Resource indicator (measurement)	Integrated Plan	Future without Integrated Plan
WATER RESOURCES		
Average for water years 1981–2005 (maf)		
Water supply		
April 1 total water supply available (TWSA)	2.99	2.84
Water distribution		
April–September Parker flow volume	0.59	0.60
April–September diversion	1.64	1.62
September 30 reservoir contents	0.58	0.32
April–September flow volume at mouth of Yakima River	0.99	0.84
1994 dry-year (maf)		
Water supply		
April 1 TWSA	2.13	1.78
Water distribution		
April–September Parker flow volume	0.24	0.28
April–September diversion	1.51	1.25
September 30 reservoir contents	-0.11	0.12
April–September flow volume at mouth of Yakima River	0.47	0.35
Irrigation proration level	65%	26%

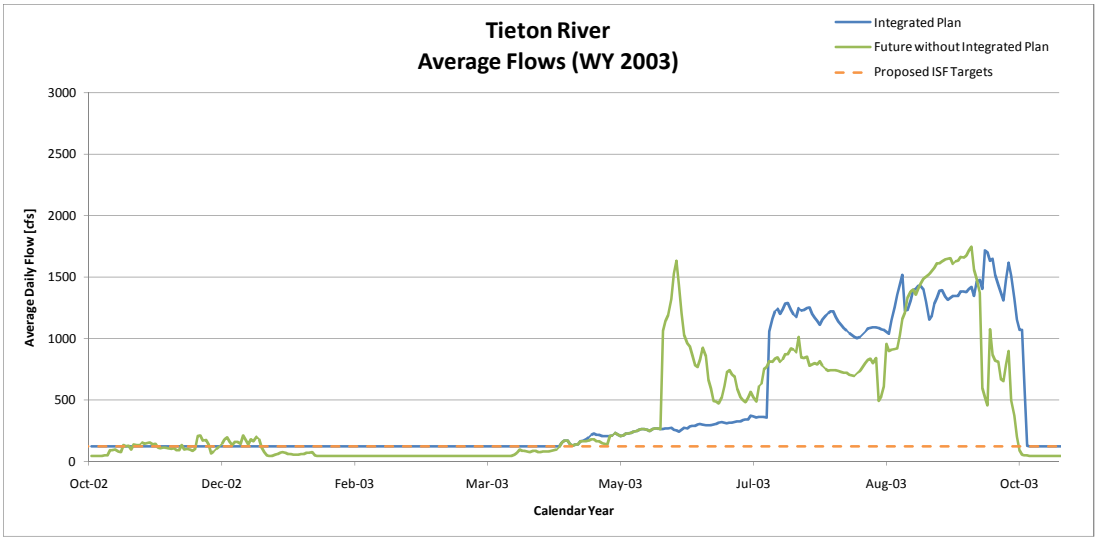
Resource indicator (measurement)	Integrated Plan	Future without Integrated Plan
ANADROMOUS FISH		
Rate of change in flow during flip-flop (average cfs/day August 16–September 14)		
Easton reach	2	-9
Ellensburg reach	-36	-78
Lower Naches River reach	-4	31
Pre- (August 1-15) and post- (September 14-28) flip-flop flow and absolute change in flow		
Easton reach		
Pre-flip-flop flow (cfs)	369	600
Post-flip-flop flow (cfs)	416	346
Absolute change in flow (cfs)	46	-254
Ellensburg reach		
Pre-flip-flop flow (cfs)	2,723	3,795
Post-flip-flop flow (cfs)	1,665	1,539
Absolute change in flow (cfs)	-1,058	-2,256
Lower Naches River reach		
Pre-flip-flop flow (cfs)	1,382	736
Post-flip-flop flow (cfs)	1,256	1,633
Absolute change in flow (cfs)	-126	897

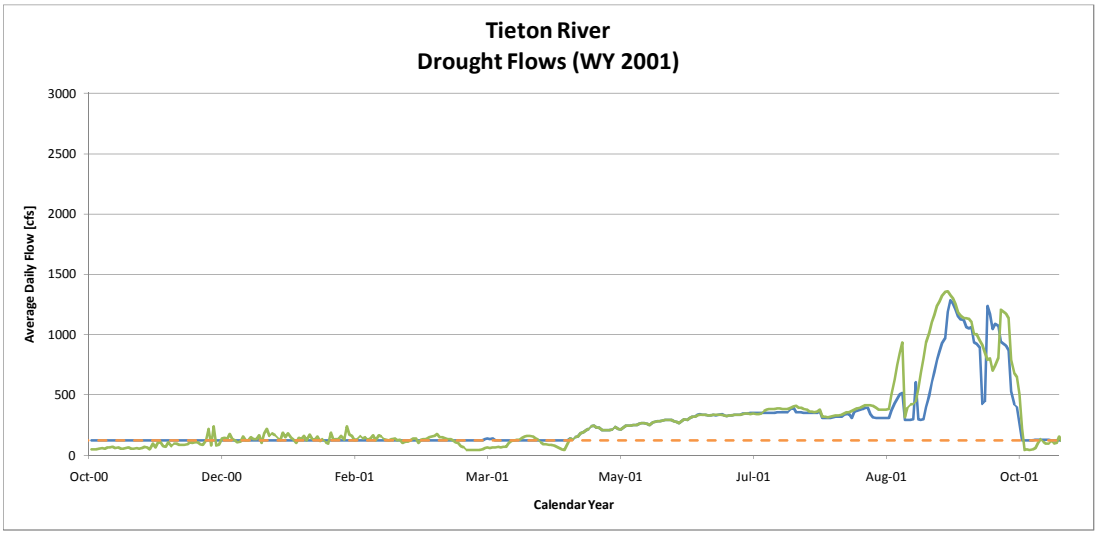
Average, minimum, and maximum reservoir elevation (feet) during bull trout spawning migration: July 15–September 15 (feet)

Kachess Lake	2238.53 2130.69-2261.96	2243.46 2202.99-2261.96
Keechelus Lake	2478.59 2432.52-2516.96	2470.11 2433.08-2516.88
Rimrock Lake	2896.99 2806.9-2926	2911.91 2870.33-2926

Hydrologic Indicator	Integrated Plan					Future without Integrated Plan				
	Average 1981-2005	Drought Year 1994	Drought Year 2001	Drought Year 2005	Wet Year 1997	Average 1981-2005	Drought Year 1994	Drought Year 2001	Drought Year 2005	Wet Year 1997
April 1 TWSA (maf)	2.99	2.13	2.09	2.37	4.73	2.84	1.78	1.85	1.81	4.56
April-September flow volume at Parker gage (kaf)	590	242	194	182	1915	599	276	208	200	1907
March-October flow volume at Parker gage (kaf)	907	396	346	301	2669	905	434	347	325	2602
April-September diversion volume upstream of Parker gage (maf)	1.64	1.51	1.52	1.55	1.68	1.62	1.25	1.33	1.31	1.71
September 30 non-Bumping or Wymer reservoir contents (kaf)	369	-180	125	60	731	299	102	132	153	589
October 31 non-Bumping or Wymer reservoir contents (kaf)	349	-153	120	56	802	286	95	129	143	698
September 30 Bumping and Wymer reservoir contents (kaf)	209	65	107	105	244	13	10	11	5	17
April-September flow volume at mouth of Yakima River (kaf)	993	471	392	418	2390	843	348	258	285	2216
Irrigation proration level (percent)[1]	91%	65%	64%	70%	100%	84%	26%	39%	38%	100%

Item	Future without Integrated Plan	Integrated Plan	Improvement
Average 1981-2005			
TWSA [April 1, kaf]	2835.4	2989.3	153.9
March-October flow volume at Parker gage [kaf]	905.4	906.6	1.2
Drought Year 1994			
TWSA [April 1, kaf]	1784.2	2127.5	343.3
March-October flow volume at Parker gage [kaf]	434.4	396.4	-37.9
Drought Year 2001			
TWSA [April 1, kaf]	1846.1	2089.8	243.7
March-October flow volume at Parker gage [kaf]	347.1	346.0	-1.1
Drought Year 2005			
TWSA [April 1, kaf]	1813.5	2369.6	556.1
March-October flow volume at Parker gage [kaf]	324.6	301.4	-23.2
Wet Year 1997			
TWSA [April 1, kaf]	4555.6	4727.5	171.9
March-October flow volume at Parker gage [kaf]	2601.5	2669.2	67.7


Tieton River
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Average Daily Flow [cfs]
3000
2500
2000
1500
1000
500
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year


Tieton River
Drought Flows (WY 2001)
Average Daily Flow [cfs]
3000
2500
2000
1500
1000
500
0
Oct-00
Dec-00
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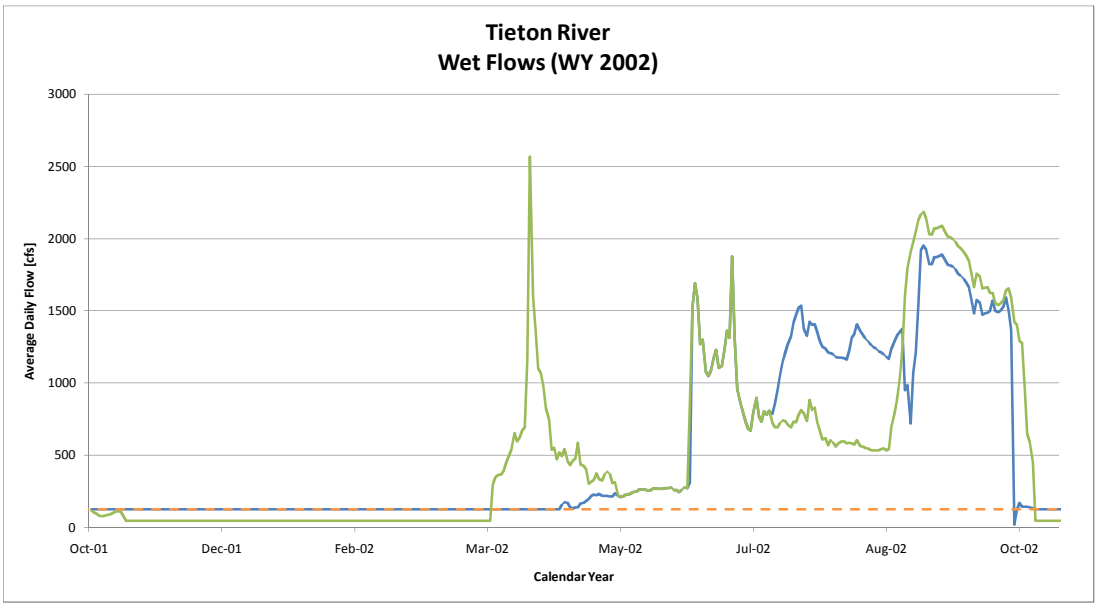
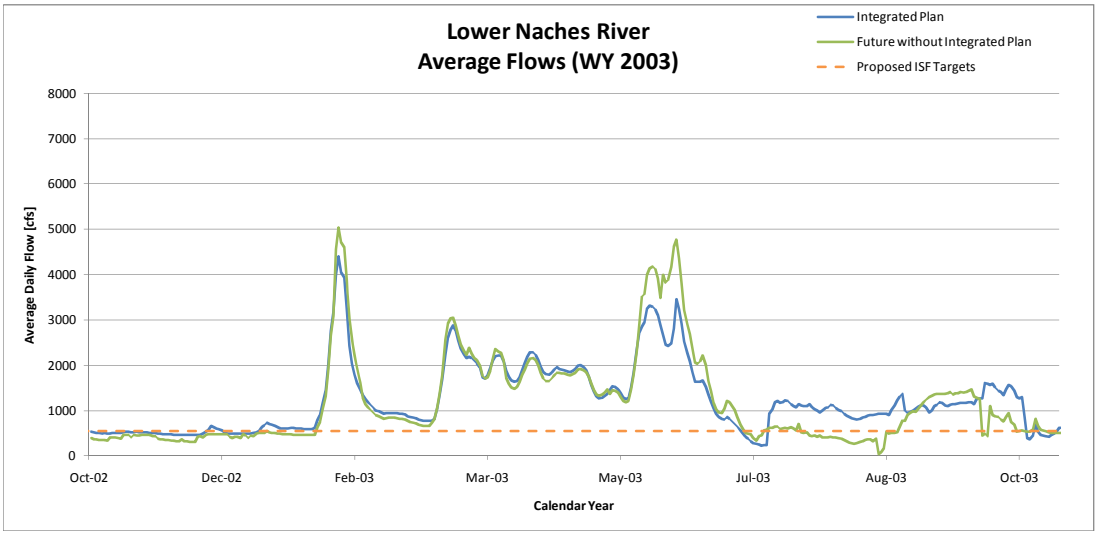
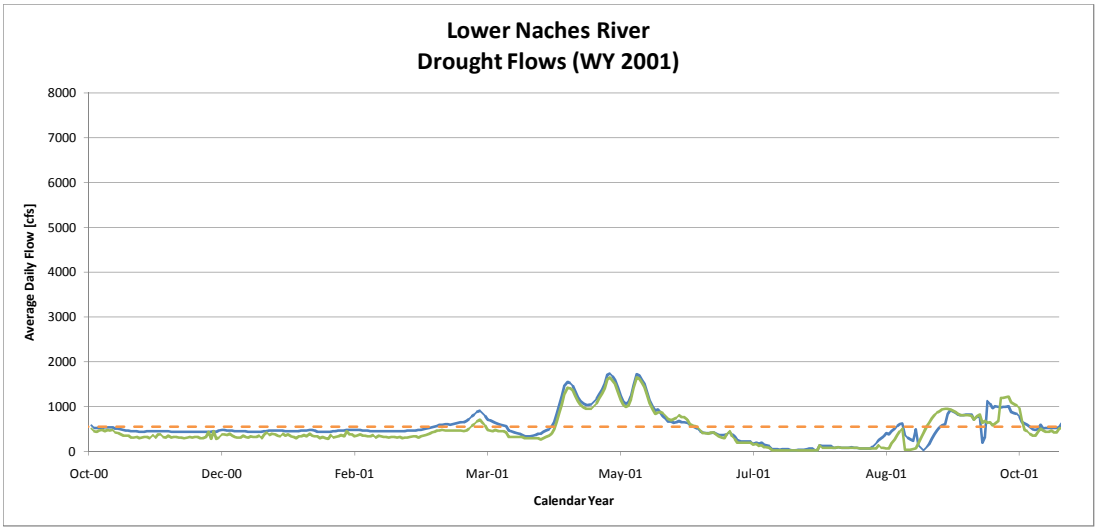
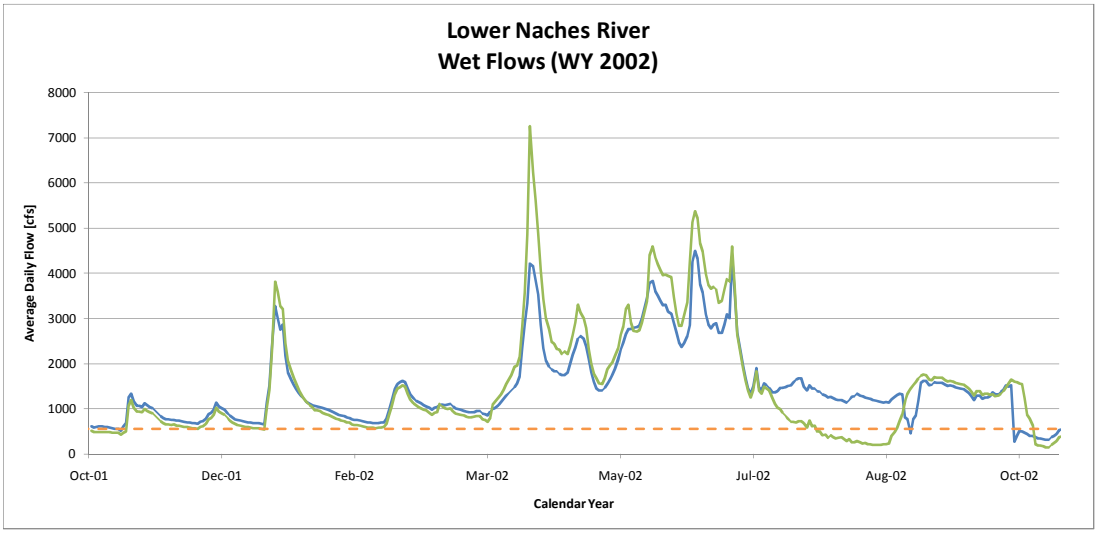
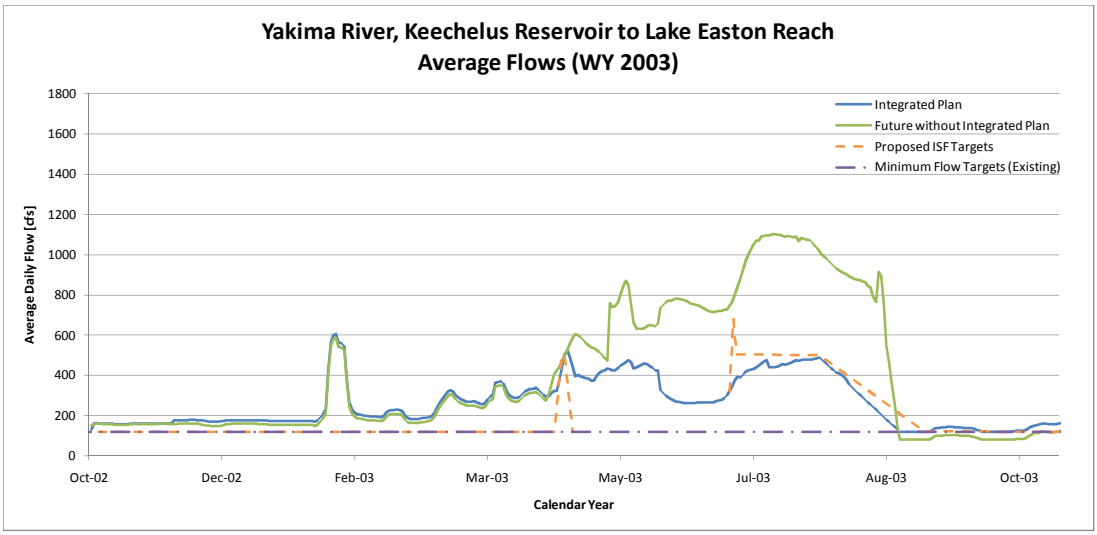
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

