
City's Proposed Ammonia Loadings

Clean Environment Commission Hearings

Selkirk, Manitoba

January 28, 2003

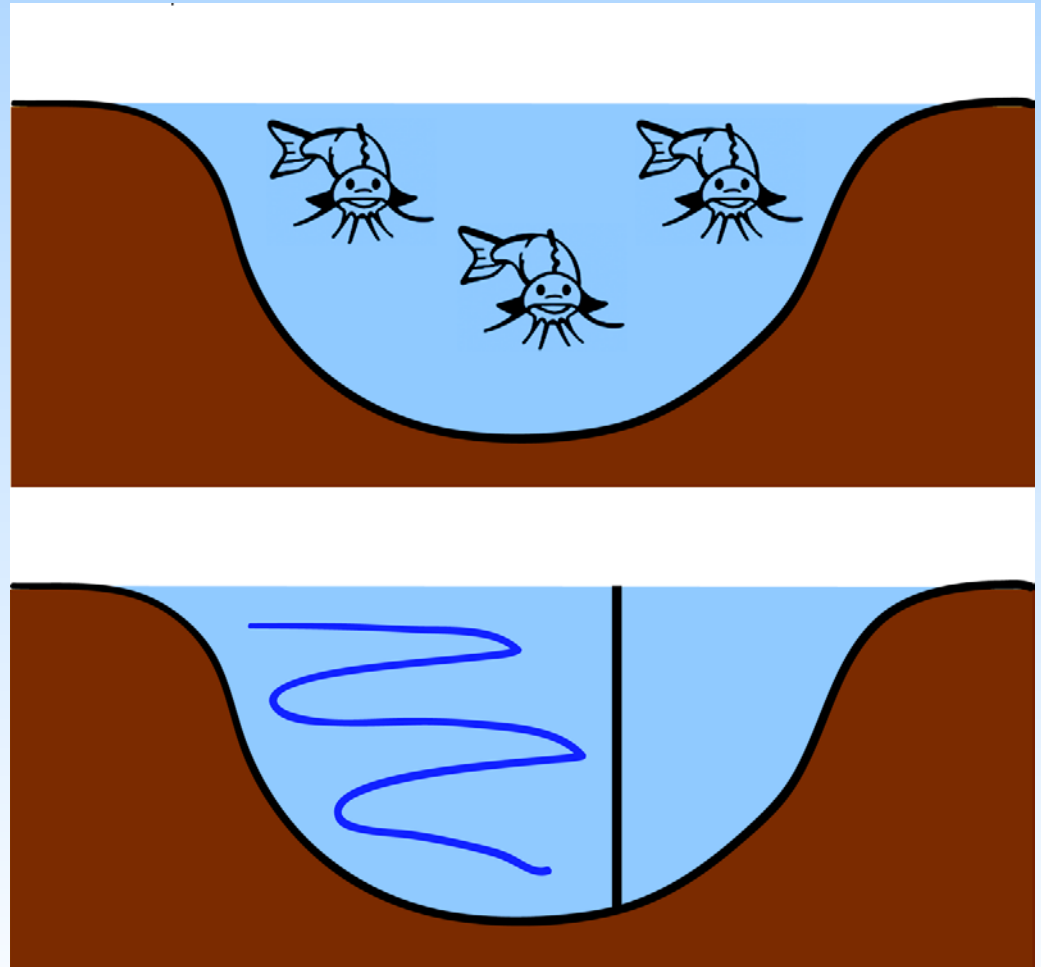
Outline

- **Application of Criteria**
- **Major differences between City & Manitoba Conservation**
- **Acute / Chronic Limits**
- **Proposed Ammonia Loading Limits**
 - **Manitoba Conservation**
 - **City of Winnipeg**
 - **Comparison**
- **Recommendations**

Application of Ammonia Criteria

Application involves several important science-based and site-specific considerations

- Allowable ammonia concentration
- Exposure
- Period of Record for Design Flow
- Flow allocation



Application of Criteria

Determines what **Load in (kg/Day)** of ammonia is allowable **at each WPCC** to meet the protective ammonia criteria **in the river**.

This dictates the level of treatment required.



Major Points of Difference: Ammonia

	City of Winnipeg	Province of Manitoba	Comment
Allowable Concentration	Site-Specific	MWQSOG	Manitoba will review when site-specific studies complete
Additional Studies	Yes	Yes	City believe these are "confirmation" studies
Duration of Exposure	30Q10 7Q10 1Q10	30Q10 7Q10 1Q10	Agree
Design Flow, Period of Record	Last 40 years Actual Data	1913-present - reconstructed	Manitoba agreed to provide scientifically defensible report for review
Flow Allocation: Red River	90% at City Boundary	75% at Point of Discharge	Both agree on need to allow capacity for others
Flow Allocation: Assiniboine River	75%	75%	Agree
Loadings limits	Governed by <i>chronic</i> concentration	Governed by <i>acute</i> "end-of-pipe" concentration or chronic concentration	City has shown rapid mixing takes place, no lethality in mixing zone, acute never governs
Plan to Meet Criteria	Centrate Treatment at NEWPCC, Monitor	Centrate Treatment will not achieve compliance	City believes any additional ammonia reduction not required

“End of Pipe” Concentrations

- **Manitoba Conservation projected allowable loadings (preliminary) governed by acute lethality and end-of-pipe concentrations**
 - ◆ **No mixing zone**
 - ◆ **Contrary to MWQSOG guidance**

Implementation - Mixing Zones

- Not reasonable to require all objectives to be met at end-of-pipe
- Tier I - Water Quality Standards still apply
- A relatively small area is allowed for mixing to occur where not all objectives have to be met
- Allow a zone of passage
- Not cause acute lethality
- Others

