



Restigouche 2011

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

SCIENCE COMMITTEE / COMITE SCIENTIFIQUE

Committee membership

- DFO Science
- NB DNRE
- Quebec MRNF
- Gespe'gewaq Mi'gmaq Resource Council (GMRC)
- Listuguj First Nation
- Eel River Bar First Nation
- Atlantic Salmon Federation
- FQSA
- RRWMC

Chair

- Paul Cameron (DFO)

Membres du comité

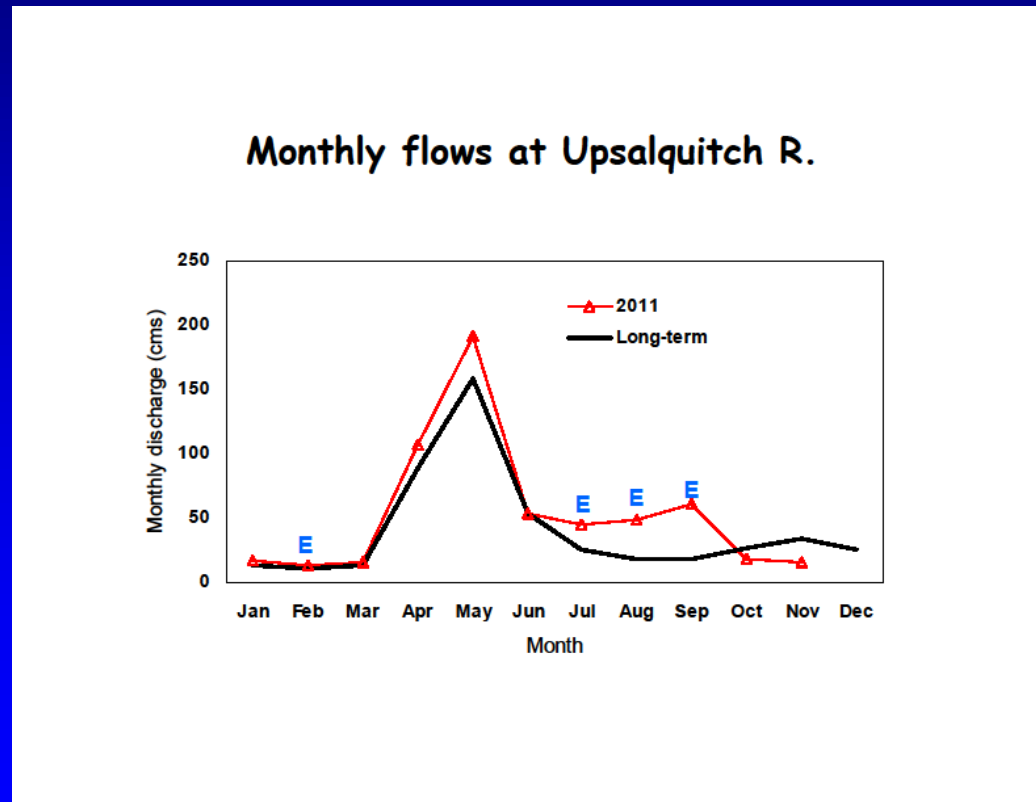
- MPO Science
- N-B MRNE
- Québec MRNF
- Gespe'gewaq Mi'gmaq Resource Council (GMRC)
- Listuguj First Nation
- Eel River Bar First Nation
- Fédération du Saumon Atlantique
- FQSA
- RRWMC

Président

- Paul Cameron (MPO)

Environment / L'environnement

- Excessive flows in February, July, August & September.
- High flow Apr. 30th (>2 year flood), spring freshet May 6th (near 10 year flood)
- No deficient flows in 2011
- Niveau d'eau était supérieur à la moyenne Février, Juillet, Août & Septembre
- Pas de niveau d'eau inférieur dans 2011



Restigouche (Upsalquitch station) 2011

Environment / L'environnement

- **Water temperatures were 1°C cooler than normal in 2011**
 - **Highest July 19th - August 6th (17.6 - 21.3°C)**
 - **Year-round water temperature recorders are located at 21 sites within the Restigouche River all were retrieved in 2011.**
- **Températures étaient 1°C moins chaude que normale dans 2011.**
 - **Température la plus chaude 19 juillet - 6 août (17.6 – 21.3°C).**
 - **Capteurs de température durant toute l'année sont distribués sur 21 sites dans la Restigouche – toutes retrouver en 2011.**



Maximum Water Temperatures (2003-2011)

Température de l'eau maximum (2003-2011)

Water Temperatures (2003-2011)

Summer water temperature statistics (July & Aug) for Restigouche River and tributaries (2003-2011)

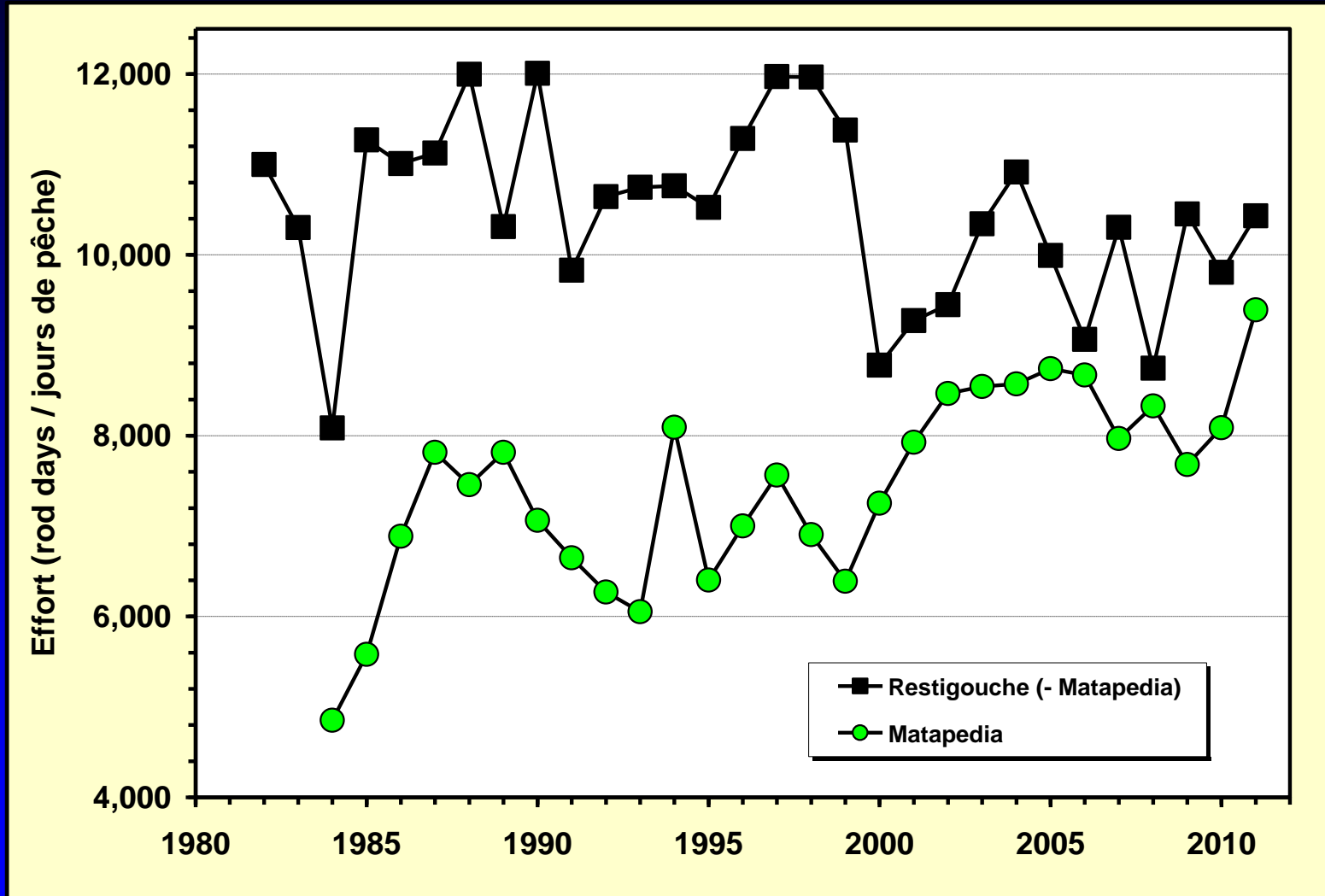
River	2003-2011	2011	2003-2011	2011
	Mean	Mean	Max	Max
Kedgwick River at Forks Pool	14.2	13.8	23.8	19.6
Kedgwick River 1 Mile bridge	15.6	15.2	25.3	20.7
Main Restigouche River at junction pool	16.0	15.6	24.5	20.5
Upsalquitch River at Crib Pool	16.9	15.0	25.7	17.6
Restigouche River at Camp Harmony	17.5	16.0	27.1	21.2
Patapedia River at 2 Mile	15.1	14.7	23.7	20.2
Patapedia River at 30 Mile	16.2	16.0	25.9	22.8
Restigouche River at Indian House	17.3	16.0	25.6	21.3
Restigouche River at Two Brooks	16.8	16.1	24.5	20.5
Restigouche River at Brandy Brook	17.2	16.2	27.8	23.1
Restigouche River at Moses Island	17.4	15.9	25.9	20.3
Restigouche River at Butters Island	18.0	16.8	27.1	20.7
N.W.Upsalquitch River at Ten Mile Pool	16.5	14.7	27.5	20.1
S.E.Upsalquitch above Basket Rock	15.7	15.0	24.5	20.0
Upsalquitch River at Two Brooks	16.7	15.6	24.5	19.3
Causapsal River at Barrier	15.9	14.3	26.8	20.6
Matapedia River below mouth of Causapsal	16.8	15.5	23.7	20.1
Matapedia River at Village Bridge	16.8	15.4	25.9	20.0
Little Main Restigouche River at Boston Brook	14.9	14.6	24.5	20.7
Larry's Gulch at DFO Meteorological Station	17.8		24.8	
Restigouche River above mouth of Upsalquitch River	17.5	16.8	25.0	22.1