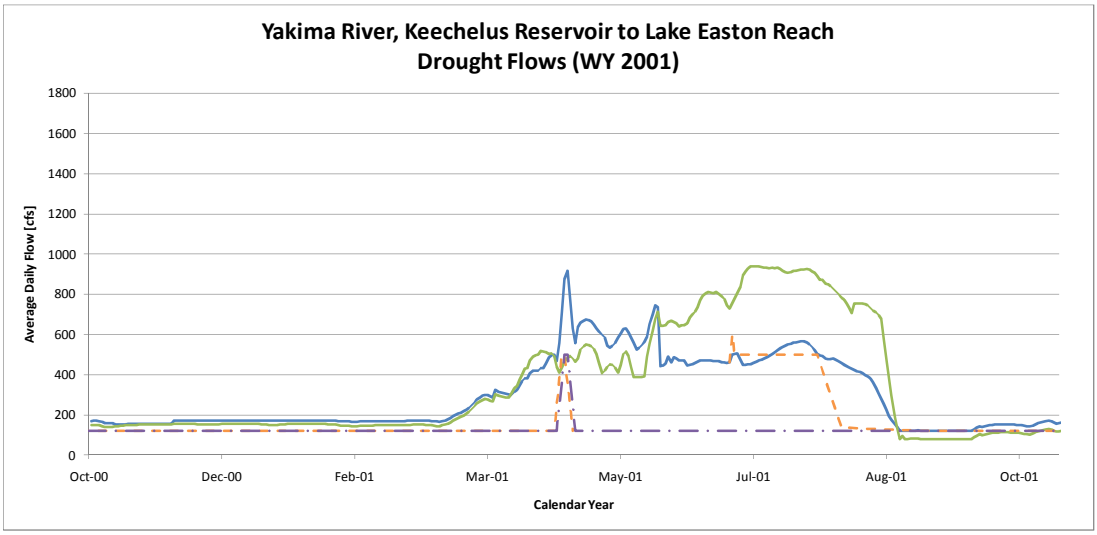

Tieton River
Wet Flows (WY 2002)
Average Daily Flow [cfs]
3000
2500
2000
1500
1000
500
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

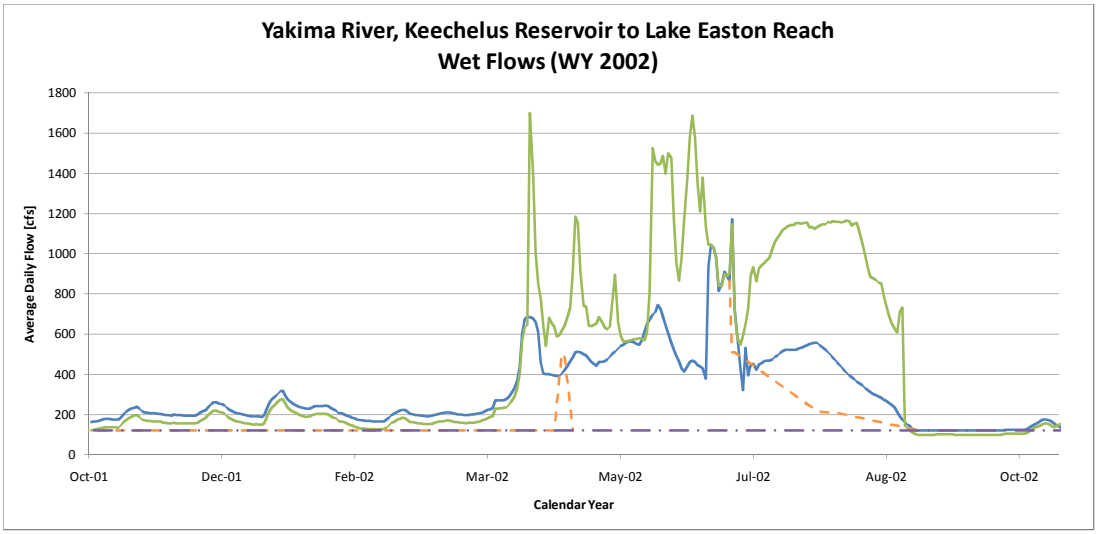

Lower Naches River
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

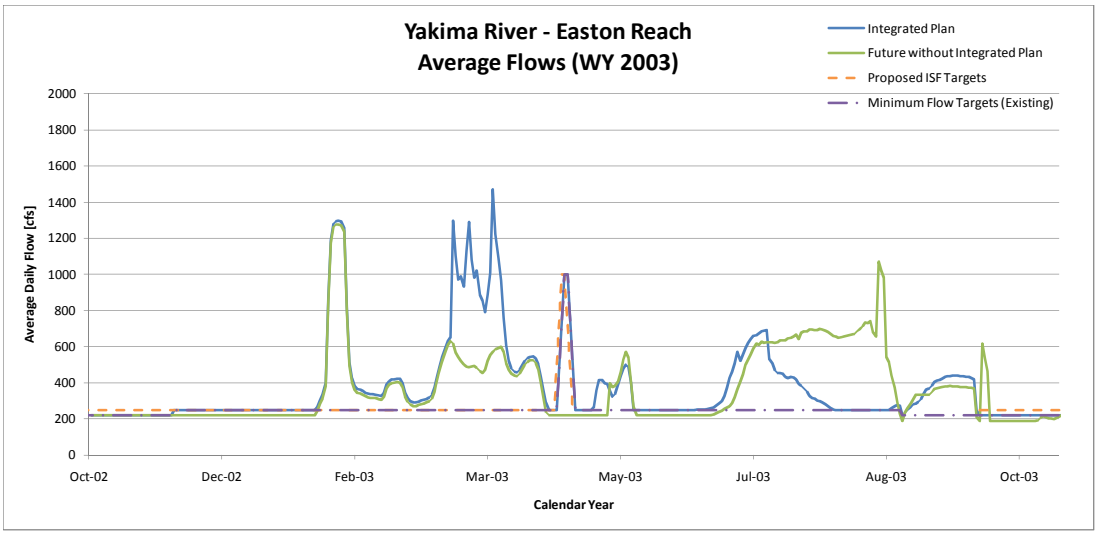

Lower Naches River
Drought Flows (WY 2001)
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

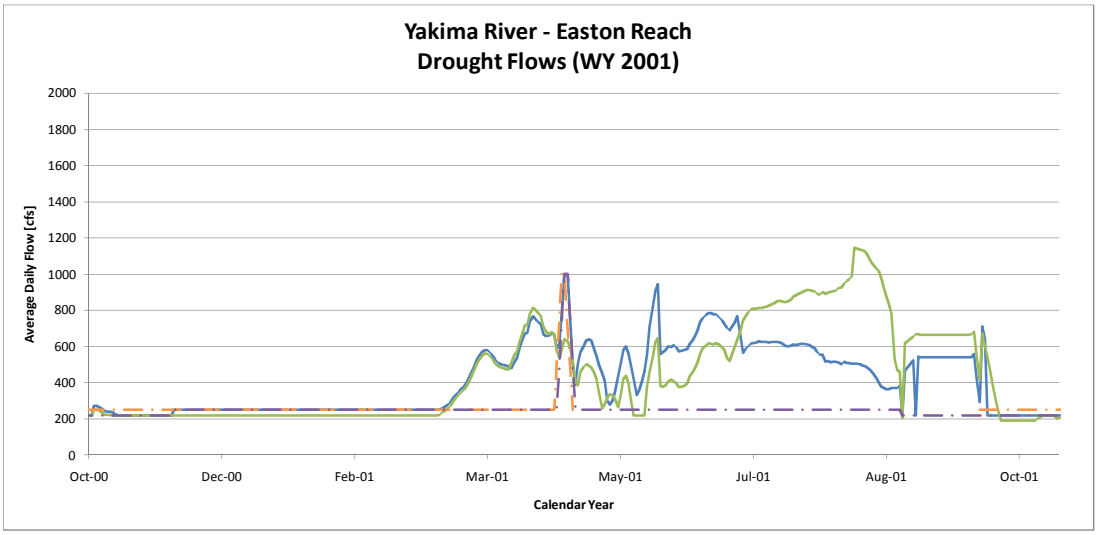

Lower Naches River
Wet Flows (WY 2002)
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

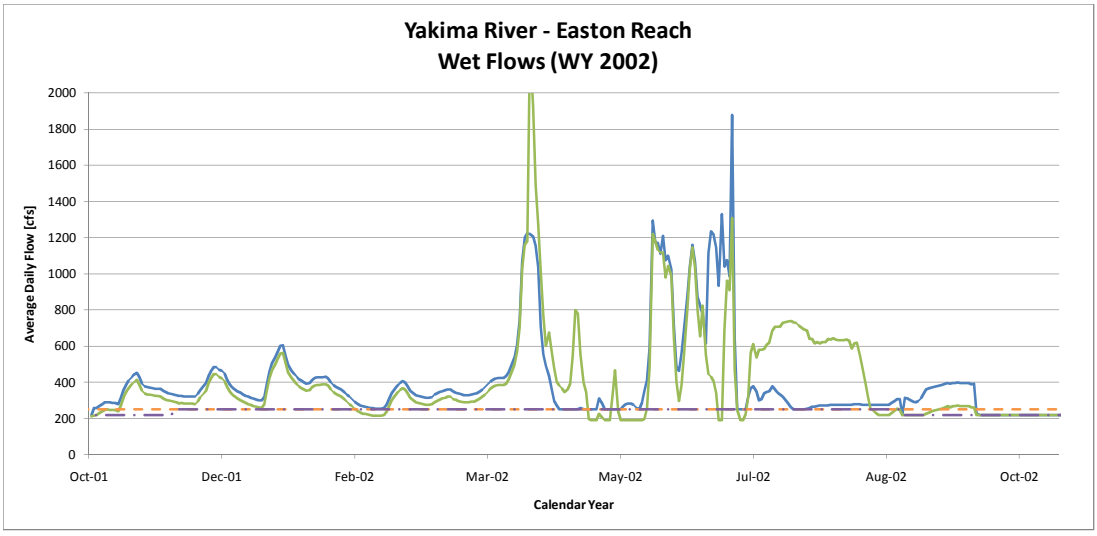

Yakima River, Keechelus Reservoir to Lake Easton Reach
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Minimum Flow Targets (Existing)
Average Daily Flow [cfs]
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

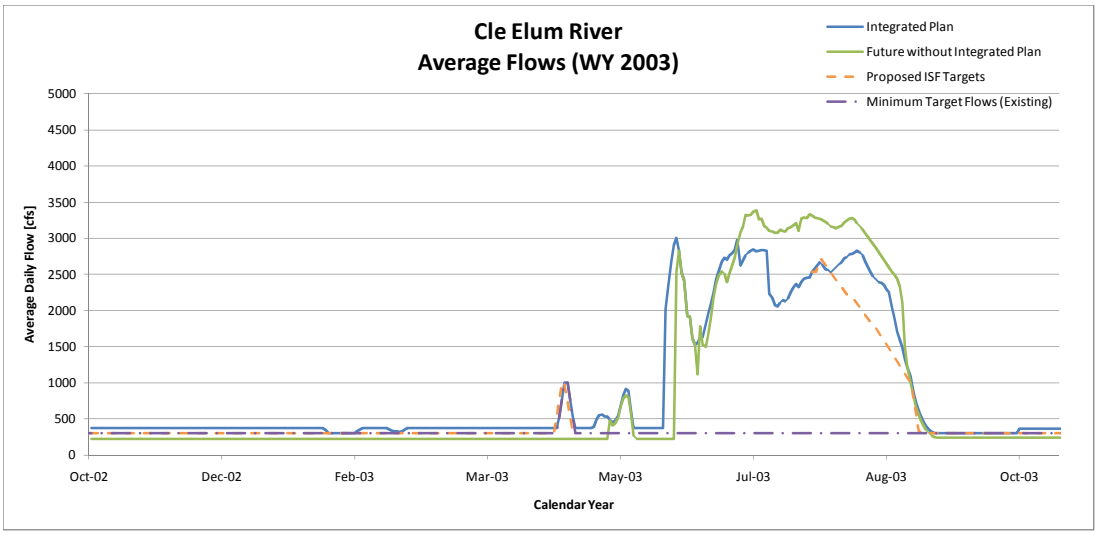

Yakima River, Keechelus Reservoir to Lake Easton Reach
Drought Flows (WY 2001)
Average Daily Flow [cfs]
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

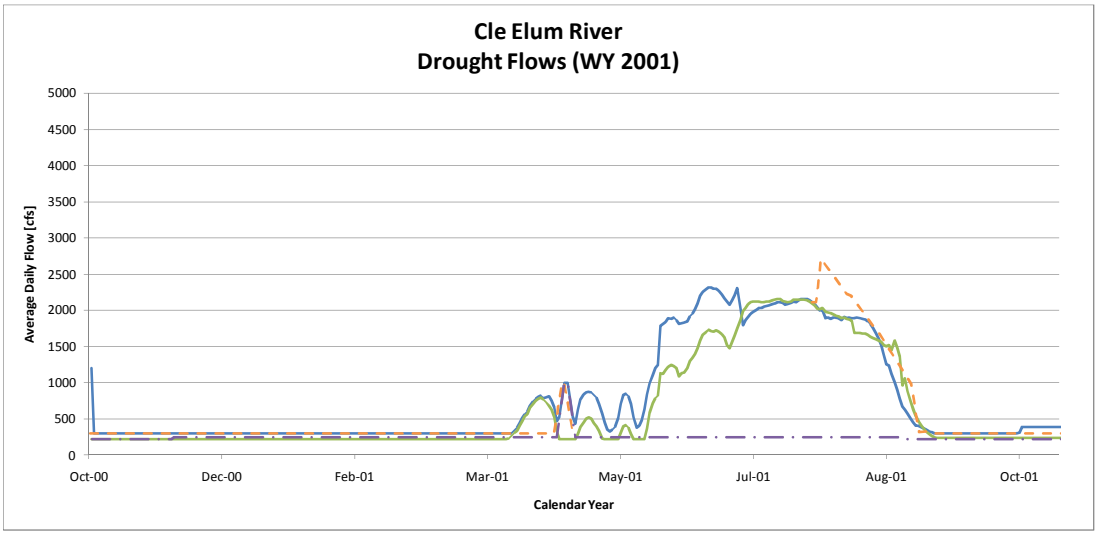

Yakima River, Keechelus Reservoir to Lake Easton Reach
Wet Flows (WY 2002)
Average Daily Flow [cfs]
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

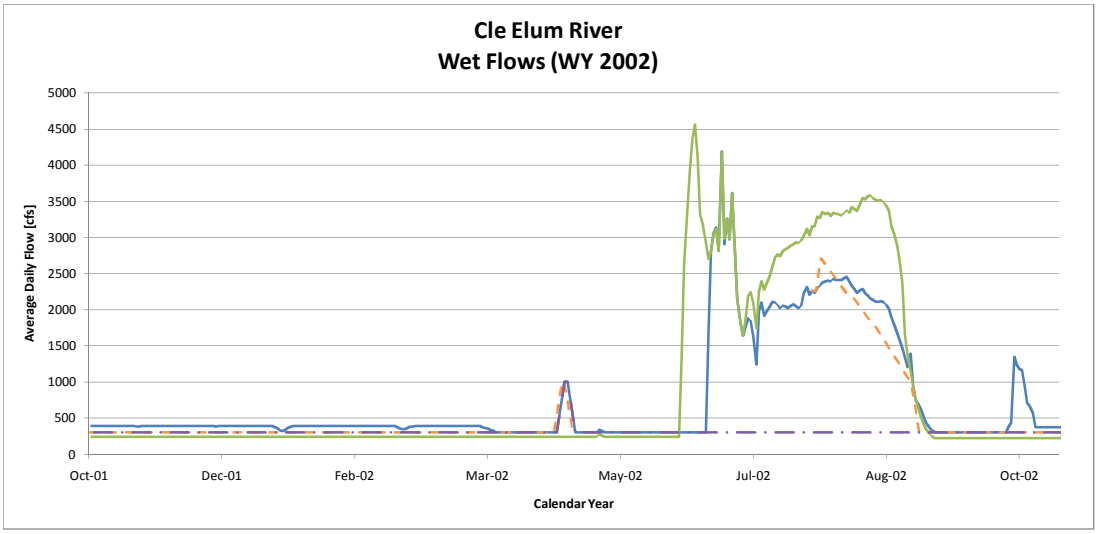

Yakima River - Easton Reach
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Minimum Flow Targets (Existing)
Average Daily Flow [cfs]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

