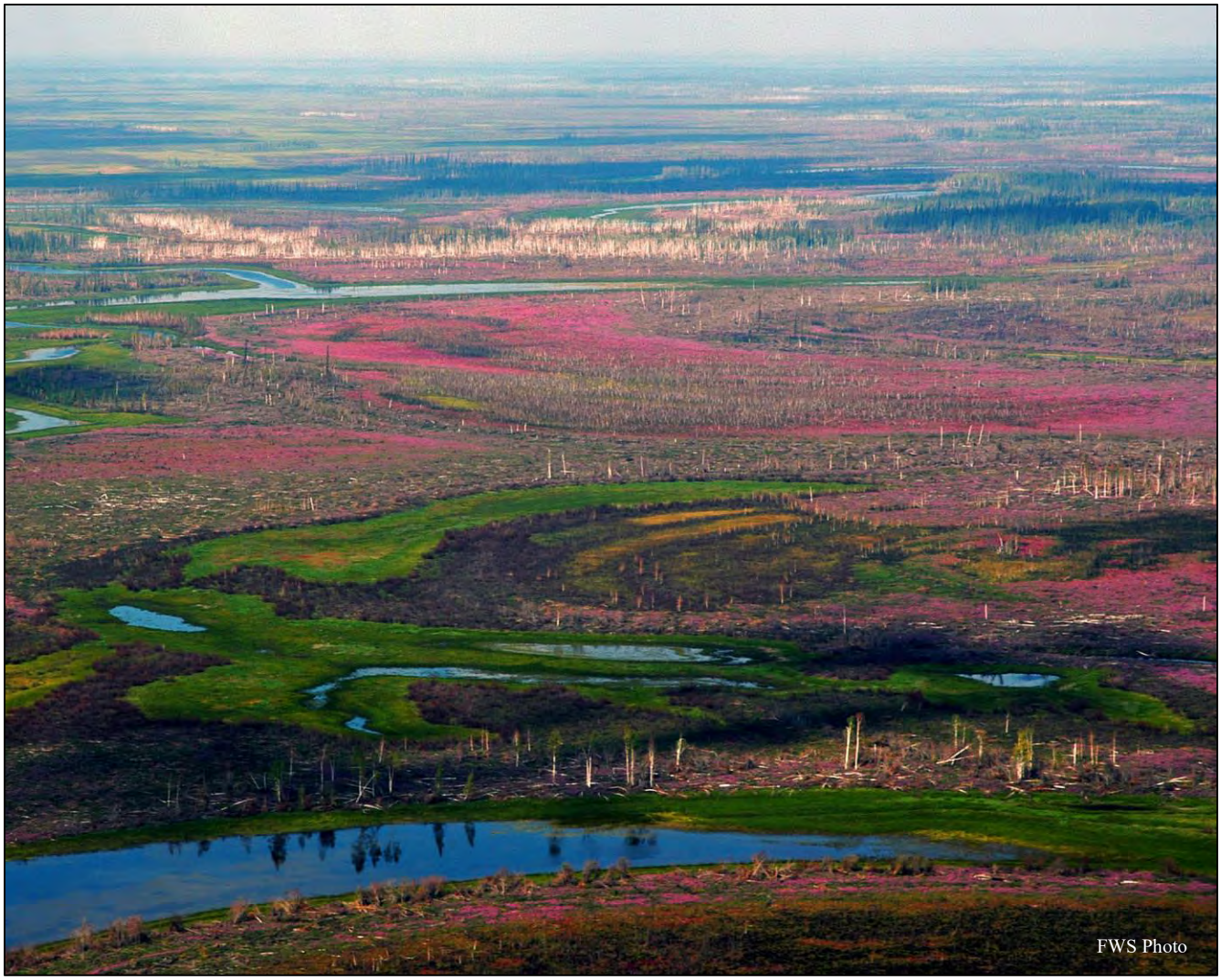
Yukon Flats National Wildlife Refuge

Annual Staff Report

October 2021 – September 2022



Refuge Overview

The Yukon Flats Basin is a world-renowned breeding ground for waterfowl. It is also home to over 1,200 Dené people who have occupied these lands for thousands of years. Encompassing this basin, Yukon Flats National Wildlife Refuge (Refuge) was created in 1980 by the Alaska Native Interest Lands Conservation Act, *aka* ANILCA. The law established the following purposes:

1. to conserve fish and wildlife populations and habitats in their natural diversity including, but not limited to, canvasbacks and other migratory birds, Dall sheep, bears, moose, wolves, wolverines and other furbearers, caribou (including participation in coordinated ecological studies and management of the Porcupine and Fortymile caribou herds) and salmon;
2. to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
3. to provide, in a manner consistent with the purposes set forth in (1) and (2), the opportunity for continued subsistence uses by local residents; and
4. to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (1), water quality and necessary water quantity within the refuge.