Max temp (2011) = 17.6°C to 23.1°C

SPORTS FISHERIES / Les PÊCHERIES SPORTIFS



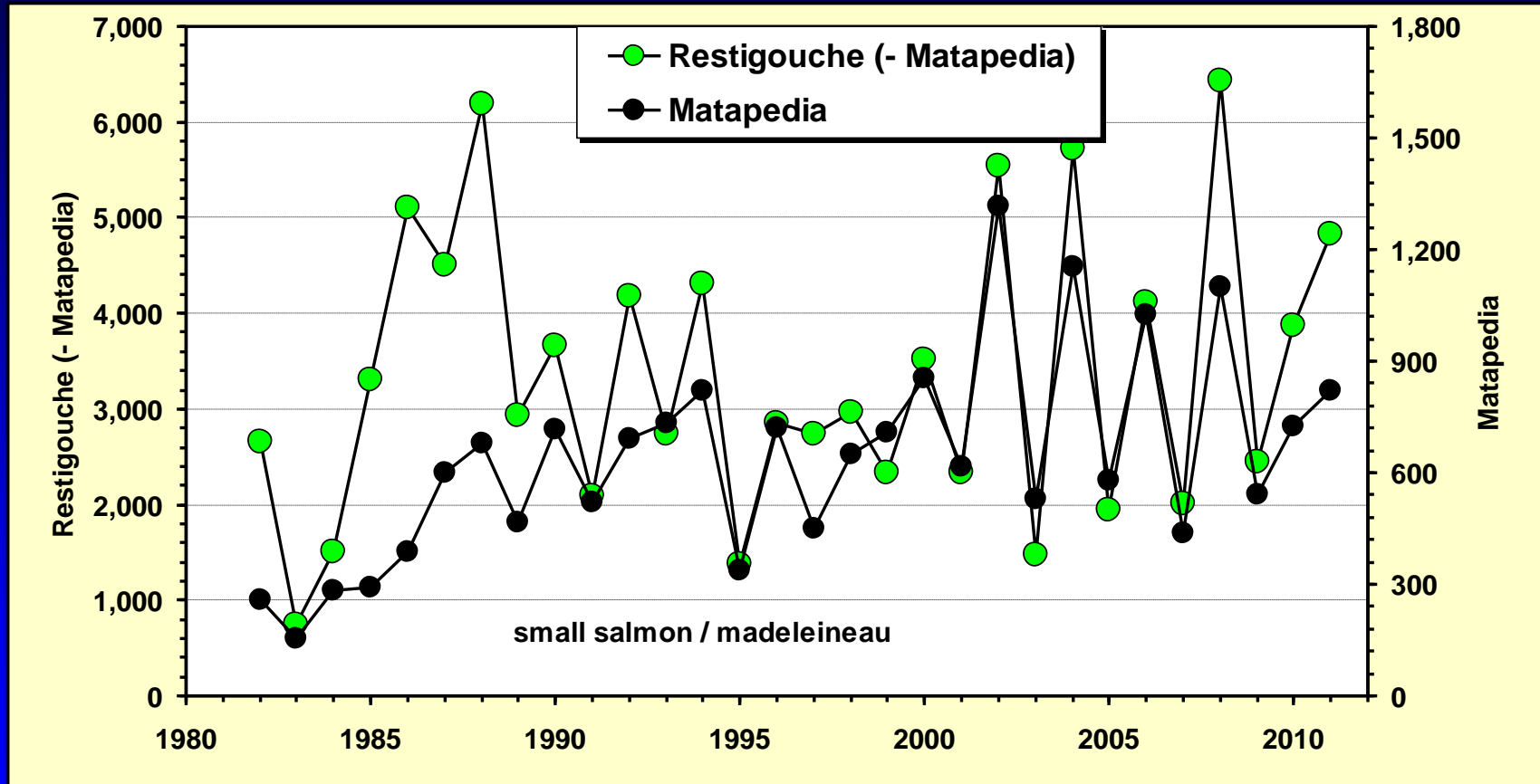
L'effort de pêche été supérieur dans le Restigouche et le Matapédia en 2011 en comparaison à 2010.



Effort up in 2011 compared to 2010 for both the Restigouche and Matapédia rivers.

Grilse / Madeleineaux

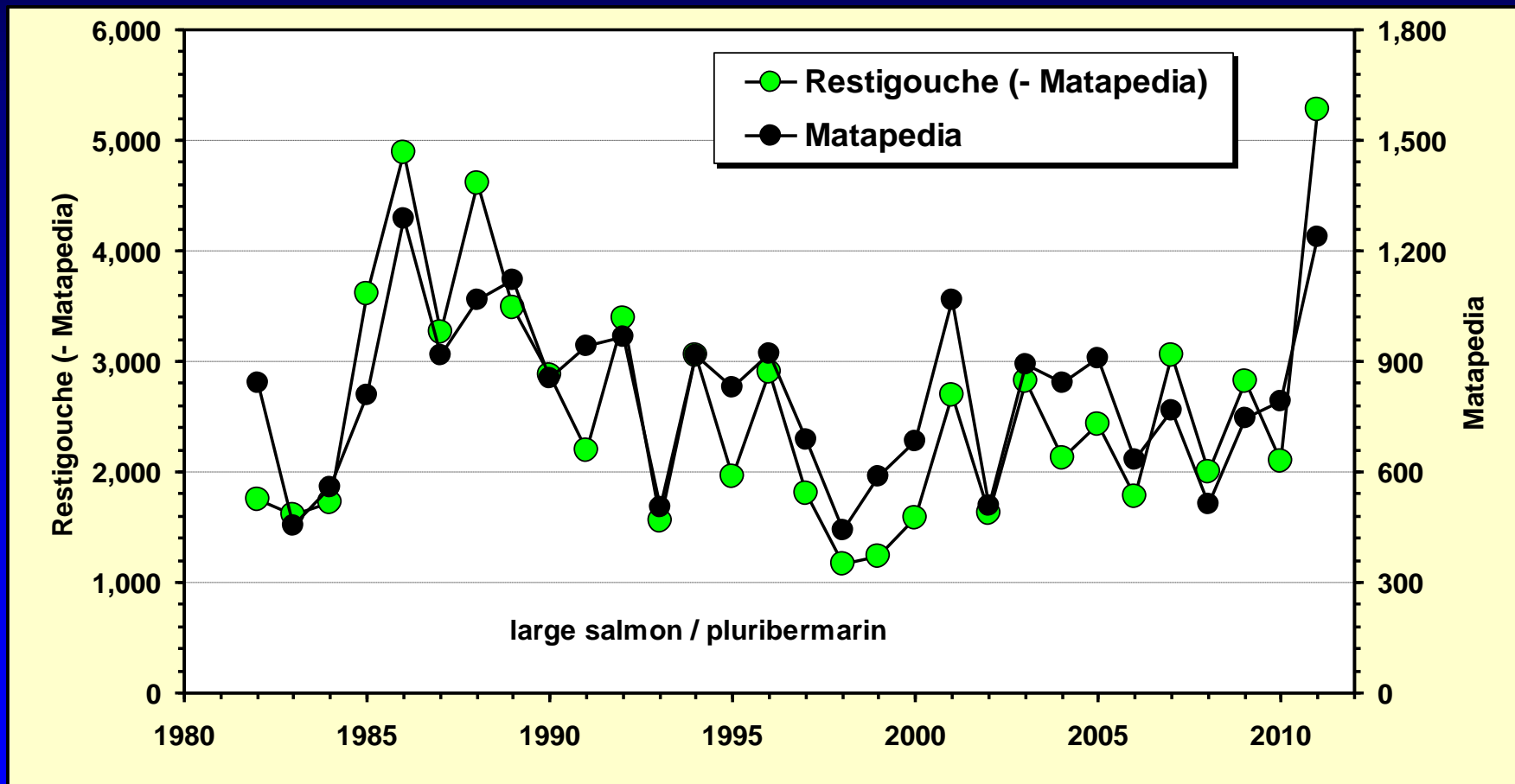
Captures de madeleineaux supérieures en 2011 en comparaison à 2010.



