in the Meduxnekeag *(continued)*



is fishing gear that you set in the stream in early spring to catch young salmon or "smolts" as they migrate to the sea.

Stay tuned to learn how successful we are!

Check out past issues of our newsletter for more on these projects. They can be found on our webpage:

naturalresources.maliseets.com/newsletters-2

- **Fall 2017** - Fish Habitat Restoration on the North Branch of the Meduxnekeag River
- **Fall 2018** - Salmon Found in the Meduxnekeag
- **Fall 2018** - Maliseet Nation Restoration of Sea Run Fish in the Beautiful Flowing River
- **Summer 2019** - Fyke Netting For Atlantic Salmon Smolts
- **Winter 2019 -** Salmon Genomics and eDNA

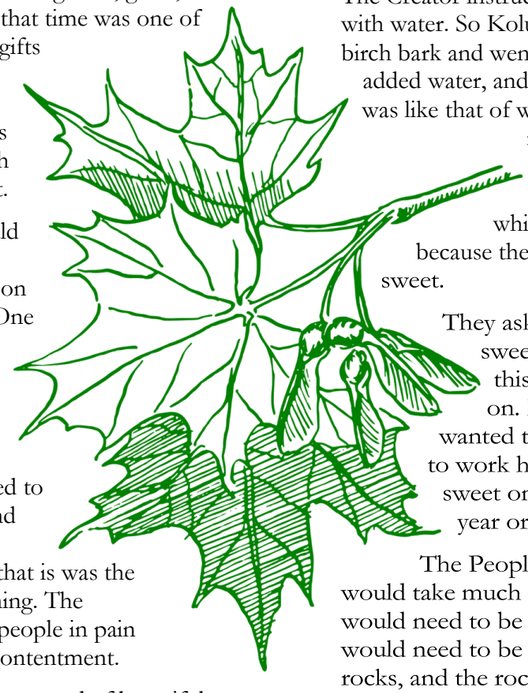
An Old Passamaquoddy Story/Legend About Maple Sap (Sonawop)

Long ago, the Creator made and gave many gifts to the people to help them during their life. The Creator made the lives of the Passamaquoddy People very good, with plenty of food to gather, grow, and hunt. The Maple tree at that time was one of these wonderful and special gifts from the Creator. The sap was as thick and sweet as honey. All you had to do was break the end off of a branch and he syrup would flow out.

In those days Koluskap would travel from native village to native village to keep an eye on the People for the Creator. One day Koluskap came to an abandoned village. The village was in disrepair, the fields were overgrown, and the fires had gone cold. He wondered what had happened to the People. He looked around and around until he heard a strange sound, he could tell that is was the sound of many people moaning. The moaning did not sound like people in pain but more like the sound of contentment.

As he got closer, he saw a large stand of beautiful maple trees. As he got closer still, he saw that all the people were lying on their backs under the trees with the end of a branch broken off and dripping maple syrup into their mouths. The maple syrup had fattened them up so much and made them so lazy that they could barely move.

Koluskap told them to get up and go back to their village and to re-kindle the fires and repair the village. But the people did not listen. They told him that they were content to lie there and enjoy the maple syrup.



When Koluskap reported this to the Creator, it was decided that it was again time that the people needed another lesson to understand the Creator's ways.

The Creator instructed Koluskap to fill the maple trees with water. So Koluskap made a large bucket from birch bark and went to the river to get water. He added water, and he added more water, until the sap was like that of water. Some say he added a measure of water for each day between moons, or nearly 40 times what is was as thick syrup. After a while the People began to get up because the sap was no longer so thick and sweet.

They asked Koluskap "where has our sweet drink gone?" He told them that this is the way it will be from now on. Koluskap told them that if they wanted the syrup again they would have to work hard to get it. The sap would flow sweet only once a year before the new year or spring.

The People were shown that making syrup would take much more work. Birch bark buckets would need to be made to collect the sap. Wood would need to be gathered to make fires to heat rocks, and the rocks would be needed to put in to the sap to boil the water out to make the thick sweet syrup they once were so fond of. He also told them that they could only get the sap for a short time each year so that they would remember the error of their ways.

