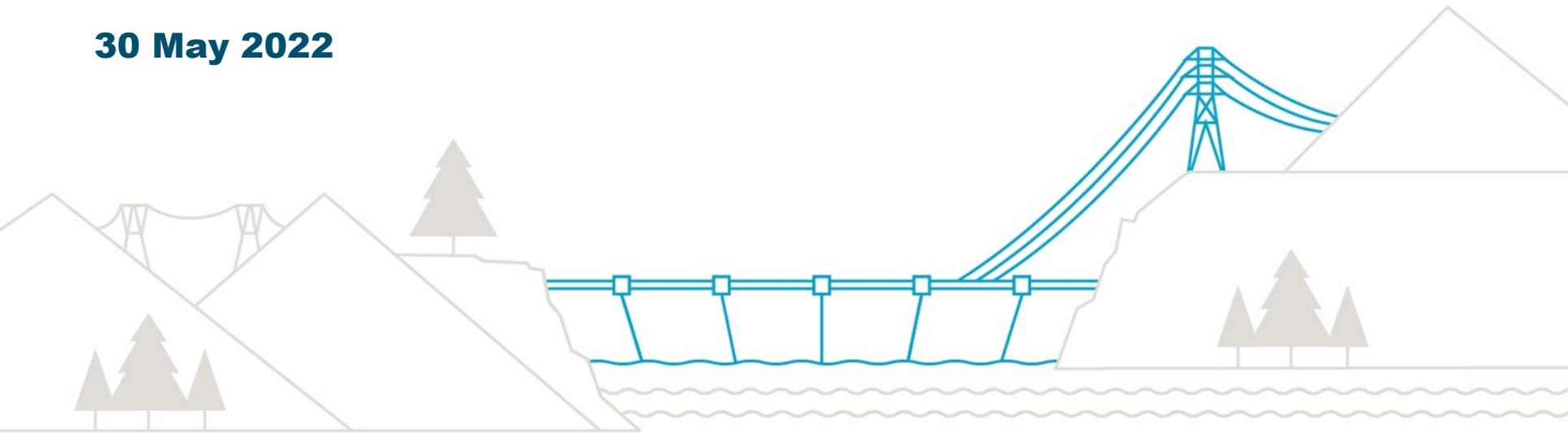


# Non-Treaty Storage Agreement

**Prepared For:  
Columbia Basin Regional Advisory Committee**

**30 May 2022**



# Outline

- Physical environment
- Contractual environment
- First Non-Treaty Storage Agreement
- Current Non-Treaty Storage Agreement
- Benefits of the Non-Treaty Storage Agreement
- End of the Non-Treaty Storage Agreement

# Non-Treaty Storage Agreement

Google: Non treaty storage agreement

<https://www.bchydro.com/energy-in-bc/operations/our-facilities/columbia/ntsa.html>

## NTSA key documents

The documents below are associated with the Non-Treaty Storage Agreement (NTSA), which is the agreement for the storage of water on the Columbia River. For an explanation of the agreement, [see our main NTSA page](#).

### Session 1 – October 2010

- [Introduction](#) [PDF, 8 KB]
- [Pre-reading](#) [PDF, 566 KB]
  - [Appendix A General Optimization Model \(GOM\) results](#) [PDF, 357 KB]
  - [Appendix B Hydroelectric Simulation \(HYSIM\) results](#) [PDF, 250 KB]
  - [Appendix C NTSA modeling](#) [PDF, 238 KB]

### Session 2 – November 2010

- [Pre-reading](#) [PDF, 1.1 MB]