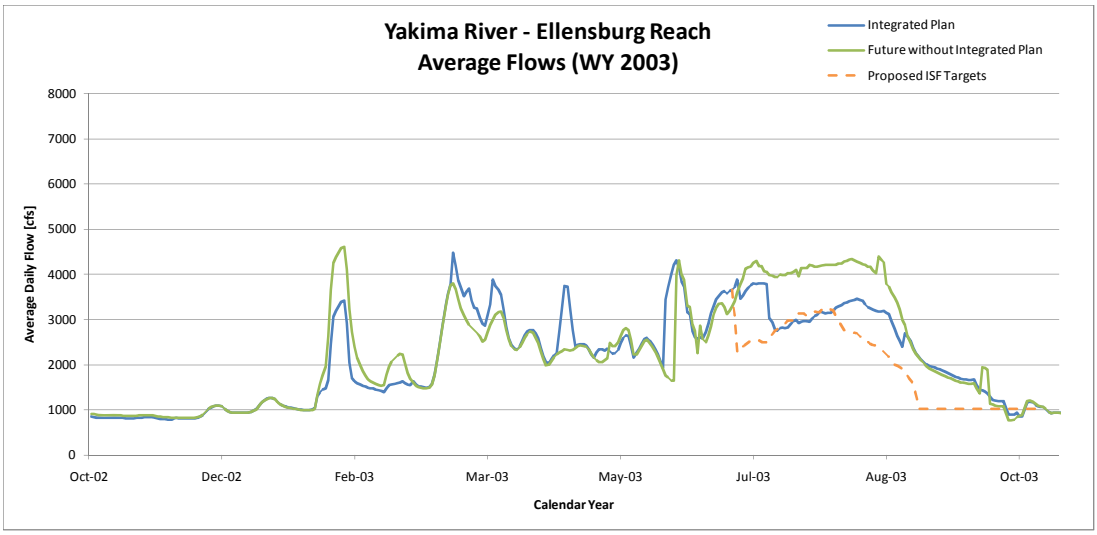

Yakima River - Easton Reach
Drought Flows (WY 2001)
Average Daily Flow [cfs]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

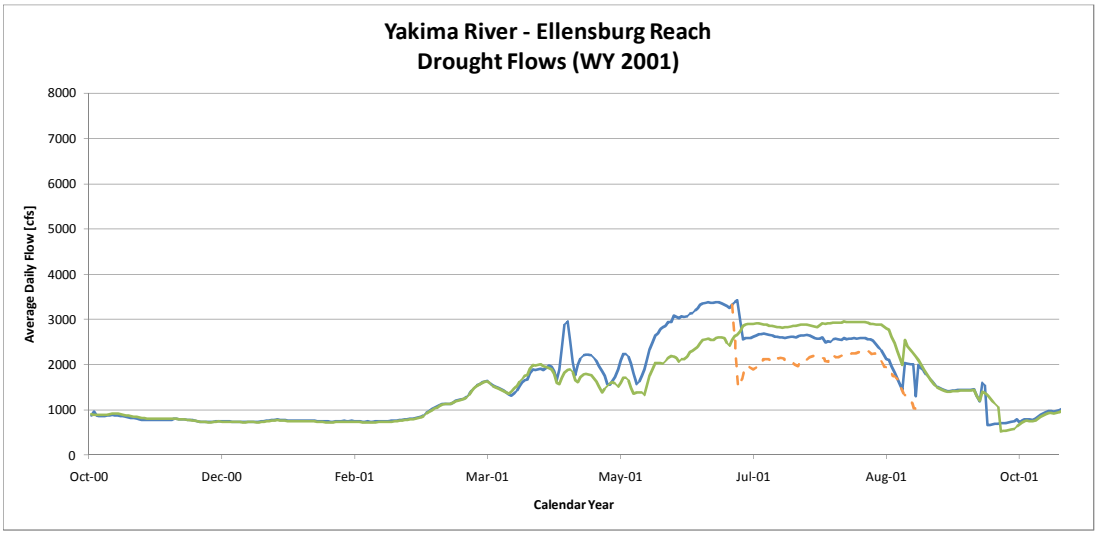

Yakima River - Easton Reach
Wet Flows (WY 2002)
Average Daily Flow [cfs]
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

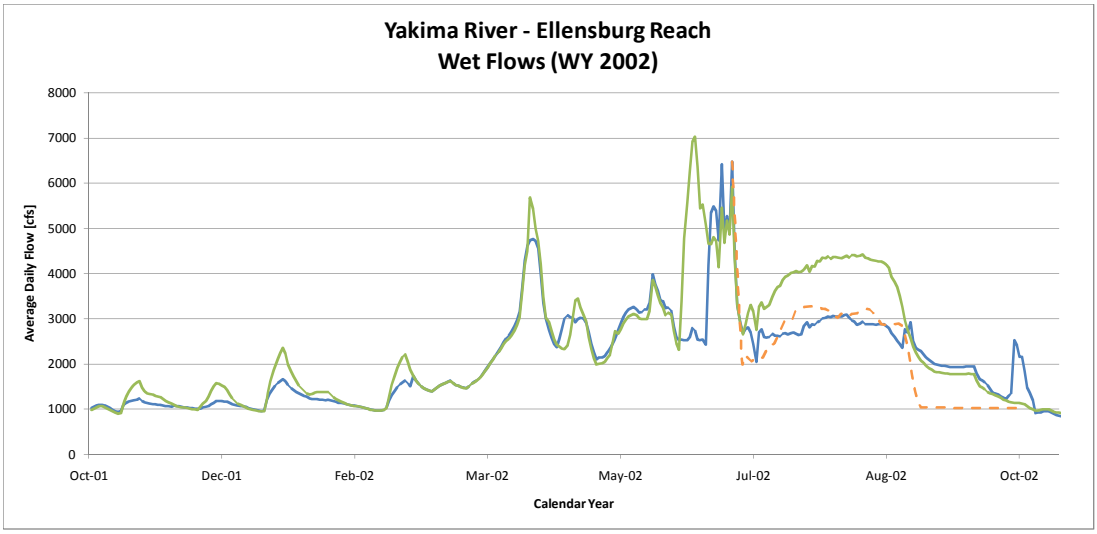

Cle Elum River
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Minimum Target Flows (Existing)
Average Daily Flow [cfs]
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

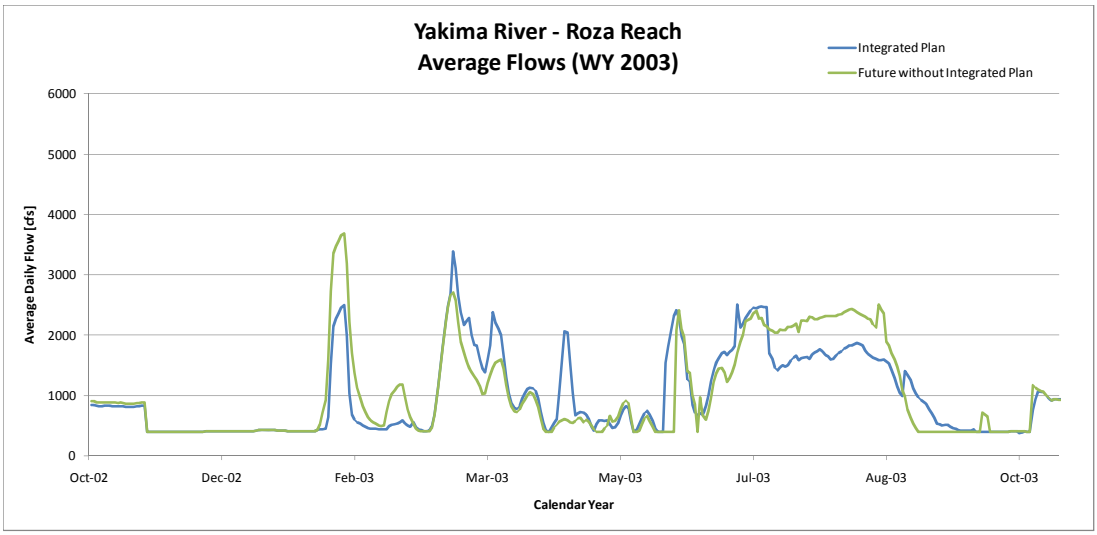

Cle Elum River
Drought Flows (WY 2001)
Average Daily Flow [cfs]
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

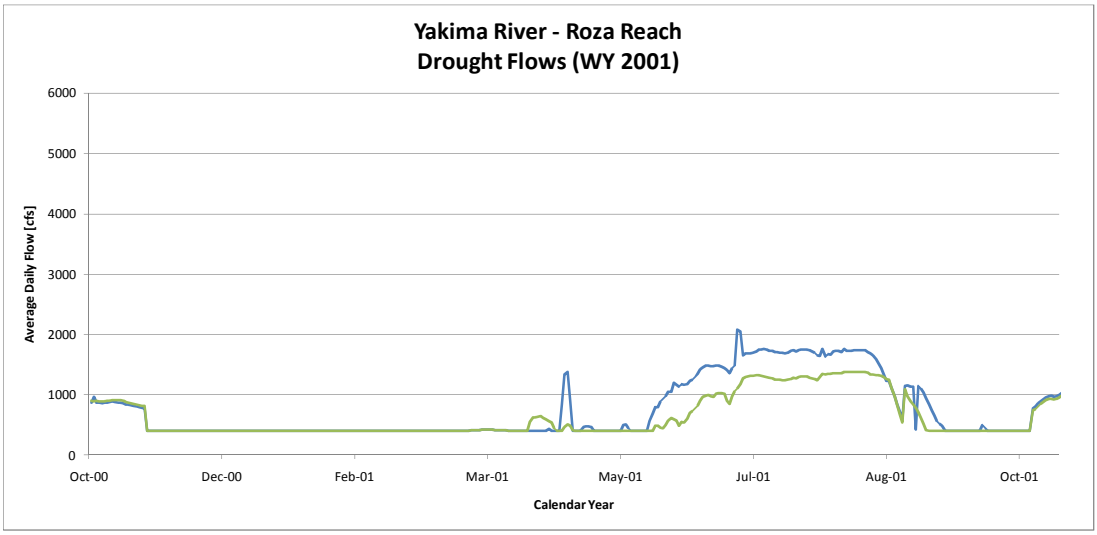

Cle Elum River
Wet Flows (WY 2002)
Average Daily Flow [cfs]
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

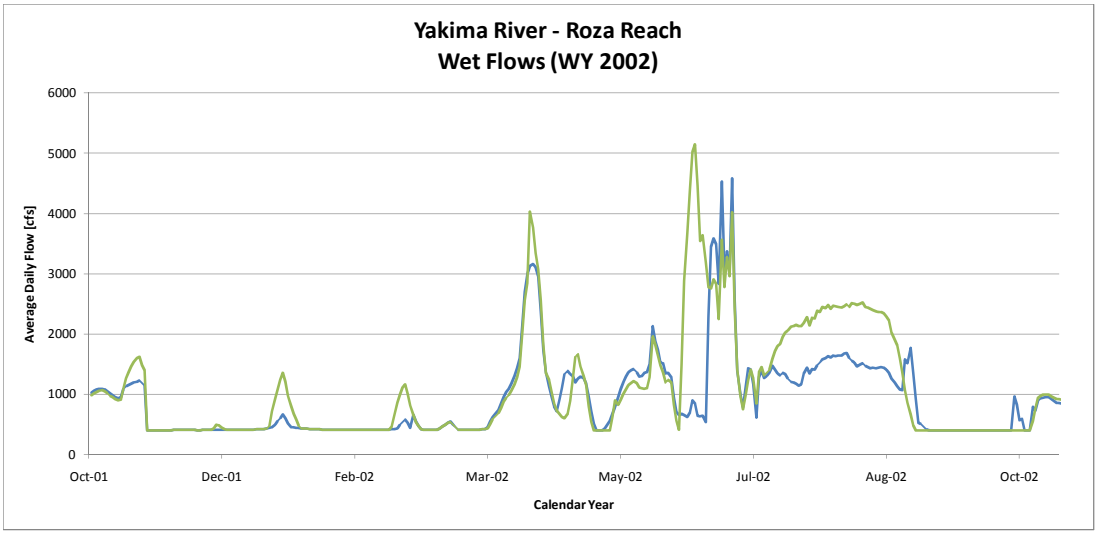

Yakima River - Ellensburg Reach
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

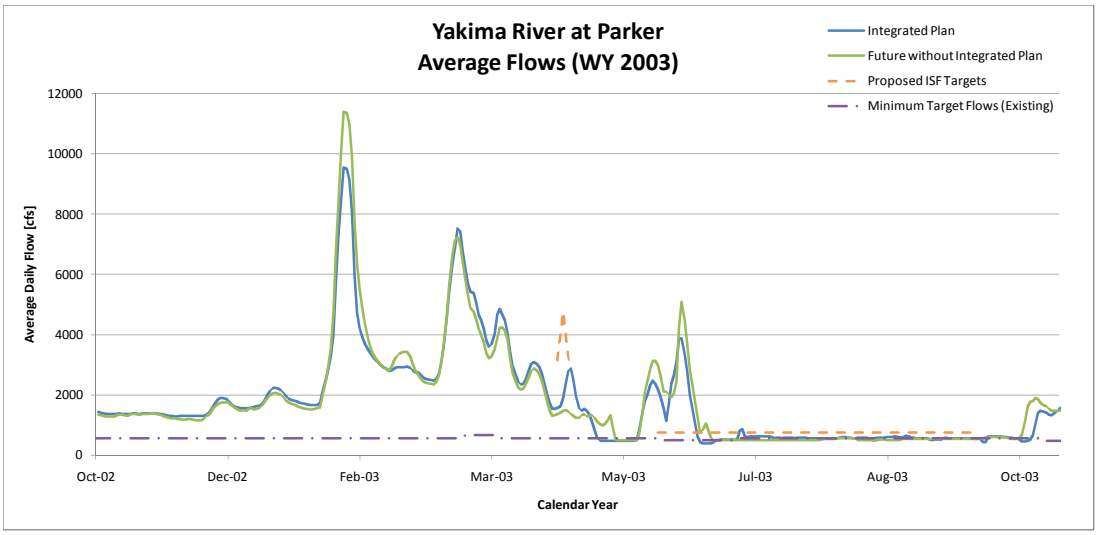

Yakima River - Ellensburg Reach
Drought Flows (WY 2001)
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

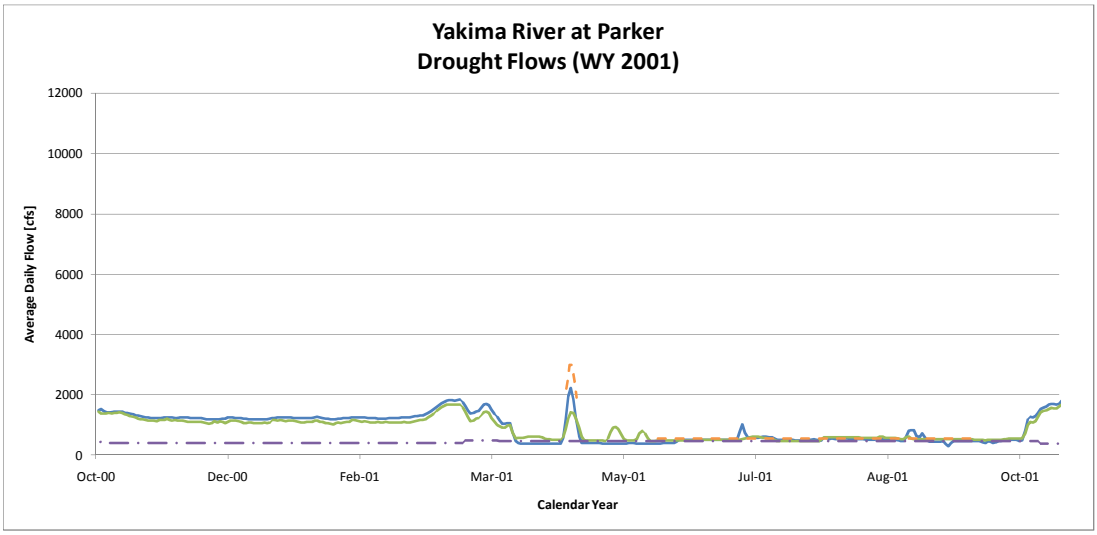

Yakima River - Ellensburg Reach
Wet Flows (WY 2002)
Average Daily Flow [cfs]
8000
7000
6000
5000
4000
3000
2000
1000
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

