Restoration of Lake Trout in the Lake Kipawa

A partnership project!

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Ministère des Forêts, de la Faune et des Parcs

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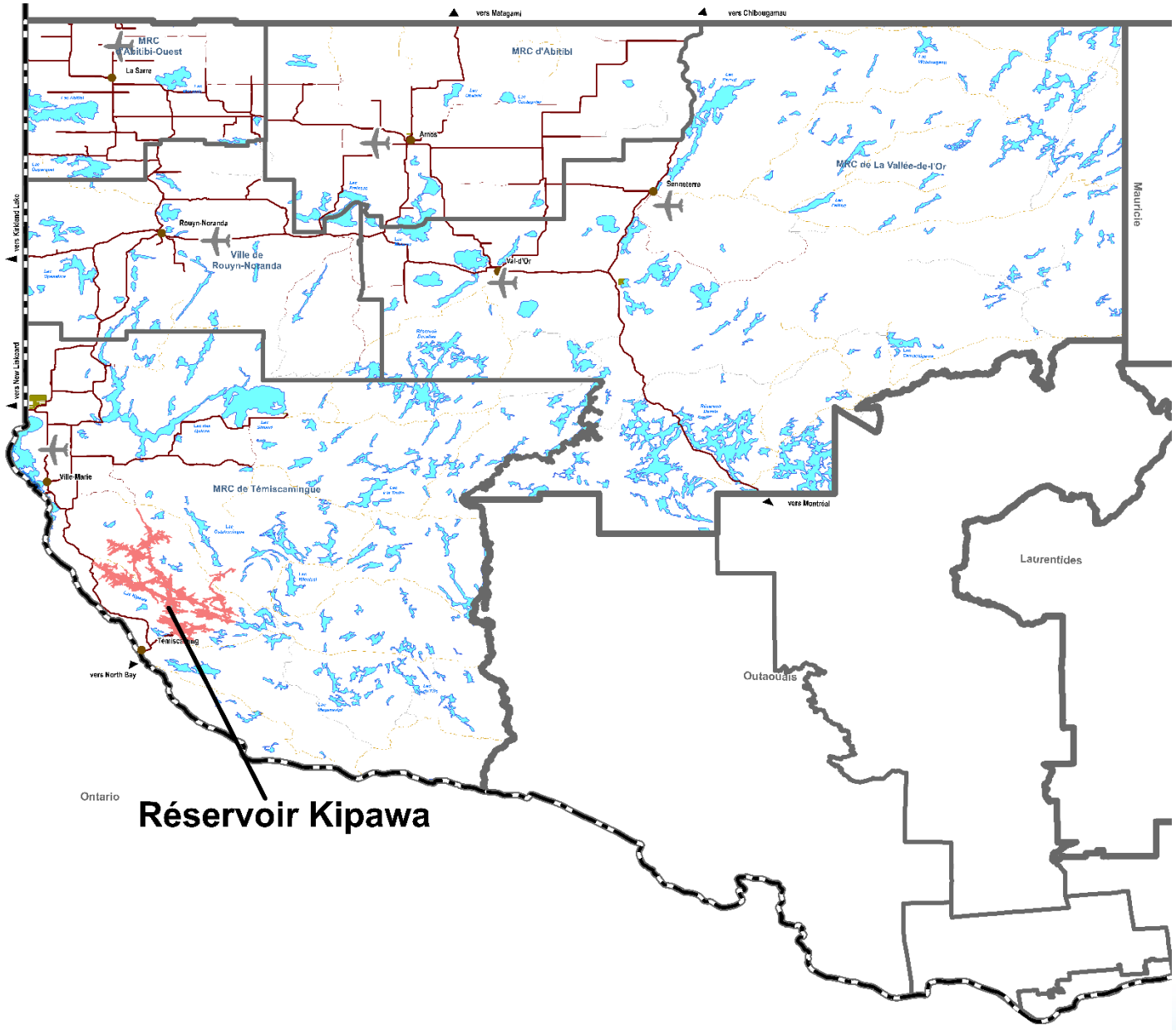

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Lake Kipawa…

- Reservoir of 300 km^2
- Located in several municipalities
- Located in the Opémican National Park
- Recognized fishing location:
  - 32 000 days per angler per year[1];
  - Approximately 18 outfitters generate 44 % of type of stay;
  - Annual regional benefits are greater than 1.8 M$.

[1]Estimate data from a fishing survey conducted in 2014

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Lake trout

- The population levels are considered as preoccuyping
- Corrective measures aim to reestablish a self-sustaining population

The problem has been proven and is based on reliable scientific data.

Context

- Creation of dam in 1910
- Many recreational fishing survey 1982-2014
- Lake trout inland monitoring to follow population health
- Current measures to assist in lake trout population health:
  - since 2015, 1 lake trout greater than 65 cm;
  - lowering the reservoir to 30 - 40 cm in October, during the breeding season;
  - stocking objective of 38 000 lake trout per year.

Field and lab work!!!

