

Restigouche 2018

SCIENCE COMMITTEE / COMITE SCIENTIFIQUE



CONSEIL DE GESTION DU BASSIN-VERSANT DE LA
RIVIÈRE RESTIGOUCHE INC.



RESTIGOUCHE RIVER
WATERSHED MANAGEMENT COUNCIL INC.

SCIENCE COMMITTEE / COMITE SCIENTIFIQUE

Terms of Reference

- Advise on science matters pertaining to the management goals and program for the Restigouche Atlantic salmon
- Coordinate the planning and implementation of stock assessment and research programs
- Review the annual stock assessment for the Restigouche Atlantic salmon
- Provide detailed outlines of stock assessment program, and supporting research

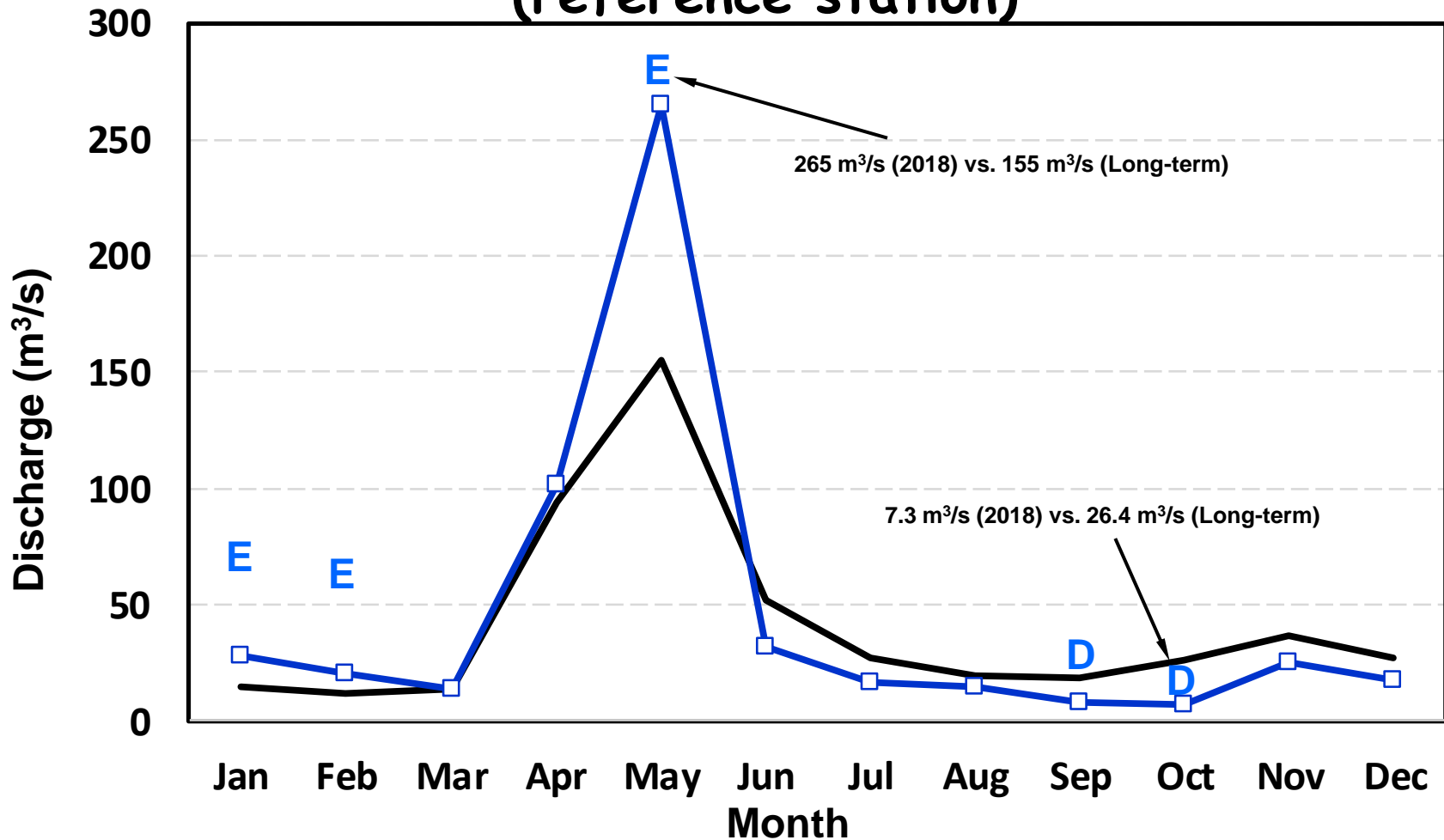


Mandat

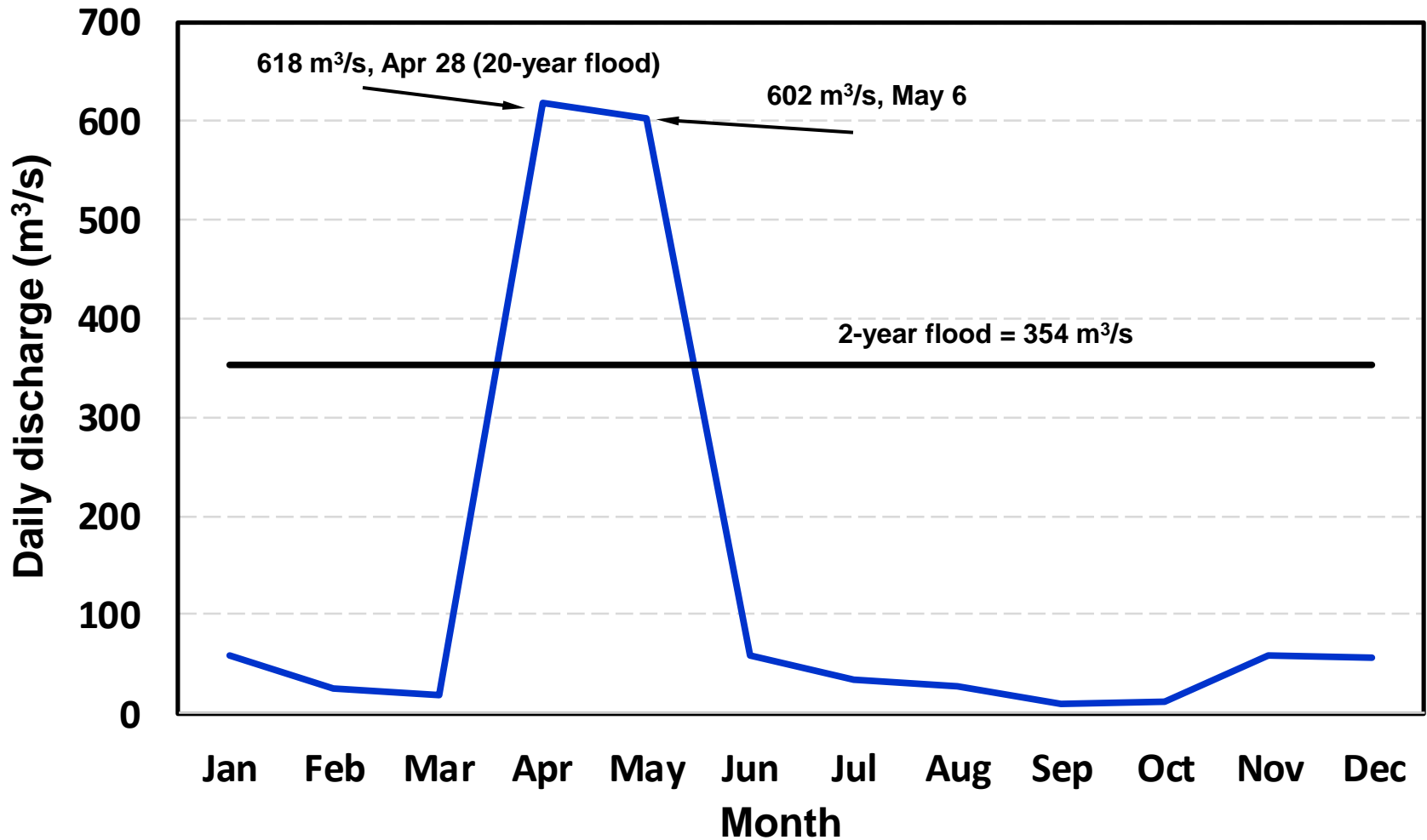
- Aviser sur les aspects scientifiques relatifs aux objectifs de gestion et du programme du saumon de la Restigouche
- Coordonner la planification et l'amélioration des programmes d'évaluations et de recherche
- Revoir l'évaluation annuel de l'état des stock de saumon de la Restigouche
- Recommandation sur programme d'ensemencement et autres recherches

Hydrological Conditions in the Restigouche River in 2018, Daniel Caissie, Fisheries and Oceans, Moncton

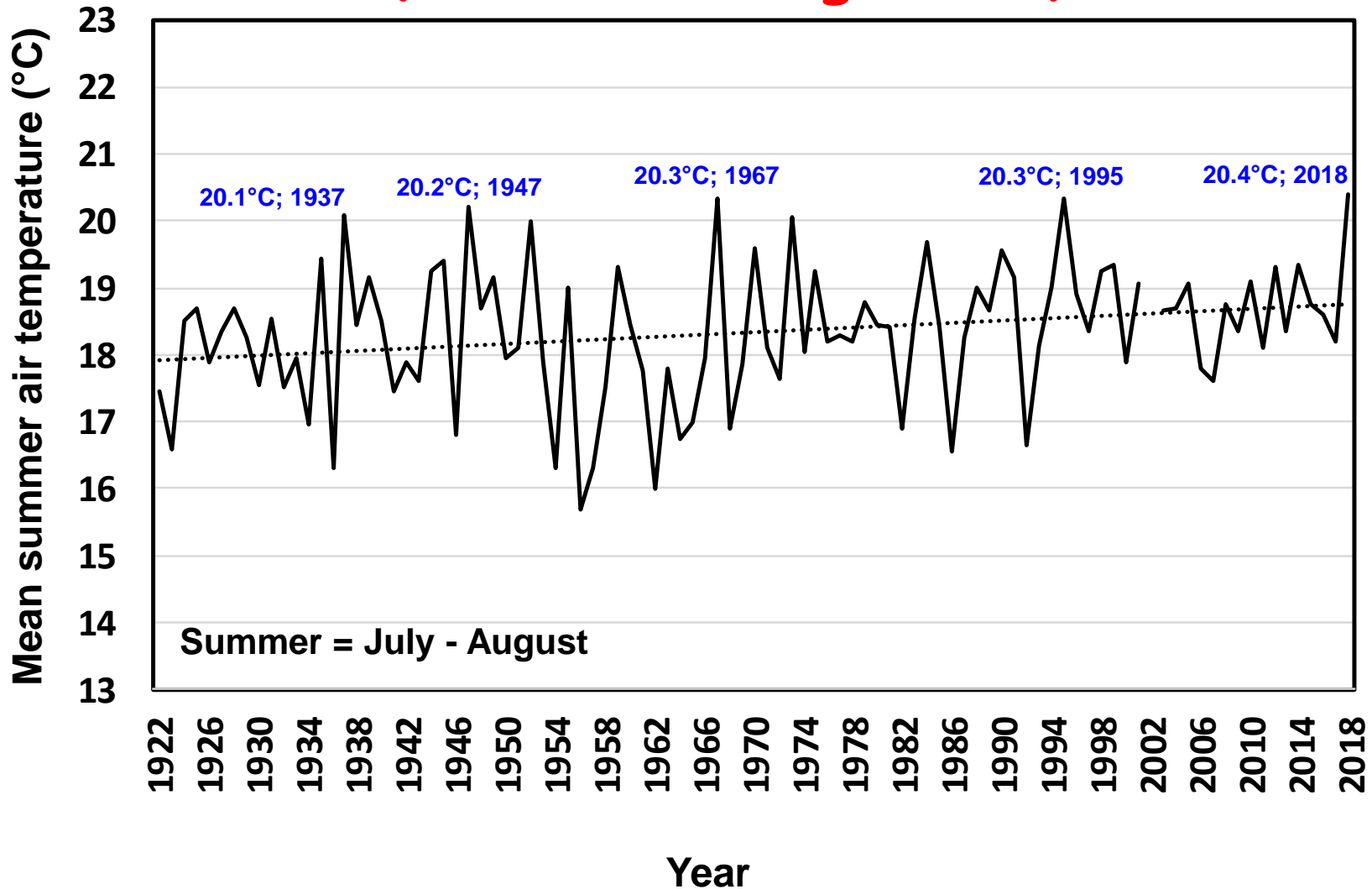
Monthly flows at Upsalquitch R. 2018 (reference station)



