

Approaches to Flow Recommendations

Ecological Flow Science Advisory Board

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Chris Goudreau, N.C. Wildlife Resources Commission

Levels of Protection (pp 84-86 of IFC book)

- No Protection
- Threshold Protection
- Partial Ecologically-Based Protection
 - Addresses 1-4 riverine components (hydrology, biology, water quality)
 - May address intra-annual variability, but not inter-annual
- Comprehensive Ecologically-Based Protection
 - Addresses all 5 riverine components (hydrology, biology, water quality, connectivity, geomorphology)
 - Maintains intra-annual and inter-annual variability
- Full Protection (hands off)

General Approaches (Richter et al. 2011)

- Minimum Flow Threshold
 - May be a single value (e.g., 7Q10) or be seasonally adjusted (e.g., Tennant, South Carolina)
- Statistically-based Standard
 - More on following slide
- Percent of Flow Standard
 - Example - Alberta

Statistically-Based Standard

- Flow components include:
 - Critical low, low, high flow pulses, small floods, high floods
 - Wet, normal, dry years
- For each, includes magnitude, duration, frequency, season
- Tied to ecologically significant events
 - E.g., spawning, floodplain rejuvenation, fry/juvenile growth, migration, sediment movement, channel maintenance

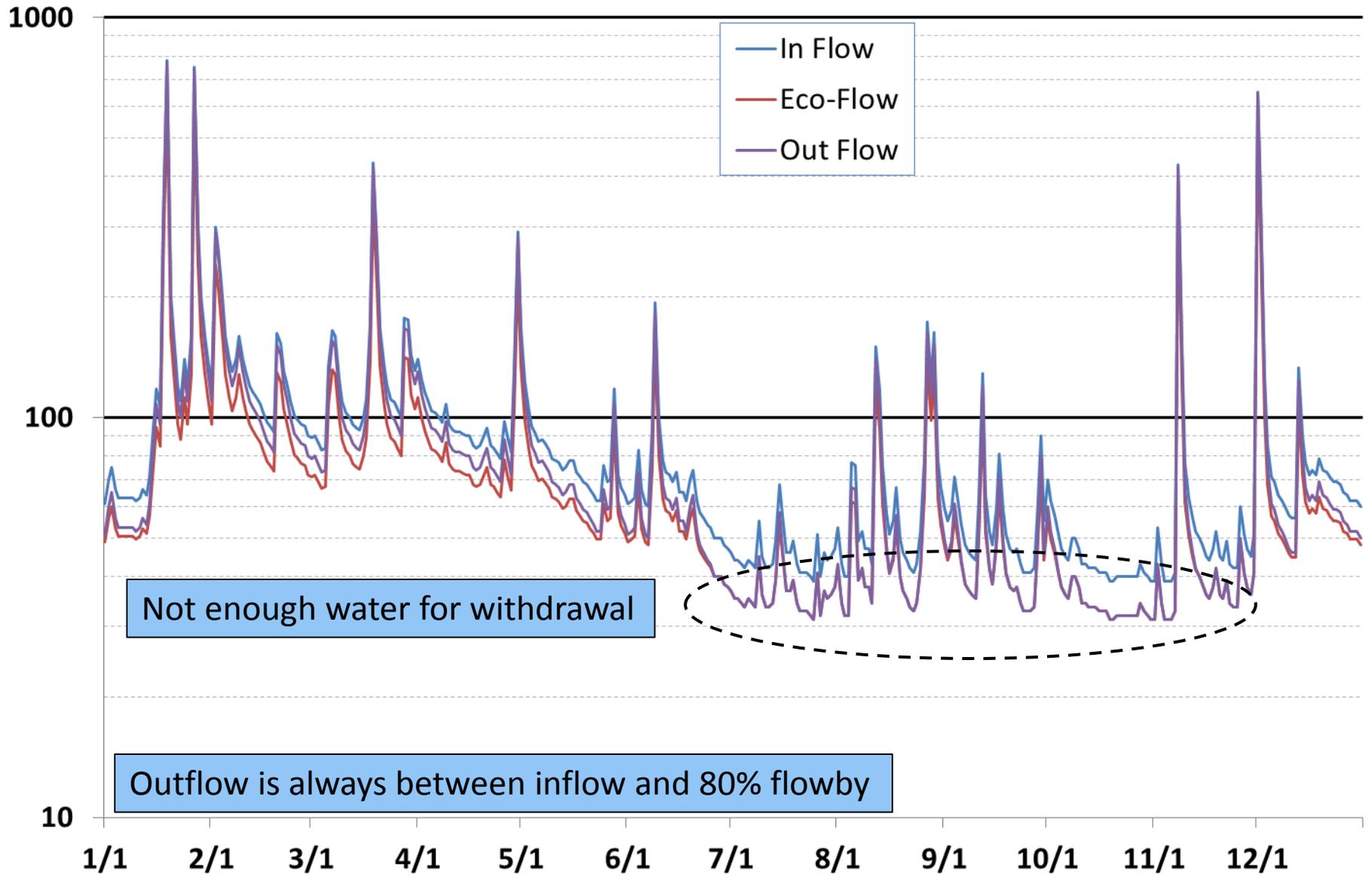
Approaches of Proposals

Proposal	Threshold	Stat-Based	POF	Other
Modified SC	20/30/40 MMF 30/40/50 MMF			
NC			80% Flow-by (daily)	
Alberta	20%-tile EBF (monthly)		85% Flow-by (daily)	
TNC	~10%-tile pass-by (monthly)	?	90% Flow-by (monthly) 95% Flow-by (monthly)	Headwater cutoff; Wet/dry year values
Ad-Hoc				Regression of ecodeficit with fish diversity or EPT richness

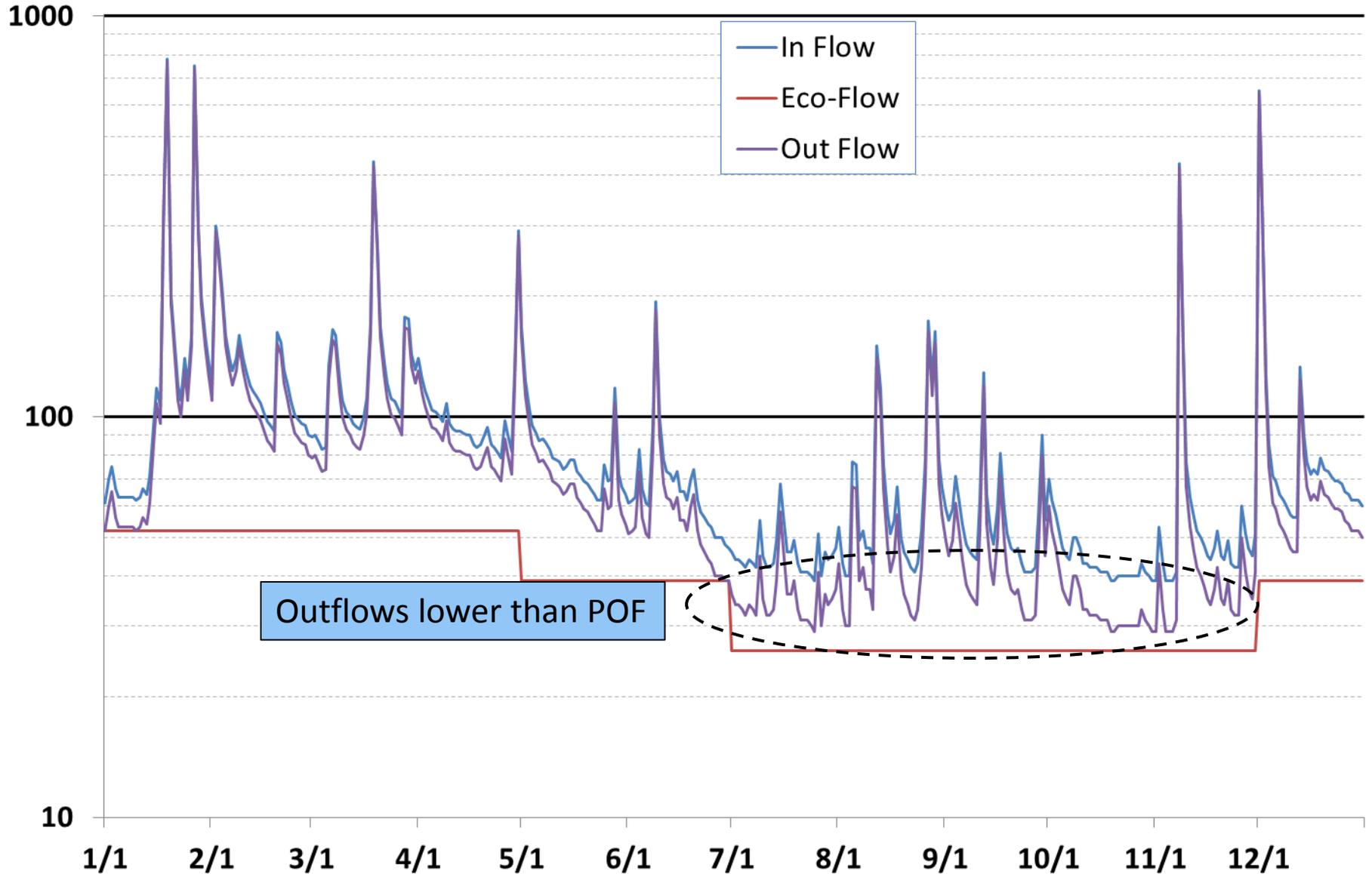
Examples of Applying Proposals

- Simplified examples – DWR model takes into account more realistic model constraints
- Comparing POF and Minimum Threshold
- Mean annual flow = 130 cfs
- Assumes constant withdrawal of 10 cfs (6.4 mgd)
- If not enough water to meet eco-flow, withdrawal is reduced

