Hood River Basin Study

Agenda

1). Goals

2). Partners

3). Study Overview

4). Recommendations

WPN Watershed Professionals Network, LLC

Goals

Evaluate:

1. Current and future water demands
2. Water conservation opportunities
3. Groundwater resources
4. Impacts of climate change to streamflow
5. Alternatives to maintain viable water use/supply
6. Impacts to fish habitat from climate and water supply alternatives

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Partners

1. Hood River Water Planning Group

Formed in 2008, stakeholders throughout Hood River Basin

2. United States Bureau of Reclamation (BOR)

$250,000 in-kind contribution through WaterSMART Basin Study program.

3. Oregon Water Resources Department (OWRD)

$250,000 Water Conservation, Reuse, and Storage Grant.

- Watershed Professional Network (Water Use, Water Conservation, PM)
- Normandeau Associates (IFIM)
- HRC, USGS (Groundwater)

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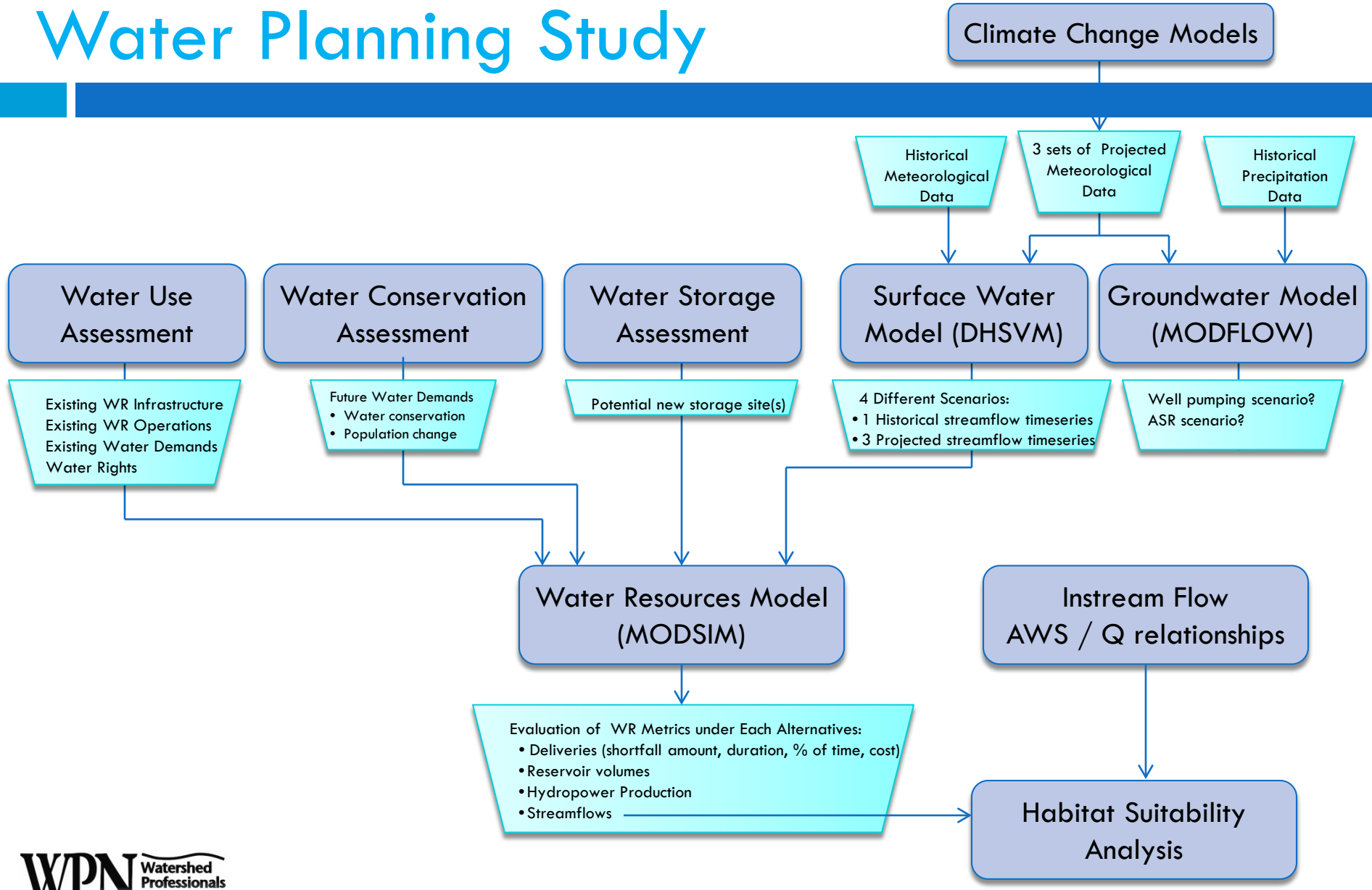
Overview of Water Planning Study



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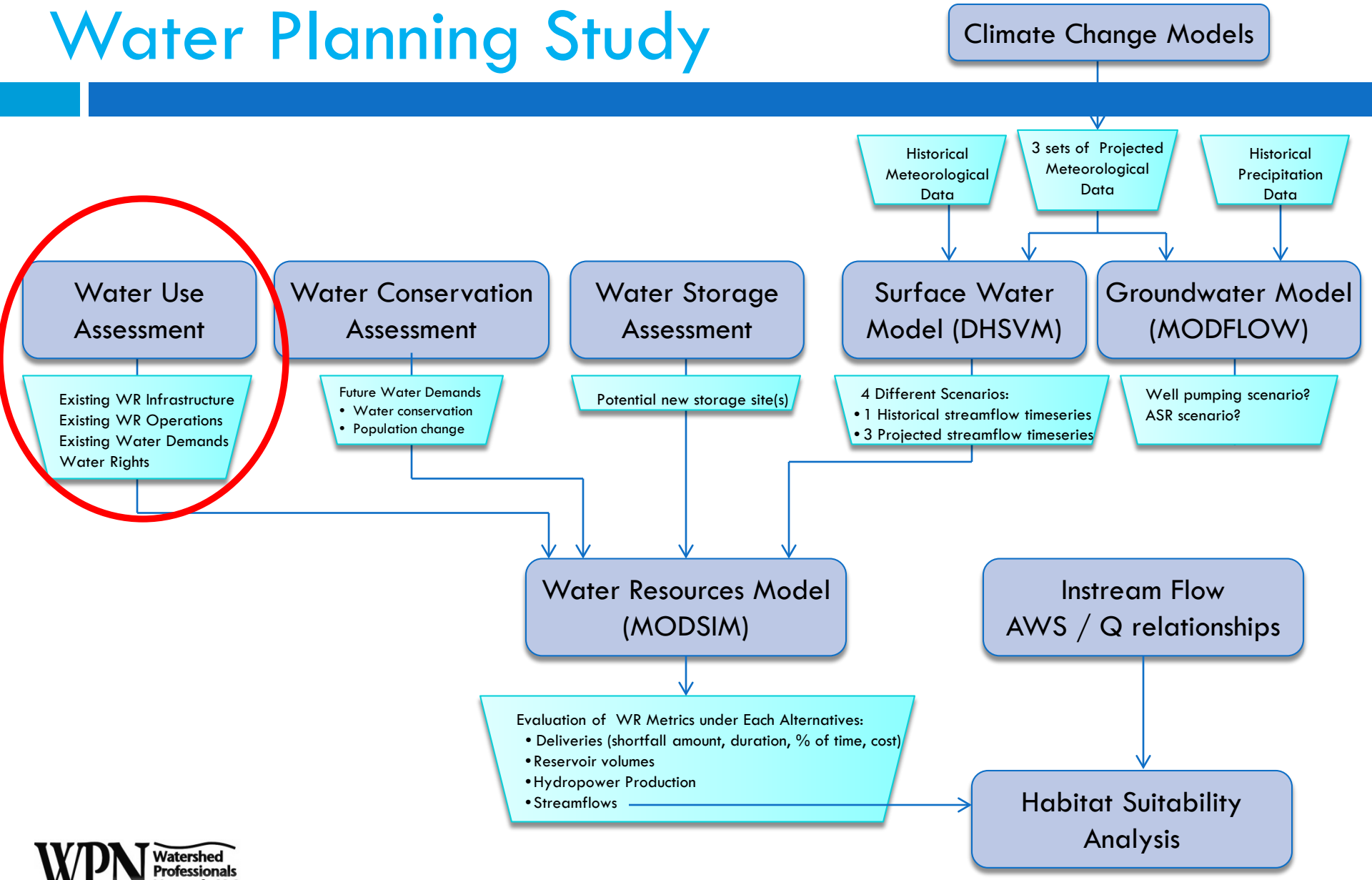

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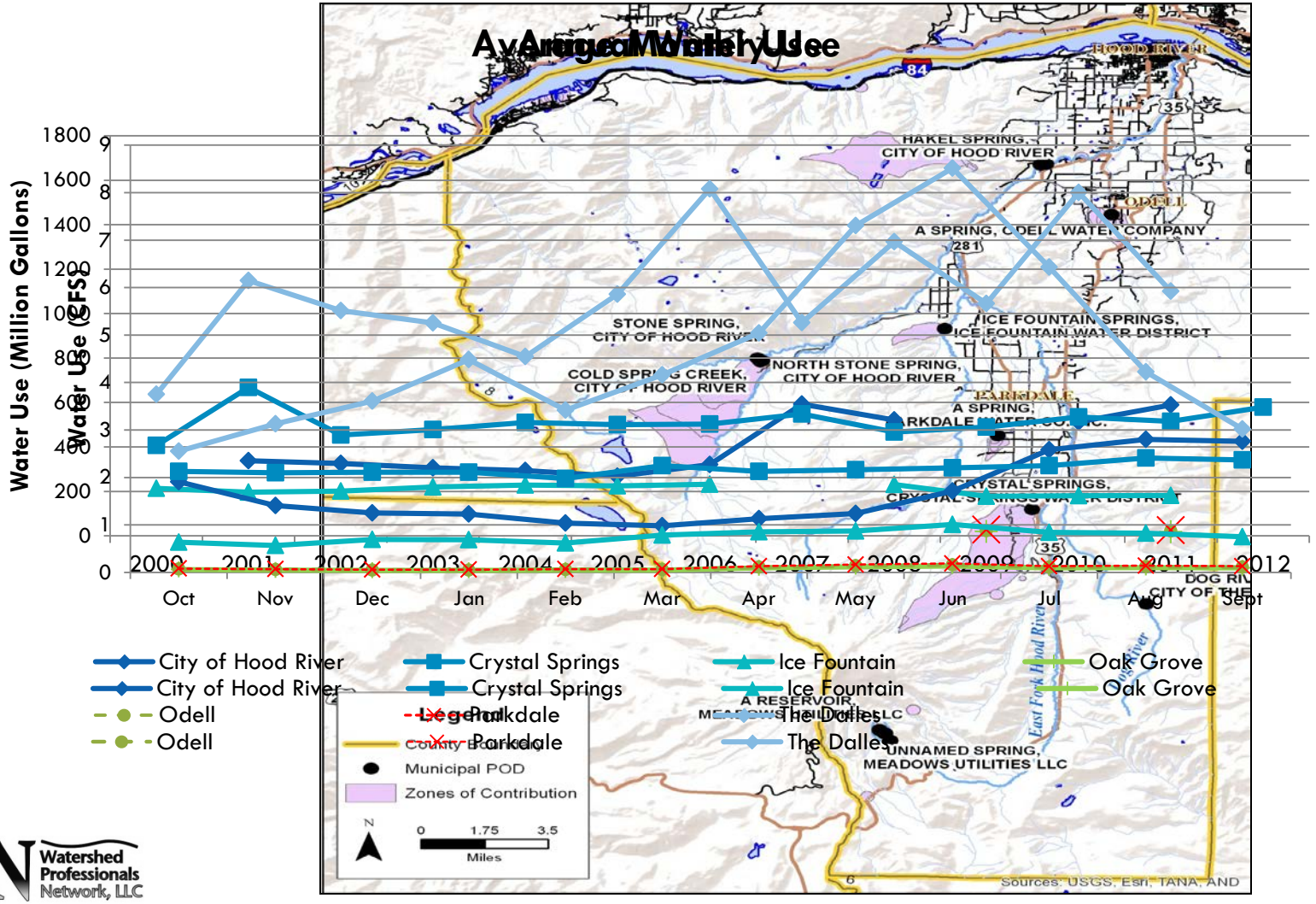
Water Use Assessment – Potable



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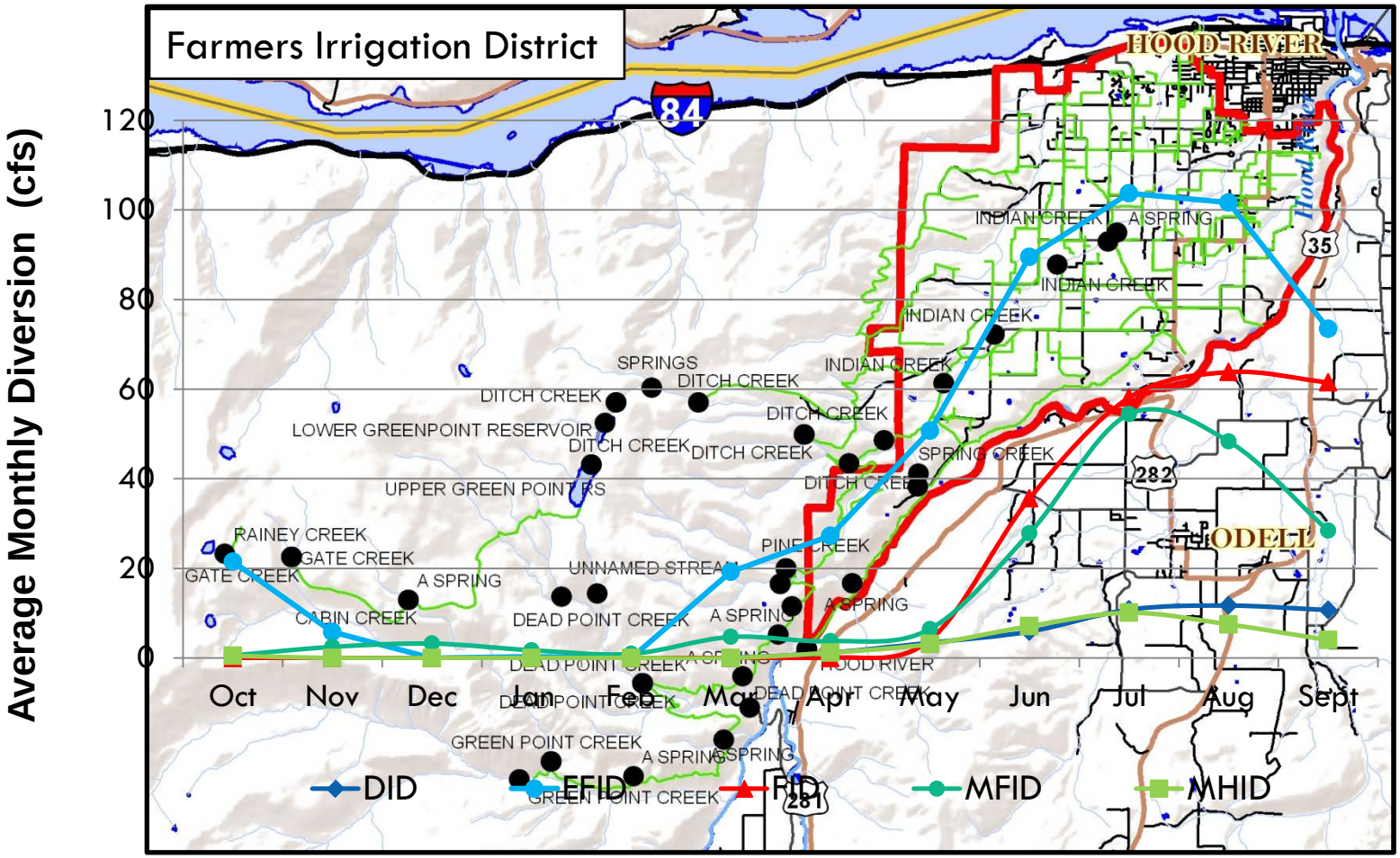
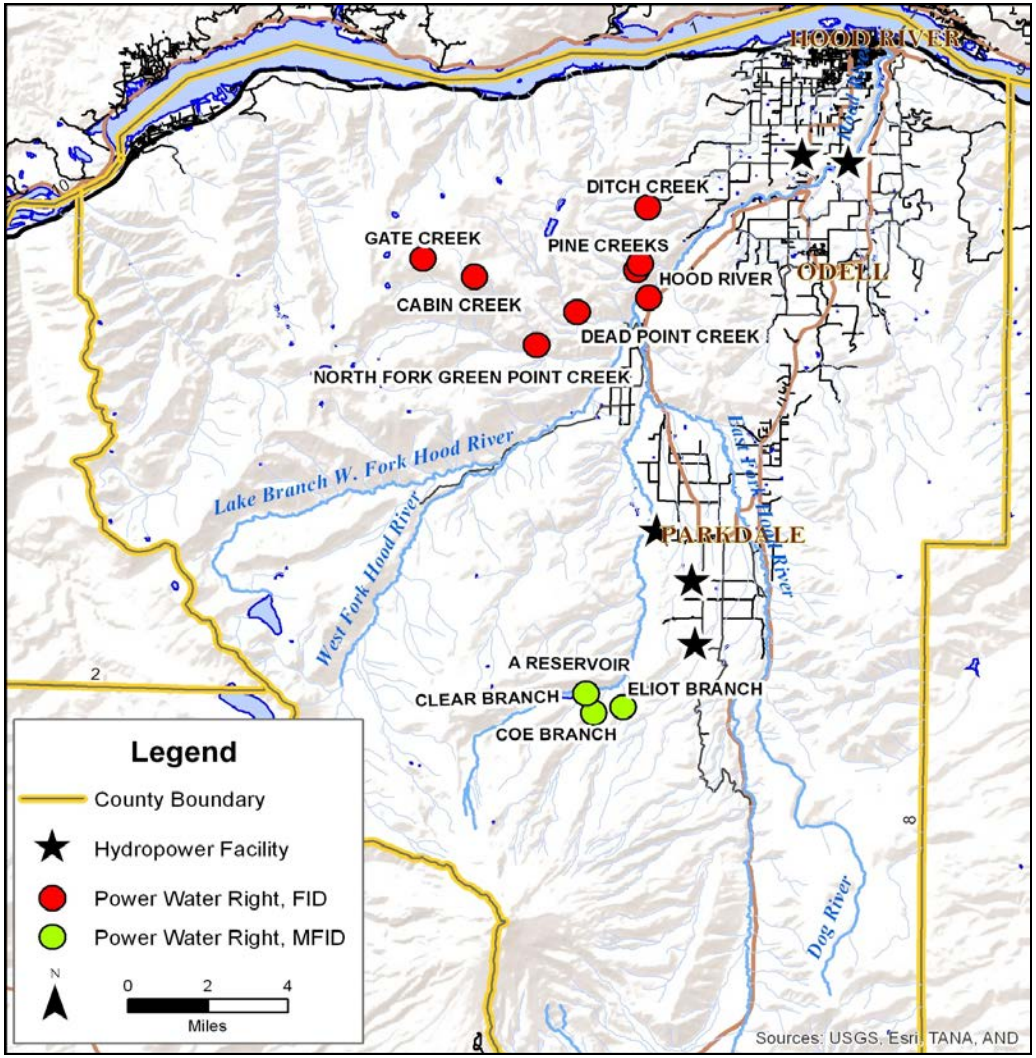
Water Use Assessment - Irrigation