The Refuge is the nation's third-largest national wildlife refuge. The external boundaries encompass approximately 11.1 million-acres of land with 8.63-million acres in federal ownership. Extending 220 miles east-west along the Arctic Circle in east-central Alaska, the Refuge lies between the Brooks Range Mountains to the north and the limestone peaks of the White Mountains to the south. The Trans-Alaska Pipeline corridor runs just outside of the western boundary while the eastern boundary extends to within 30-miles of the Canada border. The Yukon River sculpts the vast floodplain of lakes, ponds, and streams that dominate the landscape.

To fulfill refuge purposes, the staff focus much of their efforts on monitoring the status of animals and habitat that are important from a local, national and global perspective. Maintaining an open dialog with local residents is a priority. Through a diverse program of biology, education, outreach, and enforcement, staff partner with others to conserve these important resources.

This report is a brief summary of staff activities and items of interest occurring between October 2021 and September 2022.

A Changing Environment

"I notice brush growing around the drying lakes...The weather now is more unpredictable...It affects hunting and gathering and the collection of traditional foods." *Randy Mayo, Stevens Village Tribe*.

"Rivers are eroding and getting wider and shallow." *Chief Eddie Frank, Venetie*.

"Too many fires. There are some areas [that are] unrecognizable." *Linda Wells (photo left), Fort Yukon*.

Local residents are experiencing profound environmental change across the Yukon Flats ranging from extreme weather events and deviations from the historical climate including:

- increasing average annual temperatures with winters warming 8.8° F since 1950;
- more icing events;
- increasing vegetation growth;
- lengthening growing season;
- earlier river breakup and later freezeup;
- drying of many wetlands and expansion of others;
- earlier nesting by some waterfowl species;
- increasing fire size and frequency;
- loss of access to feeding habitat for whitefish; and
- movement of uncommon waterfowl species into the region.

Many of you have noticed these and other changes firsthand. How are these changes affecting physical and biological systems? How can we identify current and anticipated impacts and adapt to these changes? These are complex questions that will require research and discussion with everyone that values the land.

Refuge staff takes this issue seriously. Last year we produced an outreach bulletin that was mailed to every boxholder on the Yukon Flats and our permittees and partners, including the Eastern Interior Regional Advisory Council. The report "Yukon Flats Changing Environment," was developed in partnership with CATG and the International Arctic Research Center, University of Alaska Fairbanks. The bulletin provides perspectives of local residents and information from researchers and Refuge staff. Check out the report at: https://bit.ly/3ezAX76.

Projects

Moose Population Status

Moose surveys are conducted about every three years on the Yukon Flats. The most recent surveys conducted in the eastern and western Yukon Flats were in 2015 and 2018, respectively. A November survey is scheduled for the western Yukon Flats in 2022 and will be coordinated with the Village of Beaver. A moose population survey will be conducted in the eastern Yukon Flats potentially in 2023.