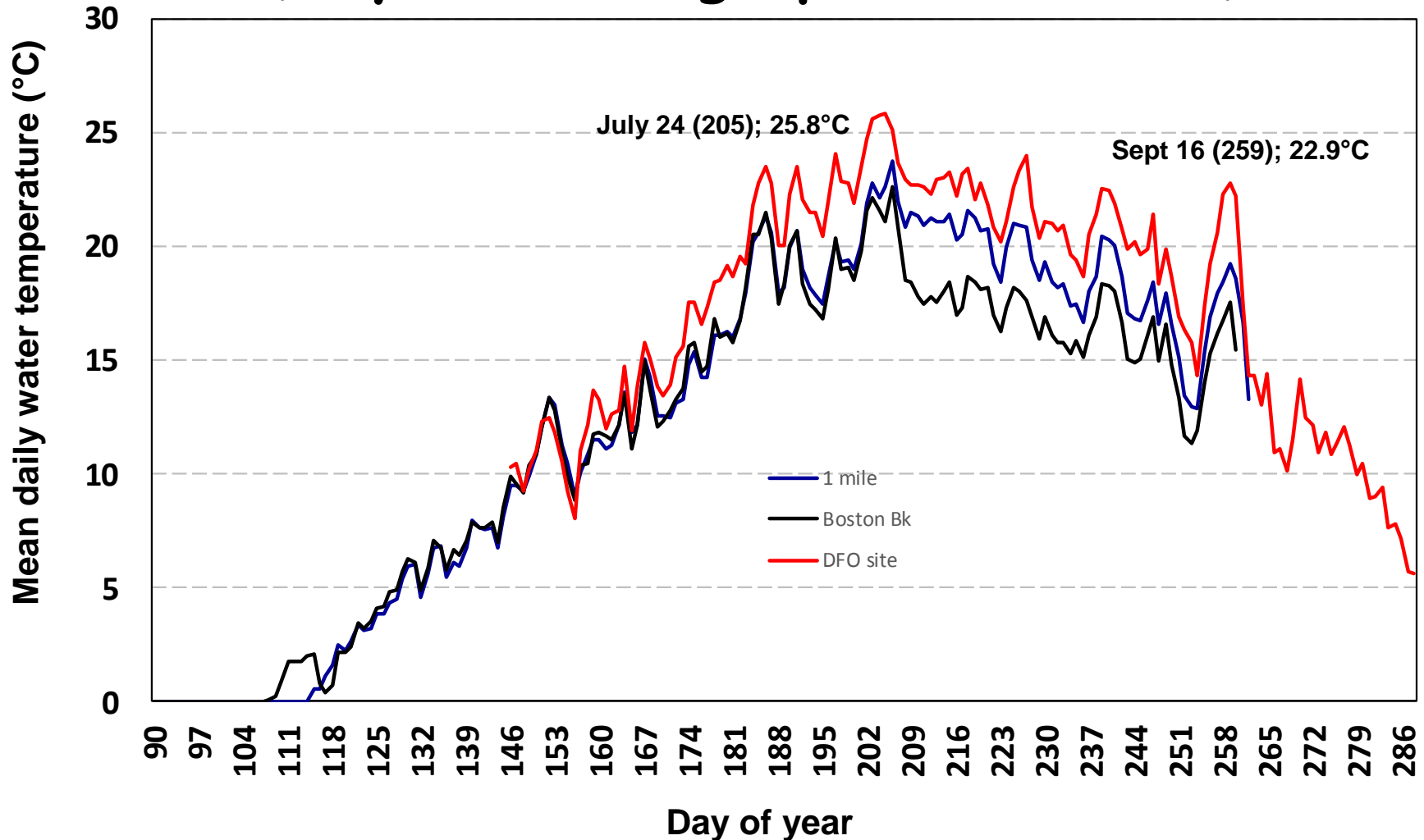
High flows at Upsalquitch R. 2018



Mean Summer Air Temperature (Bathurst) (Global warming trend)



Water temperature 2018 - Daily average (only 3 thermograph downloaded)



Maximum recorded water temperature = 27.7°C (81,9°F)

Summary

- Excessive flows in winter (Jan-Feb) and (April)
- Spring peak flow occurred on April 28 ($618 \text{ m}^3/\text{s}$), this is a 20-year flood
- Deficient flows in September and October
- Lowest daily flow was $5.25 \text{ m}^3/\text{s}$ (October 8) and close to 2-year event, no severe winter low flows in 2018 ($11.2 \text{ m}^3/\text{s}$)
- Highest mean summer air temperature of the time series was observed in 2018 at Bathurst (20.4°C)
- Daily maximum water temperature was on July 24, 2018 (25.8°C), at the DFO site (Main Restigouche)
- Maximum recorded water temperature was 27.7°C in 2018 at the DFO site



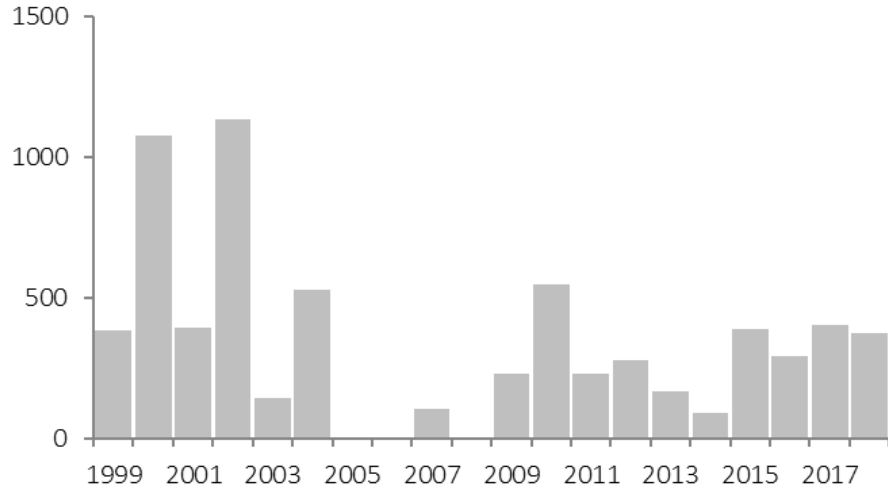
**Visual spawner counts /
Comptage visuel des reproducteurs
2018**

Spawner counts 2018

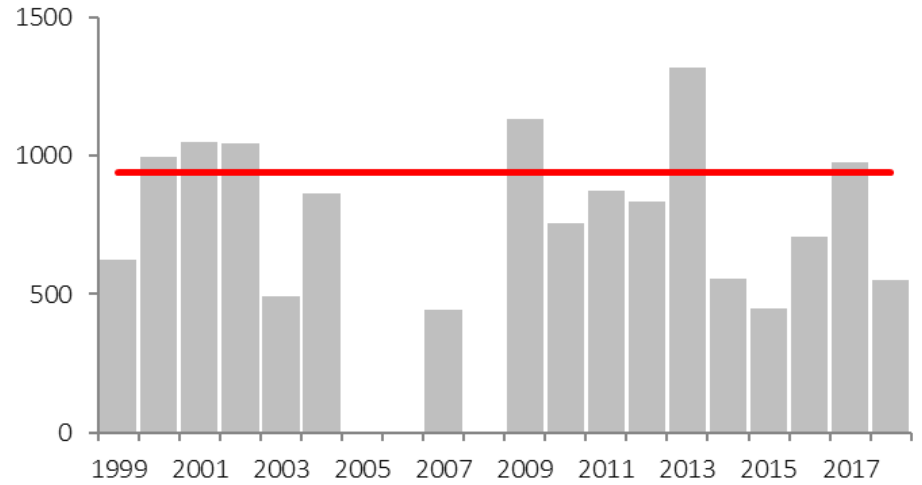
- Tributaries (Kedgwick, Little Main, Gounamitz, Upsalquitch and Patapedia Rivers) were completed from Sept. 17 to 22.
- The main stem Restigouche River was completed from Sept. 24 to 27.
- Visibility was generally good (8 to 10/10), except for Little Main (Boston Bk to Jardine Bk – 3/10 and 4/10).
- Overall the observed salmon and grilse seemed to be in generally good physical condition with some fungus noted.

Kedgewick River

Kedgewick small salmon



Kedgewick large salmon

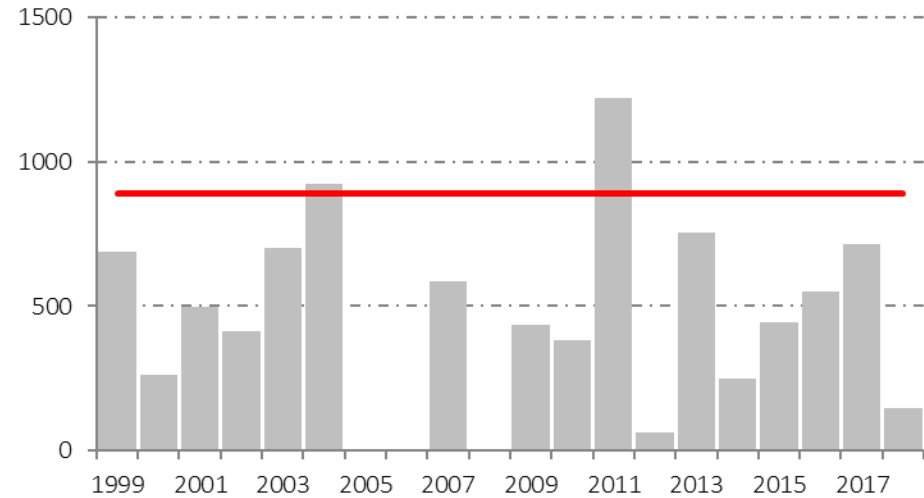
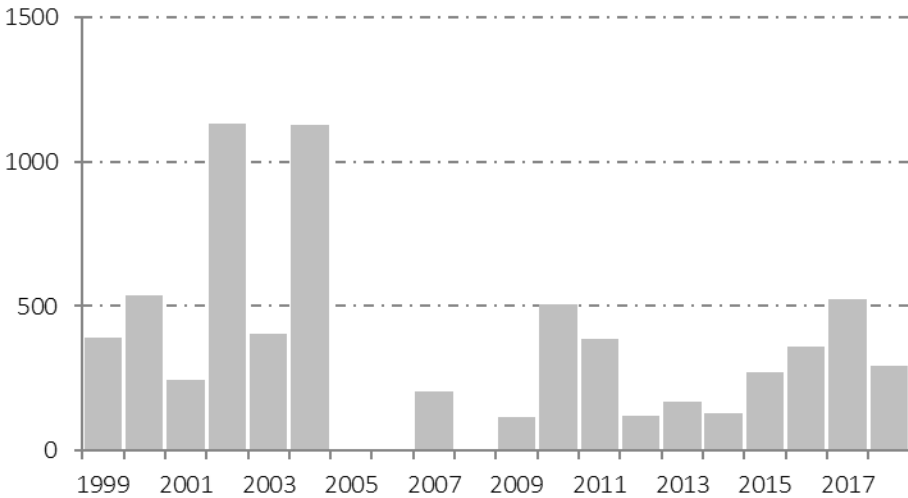


Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010	546	757	940		80.5	
2011	228	874	940		93.0	
2012	279	836	940		88.9	
2013	167	1318	940		140.2	
2014	91	556	940		59.1	
2015	387	451	940		48.0	
2016	291	707	940		75.2	
2017	403	978	940		104.0	
2018	372	553	940		58.8	

Little Main River

Little Main small salmon

Little Main large salmon



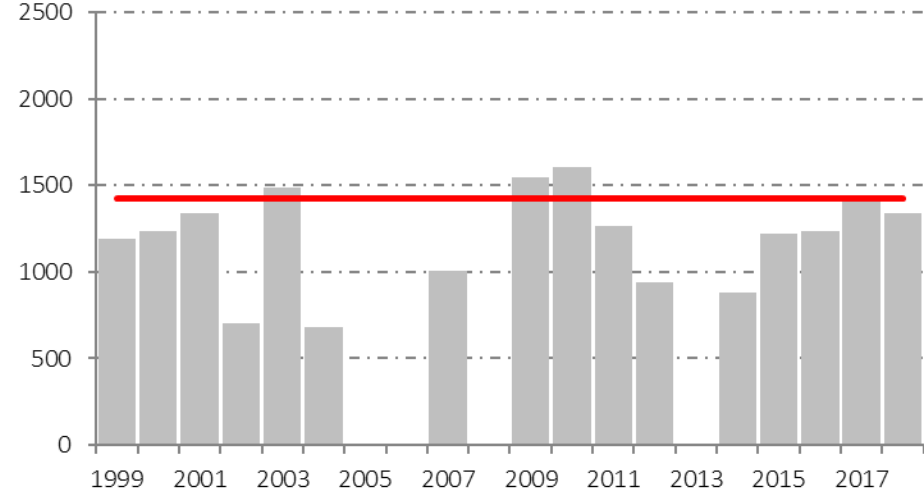
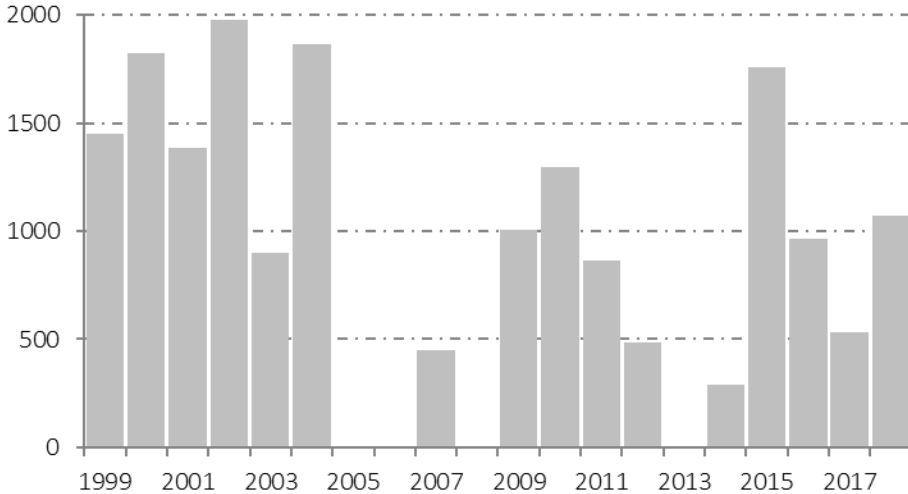
Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010	505	381	890		42.8	
2011	384	1219	890		137.0	
2012	119	63	890		7.1	
2013	168	755	890		84.8	
2014	128	250	890		28.1	
2015	272	442	890		49.7	
2016	360	551	890		61.9	
2017	522	715	890		80.3	
2018	292	145	890		16.3**	