Monitoring surveys (sample collection)

9 surveys from 1989 to 2020

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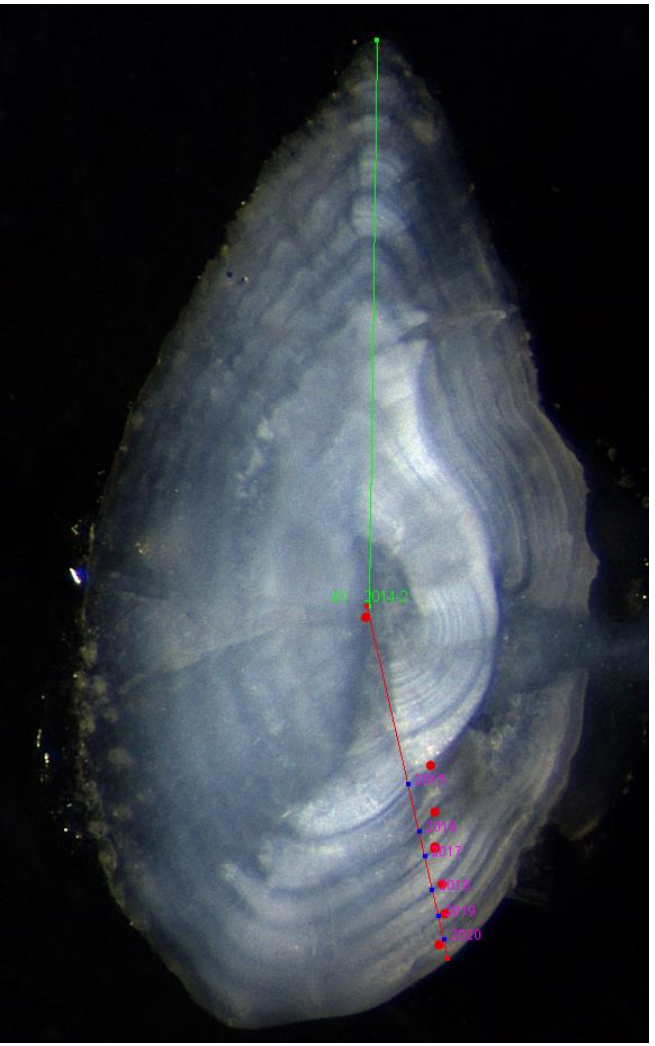
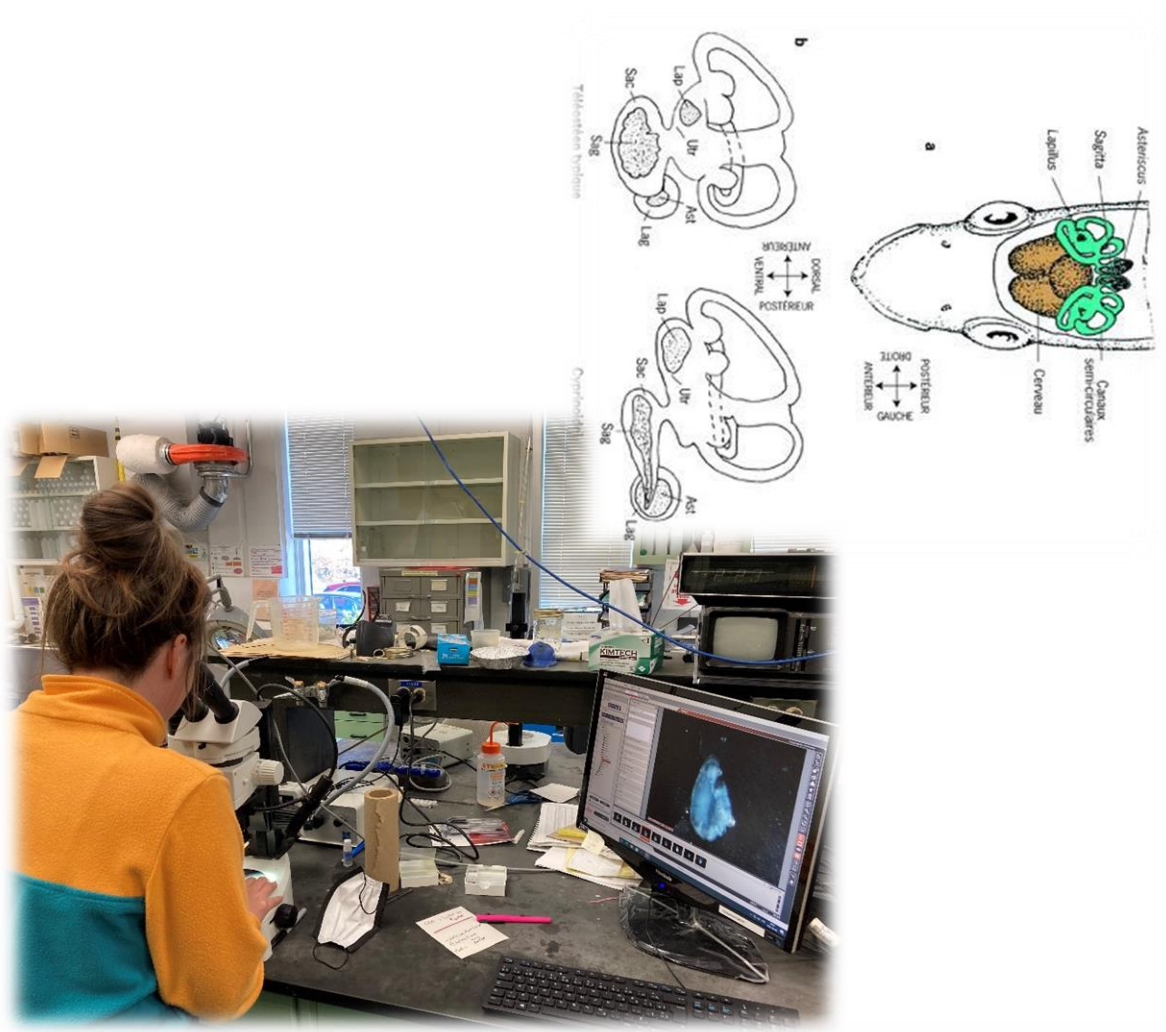
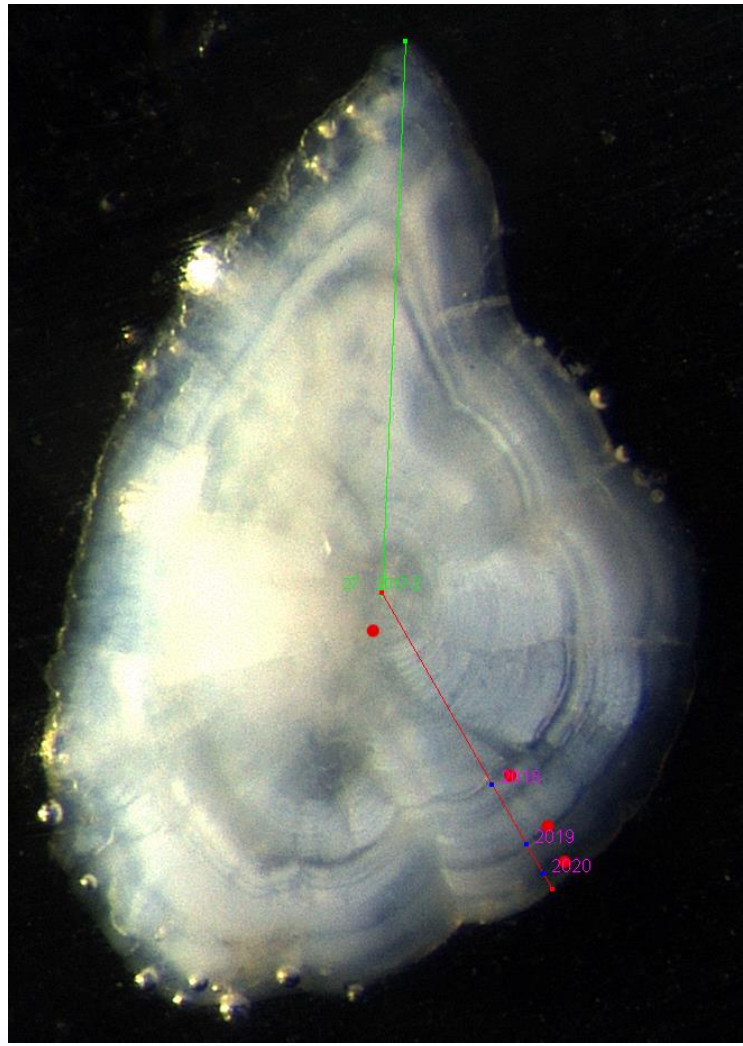
Monitoring surveys (laboratory)