Note: Inconsistent with MWQSOG Guidance, if rapid mixing occurs

North-End Water Pollution Control Centre

Month	Allowable Effluent Load (kg/d)				Allowable Effluent Concentration			
	1Q10	7Q10	30Q10	End of Pipe	1Q10	7Q10	30Q10	End of Pipe
January	15,676	16,181	6,774	3,232	90.79	93.71	39.24	18.72
February	19,499	19,290	8,119	3,640	100.26	99.18	45.68	18.72
March	21,800	22,264	11,015	4,367	96.34	98.39	48.67	19.30
April	31,002	25,997	27,926	6,094	89.46	75.01	83.25	17.58
May	31,349	25,011	12,497	5,328	97.04	77.42	38.68	16.49
June	24,517	13,674	6,947	4,475	87.45	48.78	25.62	15.96
July	16,389	7,836	4,310	4,279	61.14	29.23	16.08	15.96
August	9,054	4,618	2,320	3,783	38.20	19.49	9.79	15.96
September	7,509	5,509	2,740	3,251	34.50	25.31	13.01	14.94
October	8,462	6,670	3,356	3,112	40.61	32.01	16.11	14.94
November	6,545	7,232	4,440	3,405	31.69	35.02	22.22	16.49
December	10,440	11,367	5,651	2,915	61.00	66.42	33.02	17.03

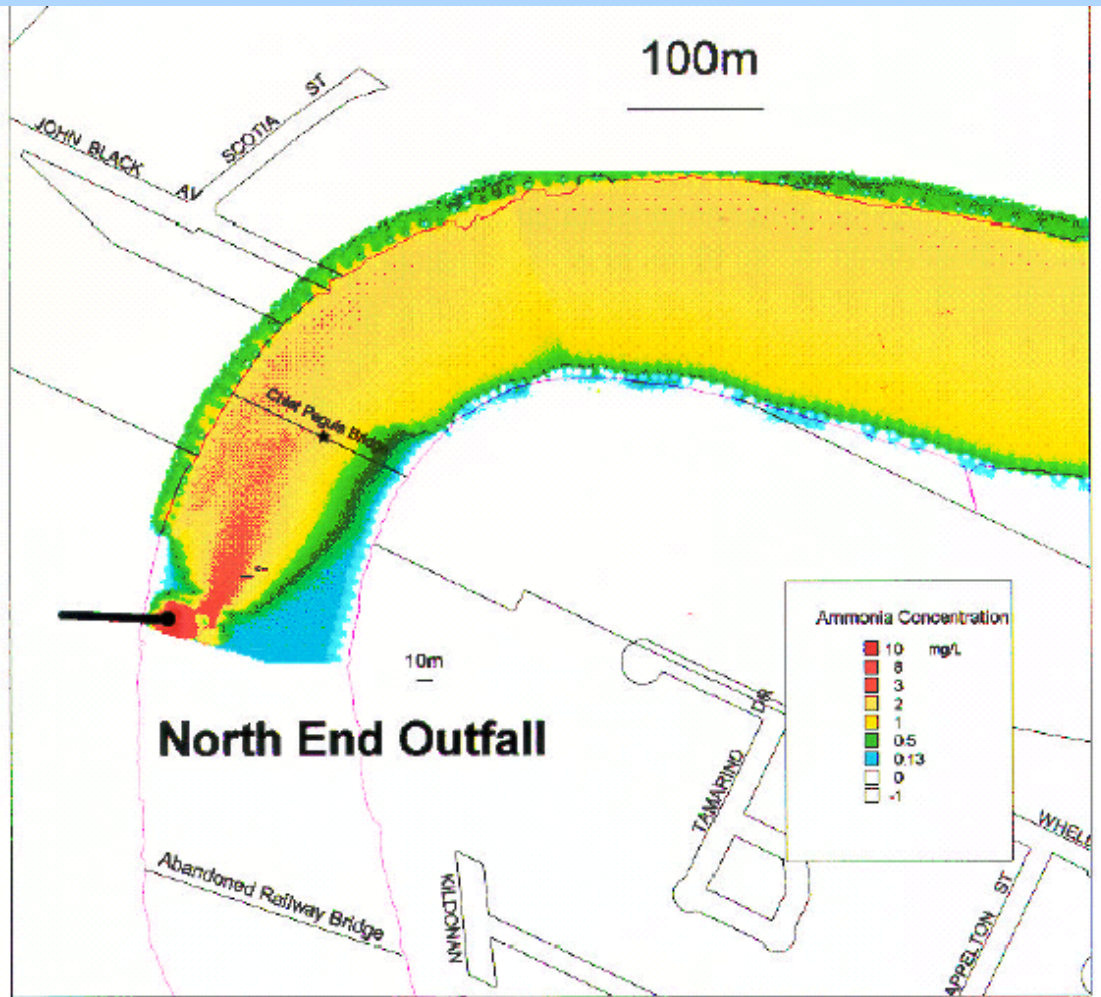
Present Typical WPCC effluent = 26mg/L. With centrate treatment= 18mg/L

Manitoba's Proposed Ammonia Loading Limits (Kg/day)