** incomplete, missing counts from Boston Bk to Jardine Bk

Upsalquitch River

Upsalquitch small salmon

Upsalquitch large salmon

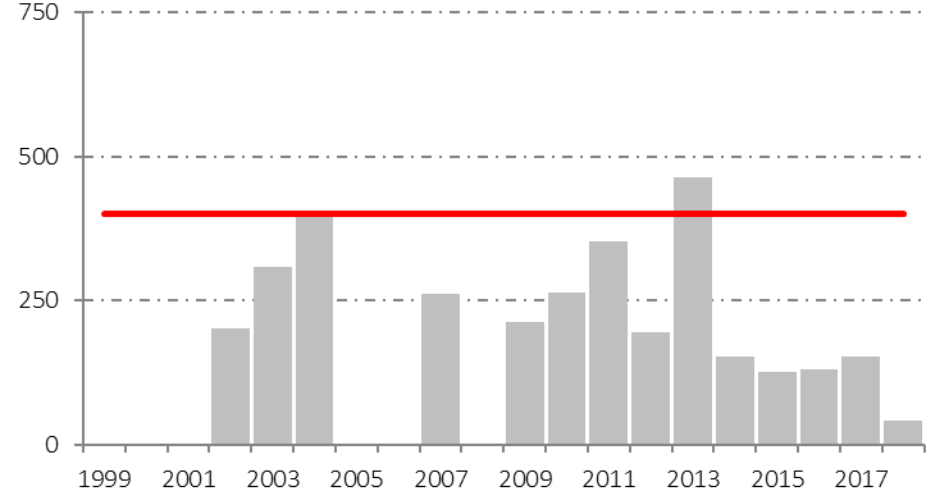
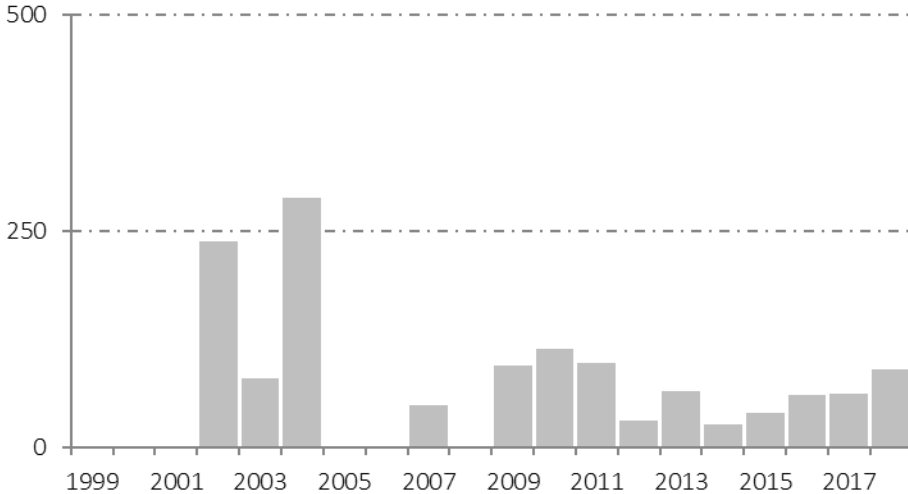


Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010	1293	1603	1427		112.3	
2011	861	1265	1427		88.6	
2012	486	942	1427		66.0	
2013			1427			
2014	290	878	1427		61.5	
2015	1759	1220	1427		85.5	
2016	965	1235	1427		86.5	
2017	530	1422	1427		99.6	
2018	1072	1339	1427		93.8	

Patapia River (September)

Patapia small salmon

Patapia large salmon



Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010	113	263	400		65.8	
2011	97	353	400		88.3	
2012	31	195	400		48.8	
2013	65	463	400		115.8	
2014	27	153	400		38.3	
2015	40	126	400		31.5	
2016	61	131	400		32.8	
2017	62	152	400		38.0	
2018	90	43	400		10.8**	

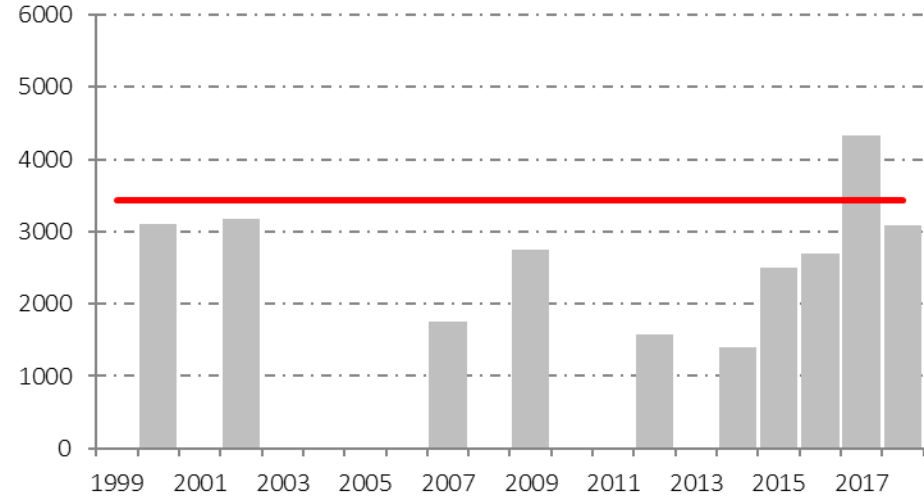
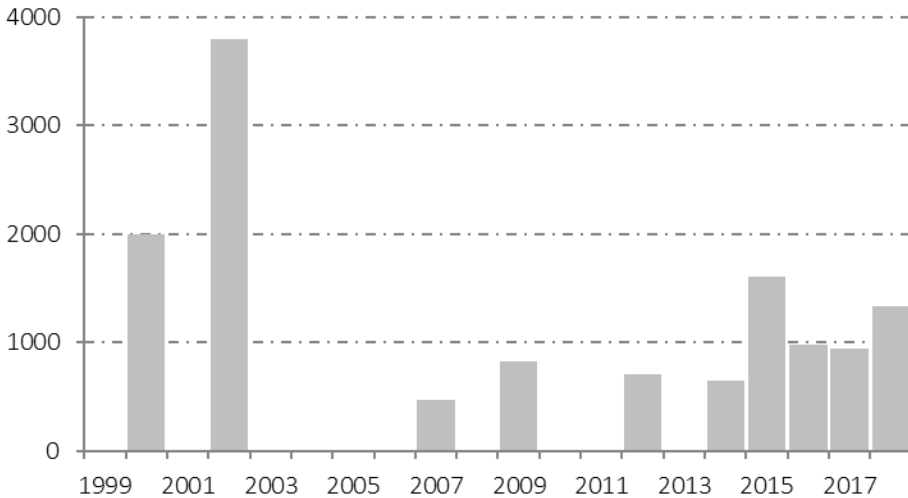
** 30 Mile (forks) to 23 Mile by truck (3 main pools)

CGRMP (Oct)	88	359
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Main stem Restigouche River

Main stem small salmon

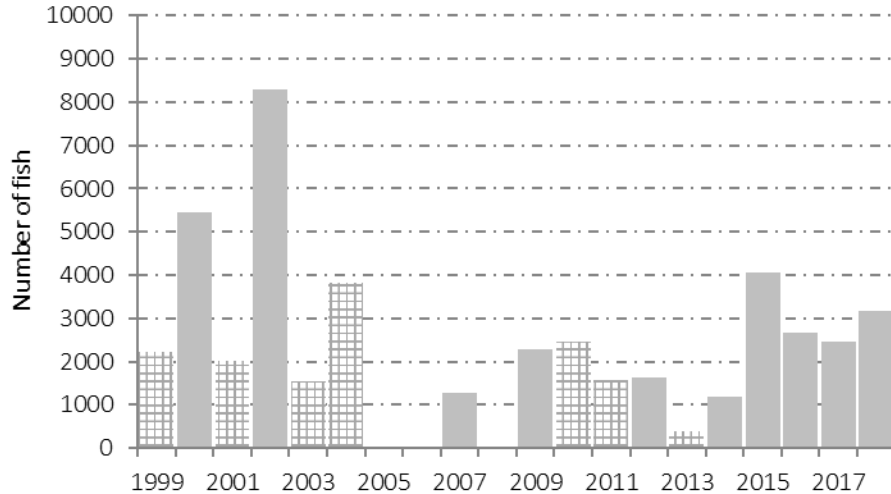
Main stem large salmon



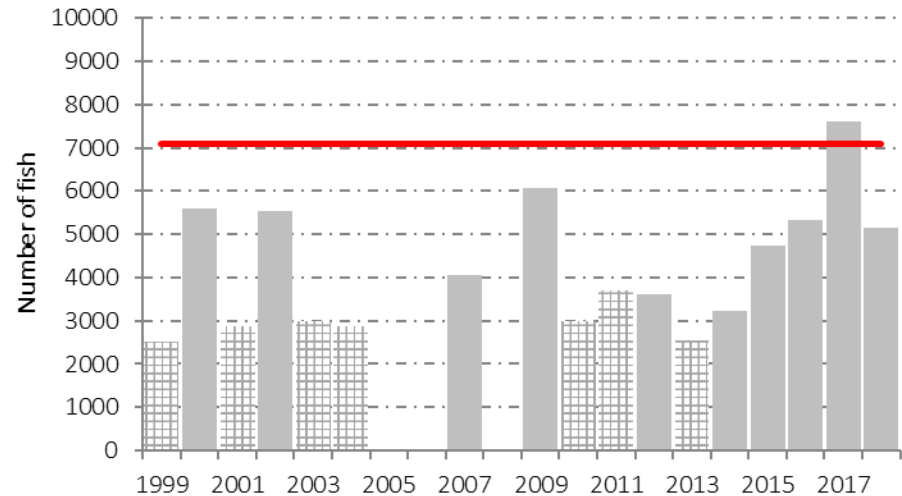
Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010			3435			
2011			3435			
2012	702	1579	3435		46.0	
2013			3435			
2014	643	1400	3435		40.8	
2015	1606	2497	3435		72.7	
2016	995	2700	3435		78.6	
2017	944	4336	3435		126.2	
2018	1332	3079	3435		89.6	

Spawner counts Restigouche River


Restigouche River small salmon



Restigouche River large salmon



Year	Grilse	Salmon	LRP equivalent	USR equivalent	% Achieved	
			(in # of large salmon)	(in # of large salmon)	LRP (1.52)	USR
2010	2457	3004	7092		42.4	
2011	1570	3711	7092		52.3	
2012	1617	3615	7092		51.0	
2013	400	2536	7092		35.8	
2014	1179	3237	7092		45.6	
2015	4064	4736	7092		66.8	
2016	2662	5324	7092		75.1	
2017	2461	7603	7092		107.2	
2018	3158	5159	7092		72.7	



Bilan saumon 2018 Rivières du Québec

Restigouche Science Advisory Committee
30-31 janvier 2019

Quebec Rivers – Rivières Québec

Captures 2018 Catches

Madeleineaux/Grilse retained

Rivières	2018	2017	moyenne 13-17
Matapédia	663	358	451
Causapscal	30	13	15
Patapédia	45	12	37
Kedgwick	10	1	6

Saumons/Salmon retained

Rivières	2018	2017	moyenne 13-17
Matapédia	118	213	431
Causapscal	76	111	128
Patapédia	0*	0*	15

Remises à l'eau/ releases

Rivières	Graciations/ C&R		
	2018	2017	Moyenne 13-17
Matapédia	723	631	478
Causapscal	61	21	14
Patapédia	26	29	44
Kedgwick	7	3	3

Effort de pêche/Fishing effort

Rivières	Jour/pêche - Rod/days		
	2018	2017	moyenne 13-17
Matapédia	7992	7507	7904
Causapscal	359	367	349
Patapédia	581	666	798
Kedgwick	187	183	219