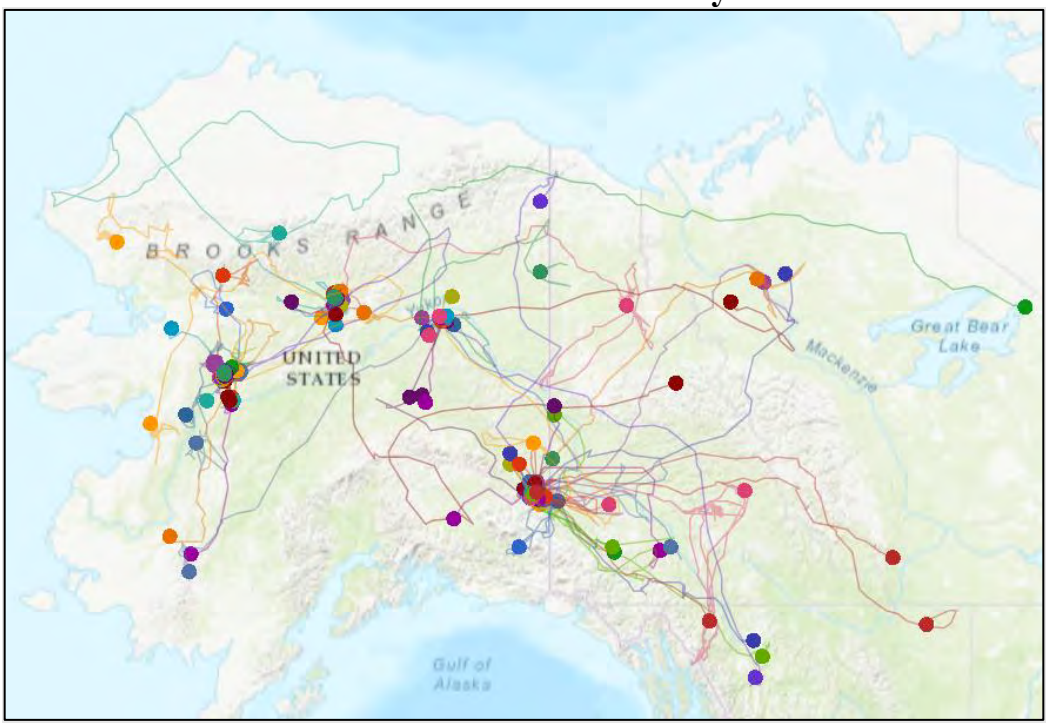
Sheep Survey

A partial White Mountains sheep survey was completed in July 2022 by ADF&G. Overall counts of rams, ewes and lambs were lower than the long-term average. Final results are pending.

Lynx Movement Study

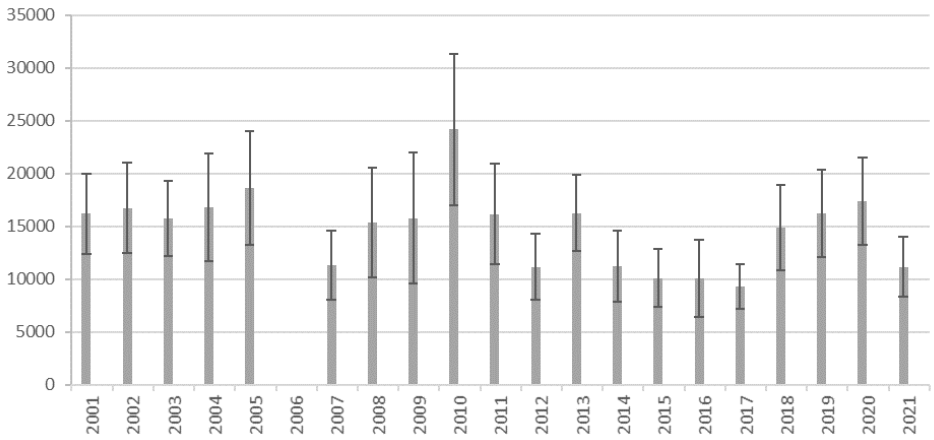
In March 2022, staff completed a sixth year studying lynx movement patterns, dispersal behavior, and survival in relation to snowshoe hare abundance. Lynx numbers decreased significantly in 2020 and staff have not live-captured a lynx since 2020. Capture operations related to this study also occurred in Tetlin National Wildlife Refuge, Koyukuk/Nowitna /Innoko Refuge Complex, and Gates of the Arctic National Park and Preserve but only 8 lynx were captured in 2022. The figure below chronicle lynx movements between 2018 to present. Many lynx have dispersed from their capture areas in all directions, some many hundreds of miles.

Movements of 127 Alaska collared lynx - 2018-2022



Waterfowl Surveys – Scoters, Scaup, Loons and Swans

2022 marked the twenty-first year of annual aerial surveys to monitor scoter and scaup populations on the Yukon Flats. All these waterbirds are important indicators of good water quality and healthy habitats. Results from the 2022 scaup and scoter surveys are still being tabulated so we provide the graph below with a historical summary of white-winged scoters through 2021. Loon surveys were completed in early August.



Invasive Plant Surveys - Yukon Flats and Interior Alaska

The US Fish and Wildlife Service National Wildlife Refuge System manages invasive species collaboratively with public and private organizations, on and adjacent to 566 national wildlife refuges, including the Yukon Flats National Wildlife Refuge. Yukon Flats refuge staff work closely with the Fairbanks Soil and Water Conservation District (FSWCD) to survey and document terrestrial and aquatic plants that are not local to the interior or Alaska. Some of these non-local plants are considered invasive when their introduction does or is likely to cause economic or environmental harm to human health.