“End of Pipe” governs most months

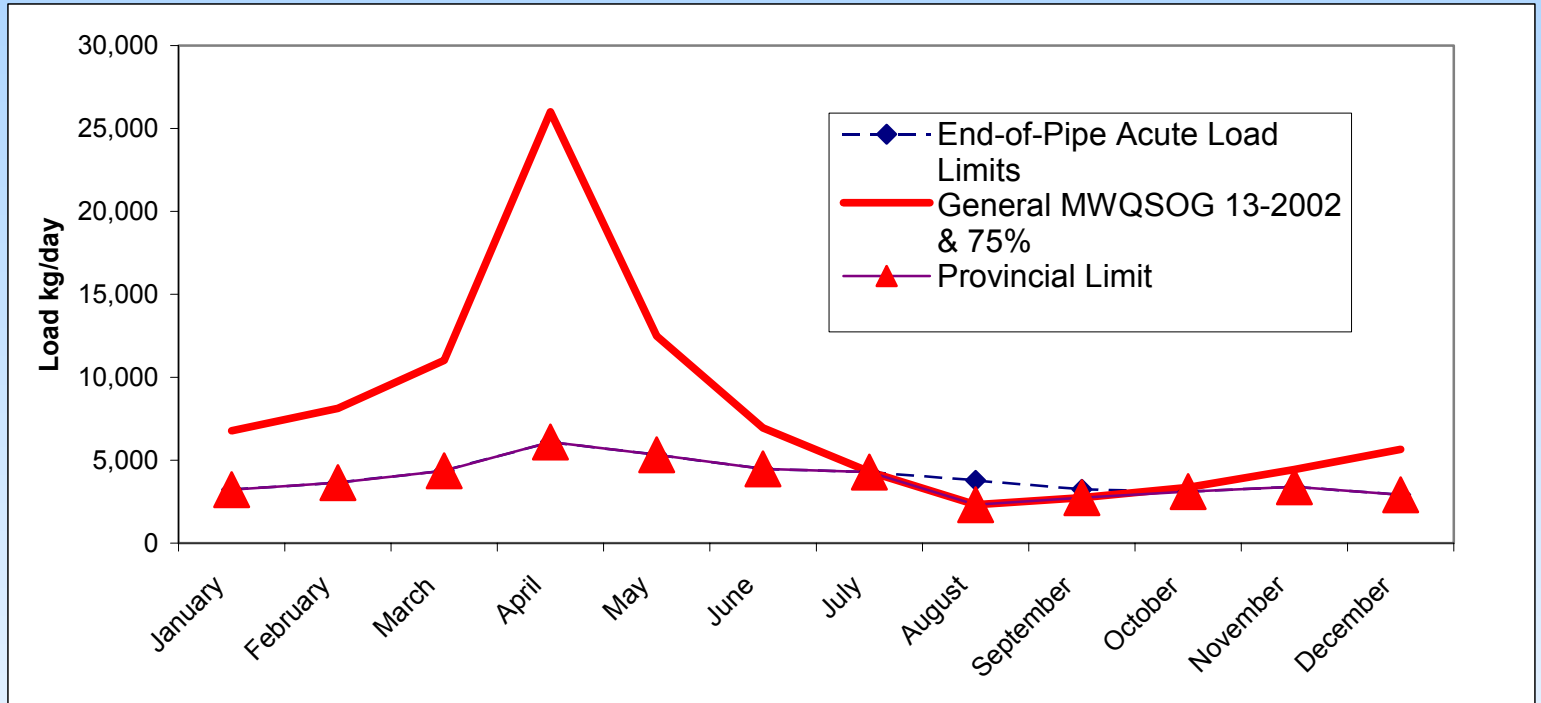
	NEWPCC	SEWPCC	WEWPCC
January	3,232	921	501
February	3,640	996	473
March	4,367	1,106	614
April	6,094	1,406	751
May	5,328	1,223	670
June	4,475	1,153	613
July	4,279	1,063	440
August	2,320	583	321
September	2,740	660	467
October	3,112	745	454
November	3,405	908	452
December	2,915	839	499

CORMIX Modeling Shows Rapid Mixing



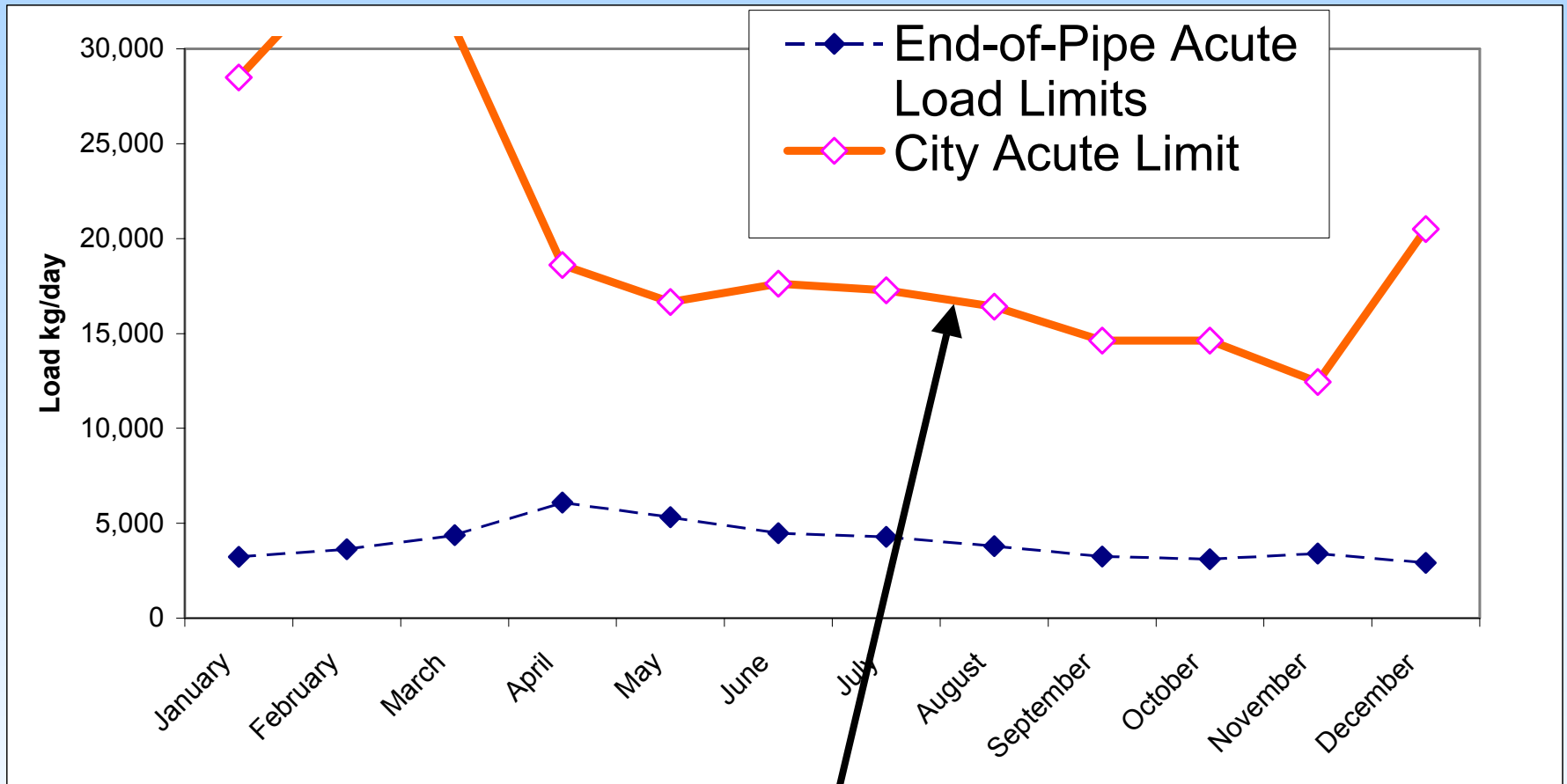
**From River Conditions
TM section
7.0 Figure 7-2**