And so, it is still to this day, each spring the Passamaquoddy remember Koluskap's lesson in honoring the creator's gifts and work hard to gather the maple syrup they love so much.

Special thanks to ***THPO Donald Soctomah*** for his efforts to preserve Passamaquoddy history.

MAPLE SYRUP FUN FACTS

- Native Americans were the first to discover maple syrup
- Maple syrup capital of the world is Canada, with Vermont the highest US producer
- It takes 40 gallons of tree sap to make one gallon of syrup
- Maple isn't used just for syrup

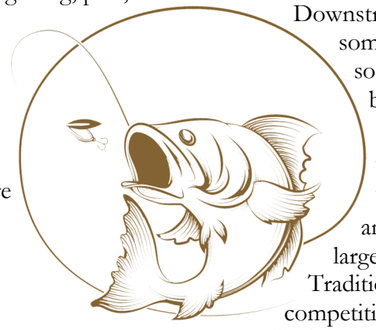
- Maple syrup is more expensive than oil
- You can detect fake syrup using a freezer
- It's full of youthful antioxidants

Check out the website below for more details
https://craves.everybodyshops.com/10-fun-facts-you-never-knew-about-maple-syrup/

Fun Facts about Amazing Atlantic Salmon *continued*

Why are hatcheries raising salmon?

Salmon are raised in hatcheries to supplement natural production in rivers. U.S. Atlantic salmon are endangered and are currently unable to produce enough juveniles under natural conditions in the rivers to support their populations. Therefore, juveniles are raised in hatcheries to various stages (i.e., fry, fingerling, parr, and smolt) to enhance survival at early life stages. Then they are stocked in the rivers so that they can migrate to sea then return to spawn after a few years. Stocking helps maintain endangered populations so they don't go extinct. This gives scientists and managers more time to figure out how to restore thriving populations to Gulf of Maine rivers again.



How many of the young salmon released from hatcheries come back as adults?

From 2010-2015, releases of hatchery-raised Atlantic salmon smolt to supplement natural production in the streams of the Gulf of Maine resulted in adult spawning returns of approximately 0.08-0.71%. This low return rate is the result of numerous factors including high mortality in the river from downstream passage barriers and low marine survival.

Why are fish ladders constructed?

Fish passage is essential for adult salmon to be able to travel upriver to spawn and for salmon smolts to be able to travel down river to reach the sea. A fish ladder, or fishway, is often constructed to help salmon swim upstream around a dam or a natural barrier that might prevent or impede progress to spawning grounds. Downstream passage of migrating smolts and some post-spawned adults past barriers is sometimes provided by constructing a bypass structure or by allowing sufficient amounts of water to spill over a dam.

What Was the Presidential Salmon?

Before the decline of Atlantic salmon, anglers competed annually to land the largest spring salmon. The Presidential Salmon Tradition was born out of a Penobscot River competition when, in 1912, Karl Anderson sent his winning 22-pound salmon to President Taft. The tradition was suspended due to low salmon abundance in 1992. President George H. W. Bush was the last President to receive a Presidential salmon.

For more information about salmon or other fun facts check out:

https://www.fisheries.noaa.gov/national/outreach-and-education/fun-facts-about-amazing-atlantic-salmon

In case you haven't heard the news, HBMI's Natural Resources Department is moving out of Administration to it's own building!

Our new offices are located up on the hill by the big red barn overlooking the Recognition Day Field. The structure is made up of 8 recycled shipping containers set on a full concrete foundation. It's still being finished but we hope to be moving in soon! Our telephone numbers and emails will remain the same so you will still be able to reach us.

Here are some pictures of the building in progress.

Top photo shows main entrance looking towards the west. It looks a bit different now.

Bottom photo shows south end of building. It is being prepped for siding. Once we're in we'll share pictures of the finished building.

Stay tuned!

Skitkomiq 2021

As you know 2020 was a year full of cancellations, social distancing, and more. Unfortunately we were not able to hold our annual Skitkomiq Culture & Science Camp. The good news is we're working on a plan to make this year's camp better than ever.

We are putting together a camp with both virtual and in person activities for tribal members aged 10 to 15. All in-person activities will adhere to Covid-19 guidelines.

What we need from you are ideas for to what we should include in this year's camp.