Grilse catches in the system were up in 2011 compared to 2010

Salmon / Saumon

Captures de saumons supérieures en 2011 en comparaison à 2010



Salmon catches in the system were up in 2011 compared to 2010

Returns and spawners / Montaisons et reproducteurs



Returns and spawners / Montaisons et reproducteurs

Restigouche New Brunswick spawner counts conducted in late Sept. & early Oct. were above the conservation requirement for the Little Main Restigouche and at or above the CR for Upsalquitch and Kedgwick. Main stem could not be completed.

-Matapedia: counts indicated egg depositions at 213% of conservation req.

-conservation exceeded every year since 1993

-Patapedia: counts indicated egg depositions were 319% of conservation requirements

-conservation exceeded every year since 1985

Décomptes de géniteurs ont atteint les superior le niveaux de conservation pour l'Upsalquitch et pres ou superior le niveau pour le Kedgwick et la Little Main Restigouche. Décomptes de la main stem Restigouche n'était possible cette annee.

-Matapédia : décompte indique une déposition d'oeufs à 213% du niveau de conservation

-excédant annuel depuis 1993

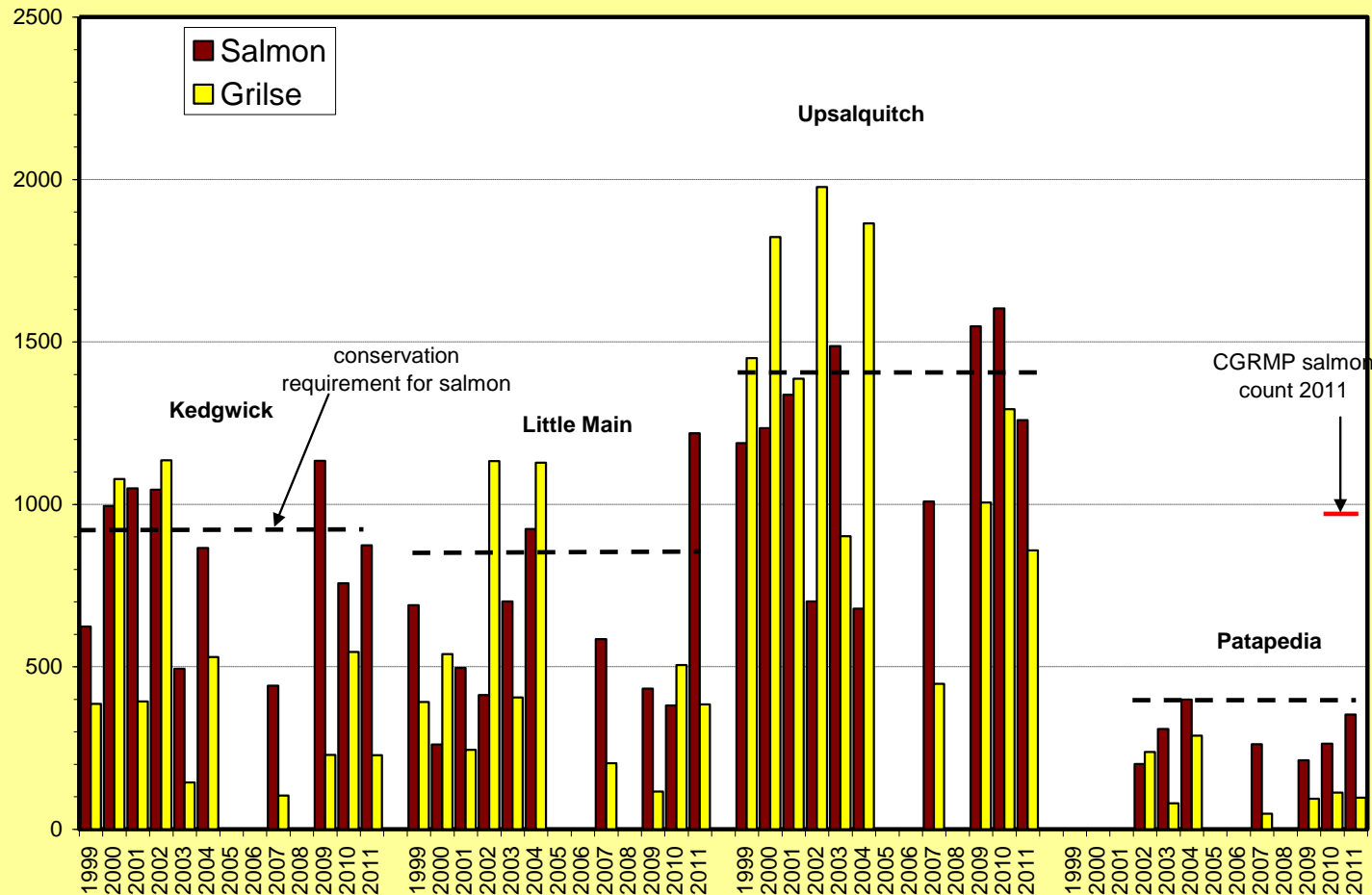
-Patapédia : décompte indique une déposition d'oeufs de 319% du niveau de conservation

-excédant annuel depuis 1985

Fall count / Décompte automnale

Rivers / Rivières	Grilse / Madeleineaux	Salmon
Upsalquitch	861	1,265
Little Main	384	1,219
Kedgwick	228	874
Patapédia	438	985
Matapedia	721	2,049
Causapscal	210	1,014

Visual (Snorkel) Counts Tributaries 1999 - 2011

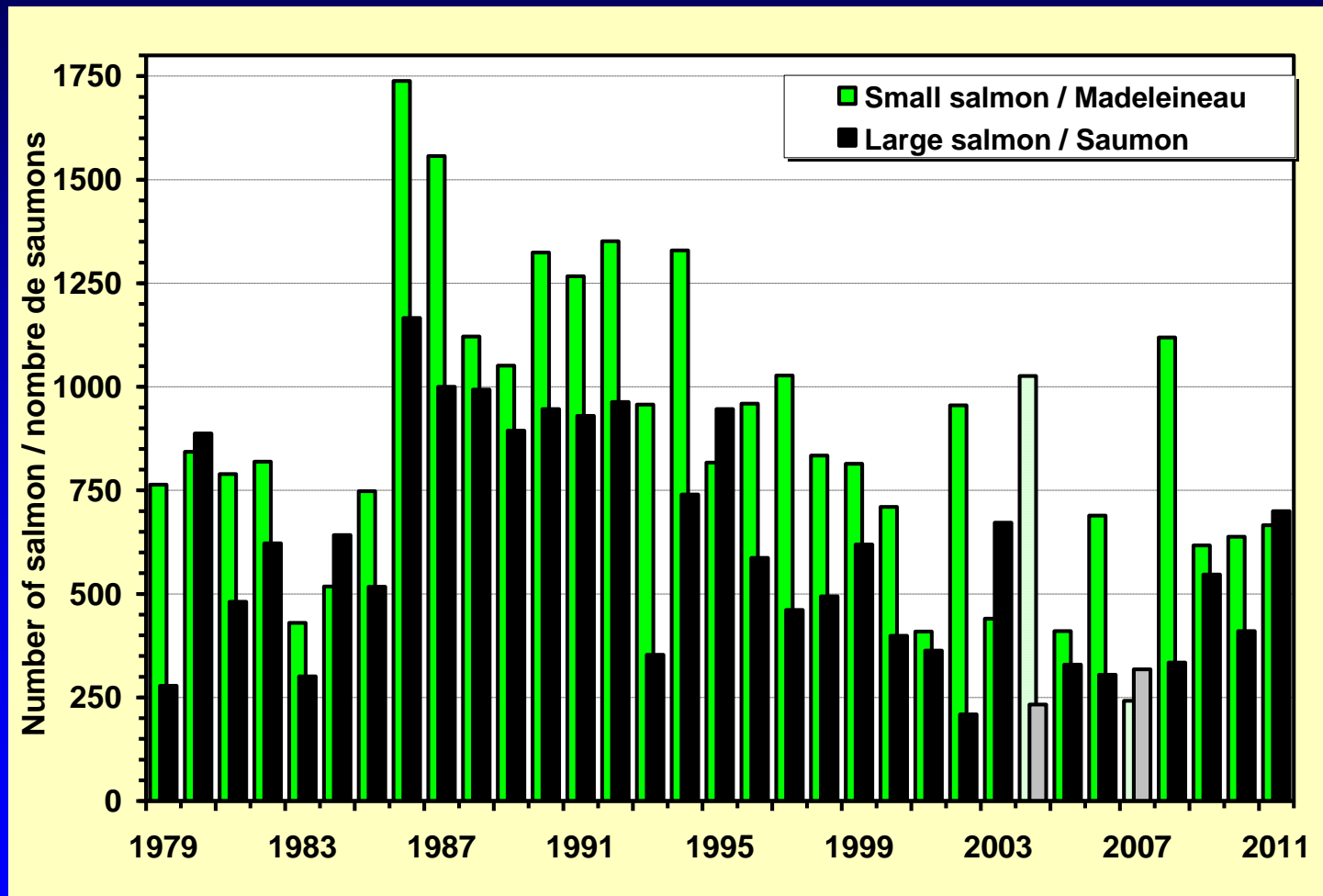


Counts are considered a minimum /

Ces décomptes représentent le minimum de poissons

North West Upsalquitch barrier

Décompte à la barrière de l'Upsalquitch (N-O); madeleineaux et saumons supérieures en 2011 en comparaison à 2010