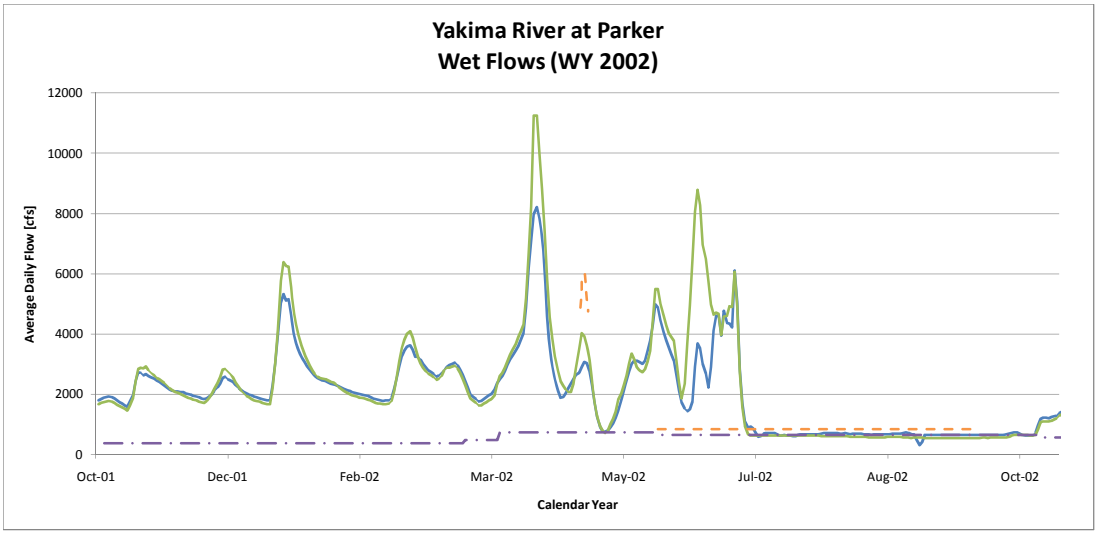

Yakima River - Roza Reach
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Average Daily Flow [cfs]
6000
5000
4000
3000
2000
1000
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

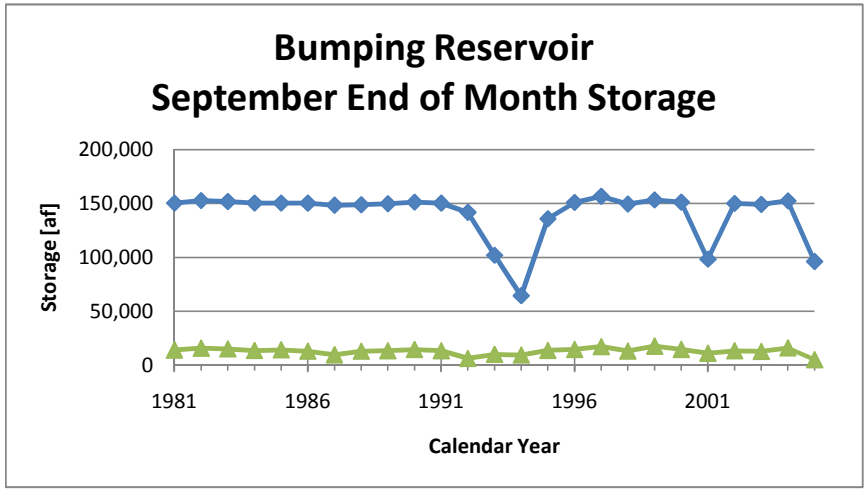

Yakima River - Roza Reach
Drought Flows (WY 2001)
Average Daily Flow [cfs]
6000
5000
4000
3000
2000
1000
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

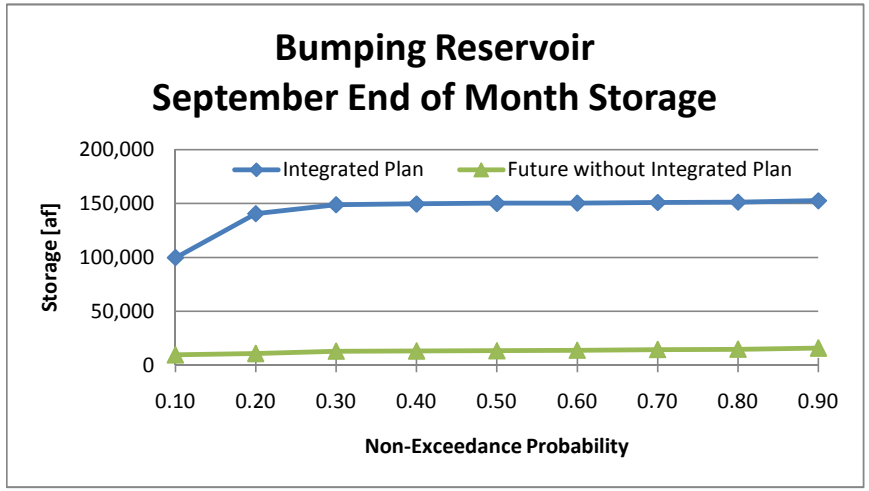

Yakima River - Roza Reach
Wet Flows (WY 2002)
Average Daily Flow [cfs]
6000
5000
4000
3000
2000
1000
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

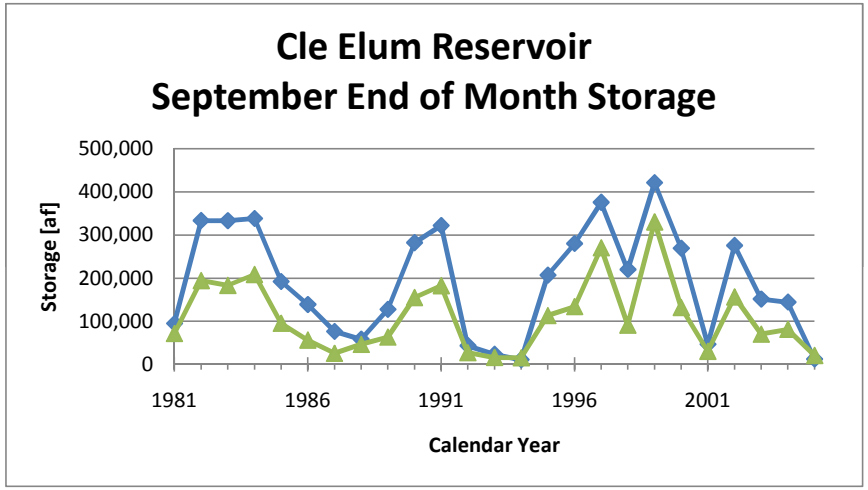

Yakima River at Parker
Average Flows (WY 2003)
Integrated Plan
Future without Integrated Plan
Proposed ISF Targets
Minimum Target Flows (Existing)
Average Daily Flow [cfs]
12000
10000
8000
6000
4000
2000
0
Oct-02
Dec-02
Feb-03
Mar-03
May-03
Jul-03
Aug-03
Oct-03
Calendar Year

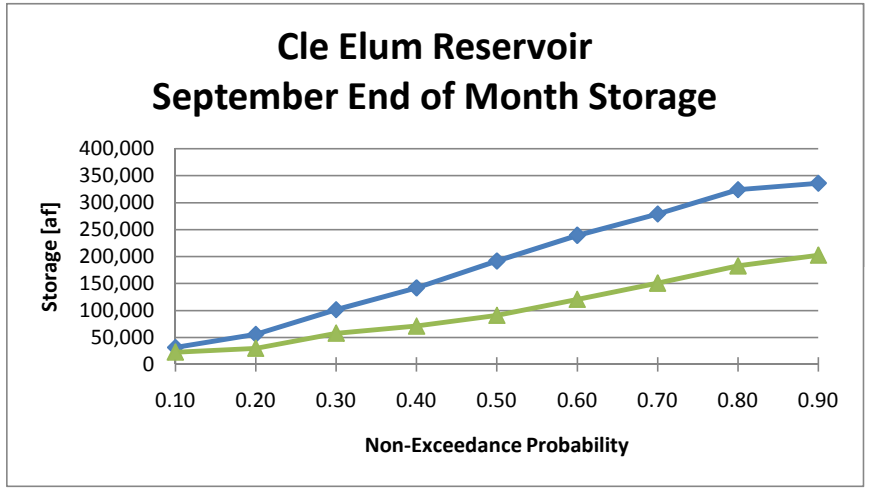

Yakima River at Parker
Drought Flows (WY 2001)
Average Daily Flow [cfs]
12000
10000
8000
6000
4000
2000
0
Oct-00
Dec-00
Feb-01
Mar-01
May-01
Jul-01
Aug-01
Oct-01
Calendar Year

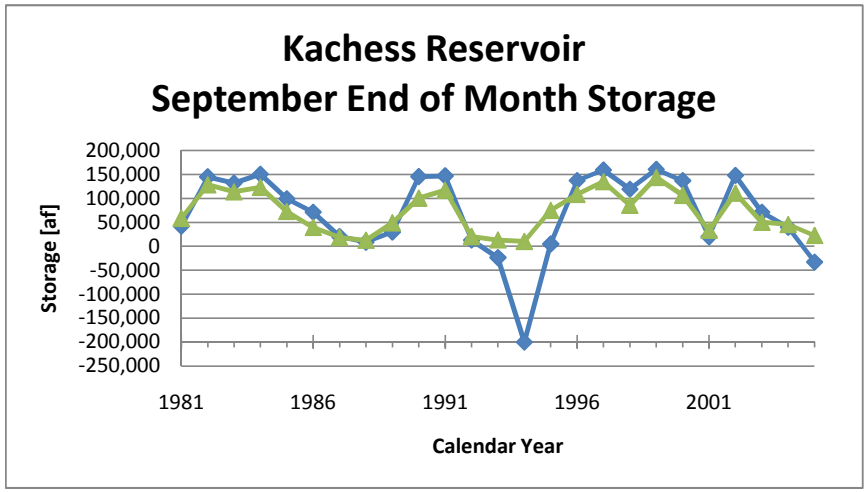

Yakima River at Parker
Wet Flows (WY 2002)
Average Daily Flow [cfs]
12000
10000
8000
6000
4000
2000
0
Oct-01
Dec-01
Feb-02
Mar-02
May-02
Jul-02
Aug-02
Oct-02
Calendar Year

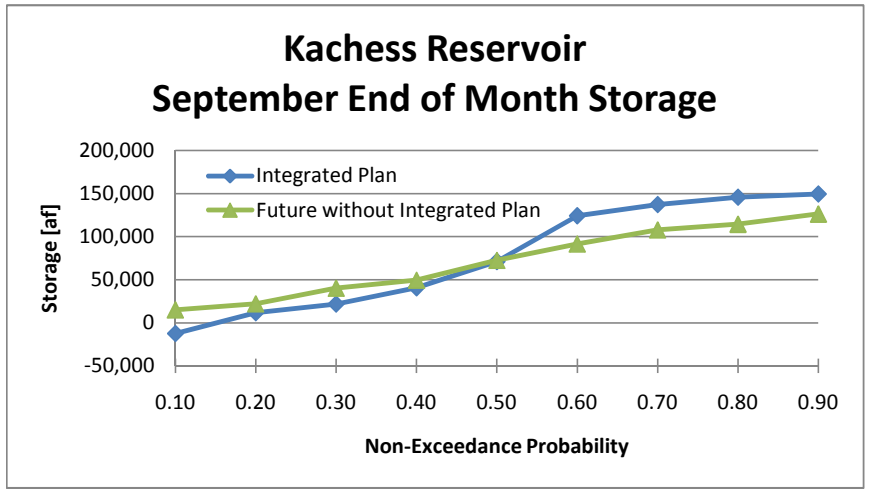

Bumping Reservoir
September End of Month Storage
Storage [af]
200,000
150,000
100,000
50,000
0
1981
1986
1991
1996
2001
Calendar Year

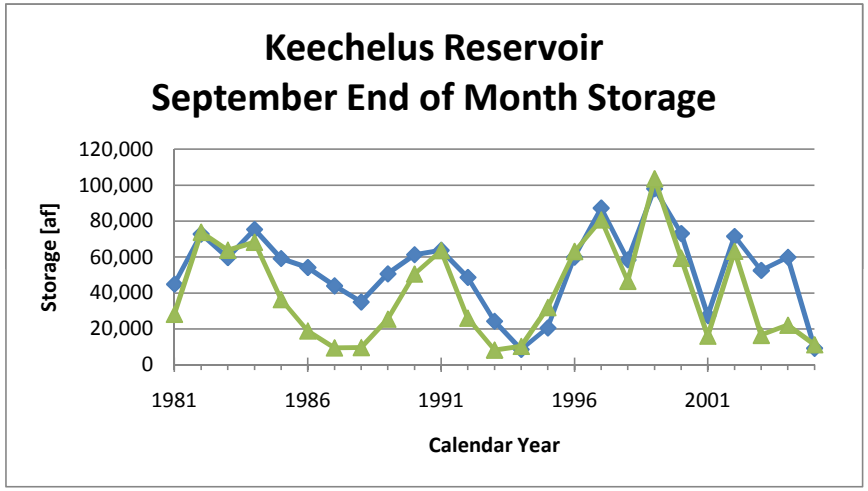

Bumping Reservoir
September End of Month Storage
Integrated Plan
Future without Integrated Plan
Storage [af]
200,000
150,000
100,000
50,000
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

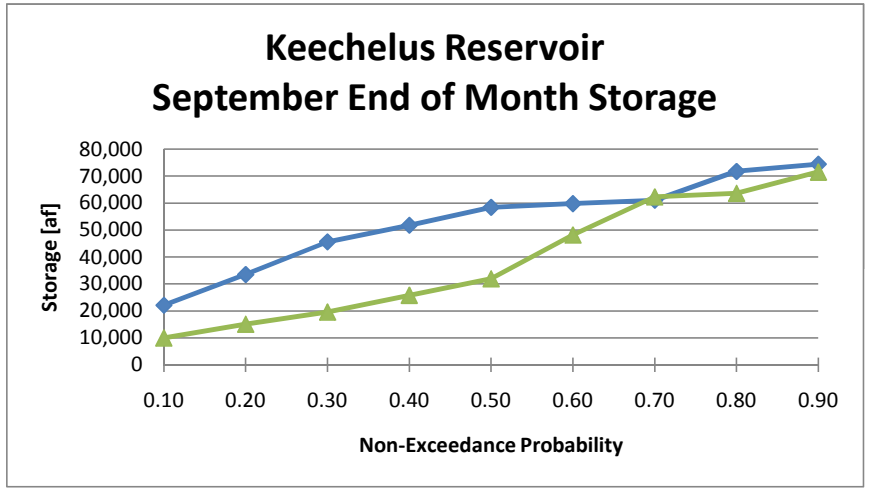

Cle Elum Reservoir
September End of Month Storage
Storage [af]
500,000
400,000
300,000
200,000
100,000
0
1981
1986
1991
1996
2001
Calendar Year

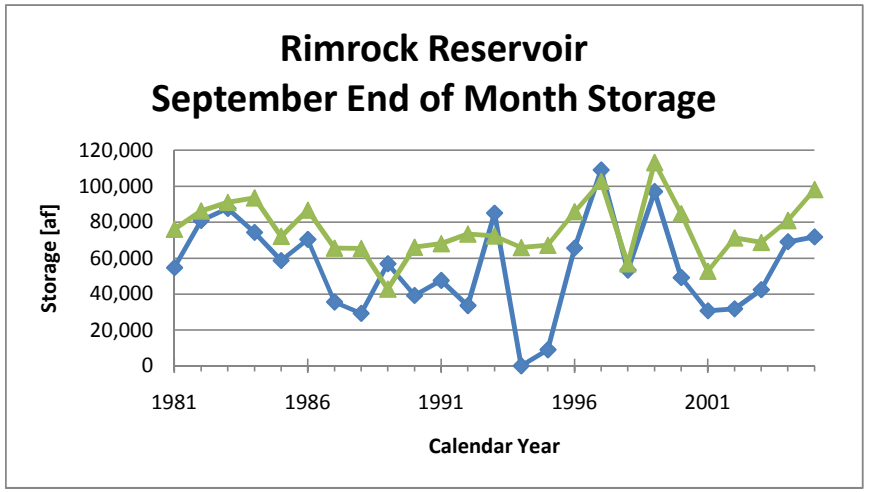

Cle Elum Reservoir
September End of Month Storage
Storage [af]
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

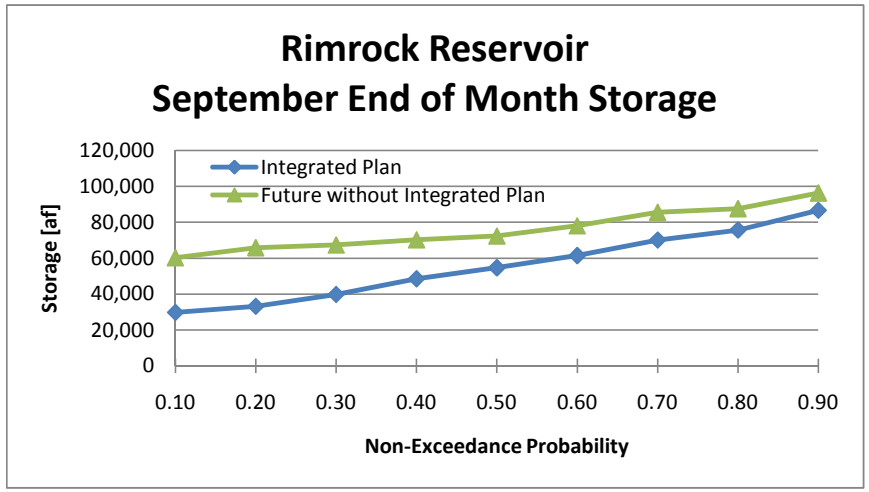

Kachess Reservoir
September End of Month Storage
Storage [af]
200,000
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
-250,000
1981
1986
1991
1996
2001
Calendar Year