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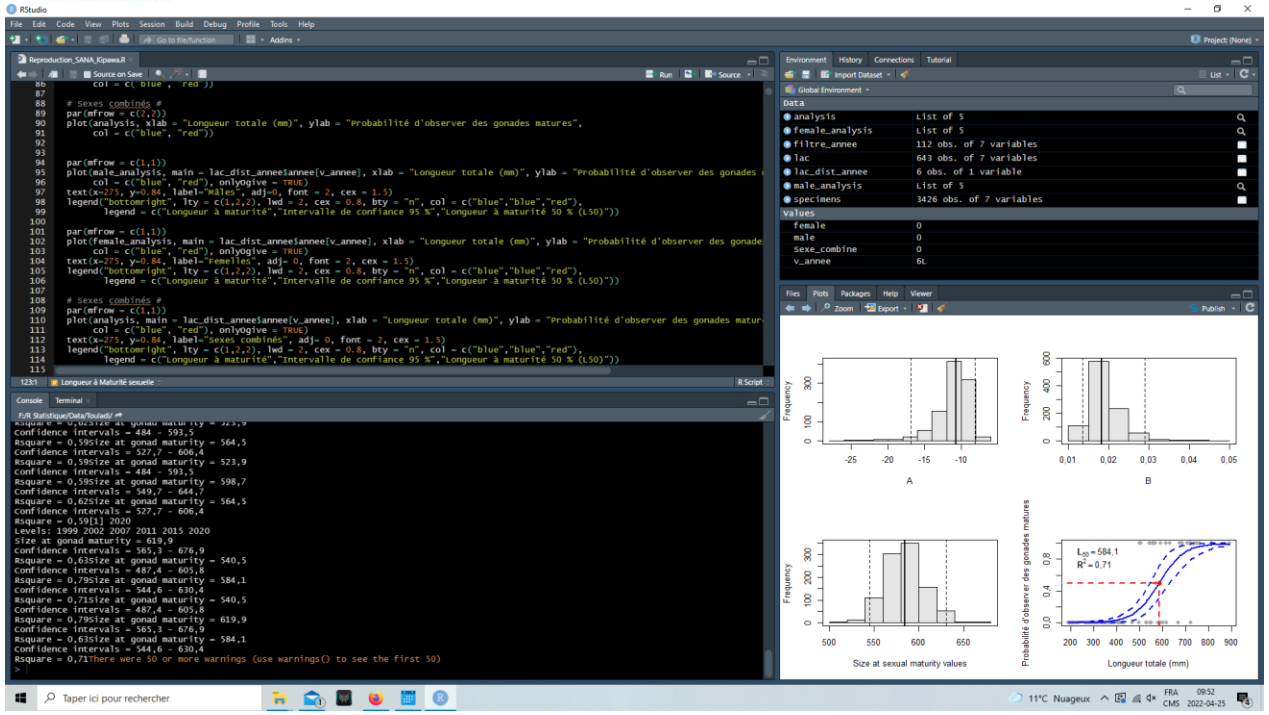
Determining the age of fish with otoliths

Monitoring surveys (data analysis)



ImageJ

Image Processing & Analysis in Java

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Recreational fishing surveys

6 surveys from 1982 to 2014

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Lake trout artificial breeding

12 since 1991, 7 since to 2021

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Lake trout stocking

11 stocking since 1992, 6 since 2015

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Symbology

Good

At risk

Poor

Online: https://mffp.gouv.qc.ca/nos-publications/etat-situation-touladi-reservoir-kipawa-bilan-inventaires-1989-2020/