Our goal is to prevent and control the spread of invasive plant populations (on land and water) on refuges and private lands. The refuge and FSWCD have conducted early detection surveys on interior Alaska rivers and in Yukon Flats communities since 2010. Staff are revisiting Yukon Flats communities over the next couple of years to update the status of non-local and invasive plants.

Invasives can directly affect Alaska's native wildlife populations by outcompeting vegetation that wildlife and subsistence users depend on. Aquatic invasives like *Elodea* can degrade salmon spawning beds. This could adversely impact Yukon River salmon population numbers which are already imperiled. *Elodea* can also make boat travel difficult, possibly preventing access to favorite hunting grounds.

Terrestrial invasive plant surveys were conducted in the communities of Circle (upper left photo) and Beaver in June and August 2022. White sweet clover infestations were detected in Circle; no high priority invasive plants were detected in the village of Beaver. In each community staff distributed outreach materials on invasive plants to community members and talked about high priority invasive plants to look out for with Native Council staff. Similar work will be conducted in Venetie in September 2022.

Early detection surveys for the invasive aquatic plant *Elodea* were conducted at North Chena Pond, Moose Creek Landing Pond, Healy Lake, Shaw Creek Pond, and lakes along the Steese Highway. Elodea was not detected in any of the water bodies surveyed. Staff traveled to Minto Village (upper right photo) to survey the extensive wetland complexes east of the community. We did not find invasive Elodea during our survey.

You can prevent the spread of both terrestrial and aquatic invasive plants by cleaning your footwear, ATV's and boats/gear before visiting new locations (fish/hunting camps, quite backwaters). If you see anything different, feel free to contact refuge staff or call the Invasive Species Hotline: 1–877-INVASIV.

Survey of Bald Eagles and other Stick-nesting Birds

The eighth annual survey of bald eagle nests and other stick-nesting birds was conducted on the Draanjik River in 2022. One-time inventory surveys were conducted in previous years (since 2014) along the Yukon, Hodzana, Beaver, Birch, Porcupine and Chandalar rivers. Inventorying and monitoring bald eagle nests and foraging sites will provide information on their local densities, trends, and habitat use, and will provide a database needed for responsible management. Federal law (Federal Register: 50 Part 22) requires permits to disturb bald eagles. As management activities arise, such as requests for right-of-ways, special use permits, mining activities, land exchanges, etc., we are required to protect nests (active and inactive) and foraging sites. This project is an effort to acquire data to properly support such actions. Results from the 2022 survey is still being tabulated.

Number of Active Nests on the Draanjik River

	2014	2015	2016	2017	2018	2019	2021	Nests Active ≥1 yr
Bald Eagle	6	10	8	5	7	8	11	35
Raven	1		3		1	1		3
Great Horned Owl		1						1
Northern Goshawk	2						1	3
Osprey	5	4	6				1	8
Red-tailed Hawk				1				1
Total	**14**	**15**	**17**	**6**	**8**	**9**	**13**	**51**

Duck Brood Survey

In July 2022, a duck brood survey was conducted at three wetland complexes, Canvasback Lake, Wetland by Track Lake, and Plot F. Data are being reviewed and preliminary observations were that brood numbers were reduced in 2022. A report is anticipated in December. No evidence of sick ducks from avian influenza was observed. Results from the 2021 duck brood survey are displayed.

Duck Banding

Ducks were banded at Canvasback Lake during August 2022. The goal of the project is to band mallard to inform harvest management. Other ducks incidentally captured were banded. Totals included 47 mallard, 209 northern pintail, and 11 American green-winged teal.

Student Conservation Association (SCA) intern, George Meleta worked for Kanuti Refuge from April through June and with Yukon Flats July to September. While at Yukon Flats George assisted with brood surveys, duck banding, and photo review for the trail cam project.

Geospatial application developed to measure a changing landscape

Refuge staff entered into a partnership with the Geographic Information Network of Alaska at the University of Alaska Fairbanks to develop a web application that will allow managers and biologists the ability to easily display and summarize *remotely sensed data* to inform natural resource management. Staff will be able to spatially monitor the growing season, snow cover, surface water, wildfires and more through time. The beauty of the new application is that it will be relatively easy to use and staff can produce maps that display change across the Yukon Flats Basin with minimal effort to share with others.