*11-21 % are Grises – 11-21 % de Madeleineaux

Quebec Rivers – Rivières Québec

Montaison (incluant captures) / Return (Including catches)

Rivières	Madeleineaux / Grilse		
	2018	2017	moyenne 13-17
Matapédia	880*	440*	631
Causapscal	39	24	47
Patapédia	133	60	130

Rivières	Saumons / Salmon		
	2018	2017	moyenne 13-17
Matapédia	1725*	1830*	1596
Causapscal	446	627	661
Patapédia	359	393	404

*Nombre estimé à partir des décomptes de mi-saison

Déposition d'œufs/egg deposition

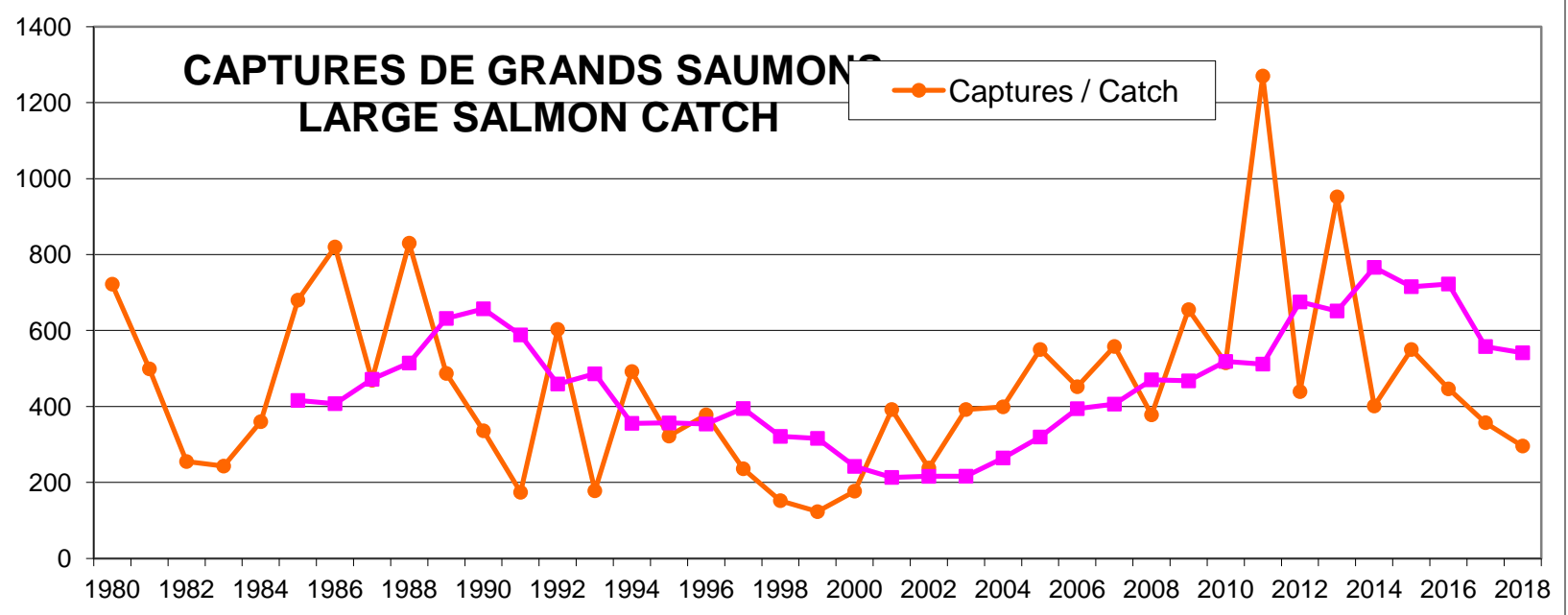
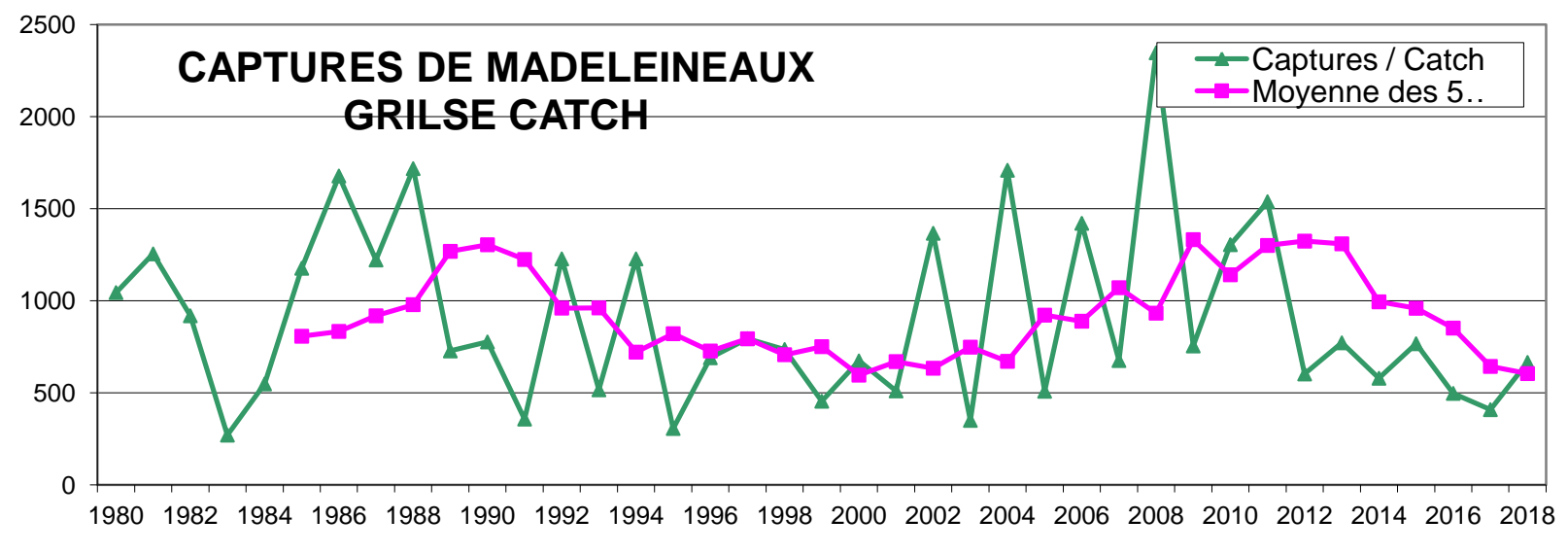
Rivières	déposition d'œuf			
	2018	2017	moyenne 13-17	% seuil optimal
Matapédia	10,4*	12,4	8,2	100 %
Causapscal	2,4	3,6	3,6	100%
Patapédia	2,3	2,8	2,6	81 %