État de situation du touladi au réservoir Kipawa

Bilan des inventaires de 1989 à 2020

Direction de la gestion de la faune de l'Abitibi-Témiscamingue

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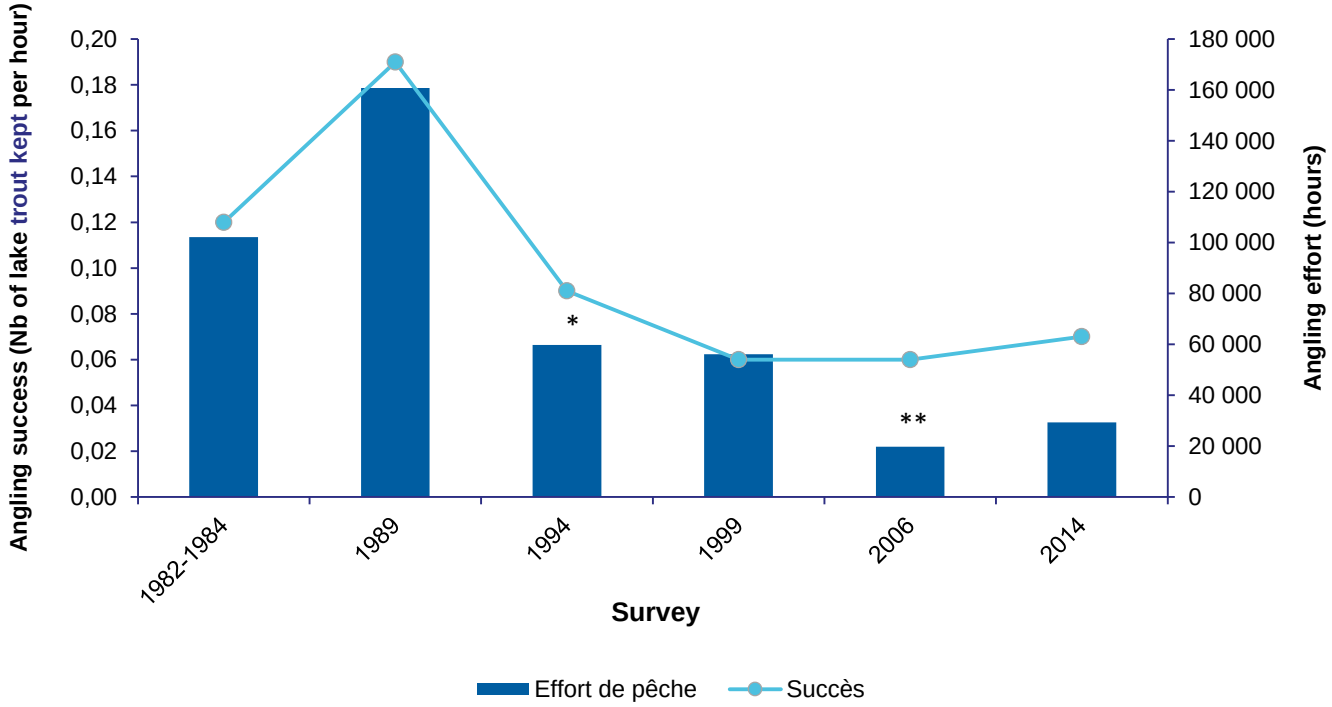
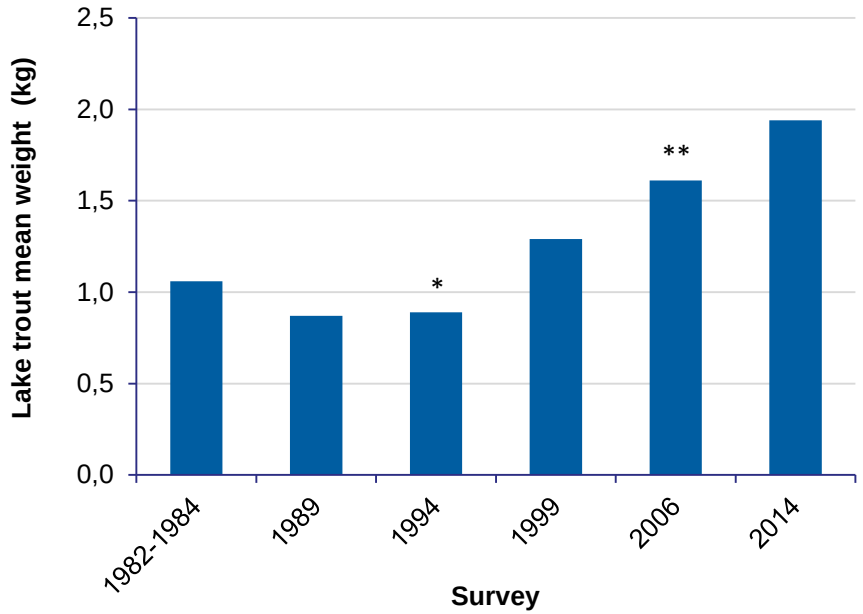
Recreational fishing

*Slot size implemented of 35 to 50 cm (fork length) in 1993
** Minimum length implemeted of 50 cm (fork length) in 2002





- Lower success and fishing effort
- Increase in the mean weight of kept lake trout