Water Use Assessment - Hydropower



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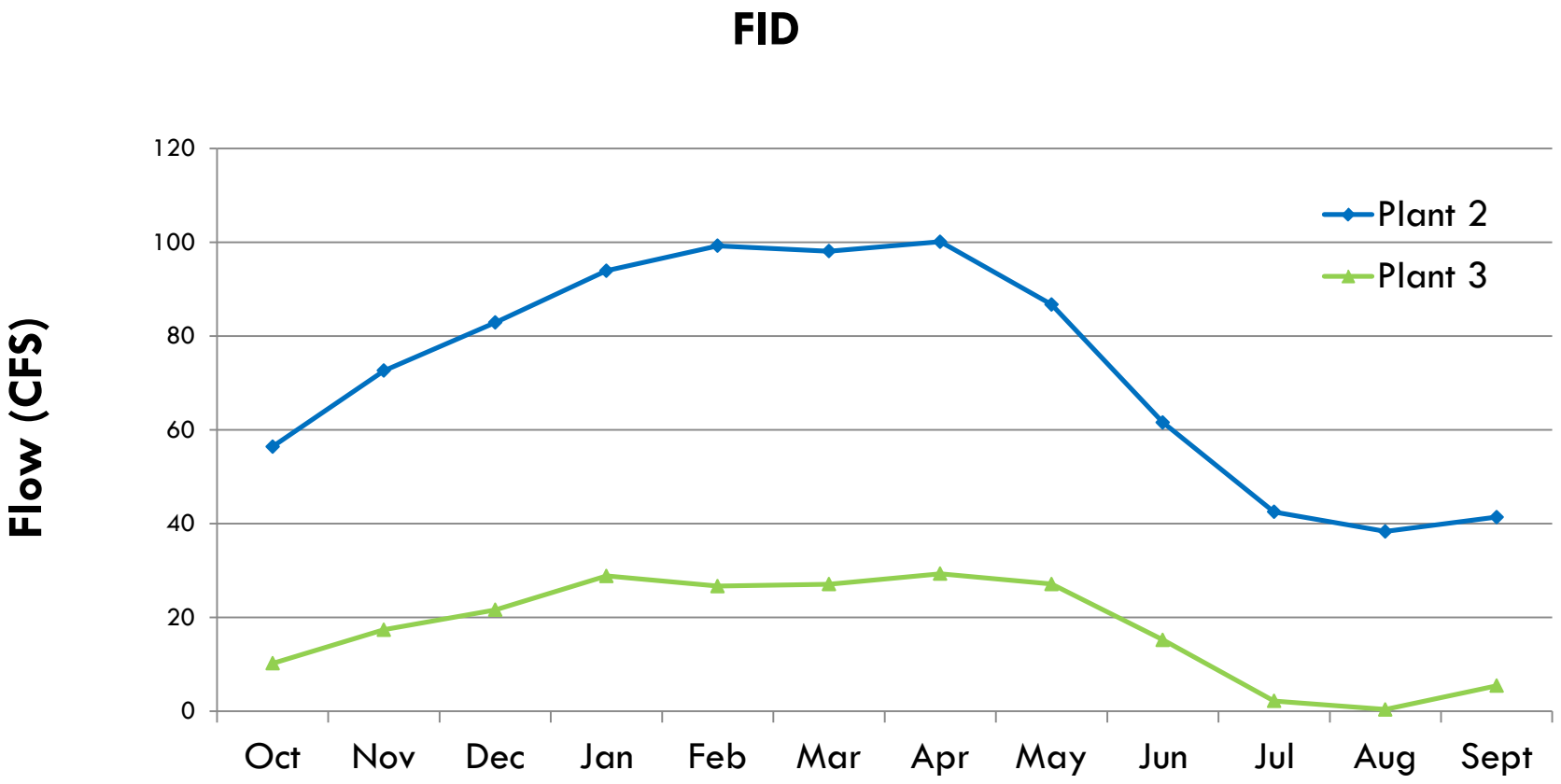
Water Use Assessment - Hydropower



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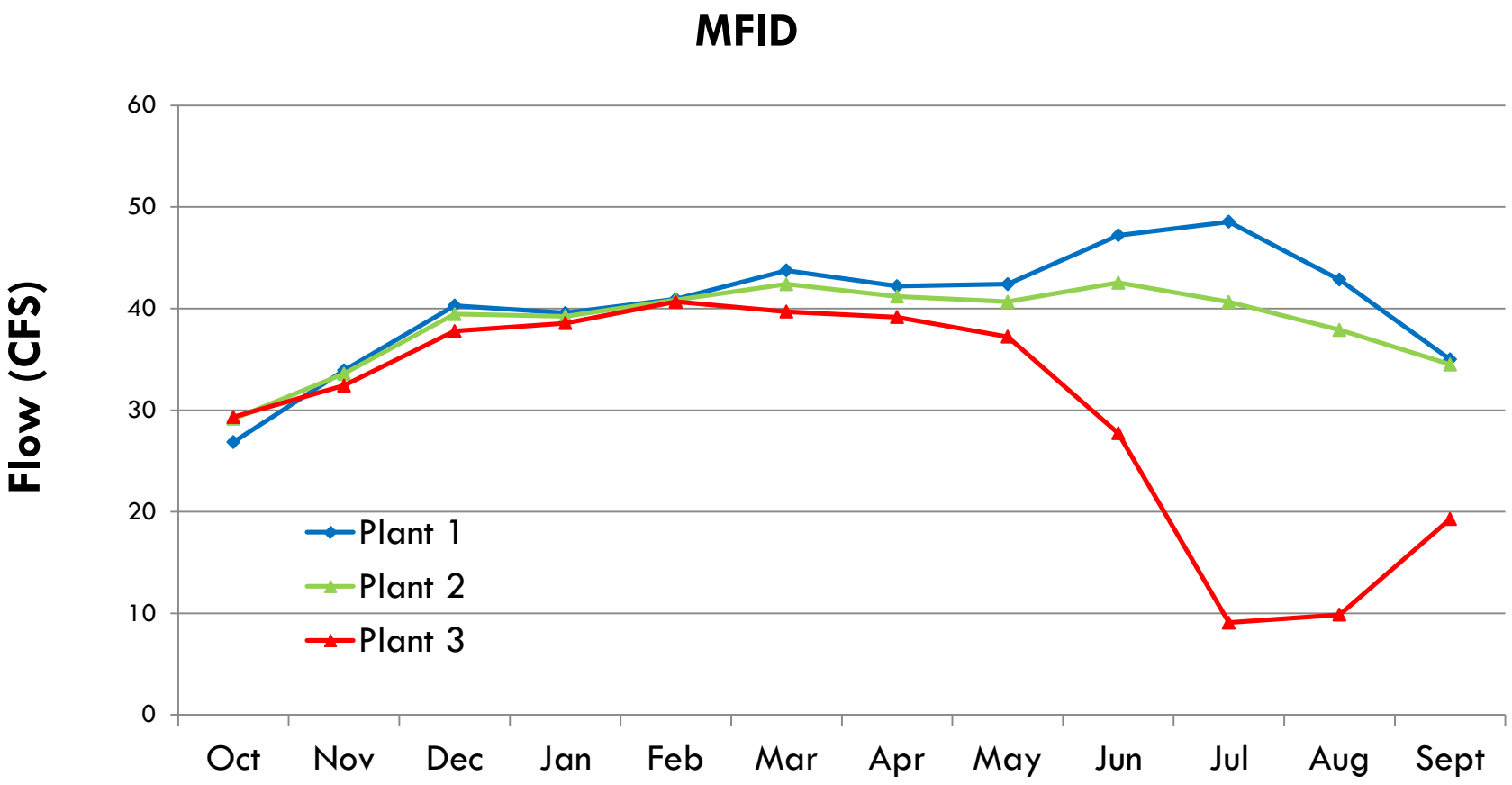
Water Use Assessment - Hydropower



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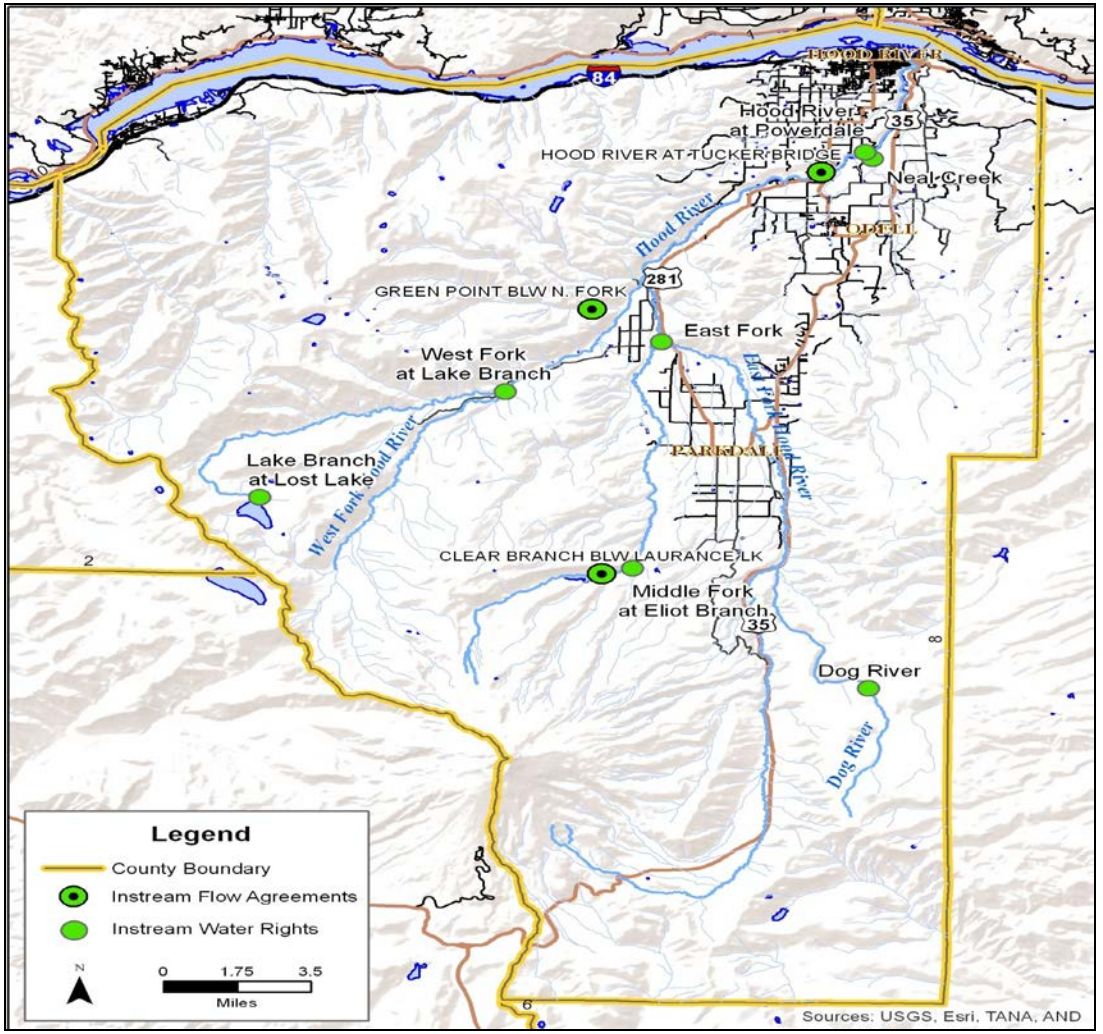
Water Use Assessment - Instream

- 8 instream rights
  (priority dates from 1983-1998)

- 2 instream flow agreements
  (no priority dates)



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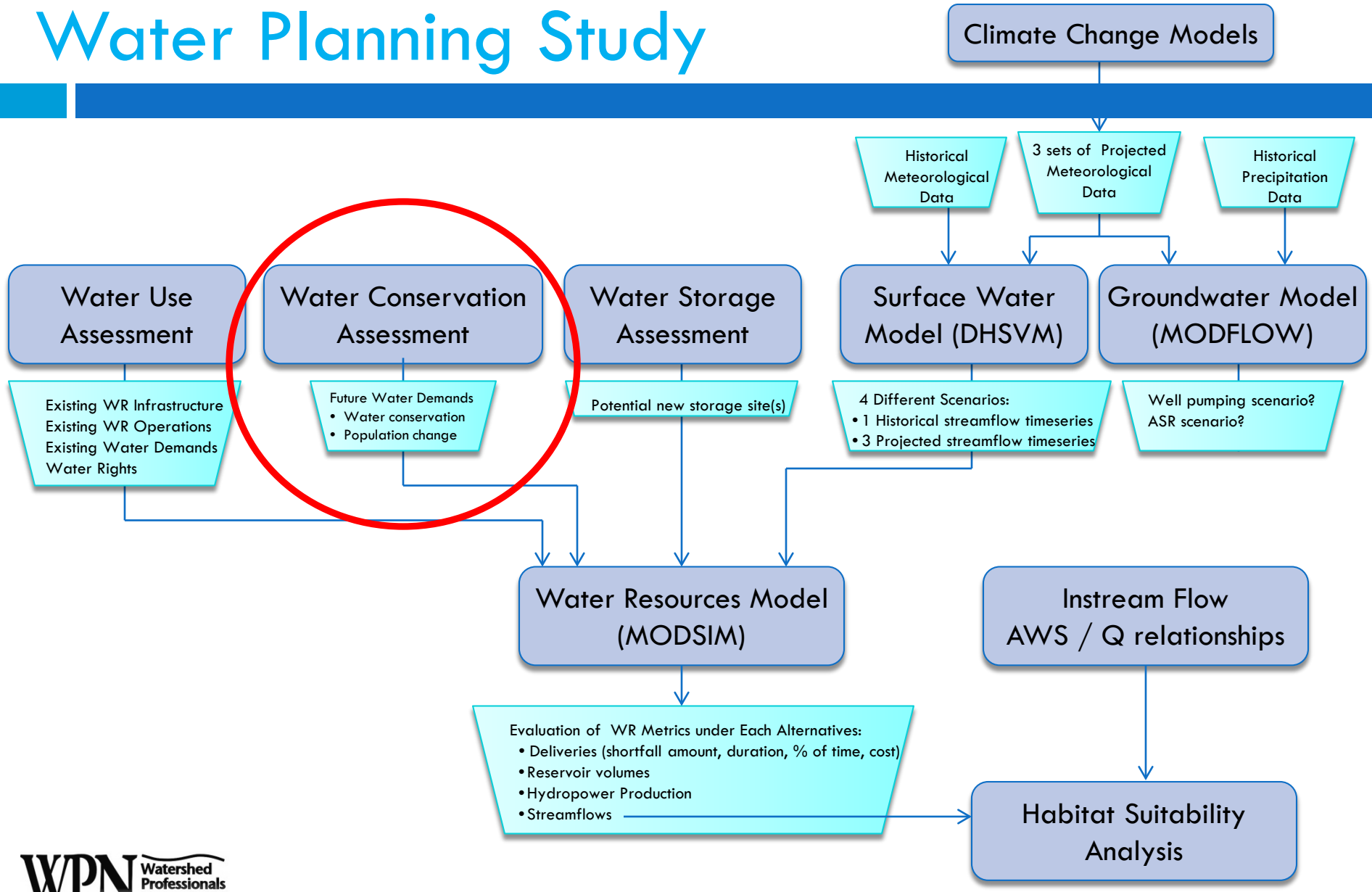
Overview of Water Planning Study



