Appendix F

Option Development Process
ARSP Modeling and Analysis
of Lake Levels and River Flows

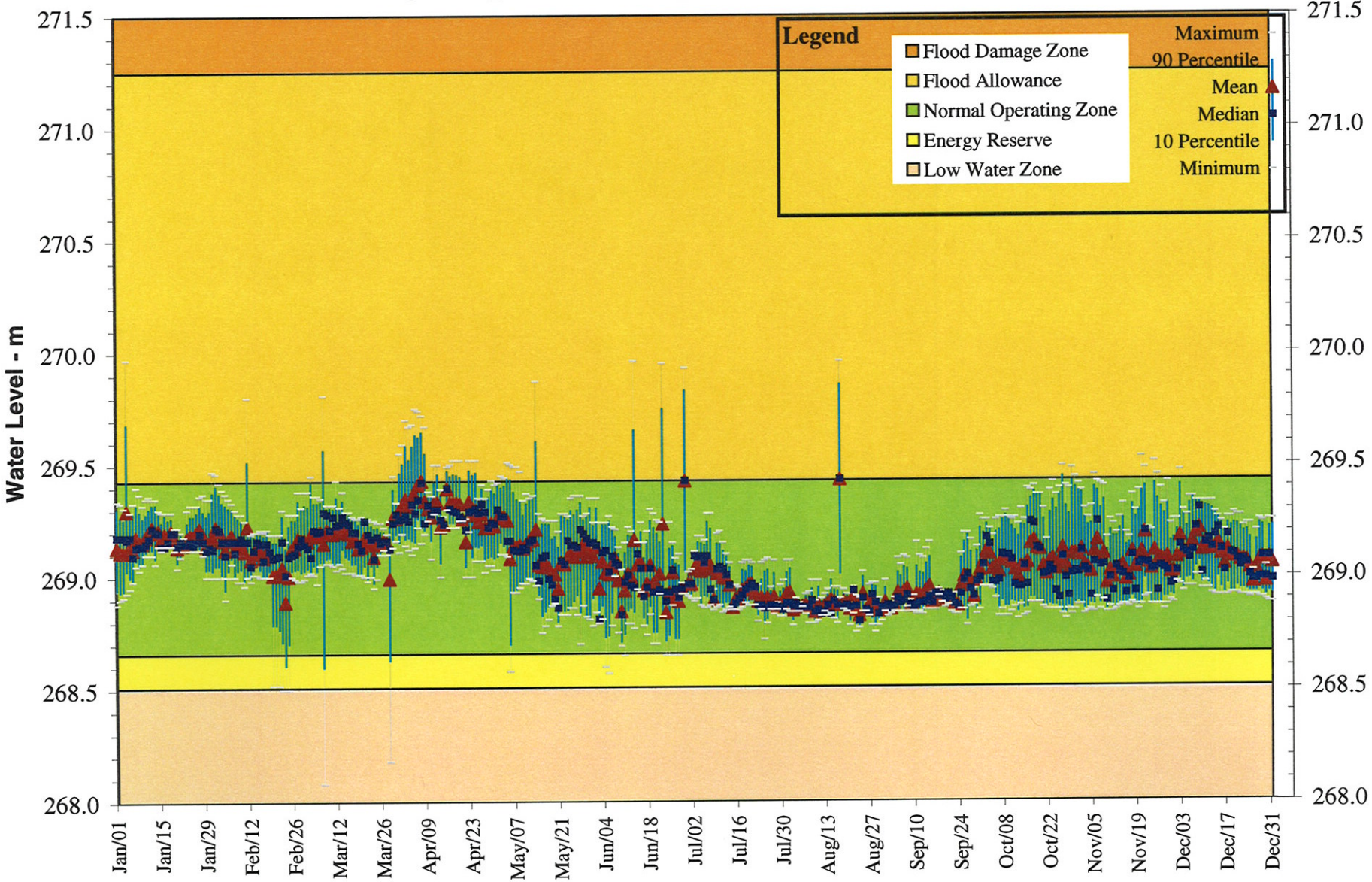
- **ARSP Base Case**
- **ARSP Case One**
- **ARSP Case Two**