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Life and breeding habitat

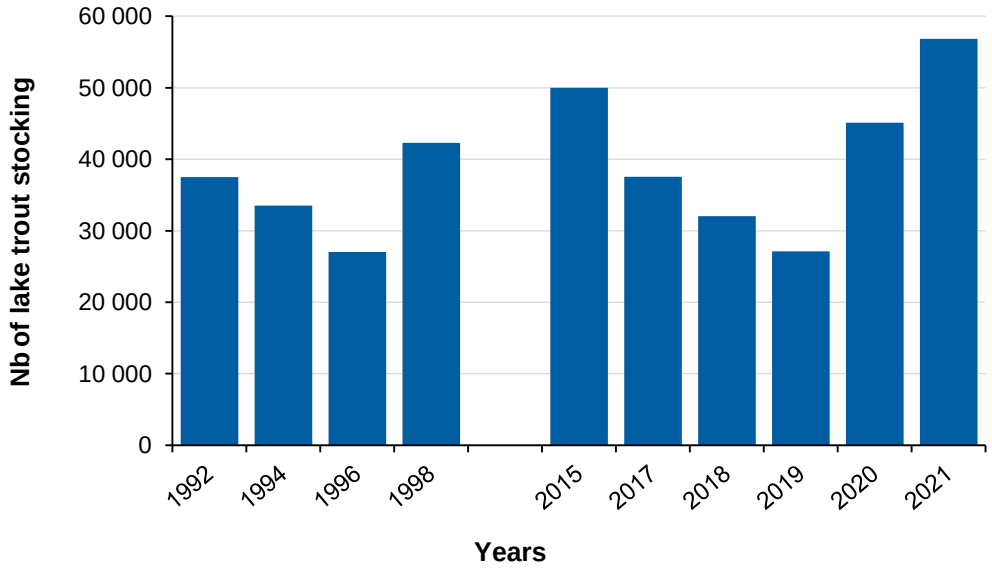
OHME Indicator

	Types d'habitat	OHME (mg/L)	Résultat
	Optimal	**> 6,7**	**8,7**
Suboptimal	Sous-optimal	2,7 à 6,7	
Lethal	Létal	< 2,7	

OHME: Oxygène hypolimnique moyen échantillonné

- Optimal life habitat
- Limited breeding habitat:
  - Before 1977, mean water fluctuation of 1,32 m and important interannual variations;
  - Between 1977 and 2013, mean water fluctuation of 1,94 m and weak interannual variations;
  - 2013 until present, regulation of water levels.
    - Lowering water levels 30 - 40 cm during lake trout breeding season

Lake trout stocking



2022:
44 000

- Stocking to restablish lake trout population
  - Restore the population so that it can be maintained over time without continus fish stocking
- 1st attempt to repopulate between 1992 and 1998:
  - Eggs mortality estimated at 70 %
- Hybrid restoration plan since 2015
  - 38 000 lake trout aged of 1 ½ years for at least 15 years

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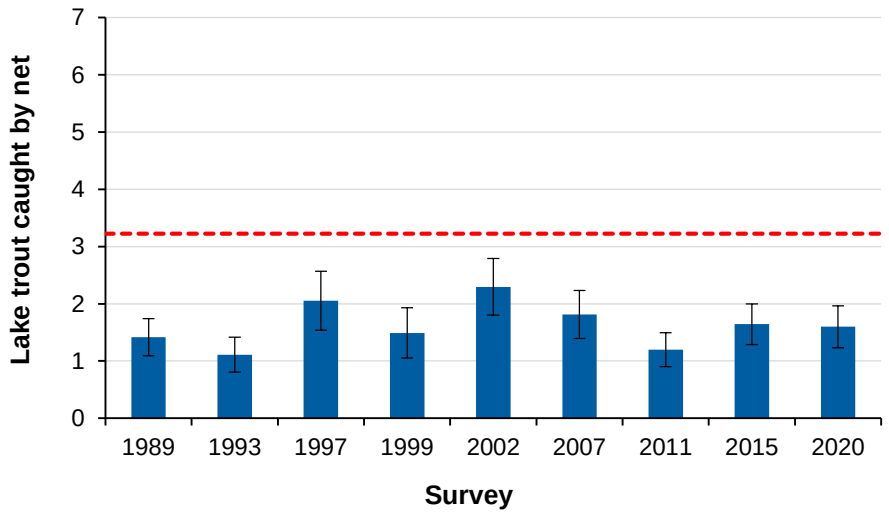
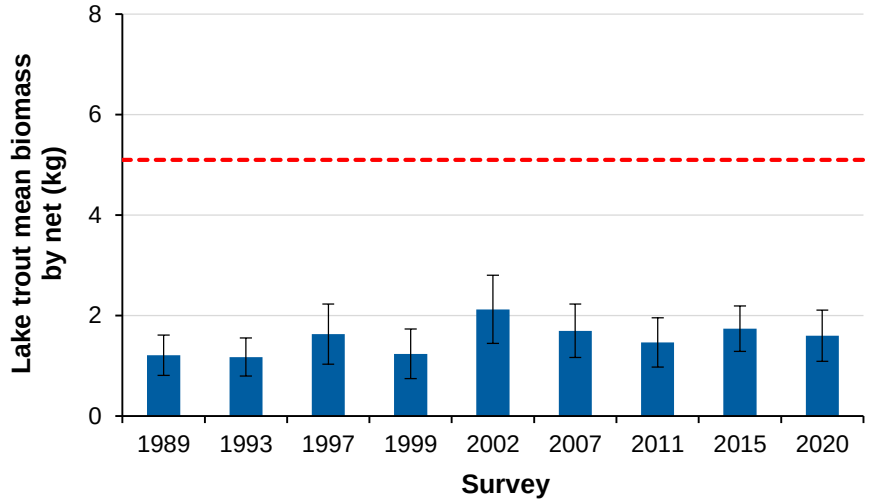
Abundance and biomass





Health threshold

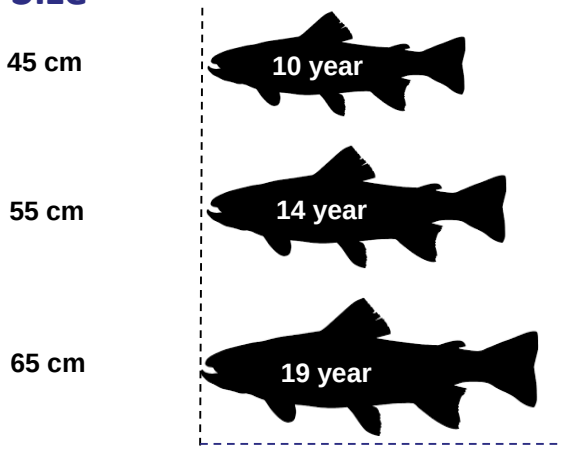
- Abundance and biomass of lake trout are stable and largely inferior to the health thresholds established for the population to be considered in good health.