*Poids moyen des grands saumons plus faible en 2018

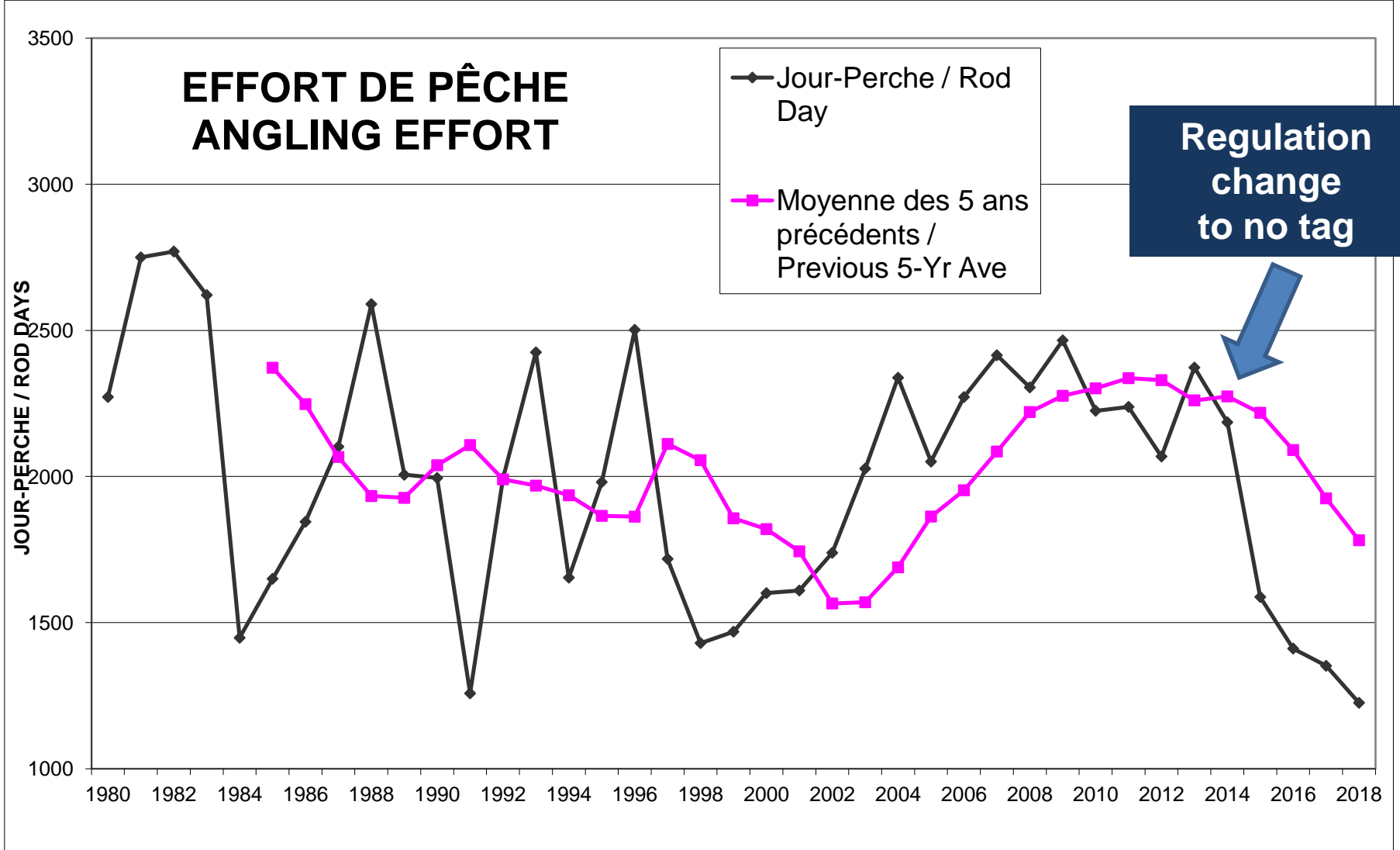
Forêts, Faune
et Parcs

Québec 

Crown Reserved waters



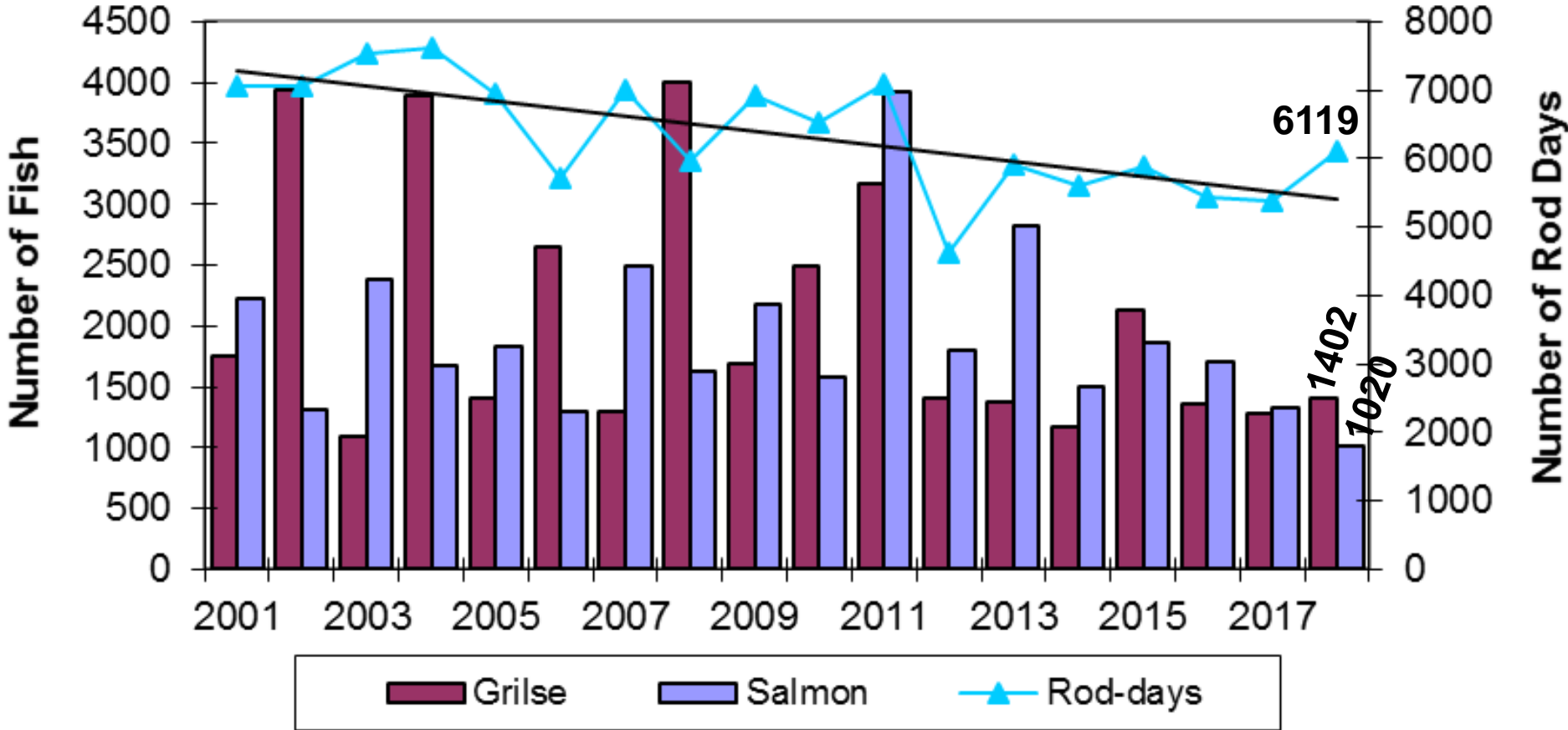
Crown Reserved waters



Private fishing camps – camps de pêche

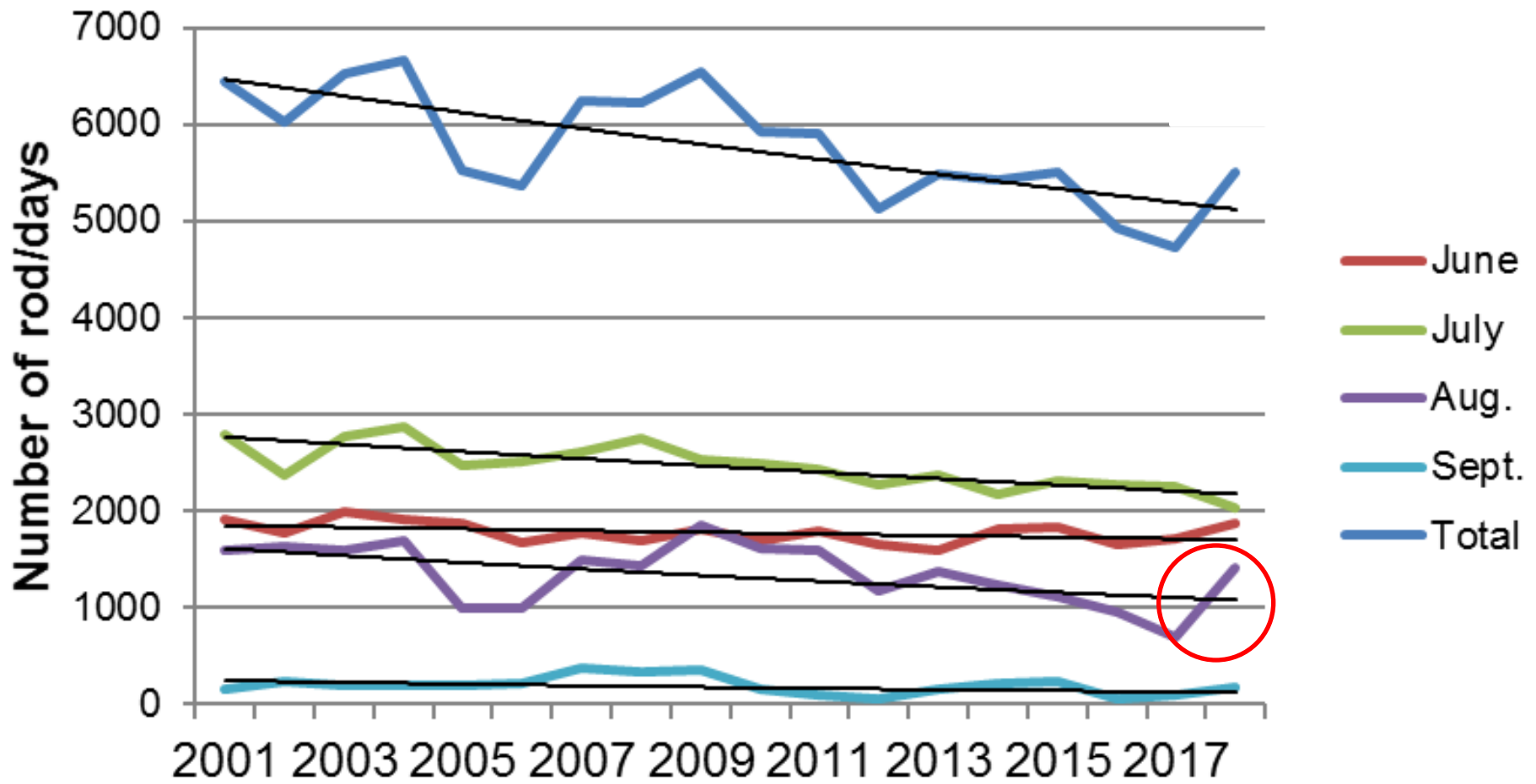


Restigouche N.B. - Lodge Angling
"Catch & Effort"



Private fishing camps – camps de pêche

Rod/days – jours/pêche



Juvenile abundances in the Restigouche 2018

Overview of sampling effort

Catchment	Start	End	Number of sites
Main channel	23rd July	5th September	11
Kedgwick	15th July	31st July	17
Little Main	15th July	1st August	10
Upsalquitch	6th August	3rd September	20
Patapedia	20th August	21st August	7
Matapedia	22nd August	29th August	13
Others	19th August	3rd September	2

80 sites sampled in total: 15 closed, 65 open.

Juvenile abundances in the Restigouche 2018

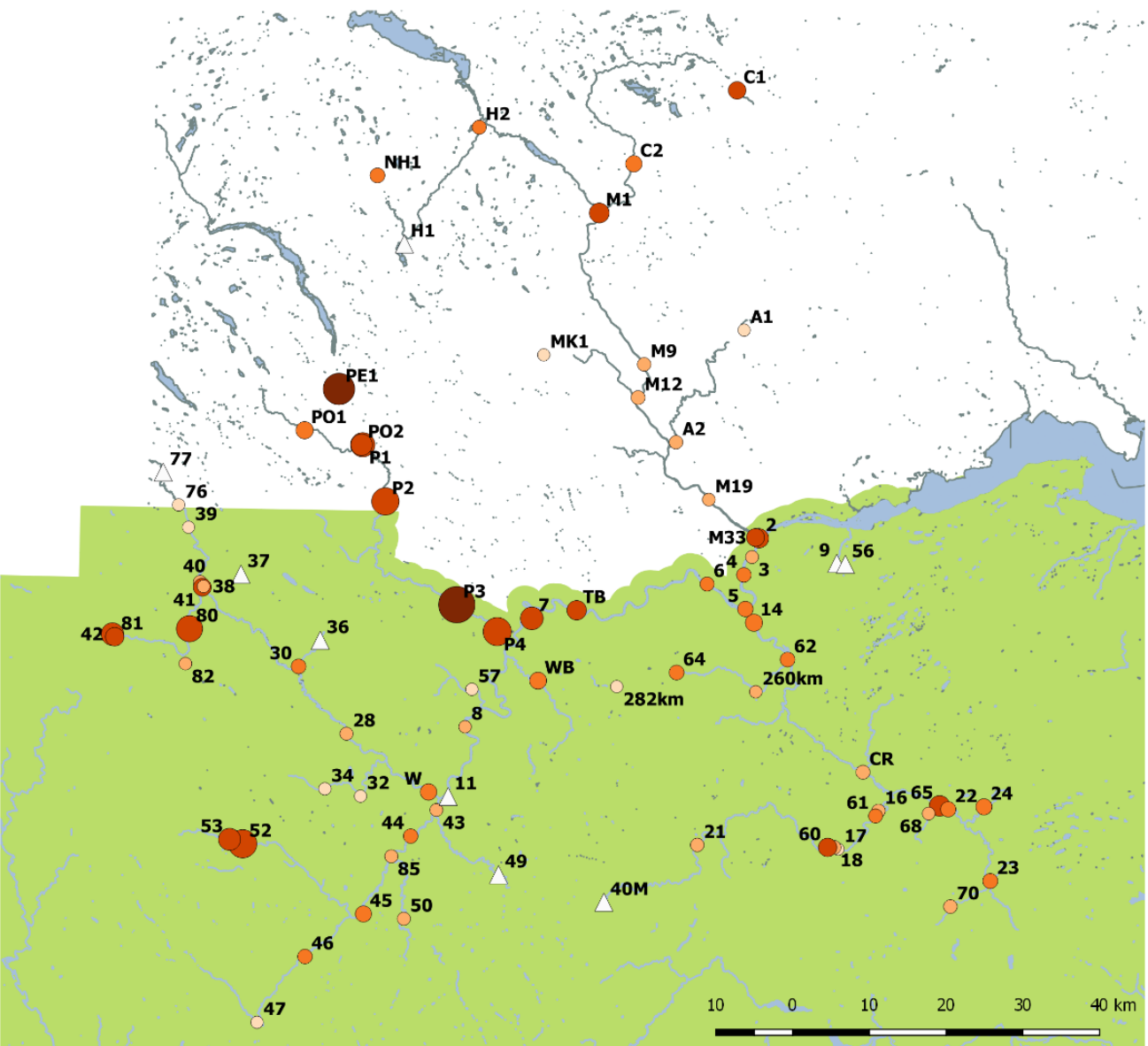
Overview of sampling effort

Catchment	0+	1+	2+
Main channel	=	▼	=
Kedgwick	▼	▼	▲
Little Main	▼	▼	▲
Upsalquitch	▼	▲	▲
Matapedia	▼	▼	▲
Patapedia	▲	▼	▼

80 sites sampled in total: 15 closed, 65 open.

Juvenile abundances in the Restigouche 2018

0+ densities in 2018



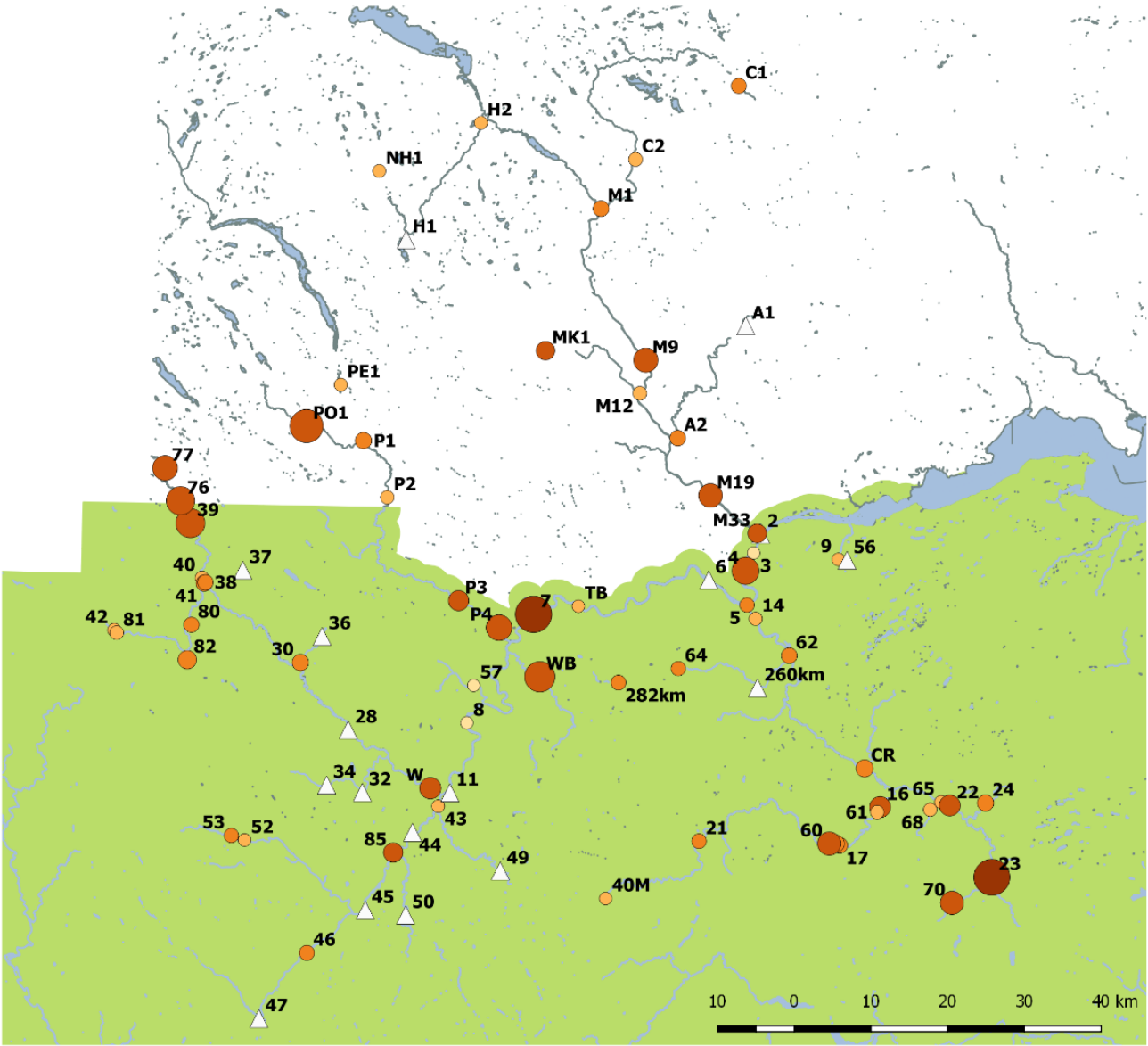
- Legend**
- 0+ densities
- 0.5
 - 1
 - 1.5
 - 2
 - △ no fish caught
 - 2.5th - 25th percentiles
 - 25th - 50th percentiles
 - 50th - 75th percentiles
 - 75th - 97.5th percentiles
 - >97.5th percentile