High Falls GS

High Falls Reservoir Water Levels

Historical Data 1997 to 2003

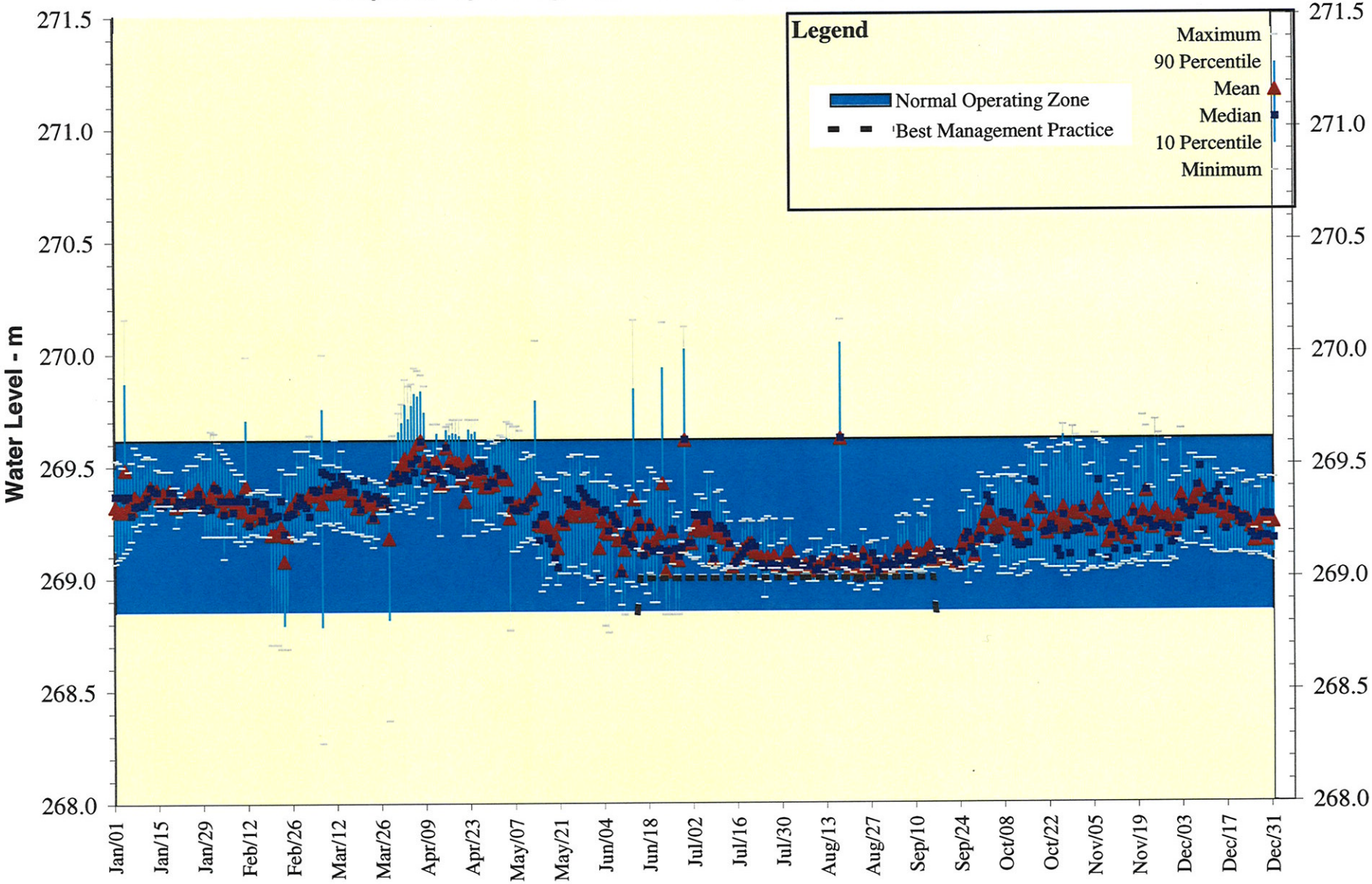
Operating Rules and Daily Water Level Statistics