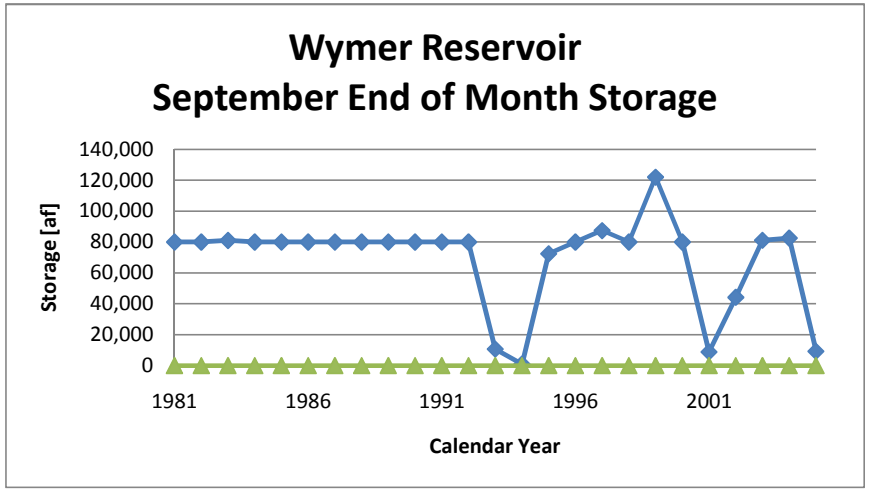

Kachess Reservoir
September End of Month Storage
Integrated Plan
Future without Integrated Plan
Storage [af]
200,000
150,000
100,000
50,000
0
-50,000
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

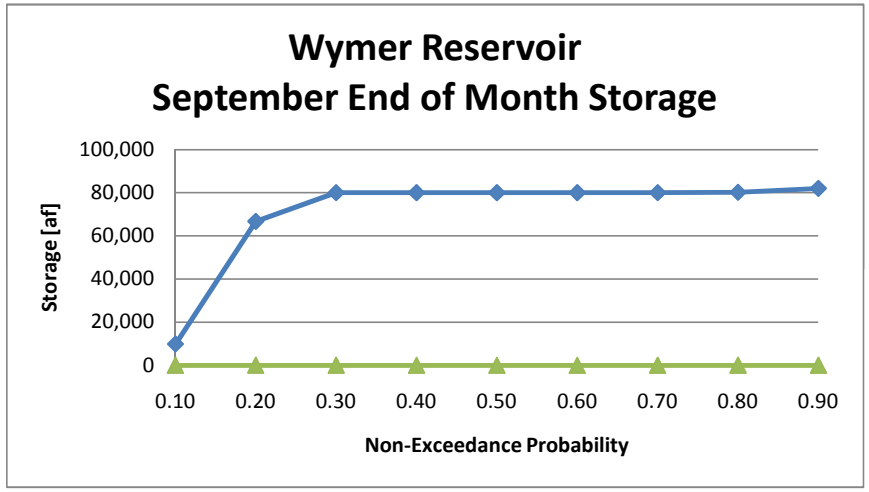

Keechelus Reservoir
September End of Month Storage
Storage [af]
120,000
100,000
80,000
60,000
40,000
20,000
0
1981
1986
1991
1996
2001
Calendar Year

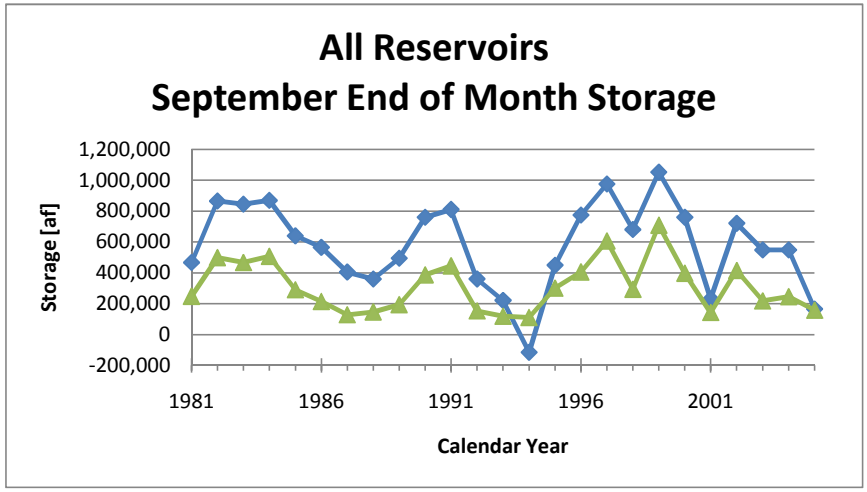

Keechelus Reservoir
September End of Month Storage
Storage [af]
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

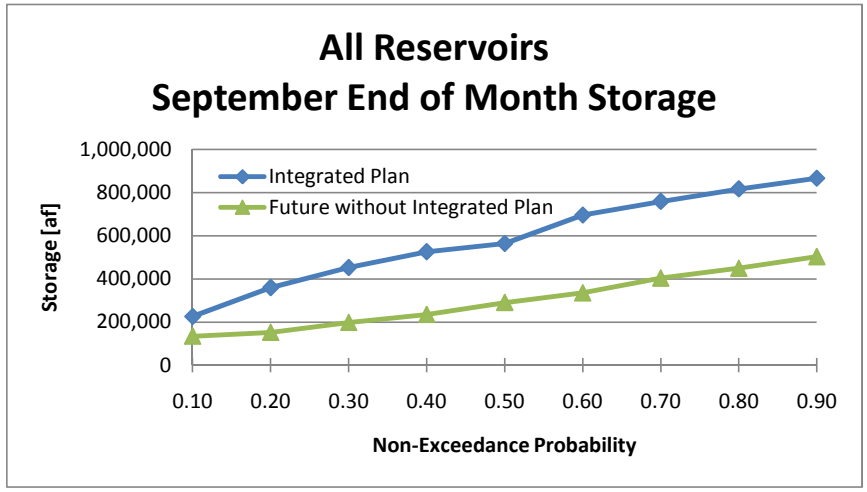

Rimrock Reservoir
September End of Month Storage
Storage [af]
120,000
100,000
80,000
60,000
40,000
20,000
0
1981
1986
1991
1996
2001
Calendar Year

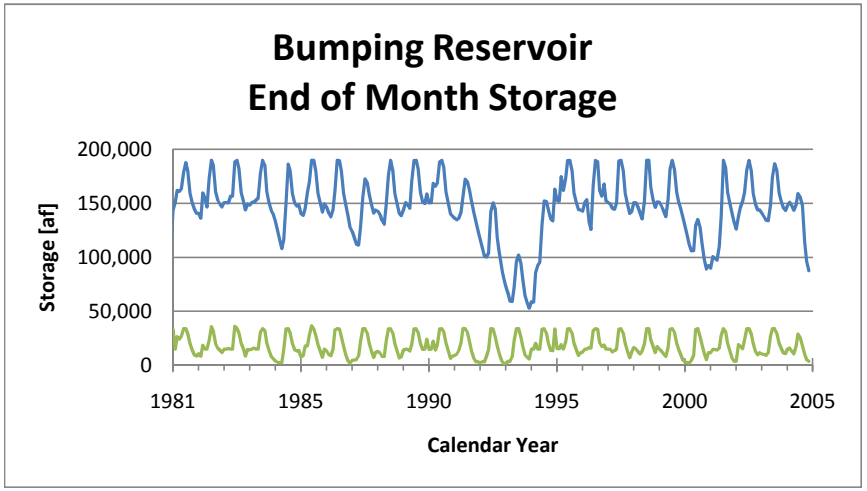

Rimrock Reservoir
September End of Month Storage
Integrated Plan
Future without Integrated Plan
Storage [af]
120,000
100,000
80,000
60,000
40,000
20,000
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

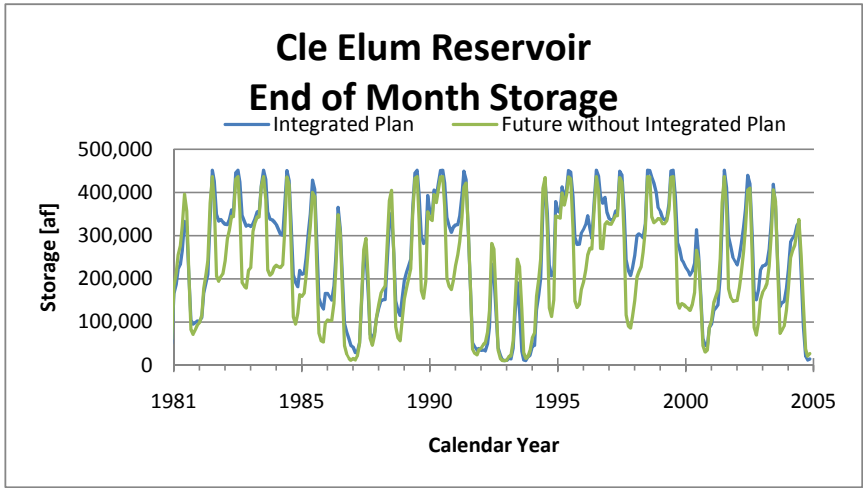

Wymer Reservoir
September End of Month Storage
Storage [af]
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1981
1986
1991
1996
2001
Calendar Year

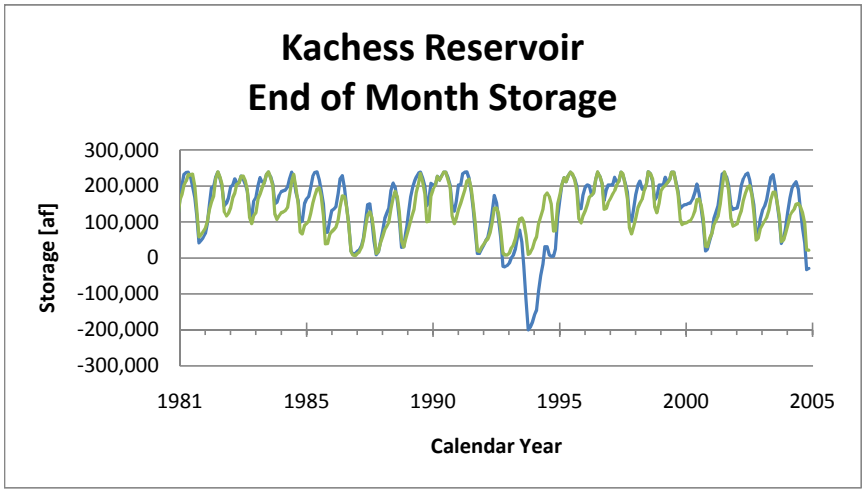

Wymer Reservoir
September End of Month Storage
Storage [af]
100,000
80,000
60,000
40,000
20,000
0
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

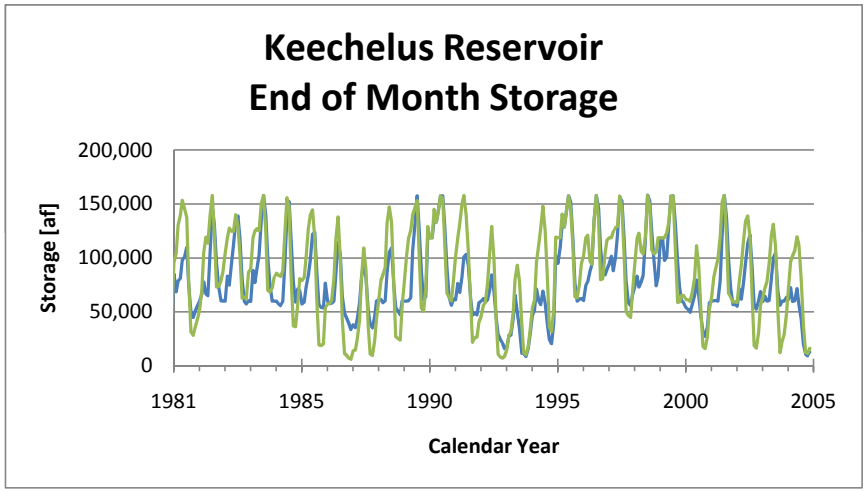

All Reservoirs
September End of Month Storage
Storage [af]
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
1981
1986
1991
1996
2001
Calendar Year

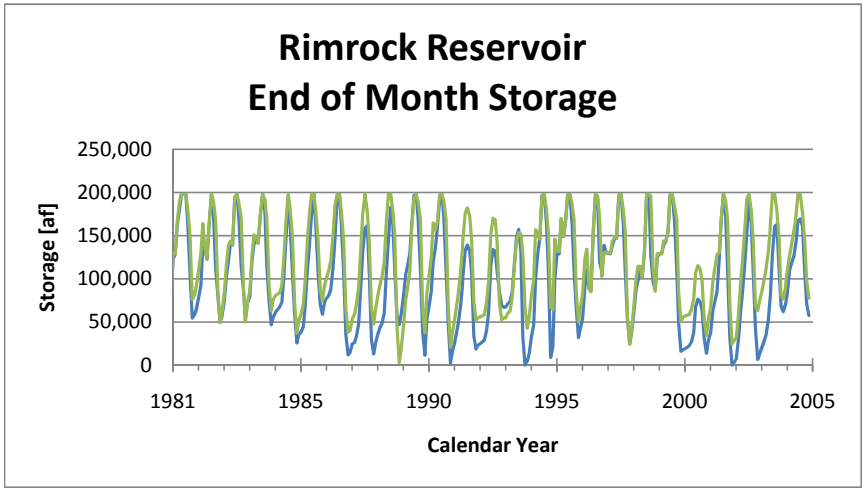

All Reservoirs
September End of Month Storage
Storage [af]
1,000,000
800,000
600,000
400,000
200,000
0
Integrated Plan
Future without Integrated Plan
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

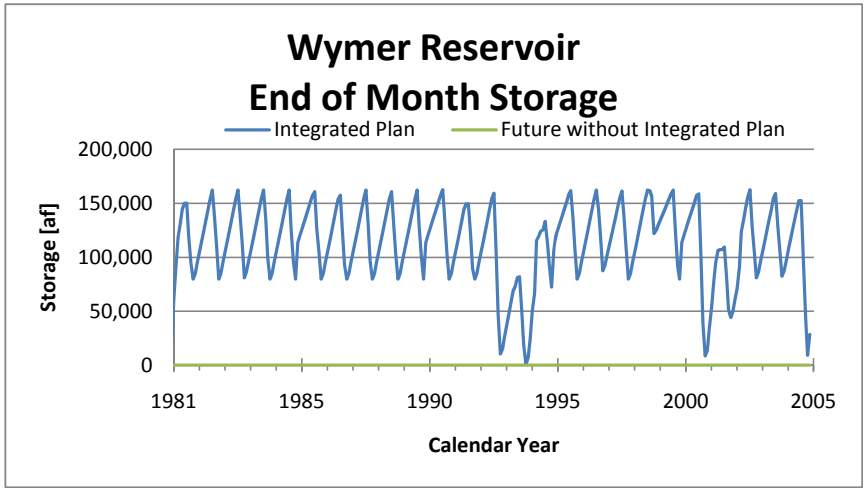

Bumping Reservoir
End of Month Storage
Storage [af]
200,000
150,000
100,000
50,000
0
1981
1985
1990
1995
2000
2005
Calendar Year

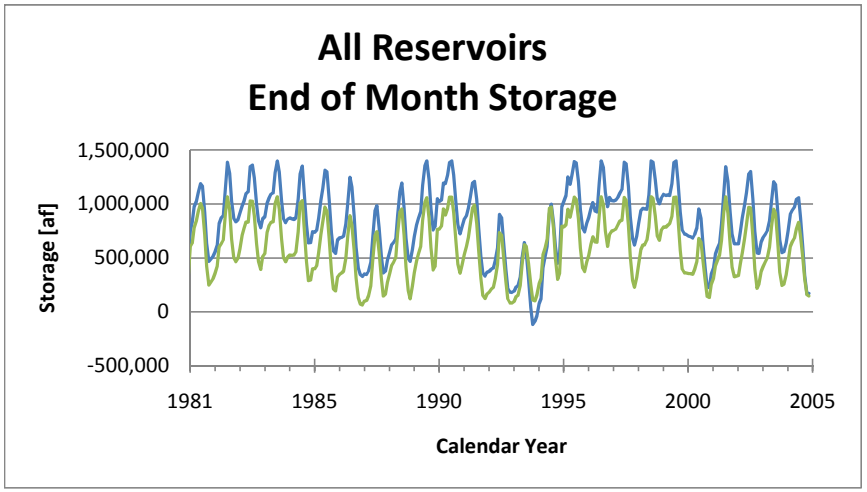

Cle Elum Reservoir
End of Month Storage
Integrated Plan
Future without Integrated Plan
Storage [af]
500,000
400,000
300,000
200,000
100,000
0
1981
1985
1990
1995
2000
2005
Calendar Year