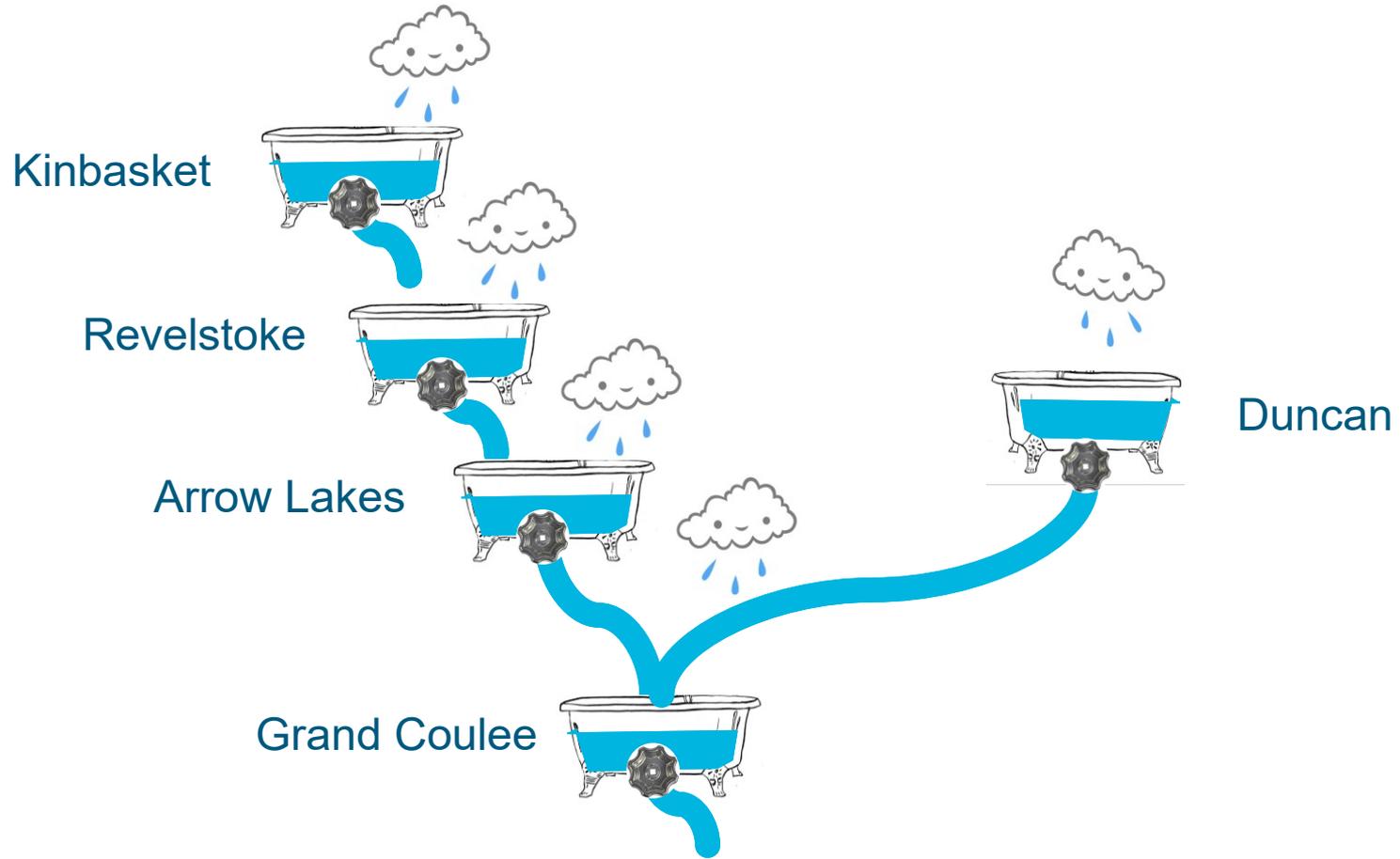
### Session 3 – June 2011

- [Non-Treaty Storage Agreement \(NTSA\) stakeholder forum report](#) [PDF, 737 KB]
  - [Appendix A](#) [PDF, 212 KB]
  - [Appendix C](#) [PDF, 270 KB]
  - [Appendix D](#) [PDF, 238 KB]
  - [Appendix E](#) [PDF, 484 KB]
  - [Appendix F](#) [PDF, 393 KB]
  - [Appendix G](#) [PDF, 189 KB]
  - [Appendix H](#) [PDF, 266 KB]
  - [Appendix I](#) [PDF, 4.7 MB]