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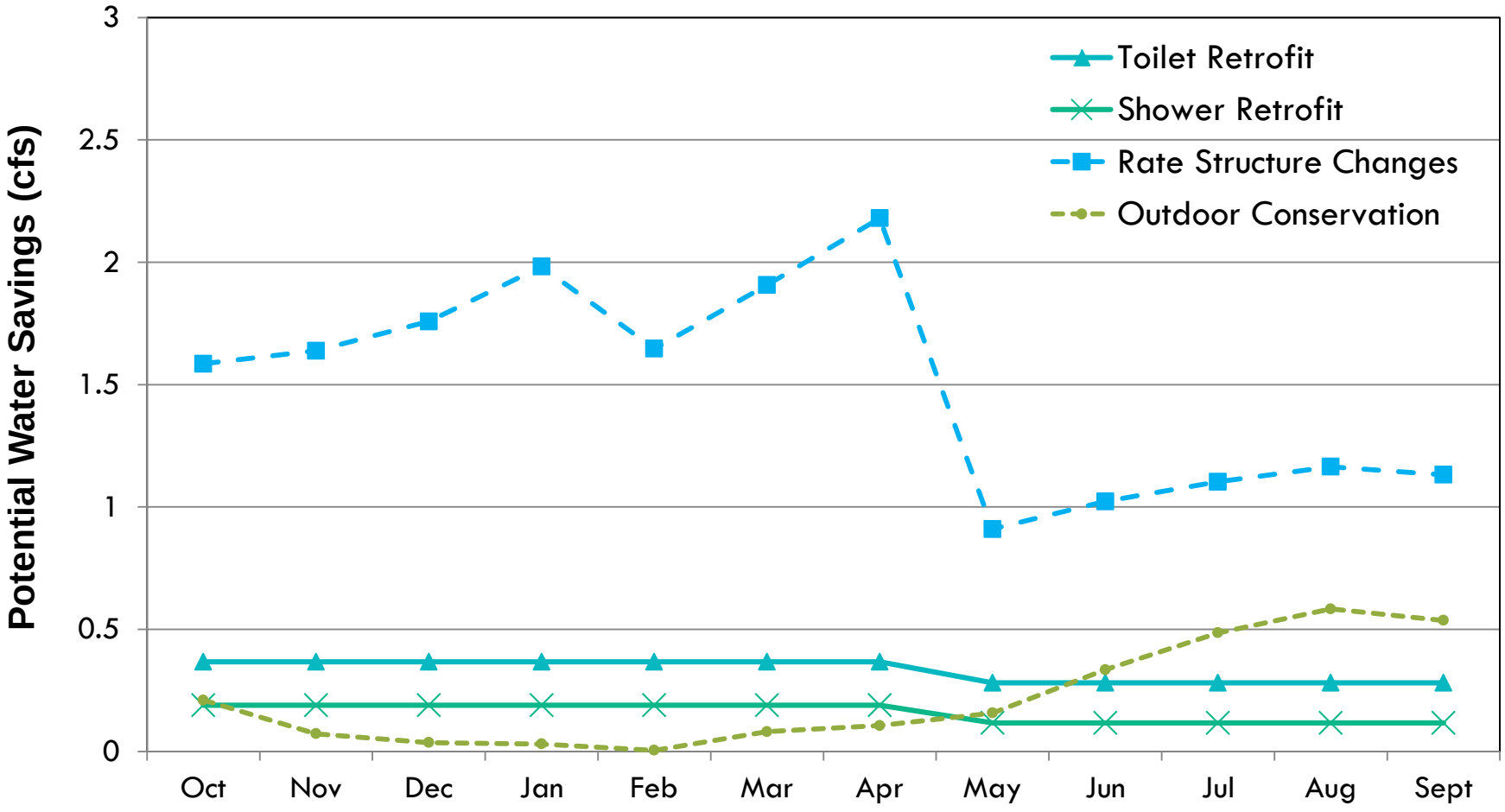
Water Conservation Assessment - Potable



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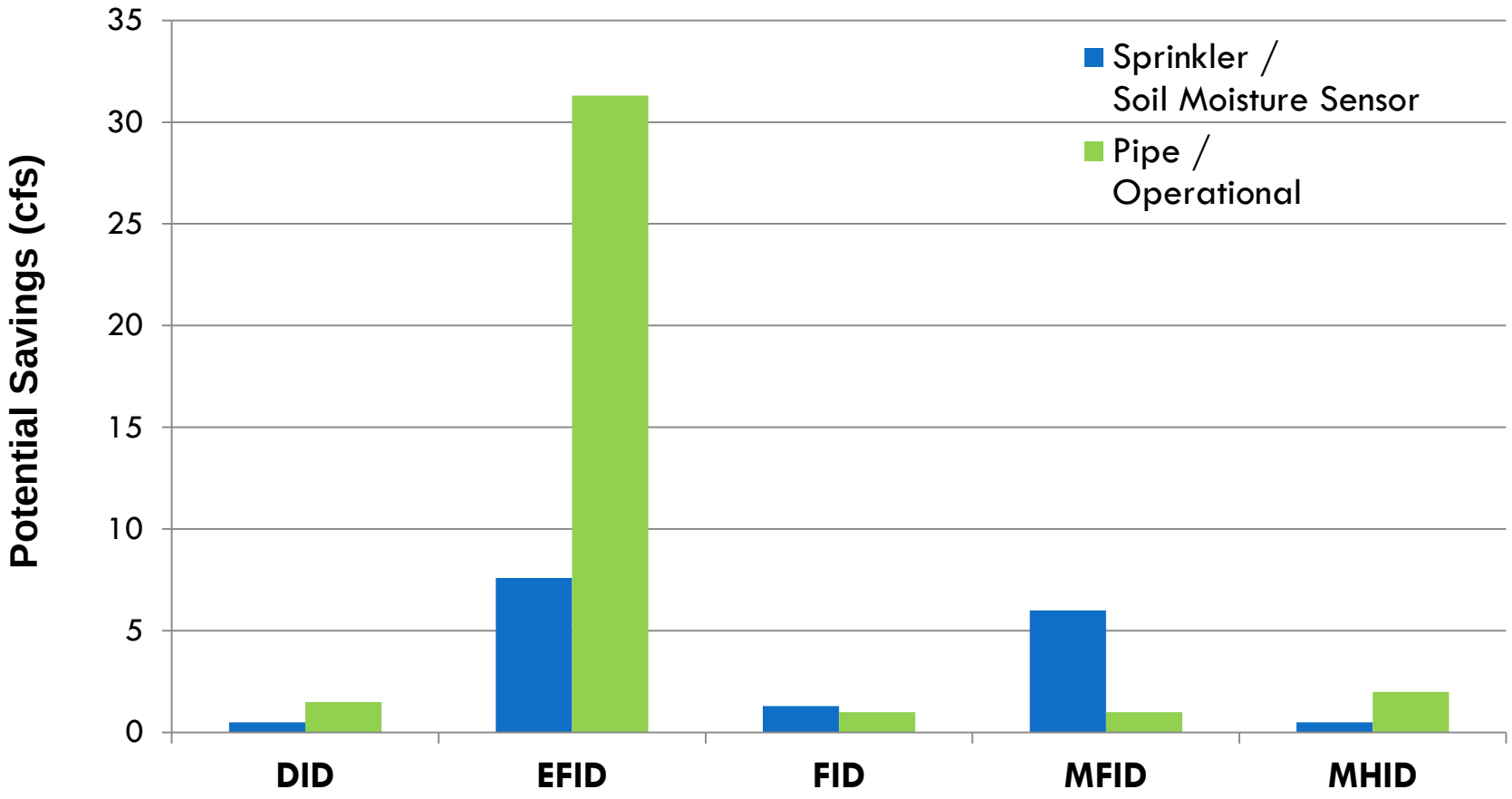
Water Conservation Assessment - Irrigation



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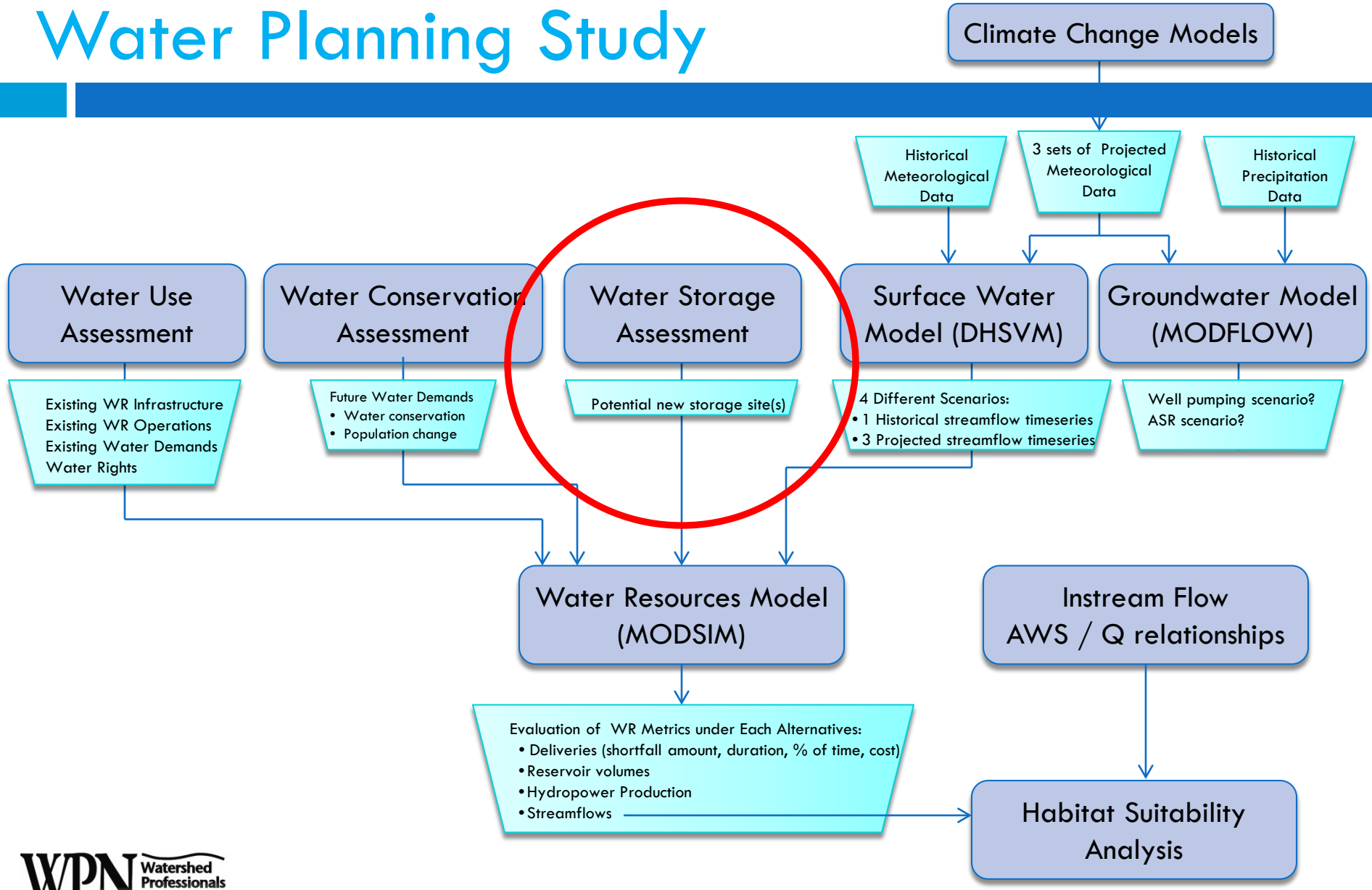
Overview of Water Planning Study



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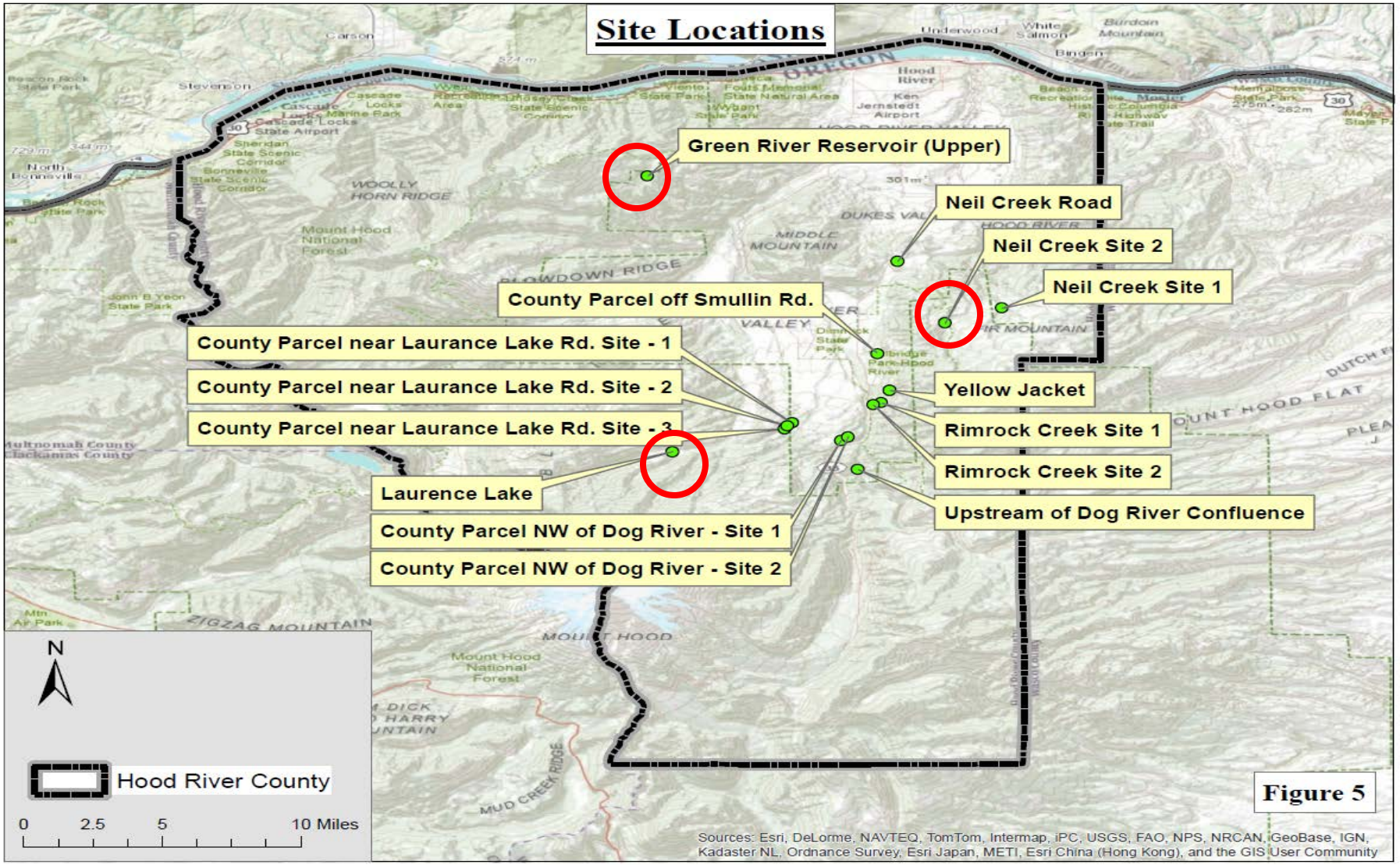
Water Storage Assessment



Water Storage Assessment

Site	District (new/expand)	Volume (ac-ft)	Cost[1]	Release[2] (cfs)	Cost / cfs[3]
Neal Creek	EFID (new)	2,557	$13-27M	14	$ 1.4M/cfs
Kingsley Res.	FID (expand)	561	$1.2 – 2.4M	3	$ 0.6M/cfs
Laurance Lake	MFID (expand)	370	$ 0.3M	2	$ 0.15M/cfs

Notes:

1. *Cost depends on source of material.*
2. *Release rate calculated on 3 month release*
3. *Cost/cfs based on average cost (e.g., $20M for EFID) and 3 month release*