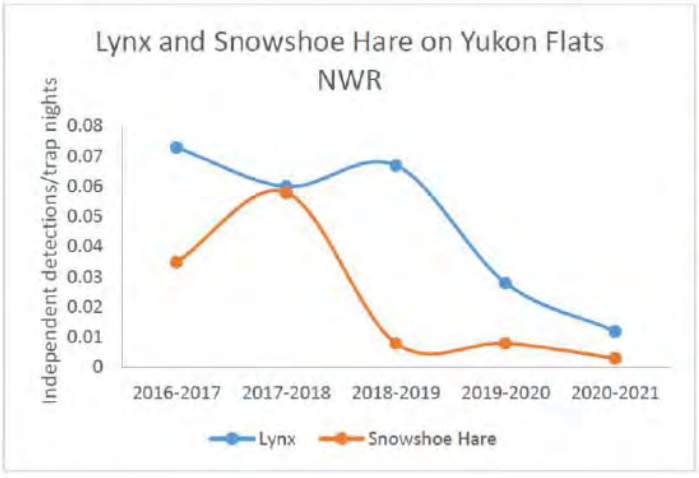
Trail Cameras

Trail cameras capture life on the Yukon Flats year-round. Since 2016, up to 34 cameras have been operating. Below is one highlight from this project.

Peak and Crash of Lynx and Snowshoe Hare Populations on Yukon Flats NWR, as Revealed through Camera Traps

By Bryce Lake, Wildlife Biologist, Yukon Flats NWR 13 April 2022

A camera trap study was conducted during 2016-2021 on Yukon Flats National Wildlife Refuge (NWR). Sixteen to 34 cameras operated year-round. Placement of cameras across the Refuge was stratified random in 100 km^2 sample units. Cameras were checked in spring or summer and SD cards and batteries replaced. Images were cataloged in a database. Relative abundance was assessed as independent detections/trapnights. Independent detections represented triggers separated by >60 minutes. Time period was July 1 until June 30 of the following year.



The lynx population peaked in 2018-2019, declined the following winter, and crashed in 2020-2021. Lynx numbers likely declined from reduced survival, and dispersal of individuals in search of snowshoe hares. Snowshoe hare numbers crashed a year earlier in 2018-2019. Experimentation has demonstrated that snowshoe hare populations crash from predation and stress from predator chases.

Eyes in the Bush – Resource monitoring in Fort Yukon and Circle

Amanda Pope extracts a soil sample along a transect in Circle. Eyes in the Bush resource monitoring program was established in 2021 to monitor measures of snow, thawed soil and air quality; dates for green up, river ice in/out, and migratory bird arrival; early detection of emerging soil-based pathogens, invasive plants and ticks; and fire monitoring. Manager Jimmy Fox installed a Purple Air air quality monitor in Beaver in July. Technicians Julie Mahler, Fort Yukon and Amanda Pope, Circle have been busy collecting over the past 16 months. The information is recorded in the Indigenous Sentinels Network (ISN) database, which provides Indigenous communities with tools, training, networking and convening, coordination, and capacity for ecological, environmental, and climate monitoring. If you are interested in expanding this effort to your Yukon Flats community contact Refuge Biologist, Mark Bertram at 907-347-1524 for information.

Law Enforcement Program

Senior Federal Wildlife Officer Cody Smith continued working towards becoming a carded pilot and spent a significant amount of time in flight training. Senior FWO Smith attended the Big Game Commercial Services Board meeting and joined in discussion on regulatory updates and issues pertaining to big game guides and transporters on interior Alaska refuges. An aerial patrol was conducted for spring bear hunt season and contact was made with permitted guides. SrFWO Smith conducted river patrols throughout Yukon Flats NWR during the salmon run for closure enforcement and gear restrictions, and additional river patrols for fall moose hunting season.

Civilian Climate Corps Fellow

Denna Martinez was selected as Civilian Climate Corps Fellow assigned to both Yukon Flats and Kenai refuges. Denna assisted us in the field with duck banding in August. She is currently focused on drafting informed options for climate change adaptation for Alaska refuges in the boreal forest.