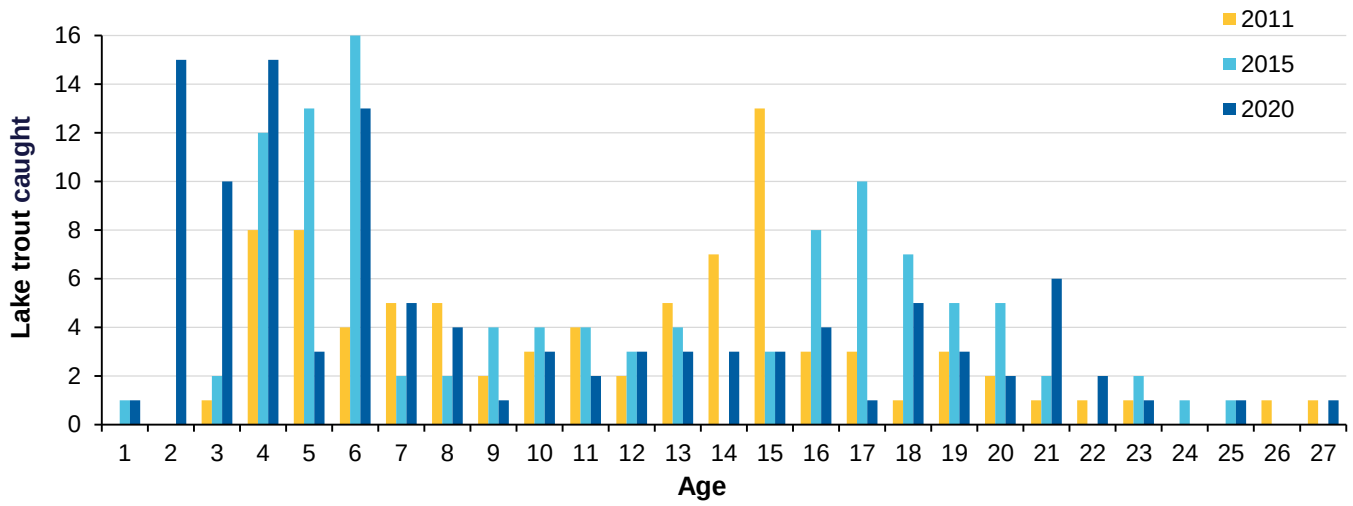
Fish population specifics

Means

Years	Number	Size (cm)	Weight (kg)	Age
2011	84	49	1,2	12
2015	115	47	1,1	11
2020	112	43	1,0	9