Grilse and salmon counts in 2011 were up compared to 2010

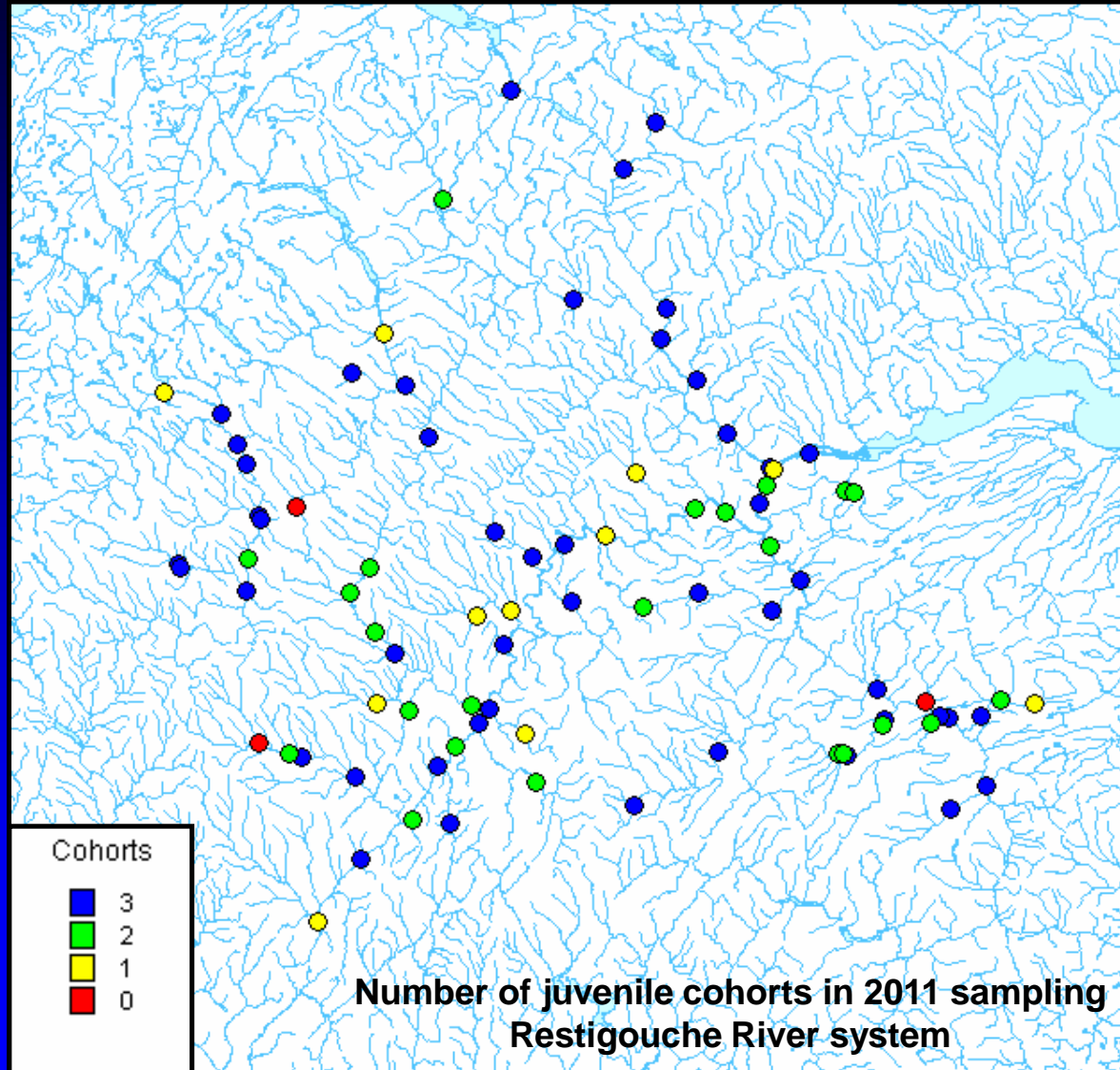
Salmon juveniles / Juvéniles de saumon



Abundances of juveniles sampled at 87 stations in 2011. Most sites had 2 to 3 juvenile year classes present.



Abondances de juvéniles échantillonnés à 87 sites en 2011. Il y avait de 2 à 3 cohortes de juvéniles dans la majorité des sites

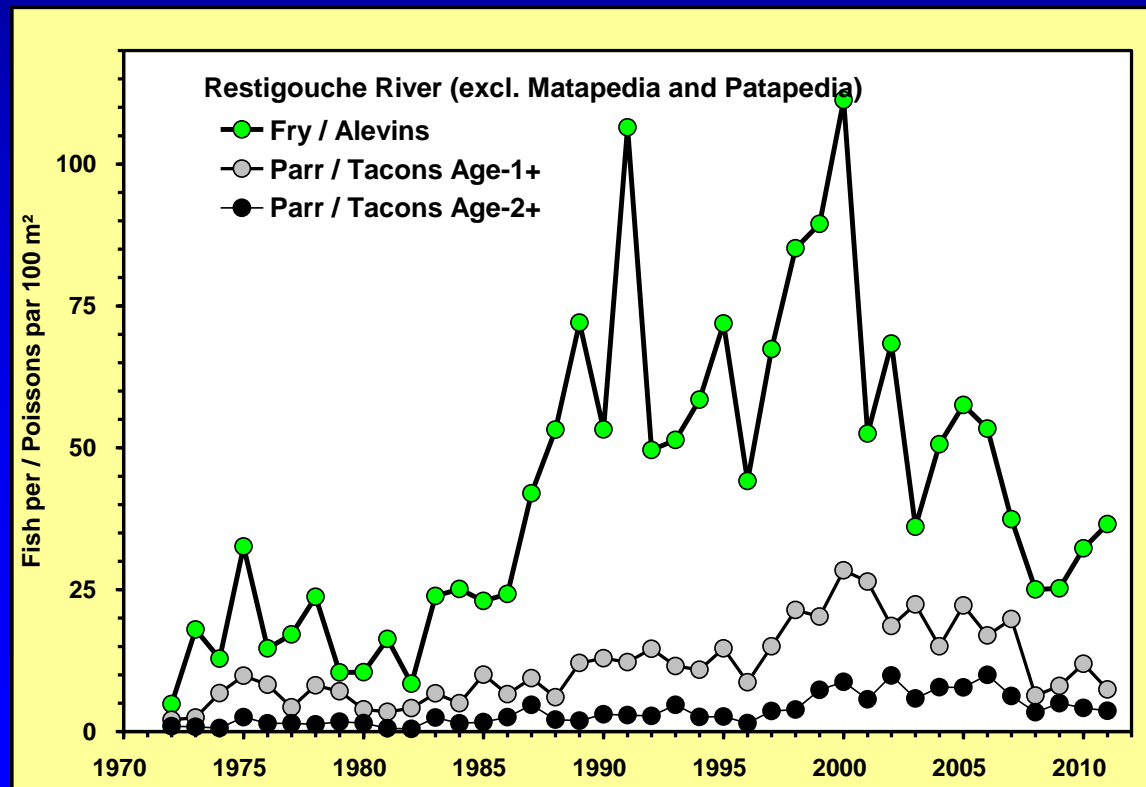


Salmon juveniles / Juvéniles de saumon



Restigouche New Brunswick fry densities are up in 2011 compared to 2010 while small and large parr densities are down.

L'abondance d'alevins est plus haut en 2011 que 2010 et les petit et gros tacons sont en bas dans Restigouche Nouveau Brunswick.



Atlantic salmon smolt production and biological characteristics

Caractéristiques et production de saumonnetaux de saumon Atlantique



Collaborative Science Project / Projet de Collaboration Scientifique

Listuguj First Nation, Eel River Bar First Nation, Restigouche River Watershed Management Council, Kedgwick Salmon Club, various lodges, Atlantic Salmon Federation, Fisheries and Oceans Canada, N. B. Department of Natural Resources

Atlantic salmon smolts / Saumonceaux de saumon Atlantique

Smolts are the final stage of fresh water production

Saumonneaux sont le dernier stade de production en eau douce

Objective:

- Is smolt production different among the tributaries?
- Is Atlantic salmon abundance limited by freshwater conditions?
- Is sea survival limiting adult salmon in the Restigouche?

Buts :

- Est-ce que la production de saumonceaux diffère entre les tributaires ?
- Est-ce que l'abondance du saumon est limitée par des facteurs en eau douce ?
- Est-ce que la faible survie en mer limite l'abondance de saumon adulte dans la rivière Restigouche ?