## Other documents

- [NTSA 2011 term sheet](#) [PDF, 4.7 MB]
- [NTSA 2012 agreement](#) [PDF, 2.5 MB]
- [NTSA fact sheet, May 2010](#) [PDF, 110 KB]
- [NTSA fact sheet, June 2012](#) [PDF, 176 KB]

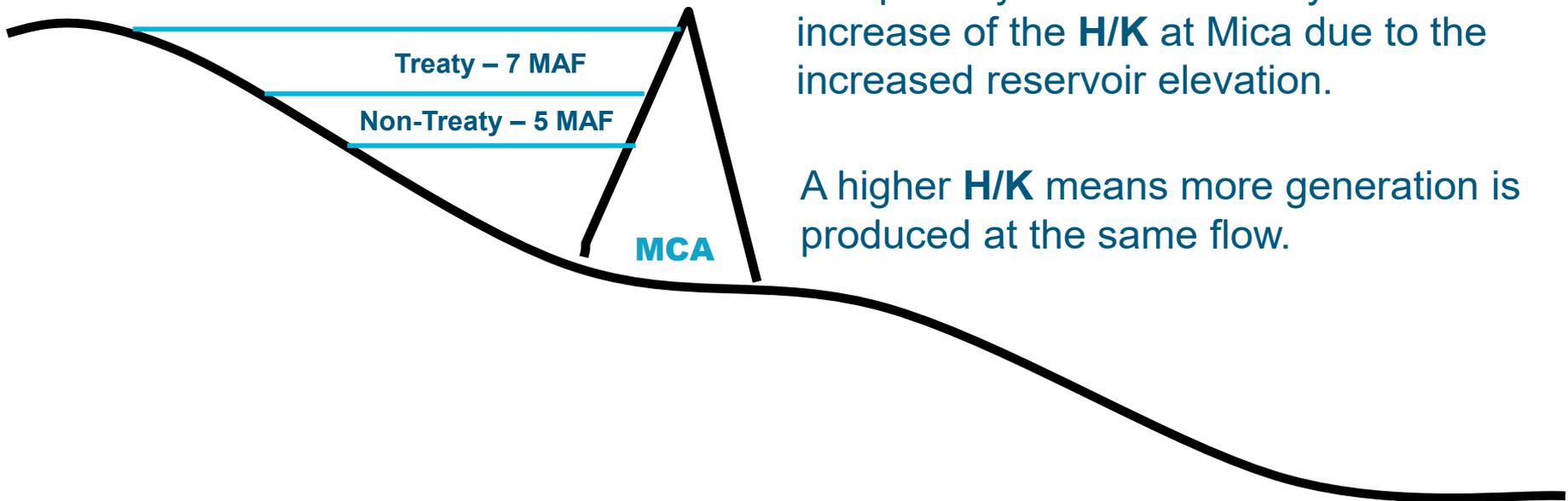
# Physical Environment



String of U.S. generating stations

# Physical Environment

**Mica was built with 5 million acre-feet more storage than required by the Treaty**



The primary benefit to BC Hydro is an increase of the **H/K** at Mica due to the increased reservoir elevation.

A higher **H/K** means more generation is produced at the same flow.

# Contractual Environment & the First NTSA

- The Treaty was in effect during Mica construction.
- Filling the Non-Treaty space required a reduction in downstream flow.
- This reduction in downstream flow lowered the generation benefit provided by the Treaty at U.S. generating stations.
- Any deviation from Treaty-specified flows requires mutual agreement with the U.S. Entity.
- An agreement with the U.S. Entity to fill the Non-Treaty space was required.
- This was the first Non-Treaty Storage Agreement (NTSA).
- Since then, several NTSAs have been signed that allow for both the storage and release of water relative to the Treaty storage requirements for mutual benefits.