Provincial Loading Limits at NEWPCC



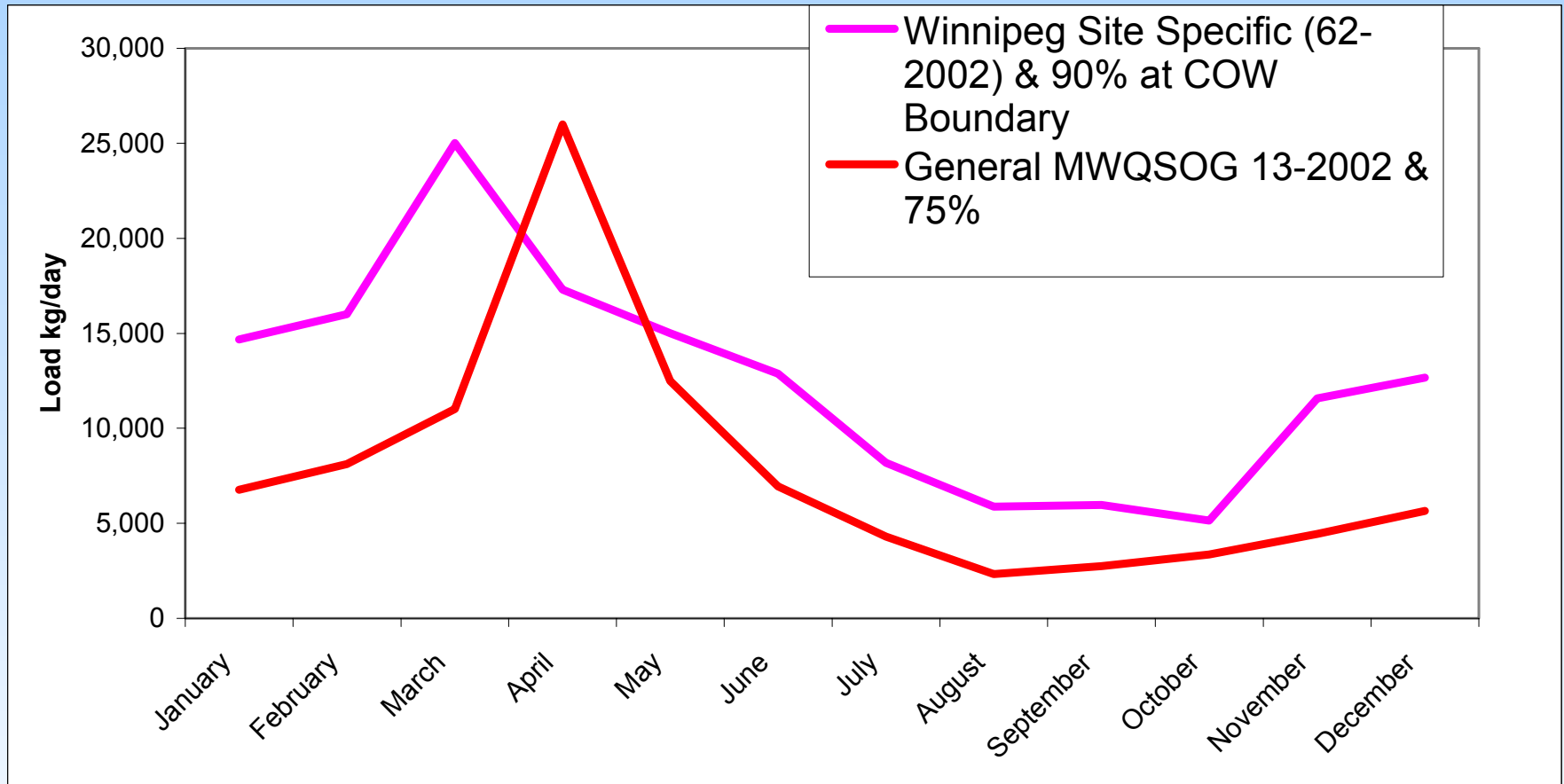
Acute “End of Pipe” governs 10 of 12 months