In the past we've featured :

- Fish activities
- Stories with tribal elders
- Native crafts
- Various Water Quality Activities
- Medicinal Plants and tree identification
- Archaeology
- Canoeing
- Harvesting Ash
- And more . . .

For more information about the camp, to sign up or suggest some activities, please reach out to

Rhonda Smart 207-541-4838 or **smart@maliseets.com**
Sam St. John at 207-267-0911 **sstjohn@maliseets.com.**

You can also reach out to us via our Facebook page.

Spring Word Search Puzzle

Find the hidden Maliseet and English words in this puzzle at right

Maliseet	English
Elankiyahsok	Petal
Kakehkipokahkil	Pipsissewa
Kakskimuhkas	Iris
Kisuskan	Sunflower
Kiwhosuwasq	Flagroot
Mahsus	Fiddlehead
Muhlehpon	Trout Lily
Pesqahsuwehsok	Flower
Pomuhseimyamkewey	Dandelion
Pskihq	Grass
Pukcinsqehsuwi-wasis	Jack in the Pulpit
Sakomawi-Mali Maksonol	Lady Slipper
Sewahpuksok	Sorrel
Wiphulaksons	Bloodroot
Wisawahtuwehkahk	Buttercup
Wisawkeskil	Goldthread

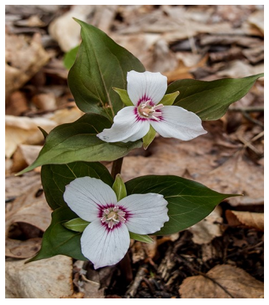
P	O	M	U	H	S	E	I	M	Y	A	M	K	E	W	E	Y	G	Q	W
E	U	E	L	A	D	Y	S	L	I	P	P	E	R	R	T	Y	U	I	E
S	A	K	O	M	A	W	I	M	A	L	I	M	A	K	S	O	N	O	L
Q	B	A	C	W	I	S	A	W	K	E	S	K	I	L	O	P	A	S	A
A	U	K	W	I	S	A	W	A	H	T	U	W	E	H	K	A	H	K	N
H	T	S	K	P	N	K	I	W	H	O	S	U	W	A	S	Q	B	I	K
S	T	K	A	H	P	S	K	I	H	Q	D	F	P	E	T	A	L	S	I
U	E	I	K	U	D	G	Q	H	F	L	A	G	R	O	O	T	O	U	Y
W	R	M	E	L	G	A	J	E	K	F	L	O	W	E	R	L	O	S	A
E	C	U	H	A	O	M	N	N	H	Z	X	C	V	B	M	N	D	K	H
H	U	H	K	K	L	M	Q	D	A	S	Z	W	D	C	A	E	R	A	S
S	P	K	I	S	D	D	C	R	E	M	U	H	L	E	H	P	O	N	O
O	T	A	P	O	T	F	V	T	G	L	B	W	Y	U	S	I	O	O	K
K	R	S	O	N	H	L	P	M	K	O	I	L	I	P	U	N	T	J	I
S	O	H	K	S	R	U	Y	B	G	T	V	O	F	W	S	I	R	C	D
O	U	E	A	X	E	S	W	Z	A	Q	B	V	N	C	A	X	R	Z	M
R	T	N	H	L	A	S	U	N	F	L	O	W	E	R	K	S	J	I	H
R	L	G	K	F	D	P	I	P	S	I	S	S	E	W	A	D	I	S	S
E	I	F	I	D	D	L	E	H	E	A	D	A	Q	W	G	R	A	S	S
L	L	E	L	J	A	C	K	I	N	T	H	E	P	U	L	P	I	T	R
T	Y	U	I	O	P	K	D	S	E	W	A	H	P	U	K	S	O	K	W

Spring Ephemerals - Spring What???

Spring is here - at least that's what the calendar says. As the snow melts get ready to start hunting Maine's native woodland wildflowers. But don't wait too long, a lot of these beauties come and go in a flash and you'll miss them.

So just what is a spring ephemeral? According to Wikipedia an ephemeral plant is one marked by short life cycles. The word ephemeral actually means transitory or quickly fading. Therefore the term, spring ephemeral, refers to perennial plants that emerge quickly in the spring and die back to their underground parts after a short growth spurt and reproduction phase. Some medicinal plants such as goldthread and bloodroot are considered ephemerals.