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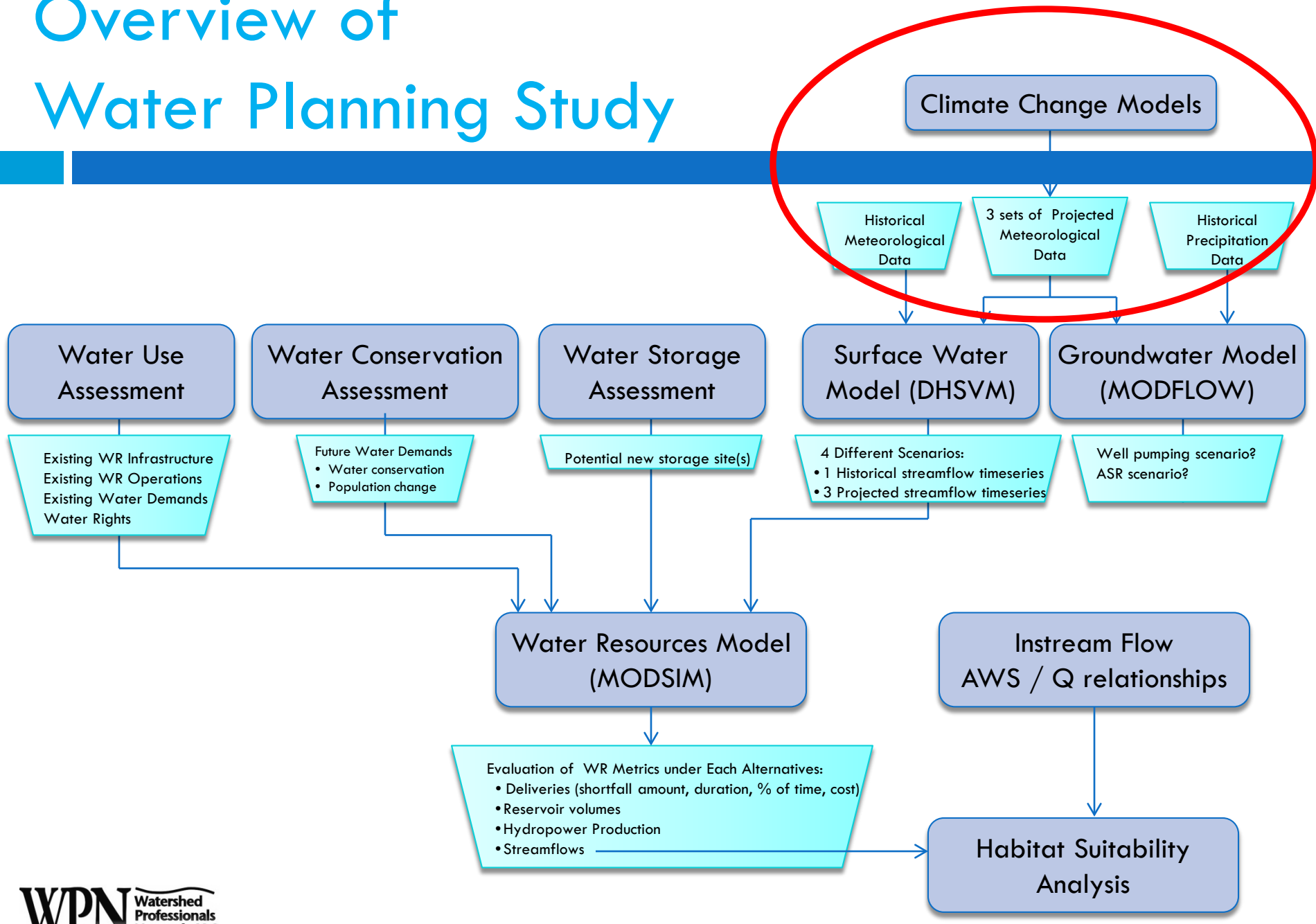
Overview of Water Planning Study



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Climate Change - temp & precip projections

Climate Change Scenario	Average Precipitation Change (%)					Average Temperature Change (°F)				
	Winter	Spring	Summer	Fall	**Avg.**	Winter	Spring	Summer	Fall	**Avg.**
More Warming Dry (MW/D)	-3	-7	-33	4	**-2**	2.2	2.7	4.3	2.7	**3.0**
Median (MED)	7	0	-14	3	**3**	2.2	2.0	2.7	2.2	**2.3**
Less Warming Wet (LW/W)	5	0	-15	12	**7**	1.4	1.3	2.3	1.6	**1.7**

3 different climate scenarios

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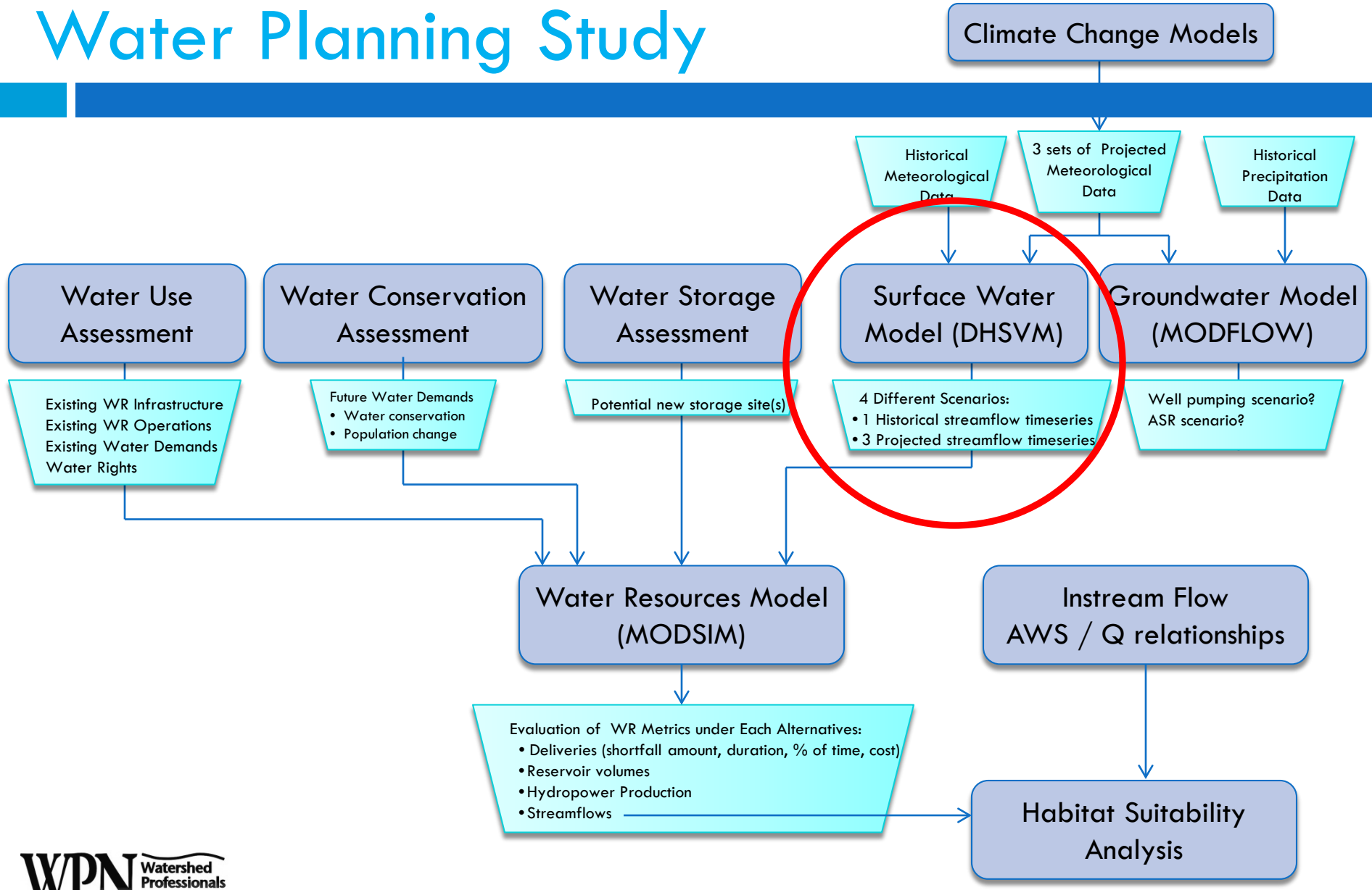
Overview of Water Planning Study



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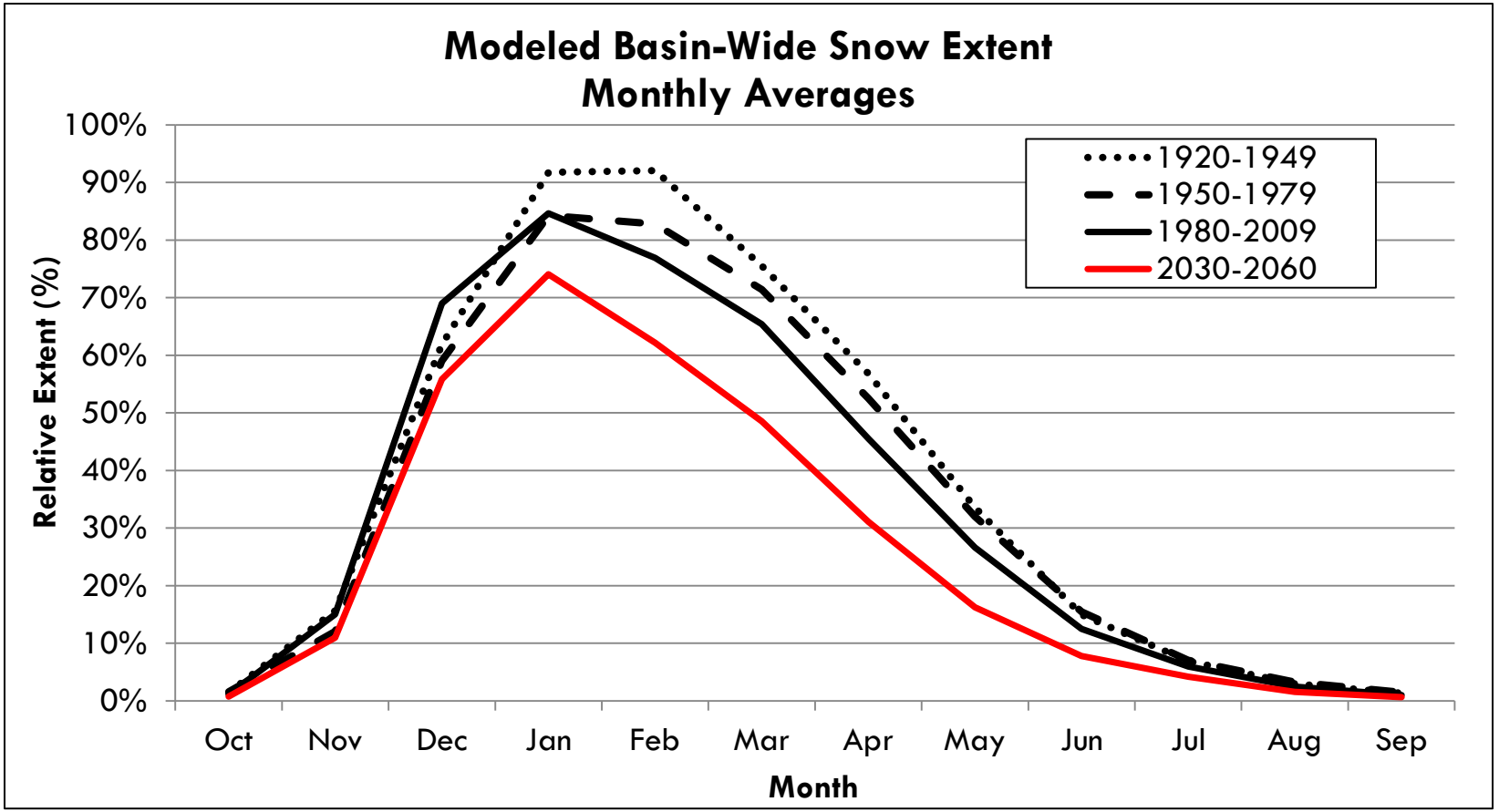
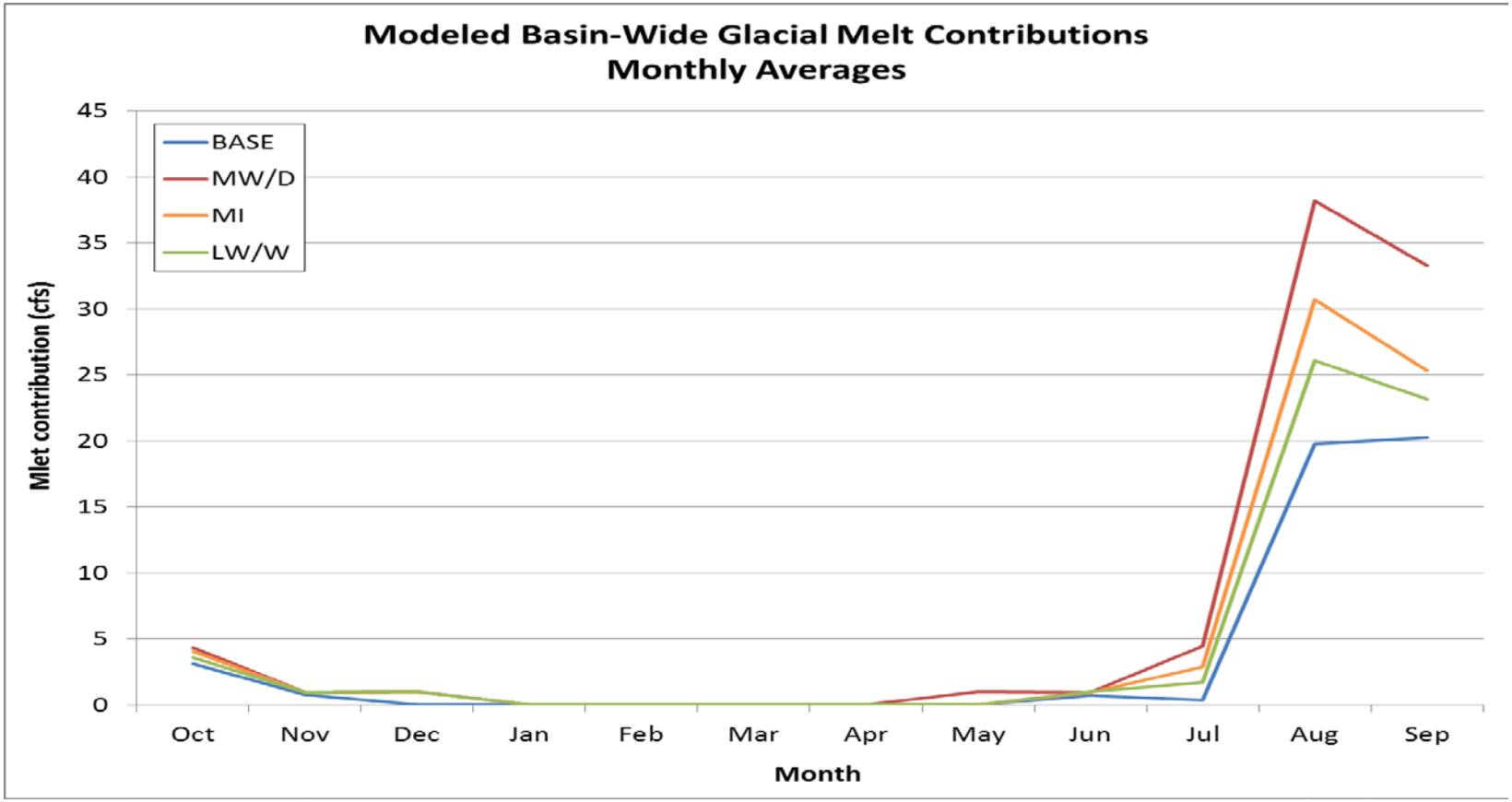
Surface Water Model - Snow