# Current Non-Treaty Storage Agreement

- “enabling agreement” – it does not specify a particular operation
- mechanism to enable alternative operations than those specified by the Treaty
- non-power and power objectives are achieved “in-season”
- decisions by mutual agreement
- Long-term agreement for certainty of operations

# Current Non-Treaty Storage Agreement

**Parties:** BC Hydro and Bonneville Power Administration (BPA)

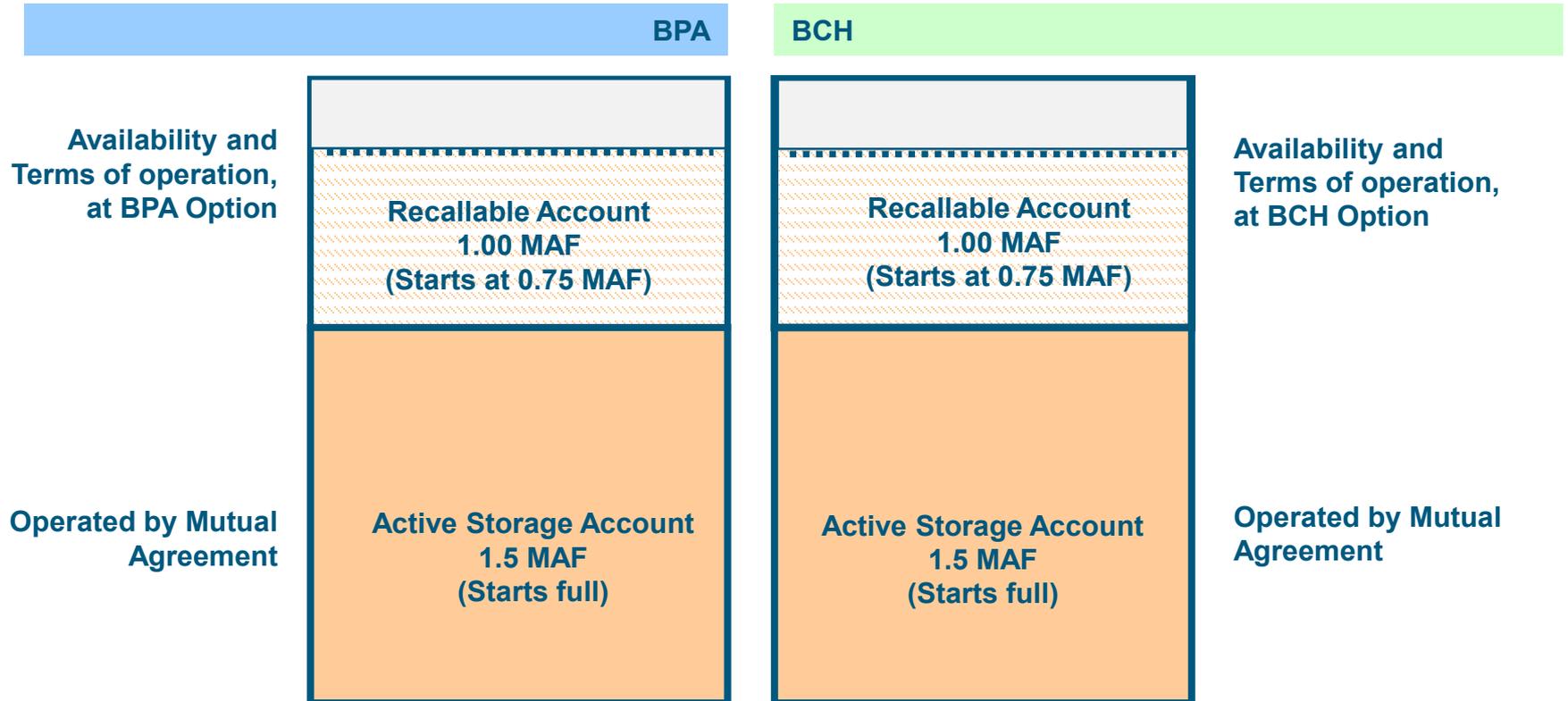
**Term:** April 2012 to 15 Sep 2024

**Purpose:** Coordinates 5 MAF of storage in Canadian reservoirs, all storage and release by mutual agreement. Both parties benefit from the energy value of generation changes at US federal projects due to the use of BC Hydro storage to shape releases.