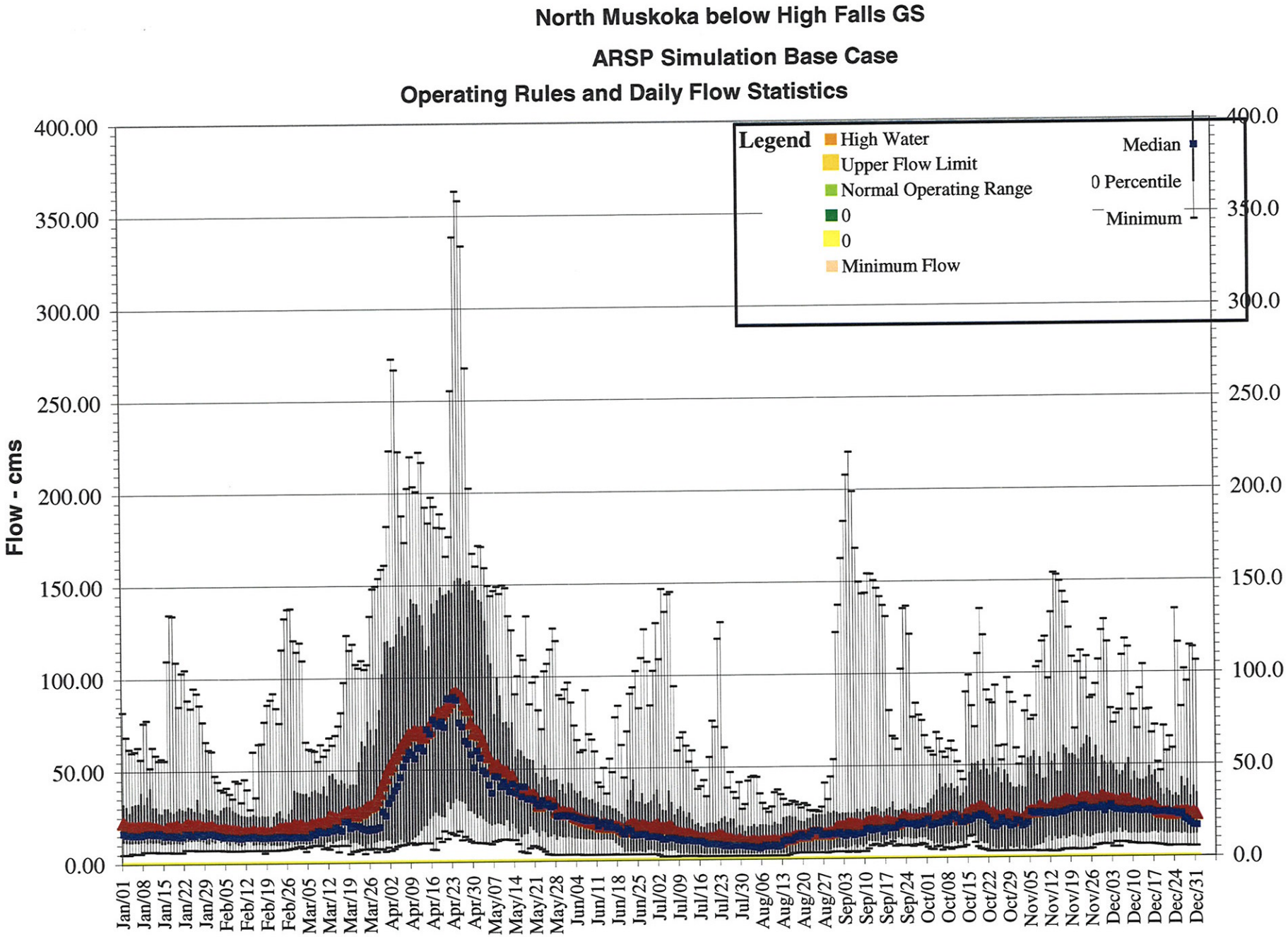


High Falls Reservoir Water Levels

Historical Data 1997 to 2003

Proposed Operating Rules and Daily Water Level Statistics




North Muskoka below High Falls GS
ARSP Simulation Base Case
Operating Rules and Daily Flow Statistics
Legend
High Water
Upper Flow Limit
Normal Operating Range
0
0
Minimum Flow
Median
0 Percentile
Minimum
Flow - cms
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan/01
Jan/08
Jan/15
Jan/22
Jan/29
Feb/05
Feb/12
Feb/19
Feb/26
Mar/05
Mar/12
Mar/19
Mar/26
Apr/02
Apr/09
Apr/16
Apr/23
Apr/30
May/07
May/14
May/21
May/28
Jun/04
Jun/11
Jun/18
Jun/25
Jul/02
Jul/09
Jul/16
Jul/23
Jul/30
Aug/06
Aug/13
Aug/20
Aug/27
Sep/03
Sep/10
Sep/17
Sep/24
Oct/01
Oct/08
Oct/15
Oct/22
Oct/29
Nov/05
Nov/12
Nov/19
Nov/26
Dec/03
Dec/10
Dec/17
Dec/24
Dec/31

