

City of Portland Seasonal Water Supply Augmentation Prediction Database

Nadia Jones
Alia Johnson

Portland's Water Supply

- ❖ Bull Run River
- ❖ 102 square mile watershed
- ❖ Two Reservoirs- 1 and 2 (conveniently named)
- ❖ Sandy River
- ❖ Columbia South Shore Well Field (CSSWF)



Project Objective

- To deliver comprehensive data for drawdown and baseline water resource augmentation predictions.

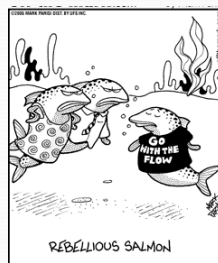


Sandy River, Or

Demand

- Municipal and industrial users (both Portland and wholesaler service areas).

- Fish!!!



Supply

Water Conservation



Peak Season Supply

- Summer peak demand
- ~122 days, early June to late September
- Late winter and early spring evaluation of....
- Precipitation
- Stream flow
- Snow pack
- Baseline Primary Resources
 - Reservoirs
 - Bull Run Stream Flow
 - Groundwater



Peak Season Supply Assessment

- Cool-Wet scenario –summer is unusually wet and cool
- Median- no supply augmentation will be needed
- Warm-Dry scenario- summer is unusually warm and dry



Flow rates and Precipitation

- Low amounts of precipitation can result in two types of seasonal critical conditions.
- 1. a dry spring condition

and/or
- 2. a dry fall conditions

Drawdown

- The period of the year where outflow from the reservoirs exceeds inflow.

- **Decision-Making Tools**

- The Rainfall-Runoff Model
 - Physically-based precipitation-runoff model, econometric regression model

- **Drawdown stats:**

- 2008- drawdown began July 21st
- 2007- drawdown began May 27th; well used
- 2006- drawdown began June 26th
- 2005- drawdown began ?????
- 2004- drawdown began May 6th
- 2003- drawdown began July 3rd

- **Determining Factors**

- Dry Spring, Dry Fall
- 2004, 2007 marked critical spring conditions.

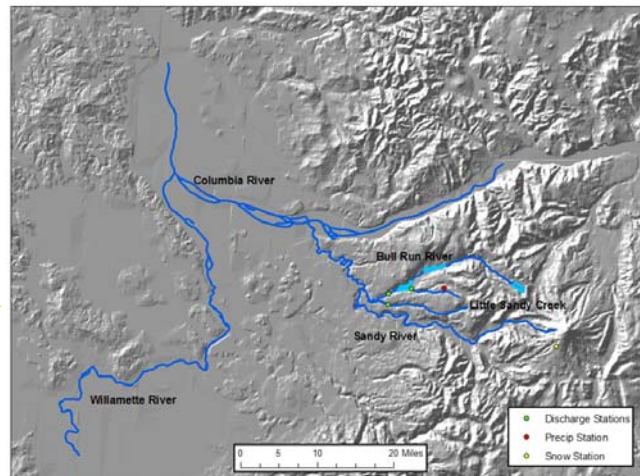
Parameters

- Precipitation
(inches ,NOAA)

- Stream Flow
(cfu USGS)

- Snow
(swe, SNOTEL)

- <http://pubs.usgs.gov/wdr/2005/wdr-or-05/pdf/bullrun2.pdf>



Methods

- Normalization
- Geocoding-X,Y
- Relationships

Data: Avg. Monthly Stream Flow

OBJECTID	Station	YEAR	MONTH	Discharge	Season	Class
1	14139000	2003	JAN	190	Winter	
2	14139000	2003	FEB	158	Winter	
3	14139000	2003	MAR	241	Spring	
4	14139000	2003	APR	144	Spring	
5	14139000	2003	MAY	71.5	Spring	
6	14139000	2003	JUN	24.4	Summer	
7	14139000	2003	JUL	14.3	Summer	3
8	14139000	2003	AUG	10.1	Summer	
9	14139000	2003	SEP	13.4	Fall	
10	14139000	2003	OCT	28.4	Fall	
11	14139000	2003	NOV	97	Fall	
12	14139000	2003	DEC	181	Winter	
13	14140001	2003	JAN	1449	Winter	
14	14140001	2003	FEB	1327	Winter	
15	14140001	2003	MAR	1814	Spring	
16	14140001	2003	APR	1011	Spring	
17	14140001	2003	MAY	481	Spring	
18	14140001	2003	JUN	298	Summer	
19	14140001	2003	JUL	262	Summer	3
20	14140001	2003	AUG	164	Summer	
21	14140001	2003	SEP	169	Fall	
22	14140001	2003	OCT	209	Fall	
23	14140001	2003	NOV	449	Fall	
24	14140001	2003	DEC	1359	Winter	
25	14141500	2003	JAN	235	Winter	
26	14141500	2003	FEB	213	Winter	
27	14141500	2003	MAR	324	Spring	
28	14141500	2003	APR	206	Spring	
29	14141500	2003	MAY	97	Spring	
30	14141500	2003	JUN	32	Summer	
31	14141500	2003	JUL	17.5	Summer	3
32	14141500	2003	AUG	12.2	Summer	
33	14141500	2003	SEP	18	Fall	
34	14141500	2003	OCT	34	Fall	
35	14141500	2003	NOV	118	Fall	
36	14141500	2003	DEC	243	Winter	
37	14139000	2004	JAN	252	Winter	
38	14139000	2004	FEB	152	Winter	
39	14139000	2004	MAR	114	Spring	
40	14139000	2004	APR	61.5	Spring	
41	14139000	2004	MAY	87	Spring	
42	14139000	2004	JUN	85	Summer	
43	14139000	2004	JUL	16.6	Summer	1

Data: Avg. Monthly Precipitation

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2003	0.6	0.4	0.8	0.4	0.2	0.1	0	0	0.2	0.2	0.6	0.6
2004	0.8	0.4	0.2	0.1	0.3	0.2	0	0.3	0.2	0.4	0.3	
2005	0.2	0.1	0.3	0.3	0.3	0.2	0.1	0	0.2	0.4	0.5	
2006	0.9	0.3	0.3	0.2	0.2	0.1	0	0	0.1	0.2	1.1	
2007	0.4	0.6	0.4	0.2	0.1	0.1	0	0.1	0.2			

Records: 1 (1 of 5) of 5

Data: Ave. Monthly Snow

OBJECTID	YEAR	JAN	FEB	MAR	APR	Class
1	2003	12.6	12.9	21.5	44	2
2	2004	31.1	47	57	63	1
3	2005	6	12.6	15.1	19.5	3
4	2006	22.5	53	60.5	73	1
5	2007	28	43	50	55.5	2

Record: 1 (1 of 5) of 5

Relationships

-DischargeHasClass

-PrecipHasClass

-SnowHasClass

-ClassHasPotential

OBJECTID	Class	Discharge_Range	Precip_Range	Snow_Range
1	1	> 150 cfs	> 0.1 inches	> 55 inches
2	2	2.95 - 150 cfs	0.07 - 0.1 inches	30 - 55 inches
3	3	< 95 cfs	< 0.07 inches	< 30 inches

(AutoNumber)
Records: 14 of 3

OBJECTID *	Class *	Drawdown_Start
1	1 Late	
2	2 Average	
3	3 Early	

Record: 1 of 3
Show: All Selected
Records (0 out of 3)

Limitations???



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