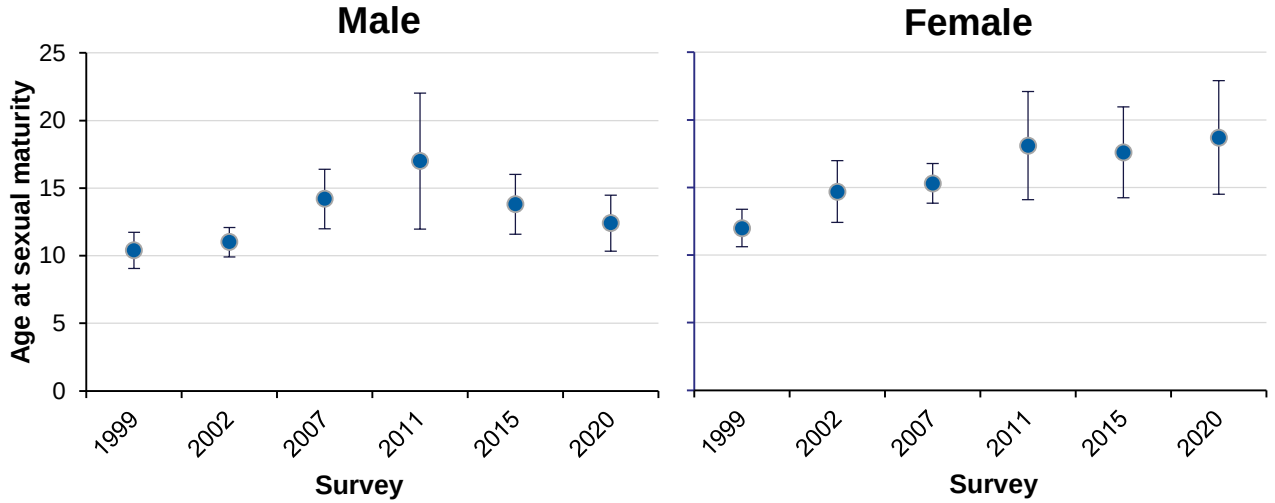
Size

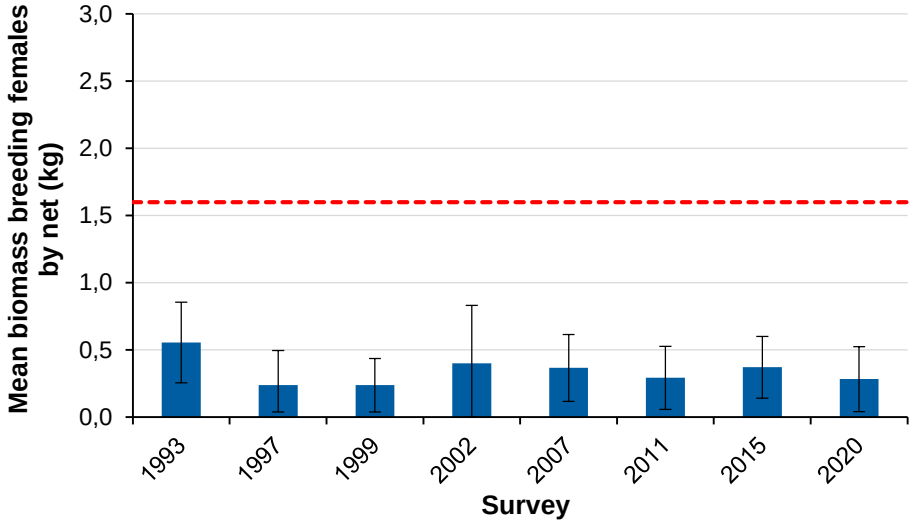




- The population is largely comprised of young and small lake trout. The larger and older lake trout are rare.
- The mean size and age have siginificantly decreased since 2011.

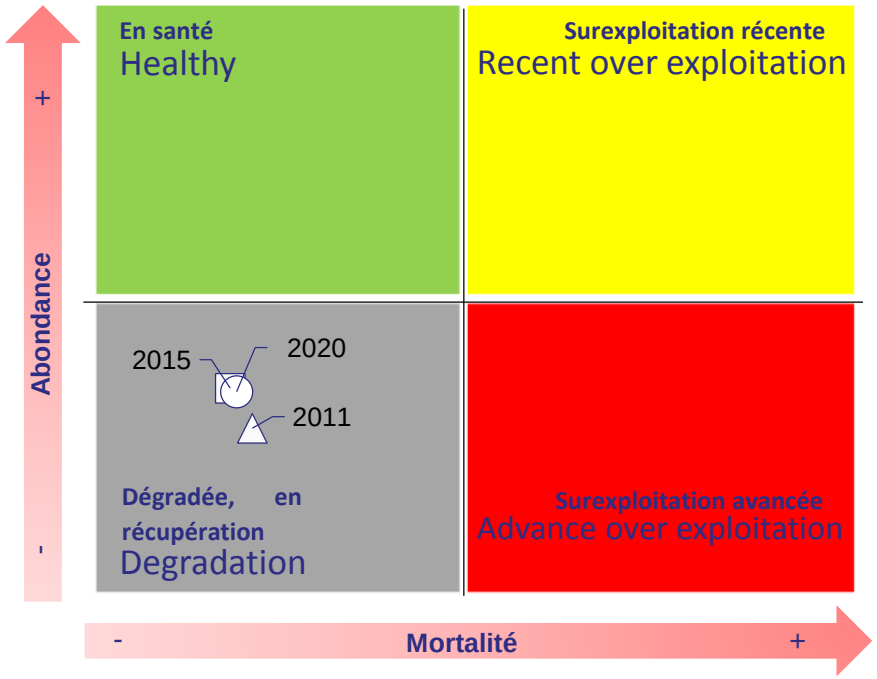
Reproduction





- Older age at sexual maturity compared to other populations of lake trout
- The biomass for reproductive females is stable and greatly below the established threshold required for a population to be considered in good health.

Mortality

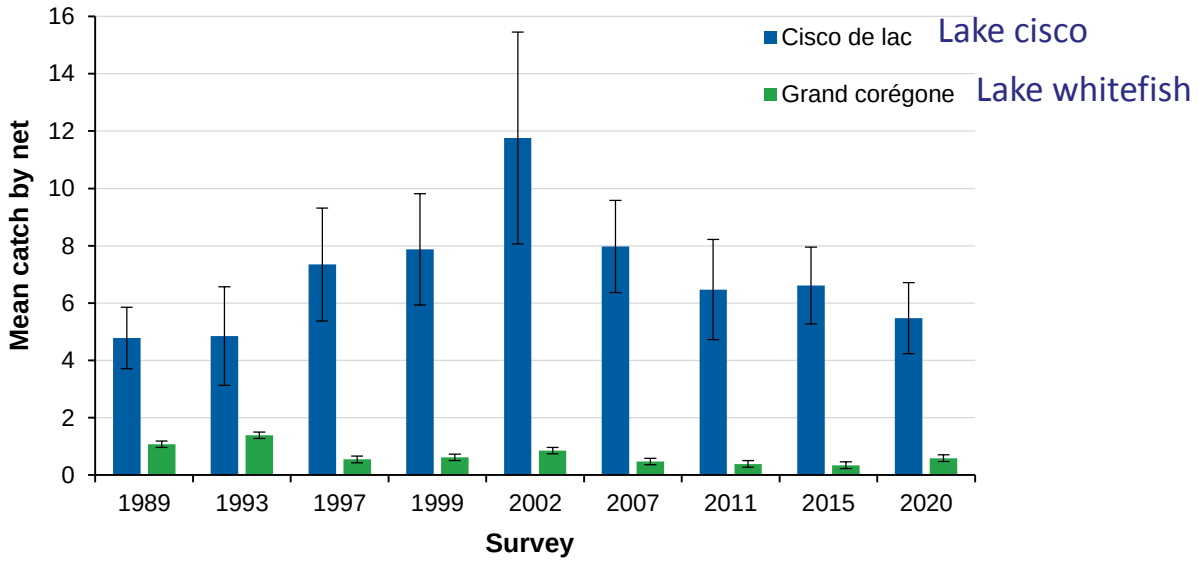


- This population is characterized by a low mortality and low abundance rate.
- Since 2007, the total annual mortality rate (natural and fishing death) is relatively stable. In 2020, it was 11%, which signifies that the population is degraded, stable, and currently does not show sign of improvement.