These plants and flowers emerge quickly when the sun begins baking the bare earth before the surrounding trees and shrubs start absorbing all the light from the sun. Some flowers are not the flashiest blossoms around but with a little searching you'll be treated to a variety of shapes, sizes and colors. Some like the Red Trillium put out fairly large red flowers, while the Trailing Arbutus puts out tiny pinkish white flowers at ground level.



While these flowers are beautiful, it is best to enjoy them where you find them. Most blooms do not survive very long and the simple act of picking them can kill the plant or keep it from flowering for many years. Many of these ephemerals are also considered medicinal plants and should only be harvested under the guidance of an elder or medicine person.

This is by no means a list of all the ephemerals you might find in and around Maine, it's a list of those you're most likely to see. Some favorites found on tribal lands are:

Fly Honeysuckle (*Lonicera canadensis)* is a native plant that looks a bit like a widespread invasive Asian variety, which is also found in Maine. It's fairly common and likes to grow on clearing edges where it can get some sun. Fly honeysuckle blooms earlier than the non-native cousin with white tubular flowers. The local variety has a round stem. The invasive honeysuckle has a stem that is more square.

It's an important wildflower species. Hummingbirds like it. It's an important food for bees who like it because it comes out earlier than other flowering plants. After blooming the plant has little red berries that are eaten by many birds such as robins, goldfinches, catbirds, turkeys and ruffed grouse. (*photo bottom right*)

Red Trillium (*Trillium undulatum)* is a common sight in the early Spring. They usually appear about the time robins return each Spring. It's pretty flower gives off a nasty stench to draw in the flies that are needed to pollinate it. That's how it gets the nickname Stinking Benjamin or Wet Dog Trillium. You may also know it as Purple Trillium and Red or Purple Wakerobin. (*photo top right*)

Painted Trillium (*Trillium erectum)* is a cousin of the red trillium is much daintier than the red and is often referred to as the Smiling Wakerobin. As with all trillium they are made up of threes - 3 leaves and 3 petals for each blossom. (*photo bottom left*)

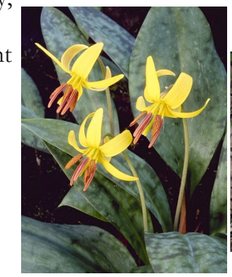
Trailing Arbutus (*Epigaea repens)* is sometimes called a Mayflower in Maine, and is one of the earliest wildflowers to bloom in Maine. The small, fragrant flowers are everywhere and once you know what to look for, they are easy to find. They like well-drained, slightly acidic soils found in any pine forest. The leaves are large, evergreen and leathery. (*photo top left*)

Wood Anemone (*Anemone quinquefolia)* grows on the forest floor in thick bunches. It is sometimes known as "windflower" because the slightest breeze makes it tremble. The small white flowers stay shut on rainy days and at night. Below the flower, there's usually a whorl with three branches bearing three leaves apiece. A whorl is the central location where stems sprout. *(photo bottom right)*

Continued page 9

Spring Ephemerals *(continued)*

Sessileleaf Belwort *(Uvularia sessifolia)* is common in Maine. It is a member of the lily family with yellow flowers that hang down toward the ground. Bellwort can be found in forests all over the eastern half of the United States. They are not very showy, you may have walked by them many times without spotting them. This plant also goes by a number of common names such as Straw Lily, Wild Oats and Merrybells. (*Photo middle right)*



Dwarf Ginseng *(Panax trifolius)* looks like a miniature version of its cousin, American ginseng. The American strain has medicinal value while the dwarf does not. It prefers to grow in damp areas. The flowers are tiny, just a few millimeters wide, lasting just over a week. *(Photo bottom left)*

Trout Lilies *(Erythtonium americanum)* are named for their mottled brown leaves, that resemble brook trout. They have the typical lily shape with large leaves and a single, central flower that points to the ground. They're a very short-blooming lasting no more than a week or two. Trout lilies also go by a number of names including Yellow, American or Eastern Trout Lily, Yellow Dogtooth Violet and Adders Tongue. *(photo top left)*