Birch Creek Open House

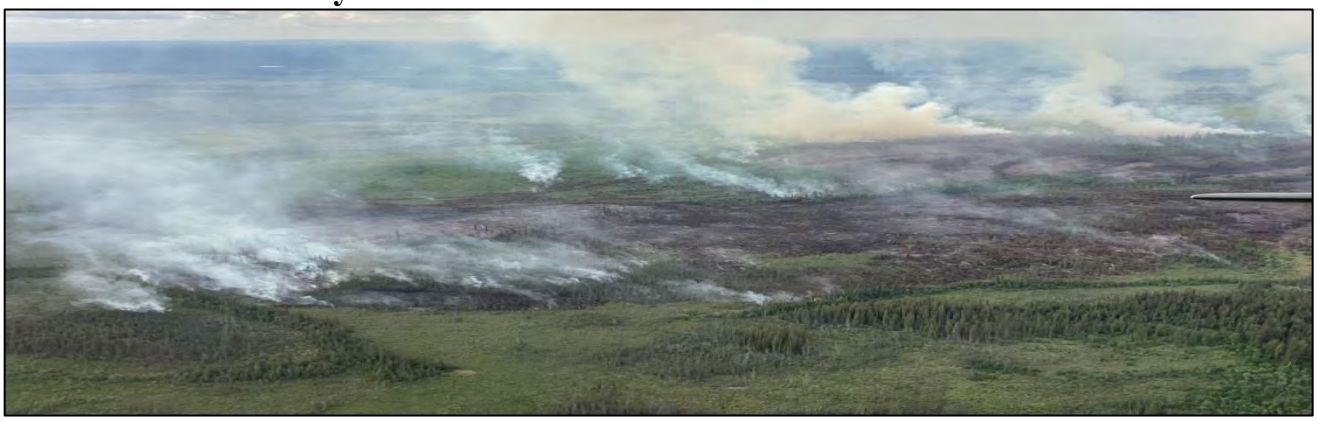
After a two-year delay, Refuge staff enjoyed several days visiting with residents of Birch Creek, Alaska. Residents were encouraged to bring any concerns they might have to the gathering to discuss with Refuge Manager, Jimmy Fox. Posters describing Refuge research projects, various resource issues and maps showing land ownership and the new 2022-23 GMU 25 Moose Hunting Map were displayed in the community library. The maps and posters were left with the Tribal Council. Food was provided by the Friends of Alaska's National Wildlife Refuges.


FWS Photo


FWS Photo

Due to concerns expressed by the Birch Creek Tribal Council, the Refuge partnered with Chief Jacqueline Baalam to design a map to help hunters understand land ownership and the boundary of Game Management Unit 25D West. The Refuge installed two information kiosks at the two boat landing sites in the community. The goal is to inform and discourage trespass on village corporation land and identify the 25D West boundary to prevent ineligible hunters from hunting moose on federal lands and waters in that area.

Fire Season Summary



Paddle fire burning near Bear Mountain [Alaska Fire Service]

Dry conditions during May and June primed the Yukon Flats refuge for a relatively active fire season. Just how dry was it? In Fort Yukon for the period of May 18th to July 3rd there was just .10" of total precipitation recorded at the FYRA2 weather station. From May 18th thru June 18th, there was **no** recorded precipitation in Fort Yukon. These dry conditions coupled with abundant lightning set the stage for an active fire season for the region. A total of 17 fires started on refuge lands and would ultimately burn 92,809 refuge acres. The first fire discovered on the refuge was detected June 18th while the last fire of the season (as of 9/6) was discovered on July 29th.

Of the four fire management options used in Alaska to determine the default response to fires: Critical, Full, Modified and Limited, the refuge had 10 fires originate within Limited, 4 within Full and 3 fires start within Modified. Fire suppression efforts were mostly successful throughout June however, as the season moved into July, it was apparent that the fuels were extremely dry and initial firefighting efforts were largely ineffective given rapid rates of fire spread. All fires originating on the Yukon Flats were determined to be lightning caused; there were 7,963 recorded lighting strikes within the refuge perimeter between May 5th and August 29th.

Pollinator (Bee) Sampling

Pollinators play a key ecological role in ensuring seed and fruit production for plants. Since there have been significant declines in bee production in the past 50 years, refuge staff initiated collection of bees on the Yukon Flats to inventory the types of bees (and other pollinating insects) present. Immediate us of this data will be to determine the range boundaries of several endangered bee species. Collection results will be analyzed this winter by the statewide Alaska Bee Atlas project.

Soil Microbe Sampling

Recent increases in air temperature in Alaska has initiated warming of permafrost laden soils. Permafrost is a reservoir to microorganisms and viruses, some potentially viable. We have limited knowledge of the potential impacts to humans, animals and plants from thawing soils. In 2021 the refuge teamed up with University of Alaska-Fairbanks to begin inventorying soil microbes. Thus far we have sampled in Fort Yukon, Circle and a few wetlands across Yukon Flats. Findings indicate a diversity of microbes are present. In the figure biological technician George Geleta takes a soil core sample in July 2022 which is cooled and then transported to the lab in Fairbanks for analysis.