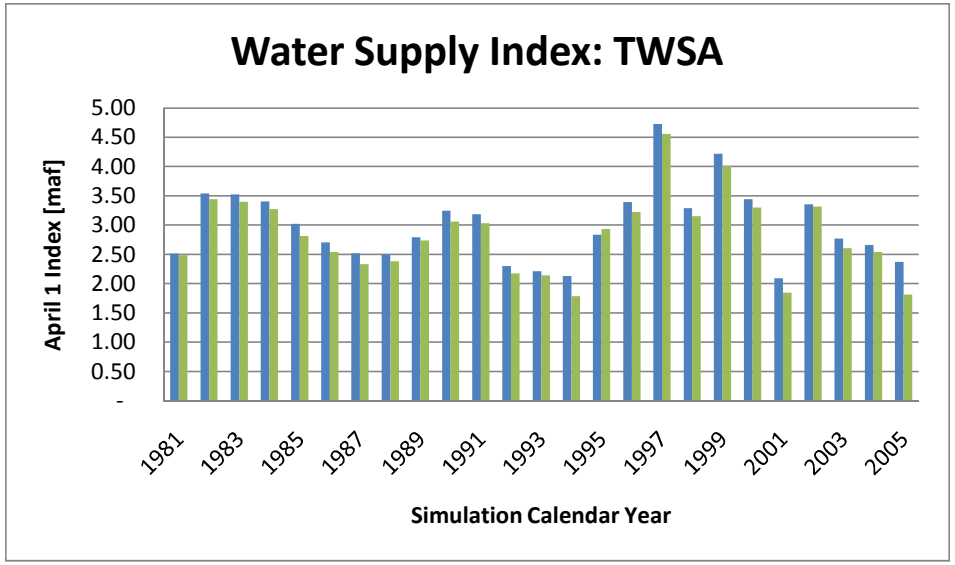

Kachess Reservoir
End of Month Storage
Storage [af]
300,000
200,000
100,000
0
-100,000
-200,000
-300,000
1981
1985
1990
1995
2000
2005
Calendar Year

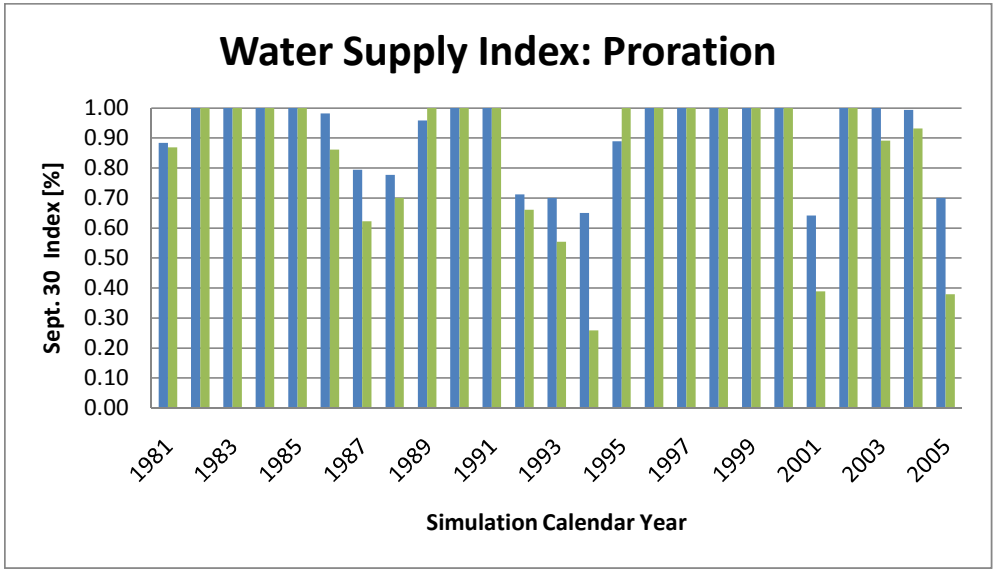

Keechelus Reservoir
End of Month Storage
Storage [af]
200,000
150,000
100,000
50,000
0
1981
1985
1990
1995
2000
2005
Calendar Year

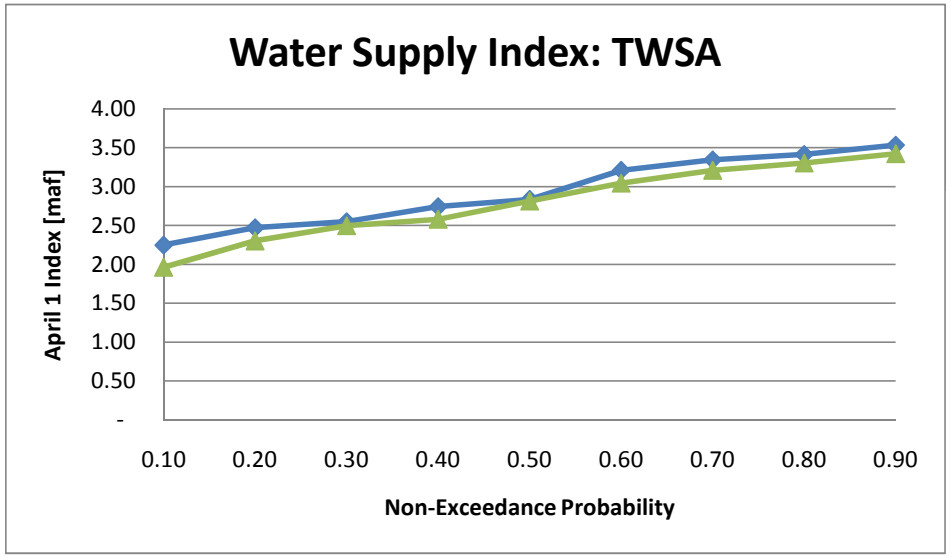

Rimrock Reservoir
End of Month Storage
Storage [af]
250,000
200,000
150,000
100,000
50,000
0
1981
1985
1990
1995
2000
2005
Calendar Year

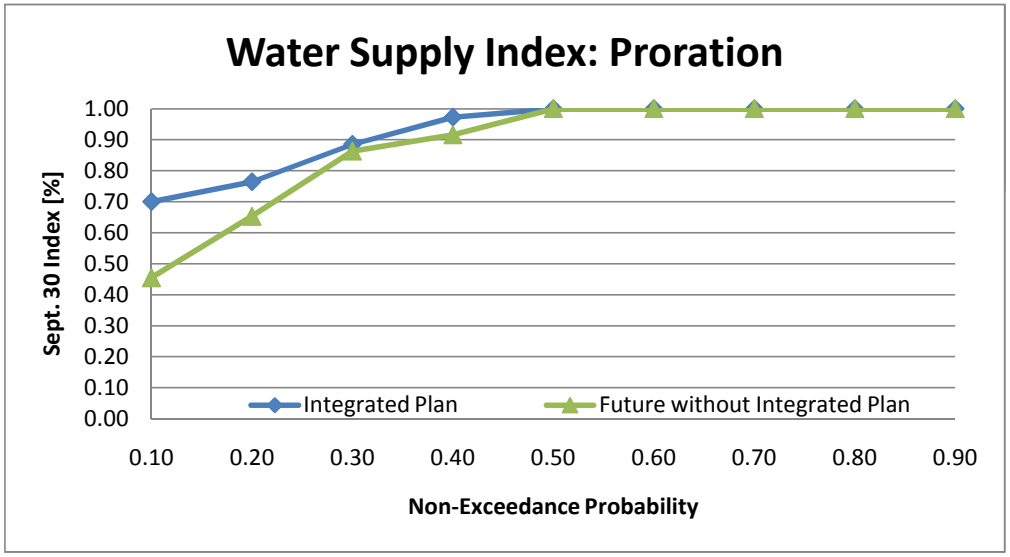

Wymer Reservoir
End of Month Storage
Integrated Plan
Future without Integrated Plan
Storage [af]
200,000
150,000
100,000
50,000
0
1981
1985
1990
1995
2000
2005
Calendar Year


All Reservoirs
End of Month Storage
Storage [af]
1,500,000
1,000,000
500,000
0
-500,000
1981
1985
1990
1995
2000
2005
Calendar Year

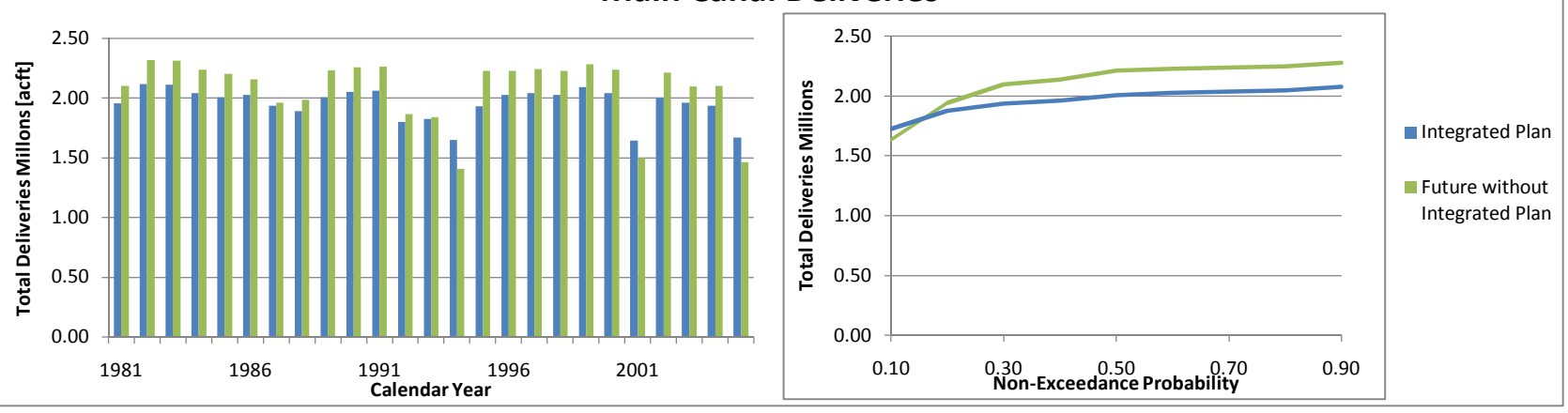

Water Supply Index: TWSA
April 1 Index [maf]
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
-
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Simulation Calendar Year


Water Supply Index: Proration
Sept. 30 Index [%]
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
Simulation Calendar Year

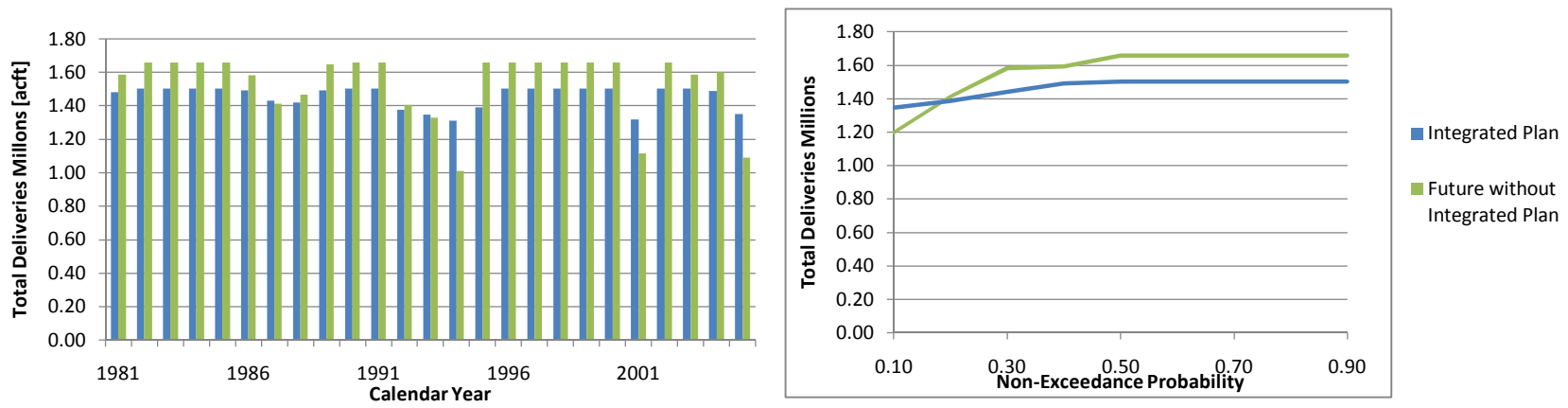

Water Supply Index: TWSA
April 1 Index [maf]
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
-
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability


Water Supply Index: Proration
Sept. 30 Index [%]
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Integrated Plan
Future without Integrated Plan
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
Non-Exceedance Probability

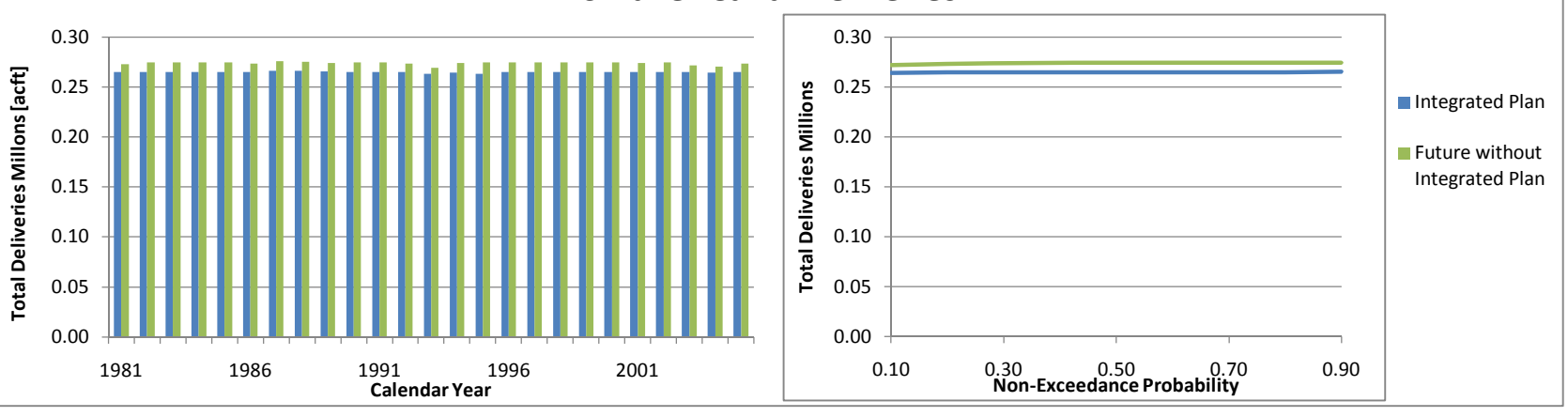
Main Canal Deliveries



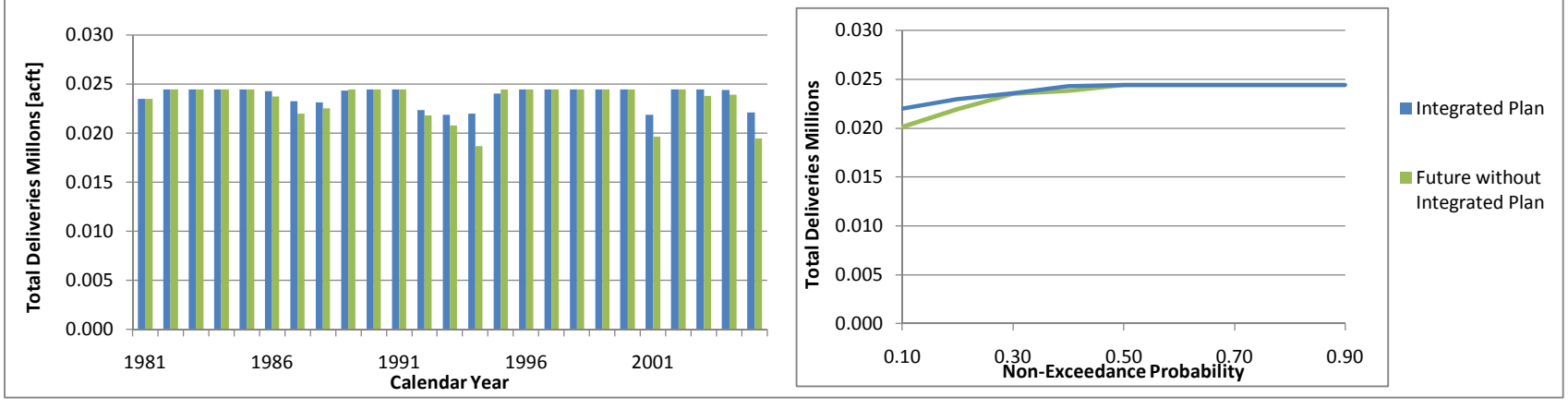
Sunnyside, KRD Irrigation, Roza Irrigation, New Reservation Canal, Tieton, and Kennewick Deliveries