Other fish species

Species	
Smallmouth bass	Lake cisco
Walleye	Northern pike
Lake whitefish	Burbot
White sucker	Longnose sucker
Yellow perch	

Principal prey



Interpretation

- The lake trout population at Lake Kipawa is degraded since at least 1989
  - High levels of fishing exploitation since the 1980's;
  - Though the living habitat is optimal at Lake Kipawa, the reproductive habitat is highly deficient because of the fluctuation of water levels.
- The reproductive potentiel is very low because there are so few large reproductive females.

Interpretation

- Age at sexual maturity of male and female lake trout are very high compared to the provincial average (5 to 7 years and 6 to 8 years, respectively)
- The mortality rate is low and stable
- Presence of sufficient prey
- The population restoration program in and of itself that took place between 1992 and 1998 was insufficient and unable to improve the health of the lake trout population

Conclusion

- The lake trout population at Lake Kipawa is in a highly degraded state.
- Prior to the measure regulating the water level variation, implemented in 2013, the drawdown seemed to limit the gradual transition towards a healthy lake trout population.
- It is too early to measure the efficiency of the repopulation program and the measures regulating the water level variation that was implemented in 2015 and 2013, respectivly.

Recommendations

- Maintain the current regulatory mesures in place
- Continue the lake trout repopulation stocking program
- Pursue the pilot project at Lake Kipawa regarding the drawdown and water level variations
- Evaluate the efficiency of the repopulation program and the measures regulating the water levels

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Partnership

- Municipalities and MRCT
- First Nations communities
- Outfitters Association
- Hunting and Fishing Federation
- Association touristique régionale
- Tourisme Abitibi-Témiscamingue
- Organisme de bassin versant du Témiscamingue
- Centre d’expertise hydrique du Québec
- Residents of Lake Kipawa

Thank you for your attention!

Questions? Concerns?

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Complementary slides

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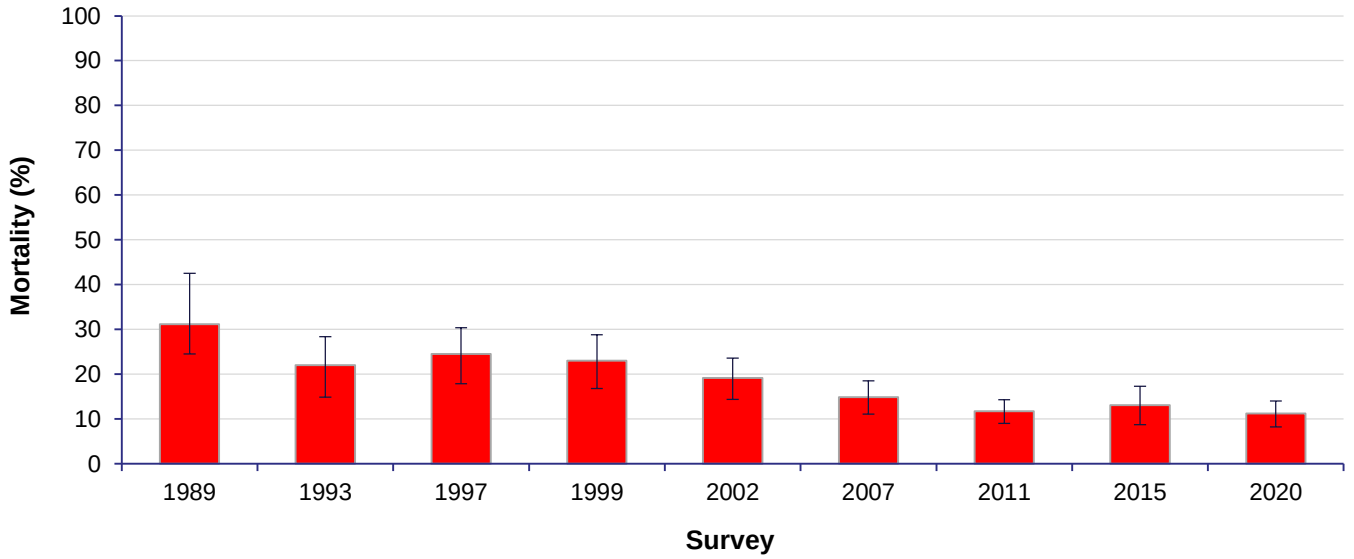
Total mortality



Lake trout ice fishing impact

- Lake trout fishing is twice as detrimental to stocks in winter than in summer
- 2/3 of fish caught are lake trout on the verge of being sexually mature
- In a single day of ice fishing, fish caught is equivalent to 2 – 4 times the maximum annual sustainablity (study in Thunder Bay)

Mean winter and summer lake trout angling success for different sectors for the state of Maine

Succès de pêche moyen au touladi en hiver et en été pour différents secteurs de l'état du Maine (p/j-p)

Année	Saison	A	B	C	D	E	F	G	Moyenne
1994	Hiver	0,36	0,17	0,4	0,55	1,1	0,21	0,37	0,45
	Été	0,25	0,06	0,3	0,38	0,5	0,26	0,28	0,29
	Facteur	1,44	2,83	1,33	1,45	2,20	0,81	1,32	**1,63**
1999	Hiver	0,37	0,15	0,34	0,64	0,73	0,28	0,69	0,46
	Été	0,39	0,08	0,38	0,27	0,43	0,19	0,26	0,29
	Facteur	0,95	1,88	0,89	2,37	1,70	1,47	2,65	**1,70**

Lake trout ice fishing impact

Estimate of illegally kept lake trout caught by ice fishing in 1993 (Outaouais, Qc)

- Blue Sea : 21 to 127% of the maximum sustainable yield;
- Argile : 0 to 55% of the maximum sustainable yield.

Witholding a high proportion of annual production may cancel out the gains created by summertime catch and release practices