Flow Evaluation

Yellow cells indicate values that can be changed for analysis

North Muskoka below High Falls GS
ARSP Simulation Base Case
Daily Flows Model Results 1951 to 2000

Walleye Spawning

Min Flow 3 m^3/s Achieved #N/A of time

No of days above minumum flow

First half of season		*Last half of season*		*For whole season*	
Min	25 days	Min	24 days	Min	49 days
Avg	25 days	Avg	24 days	Avg	49 days
Years Provided	100%	Years Provided	100%	Years Provided	100%

From flow duration curve

%	Flow	*No of days min flow is achievd*	*90% percentile peak flow*
99%	7.05 m^3/s	49 days	117 m3/s
95%	12.57 m^3/s		

Summer Minimum 7-day Flow

	Maximum	15.84 m^3/s
	Minimum	1.79 m^3/s
90%	Percentile	10.00 m^3/s
10%	Percentile	3.25 m^3/s
	Median	5.54 m^3/s
	Mean	6.16 m^3/s

Maximum Flows

Regulatory Flood Outflow	No of years exceeded	Maximum Daily Flow

N/A	m³/s	0	363.40 m³/s

Minumum Flows

Min Daily flow	*7-day minimums*			
	2	10	20	return period
	-yr 7Q2	-yr 7Q10	-yr 7Q20	
1.78 m³/s	5.33	3.25	3.23	m³/s

Summer Fluctuations

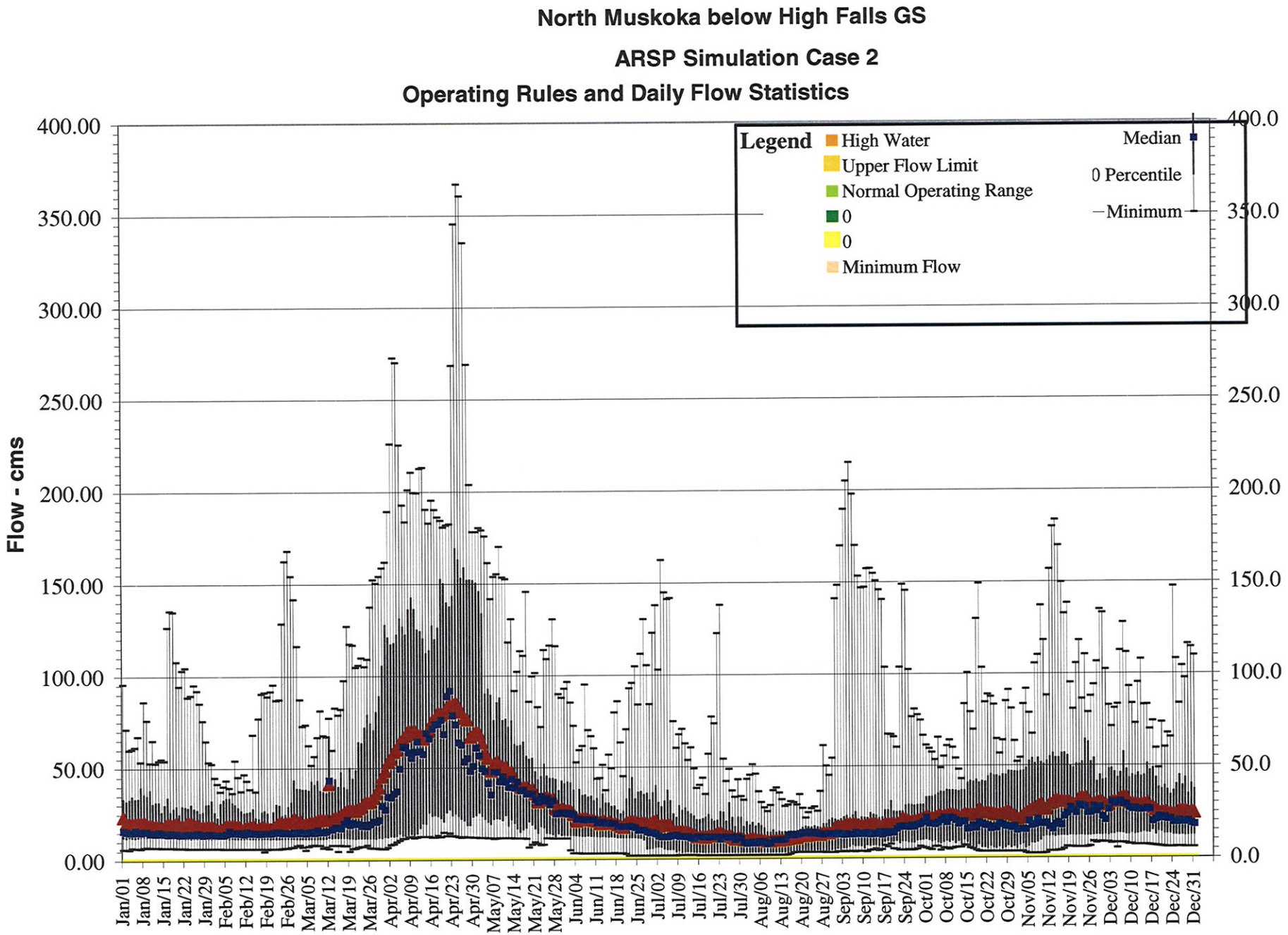
Delta Flow	Average number of daily flow fluctuations per year		
1	50.64		
3	23.94		
5	13.72		
>6.37175	9.44	0.5	ratio of summer median