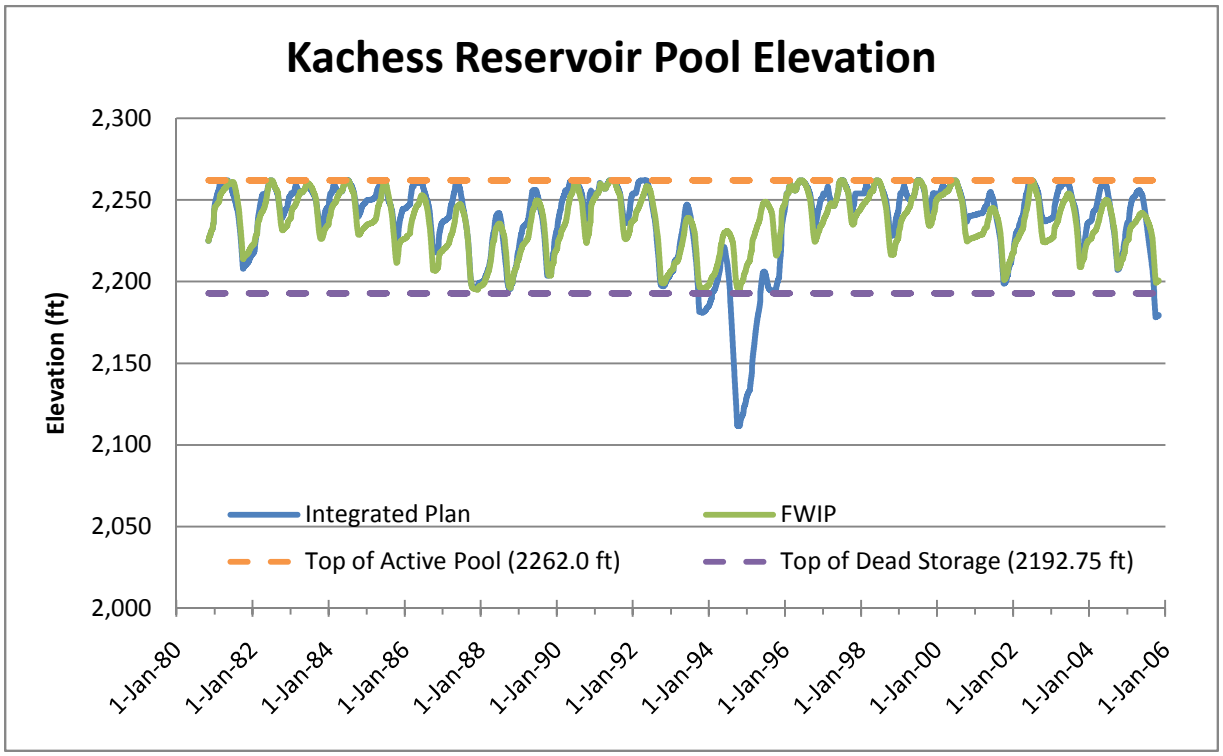


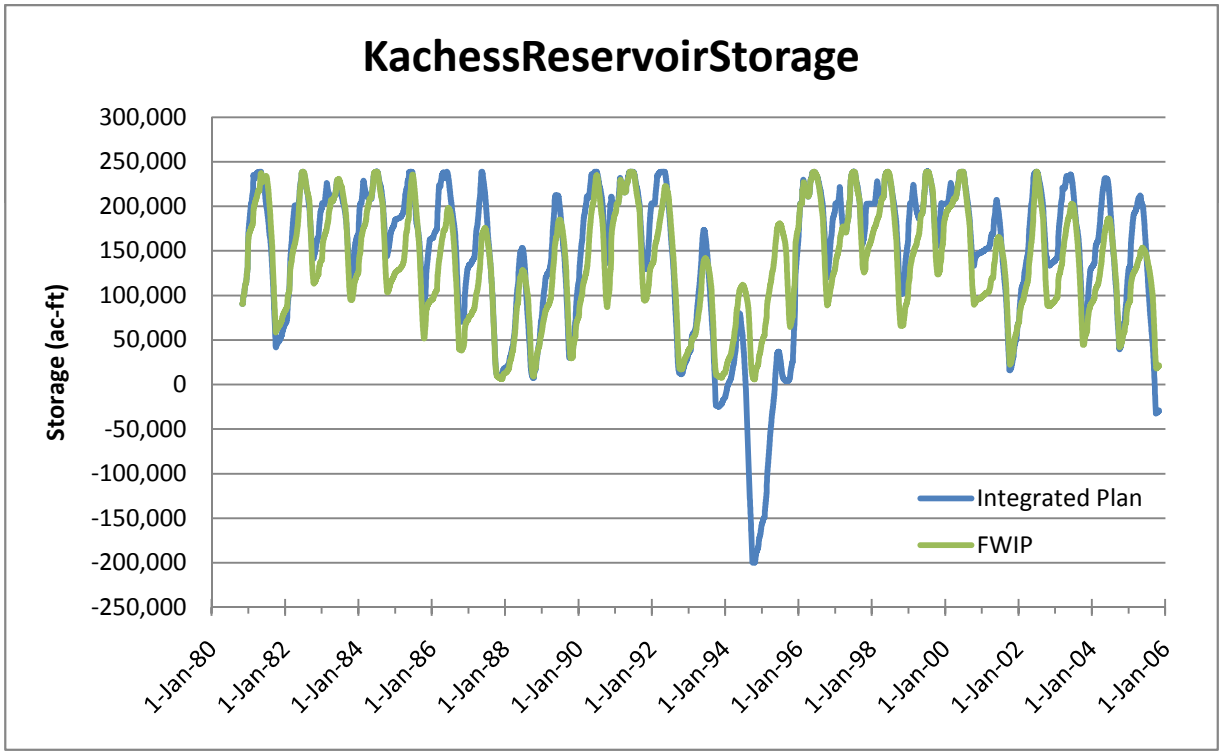
Smaller Canal Deliveries

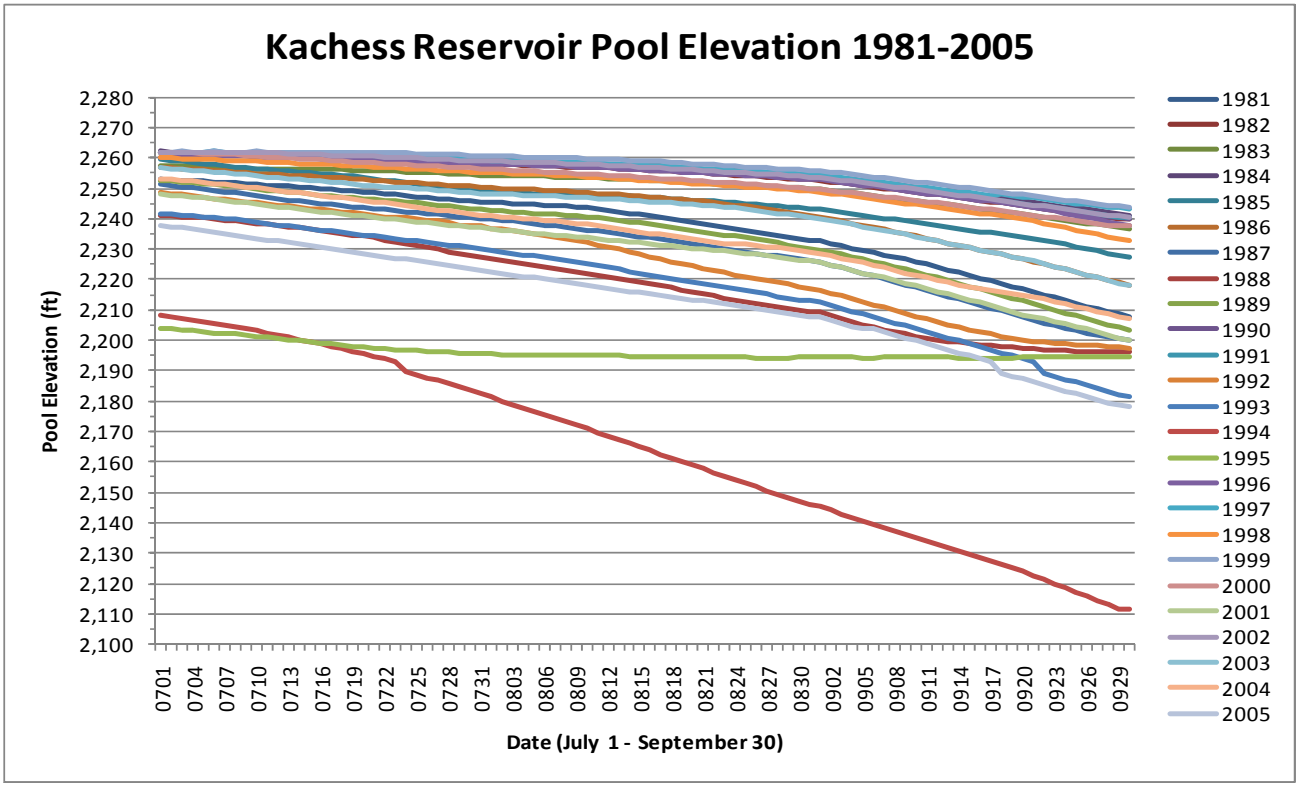


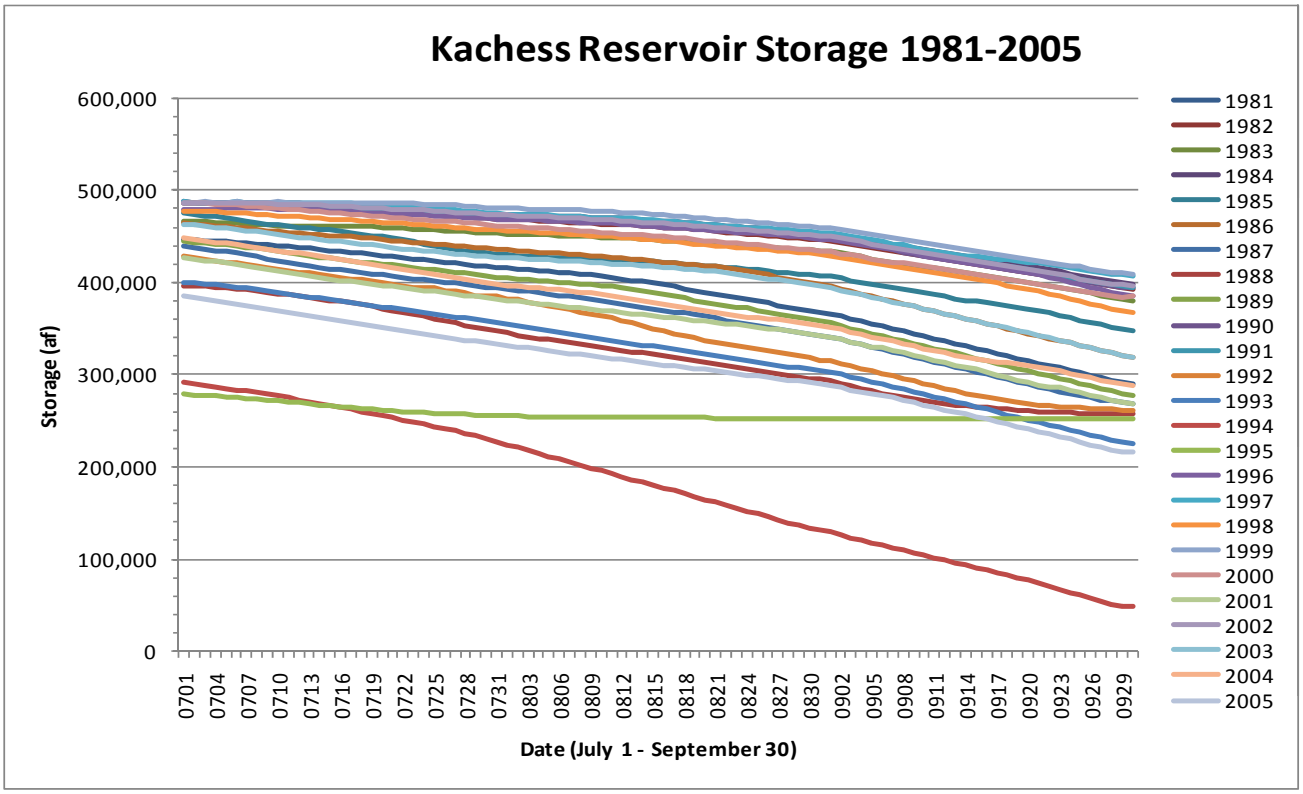
M&I Surface Water Deliveries

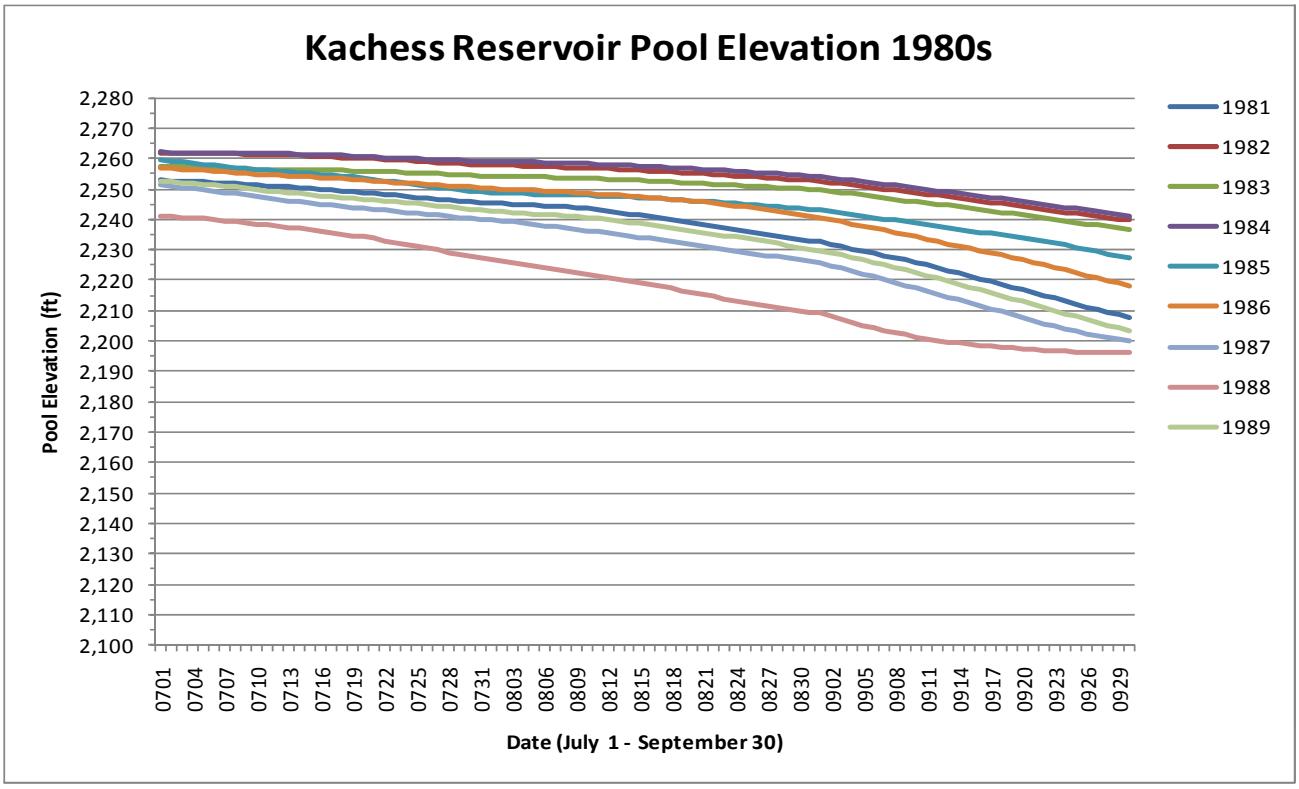


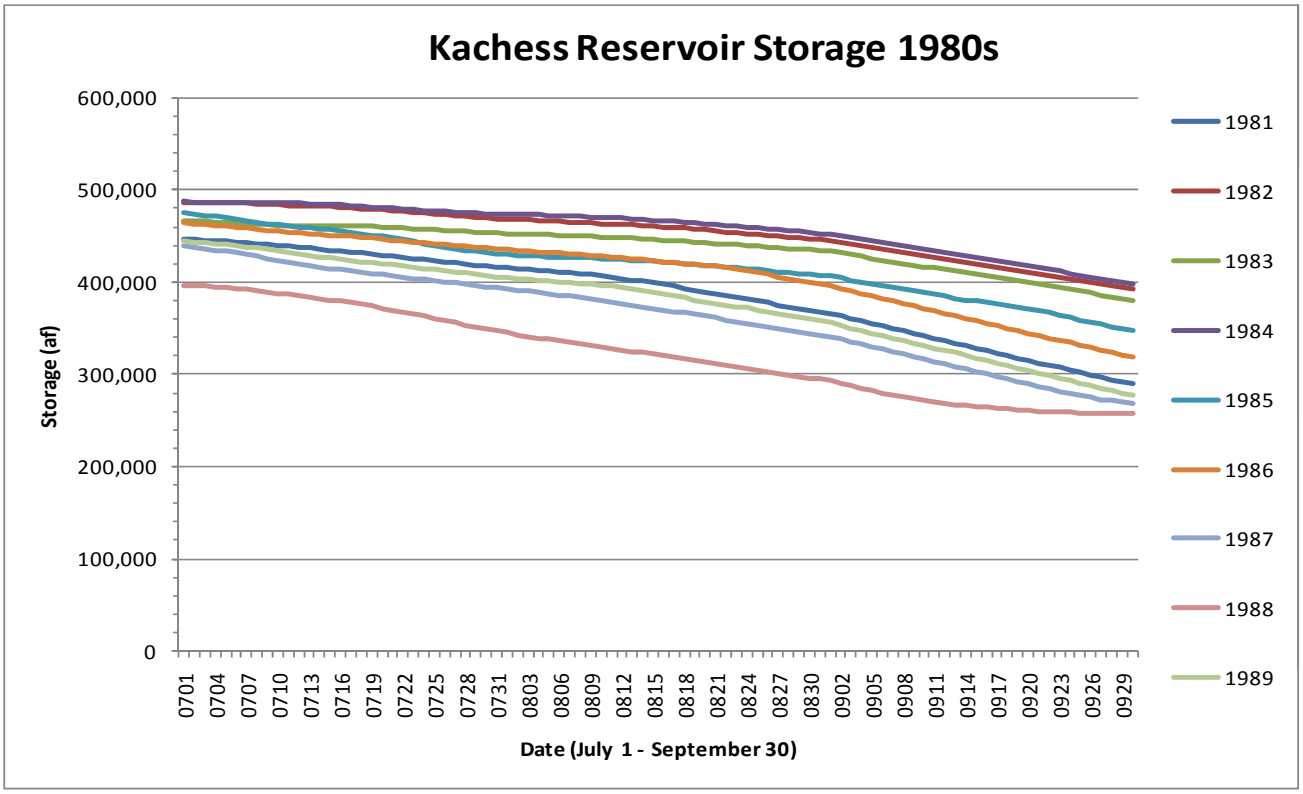

Kachess Reservoir Pool Elevation
Elevation (ft)
2,300
2,250
2,200
2,150
2,100
2,050
2,000
Integrated Plan
FWIP
Top of Active Pool (2262.0 ft)
Top of Dead Storage (2192.75 ft)
1-Jan-80
1-Jan-82
1-Jan-84
1-Jan-86
1-Jan-88
1-Jan-90
1-Jan-92
1-Jan-94
1-Jan-96
1-Jan-98
1-Jan-00
1-Jan-02
1-Jan-04
1-Jan-06