## Key Provisions:

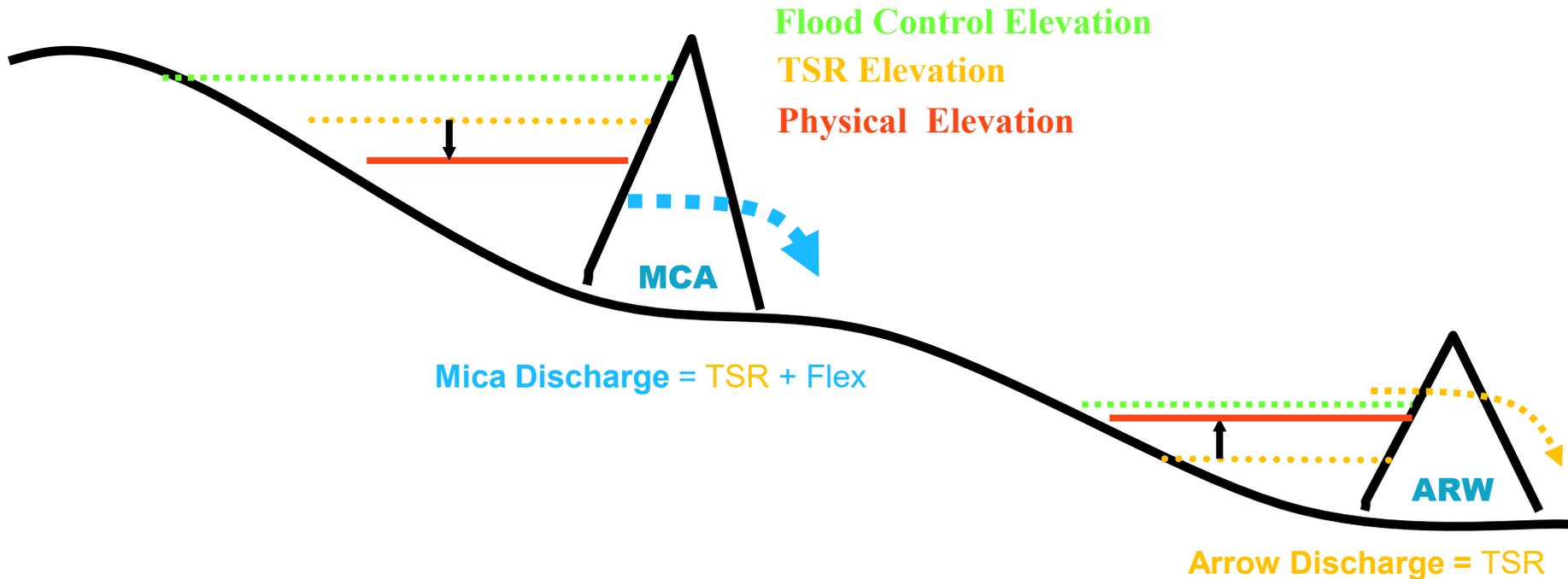
- Draft/Storage limits:
  - Freshet “0” storage (US fish window) but can release.
  - U.S. Chum restrictions may limit releases in Nov/Dec as observed in Dec 2016.
- BPA and BCH have dry release provisions (exercised in 2015).
- BPA compensates BC Hydro for H/K losses at Mica.
- Flows are specified on a weekly basis, confirmation by noon every Thursday.
- Either party can decline a transaction if flow impacts are unacceptable.