Permafrost Sampling

Yedoma (figure right below) is very old ice-rich permafrost that is loaded with carbon. Yedoma exists in the foothills in the southern Yukon Flats. We have partnered with permafrost and soils expert Torre Jorgenson and retired FWS botanist Janet Jorgenson to initiate permafrost monitoring stations at two locations in the Yukon Flats Basin to monitor both soil and water temperatures and measure thaw depths in both burned and unburned habitats. Below left, Torre deploys small instruments in the water and soil that take monthly measures remotely. The probes are replaced every 3-5 years.

Refuge Management Information

Impacts from the Global Coronavirus (COVID-19) Pandemic

Restrictions relaxed since our report last fall. As you read through this report, you'll learn that we've mostly returned to normal operations. We postponed an open house event in Birch Creek in June due to high infection and hospital admissions in Fairbanks but were able to complete the event in late August (see below for details).

Staffing and Budgets

Due to long-term funding declines for the National Wildlife Refuge System, the Service initiated a multi-year effort to thoughtfully adjust distribution of funding and staffing among the 16 refuges in Alaska. The intent was to meet Refuge System goals and priorities while giving flexibility to managers in response to unpredictable budget cycles. As a result, staffing and budgets for the Kanuti and Yukon Flats National Wildlife Refuges have been reduced. As staff leave or retire many positions will not be refilled and eventually the two offices will be combined with each retaining a manager. This plan is subject to change if funding for Refuge System increases significantly. In 2019, after Nathan Hawkaluk transferred to Arctic Refuge the deputy manager position for Yukon Flats Refuge was not refilled. Last December, Park Ranger, Mimi Thomas and Subsistence Coordinator, Vince Mathews retired. The position for Thomas will not be refilled. The subsistence coordinator position is funded by the Office of Subsistence Management and serves Arctic, Kanuti and Yukon Flats refuges. However, recruitment for the position is pending.

Beaver Creek looking south into the limestone ridges of the White Mountains which form the southern boundary of the Yukon Flats Refuge.

Annual Funding Agreement with Council of Athabascan Tribal Governments

The Service entered its 20th year of partnering with CATG under the Indian Self-determination and Education Assistance Act. Programs, functions, services and activities CATG employees performed included brush clearing, fence construction and repair, and construction of a kiosk in Beaver; Eyes in the Bush monitoring in Circle and Fort Yukon (see below for details); cultural and science camp in Fort Yukon (cancelled due to COVID); maintenance and logistics in Beaver and Fort Yukon; hunter liaison work in Circle and Fort Yukon (see below); and a pilot project to partner with tribes in Beaver, Birch Creek and Stevens Village to improve reporting outcomes for the 25D-West federal moose hunt. In addition, the Director of the Service recently allocated additional funding for CATG to expand cultural and science camps to other villages in 2022-23.

Status of Compatibility Determinations

Last fall we embarked upon completing a required review of various uses of the Refuge to ensure they are compatible with achieving the purposes of the Refuge. The uses being reviewed are hunting, fishing, trapping, natural resource gathering, cabins, motorized access, wildlife observation and photography, scientific research and surveys, management activities of the State of Alaska, and surface exploration for oil and gas. Since that time, we've engaged in consultations with Alaska Native tribes and ANCSA corporations, Tanana Chiefs Conference Hunt and Fish Task Force and several departments of the State of Alaska. This fall we anticipate releasing draft determinations for public review and comment except for the draft determination for oil and gas exploration, which may be released for public review and comment next spring.

Status of Doyon-Hilcorp Project

Last fall we reported that in 2021 we commented on Hilcorp applications for temporary water use authorizations to support a stratigraphic well program on lands adjacent to the Refuge. We have no further news to share since our report last October.

The 10,000 square mile Yukon Flats Basin is central to the Yukon Flats Refuge.

Hunter Liaison Project

At the time of this writing, hunter liaisons are working in Circle and Fort Yukon. We appreciate funding support from the offices of Yukon-Charley Rivers National Preserve (Circle) and Arctic National Wildlife Refuge (Fort Yukon). The report from the Fall 2021 season is attached to this report.