Goldthread (*Coptis trifolia)* gets its name not from its blooms but from its bright yellow roots. Many Native Americans chew the root to treat mouth sores, thereby giving it the nickname canker root. It is also sometimes used as an eyewash. It has little white flowers and is related to the buttercup. *(photo bottom right)*

Bloodroot *(Sanguinaria canadensus)* gets it's name from it's orange rhizome and the reddish sap that oozes from the roots when broken. You may have noticed bloodroot blooming when you are heading to your favorite fiddlehead spots since it likes to grow in moist woods. *(Photo top right)*

Hobblebush *(Viburnum lantanoides)* is not actually a spring ephemeral wildflower. It's a woodland shrub with dramatic large white flower clusters that bloom before other shrubs put out their leaves. It is often seen growing along dirt roads and well-trodden trails. The white flowers have large sterile, bee attractive flowers on the outside and smaller blooms with stamen and pistil on the inner side of the cluster. It is a favorite browse for both moose and deer. Hobblebush gets its names because its low lying branches tend to root where they touch the ground creating loops to trip on. Hikers have also used it as emergency toilet paper due to it's extra large sturdy leaves. *(photo middle left)*

For more information on spring ephemerals or wildflowers in general check out the websites listed below:

www.maineaudubon.org/news/elementary-connections-spring-wildflowers

www.wildflower.org/collections/collection.php?collection=ss_02

https://en.wikipedia.org/wiki/Ephemeral_plant)

All photos in this article are courtesy of the Lady Bird Johnson Wildflower Center www.wildflowers.org

Individual Photo credits are as follows:

Bennie Bengston - *Wood anemone and Sessile Bellwort*
Stephanie Brundage - *Painted Trillium*
Alan Cressler - *Dwarf Ginseng and Fly Honeysuckle*
Lynn Crosby Gammill - *Bloodroot*
Thomas Muller - *Hobblebush*
Christine Orr - *Trailing arbutus*
Doug Sherman - *Trout Lily and Red Trillium*
R.W. Smith - *Goldthread*

Fun Facts about the Amazing Atlantic Salmon *continued*

What eats Atlantic salmon?

In freshwater, juveniles are eaten by a variety of fish (smallmouth bass, striped bass, Northern pike, slimy sculpin, etc.), birds (kingfisher, double-crested cormorant, mergansers, osprey, blue heron, snowy egret, etc.), and mammals (otter, mink, etc.).


Salmon tagged and ready for release


Hatchery salmon smolt

In the ocean, Atlantic salmon are eaten by:

- Large predatory fish like Atlantic halibut, Atlantic bluefin tuna, swordfish, and striped bass.
- Greenland shark, mako sharks, porbeagle sharks, and other sharks.
- Seabirds such as the Northern gannett.
- Various seals (harp, grey, harbor, etc.).
- Toothed whales like killer whales, dolphins, and porpoises.

Atlantic salmon are also caught for consumption by humans in targeted aboriginal or traditional First Nations fisheries.

How large do salmon get?

The largest Atlantic salmon was 105 pounds and 60 inches. However, depending on how long they are at sea, adults returning to the Gulf of Maine rivers typically weigh approximately 7-12 lbs. and are 28-32 inches long after 2 years at sea.

What is the oldest known age of Atlantic salmon?

The maximum recorded age was 13 years old, but most Atlantic salmon that survive to reproduce live 5 to 8 years (1-7 years in fresh water, 1-6 years in the marine environment).

Do salmon return to spawn in freshwater areas where they were born?

Almost always. While some straying has been documented, most spawning salmon return to the river in which they were born and sometimes they even home to the very stream of their birth.

How many eggs do Atlantic salmon have?

Generally from 2,500 to 7,000 depending on the size of the female (larger females have more eggs), or about 600 -800 eggs per pound of body weight.

What is the ESA and how does it relate to salmon?

The Endangered Species Act (ESA) is a law passed in 1973 that provides for the protection and conservation of species that are at very high risk of going extinct. Atlantic salmon populations in the Gulf of Maine are listed as endangered under the ESA. This means that they are in danger of extinction throughout all or part of their range. Before construction of dams in the early 1830s, more than 100,000 Atlantic salmon returned to U.S. rivers each year; now adult returns are usually less than 1,000.