# Non-Treaty Storage Accounts



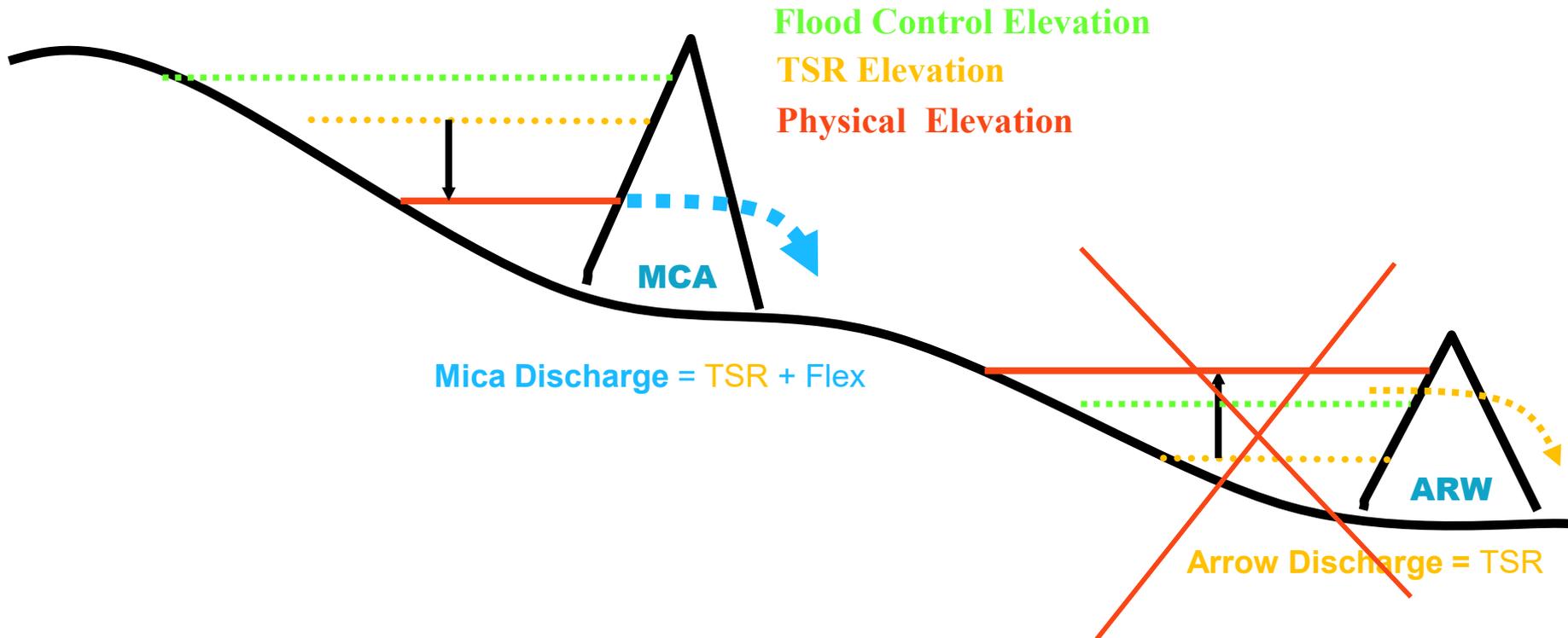
# Storage Operation - Utilizing Flex

Canada can draft more than specified Treaty discharge from Mica (Flex).