Surface Water Model - Glaciers



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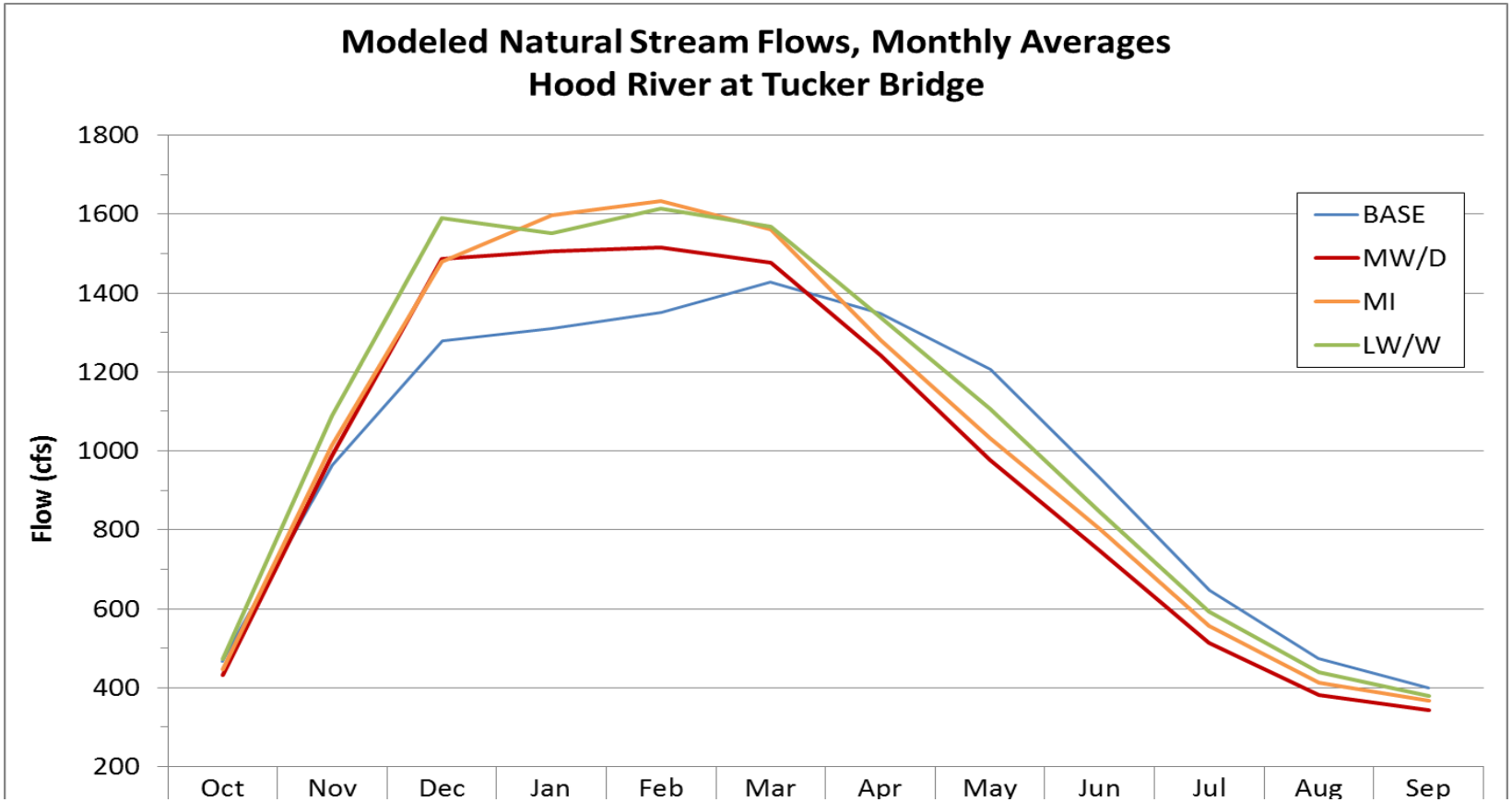
Surface Water Model - Streamflow



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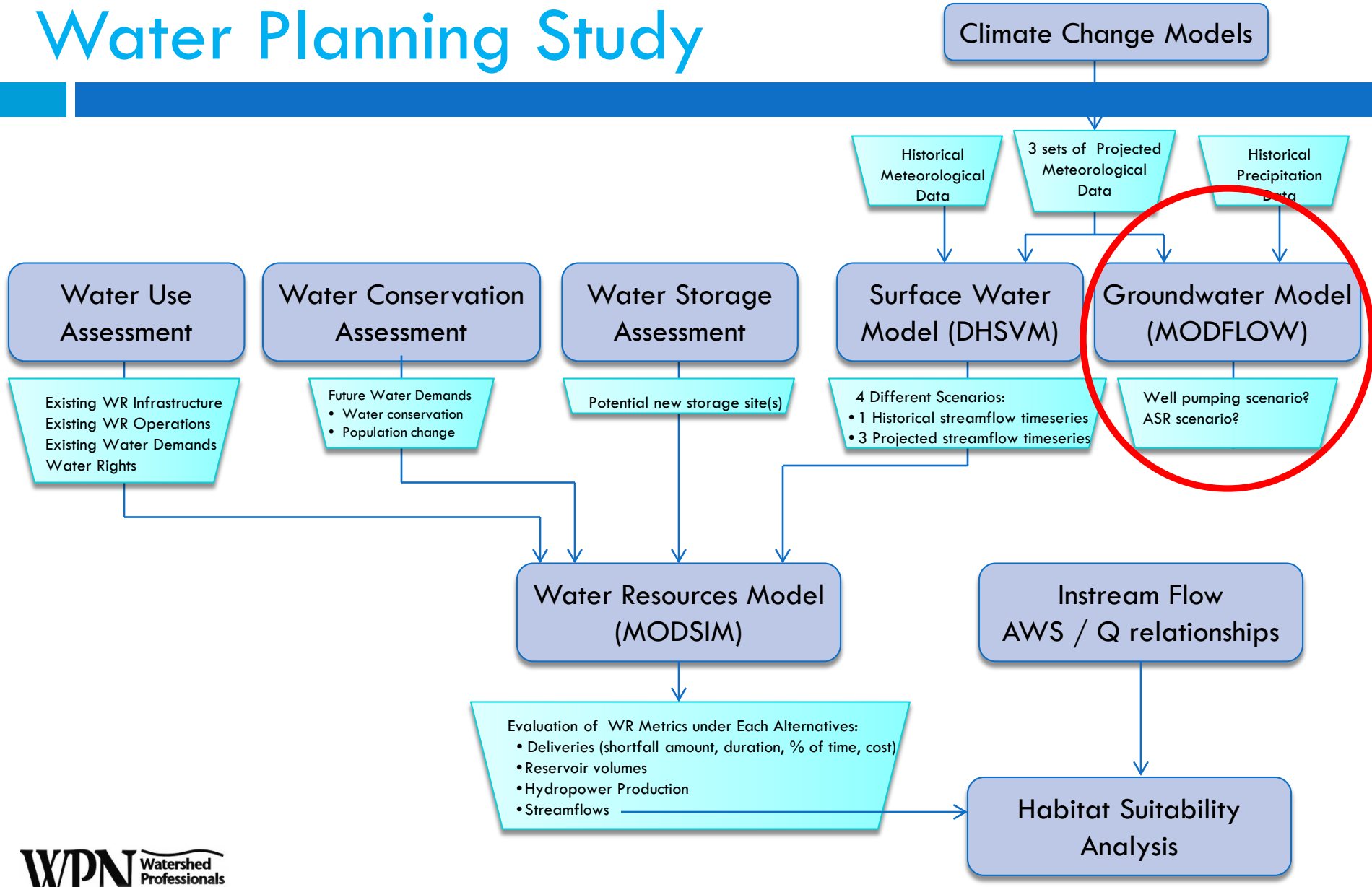

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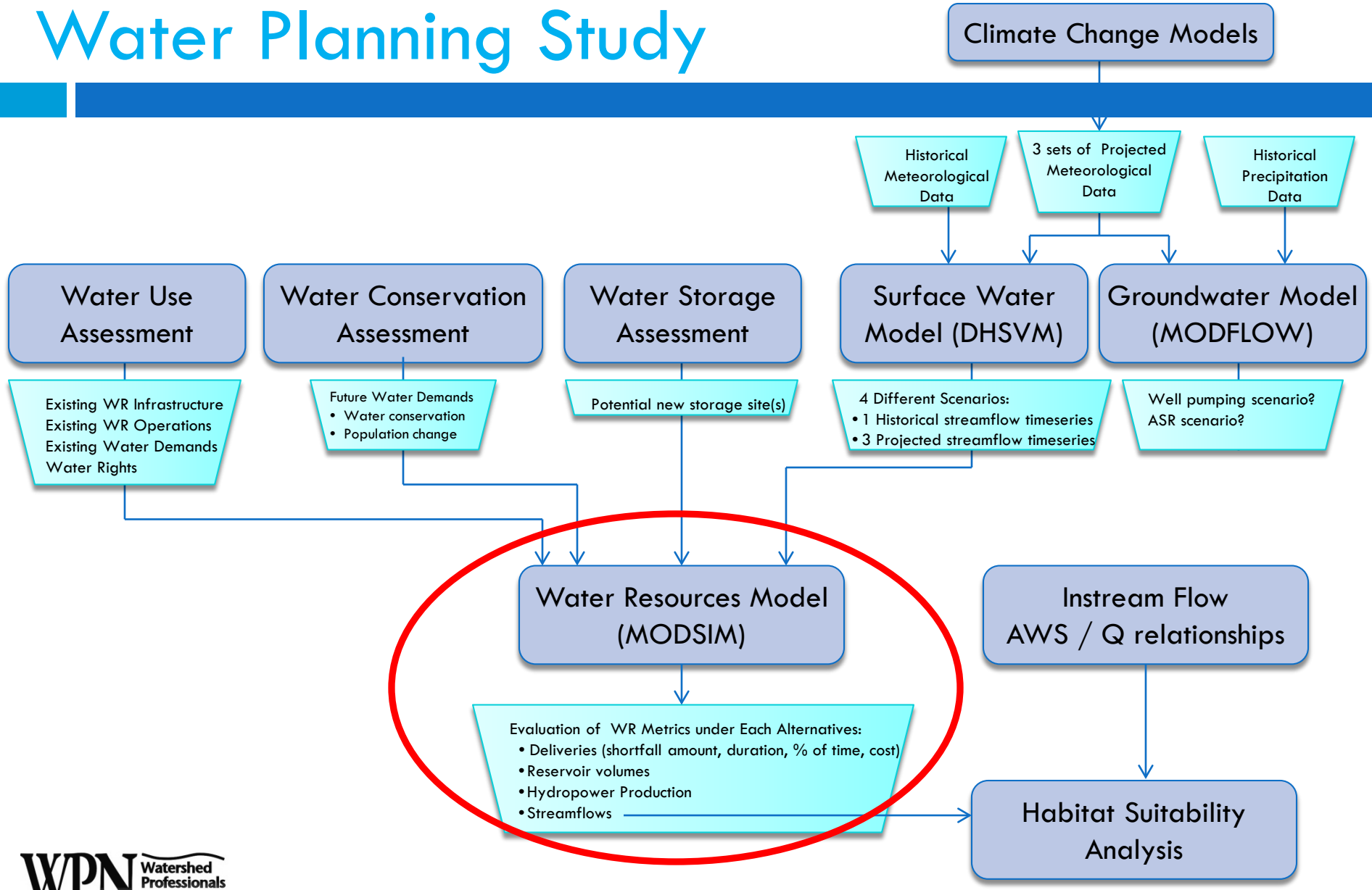
Overview of Water Planning Study



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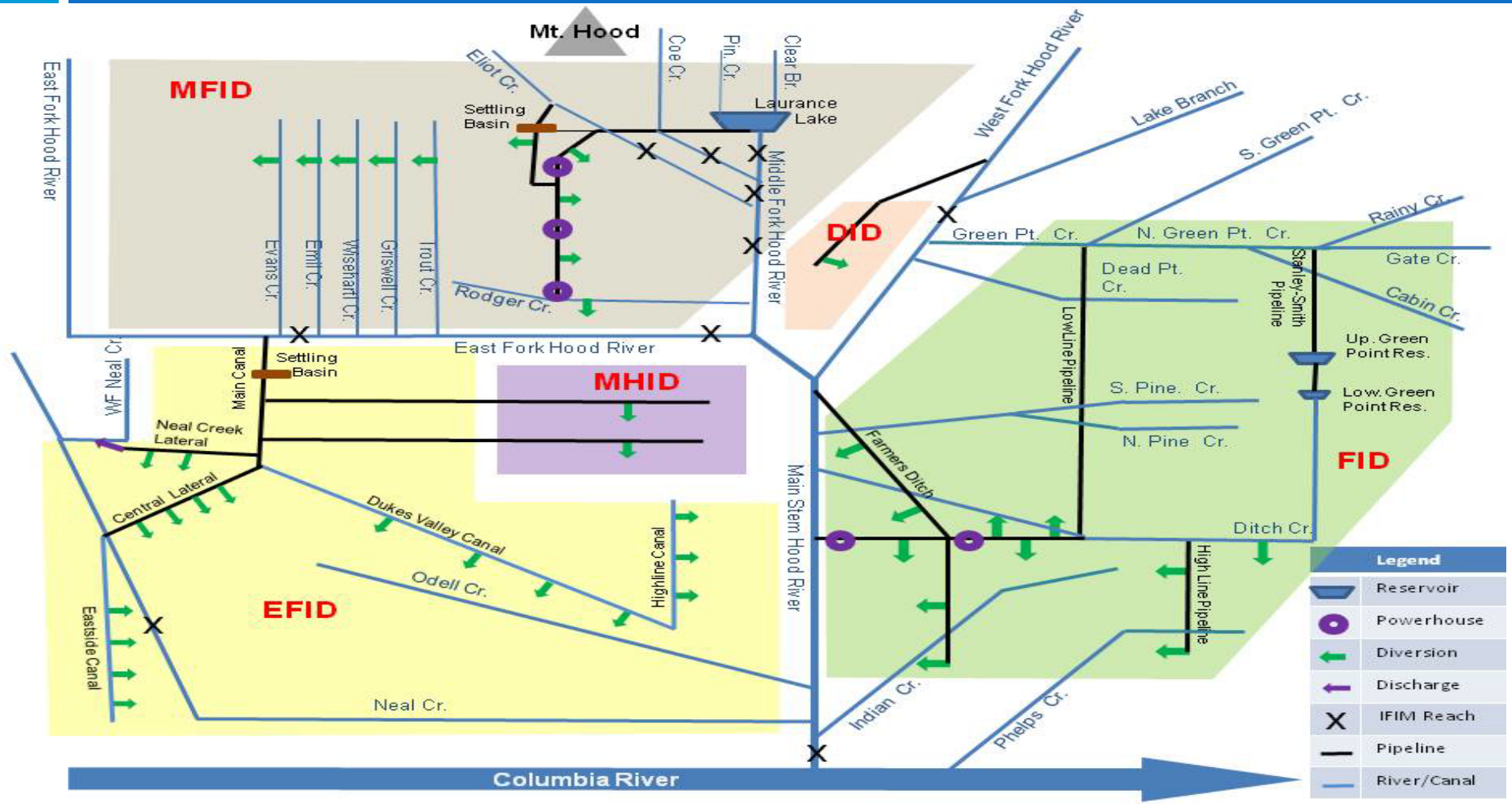
Water Resource Modeling - Schematic



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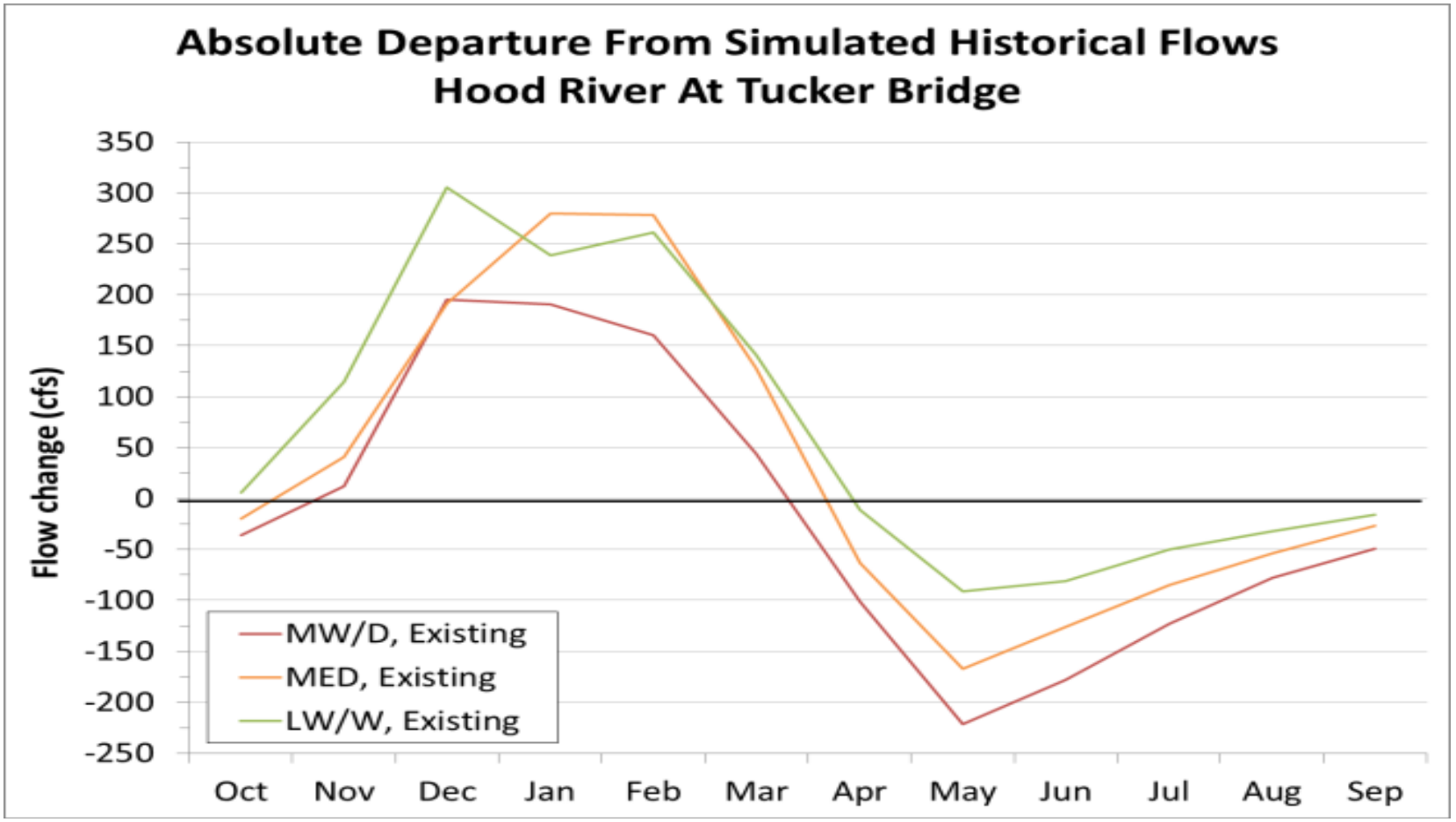
Water Resource Modeling - Alternatives