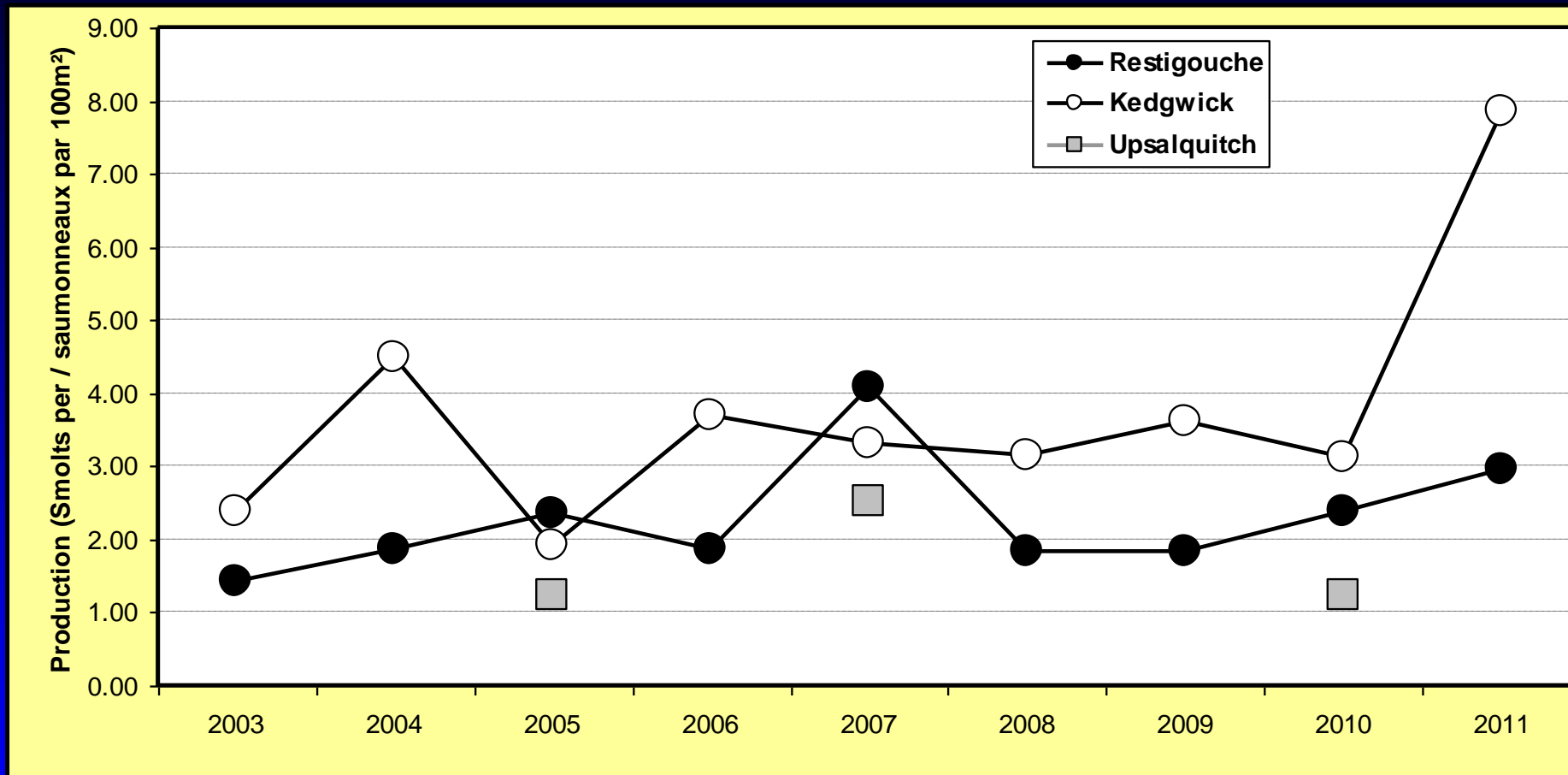
Atlantic salmon smolts / Saumonceaux de saumon Atlantique

Smolt abundance / Abondance de saumonceaux

	<u>Kedgwick</u>	<u>Restigouche total</u>
2003	91,800	379,000
2004	131,500	500,000
2005	67,000 (min.)	630,000
2006	129,000	500,000
2007	116,000	1,100,000
2008	110,000	487,000
2009	127,000	491,000
2010	108,600	636,000
2011	278,000	792,000

Age 100% age 3 years / ans

Atlantic salmon smolts / Saumonceaux de saumon Atlantique



View 2011 estimates cautiously :

- only one wheel was operational in the lower Restigouche.
- few tag recaptures at both the Kedgwick and Restigouche locations.
- lowest trap efficiency of the time series.

2010 - 2011 Restigouche Summary / Sommaire

	2010	2011
• Grilse / Madeleineaux	↑	↑
• Salmon/Saumons	↓	↑
• Angling / Pêche	OK	↑
• Conservation	OK	↑
• Juveniles / Juvéniles	OK	OK
• Smolts / Saumonceaux	Medium	High

ASF smolt sonic tracking work:

**Sonic tracking of Atlantic salmon:
lessons on the migration pathways,
mortality points, and social dynamics**



Jonathan Carr
January 25, 2012
Restigouche Science Meeting



**Director, Research & Environment
Atlantic Salmon Federation**

The “Issue” in summary

- North American salmon abundance stuck at historic low levels
- Hypotheses re. freshwater, estuary, sea
- Juvenile densities in key rivers are healthy
- Points to an unknown problem in the ocean
- Follow the problem

Finding the ocean murder site:

- Document ocean migration routes of smolts from a 600 km South-to- North cline in rivers
- Establish quantitative, replicated estimates of smolt/postsmolt mortality rates, by migration stage (freshwater, estuary, Gulf)
- Compare patterns among rivers, within and among years
- Document kelt migrations (ASF & MSA)

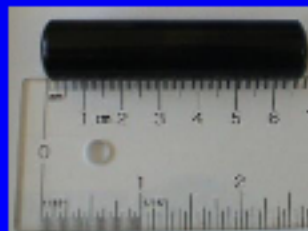
Sonically tagged smolts released

	2007	2008	2009	2010	2011
SMOLTS					
Miramichi	80	80	80	80	80
– Restigouche	100	46	81	80	99
– Cascapedia	47	40	54	40	45
– St. Jean (North Shore)	25	58	44	49	50
– Western Arm Brook	25	25	25	0	0
– Margaree	0	0	25	0	0
Totals	277	249	309	252	274



KELTS

– Miramichi	0	50	50	50	50
– St. Jean	10	10	14	15	10
– Margaree	0	0	0	2	0



Sonic Telemetry Strategies

- Wire key choke points on migration routes
 - Head of tide zones
 - Estuary exits
 - Gulf
 - Long time series
- Tag smolts, kelts
- N-S 600 km separation