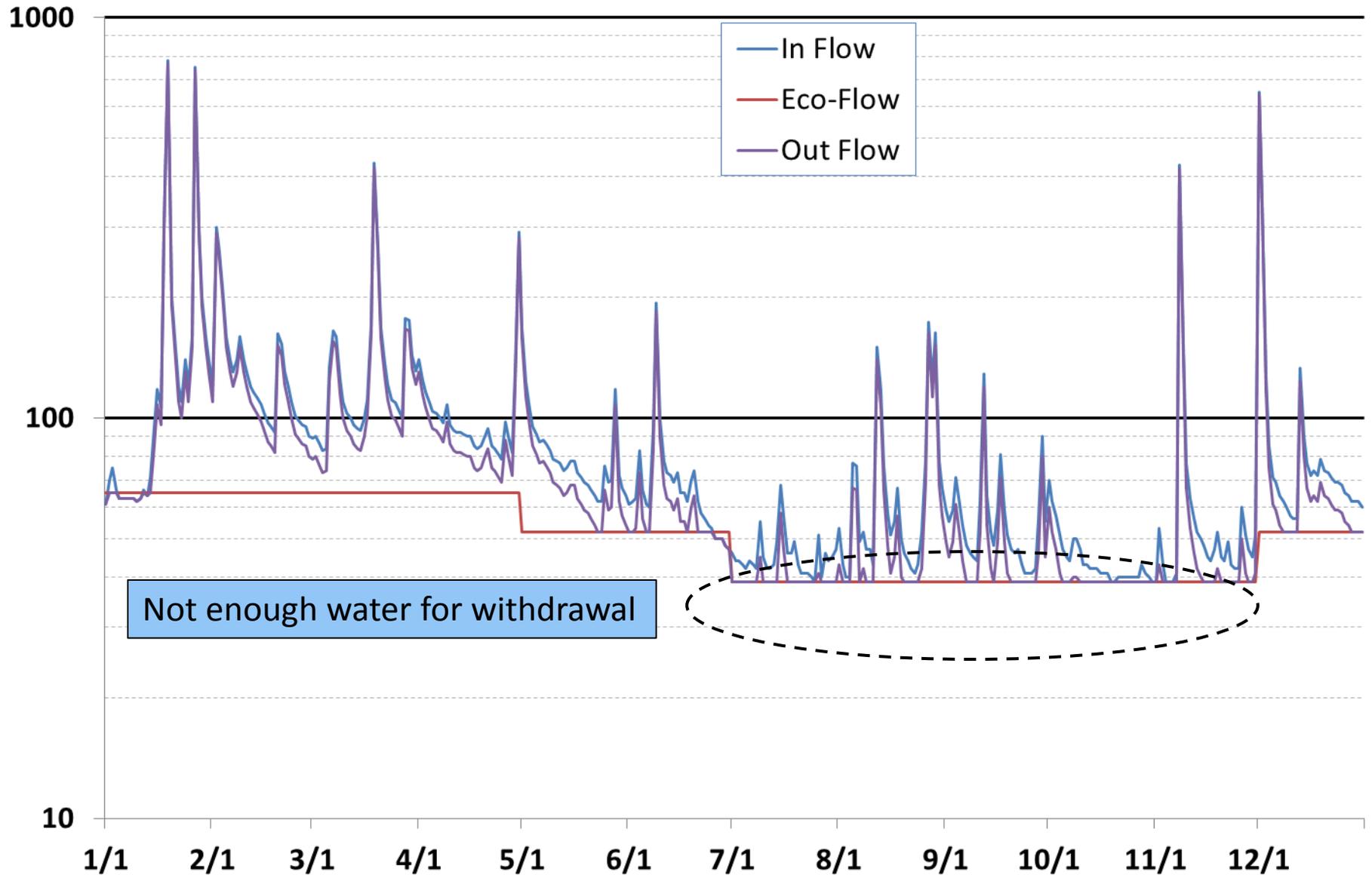
Eco-Flow = 80% Flowby



Eco-Flow = 20/30/40 %MAF



Eco-Flow = 30/40/50 %MAF



Application of Proposals

Proposal	Headwater	Wadeable	Large River	Coastal Non-Tidal	Coastal Tidal
Modified SC	✓	✓	✓	✓	
NC	✓	✓	✓	✓	
Alberta	✓	✓	✓	✓	
TNC	No withdrawal	✓	?	?	
Ad-Hoc	✓	✓	?	?	