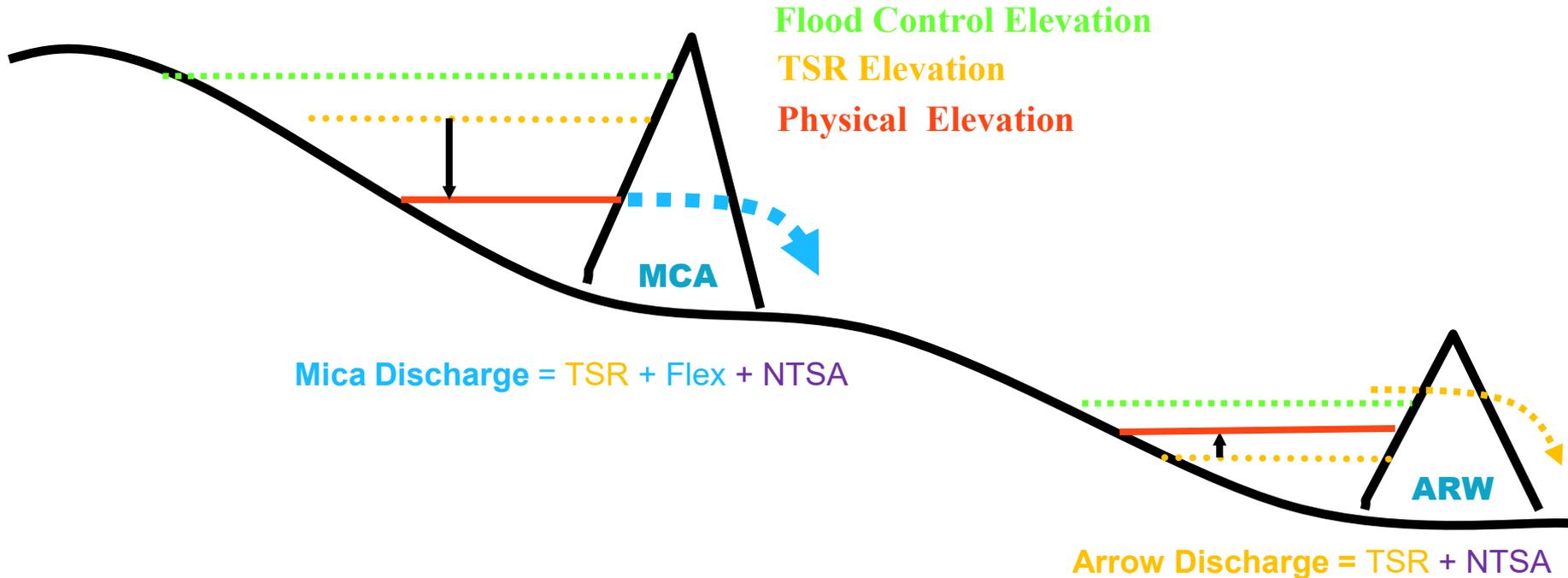
# Storage Operation - Need for NTSA

Flex must respect flood control.



# Storage Operation - With NTSA

NTSA allows additional discharge from Mica which flows through Arrow to the U.S.



# NTSA – BCH Dry Release

## Provision

- BCH has Dry Release rights during low water conditions.
- Under BCH Dry Period Conditions, BCH may release up to 2 kcfs from Arrow from Oct through April from its Active and Recallable account.
- BPA has concurrent release rights.
- Energy associated with BCH water transaction under Dry Operations shall be calculated by multiplying estimated U.S. H/K by the release amount.
- Headloss energy associated with BPA water transaction shall be delivered to BCH.
- Energy exchanges are scheduled weekly, and energy delivered flat ATC to the border subject to capacity limitation of the delivering Party.
- After-the-fact energy is calculated based on after-the-fact U.S. H/K and the resulting energy adjustments shall be delivered in a timely manner by BCH or BPA.
- Both BCH and BPA shall make reasonable efforts to return the water as soon as practical.

# **NTSA - Summary**

**The Non-Treaty Storage Agreement allows changes to Treaty flows below Arrow for mutual benefit with the U.S.**

**For operation of the BC Hydro account, changes in power production in the U.S. are calculated relative to the Treaty operation, and the U.S. is compensated by BC Hydro if the generation is lower.**

**BC Hydro receives the benefit if they are higher. In return BPA can operate its account compensating BC Hydro for any head losses.**

**All changes remain by mutual agreement.**

# NTSA Benefits - Examples

- NTSA was used to reduce peak flows at Birchbank in 2012 by about 20 kcfs at 215 kcfs on 20 July. Absent this agreement, flows would have exceeded 225 kcfs which are known to cause regional flooding at Castlegar, Robson, Genelle and Trail.
- Storage under this agreement also reduced the duration of high flows in excess of 200 kcfs from 23 to 7 days in July 2012.
- BPA exercised 0.5 Maf of dry release provision in 2015 for fish flow augmentation in May/June 2015.
- BCH fully utilized storage under NTSA to help mitigate low Arrow water level impacts on fish, recreation and industrial users in 2015 (3<sup>rd</sup> driest year on record) and 2016 (dry summer conditions).
- BCH and BPA both opened their Recallable accounts in Oct 2015 and Oct 2016 to enable additional 0.5 Maf storage combined. This effectively kept Arrow higher by about 4 ft for BC in the fall/winter and improved certainty for U.S. flow augmentation water in the summer.