Alt.	Description	Climate[1]	Water Demands[2]	Water Conservation[3]	Water Storage[4]
Base	Historic climate, existing demands	Historic (1980-2009)	Existing	Existing	Existing
Existing	Future climate, existing demands	Future (2030-2059)	Existing	Existing	Existing
Demands	Future climate, future demands	Future (2030-2059)	Future (potable & irrig. increases)	Existing	Existing
Conservation	Future climate, future demands, water conservation.	Future (2030-2059)	Future (potable & irrig. increases)	Future (irrig. water conservation)	Existing
Storage	Future climate, future demands, water conservation, additional storage.	Future (2030-2059)	Future (potable & irrig. increases)	Future (irrig. water conservation)	Existing & New Storage (larger FID & MFID, new EFID)

Water Resource Modeling - Results



Different climate scenarios

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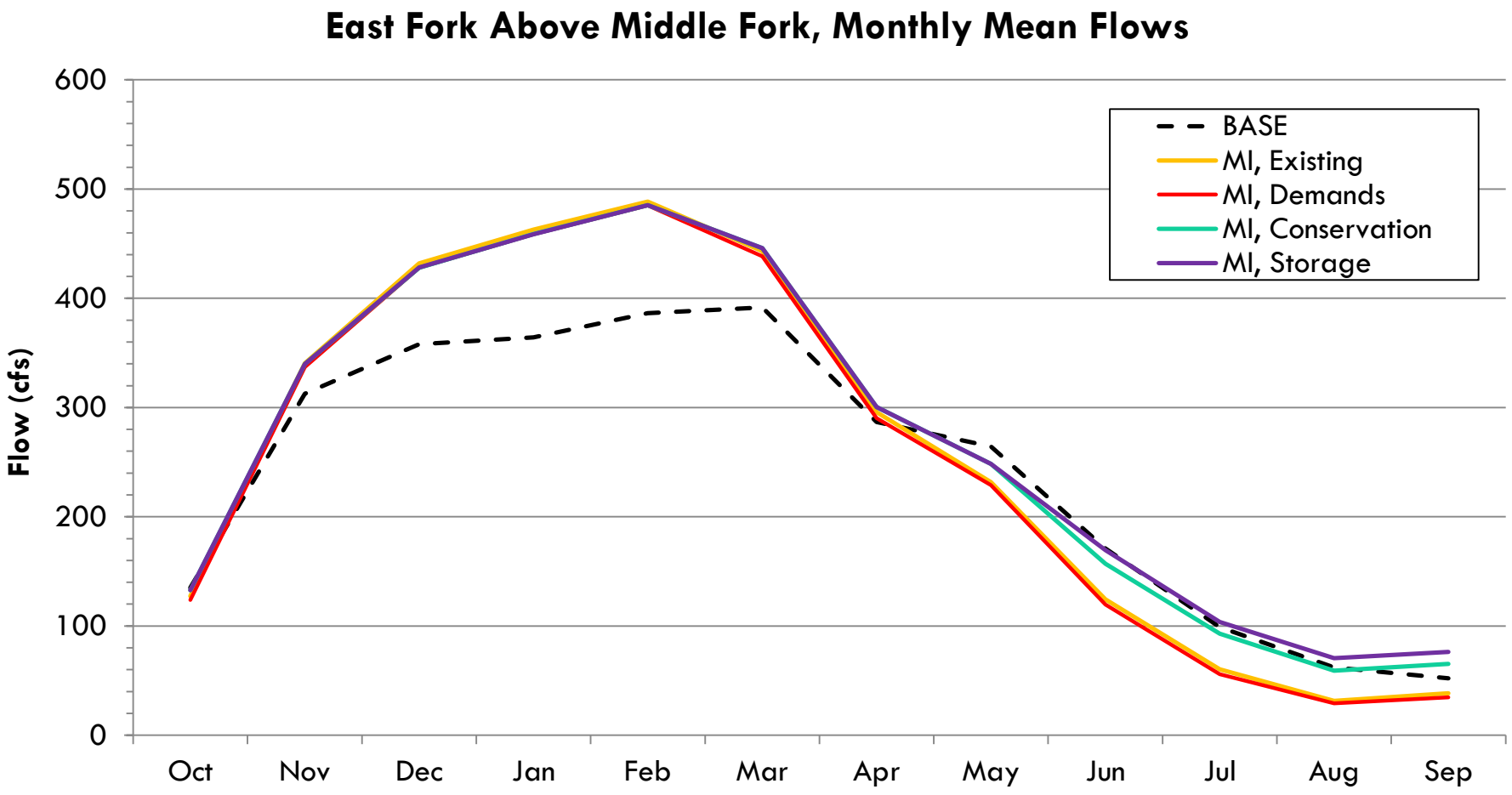
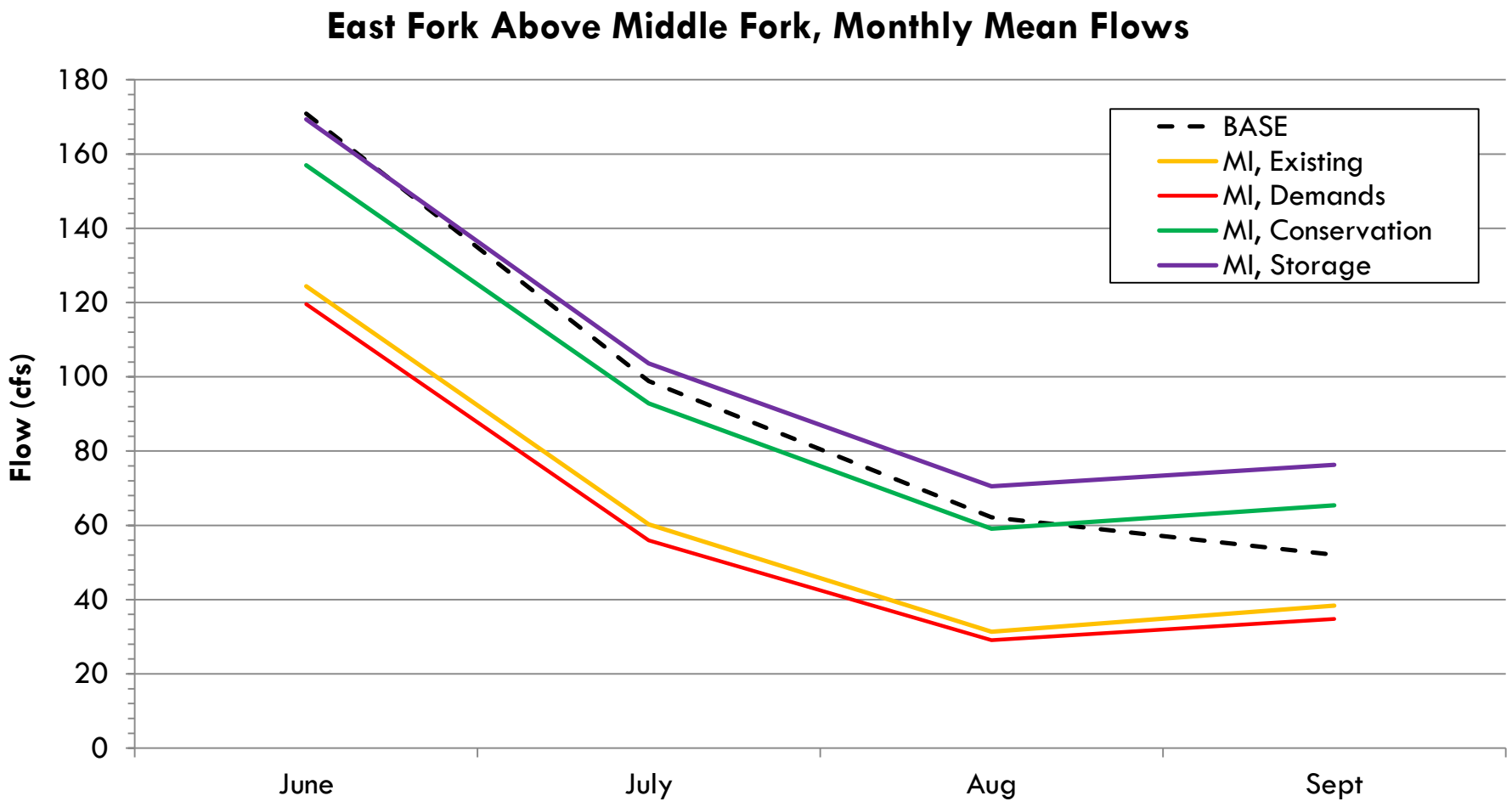
Water Resource Modeling - Results



Different water resource alternatives

Water Resource Modeling - Results



Different water resource alternatives

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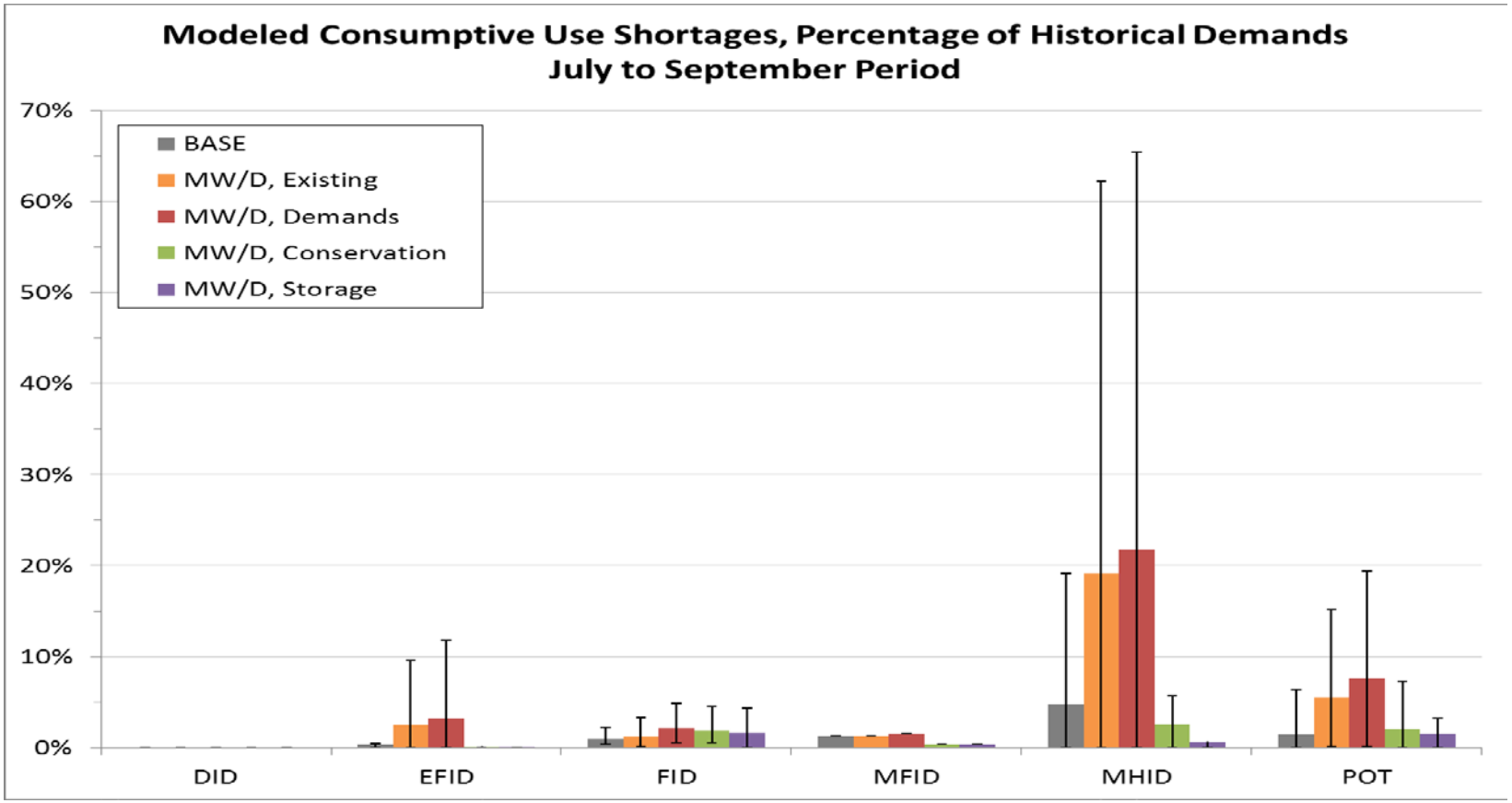
Water Resource Modeling - Results



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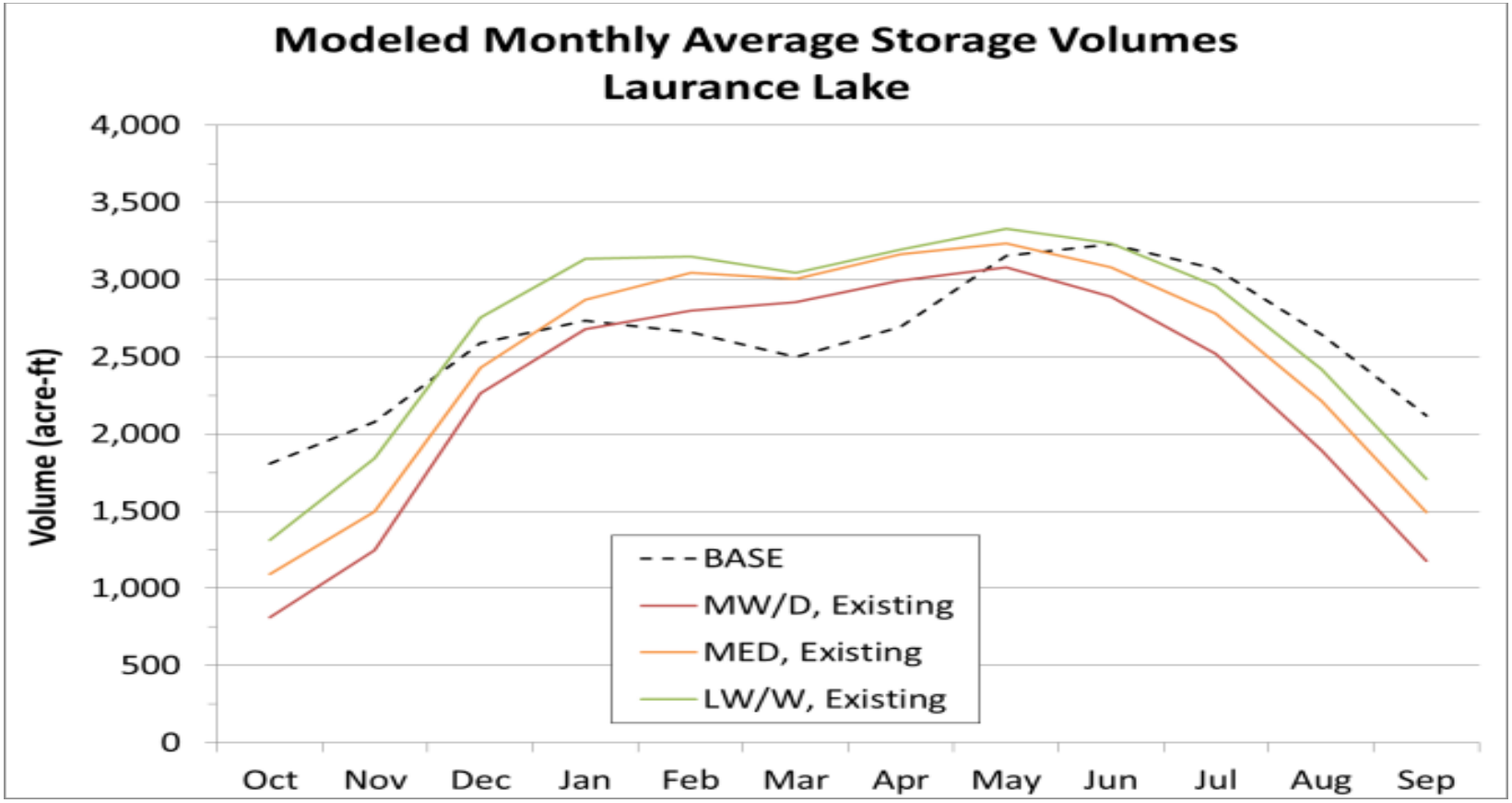
Water Resource Modeling - Results