Comparison of Acute Loadings at NEWPCC

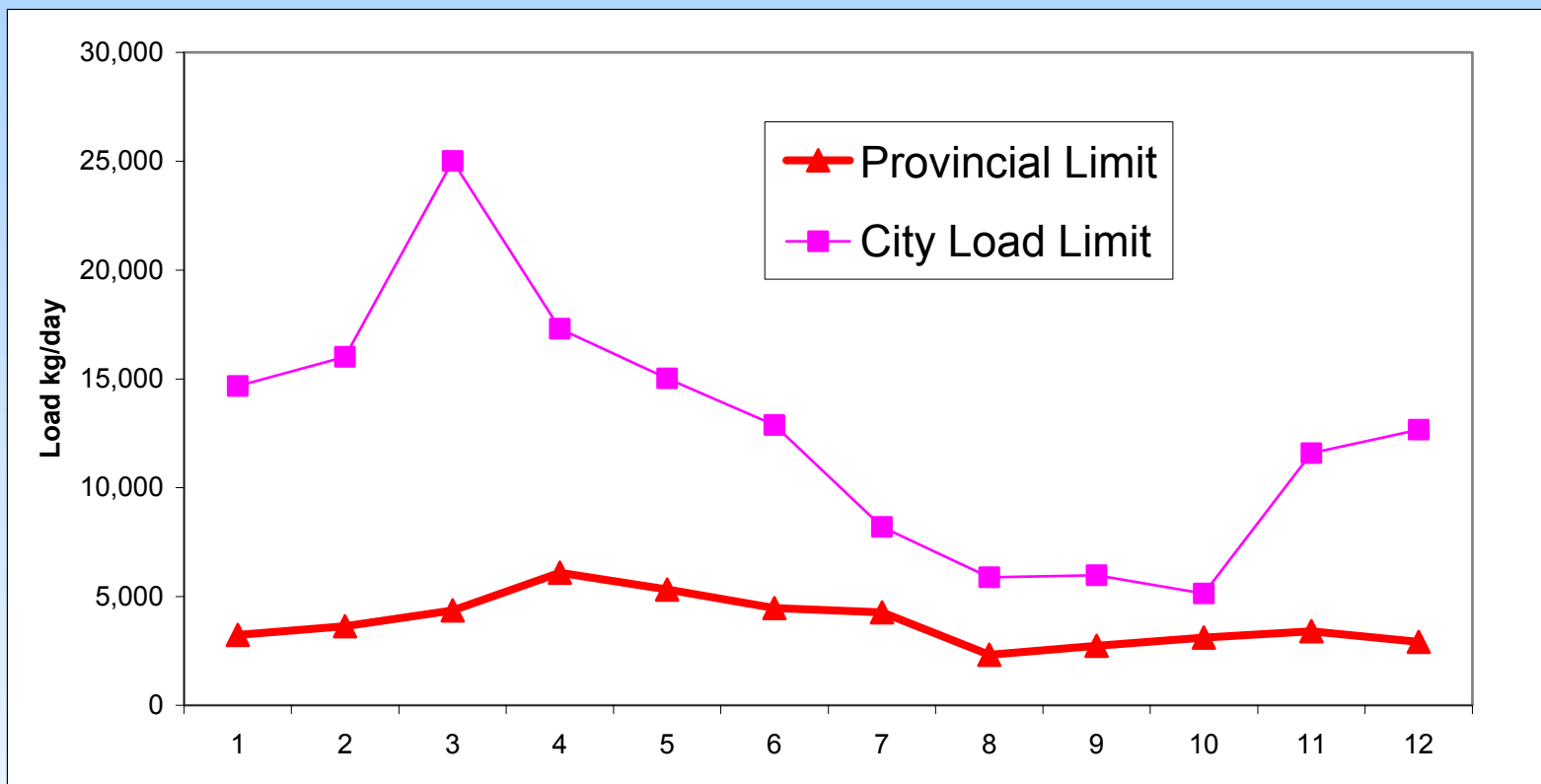


Based on no acute lethality in mixing zone

Comparison of Chronic Loadings at NEWPCC



Comparison of City and Provincial Loading Limits (NEWPCC)



City of Winnipeg's Proposed Ammonia Loading Limits (Preliminary)

Notes

Based on Lowest of:

1) Chronic Instream Criteria

a) 90% Flow Allocation on Red River and
75% on Assiniboine River at City
Boundary