Why are there so few Atlantic salmon left in New England rivers?

There are many reasons why U.S. Atlantic salmon population abundances are so low. There are three primary causes:

- **Habitat degradation**

Centuries of industrialization on New England rivers (e.g., paper and textile mills, deforestation of riparian areas and log drives) has resulted in the degradation of a lot of the fishes' spawning and rearing habitat, effectively reducing the productive capacity of our rivers.

- **Barriers to migration:** Barriers, such as dams and hydroelectric power plants, and poorly designed culverts at road crossings can delay or prevent juvenile salmon swimming downstream and adults swimming upstream. This can make it difficult or impossible for them to reach the habitats they need to survive.

- **Marine survival:** Recently, fewer Atlantic salmon have survived their journey to the Northwest Atlantic. Potential drivers include harvest, starvation (via thermal habitat and food food-web changes), predation, and disease.

Continued page 10

EPA Science Matters

Working with Tribal Partners to Restore Fisheries in Northern Maine

Native American tribes in Maine have traditionally fished migrating and resident fish species, including Atlantic salmon, as a key part of their diet. However, over time, these traditional practices have been negatively impacted by industrial development which has caused decreasing water quality, loss of fish habitat, and obstacles to fish migration pathways. Additionally, interbreeding wild Atlantic salmon with less genetically-diverse domesticated and farm-raised salmon has caused reduced fitness and adaptability of wild Atlantic salmon. The decline, and in some cases the elimination, of these important fish populations has meant the loss of a central component of tribes' traditional diet.


Cara O'Donnell and Sam St. John, Houlton Band of Maliseet Indians and Ross Jones and Robert Beaumaster, Department of Fisheries and Oceans Canada, setting fyke netting in the Meduxnekeag River.

Atlantic salmon are culturally significant to the Maliseet people whose ancestors have fished and lived along the St. John River (or Wolastoq in the Maliseet language) for thousands of years. The Meduxnekeag River is an important tributary in the St. John River Watershed that begins at the Meduxnekeag Lake in northern Maine and joins with the St. John River near Woodstock, New Brunswick Canada. The Meduxnekeag River runs adjacent to the Houlton Band of Maliseet Indians (HBMI) Trust Lands and is a vital tribal resource. One of the primary missions of the HBMI is to restore Atlantic salmon to the Meduxnekeag River.


Tina MacFarlane, Oromocto First Nation, taking the length and weight of the Atlantic salmon before the fin clip, Nashwaaksis Stream, New Brunswick

Sharri Venno, an environmental planner for the HBMI, describes the importance of the Atlantic salmon, "The loss of Atlantic salmon and other sea run fish to the Houlton Band of Maliseet Indians - from the damming of the Meduxnekeag River in the 1800's, the construction of Mactaquac Dam on the Wolastoq/St John in 1968, to the ongoing impacts of climate change- has represented an ever-increasing loss of sustenance, of traditional practices, and of spiritual ceremonies. Ultimately it is a cultural loss of relationship between the tribal community and sea run fish that I can't put into words. Restoring that relationship through the return of these fish to tribal waters will be of immeasurable value to the Tribe and their efforts to sustain the health and welfare of our community and cultural lifeways."


Damon Reynolds (left) and Sebastian Walton (right), Houlton Band of Maliseet tribal members, electrofishing in a tributary of the Wolastoq River.

The HBMI has taken significant steps towards the restoration of salmon in the watershed, including conducting water quality monitoring, restoring aquatic habitats and ecosystems, and partnering with EPA and other federal agencies to perform fish habitat assessments. In 2018, the HBMI conducted an environmental DNA (eDNA) presence/absence study of salmon within the watershed. Results confirmed the presence of Atlantic salmon occurred only on the Canadian tributaries of the Meduxnekeag River, underscoring the importance of continued restoration efforts.

EPA researchers are working in collaboration with the HBMI, as well as with the Maliseet First Nations in Canada, to help restore and reclaim their heritage of a thriving Atlantic salmon fishery in the St. John River Watershed and the Meduxnekeag River. By leveraging knowledge from key Atlantic salmon researchers and genetic experts who are working as partners on the project, the HBMI can gain valuable information and resources on the Atlantic salmon population in the Meduxnekeag River and avoid expensive and time-consuming hit-or-miss trial-and-error breeding efforts.