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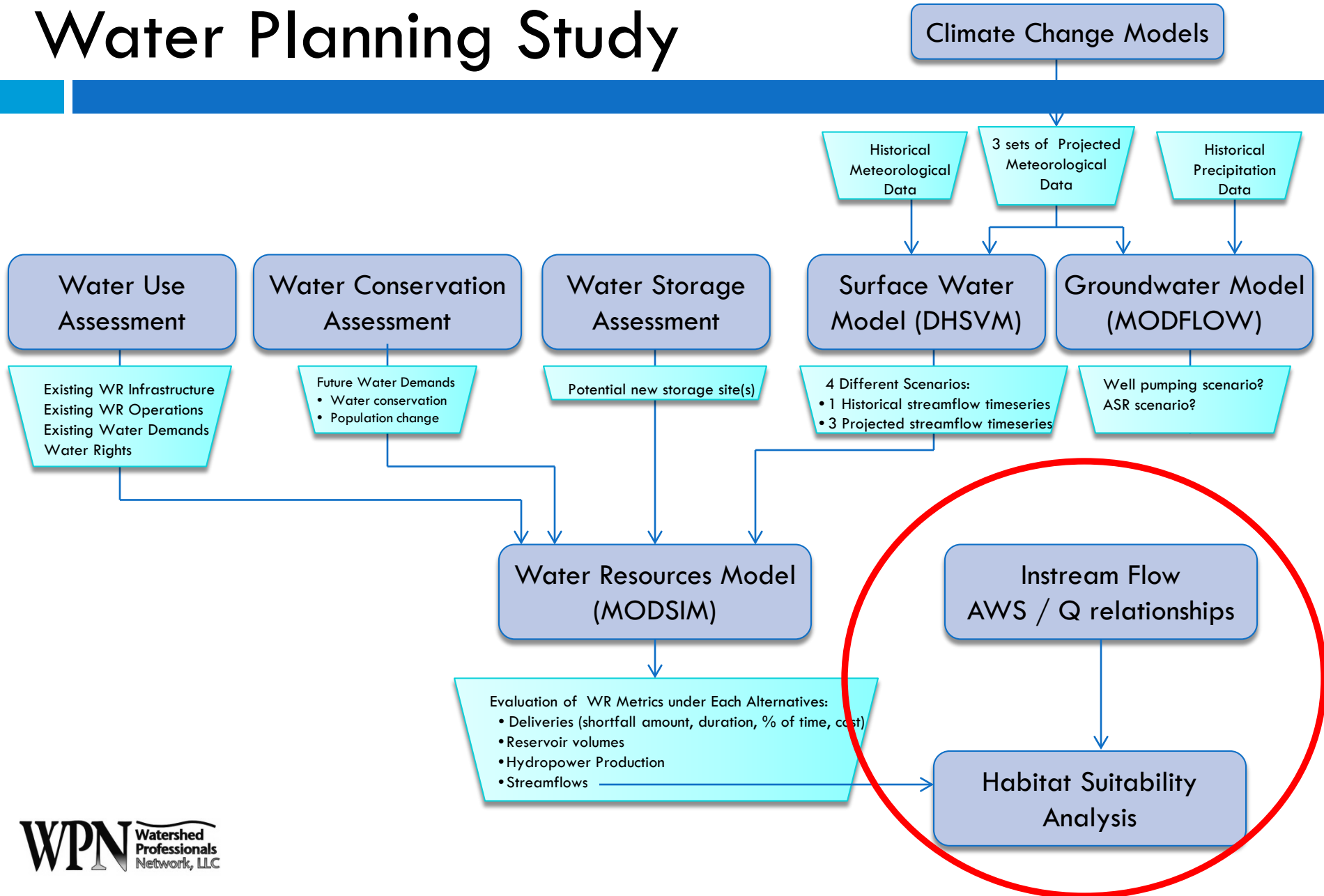
Overview of Water Planning Study



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Instream Flow Assessment

IFIM study of 5 reaches:

- Neal Creek
- East Fork (upper)
- East Fork (lower)
- Green Point
- West Fork

Species of concern:

- Chinook
- Coho
- Steelhead
- Bull trout

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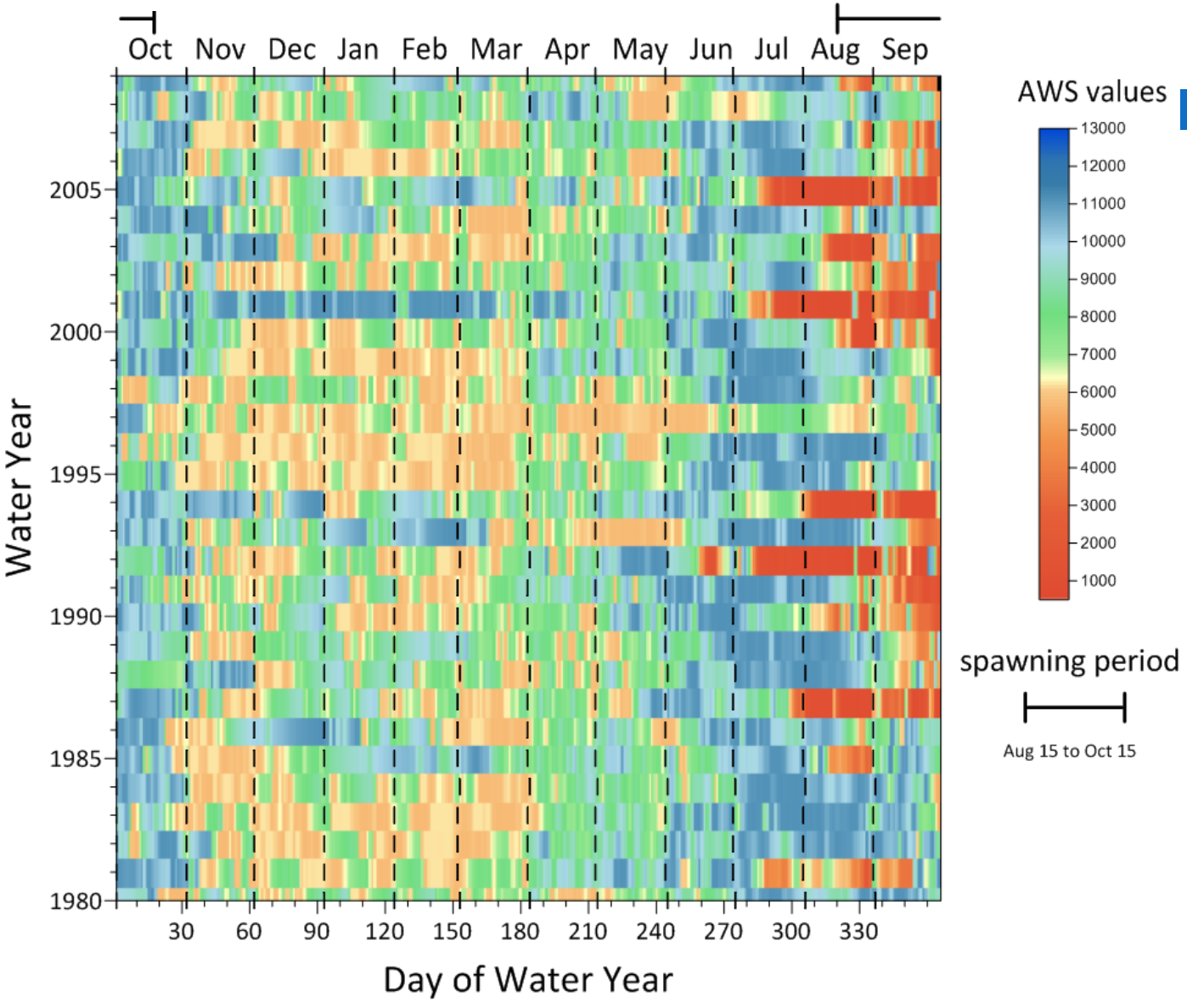
Upper East Fork Hood River, OR
Spawning Chinook Salmon AWS values

Base (WY 1980-2010)



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environmental consultants

Upper East Fork Hood River, OR
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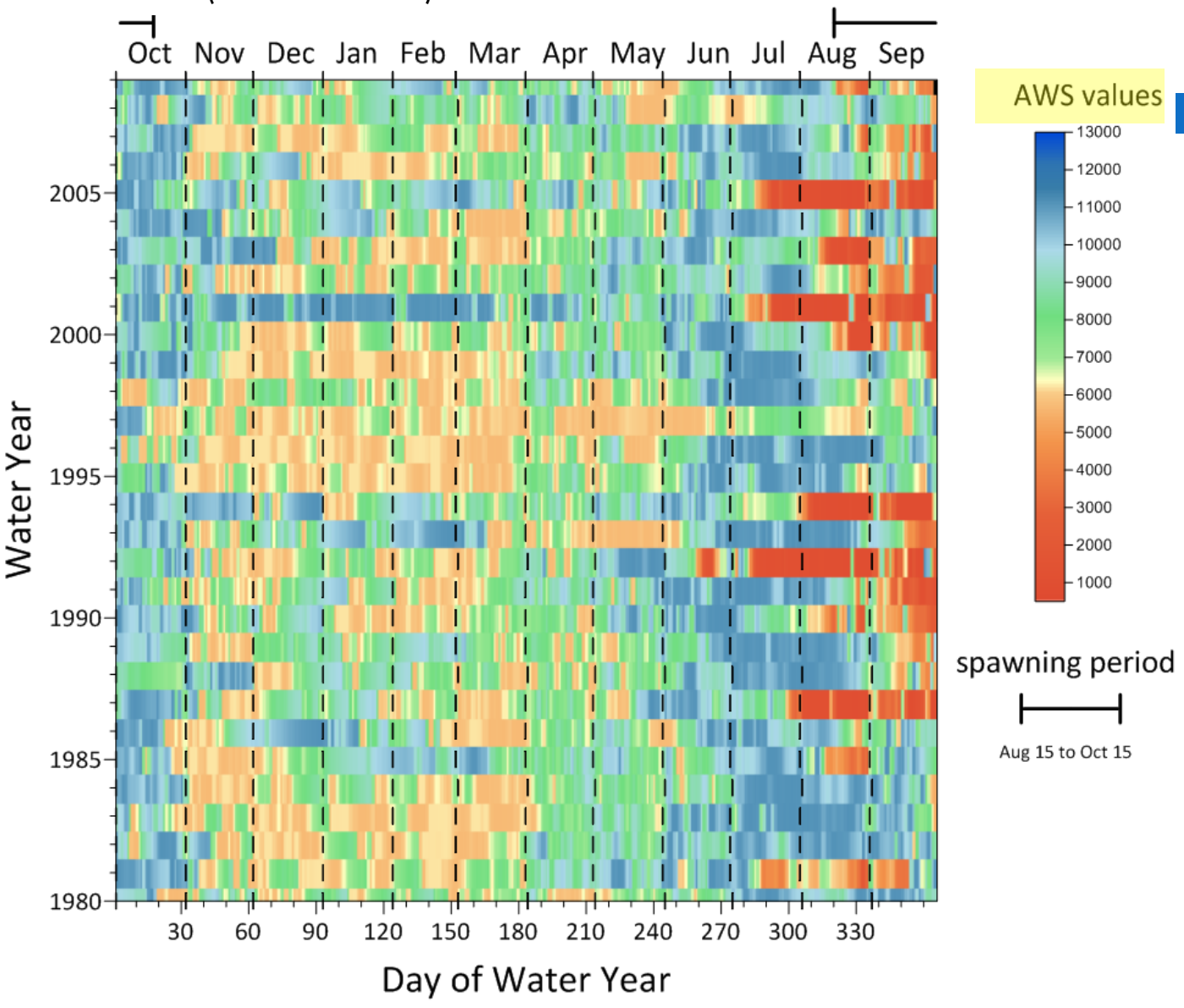

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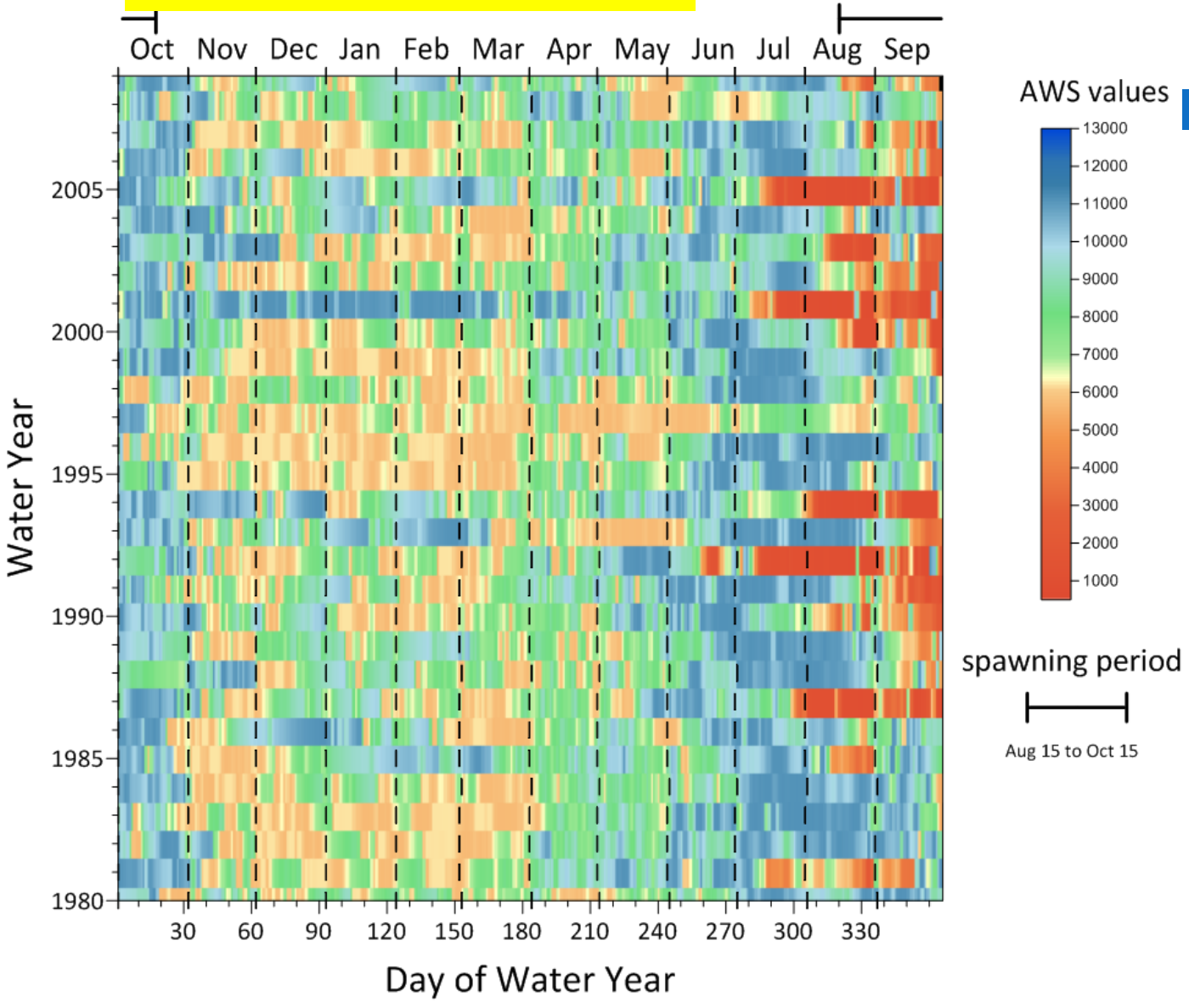

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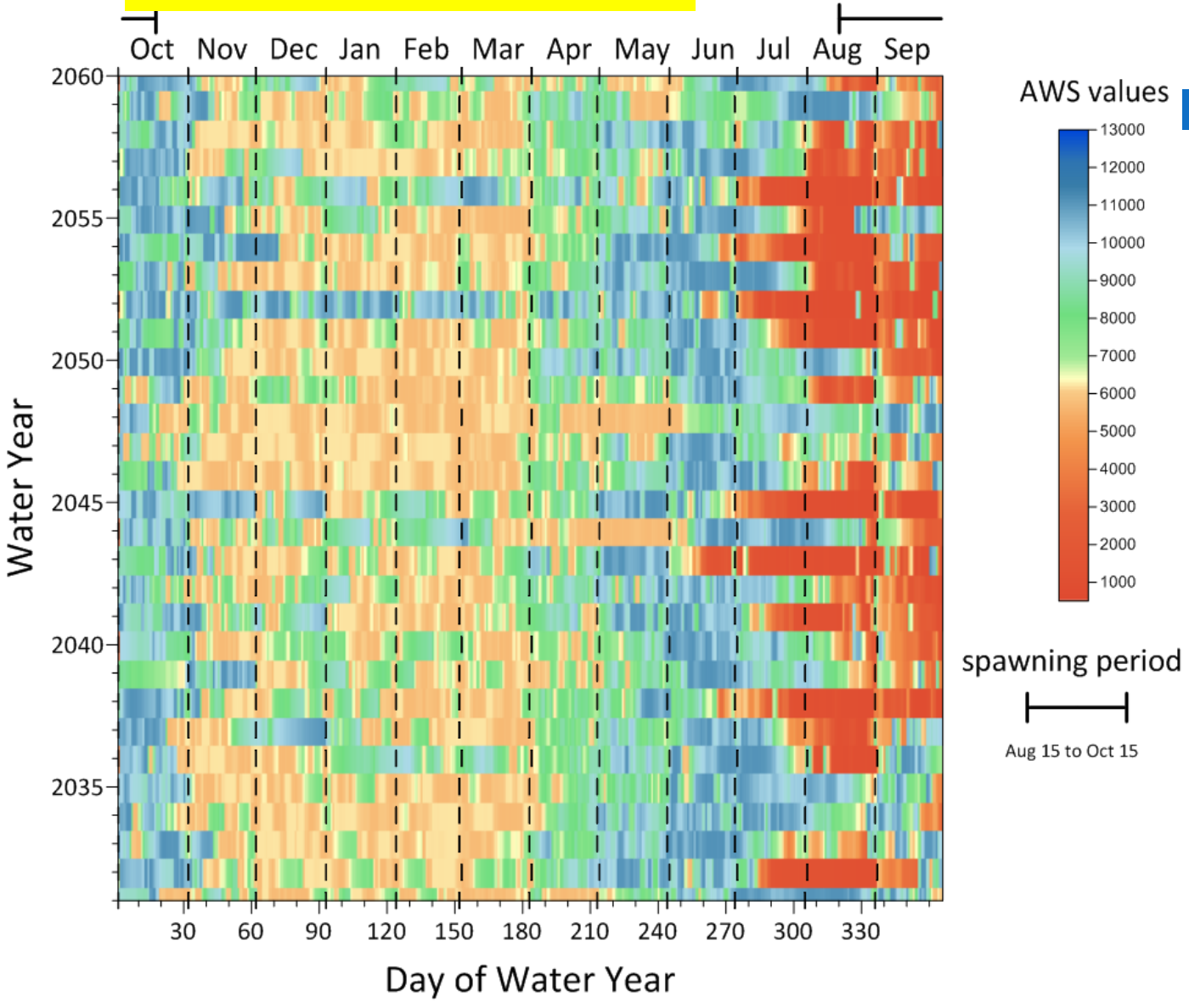
Upper East Fork Hood River, OR