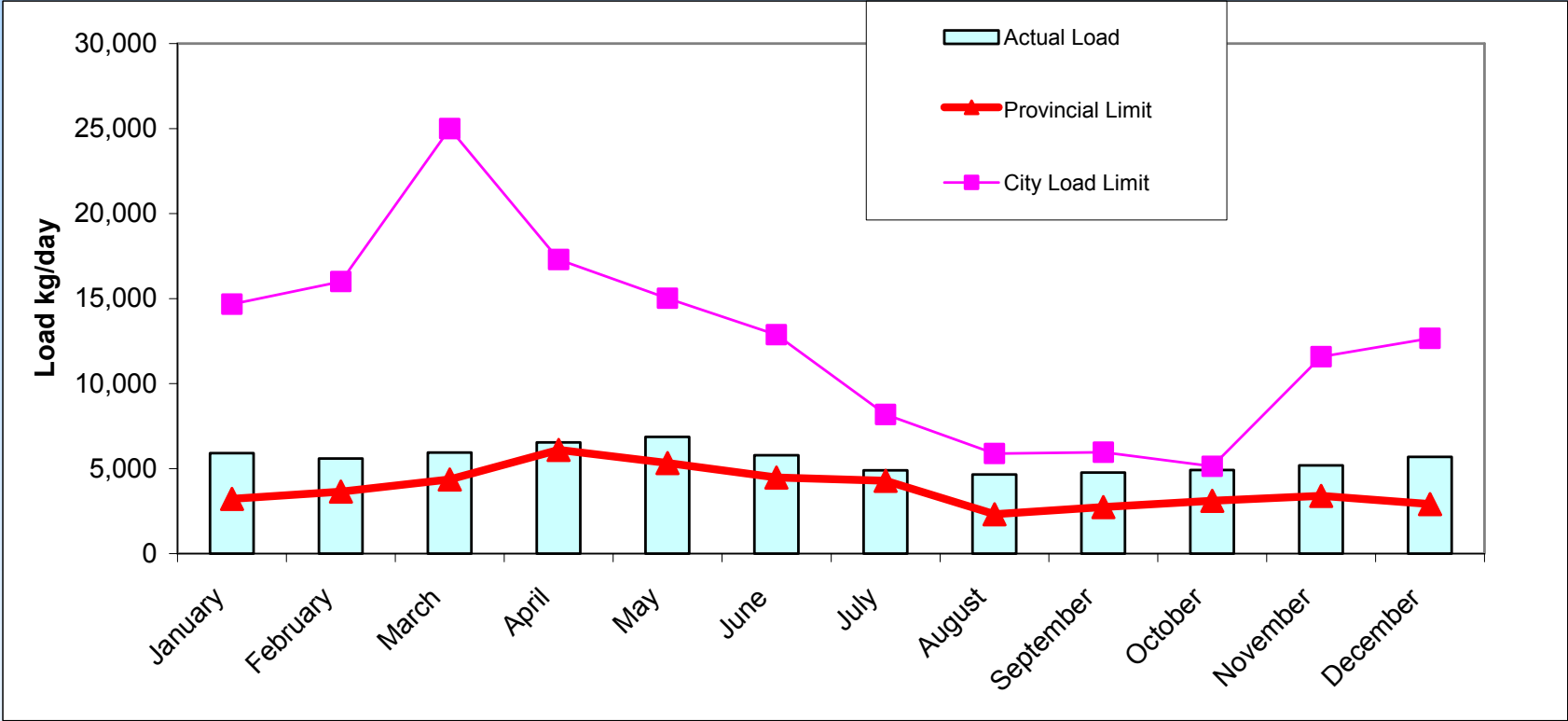
b) Period of Record (1962-present) for
Design Flows

2) Acute Criteria with **5:1** dilution ratio in Mixing
Zone

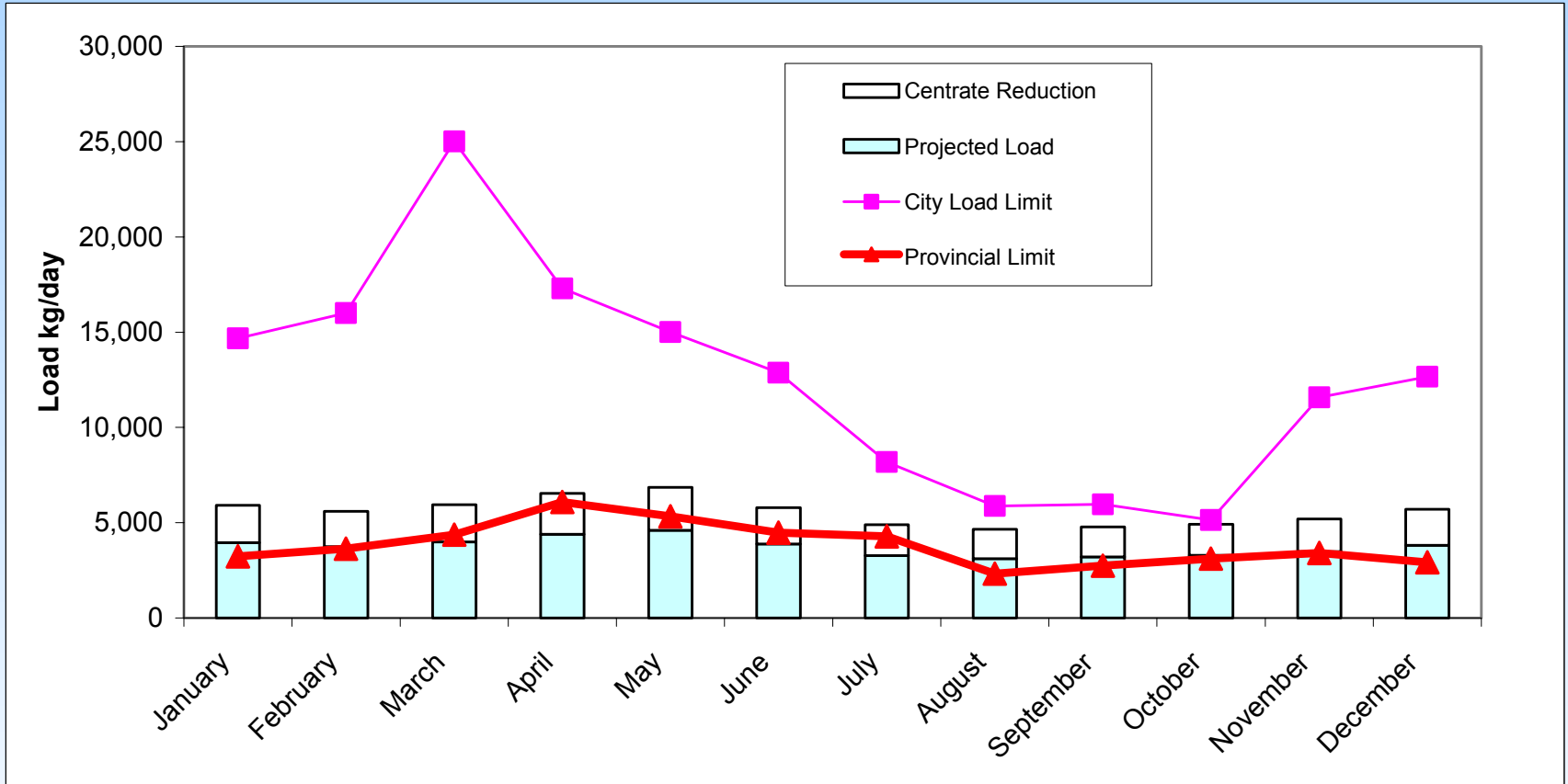
	NEWPCC	SEWPCC	WEWPCC
January	14,680	3,869	3,806
February	16,006	4,602	4,381
March	25,007	9,683	5,258
April	17,301	9,574	2,086
May	15,016	6,340	1,488
June	12,881	6,911	931
July	8,192	3,368	743
August	5,880	1,676	521
September	5,969	1,994	480
October	5,136	1,314	646
November	11,581	2,266	2,180
December	12,663	2,607	3,453