Riviere St Jean

Cascapedia

Restigouche

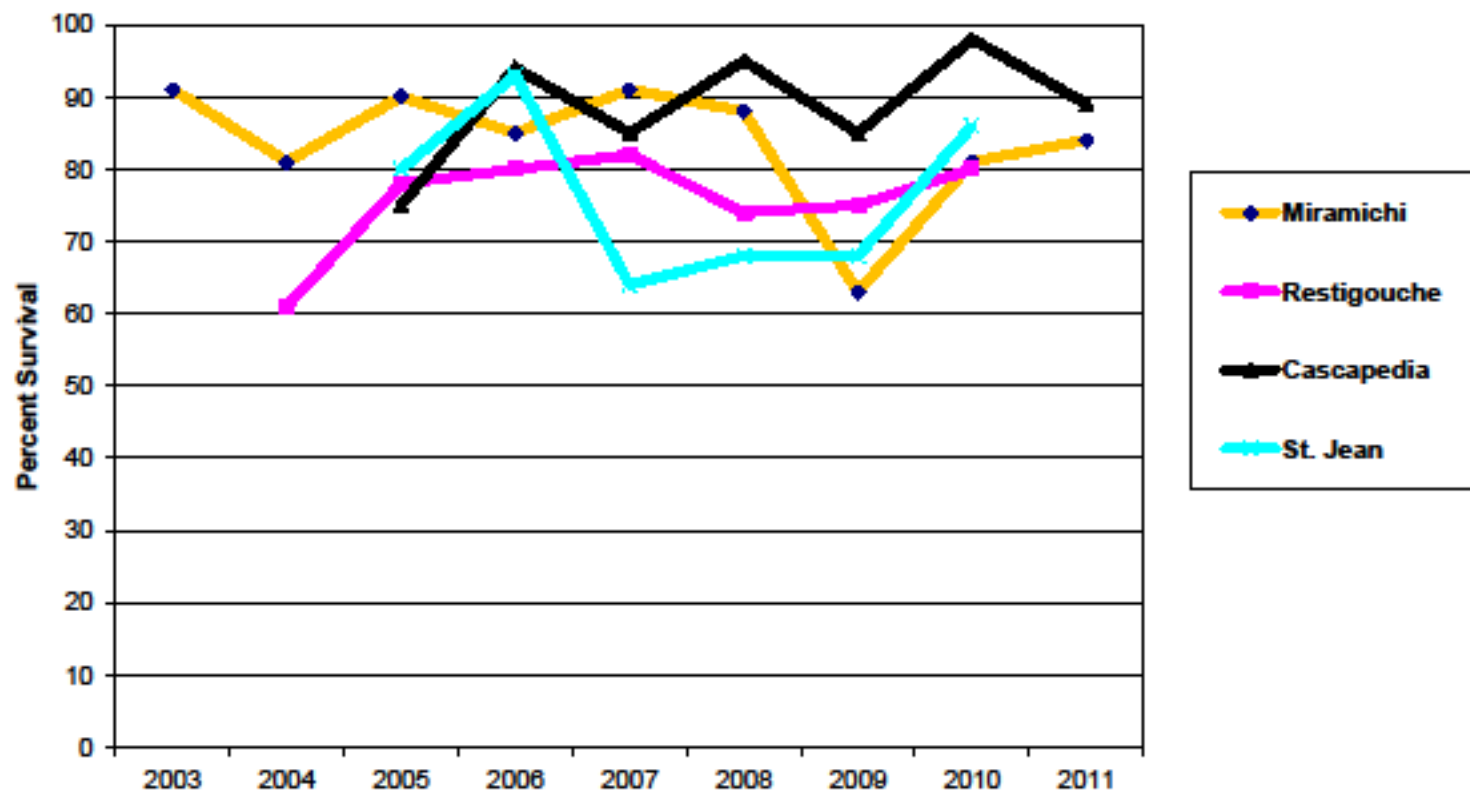
Miramichi

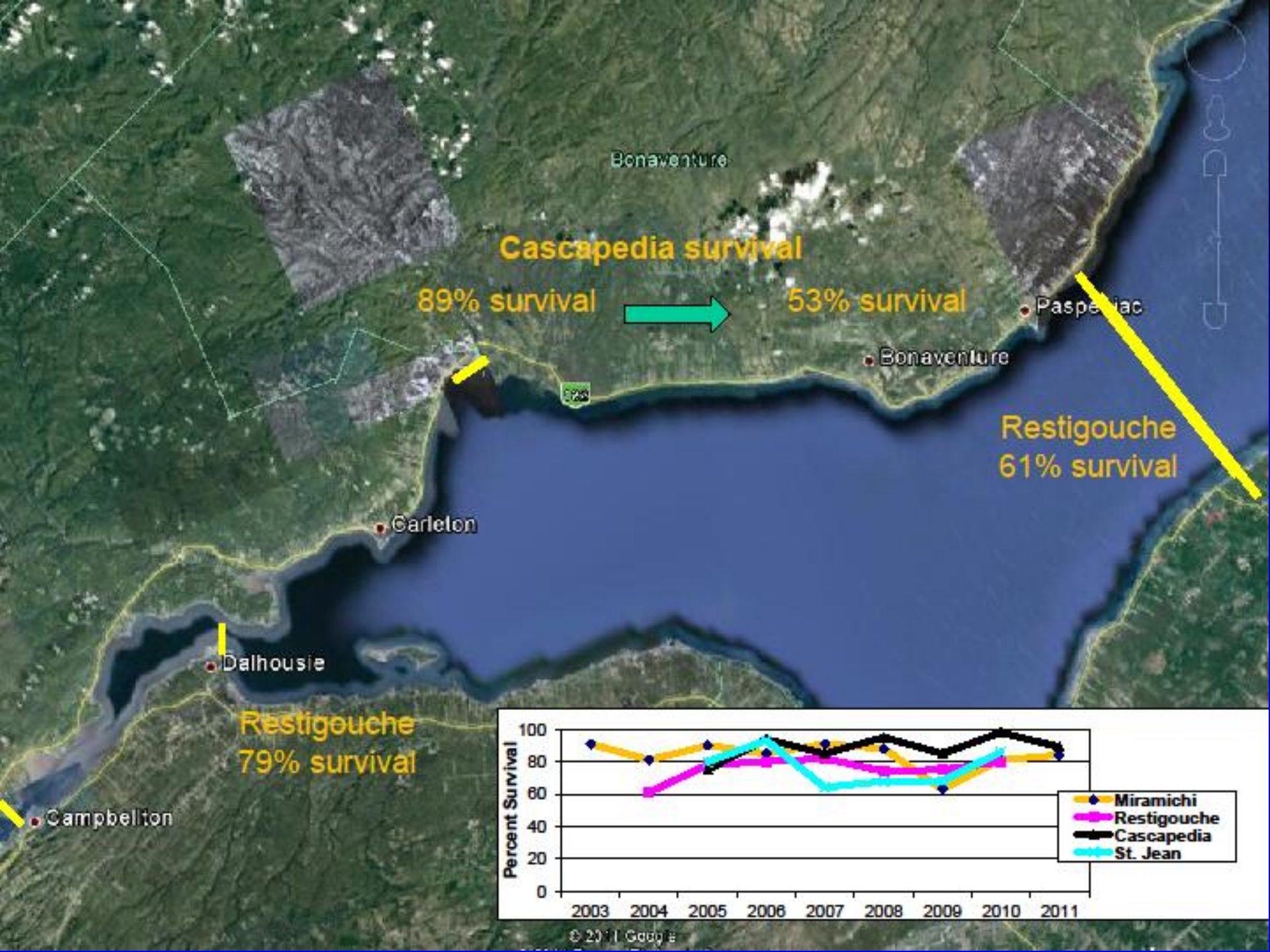


Stage distances

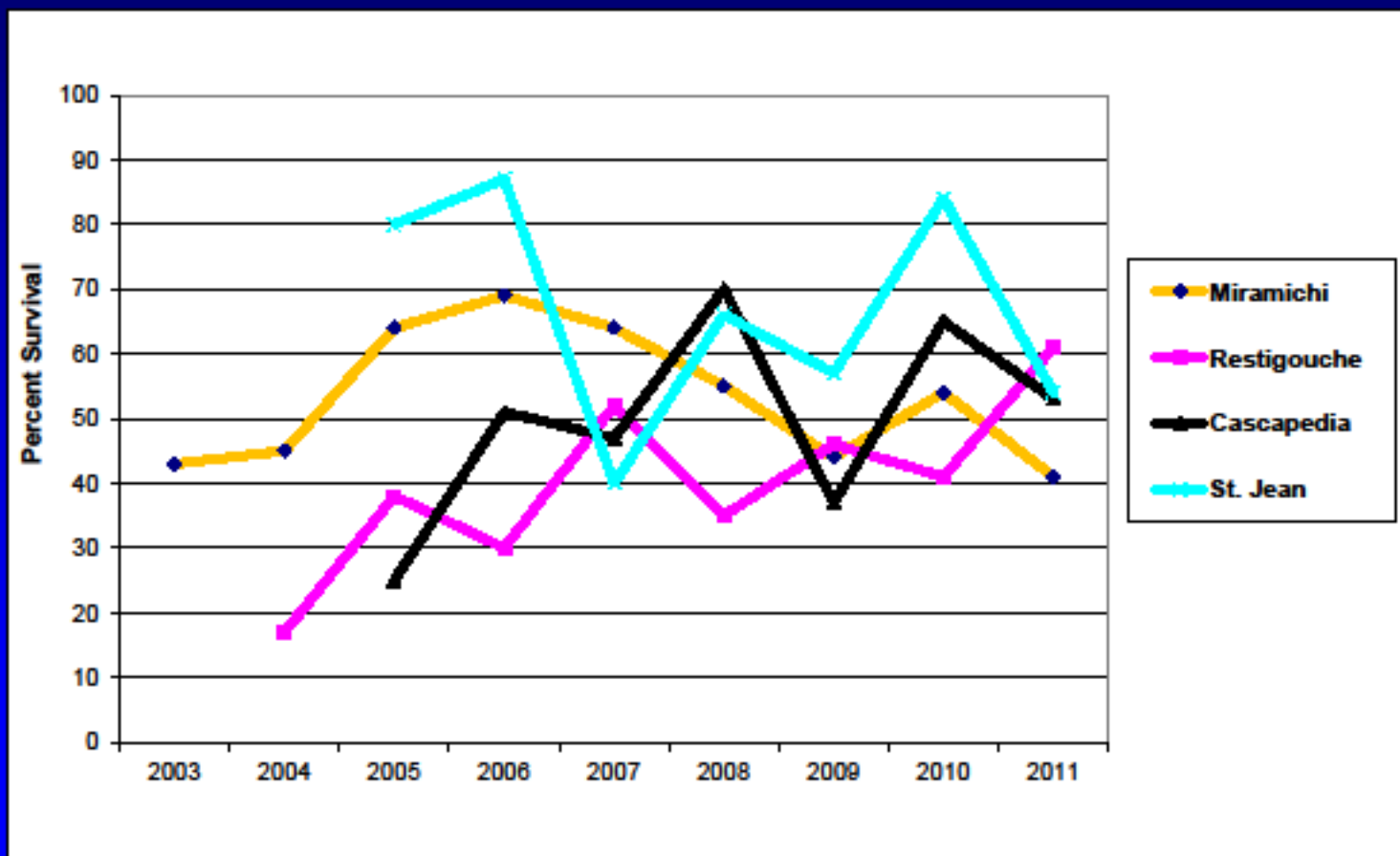
Tagging site	From tag site To HoT km	From HoT tot to Est Exit Km	From Est Exit to SoBl km
Miramichi			
Rocky Brook (SW Mir)	127.49	55.91	800
LSW (Catamaran Brook)	35.88	63.3	800
Restigouche			
Kedgwick	115.29	125.33	800
Upsalquitch	30.04	125.33	800
Cascapedia	8.06	6.18	800
Margaree	0.225	9.19	642
St Jean	20	3	655