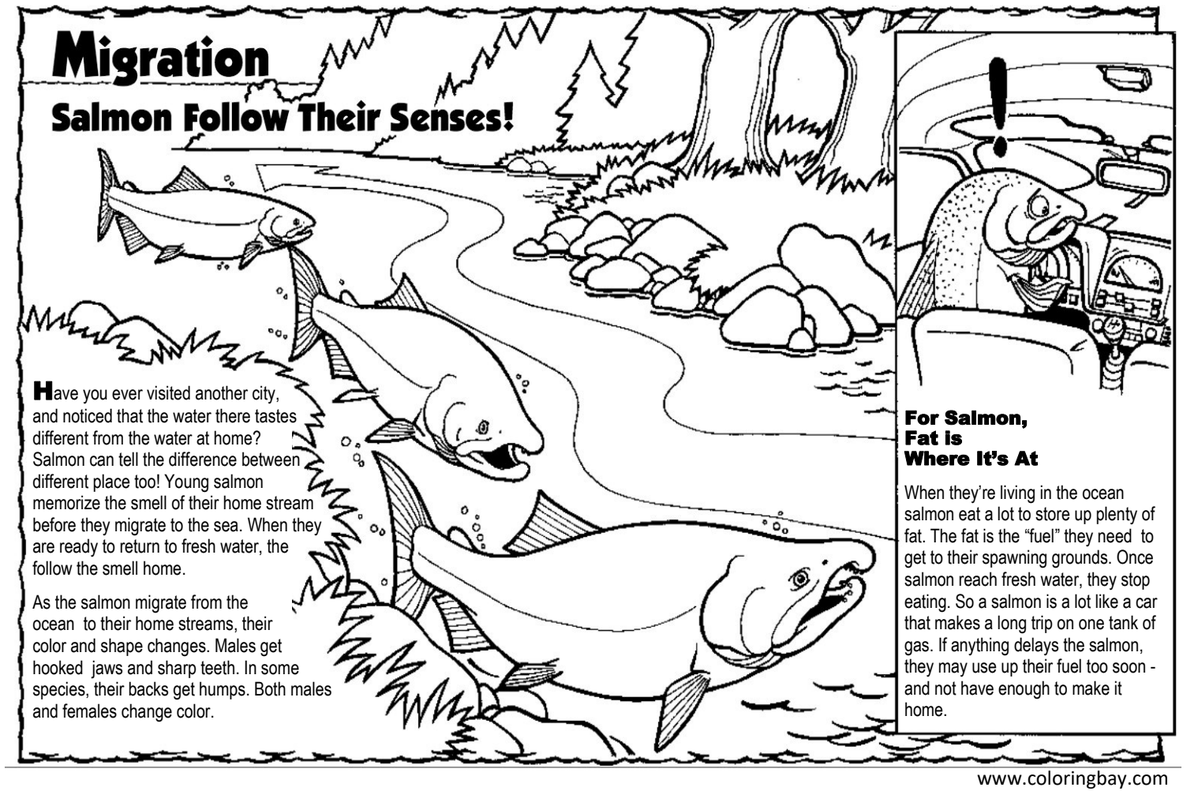
Continued page 6

EPA Science Matters *continued*

On EPA's role in this collaborative research effort, Deb Szaro, EPA Acting Regional Administrator for Region 1, says "By initiating and facilitating this research project, EPA plays a pivotal role in the restoration of Atlantic salmon in the St. John River and furthers the efforts of the cross-boundary Wolastoq watershed restoration collaboration by convening tribal, federal, state and international partners to construct a genetic diversity mapping of salmon within the river system."