Acute within mixing zone never governs

Existing Loading at NEWPCC



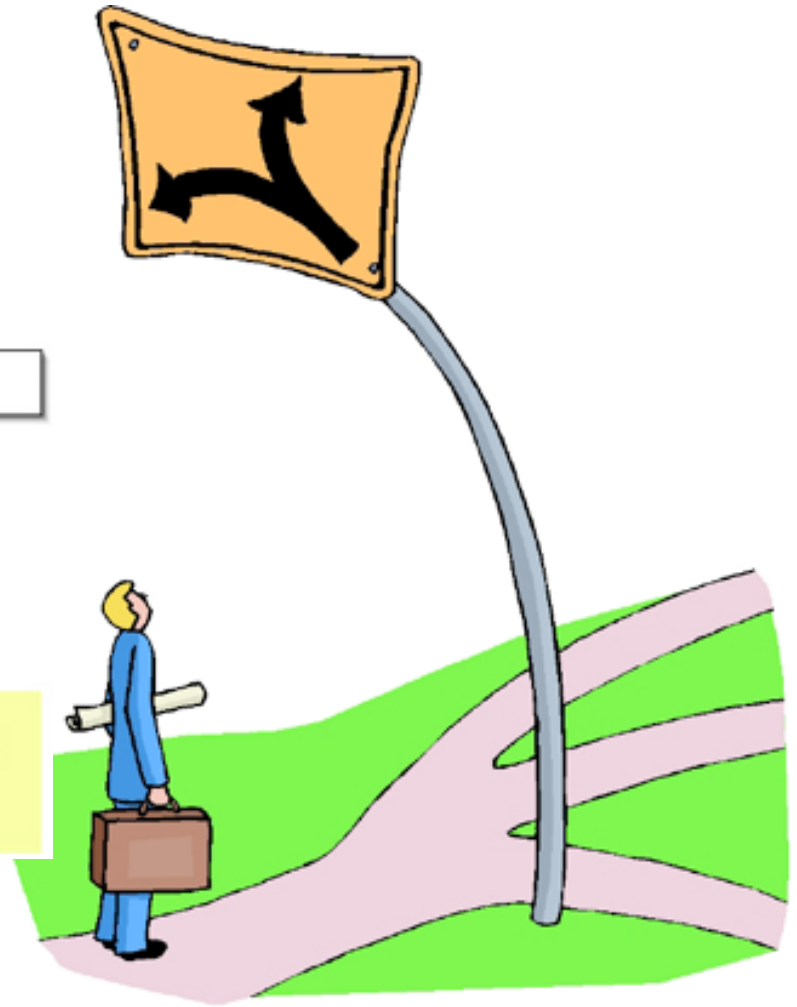
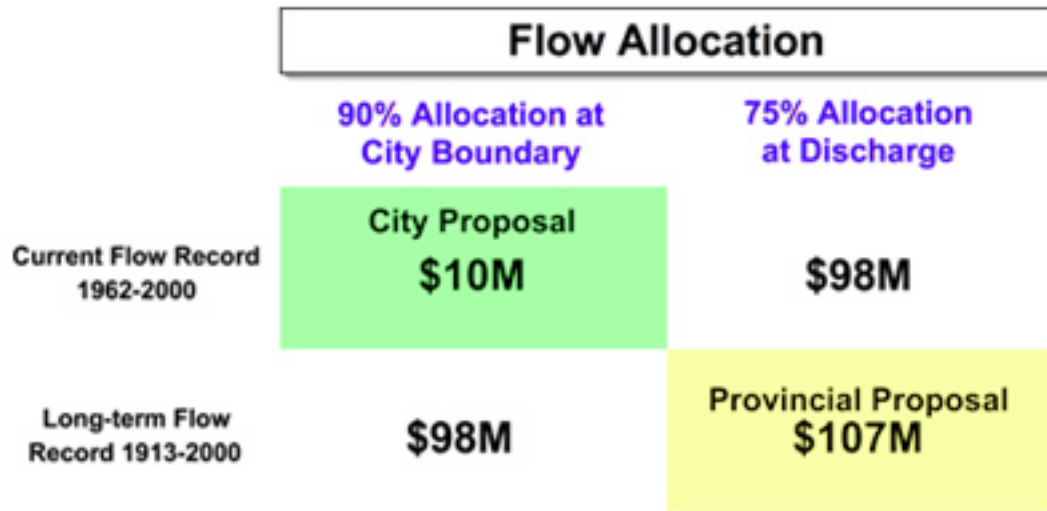
Centrate Treatment will Reduce Loading at NEWPCC



City Proposal is Conservative

- **Although NEWPCC loadings may currently meet the City's proposed license limits in all months, *centrate treatment* (which reduces the load by 30%) is proposed. Why?**
 - ◆ **Current October conditions are close to proposed limit**
 - ◆ **City would like to ensure loading limits not exceeded**
 - ◆ **Centrate Treatment provides for:**
 - ▶ **Variability of Treatment performance**
 - ▶ **Possible faster growth in City over next decade than predicted**
 - ▶ **Changes to lower design flows,**
 - ▶ **Time to add additional ammonia reduction, if required**