% survival, release to head of tide

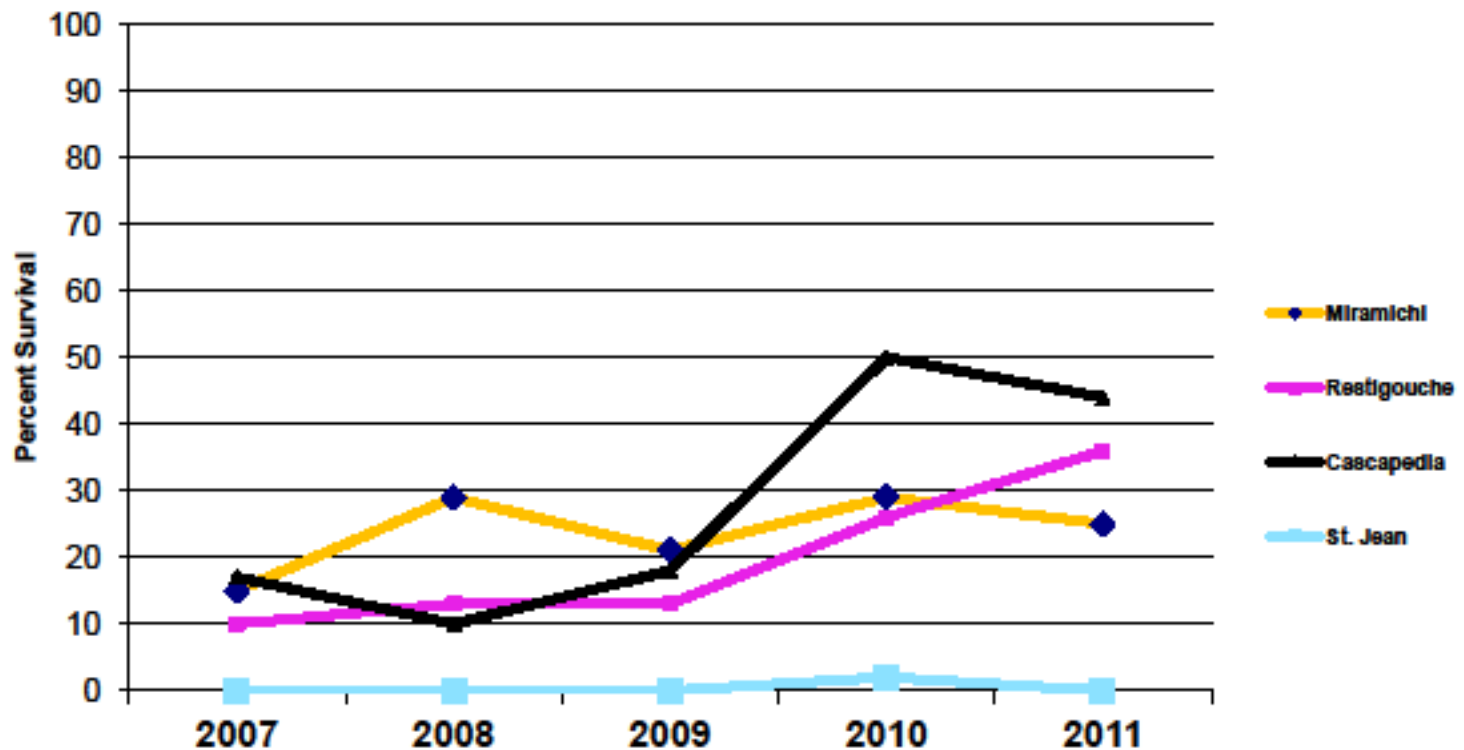




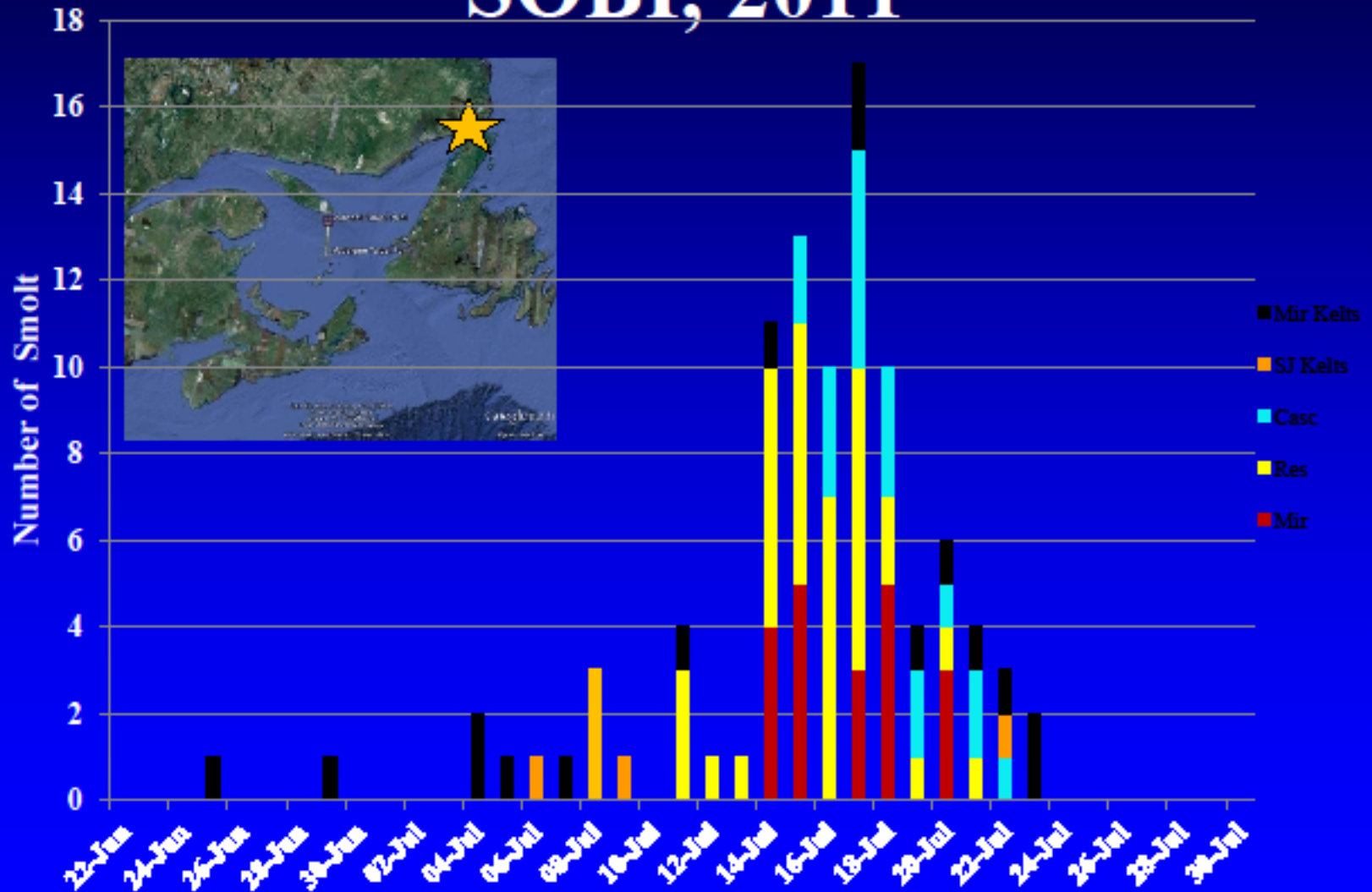
% survival, release to estuary exit



% survival, release to Strait of Belle Isle



Timing of Smolts and Kelts Through SOBI, 2011



What we have learned from smolts?

- Strait of Belle Isle a major migration route
- Synchronised kelt and smolt migration: social transmission of migration route?
- Synchronization of smolt migrations from different rivers: benefits of shoaling?
- Ocean currents are not key determinants of smolt movements.

**N=16 kelts (alternate year spawners)
June 25 to July 23**

**N=6 kelts (consecutive year spawners)
July 9 to July 26**

**2 kelts passed Cabot Strait!
(alternate year spawner)
June 10, 16**



What have we learned from Kelts?

- Survival of tagged kelts through the estuary zone was high (>90%).
- Higher mortality rates occurred for kelts in the Gulf of St. Lawrence and further into the Atlantic Ocean.
- Majority of salmon returns consisted of large females.
- Consecutive spawning salmon spend ~55 days at sea prior to returning, while alternate spawning salmon spend ~400 days at sea prior to returning.