# End of the NTSA

- Expires September 2024
- The modernized Treaty will form the contractual environment for any new NTSA

# End of the NTSA

Objective	Attribute	Direction	Units	MSIC Type	MSIC Val				
						A (Full Utilization)	B (Moderate & Flex)	C (Low Utilization)	D (none)
Kin - Navigation	Total site-days / year (Downie)	H	days	A	7	343	346	350	360
Kin - Rec - Water - Canoe	2404 < days < 2475	H	days	A	7	150	151	155	168
Kin - Rec - Water - Columbia	2375 < days < 2475	H	days	A	7	174	175	176	181
Kin - Rec - Shore - Columbia	2444 < days < 2473	L	days	A	7	50	44	45	46
Kin - Heritage	Weighted days - Erosion	L	days	A	7	205	206	213	233
Kin - Heritage	Weighted days - Inundation	H	days	A	7	507	522	543	601
Kin - Vegetation	Flooded Weeks (early; 749-751m)	L	weeks	R	10%	2.20	2.30	2.40	3.10
Kin - Dust	SqKm - Days (April)	L	sqkm-days	R	10%	1,500	1,490	1,410	1,300
Kin - Erosion	days >= 2470	L	days	A	7	52	61	64	76
Kin - Pelagic Productivity	MMm3-Days	H	MMm3-days	R	10%	0.84	0.84	0.85	0.86
Kin - Entrainment	Proportion Juvenile Kokanee	L	total ppn	R	10%	0.30	0.30	0.30	0.29
Rev - Entrainment	Proportion Juvenile Kokanee	L	total ppn	R	10%	0.90	0.89	0.89	0.88
Rev Reservoir - Stability	0.25m over 1-day rolling	L	rolling days	R	10%	210	227	212	204
Mid-Col - Rec - Boat Access	days > 1435	H	days	A	7	36	30	36	71
Mid-Col - Rec - Shore Access	days < 1435	H	days	A	7	146	151	145	109
Mid-Col - Wetlands	Flooded Weeks - Montana - Fall	L	weeks	R	10%	5.00	5.10	5.60	14.20
Mid-Col - Wetlands	Flooded Depth - Montana - Fall	L	metres	R	10%	1.40	1.20	1.40	2.10
Mid-Col - Aquatic - River Length	kilometres - October	H	km	R	10%	24.90	24.10	24.10	16.60
Mid-Col - Sturgeon - WUA	% time > 200 m2	H	percent	R	10%	76%	75%	77%	83%
Arr - Fish - Pelagic	MMm3-Days	H	MMm3-days	R	10%	1.78	1.78	1.79	1.82
Arr - Rec	Weighted days	H	days	A	7	221	220	229	257
Arr - Heritage	Weighted days - Erosion	L	days	A	7	212	209	216	262
Arr - Heritage	Weighted days - Inundation	H	days	A	7	129	115	136	221
Arr - Dust	days < 1410	L	days	A	7	43	42	43	28
Arr - Vegetation	Flooded Weeks (latter; 436-437)	L	weeks	R	10%	3.50	3.70	3.90	10.70
Arr - Wildlife	% Useabe Habitat - Nesting	H	percent	R	3%	6%	12%	6%	1%
Arr - Wildlife	% Useabe Habitat - Fall Migration	H	percent	R	4%	30%	28%	24%	1%
Arr - Navigation	Weighted-Days	H	days	A	7	221	220	229	257
LCR - Boat Access	40000 < days < 103000	H	days	A	7	61	60	61	64
LCR - Shoreline Access	60000 < days < 99000	H	days	A	7	87	87	87	92
LCR - Flooding at Genelle	days > 165 kcfs	L	days	A	n/a	0	0	0	0
LCR - Whitefish	% Egg Loss	L	percent	R	10%	22%	22%	22%	16%
LCR - TGP	days > 115%	L	days	R	10%	36	31	38	82
Power Generation	Incremental Cost	L	\$M/yr	A	0.5	\$ 0.00	\$ 0.10	\$ 0.60	\$ 11.80
Greenhouse Gas	Incremental Carbon Benefit	H	Ktonnes/yr	R	10%	171	153	176	0