Comparison of Manitoba and City Positions



The City believes its program will meet protective criteria, even with many conservative assumptions

City Recommendations

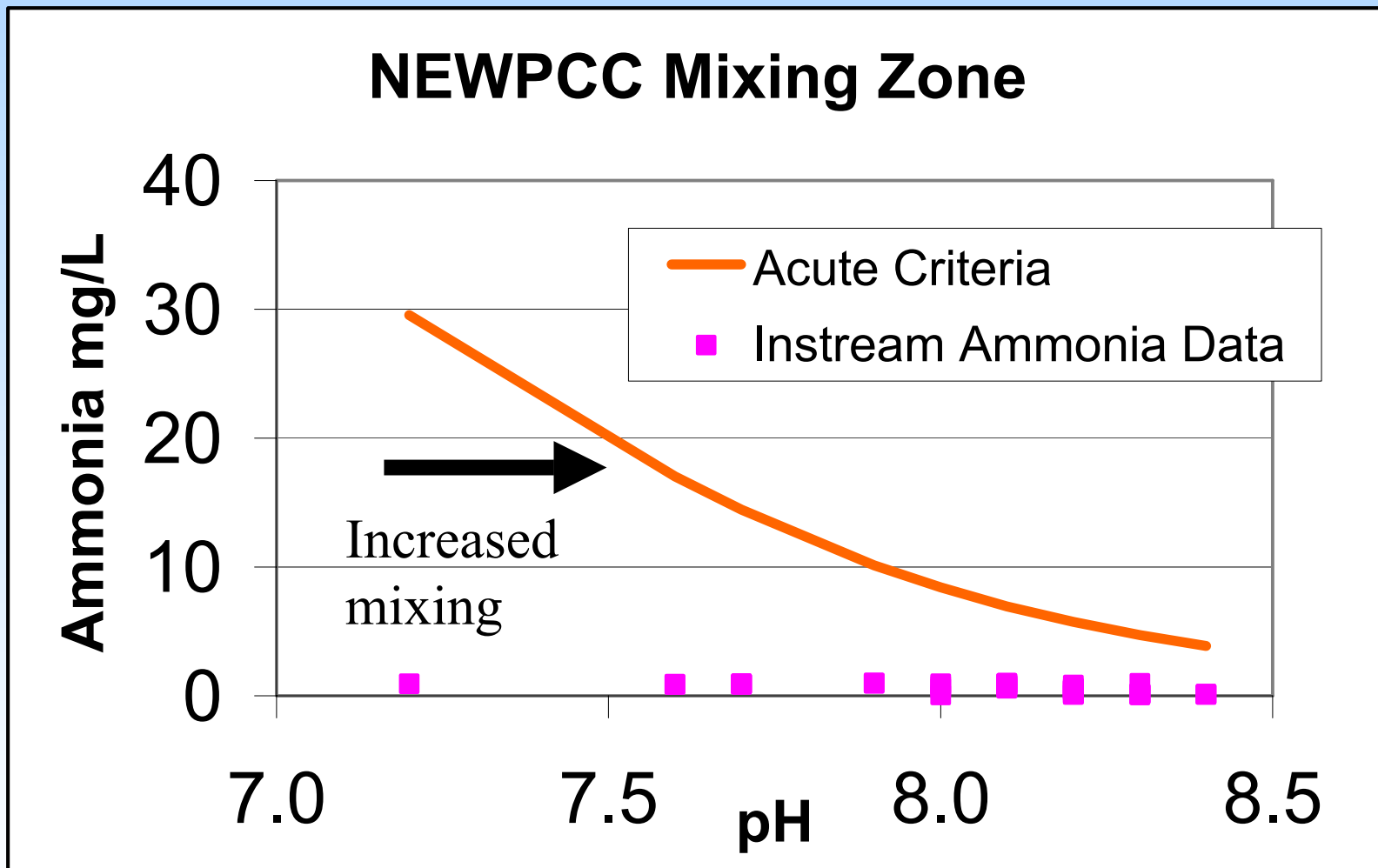
- **City proposes ammonia loading limits be based on the lower of:**
 1. **Chronic in-stream criteria**
 - ▶ 90% flow allocation at City boundary for Red River
 - ▶ 75% flow allocation at City boundary for Assiniboine River
 - ▶ Period of Record (1962-present) for design flows
 2. **No lethality in mixing zone (acute criteria with 5:1 dilution ratio in mixing zone)**
- ◆ **City proposes that City and Province review preliminary loading limits to define specific limits**

Thank You

If Criteria Exceeded, What effects would result?

- **Fish would be exposed only if they stayed in the zone of exceedance for 30 days**
 - ◆ Evidence shows fish move extensively
- **Criteria is protective**
 - ◆ Only (5%) of aquatic community stressed
 - ◆ Only 20% of individuals in those species stressed

Monitoring Shows No Acute Lethality in Mixing Zone at NEWPCC



Proposed CSO Control Plans

	City of Edmonton	City of Winnipeg
Combined Sewer Service Area	5,000 ha (16%)	8,700 ha (30%)
Volume of CS Overflow	3.0M m3/year	6.8M m3/ recreation season
Number of Overflow Points	19	79
Proposed Control Methods	<ul style="list-style-type: none"> -Raise Weirs -In-line Storage - Off-line Storage - Opportunistic Sewer Separation 	<ul style="list-style-type: none"> -Raise Weirs -In-line Storage - Off-line Storage - Opportunistic Sewer Separation
Proposed Control Plan: PHASE A PHASE B (not recommended)	<p>\$120-140M (20 years)</p> <p>\$120M (no timeline)</p>	\$270M (50 years)
Number of OF's after Plan	Average 2-3 Overflows (PHASE A)	Average 4 Overflows
Approximate Cost per Ha of Control Plan	\$26,000/ha	\$30,000/ha