Densities ranging from 0.01 to 2 fish/m²

9 sites with no 0+

Juvenile abundances in the Restigouche 2018

1+ densities in 2018



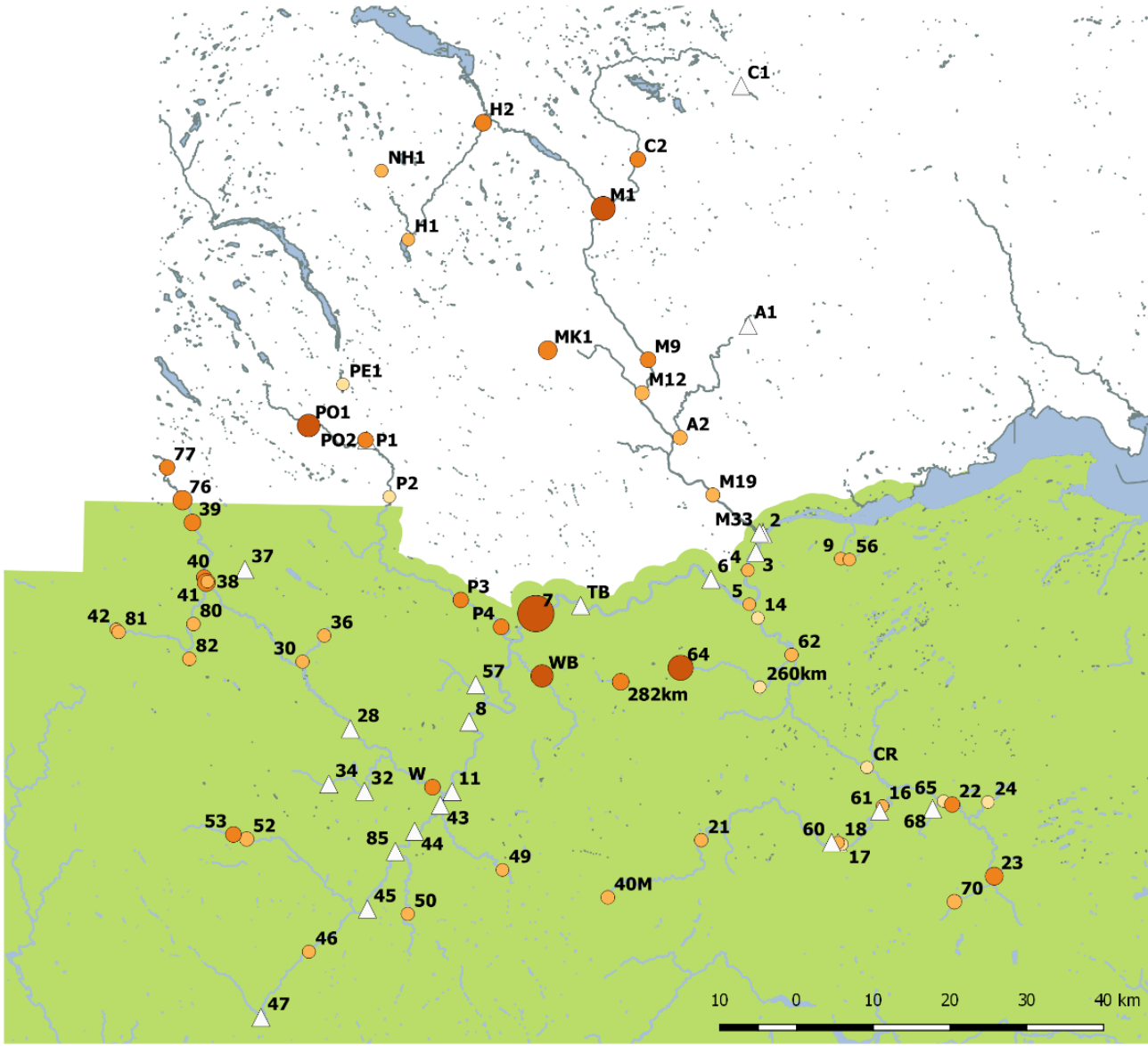
- Legend
- 1+ densities
- 0.2
 - 0.4
 - 0.6
 - △ no fish caught
 - 2.5th - 25th percentiles
 - 25th - 50th percentiles
 - 50th - 75th percentiles
 - 75th - 97.5th percentiles
 - >97.5 percentile

Densities ranging from 0.01 to 0.57 fish/m²

17 sites with no 1+

Juvenile abundances in the Restigouche 2018

2+ densities in 2018



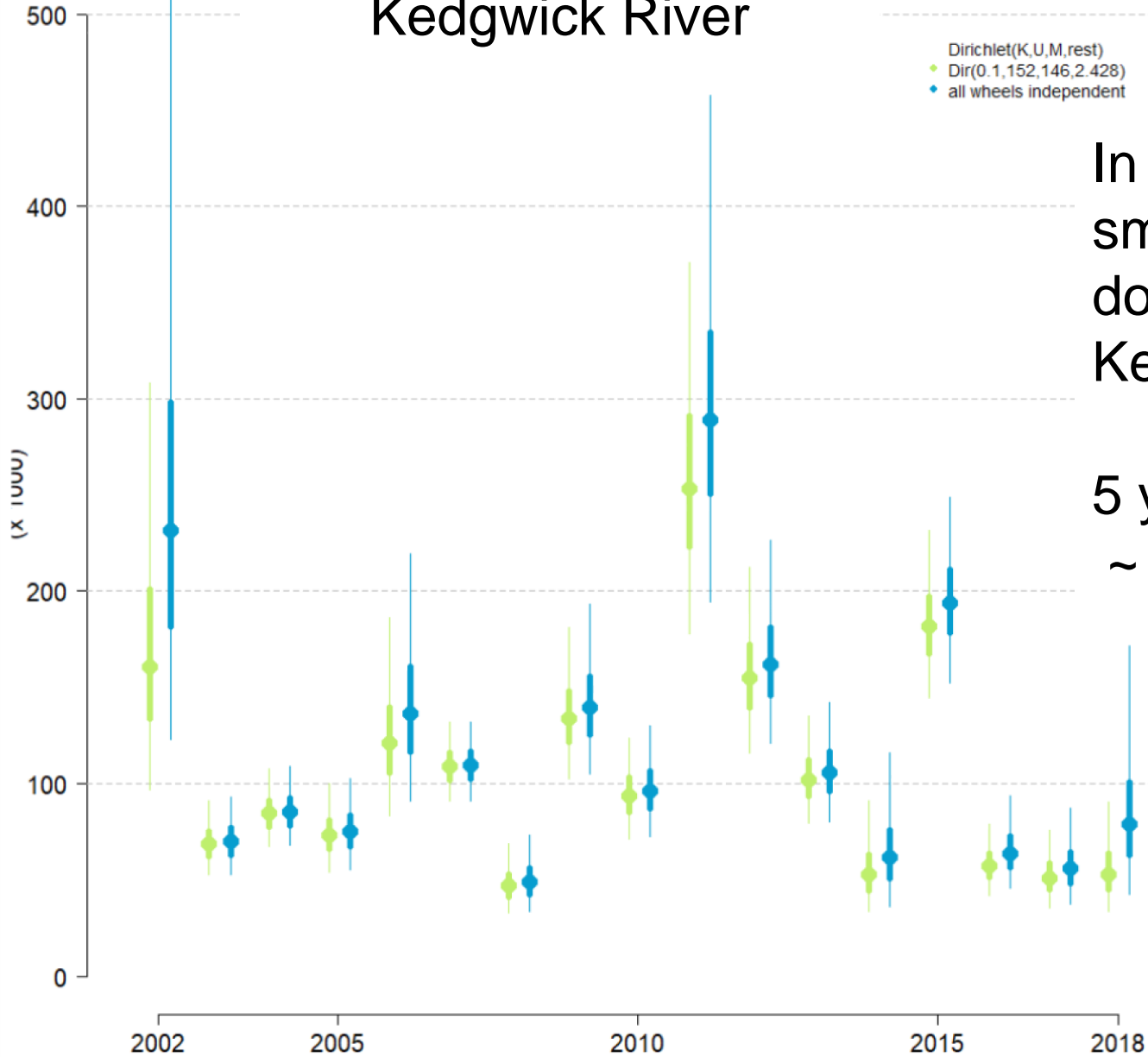
- Legend**
- 2+ densities
 - 0.1
 - 0.2
 - 0.3
 - 0.4
 - 0.5
 - △ No fish caught
 - 2.5th - 25th percentiles
 - 25th - 50th percentiles
 - 50th - 75th percentiles
 - 75th - 97.5th percentiles
 - >97.5 percentile

Densities ranging from 0.01 to 0.49 fish/m²

19 sites with no 2+

Smolt abundance in the Restigouche

Kedgwick River

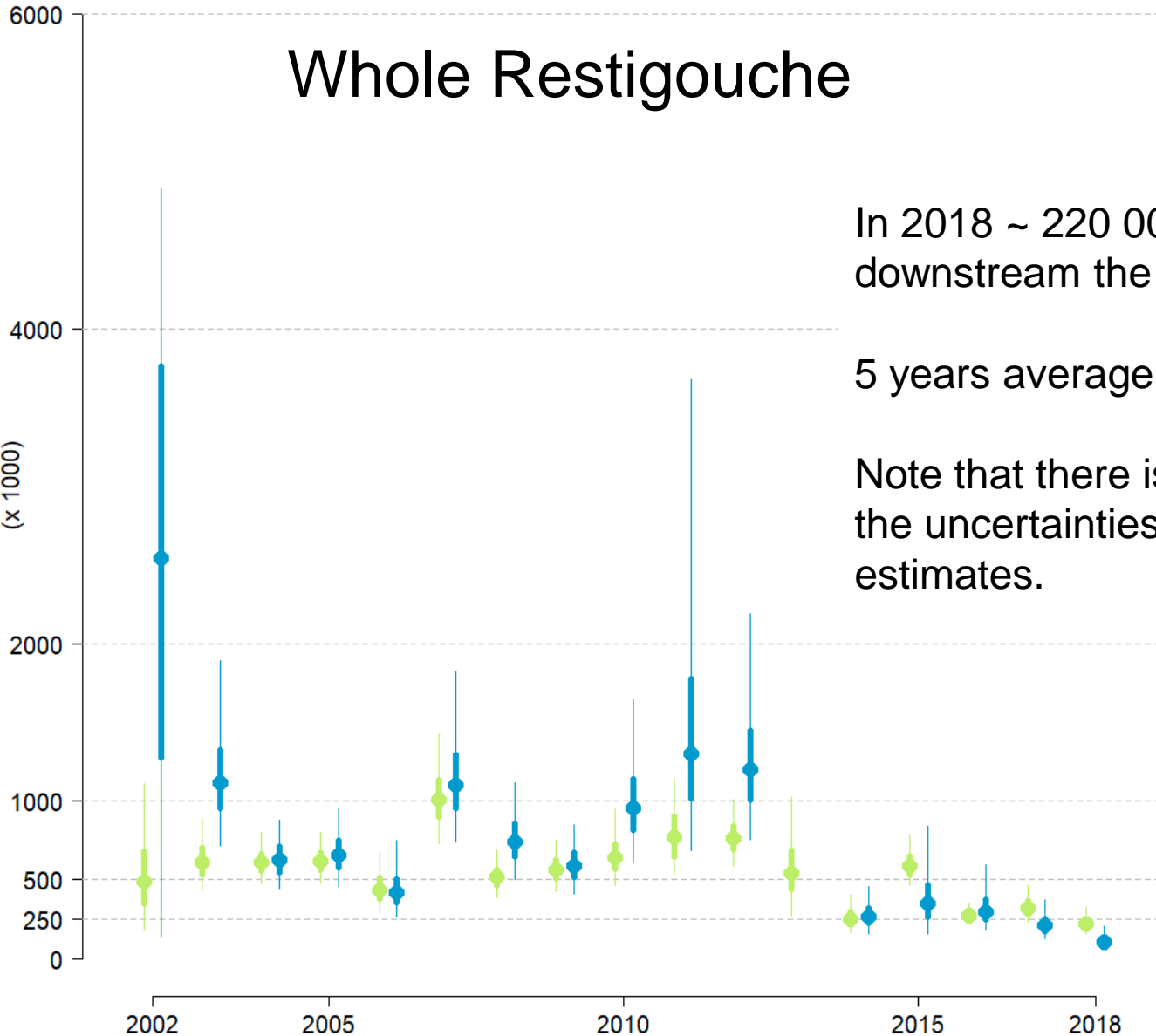


In 2018 ~ 53 000 smolts moving downstream the Kedgwick River.