To enable more effective Atlantic salmon preservation and restoration efforts by tribal, state, federal, and international partners, EPA is collaborating closely with the HBMI, the Maliseet Nation Conservation Council, US Fish and Wildlife Service, the National Oceanographic and Atmospheric Administration, Division of Fisheries and Oceans - Canada, and the University of New Brunswick, to create a cloud-based Population Diversity Database. The Population Diversity Database housing the data of genetic analysis of fish tissue samples will be used to establish routine genetic assessment of Atlantic salmon tissue and provide key information on natural diversity. Having a database of genetic information on salmon in the watershed creates the ability to consistently choose the genetic strain of salmon that has the greatest chance of survival and the closest genetics to current Atlantic salmon populations present in the Canadian side of the Meduxnekeag River while promoting the genetic diversity necessary to re-establish and maintain the native salmon population. The data will provide valuable information for live gene banking, captive rearing, and release of salmon into tributaries with limited or nonexistent salmon populations. Using the genetic information in the Population Diversity Database, the HBMI will be able to reliably select tributary-specific salmon to restore to the Meduxnekeag River. The database and genetic information will help to advance efforts to increase biodiversity and continue restoration throughout the entire St. John River watershed and others along the Atlantic coast. In addition to informing ongoing restoration efforts, the development of the Meduxnekeag-specific genetics database will provide the HBMI with information to help inform the development of next steps in the overall salmon restoration plan for the Meduxnekeag River.

www.epa.gov/science matters/working-tribal-partners-restore-fisheries-northern-maine



www.coloringbay.com

Fun Facts about the Amazing Atlantic Salmon

An endangered species, Atlantic salmon are now being raised in hatcheries and outfitted with satellite tags to keep track of their migration patterns.

What's the difference between Atlantic and Pacific Salmon?

The Atlantic salmon is actually one species within the genus Salmo. There are seven different species of Pacific salmon, which belong to the genus Oncorhynchus.

Atlantic salmon generally don't live long after spawning but are capable of surviving and spawning again. Most Pacific salmon die shortly after spawning, with the exception of steelhead.


Atlantic salmon

Where do Atlantic salmon live?

Atlantic salmon used to be found from Long Island Sound to New England, but those populations no longer exist in these rivers. Currently U.S. Atlantic salmon are only found in a handful of rivers in Maine.


Atlantic salmon

Why do salmon go to sea?

Atlantic salmon go to sea to grow. The energy content and abundance of food in the ocean is much higher than in freshwater, so fish are able to grow very big, very quickly. This is important because larger fish are less likely to be eaten and the females have more eggs. A lot of eggs are needed to produce enough juveniles that will grow to maturity and return to spawn and sustain the population.

When do Atlantic salmon migrate to the ocean?

Young Atlantic salmon (called "smolts") migrate to sea every year in the spring. The "smolt run" in the Gulf of Maine begins in the middle of April and is over by the beginning of June. Due to regional climate impacts, the smolt run is starting earlier than in the past. The run begins later at northern latitudes.

How old are Atlantic salmon when they migrate from freshwater to the ocean?

Atlantic salmon smolt are usually 2-3 years old when they begin their migration in U.S. waters, but migrating smolt are often older at higher latitudes.

Where do Atlantic salmon go in the ocean?

North American Atlantic salmon migrate in the spring from the rivers where they were born. They move into the Labrador Sea for their first summer, autumn, and winter. The following spring they move to the coastal waters of Labrador and the Canadian Arctic, West Greenland, and sometimes to the waters of East Greenland. After a second winter at sea, adults from many populations are large and mature enough to spawn, and they migrate back to freshwater areas to reproduce.

What is a landlocked salmon?

A landlocked Atlantic salmon is a freshwater form of the sea-run Atlantic salmon. They are genetically considered a subspecies of the sea-run Atlantic salmon. They reside in lakes, never making the marine migration. They generally do not grow as large as sea-run fish, averaging between 12 and 20 inches long.

What do Atlantic salmon eat?

In fresh water, young salmon mostly eat small insects such as mayflies, stoneflies, caddisflies, blackflies, and riffle beetles. Sometimes they eat small amphibians and fish.

When they're in the ocean, young and adult salmon eat a wide variety of prey, including:

- Fish such as capelin, Atlantic herring, sand lance, barracudina and lanternfish.
- Crustaceans such as amphipods and euphausiids or "krill."
- Cephalopods like squid and octopus.
- Polychaete worms.

Just before adults migrate to estuaries to begin the spawning migration, they stop eating altogether.

Continued page 8