Water Usage

Median Flow		*10% Percentile*	
summer	winter	summer	winter
m³/s	m³/s	m³/s	m³/s
16.24	22.17	5.08	2.92

Power Generation

	Quarter				
	1	2	3	4	Annual
Flow	21.64	45.34	14.87	25.82	26.90 m³/s


North Muskoka below High Falls GS
ARSP Simulation Case 2
Operating Rules and Daily Flow Statistics
Legend
High Water
Upper Flow Limit
Normal Operating Range
0
0
Minimum Flow
Median
0 Percentile
Minimum
Flow - cms
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Jan/01
Jan/08
Jan/15
Jan/22
Jan/29
Feb/05
Feb/12
Feb/19
Feb/26
Mar/05
Mar/12
Mar/19
Mar/26
Apr/02
Apr/09
Apr/16
Apr/23
Apr/30
May/07
May/14
May/21
May/28
Jun/04
Jun/11
Jun/18
Jun/25
Jul/02
Jul/09
Jul/16
Jul/23
Jul/30
Aug/06
Aug/13
Aug/20
Aug/27
Sep/03
Sep/10
Sep/17
Sep/24
Oct/01
Oct/08
Oct/15
Oct/22
Oct/29
Nov/05
Nov/12
Nov/19
Nov/26
Dec/03
Dec/10
Dec/17
Dec/24
Dec/31

Flow Evaluation

Yellow cells indicate values that can be changed for analysis

North Muskoka below High Falls GS
ARSP Simulation Case 2
Daily Flows Model Results 1951 to 2000

Walleye Spawning

Min Flow 3 m^3/s Achieved #N/A of time

No of days above minumum flow

First half of season		*Last half of season*		*For whole season*	
Min	25 days	Min	24 days	Min	49 days
Avg	25 days	Avg	24 days	Avg	49 days
Years Provided	100%	Years Provided	100%	Years Provided	100%

From flow duration curve

%	Flow	
99%	11.57	m^3/s
95%	12.99	m^3/s

No of days min flow is achievd
49 days

90% *percentile peak flow*
113 m3/s

Summer Minimum 7-day Flow

	Maximum	12.93 m^3/s
	Minimum	1.79 m^3/s
90%	Percentile	11.91 m^3/s
10%	Percentile	3.28 m^3/s
	Median	5.59 m^3/s
	Mean	6.47 m^3/s

Maximum Flows

Regulatory Flood Outflow | No of years exceeded | Maximum Daily Flow

N/A	m³/s	0	366.94 m³/s

Minumum Flows

Min Daily flow	*7-day minimums*			
	2	10	20	return period
	-yr 7Q2	-yr 7Q10	-yr 7Q20	
1.78 m³/s	5.57	3.28	2.07 m³/s	

Summer Fluctuations

Delta Flow	Average number of daily flow fluctuations per year		
1	43.92		
3	19.66		
5	11.22		
>6.2515	8.12	0.5	ratio of summer median

Water Usage

Median Flow		*10% Percentile*	
summer	winter	summer	winter
m³/s	m³/s	m³/s	m³/s
15.03	19.43	5.30	2.15

Power Generation

	Quarter				
	1	2	3	4	Annual
Flow	21.93	44.93	14.58	26.24	26.90 m³/s