5 years average ~ 80 000 smolts

Smolt abundance in the Restigouche

Whole Restigouche



In 2018 ~ 220 000 smolts moving downstream the Restigouche

5 years average ~ 330 000 smolts

Note that there is a significant reduction of the uncertainties for the whole river estimates.

Salmon Health Monitoring

Summer virus testing 2017-2018

Wider assay of tests for comparable tissue types (DFO)

- All field sampling took place at the Listuguj Wharf
- Total fish sampled per year: 30

2017 research paper : PRELIMINARY

Compare samples from the Restigouche, Saint-John and Magaguadavic

The most prevalent agents in the Restigouche population included (50% of samples)

- *Ichthyophonus hoferi* a common protist parasite (Marine + FW)
- *Parvicapsula pseudobranchicola* (Marine parasite common in farmed salmon)
- St John River had similar agents
- The Magaguadavic population was unique in its infectious agent community composition, carrying more viruses than any other group as well as other bacterial and parasitic agents.



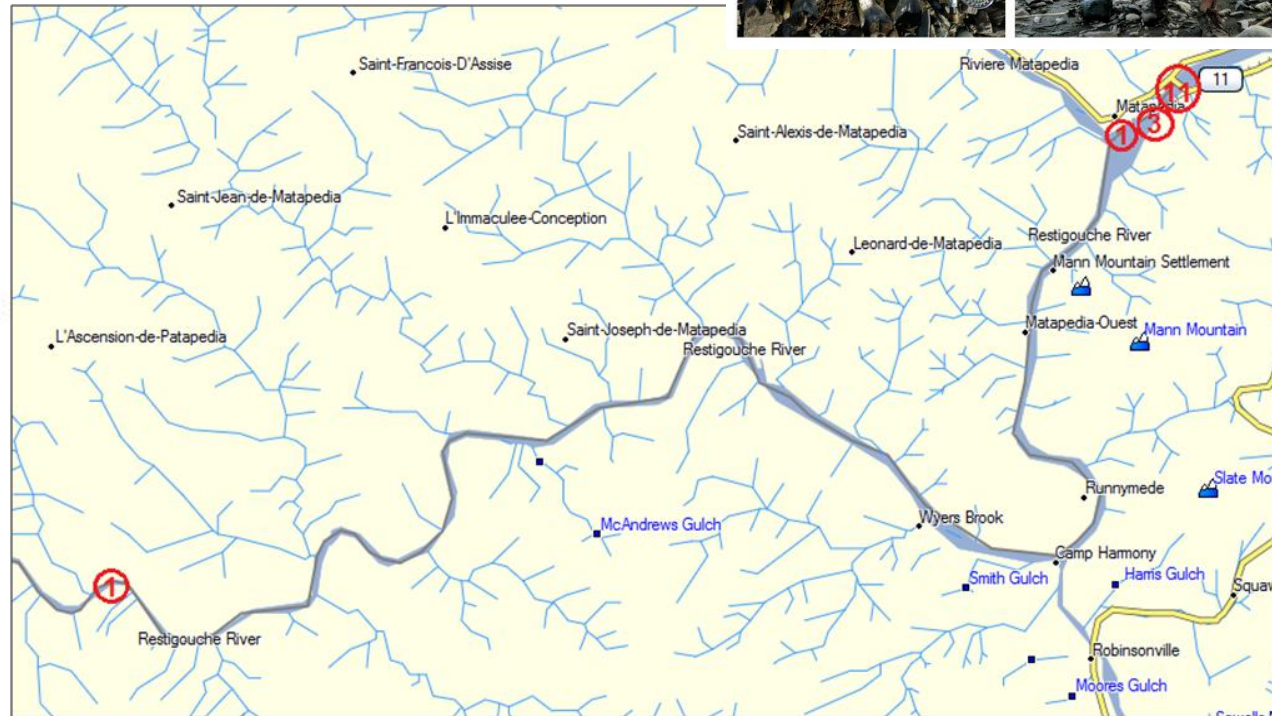
Natural Resource Directorate
Listuguj Fisheries



Striped Bass Bycatch Project



- 12 Licenses issued
- 10 Logs received
- Samples
 - 5 Bycatch
 - 11 Targeted
- Total Rod Hours*
 - 17 613



* Hours from logs received

Overall catches and observations – Restigouche and Matapedia rivers

Catches reported	Nbr	Location	Source	Note
20-06-2018	2	Riv. Restigouche, Pont CN	Rest. River Lodge	MPO
21-06-2018	1	Riv. Restigouche. Mc-Cullum		Remis à l'eau
03-07-2018	1	Riv. Matapédia, Fosse Angus		
07-07-2018	1	Riv. Matapédia, Routhierville		
11-07-2018	1	Riv. Matapédia, Glenn Emma		MFFP
11-07-2018	5	Riv. Restigouche, Mc-Cullum		Remis à l'eau
11-07-2018	7	Riv. Restigouche, Pont interpr.	David LeBlanc	MPO
12-07-2018	4	Riv. Restigouche, Pont interpr.	David LeBlanc	MPO
12-07-2018	1	Riv. Restigouche, Pont CN	Rest. River Lodge	MPO
07-07-2018	1	Riv. Restigouche, Red Pine	Rest. Salmon Club	MPO
17-07-2018	1	Riv. Restigouche, main pool	Rest. Salmon Club	MPO
19-07-2018	3	Riv. Matapédia, pont St-Alexis		Remis à l'eau
28-07-2018	1	Riv. Matapédia, Secteur 1		MFFP
xx-07-2018	1	Riv. Matapédia, Secteur 3		
Total by catch:	30			
	2	Sent to MFFP for analysis		
	16	Sent to DFO for analysis		
Observations	Nbr	Location	Source	
11-07-2018	100+	Riv. Restigouche, Mc-Cullum	David L	
xx-07-2018	4	Glen Emma-fosse bridge		
xx-07-2018	1	Glen Emma - Hell's gate pool		
23-07-2018	30	Pont couvert	CGRMP	
23-07-2018	12	Glen Emma - Mc Neil	CGRMP	
24-07-2018	6	Glen Emma-Fosse Stephenson	CGRMP	
24-07-2018	15	Glen Emma-Fosse Richard	CGRMP- décompte	
24-07-2018	50	Glen Emma-Fosse Falls	CGRMP- décompte	
24-07-2018	12	Glen Emma-Fosse Angus	CGRMP- décompte	

Stomach content analysis n: 9/16 bass	
Species	Total
Small Cyprinids	14
Atlantic Salmon	4
Crayfish	2
American Eel	2
White Sucker	1
Gaspereau	1

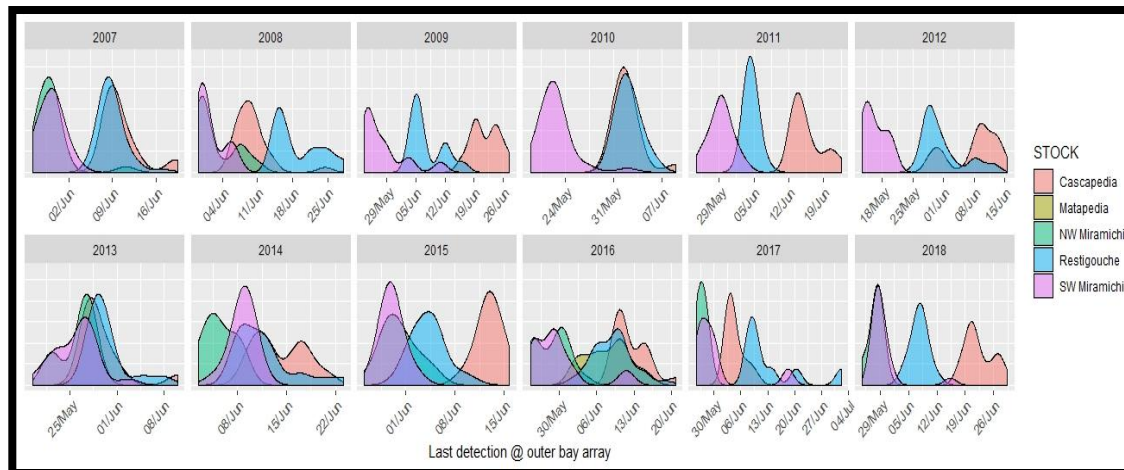
Atlantic Salmon Federation Research Update

Jonathan Carr

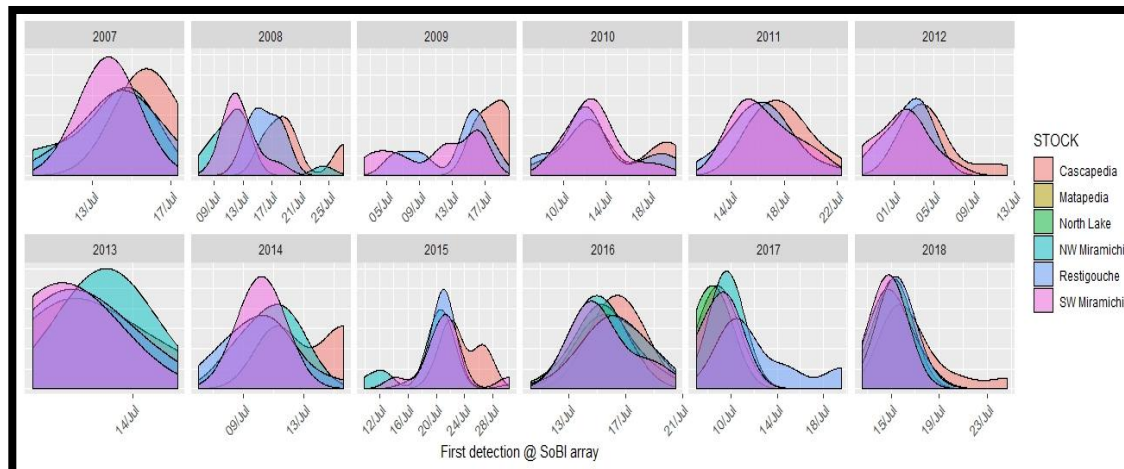


RRWMC Science Advisory Committee Meeting
January 30, 2019

Postsmolt and Kelt Migration Through SoBI



Movement “into” the gulf varies between stocks



Little variation between stocks when exiting the gulf

Connectivity model study 2017-2018

Watershed-scale connectivity analysis: An applied GIS model towards the strategic management of barriers to Atlantic salmon migration in the Restigouche River watershed (2017-2019)



Michael J. Arsenault, Allen Curry, Carole-anne Gillis, David LeBlanc, Tommi Linnansaari, and Jae Ogilvie



Connectivity model study 2017-2018



Undersized crossing



Perched crossing



Beaver dam blockage

Barriers to migration

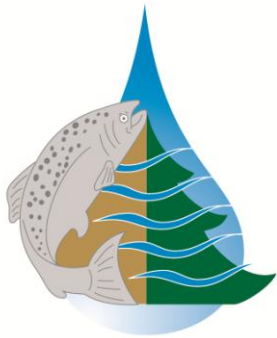
Connectivity model study 2017-2018

Outcome

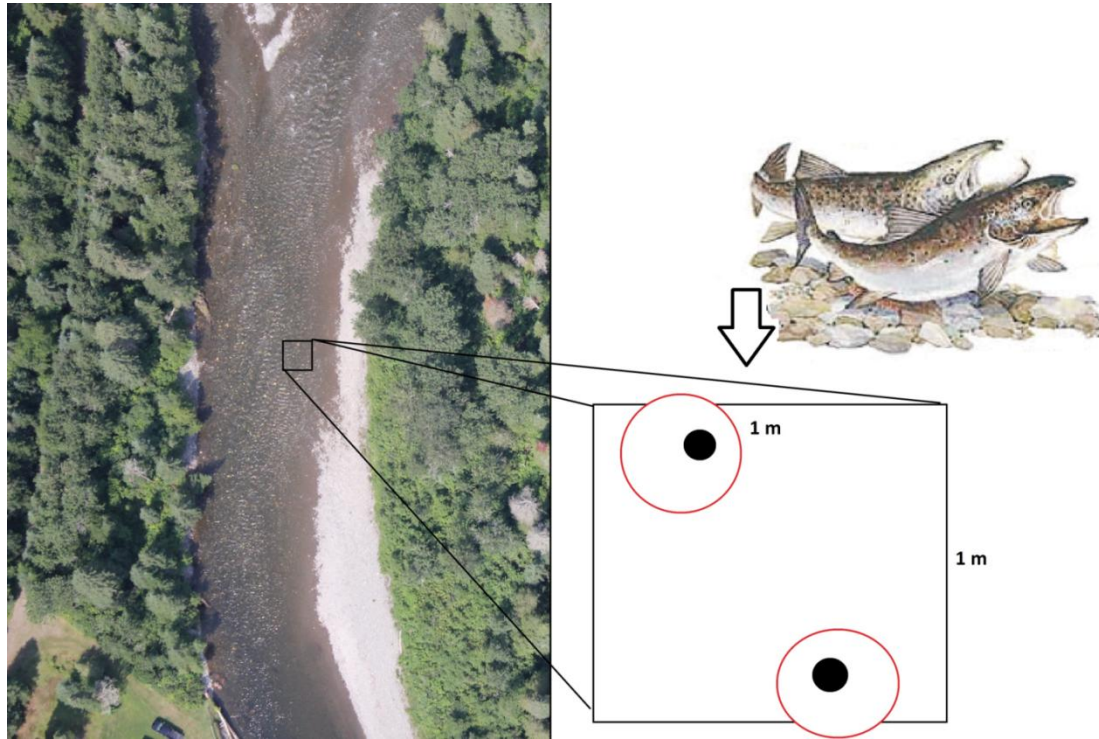
- An adaptive, cost-effective approach for maintaining road networks
- A detailed inventory of culverts and beaver dams within the watershed
- A model that can predict stream networks based on DEM (LiDAR) data that can be used on other watersheds
- A set of models that can identify culverts that have a high chance of preventing upstream migration