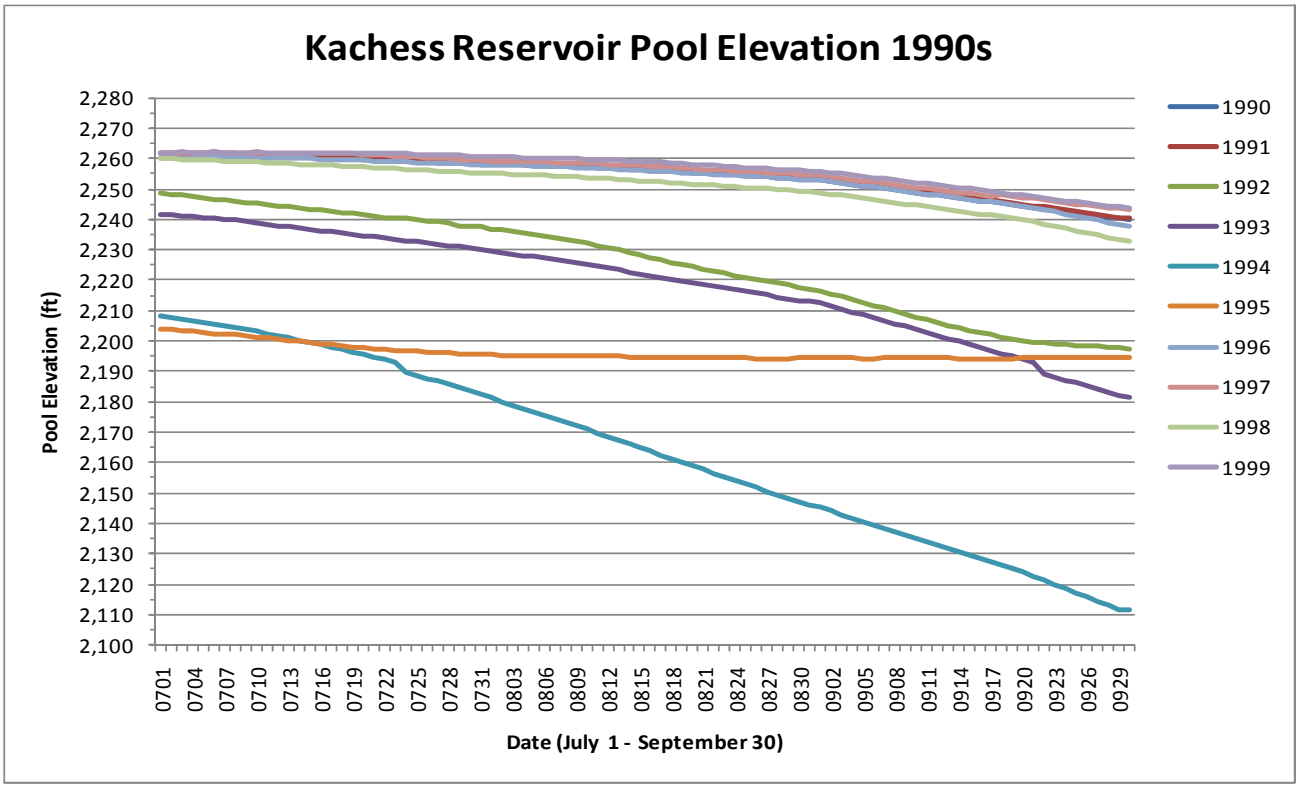

KachessReservoirStorage
Storage (ac-ft)
300,000
250,000
200,000
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
-250,000
Integrated Plan
FWIP
1-Jan-80
1-Jan-82
1-Jan-84
1-Jan-86
1-Jan-88
1-Jan-90
1-Jan-92
1-Jan-94
1-Jan-96
1-Jan-98
1-Jan-00
1-Jan-02
1-Jan-04
1-Jan-06

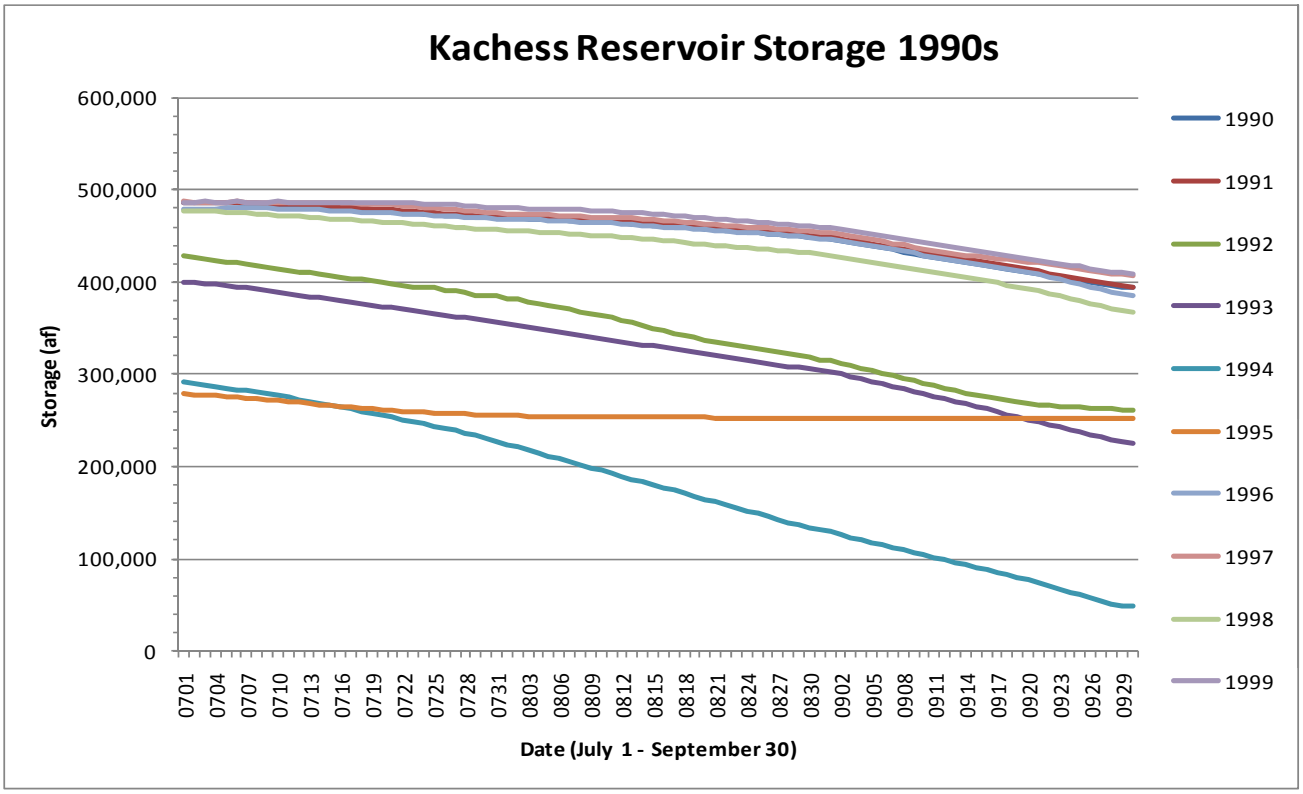

Kachess Reservoir Pool Elevation 1981-2005
Pool Elevation (ft)
2,280
2,270
2,260
2,250
2,240
2,230
2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140
2,130
2,120
2,110
2,100
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

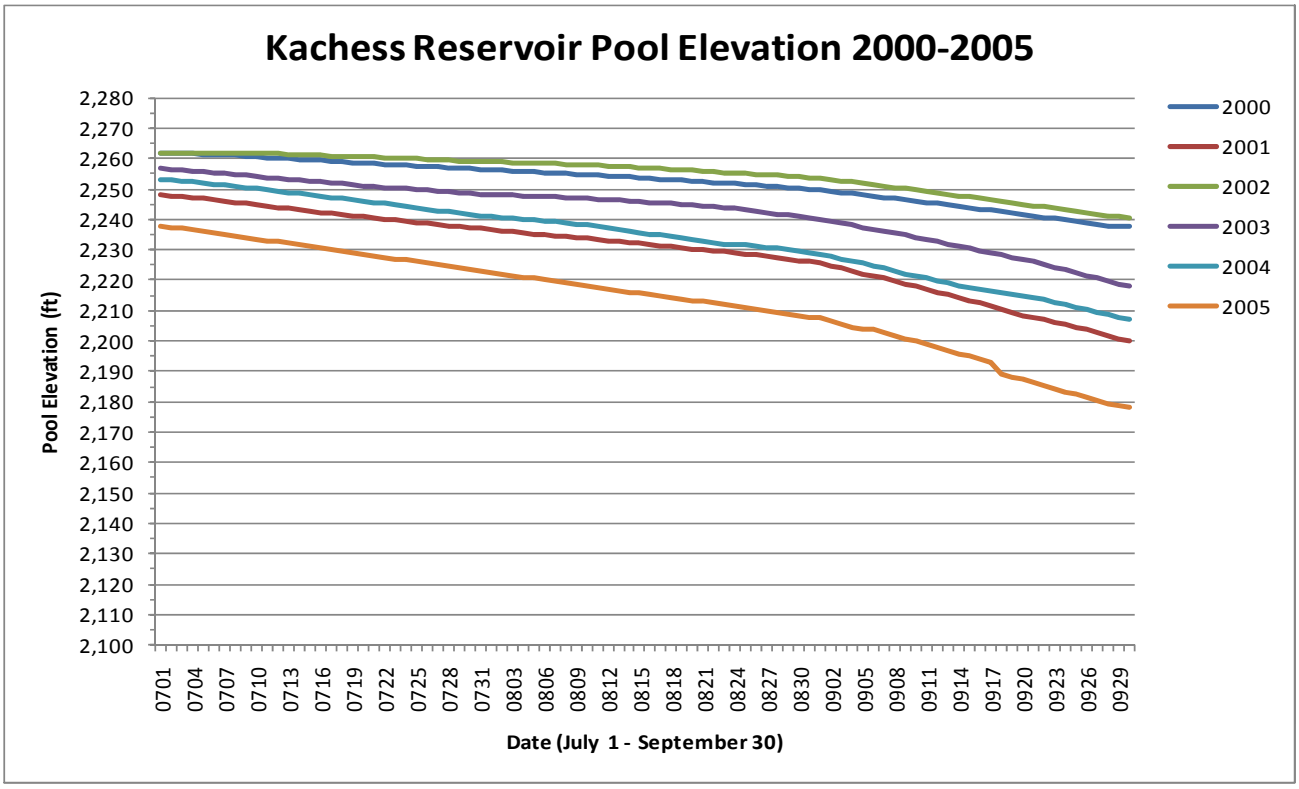

Kachess Reservoir Storage 1981-2005
Storage (af)
600,000
500,000
400,000
300,000
200,000
100,000
0
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005

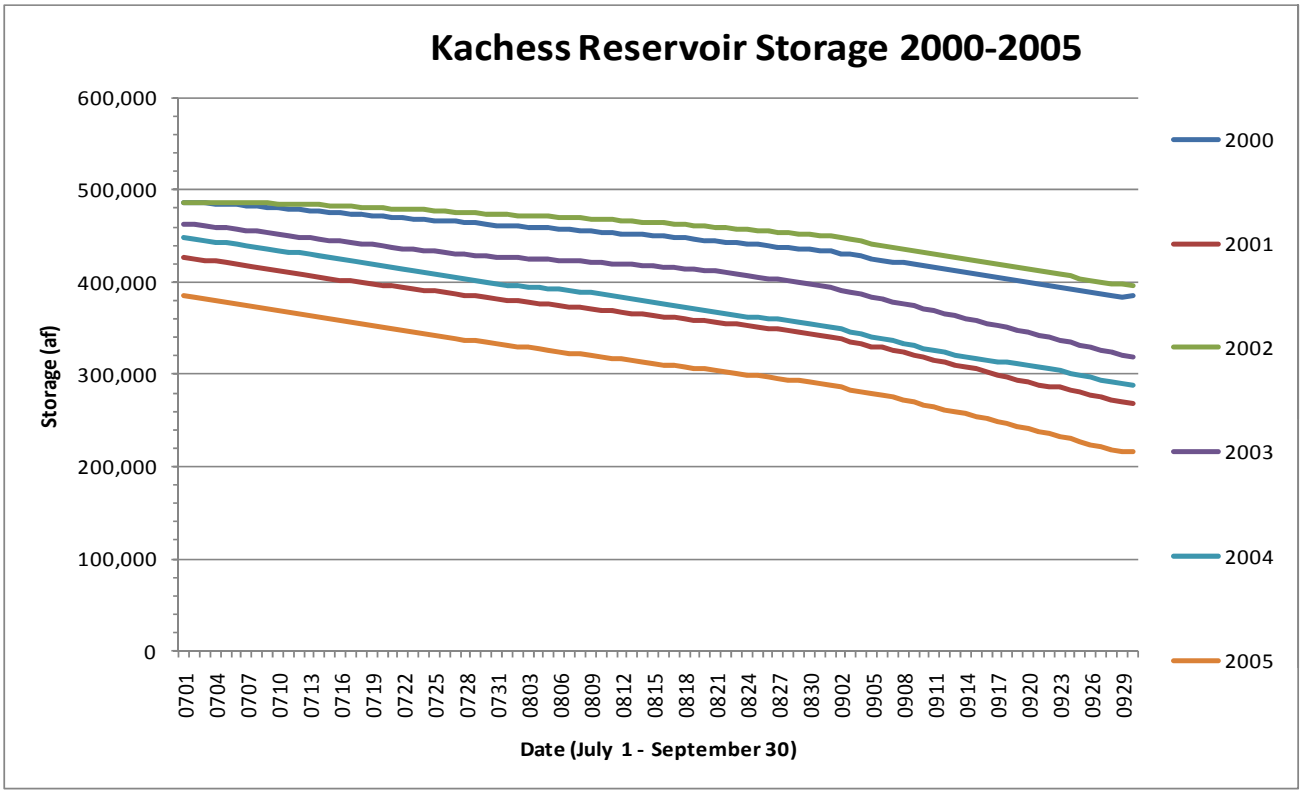

Kachess Reservoir Pool Elevation 1980s
Pool Elevation (ft)
2,280
2,270
2,260
2,250
2,240
2,230
2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140
2,130
2,120
2,110
2,100
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1981
1982
1983
1984
1985
1986
1987
1988
1989


Kachess Reservoir Storage 1980s
Storage (af)
600,000
500,000
400,000
300,000
200,000
100,000
0
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1981
1982
1983
1984
1985
1986
1987
1988
1989


Kachess Reservoir Pool Elevation 1990s
Pool Elevation (ft)
2,280
2,270
2,260
2,250
2,240
2,230
2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140
2,130
2,120
2,110
2,100
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


Kachess Reservoir Storage 1990s
Storage (af)
600,000
500,000
400,000
300,000
200,000
100,000
0
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999


Kachess Reservoir Pool Elevation 2000-2005
Pool Elevation (ft)
2,280
2,270
2,260
2,250
2,240
2,230
2,220
2,210
2,200
2,190
2,180
2,170
2,160
2,150
2,140
2,130
2,120
2,110
2,100
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
2000
2001
2002
2003
2004
2005


Kachess Reservoir Storage 2000-2005
Storage (af)
600,000
500,000
400,000
300,000
200,000
100,000
0
0701 0704 0707 0710 0713 0716 0719 0722 0725 0728 0731 0803 0806 0809 0812 0815 0818 0821 0824 0827 0830 0902 0905 0908 0911 0914 0917 0920 0923 0926 0929
Date (July 1 - September 30)
2000
2001
2002
2003
2004
2005