Permitted Research Activities

All permittees are required to avoid interfering with subsistence activities, and if operating aircraft to do so in a manner that does not result in harassment of wildlife. Seven air taxi operators received a permit to provide services on Refuge lands and waters in 2022, if needed. Nearly twenty permits are valid for subsistence and trapping cabins. One filming permit was issued for a brief period this spring. Two big game guides and two recreational guides operated in 2022. Three scientific researchers were permitted to investigate the level of fire severity in recent burns, map wetlands and collect permafrost temperature data. The Poker Flats Research Range continued their annual operation under permit to retrieve rocket debris located on Refuge lands.

Big Game Guide Selections

For nearly two decades, one guide has led several black bear hunters in late spring in the western half of the Refuge and one has guided a few grizzly hunters and one moose hunter in the eastern half of the Refuge. In agreement with the Service, both guides operate far from subsistence use areas, and no direct complaints or conflicts have been recorded. At this time, the Refuge Manager is reviewing proposals submitted for the next five-year big game guide permit cycle and considering input from tribal consultations and discussions. Two applications were received for the eastern half of the Refuge (grizzly bear, moose and wolf), and one for the western (black and grizzly bear and wolf).

The braided Yukon River between Circle and Fort Yukon provides world class spawning habitat to sheefish, bering cisco, and other whitefish species.

Fire in the Anthropocene Workshop

At this time, the Alaska Fire Science Consortium and International Arctic Research Center are working with Refuge staff to publish an overview report that will convey the science showing the changes related to increasing wildland fires, permafrost thaw and other habitat changes, greenhouse gas emissions, and workshop discussions around using fire to minimize or mitigate these changes. For example, concern about wildland fire emissions are emerging around the U.S. According to a NASA-funded emissions calculation tool, wildland fires across the Yukon Flats in 2019 released an estimated 30-million metric tons of CO_2. The Environmental Protection Agency translates that amount to 7 1/2 coal-fired power plants in operation for one year. While wildland fire emissions are different in space and time, the number is still significant. (Note: the 2019 calculation does not account for emissions released afterwards if the fire triggers permafrost thaw.)

Facilities and Property

Construction of a bunkhouse in Fort Yukon began in 2020 and was delayed by the global pandemic. Building construction has concluded. However, one technical problem is being evaluated. Once resolved the bunkhouse should be operational and will house Service employees and partners on an intermittent basis. Due to rising costs and volatility of fossil fuel-based energy, and decreasing costs of renewable energy, the Service has initiated a project to evaluate the financial and logistical feasibility of installed solar photovoltaic systems for electricity. The review will include facilities in Fairbanks and Fort Yukon, and potential energy efficiency modifications to the Service hangar in Fairbanks. Due to increasing snow accumulations, last winter a portion of the hangar roof was modified to withstand future heavier snow loads. This winter we will be assessing the feasibility of installing a hoist in the hangar to facilitate exchange of floats, skis and wheels on aircraft. A new truck and snowmachine will replace a well-used truck and snowmachine in Fort Yukon – both will be transferred to CATG. Vandalism occurred at the Service storage shed in Beaver and government equipment has not been recovered.

Trona, an evaporite salt deposit, that surfaces as some wetlands are drying, is common across the Yukon Flats.

Old BIA School Contaminant Remediation Project

The Service owns a lot in Beaver, Alaska, which contains the current school and an old Bureau of Indian Affairs school. The grounds and the old school are contaminated with an assortment of chemicals. With internal advocacy, Refuge staff were successful in obtaining funds from the Service to characterize the contamination and prepare a scope of work. No companies have yet bid on the call for proposals.

Ikheenjik River (Birch Creek) Watershed Management Plan

The Refuge staff were invited to share comments, questions and observations with the Bureau of Land Management regarding their intent to develop a watershed management plan for lands they administer. We provided input about protecting water quality and quantity to help ensure that downstream in the Refuge the Service can fulfill that purpose.

17(b) Trail Easements

The Service received an inquiry about existing ANCSA 17(b) trail easements between Fort Yukon, Alaska and Christian Village. A member of the public requested information related to maintenance of the official trails. However, no ANCSA 17(b) trail easement goes to Christian Village. An easement exists between Fort Yukon and Alexander Village.

For more information on the Yukon Flats National Wildlife Refuge go to https://www.fws.gov/refuge/yukon-flats or call 1-800-531-0676.

Oxbow lakes form when rivers change course creating pockets of habitat for waterbirds and fish.