Tracking Initiatives for 2012



- More receiver coverage in estuaries
 - Acoustic releases
- Archival pop up tags (ASF & MSA)



Pop Up Tag Objectives

- Location & movements of kelts in Gulf and past SOBI
 - Where do consecutive spawning salmon go in Gulf?
 - Do alternate spawners go to Greenland?
- Might provide information on smolt tracks in Gulf
- Where are the mortalities occurring?
 - Identifying the murder suspects



Other subjects addressed by
the Science committee/

Autres sujets discutés au Comité
Scientifique

Received an update on Didymo
/ Situation de l'algue Didymo



- didymo continues to show seasonal & annual variability.
- in 2011 – extensive blooms were mainly localised on the Upsalquitch and Kedgwick Rivers.
- the research project is led by Carole-Anne Gillis.
- volunteer committee continued – >300 observations May – November on 17 different rivers by 30 organizations.
- Two papers submitted to journals.
- in 2012 will continue to determine if didymo presence affects habitat selection & growth rates.

Other subjects addressed by the Science committee/

Autres sujets discutés au Comité Scientifique

Received an update on fungus / Situation du champignon Saprolegnia

- RRWMC began to receive reports of mortalities and fish with fungus early November.
- reports of 171 dead salmon
- some female mortalities still contained eggs
- affected salmon seemed to be concentrated in the lower part of the system.
- in 2011 the incidence of fish with fungus was greater than 2010 but less than 2003 and 2004.

Other subjects addressed by
the Science committee/
Autres sujets discutés au Comité Scientifique

RRWMC summarized two projects initiated with partners in 2011



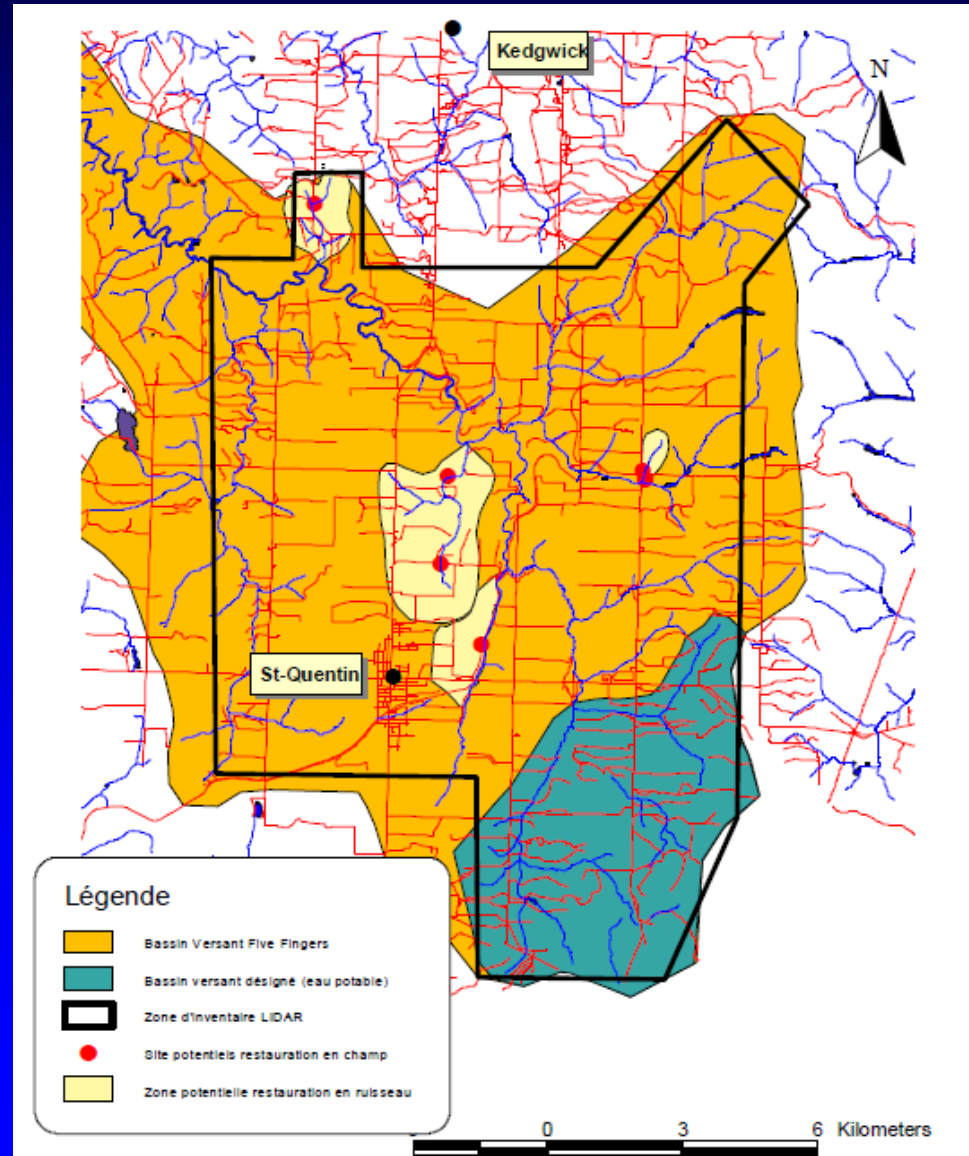
Imagerie
thermique

Caméra haute
précision

- evaluate surface run-off in Five Fingers sub-watershed
- identifying and mapping the location of thermal refugia throughout the Restigouche watershed.
- update the information on the quality and availability of habitat for juvenile salmon for all the tributaries of the Restigouche River.

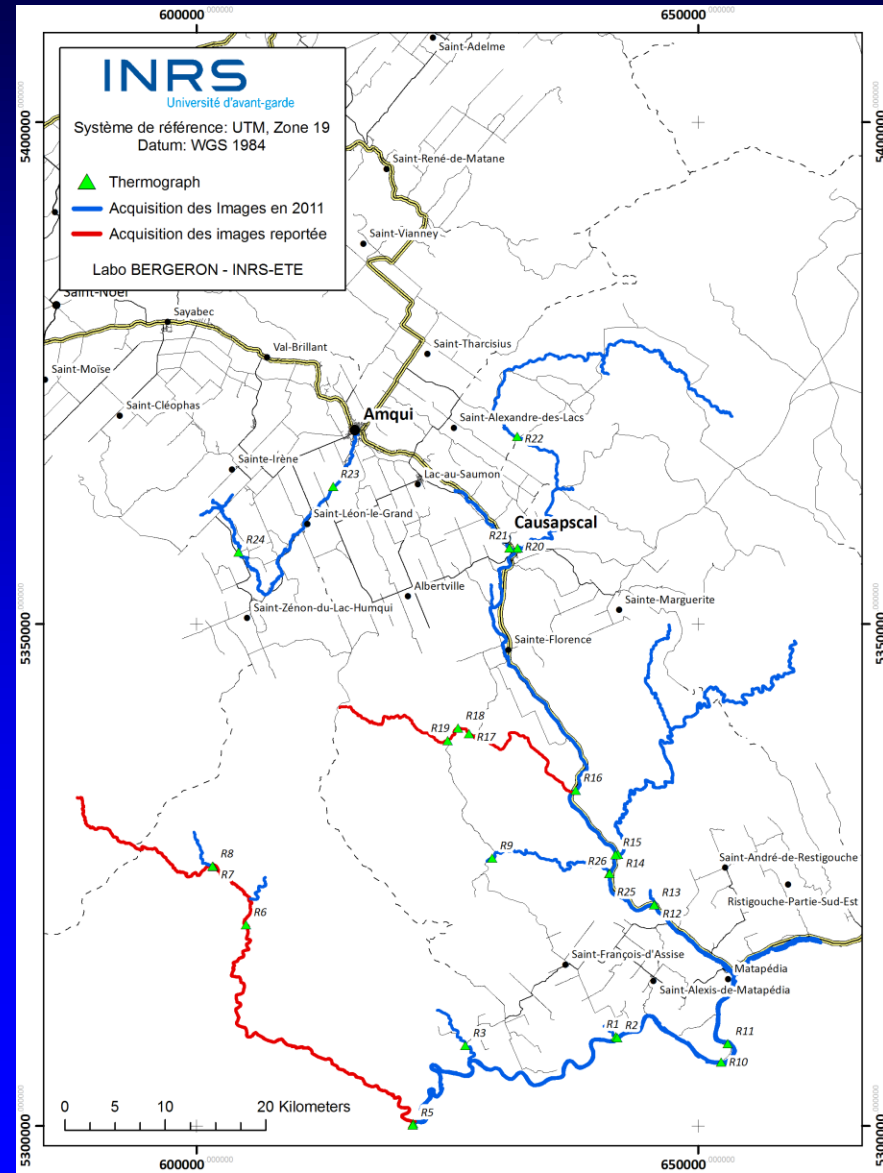
Other subjects addressed by
the Science committee/
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- LIDAR imaging project
utilizing laser technology to
map area
- locate sources of sediment
harmful to fish habitat
- develop plans to improve
water quality
- data acquisition in June
currently being processed



Other subjects addressed by the Science committee/ Autres sujets discutés au Comité Scientifique

- aerial helicopter survey utilizing thermal imaging and precise photogrammetric imaging.
- locate cold water refuges
- update characterization of salmon habitat
- In 2011 completed 400 km covered boundary waters and Quebec portions of watershed
- expected to continue for two more years to complete rest of the Restigouche watershed



Thanks / Remerciements

- All those camps who reported their very important statistics
- Participating individuals and agencies
- New Brunswick Wildlife Trust Fund