Spawning Chinook Salmon AWS values

Existing (WY 2031-2060)



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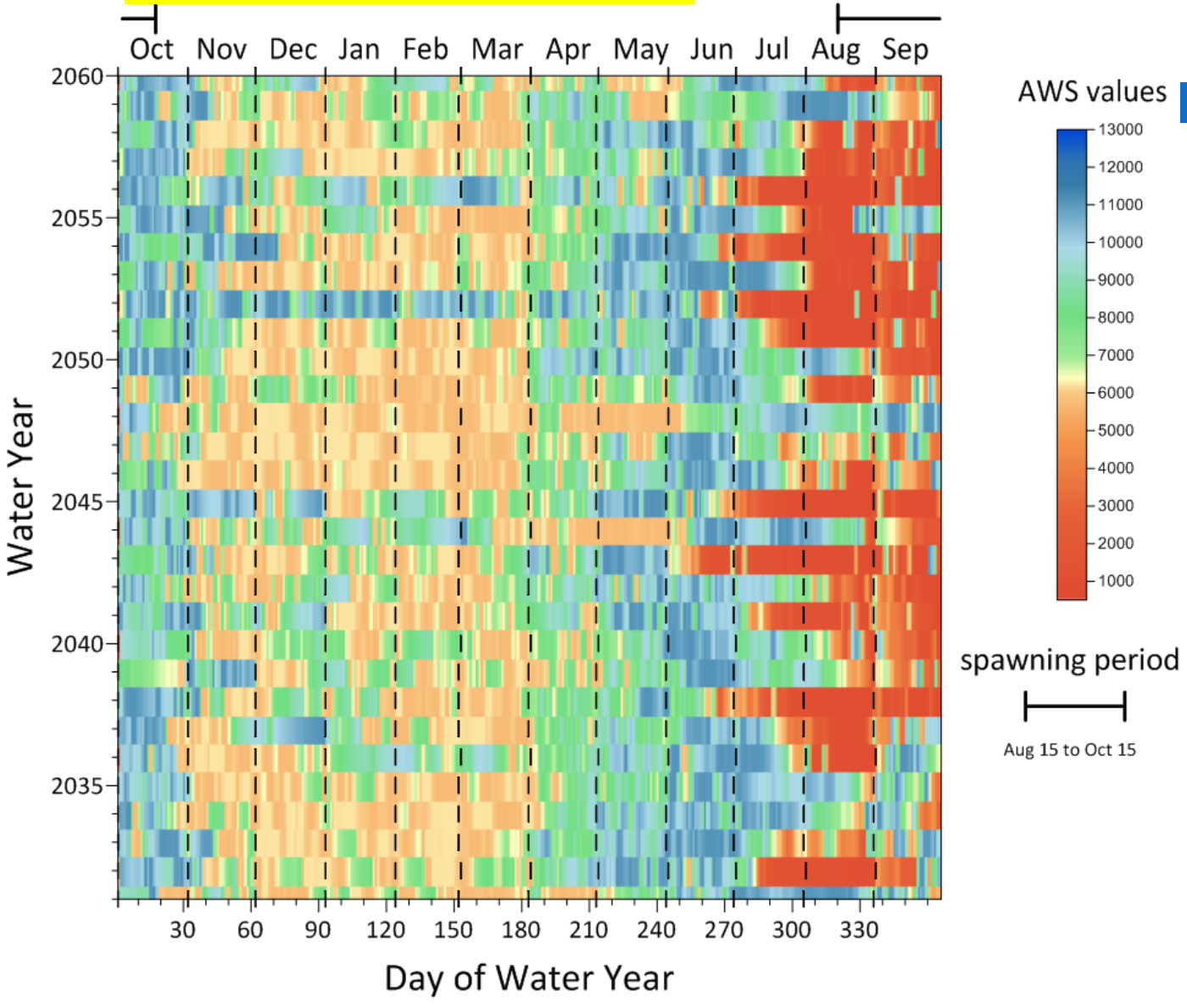
Upper East Fork Hood River, OR
Spawning Chinook Salmon AWS values

Demands (WY 2031-2060)



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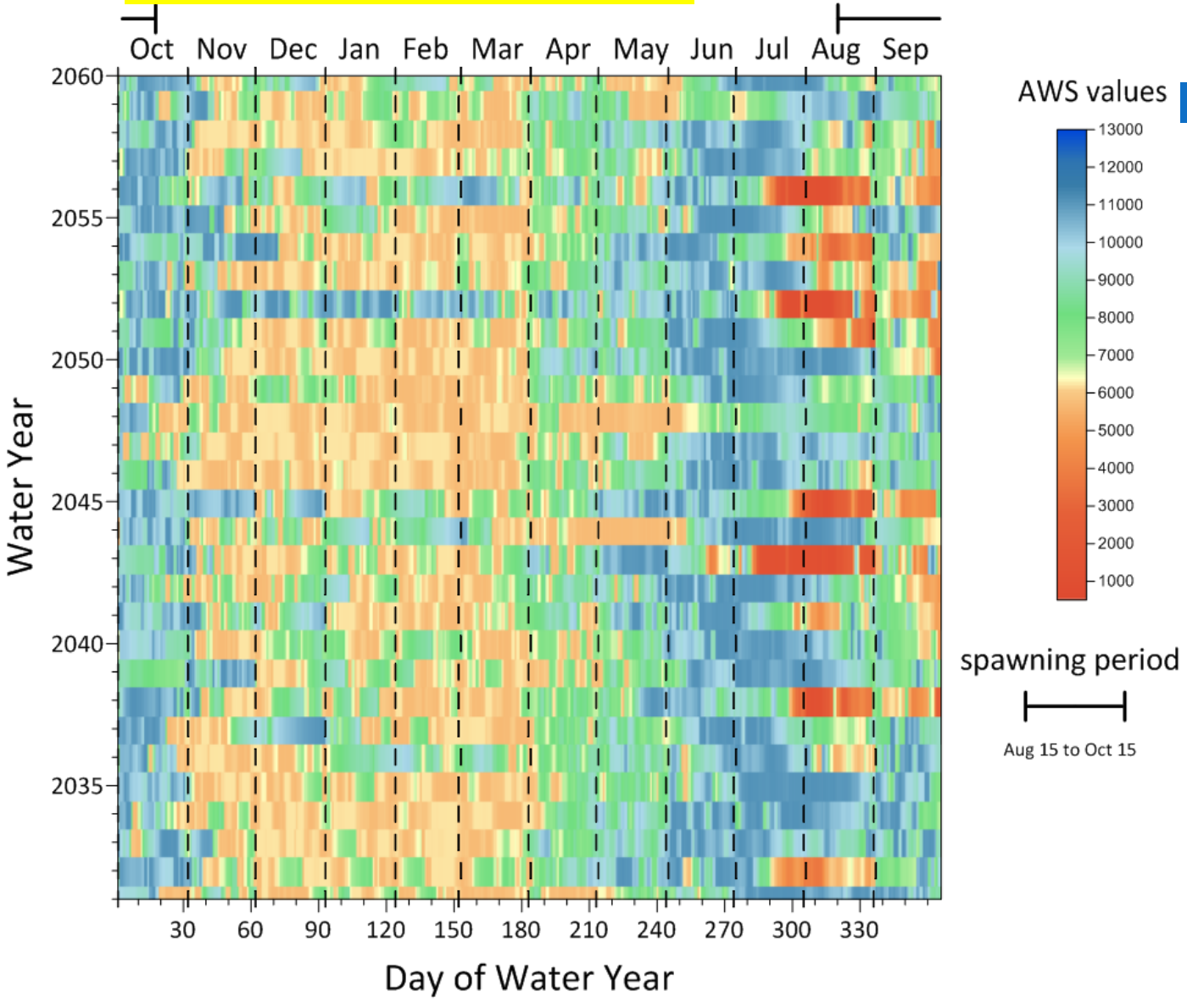
Upper East Fork Hood River, OR
Spawning Chinook Salmon AWS values

Conservation (WY 2031-2060)



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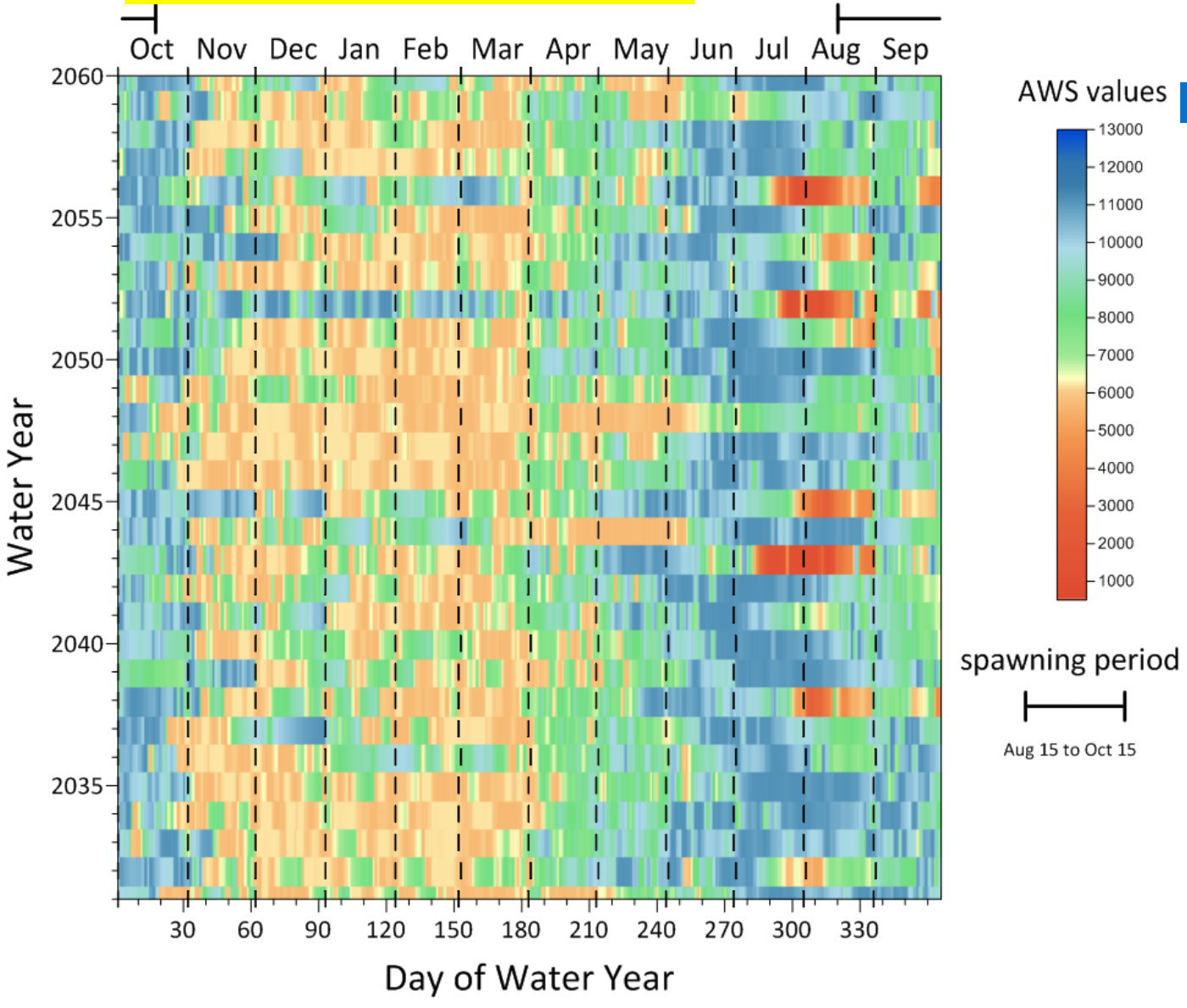
Upper East Fork Hood River, OR

Spawning Chinook Salmon AWS values

Storage (WY 2031-2060)



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80th percentile AWS changes, median climate

			Climate	Demands	Conservation	Storage
East Fork (lower)	Spring Chinook	Spawning	-46%	-57%	53%	96%
		Juv. Rearing	-6%	-5%	-5%	-5%
	Coho	Spawning	-17%	-19%	2%	2%
		Juv. Rearing	1%	0%	1%	1%
	Winter Steelhead	Spawning	-5%	-5%	-5%	-5%
		Juv. Rearing	-11%	-13%	-5%	-4%
West Fork	Spring Chinook	Spawning	-7%	-9%	-6%	-6%
		Juv. Rearing	-1%	-1%	-1%	-1%
	Coho	Spawning	-5%	-5%	-5%	-5%
		Juv. Rearing	-1%	-1%	-1%	-1%
	Winter Steelhead	Spawning	-13%	-13%	-13%	-13%
		Juv. Rearing	-2%	-2%	-2%	-2%
	Bull Trout	Spawning	-3%	-3%	-2%	-2%
		Adult	-2%	-2%	-1%	-1%
Green Point	Spring Chinook	Spawning	-3%	-6%	-6%	-5%
		Juv. Rearing	-1%	-1%	-1%	-1%
	Coho	Spawning	0%	0%	0%	0%
		Juv. Rearing	0%	0%	0%	0%
	Winter Steelhead	Spawning	-10%	-10%	-10%	-10%
		Juv. Rearing	-4%	-6%	-4%	-4%
Neal Creek	Coho	Spawning	-1%	-1%	-1%	-1%
		Juv. Rearing	-1%	-1%	-1%	-3%
	Winter Steelhead	Spawning	1%	1%	1%	1%
		Juv. Rearing	0%	0%	0%	-1%

Potential Actions

	Type	Period	Savings (CFS)	Cost ($M)	Cost per CFS	Notes
Potable	Toilet Retrofit	All	0.4	$ 2.6 M	$ 7.2M/cfs	$225 rebate/home
	Shower Retrofit	All	0.2	$ 0.8 M	$ 4.0 M/cfs	$50 rebate/home
	Outdoor	Summer	0.5	n/a	n/a	-25% of current outdoor
	Rate structure	All (Summer)	1.8 (1.0)	n/a	n/a	25% rate increase
Sprinkler Upgrade	DID	Summer	0.5	$ 0.2 M	$ 0.4 M/cfs	
	EFID	Summer	7.6	$2.7 M	$ 0.4 M/cfs	
	FID	Summer	1.3	$ 0.6 M	$ 0.4 M/cfs	
	MFID	Summer	6.0	$ 2.5 M	$ 0.4 M/cfs	
	MHID	Summer	0.5	$ 0.2 M	$ 0.4 M/cfs	
Piping	DID	Summer	1.5	$ 1.4 M	$ 0.95 M/cfs	
	EFID	Summer	21+	$28 M	$ 1.3 M/cfs	
	FID/MFID/MHID		Limited			
Storage	EFID (new)	summer	14	$13-27M	$ 1.4 M/cfs	2,557 ac-ft
	FID (expand)	summer	3	$1.2 – 2.4 M	$ 0.6 M/cfs	561 ac-ft
	MFID (expand)	summer	2	$ 0.3 M	$ 0.15 M/cfs	370 ac-ft

Recommendations

- Implement irrigation efficiency upgrades
- Reduce or eliminate overflows and canal seepage in EFID
- Further evaluate expanding storage at Green Point and Laurance Lake
- Collect data for use in future analysis of reservoir storage in EFID
- Collect/use additional data for optimal streamflows for aquatic habitat
- Expand groundwater data collection
- Implement projects for increased summer streamflow and flexibility
- Refine modeling that was done as part of this Basin Study
  -particularly glacier, groundwater, stream temperature
- Other?