Restigouche habitat area update in the context of the precautionary approach - *David LeBlanc, RRMWC*



RRWMC
CGBVRR



Restigouche Science Advisory Committee
Campbellton, 2019



Kedgwick River Watershed

- North Branch Clearwater/Clearwater Brook
- McDougall Brook
- States Brook
- Portage
- Belle Kedgwick
- Union

Sub watershed	m ²
Kedgwick	174 709
Little Main Restigouche	56 906
Upsalquitch	450 994
Main Restigouche	109 499
TOTAL	+792 108

Habitats salmonicoles
 Cours d'eau



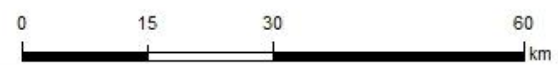
Habitat characteristics Population biological characteristics

River	Egg requirement (million)		Fluvial area (million sq m)		Prop. of MSW in run	Proportion of female in MSW	Nbr eggs/female	Prop of eggs from MSW	LRP egg rate	MSW requirement	
	Before	Proposed	Before	Proposed					Before	Proposed	
	Restigouche (excl. Matapedia)	36,22	40,11	21,62	26,39	0,61	0,63	8978	0,993	1,52	6404
Update + 792,108 m ²	40,11	41,32	26,39	27,18	0,61	0,63	8978	0,993	1,52	7091	7305

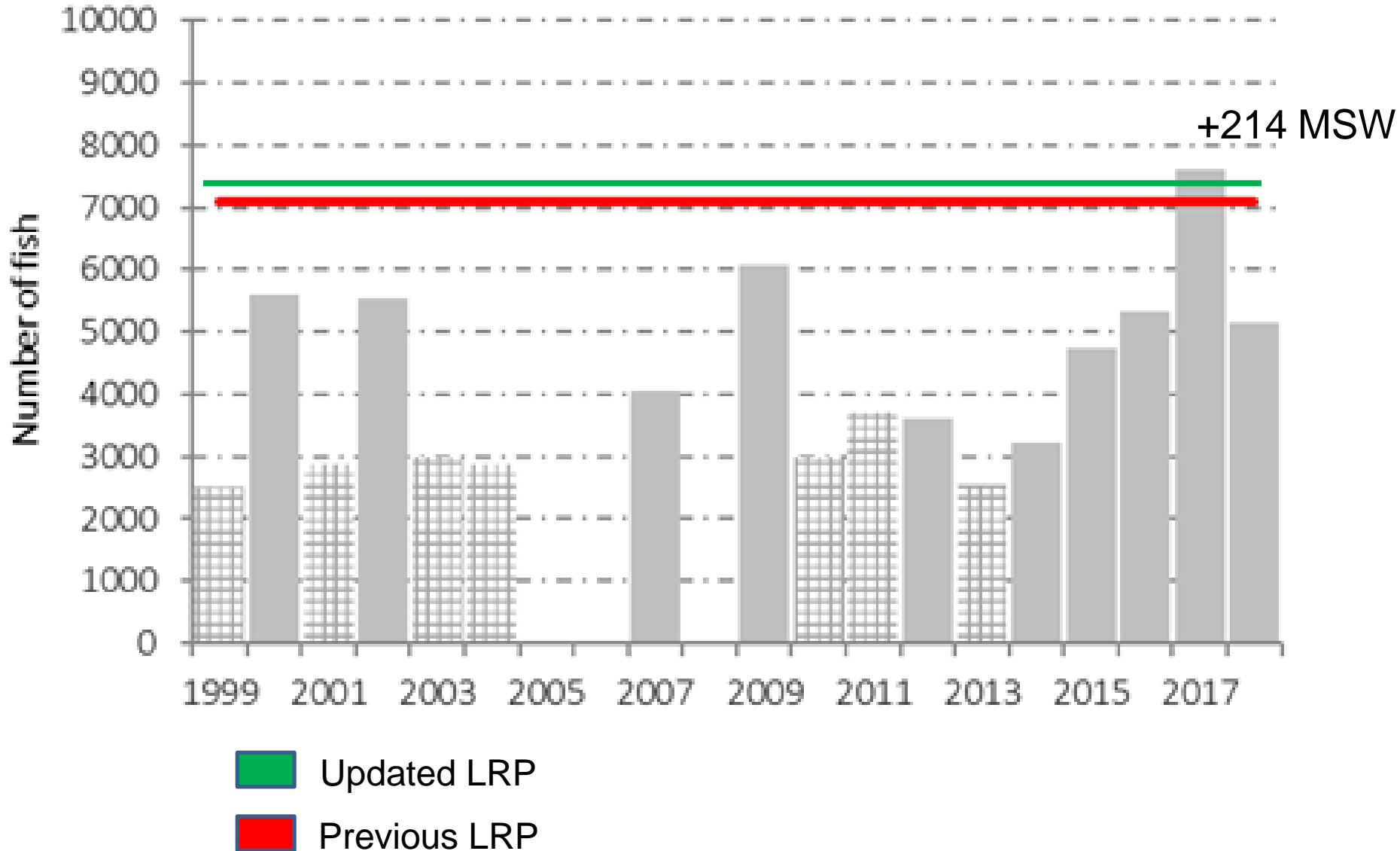
- Little Five Fingers
- Boston Brook
- Bells Brook
- Cyr Brook
- Cedar Brook

Main Stem Restigouche River

- Cheuters Brook
- Beaver Brook
- Hailes Brook



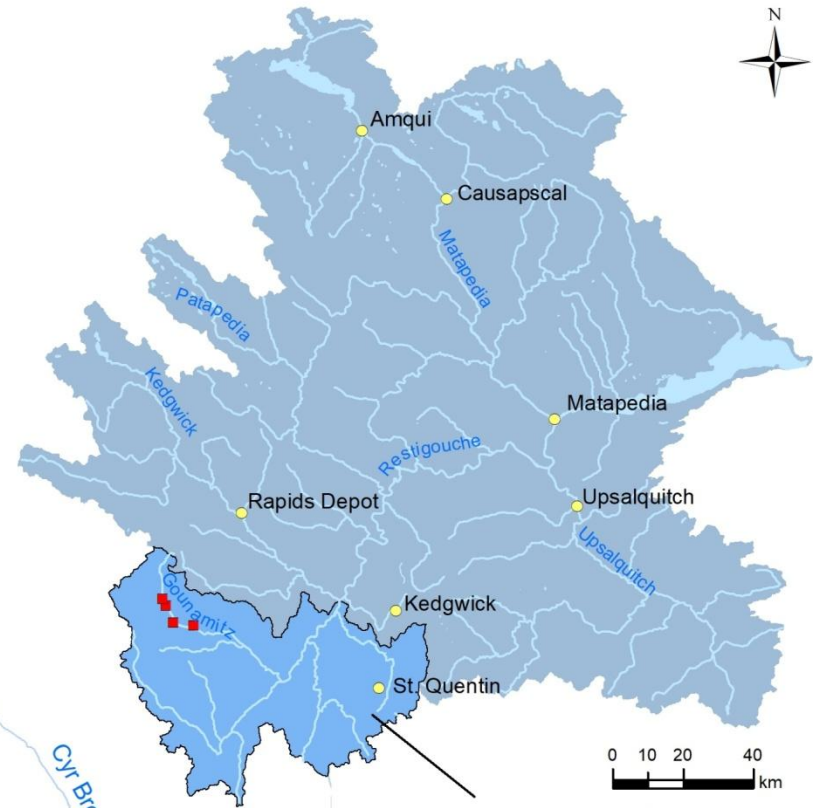
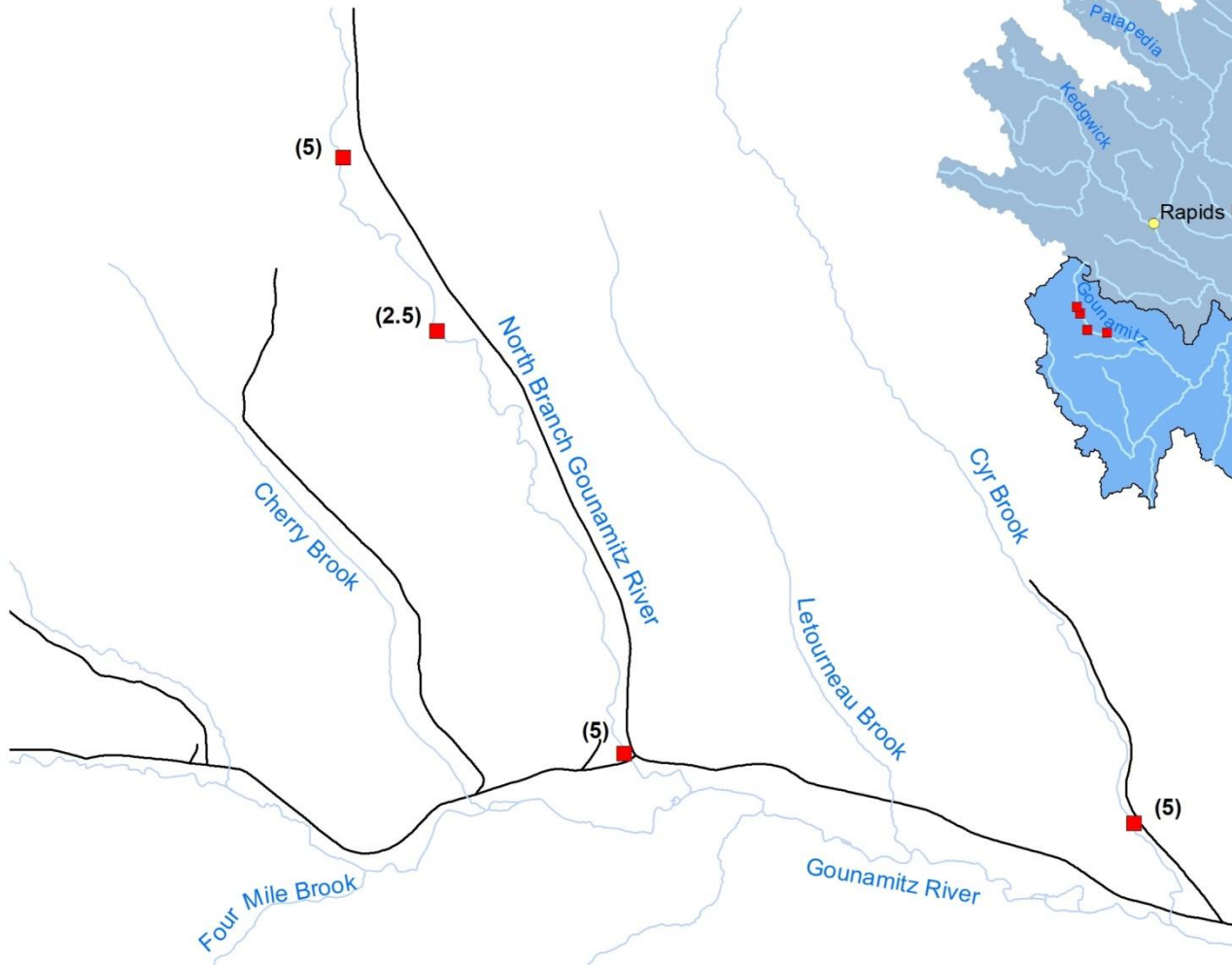
Restigouche MSW numbers and LRP targets with old vs. new habitat



Scotty boxes – Egg planting in vacant habitats

Carole-Anne Gillis





Little Main Restigouche Watershed

■ Scotty Box



Vacant habitat recolonization

In stream incubators (Scotty boxes)



**17 500 fertilized eggs from 4 females + 4 males collected at Boston Brook Lodge home pool
Incubation boxes deployed on Cyr Brook and Northbranch Gounamitz**

